The President's Commission on Pension Policy
Coming of Age: Toward a National Retirement Income Policy
Appendix, Volume 3, 1981

EXTRAITS

CHAPTER 26: ESTIMATING THE EMPLOYMENT EFFECTS A MINIMUM UNIVERSAL PENSION SYSTEM

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I. INTRODUCTION

The President's Commission of Pension Policy (PCPP) has proposed the establishment of a Minimum Universal Pension System (MUPS) in the United States. As currently envisioned, a MUPS would mandate that employers provide pension plans for every worker who satisfies some general eligibility criteria (such as age and job tenure minimums) and exceeds some modest level of work effort (perhaps 500 hours worked per year). A MUPS would further require that all private pension plans provide each worker with some minimum level of coverage -- either expressed as a defined contribution or a defined benefit.

Besides increasing retirement incomes for workers now without pensions, MUPS could have a variety of other effects, including a reduction in employment in groups affected by the new policy, changes in prices and wages, and increased aggregate savings rates. In this paper, we explore the potential employment impacts of a MUPS. Information about employment impacts is crucial to the evaluation of MUPS because the employment decreases which might accompany a MUPS would be concentrated in precisely those groups it is designed to assist -- workers not currently participating in a private pension plan.

Two issues are significant:

- Impact of MUPS on labor costs -- by requiring employers to provide pensions for workers who previously had no private pension coverage or to increase contributions for currently covered workers, MUPS may increase employment costs. Although required contributions will raise pension costs, other components of the compensation package might be reduced when employers are required to provide pension coverage. For example, wages might increase more slowly, thus offsetting part or all of the impact on total employment costs. Thus, the degree to which pension costs are substituted for other labor costs will affect the overall impact of a MUPS on labor costs.

- Impact of MUPS on employment -- as labor costs rise, employers may respond by employing less labor and perhaps by substituting other factors of production for classes of labor that have become more expensive to employ. If MUPS causes an increase in labor costs, some firms may respond by reducing their work forces rather than shifting the full costs to workers through

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adjustments in the compensation package. Among smaller firms, however, there may be less flexibility to reduce the size of the workforce or substitute other factors of production without adverse effects on the business itself.

Below we present estimates of both these impacts in the short and the long run. These estimates are sensitive to the assumptions used in conducting the analysis. In addition, there is little consensus on some aspects of labor market behavior, knowledge of which is essential to the analysis. Nevertheless, we find that the aggregate employment impacts of the MUPS policies studied here are likely to be relatively small under most plausible sets of assumptions. Of course, a more generous MUPS policy than the ones examined here might have more significant effects.

The principal MUPS policy analyzed in this paper provides a 3 percent defined contribution plan to all presently uncovered workers who meet participation standards of 25 years of age, 1 year of service and 1,000 hours of annual work. We assume participants are vested after five years of service.1/ If the employers bear all of the costs of such a plan, we estimate that this policy in the short run could result in an aggregate loss of about 200,000 jobs, a 0.2 percent decrease in employment levels. In the long run, compensation adjustments could result in some pension costs being shifted backward onto workers through lower wage rates. If all of the increased pension costs are shifted backward onto workers, then no long run employment reduction occurs. Even if only part of the pension costs are shifted, we doubt that the employment decrease would exceed 50,000, a 0.1 percent decrease.

In spite of this relatively small impact, the Commission adopted several policies designed to offset potential employment and wage reduction effects.

The Commission proposed that the tax treatment of social security contributions and benefits be changed. Initially, this policy would lead to a reduction in payroll-related taxes paid by workers. For a worker in the 20% marginal tax bracket, the payroll-related tax reduction would equal 1.33% of covered pay.

Below we show that absent other offsetting policies, a MUPS would primarily affect costs for smaller employers. The Commission took this fact into account when they proposed that businesses be able to receive a tax credit of 46% of their contribution to a MUPS or an employee pension plan

1/ This version of a MUPS differs from the final recommendation of the PCPP which specified full and immediate vesting of all MUPS benefits. The cost of a MUPS including full and immediate vesting provisions would be approximately 32 percent greater than the MUPS with five year vesting analyzed here.

(up to the 3% of pay minimum standard). Businesses, therefore, would receive a reduction in taxes equal to 1.38% of pay. Other analyses prepared by ICF and Commission staff show this proposal to be targeted primarily at relieving small businesses of the costs of a MUPS.

These same analyses also suggested that in the initial years of such a program employers might face some cost difficulty since, according to the literature on similar programs, they might have to absorb most of the costs. The Commission, therefore, recommended in its final report that such a program be phased in over a three-year period.

The small employment effects estimated here and the Commission's tax and phase-in measures should alleviate the concerns about negative employment or wage reduction effects of the introduction of a MUPS. This chapter is included in this volume to explain the background work and analysis that eventually lead to the formulation of the Commission's final recommendations. The quantitative findings of this chapter should not, however, be utilized to estimate the impact of the Commission's final recommendations since the phase-in and tax proposals were not included in the analysis.

In the discussion below we first present some background material on existing private pension coverage. A second section describes the major components of the model and reviews the labor economics literature from which we choose key parameters for the model. A third section presents the results of the analysis. Finally we discuss the significance of these findings and some important caveats.

II. BACKGROUND

The PCPP staff initially defined several variants of the MUPS proposals for analysis. To simplify the exposition we will focus on a MUPS providing a 3 percent minimum defined contribution plan for all workers over age 25 with one year of service and 1,000 hours of annual work. In the empirical section of the paper we will show some comparative results for a 6 percent minimum defined contribution MUPS and a plan which would liberalize current ERISA minimum private pension standards. Under the liberalized ERISA plan employers not currently operating a pension plan would not be required to establish one.

As shown in Table 1, approximately one-third of all employees work in establishments with no pension plan at all. The remaining two-thirds work in establishments with a pension plan, but have varying degrees of coverage and benefits. MUPS will affect the entire group of workers without a plan. Also, depending upon the generosity of the MUPS plan, it will have different effects on the remaining workers.

As an initial estimate of the workers with plans more generous than MUPS, Table 1 indicates that approximately 35 million people work in establishments where the employer makes pension contributions in excess of 3 percent of

TABLE 1

EMPLOYEES IN ESTABLISHMENTS WITH PENSION PLANS, 1977[a/]
(In Millions)

Plans Contributing[b/]	Workers	% of Total
Less than 3 Percent of Payroll	10.7	16.0%
More than 3 Percent of Payroll	34.5	51.5%
Subtotal	45.2	67.5%
No Plan	21.8	32.5%
Total	67.0	100.0%

a/ Includes workers in the private nonfarm economy and excludes self-employed individuals.

b/ Not all employees may be eligible to participate in these plans.

SOURCE: Survey of Expenditures for Employee Compensation, 1977, Bureau of Labor Statistics.

payroll. Because some of these contributions are based upon plans with less generous participation and vesting rules than MUPS, some of these plans would still have to be changed to conform with MUPS standards. But, the sponsors could reduce the benefits in excess of the MUPS standard to meet the costs of complying with all aspects of MUPS.

Although it appears that 16 percent of the workforce would require higher pension contributions under a MUPS, the BLS data do not permit us to determine whether this is due to:

- low contribution rates for all workers; or
- higher contribution rates for only a small portion of pension participants in this group of workers.

As a result, a portion of this group may be ineligible for their employers' pension plan. In any event, these workers would be more heavily affected than the 35 million workers with more generous plans, but less heavily affected than the 22 million workers with no plans at all.

To evaluate the potential impact on the 21.8 million or more employees with no plan, we examined the characteristics of the establishments employing

these individuals. As illustrated in Table 2, more than three-fourths of these employees work in three industries -- manufacturing, retail trade, and services. The large number of nonparticipating employees in the retail trade and service industries is indicative of low rates of pension plan coverage in these sectors. The 16 percent of nonparticipants in the manufacturing industries is attributable more to the size of the sector in the overall economy than to particularly low rates of coverage there.

TABLE 2

EMPLOYEES IN ESTABLISHMENTS WITH NO PLANS, 1977
(In Millions)

Industry	Number	% of Total
Manufacturing	3.5	16.0%
Retail Trade	7.3	33.5
Services	5.9	27.1
Other	5.1	23.4
Total	21.8	100.0%

SOURCE: Survey of Expenditures for Employer Compensation, 1977, Bureau of Labor Statistics.

In addition, further analysis of the BLS survey suggests that the establishments without pension plans:

- pay lower wages -- establishments where the average wage was below $7 per hour in 1977 contained approximately 86 percent of the 21.8 million workers in establishments without plans.
- are small -- approximately 64 percent of these 21.8 million workers work in establishments with fewer than 50 employees, and almost 80 percent work in establishments with fewer than 100 employees.
- pay lower wages and are small -- approximately 11.9 million employees (55 percent of the 21.8 million employees in establishments without plans) work in establishments in which the average wage is less than $7 per hour and fewer than 50 workers are employed.

Household data from the May 1979 Current Population Survey (CPS)[1] reinforce the view about potential areas of impact identified above. This survey also suggests that the most heavily affected workers will be:

- younger workers -- approximately 19.2 million private wage and salary workers (27 percent of the total) were under age 25 in 1979; of this group, approximately 12.5 million or 17.5 percent of the total private workforce indicated that they were not members of a pension plan.

- part-time workers -- approximately 25 percent of the private workforce works part-time or full-time for less than a year; approximately 11.9 million of these workers, or 17 percent of the private workforce, indicated that they were not members of a pension plan.

This brief review of facts about present pension plan participation highlights the importance of analyzing employment impacts by wage level, size of establishment, and industrial sector. Our brief consideration of the BLS data on employee compensation also shows the difficulty in using data from surveys of establishments to examine effects on individual workers. To examine these effects, we rely primarily upon estimates from tabulations of the 1979 Current Population Survey.[2] When necessary, we supplement these CPS tabulations with information drawn from the BLS Survey of Expenditures for Employee Compensation (EEC Survey).

III. DESCRIPTION OF THE METHODOLOGY

The previous section described the importance of understanding current pension coverage in evaluating the impacts of a MUPS. This section describes the model used in this employment analysis and in so doing summarizes the key points from our survey of recent economic research regarding the shifting of labor costs and the impacts of labor cost changes on employment levels.

In general, the potential impact of a MUPS on the labor market will depend upon three factors:

- the size of the potential increase in labor costs caused by the MUPS,

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1/ Gayle Thompson Rogers, "Pension Coverage and Vesting Among Private Wage and Salary Workers, 1979: Preliminary Estimates from the 1979 Survey of Pension Plan Coverage," Working Paper No. 16, Social Security Administration, Office of Research and Statistics, Tables 3 and 4.

2/ For a full discussion of the ICF analyses of the 1979 Current Population Survey see Appendix B of "Background Analysis of the Potential Effects of a Minimum Universal Pension System", ICF Incorporated, April 1981.

- the extent to which an increase in pension contributions by employers is offset by a reduction in wages or other employee benefits (often referred to as "backward shifting onto labor" or "substitution within the compensation package"), and

- the impact on employment of any increase in labor costs borne by the employer.

Below we discuss each of these factors in turn. A brief summary of the literature in these areas is presented in Appendix I.

A. Estimation of Potential Labor Cost Increases[1/]

ICF analyses of the 1979 Current Population Survey provide percentages of workers not currently participating in a pension plan who would be included in a plan under a 3 percent defined contribution MUPS with eligibility standards of 25 years of age, 1 year of service on the job and 1,000 hours worked annually.[2/] Table 3 summarizes the results of this detailed analysis. These figures provide the starting point for our cost analysis.

To these figures we apply information about the average wage of all workers of a particular job class, the average wage of workers who would receive pension coverage through a MUPS, and the fraction of compensation received in the form of fringe benefits. The first two items are estimated from CPS data at the same time the eligibility distributions are constructed. The last item is estimated for each industry/establishment size cell from BLS Expenditures for Employee Compensation data. The percentage change in labor costs for these workers is simply the ratio of the increase in pension costs for any particular class of workers to the initial compensation levels.[3/]

1/ We label these changes in labor costs potential because we recognize that other items of compensation may change to offset some of these increased pension costs.

2/ These are workers who are answered no to either of the following questions: (1) "Excluding Social Security, Railroad Retirement, or Veteran's Pensions, does your employer or union have a pension or other retirement for any of its employees?" or (2) "Are you included in such a plan?"

3/ Algebraically we have $dC_i/C_i = (.03)(1-f_i)(m_i V_i)/W_i$ where C_i is compensation, f_i is the fraction of compensation received in fringe benefits, m_i is the fraction of workers gaining pension coverage due to MUPS, V_i is the average wage of newly covered workers, W_i is the average wage of all workers and i denotes a particular worker class.

TABLE 3

PERCENT OF WORKERS PARTICIPATING IN PRIVATE PENSION PLANS BEFORE AND AFTER A MUPS BY INDUSTRY AND ESTABLISHMENT SIZE[1]

	Total Employment (in millions)	Percent Currently Participating	Percent Participating with MUPS[2]
Industry			
Mining	0.8	70.6	81.0
Construction	4.6	36.8	62.0
Manufacturing	21.0	66.1	81.9
Transportation	5.1	66.3	84.4
Retail Trade	17.6	29.2	53.1
Finance	4.8	49.9	71.3
Services	15.4	29.8	58.0
Local Government	12.3	77.2	84.8
Federal Government	3.1	86.7	91.3
Other	1.6	13.3	46.8
Establishment Size			
Less than 25	33.1	29.2	56.3
25 to 99	20.2	53.0	71.5
100 to 499	16.8	65.7	81.4
More than 499	15.9	85.4	93.6
Total	86.1	52.3	71.6

SOURCE: Current Population Survey, May 1979 and ICF analyses.

1/ Includes all workers in the civilian economy but excludes self-employed individuals.

2/ Assumes participation for MUPS benefits at age 25, 1 year of service and 1,000 hours of annual work.

One difficulty with this approach is the exclusion of workers currently participating in a pension plan but benefiting from contributions (either directly or implied in terms of future benefits accruing in a defined benefit plan) below the 3 percent minimum. Although our examination of available data files suggests few workers receive contributions below a 3 percent rate, no accurate data exists with which to assess the actual size of this population.

Instead we compare information about the percent of workers employed by establishments with plans but not participating in these plans from the CPS survey with BLS data from the EEC survey on pension contribution rates. If we assume that the rate of coverage is constant across all establishments, we can estimate the number of establishments below the MUPS minimum and the amount of increased pension contributions required to raise them above the minimum.

For example, in a firm in which average pension contributions were reported to be 1 percent of payroll expenses, we would assume that 84 percent of employees were participating in the pension plan (the CPS average rate of participation in firms with plans). Thus we adjust the effective contribution rate for participating employees only to 1.2 percent. We then estimate the MUPS-induced expenses for participating employees to be an additional 1.8 percent of payroll expenses.[1/]

The costs shown in Table 4 include both the costs of covering initially non-participating workers and of increasing contributions for other workers. Of the aggregate cost increase of $6.83 billion,[2/] only 12.8 percent is attributable to workers currently participating in a plan below MUPS minimum levels.

B. Substitution of Pension Contributions for Wages and Other Fringes

The extent to which pensions are substitutable for wages and other fringe benefits within the compensation package is the key question in the analysis of MUPS employment effects. The literature on this subject consists of only a

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1/ Note that if, as is likely, participation rates are lower than 84 percent in firms contributing below the 3 percent MUPS floor, this procedure overestimates costs for participating workers. This overestimate occurs because participating workers actually would be receiving contribution of a rate higher than our imputed value. Since we obtain our estimate of costs for non-participating workers from CPS sources, these estimates remain unaffected. This overestimate probably has little effect on our aggregate analysis because costs for participating employees comprise such a small portion of total MUPS costs.

2/ This cost figure differs slightly from those shown in Table 25 of "Background Analysis of the Potential Effects of a Minimum Universal Pension System", ICF Incorporated, April 1981. Costs for a fully implemented MUPS shown in Table 25 are presented in 1984 dollars and include self-employed workers. In addition, MUPS policies in that table include provisions for full and immediate vesting.

TABLE 4

POTENTIAL LABOR COST CHANGES DUE TO A MUPS
BY INDUSTRY AND ESTABLISHMENT SIZE

	Increase in Pension Costs 1/ (Million $)	Percent Increase in Labor Costs
Industry		
Mining	39	0.20
Construction	569	0.70
Manufacturing	1,637	0.41
Transportation	481	0.45
Retail Trade	1,602	0.80
Finance	420	0.52
Services	1,607	0.84
Local Government	286	0.16
Federal Government	52	0.08
Other	137	0.98
Establishment Size		
Less than 25	3,372	0.82
25 to 99	1,442	0.48
100 to 499	1,263	0.44
More than 499	753	0.22
Total	6,830	0.51

1/ In millions of 1978 dollars.

very few studies.[1] The consensus of these studies is that it is not possible to reject the hypothesis that wages and pensions are fully substitutable within the total compensation package. This finding is consistent with a body of research on the ultimate incidence of the Social Security payroll tax.[2] Thus this research suggests that there would be little, if any, increase in total labor costs as a result of a MUPS in the long run. There would however be potentially important alterations in the composition of the compensation package.

The sparse literature on substitution within the compensation package is not unanimous in this conclusion. Careful policy analysis requires the consideration of alternative assumptions regarding the shifting of MUPS costs from employers to workers. Another group of labor market analyses provides a convenient alternative assumption about compensation substitution. These are certain studies of the incidence of the Social Security payroll tax.

Although these incidence studies do not agree on the proportion of the employer's share of the payroll tax which is shifted backward onto labor through lower wage rates, some recent, careful studies have arrived at estimates in the neighborhood of 40 percent.[3] That is, 40 percent of the employer's share of the payroll tax 40 percent is "paid" by labor in the form of lower wages. We will use this finding of a 40 percent shifting of the payroll tax as an alternative assumption for long run compensation substitution in the analysis below.[4]

There has been no direct study of the question of how long it takes for the compensation package to adjust to changes in required pension contributions. However studies of the incidences of the payroll tax suggest that a substantial part of the adjustment occurs within a reasonably short period of time (approximately a year).

1/ Ronald Ehrenberg and Robert Smith (1980), Ronald Ehrenberg (1980), Robert Smith (1979), Robert Inman (1980), Bradley Schiller and Randall Weiss (1979) and William Oakland (1980).

2/ John Brittain (1971), Wayne Vroman (1974a).

3/ Wayne Vroman (1974b) and Daniel Hamermesh (1979).

4/ If we assume that 40 percent of the increased labor costs is offset by lower wages in the long run, then the employer will bear less than 60 percent of the increased costs. Supplemental payments, such as employee benefits tied directly to wages and unemployment compensation payments, will decrease along with wages. Probably 50 percent of the cost increase will persist in the long run and 10 percent of labor cost increase will be absorbed in decreases in these supplemental expenses.

C. Employer Response to Higher Labor Costs

There has been a substantial amount of research on the impact of increased labor costs on the level and distribution of employment. Economists often summarize this impact in a parameter called the wage elasticity of demand which shows the percentage change in employment which results from a one percent change in compensation costs. For example, if a one percent increase in compensation would result in a three-tenths of one percent decrease in employment, then the wage elasticity would be -0.3. Below we divide our discussion of these studies into those which analyze short run impacts and those which analyze long run impacts. By short run we mean a time period in which employers are not able to alter production methods or the composition of their compensation package. This might be from one to several years.

An excellent review of short run studies of the wage elasticity of demand[1/] concludes that a 10 percent increase in labor costs causes a 3 percent decrease in employment. However the variation in published estimates is consistent with actual adjustment which might range from 1 percent to 6 percent for each 10 percent increase in labor costs.

In the long run the wage elasticity depends on the share of total compensation which accrues to labor and the ease with which employers can substitute capital inputs for labor inputs. There has been considerable controversy among economists on the substitutability of capital for labor in production. Complicating our problem even further is our need for elasticities differentiated by industry. (These industry-specific elasticities are not available in the short run.) Reasonable estimates are available for some industries.[2/] Through analysis of labor share figures derived from the National Input-Output model, we have chosen wage elasticities for the other industries included in our simulation.[3/] Below we show the results are not sensitive to the values of these elasticities.

In the short run we use the wage elasticity of demand to translate the labor cost figures of Table 5 into employment decreases. We assume (1) no offsetting adjustments in the compensation package occur and (2) the quantity of labor supplied remains fixed at its initial levels even as unemployment develops.

In the long run neither of these conditions holds. Instead we incorporate various degrees of substitution within the compensation package into the analysis. Also we allow decreases in the quantity of labor supplied to affect

1/ Daniel Hamermesh (1976).

2/ Manufacturing (Berndt (1976)), retail trade (Cotterill (1975)), and government (Ashenfelter and Ehrenberg (1975)).

3/ Survey of Current Business, April 1979.

the final level of employment. (See Appendix II for a discussion of the economics of this interaction between the supply and demand for labor. There we derive the formula used to estimate the long run employment change.) Labor supply effects are incorporated into the analysis through a parameter analogous to the wage elasticity of demand -- a wage elasticity of supply. We employ a value of .3 for the wage elasticity of supply throughout the analysis.1/

The industrially-disaggregated long run wage elasticities of demand used in the analysis are as follows:

Mining	-0.20
Construction	-0.25
Manufacturing	-0.38
Transportation	-0.58
Retail Trade	-0.65
Finance	-0.70
Services	-0.70
Local Government	-0.70
Federal Government	-0.70
Other	-0.50

IV. ESTIMATED EMPLOYMENT EFFECTS

In this section we present estimates of the employment effects of a MUPS. Our general procedure is as follows. First we discuss the short run effects on employment of a MUPS. We analyze the short run first since it contains the maximum MUPS impact on the economy. Even in the short run we find only a small employment decrease. Second when we contrast the short run and long run results, we find considerably smaller employment declines. Next we present a number of sensitivity analyses to acquaint the reader with the role the chosen parameters play in affecting the final results. A third section presents analyses of the sensitivity of our results to changes in the behavioral assumptions underlying the model. A fourth section analyzes the impacts of changes in the specification of the MUPS itself. Fifth and finally, we examine a few special sectors of the economy where impacts are expected to be differentially large.

1/ Most of analysts studying the behavior of prime age male workers have concluded thair supply function is highly inelastic with respect to wages. Studies of female and of younger and older male supply finds more responsiveness to wage rates. Many of the better studies of this topic are collected in Glen Cain and Harold Watts (1973).

A. Short Run Results

In the short run (approximately a year from MUPS implementation), the economy would absorb the maximum employment effects of a MUPS. Table 5 shows that even these maximum effects would be quite small when viewed relative to the size of the aggregate labor force. We estimate that about 160,000 jobs would be lost in the short run due to a MUPS. This represents a 0.2 percent decrease in employment levels. This estimated decrease is only slightly greater than the margin for error inherent in the BLS estimates of the employment levels themselves.

Even though we estimate that the effect of a MUPS on employment is likely to be small, we still consider it useful to consider the relative impacts throughout the economy. Even a small employment effect, if concentrated in particular sectors, could result in a severe dislocation. Table 5 shows estimates of MUPS impacts on establishments by size, workers by wage level, and the economy by industrial sector.

Small establishments are affected more severely by a MUPS than large establishments. We estimate that over half of the jobs lost would be in establishments employing less than 25 workers. These small establishments account for only 38 percent of total employment. The proportionately greater impact on these establishments reflects their much lower rate of pension coverage (only 29 percent of their workers participate in plans as shown in Table 3). The impacts of a MUPS decrease as establishment size grows. Large establishments, in which over 85 percent of workers are already covered by plans, would scarcely be affected at all. For these establishments the percentage change in employment levels would only be 0.1 percent.

Low wage workers would be more likely to lose their jobs than high wage workers. Again this reflects the increasing probability of pre-MUPS pension coverage as wages grow. About a quarter of one percent of workers making less $4 per hour (in 1978 dollars) would lose their jobs. This is a total of about 60,000 workers, roughly 40 percent of the total MUPS-induced employment loss.

Perhaps the most interesting disaggregate analysis of the MUPS impact is by industrial sector. Of the total job loss of 160,000, about 54 percent, 87,000 jobs, are lost in the trade and service sectors. Despite the disproportionate impact, these two sectors maintain lower rates of pension coverage after the imposition of a MUPS than any of industrial sector except the "other" category, which comprises mainly agricultural activities. The next largest employment decrease, 33,000 jobs, is in the manufacturing sector. The relative size of this loss is indicative more of the size of the manufacturing sector within the economy than the size of the MUPS impact. The percentage change in employment levels in the manufacturing sector is only 0.16 percent, less than the economy-wide average of 0.19 percent.

TABLE 5

SHORT RUN EFFECTS OF A 3 PERCENT DEFINED CONTRIBUTION MUPS ON EMPLOYMENT BY ESTABLISHMENT SIZE, WAGE RATE AND INDUSTRIAL SECTOR

	Percent Decline in Employment	Jobs Lost	
		Number (In Thousands)	Percent (Of Total Jobs Lost)
I. Establishment Size (Number of Employees)			
Less than 25	.26%	87	54%
25-99	.17%	34	21%
100-499	.16%	27	17%
500 or more	.08%	13	8%
II. Hourly Wage Rate			
Less than $4	.23%	61	38%
$4-$7	.18%	58	36%
$7 or more	.15%	42	26%
III. Industrial Sector			
Mining	.08%	1	0.4%
Construction	.24%	11	6.8%
Manufacturing	.16%	33	20.8%
Transportation	.16%	8	5.0%
Trade	.25%	45	27.8%
Finance	.16%	8	4.9%
Service	.27%	42	26.3%
Local Government	.06%	7	4.4%
Federal Government	.04%	1	0.7%
Other	.30%	5	3.0%
IV. Total	.19%	161	100.0%

Throughout this paper we concentrate on MUPS effects on employment, not unemployment levels. We cannot determine exactly how these employment declines will affect unemployment rates without knowing how many of the displaced workers withdraw from the labor force entirely or how many new labor force entrants might be stimulated by the increasing unemployment rate. Assuming an unemployment rate of 6.0 percent, the average prevailing in 1978, and assuming the employment decline of Table 5 is directly translated into an unemployment increase, then unemployment levels rise 161,000. This corresponds to an increase of .16 percentage points, a 2.7 percent rise in the unemployment rate.

B. Long Run Results

The short run analysis assumes that markets do not adjust to the imposition of a MUPS, except by allowing employers to decrease output and therefore employment levels. In the long run, employers and employees bargain over employment and wage levels. The process will result in a shifting in some of the burden of the added MUPS costs to workers through lower wage rates. In order to model the resultant market equilibrium we require knowledge about the behavior of workers as well as the behavior of employers.1/

The results shown in Table 6 show a range of possible outcomes. As discussed above, we are unsure about the final apportionment of the MUPS costs between labor and capital. If all of the increased MUPS costs are ultimately offset by wage (and other employee benefit) declines, then there is no long run increase in labor costs an therefore no change in employment levels. Although this case is not depicted in Table 6--it would consist merely of a column of zeros--it should be considered just as possible an outcome as the two alternative shifting assumptions shown there.2/

Table 6 shows that the already small short run effect is even smaller in the long run. If wage decreases offset 40 percent of the MUPS cost, about 50,000 jobs would be lost in the long run--a 0.1 percent decrease in employment levels. If shifting is more substantial, say 60 percent, then only about 25,000 jobs are lost.

1/ Appendix II discusses the process of market adjustment in more detail.

2/ We assume that a 40 percent decline in wages reduces employer labor costs 50 percent and a 60 percent decline reduces labor costs 75 percent. The difference between the wage decrease and employer labor costs are accounted for by changes in employer benefits and supplemental labor costs, such as unemployment insurance.

TABLE 6

LONG RUN EFFECTS OF A 3 PERCENT DEFINED CONTRIBUTION MUPS ON EMPLOYMENT BY ESTABLISHMENT SIZE AND INDUSTRIAL SECTOR, FOR TWO ASSUMPTIONS ON SHIFTING OF MUPS COSTS TO WORKERS

	Percent of MUPS Costs Shifted to Workers					
	40 Percent Wage Decrease			60 Percent Wage Decrease		
	Percent Decline in Employment	Jobs Lost (Thousands)	Jobs Lost Percent	Percent Decline in Employment	Jobs Lost (Thousands)	Jobs Lost Percent
I. Establishment Size (Number of Employees)						
Less than 25	.08%	27	55%	.04%	16	55%
25 to 99	.05%	10	21%	.02%	6	21%
100 to 499	.05%	8	16%	.02%	5	16%
500 or more	.02%	4	8%	.01%	2	8%
II. Industrial Sector						
Mining	.01%	a	b	.01%	a	b
Construction	.05%	2	5%	.03%	1	5%
Manufacturing	.04%	9	18%	.02%	4	18%
Transportation	.05%	2	5%	.02%	1	5%
Trade	.08%	14	30%	.04%	7	29%
Finance	.05%	3	5%	.03%	1	5%
Service	.09%	14	29%	.05%	7	29%
Local Government	.02%	2	5%	.01%	1	5%
Federal Government	.01%	a	1%	.01%	a	1%
Other	.09%	1	3%	.04%	1	3%
III. Total	.06%	49	100%	.03%	24	100%

a Less than 500 jobs

b Less than 0.5 percent

The pattern of this job loss is identical across establishment sizes and industrial sectors under all shifting assumptions. In either case a majority of the job loss occurs in small firms (those employing less than 25 workers). The trade and service sectors each account for about 30 percent of the jobs that are lost. Another 18 percent are lost in the manufacturing sector. In comparison to the short run results, the relative employment decreases are greater in the trade and service sectors in the long run.

The long run changes in wage levels have other implications besides the mitigation of the employment declines. Foremost among these implications is a decrease in current disposable incomes. Table 7 shows that the current disposable income decline could be as much as 4 billion dollars. The decline in disposable income is less than the total cost of MUPS shown in Table 4 because fringe benefits absorb some of the decreased compensation occurring during the shift and because declines in payroll, corporate income and personal income taxes absorb some of the shift. The last column of Table 7 shows the magnitude of the personal income tax losses which vary from 300 to 700 million dollars depending on the assumed degree of shifting.

TABLE 7

LONG RUN DECREASES IN CURRENT DISPOSABLE
INCOMES AND PERSONAL INCOME TAX REVENUES RESULTING
FROM A 3 PERCENT DEFINED CONTRIBUTION MUPS
(In Millions of Dollars)

Percent Wage Decrease	Current Disposable Incomes Decreases	Percentage Change in Disposable Income	Tax Revenue Decreases
40 Percent	1,977	-0.23	375
60 Percent	2,996	-0.34	541
100 Percent	3,954	-0.46	707

C. Sensitivity Analyses-Labor Demand and Supply Parameters

The results reported above are relatively insensitive to changes in the behavioral parameters used in the simulations. The short and long run employment decreases remain small whatever plausible values of these parameters are assumed. Above, we described the variation in results which accompany variation of our assumed shifting parameter over the range of 40 to 100 percent. In this subsection, we briefly present similar comparisons of results produced as the assumed wage elasticity of demand for labor values vary.

Table 8 shows the aggregate decline and percentage change in employment which occurs as the short run demand elasticity, the long run demand elasticity, and the long run supply elasticity vary over plausible ranges. In

TABLE 8

COMPARISON OF TOTAL EMPLOYMENT DECREASES
RESULTING FROM A 3 PERCENT DEFINED
CONTRIBUTION MUPS ACROSS ELASTICITY ASSUMPTIONS

	Number (In Thousands)	Percentage Decrease
Short Run Demand Elasticity		
Low (-.09)	45	0.05%
Medium (-.32)	161	0.19%
High (-.62)	312	0.36%
Long Run Demand Elasticity[a/]		
Low	21	0.03%
Medium	29	0.03%
High	35	0.04%
Long Run Supply Elasticity[b/]		
Low (.10)	13	0.01%
Medium (.30)	29	0.03%
High (.50)	40	0.05%

a/ Assumes 70 percent of increased pension costs are shifted backward onto workers. See page 16 for a listing of the exact values by industrial sector for the medium elasticity case. The low values equal one-half the medium and the high values all equal -1.0

b/ Assumes 70 percent of increased pension costs are shifted backward onto workers and the medium set of long run demand elasticities.

the short run case, we vary the demand elasticity from -.09 to -.62 in accordance with the range suggested by Hamermesh.1/ Although the results vary directly with these elasticity values, the absolute employment decline remains relatively small even in the high elasticity case.

In the long run, both the supply and demand elasticity affect the results. For purposes of these sensitivity tests, we used elasticities equal to one-half of those values shown on page 16 for our low demand elasticity tests. We arbitrarily set the demand elasticities to -1.0 in every industrial sector for our high demand elasticity runs. The difference between the low and high elasticity result is only 14,000 jobs.

Results are slightly more sensitive to variations in the supply elasticity but still quite small relative to the size of the aggregate labor force. The estimated employment decline for the low supply elasticity value, set to +0.1, is 13,000. For the high supply elasticity of +0.5, the decline is 40,000.

D. Sensitivity Analyses--Policy Alternatives

The estimated employment effects are more sensitive to changes in policy parameters than to changes in assumed elasticity values. Of the many possible policy dimensions which could be analyzed here, we choose to address the impacts which result from changes in participation standards, changes in the minimum rate of contributions, and changes in the extent of plan coverage.

Table 9 shows how the results change as participation standards are altered. The baseline policy used in all previous analyses assumed that all workers (1) age 25 or above, (2) employed a year or more and (3) working 1,000 hours annually would be covered by the MUPS. In both the short and the long runs, liberalizing these participation standards to include persons 20 to 25 years of age and working between 500 and 1,000 hours annually increases the employment decline about 25 percent. Tightening the participation standards to include only persons over 30 decreases the employment decline about 17 percent. In all three cases, the estimated employment decline is less than a quarter of a percent.

Table 10 compares the employment effects of four MUPS alternatives. The first alternative is the policy analyzed in Tables 5 and 6--a 3 percent defined contribution plan with five year vesting and participation standards of 25 years of age and one year of service and 1,000 hours worked. We compare this policy with two variants. One variant simply increases the minimum contribution rate to 6 percent. The second variant provides full and immediate vesting to all MUPS participants. A fourth alternative operates identically to a MUPS for employers who already have established pension plans. However, under this alternative, which can be best understood as an extension of ERISA participation standards, no employer would be required to begin a pension program.

1/ Hamermesh (1976).

TABLE 9

COMPARISON OF TOTAL EMPLOYMENT DECREASES RESULTING
FROM A 3 PERCENT DEFINED CONTRIBUTION MUPS
BY ALTERNATIVE PARTICIPATION STANDARDS

	Number (In Thousands)	Percentage Change
Short Run		
20 Years-1 YOS-500 Hours	203	0.24%
25 Years-1 YOS-1,000 Hours	161	0.19%
30 Years-1 YOS-1,000 Hours	134	0.16%
Long Run a/		
20 Years-1 YOS-500 Hours	37	0.04%
25 Years-1 YOS-1,000 Hours	29	0.03%
30 Years-1 YOS-1,000 Hours	24	0.03%

a/ Assumes 70 Percent of increased pension costs are shifted backward onto workers.

TABLE 10

COMPARISONS OF TOTAL EMPLOYMENT DECREASES RESULTING
FROM A THREE ALTERNATIVE MUPS

	Number (In Thousands)	Percentage Change
Short Run		
3% DC Plan - Five Year Vesting	161	0.19%
6% DC Plan - Five Year Vesting	398	0.46%
3% DC Plan - Full and Immediate Vesting	214	0.25%
Liberalized ERISA	59	0.07%
Long Run a/		
3% DC Plan - Five Year Vesting	29	0.03%
6% DC Plan - Five Year Vesting	72	0.08%
3% DC Plan - Full and Immediate Vesting	39	0.04%
Liberalized ERISA	11	0.01%

a/ Assumes 70 percent of increased pension costs are shifted backward onto workers.

The increase of the minimum contribution rate results in a substantially increased employment loss. Job losses more than double because costs to employers who already cover some employers, but at less than the 3 percent standard increase more than proportionately. For example, a participating employer whose pension contribution rate was 1.5 percent would incur a 100 percent when a 3 percent MUPS is imposed, but a 300 percent increase in pension contributions under a 6 percent MUPS. Also this alternative includes workers with contribution rates between 3 and 6 percent who were not included under a 3 percent MUPS. The short run job loss for the 6 percent alternative is almost 400,000 jobs, about one half of one percent of the labor force. The long run decline is 70,000 jobs, a percentage decrease of 0.1 percent.

The inclusion of full and immediate vesting provisions in the MUPS increases its employment effects but not nearly as greatly as does the increase in the minimum contribution rate. Full and immediate vesting provisions increase MUPS costs about 32 percent. Employment decreases in the short and long run are altered in the same proportion. Almost 210,000 jobs (a .25 percent decline) would be lost in the short run and about 40,000 jobs (a .04 percent decline) would be lost in the long run.

The liberalized ERISA plan has an extremely small effect on the economy. Short run job losses are about 60,000 and long run losses only 10,000. While the pattern of job losses across establishment sizes and industries was very similar to that shown in Tables 5 and 6 for all previous sensitivity analyses, this is not the case for this alternative. In the long run only 33 percent (compared to 55 percent) of the total job loss would occur in small establishments. The trade and service sectors absorb slightly less of the total job loss (52 percent compared to 58 percent) and the manufacturing sector slightly more (18 percent compared to 24 percent).

E. Major Sectors Affected by MUPS

The analysis above has concentrated principally on "average" workers--either in the economy as a whole or in selected establishment size or industrial sector categories. One particular class of workers is likely to be much more severely affected by a MUPS than these "average" workers. This class is a portion of the workforce receiving wages at or near the minimum wage. Downward wage adjustments is statutorily prohibited for these workers. Typically these workers receive very little in fringe benefits so employers will not be able to shift wage declines into bigger cuts of fringe benefits. We therefore expect that our estimated short run effects would persist in the long run for all minimum wage workers.

Although these short run effects are roughly five times larger than the long run effects, they still are not exceedingly large--amounting to only a 0.2 percent decrease in employment. Given the combined effect of public policies required to produce this result, we do not believe it is useful to ascribe all this job loss as a cost of a MUPS. It could be as easily attributed to the minimum wage law.

Even the disaggregated analyses presented above obscure many differences among types of employers. The trade category in the industrial sector analysis contains activities as diverse as oyster bars and heavy construction equipment distributors. Unfortunately analysis of particular types of employers requires a sample size considerably greater than even the large CPS sample. We can use the BLS Survey of Expenditures for Employee Compensation to convey a rough sense of what types of activities would bear the greatest MUPS impacts. In that survey the activities listed below, distinguished by 4 digit SIC code, were most likely to be without pension coverage, pay low wages, and employ less than 25 workers. (As seen above, it is these circumstances in which MUPS effects are the largest.)

Types of Establishments Most Likely to
Be Small and Without Pension Coverage

5411	Grocery Stores
5541	Gasoline Stations
5810	Miscellaneous eating and drinking places
5812	Eating Places
5813	Drinking Places
7231	Beauty Shops

Because the sample size of such establishments is quite small, it is not possible to provide a statistically representative picture of them. Based upon the BLS data we can present a stylized sketch of a more or less typical, impacted establishment. Such an establishment might have 10 employees and a wage bill of about $35,000 per year. It might pay another $2,500 in fringe benefits for a total compensation cost of $37,500. If such an establishment were required to establish a 3 percent defined contribution MUPS (defined as a percent of wages), the added pension cost would be $1,050. Based on the analysis of short term employment effects presented above, the employment loss in such an establishment would be 0.09, i.e., approximately 1 job lost for every 11 such establishments.

F. Employment Effects of a Policy Alternative

This study is concerned with the impact of MUPS on employment. The impact on employment of alternative ways of increasing retirement income is also of interest. One such alternative would increase social security retirement benefits, particularly those of retirees who had worked for low wages. An analysis of the employment effects of social security benefit changes is beyond the scope of this paper, but here we briefly enumerate the different ways of financing social security benefits and suggest how these might affect employment. We also present some orders of magnitude of the effect of social security tax increases on employment, based on studies performed by other researchers.

Benefit increases under social security may be financed in three ways: (1) increasing the payroll tax rate, currently 6.65 percent levied on the employer and on the employee (for a total tax rate of 13.3 percent); (2) increasing the level of earnings up to which the tax rate is applied; called the "taxable maximum earnings" and currently $29,700 per year;[1/] and (3) funding social security benefits from general revenues instead of an earmarked payroll tax.

To a substantial degree analysis of the employment effects of payroll taxes on employment parallels that of the MUPS analysis. Differences may enter if social security benefits are perceived as either larger or smaller than are private pension benefits for equivalent levels of contributions. Perceptions about benefits could differ between social security and private plans because of differences in rates of return or because of differences in expected probabilities of benefit receipt. If private pension benefits are perceived to be larger than social security, then wage reductions to fund MUPS might be more acceptable than an equivalent social security tax (also shifted in part to lower wages). The greater the wage reduction, the smaller the increase in labor costs, and as a result, the smaller the decrease in employment. There is little, if any, information available on the question of differences in perceptions of the size of private pension as compared with social security benefits.

Most recent empirical studies of the employment effects of social security have assumed rates of shifting the employer's share of payroll taxes that are in the range used in this paper. The Congressional Budget Office projected the effects of a $10 billion increase in employer payroll taxes to be 200,000 jobs (in both the short and medium term).[2/] This analysis is relevant to the period beginning in 1978. The current study has examined a $7 billion employer cost increase associated with a 3 percent defined contribution MUPS. The relevant year for analysis is also 1978. Thus the tax examined by CBO exceeds by 47 percent the MUPS cost. The MUPS employment effect most easily compared with that of CBO is a reduction of about 160,000 jobs. There are too many differences in the underlying methodology to try to reconcile the two estimates. Nonetheless, given the differences in method they appear reasonably close. In general, there is no strong reason to believe that equivalent-amount social security tax and employer-paid private pension contributions would have vastly different effects on employment.

1/ Since studies have shown that further increases in this level, beyond the automatic increases included in current law, would produce relatively little in added revenue, we ignore this way to increase social security revenues.

2/ Congressional Budget Office, "Aggregate Economic Effects of Changes in Social Security Taxes", August 1978.

If social security benefit increase was financed through general revenues, the employment effects would probably be smaller still, since the burden would fall on consumers as well as employers. Of course, in this case, even more of the tax increase would appear in the form of higher prices.

V. SUMMARY AND CONCLUSIONS

The major conclusion of this analysis is that a 3 percent defined contribution MUPS would not cause large employment declines in the United States. Despite a number of alternative runs of our model, we were unable to detect a single instance of even a 1 percent decrease in aggregate employment levels. For the most part, employment declines were about the order of magnitude of the margin for error in estimating employment levels.

This result is really not surprising. The increase in compensation costs resulting from a 3 percent defined contribution MUPS can never exceed 3 percent. This increase is further mitigated by excluding large segments of the labor force who either already are covered by pension or who do not meet participation standards. Even if we use the highly unrealistic assumption that every worker in the economy was fully affected by the MUPS (i.e., no pension plans exist and the MUPS has no participation standards), the job loss is only three quarters of a percent in the short run and one quarter of a percent in the long run.

We have, however, found some interesting patterns in the distribution of these small employment decreases. The following types of workers could be most severely affected:

- low wage workers, especially those near the minimum wage
- workers in small establishments
- workers in the trade and service sector.

Even for these relatively more affected workers the long run percentage decline in employment is less than a tenth of a percent.

As mentioned in the introduction, the Commission adopted several proposals to offset the potential negative effects listed above. Integration of these proposals into the models and analysis was not possible given the time and budget constraints of this research effort. Further research on the potential employment effects of a MUPS should attempt to integrate offsetting tax, implementation and other policies with the direct cost effects of such a system.

APPENDIX I

REVIEW OF RESEARCH

This appendix presents a brief overview of the literature in each of three areas that are central to the analysis of a MUPS:

- Adjustments within the compensation package
- Incidence of the Social Security payroll tax
- Response of employers to changes in labor costs

For each of these three areas we present (a) a brief introduction to the area, (b) principal conclusions of the literature, and (c) brief summaries of the major studies reviewed.

1. Adjustments within the Compensation Package

a. Introduction

If increases in pension contributions of employers are offset by reduced wages (or a slower growth in wages than otherwise would occur), then the costs of employing MUPS-affected workers will not rise. If costs do not increase, then employers will not reduce the numbers of MUPS-affected workers hired. An understanding of the extent and timing of any adjustments within the compensation package of MUPS-affected workers is therefore crucial to the evaluation of the employment effects of a MUPS.

Workers and employers jointly determine an amount of compensation and the distribution of this amount between wages and fringe benefits such as pensions, health and welfare benefits, paid vacations, and the like. Even if one component of the package, say pensions, is increased in value as a result of factors at least partially outside the worker-employer nexus, the level of compensation may still adjust to the level it would have attained absent the outside intervention. For this to happen, wages, or other forms of compensation, would have to fall in value. Unfortunately, few economists have studied the extent to which adjustments within the compensation package occur.

b. Principal Conclusions about Adjustments within the Compensation Package

- The consensus of the few studies available support the following helpful, but weak, statement: No evidence contradicts the theoretical prediction that wages and pensions are fully substitutable within the total compensation package. Put another way, no studies have found instances where wages do not adjust to offset any changes in pension contributions.

- This implies that in the long run there will be a full substitution of lower wages for MUPS-mandated pensions, except in the case of workers at or near the minimum wage. Because this implication is based upon only a few studies which reach highly qualified conclusions, any analysis of MUPS effects should present alternate estimates of the extent of wage-pension substitution.

- The caveats that attach to the conclusions above are many:

  -- The generalizability of these studies is questionable. Most investigate only the public sector. Only two studies have examined private labor markets. Most of the studies reviewed limit themselves to very large employers where pension coverage rates are high and therefore MUPS effects would be small.

  -- The data used in these studies is generally too weak to support the complex analysis required. Thus, results are usually ambiguous and subject to the interpretation of the analyst.

  -- All these studies employ cross sectional data and thus implicitly capture only long run effects. No time series studies, capable of assessing dynamic adjustment paths, have been attempted.

c. Summaries of Selected Studies

1) Ronald Ehrenberg and Robert Smith (December, 1980), "Who Pays for Pension Reform", (mimeo):

Ehrenberg and Smith use Hay Associates survey of compensation plan data to estimate private sector, white collar employment wage-pension tradeoffs. They develop an analysis that seeks to control for differences in the quality (efficiency, motivation) of workers across firms. The results are somewhat mixed in terms of statistical significance but suggest that wages and pensions are traded-off on close to a dollar-for-dollar basis within the compensation package.

2) Ronald Ehrenberg (1980), "Retirement System Characteristics and Compensating Wage Differentials in the Public Sector", Industrial and Labor Relations Review:

Ehrenberg estimates the effect of employee pension contributions on wages. He concludes that retirement systems with more generous characteristics tend also to be associated with lower salaries. This result is generally supportive of the full substitution hypothesis, but Ehrenberg's formulation allows the estimation of directional effects only, not quantitative magnitudes. His model also includes a

variable for employee contributons to pension funds. He finds that increases in this contribution rate when pension benefits are held constant are offset by increases in wages. His primary data base was a 1973 cross section of uniformed public employees' (police and firefighters) wages and pension plans for all U.S. cities with populations over 50,000. Given the limited nature of the study--it asks only a narrow question about certain types of public employees--his results appear fairly reliable. This is probably the best available study of the tradeoff between pensions and wages.

3) Robert Smith (1979), "Pensions, Underfunding, and Salaries in the Public Sector" (forthcoming in the Review of Economics and Statistics):

Smith estimates the effect which employer pension contributions have on wages. He employs a unique data base of cities and counties in Pennsylvania to analyze the wages of non-uniformed public employees. The data set allows Smith to use a standard set of accounting rules to estimate contribution rates required in each retirement plan for full funding. His results also are consistent with the hypothesis suggesting full substitution of pension contributions for wages.

4) Robert Inman (1980), "Wages, Pensions, and Employment in the Local Public Sector" (mimeo):

Inman builds a very complex model to examine the entire process of wage, pension, and employment decisionmaking in the local public sector. Unfortunately, his model's complexity is not equalled by the data available for estimation purposes, compiled for 60 large U.S. cities for 1970-1973 and including police and firefighters only. His results primarily apply to underfunding effects and offer little aid to any MUPS analysis.

5) Bradley Schiller and Randall Weiss (1979), "Pensions and Wages: A Test for Equalizing Differences" (forthcoming in the Quarterly Journal of Economics):

Schiller and Weiss present the only analysis of wage and pension tradeoffs in the private sector. Their primary interest centers on the substitution of employer pension contributions for wages. Their data base includes wages and pension information for over 13,000 workers in 133 large firms. They estimate the regression coefficient for the wage substitution effect to be -1 for workers aged 45-54, indicating complete substitution. Unfortunately their results show this same coefficient to be +1 (but not statistically significant) for workers aged 40-44. This inconsistency reduces the confidence one can place in the results of the study. The nature of their data base, a merger of a social security data file with a pension survey, excludes many important job characteristics from their sample. They attempt to overcome this by appending many geographic characteristics, such as average wage and percent unionized in the area, to their records.

6) William Oakland (1980), "The Tradeoff between Public Employee Pensions and Wages", (mimeo).

Oakland builds a useful theoretical model of the public employee labor market. By imposing a few assumptions about how employers and employees view wages and pension benefits, he obtains two alternative expressions for public employee wages. Unfortunately, he obtains very poor results when estimating these expressions with cross sectional data for U.S. cities in 1975. In particular many of his pension variables had the wrong sign and were statistically insignificant.

2. Incidence of the Social Security Payroll Tax

a. Introduction

The Social Security system is financed by payroll taxes paid by employers and employees. Currently the rate of this tax is 6.65 percent of taxable wages for both the employer and employee. For some time economists have thought that while the employer's share of the tax is levied on the employer, at least part of the ultimate incidence would be on the employee. That is, the tax would be shifted onto the worker through lower wages. This process, sometimes referred to as backward shifting, assumes that implicitly or explicitly employers and workers agree on a total compensation package, comprised of the payroll-tax financed retirement benefits, fringe benefits, and wages. If employers only hire workers whose productivities outweigh their total costs of employment, then at least part of the increased cost of the tax should be paid by the worker.

Whether the tax is shifted and if so, how rapidly, are questions of some interest for an evaluation of a MUPS. Because few studies have examined the extent to which wage and pensions contributions can be traded off within the compensation package, studies of payroll tax shifting provide some information about possible wage adjustments subsequent to a MUPS. Additionally, decisionmakers would like to know the speed with which this adjustment process will occur. Payroll tax studies provide the only source for information on this point.

b. Principal Conclusions about Shifting and Incidence of the Payroll Tax

- Although the studies reviewed do not agree on the proportion of the employer's share of the payroll tax which is shifted backward onto labor, many of the more careful, recent studies have arrived at estimates in the neighborhood of 40 percent (Hamermesh (1979) and Vroman (1974a). That is, while the payroll tax is levied on the employer, the firm pays only 60 percent of it. The remaining 40 percent is "paid" by labor in the form of lower wages or a slower rate of growth in future wages.

- The uncertainty surrounding these estimates remains large. The available data for these types of analysis is either highly aggregated, incomplete, or unreliable. In many cases, a combination of all three problems obtains. Most authors are far more tentative about their estimates than is typical in scholarly journals. A minority of studies find that the payroll tax is fully shifted onto labor, i.e., each dollar of the payroll tax is offset by wage reductions.

- All studies which examine the question of timing find that the shift occurs rapidly. Virtually all of the tax which will be shifted probably has shifted within a year of any payroll tax change.

c. Summaries of Selected Studies

1) George Perry (1970), "Changing Labor Markets and Inflation", Brookings Papers on Economic Activity.

Perry uses aggregate time series (1953-1960) data to fit a wage equation derived from the Phillips curve tradeoff between inflation and unemployment. The estimated coefficient for the payroll tax is 1.4, which Perry interprets as a shifting of 40 percent of the employee's tax to employers. This result seems suspect because the direction of this shift disagrees with most other studies, which show a shifting of the tax from employer to employee. Perry's principal purpose is the analysis of the relationship between inflation and unemployment by age/sex group. Payroll taxes were added to his model as a peripheral variable only.

2) John Brittain (1971), "The Incidence of Social Security Payroll Taxes", American Economic Review.

Brittain uses aggregate cross sectional data from 64 countries during the period 1957-1959 to fit a wage equation derived from marginal productivity theory. The equation includes labor's value added and the payroll tax rate for all manufacturing industries as a whole and each individual two-digit industry. The estimated coefficent on the tax term exceeds one in nearly every case. The study has received extensive criticism, particularly from Feldstein (1972, American Economic Review) because it did not include an analysis of the supply of labor as well as the demand for labor.

3) Wayne Vroman (1974a), "Employer Payroll Taxes and Money Wage Behavior", Applied Economics.

Vroman uses aggregate time series data (1956-1969) to fit a wage equation similar to Perry's. Vroman adds a measure of the change in other labor income and profit rates to Perry's formulation.

Introduction of lagged effects for the payroll tax term produces Vroman's preferred equation in which the coefficient ranges from -.16 to -.48 depending on the lag (2 or 3 quarters) and definitions of wages and unemployment. The coefficients imply that between 16 percent and 48 percent of employer-paid payroll taxes are ultimately borne by workers in the form of lower wages. Although the study appears quite sound, Vroman's other article seems to show contradictory results.

4) Wayne Vroman (1974b), "Employer Payroll Tax Incidence: Empirical Tests with Cross-Country Data", Public Finance.

Vroman extends Brittain's model by reestimating it for a different year (1964) and by including variables which correct for the method used to calculate value added in each country and for the comprehensiveness of each country's survey of firms. Vroman also reestimated the model with OECD instead of UN data. Although Vroman's results are less strong than Brittain's, most agree with a full shifting of the payroll tax onto labor.

5) Daniel Hamermesh (1979), "New Estimates of the Incidence of the Payroll Tax", Southern Economic Journal

Hamermesh uses a reduced form depiction of the labor market and micro data for white males only from the Panel Study on Income Dynamics. Although subject to some problems--for example, the results may be biased because the dependent wage variable is used to estimate the payroll tax rate--this study is probably the best of those reviewed. Estimated shifting to the worker is 36 percent with virtually all of the shifting occurring within one year. Six years of lagged payroll tax payments were included in the model to examine rates of adjustment of wages to tax changes.

6) Jon Frye and Robert Gordon, "The Variance and Acceleration of Inflation in the 1970s: Alternative Explanatory Models and Methods", National Bureau of Economic Research working paper #551, September 1980.

Frye and Gordon build a model of the inflationary process which includes a number of channels of explanation of postwar U.S. inflation--aggregate demand increases, supply shocks, government interventions and the inertia of the inflation process itself. Among the supply shifts which they consider is the increase in the payroll tax rate during the 1970s. They estimate that 43 percent of all payroll tax increases, paid by both the employer and the employee, eventually are passed along to consumers in the form of higher prices. Their results are consistent with an increase in wages resulting from Social Security payroll tax increases.

3. Employer Responses to Higher Labor Costs

a. Introduction

As labor costs rise employers seek to maintain profits. Given adequate time and flexibility in selecting inputs to their production process, employers will adjust their hiring of inputs. The tendency will be to use less of the more expensive input. The extent to which employers hire fewer MUPS-affected workers will be indicated by the nature of their labor demand function. An important characteristic of this function is the wage elasticity of demand for labor, the percentage change in employees demanded in response to a percentage change in the wage.

The volume of research of labor demand functions is far too large to survey adequately here. Below we discuss some conclusions we have drawn from a selective review of studies of most relevance to a MUPS. The demand studies reviewed can be seperated into four categories: (1) short run studies, (2) long run studies, (3) studies of the minimum wage, and (4) studies of National Health Insurance.

b. Principal Conclusions about Employer Responses to Higher Labor Costs

- Daniel Hamermesh has conducted a thorough review of the economic literature discussing short run demand curves for labor. He concludes that in the short run a ten percent increase in the compensation rate will cause a 3.2 percent decrease in the quantity of labor employed. He also provides a range which bounds nearly all published estimates of the wage elasticity of demand. This range is .9 percent to 6.2 percent.

- If full substitution of wages for pensions occurs in the long run, there will be no aggregate employment change since labor costs do not increase. If this is not the case, the employment change will depend on (1) the substitutability of labor for capital (a substitution effect) and (2) the change in the use of inputs which results from the cost increase (a scale effect). The scale effect is probably negligible because of the very small magnitude of the probable MUPS cost increases. The size of the substitution rate at which lower priced workers would be substituted for higher priced workers is a matter of some controversy among economists.

- A ten percent increase in the minimum wage is typically estimated to reduce the employment of teenagers by 1 to 3 percent.

- Even if there is no aggregate change in employment in the long run in terms of hours worked, there could be other effects. The total number of workers employed may shrink if employers increase the length of the workweek. This would occur if pension contributions or retirement benefits are determined strictly on the basis of

straight-time pay so that employers have an incentive to substitute overtime for regular time work. Also, the total number of hours could be worked by different workers. If the price (wage) of a labor group, (say unskilled 20-24 years old) rises, more skilled and/or experienced workers may be hired instead. As the review article by Hamermesh and Grant (1979) points out, our knowledge of these substitution phenomena is limited. Available information suggests that policies that increase the cost of young workers will lead to some substitution for them of older workers.

c. Summaries of Selected Studies

1) Daniel Hamermesh (1976), "Econometric Studies of Labor Demand and Their Application to Policy Analysis", Journal of Human Resources.

Hamermesh provides an excellent survey of all studies of short run labor demand. The review covers the difficult empirical and theoretical issues which differentiate these studies and discusses how short run labor demand parameters can be applied in various policy contexts. His survey separates studies which estimate substitution effects (variations in the quantity of labor demanded as wages change if capital prices and output are constant) from studies which estimate scale effects (variations in the quantity of labor demanded as output changes). He concludes that, using a four-quarter impact period, the best estimate of the wage elasticity of demand is .32. He also provides low and high estimates of .09 and .62, respectively. This study combines the virtues of comprehensive coverage of the literature and a distinct policy orientation and is therefore of direct relevance to any MUPS impact analysis.

2) Daniel Hamermesh and James Grant (1979), "Econometric Studies of Labor - Labor Substitution and Their Implications for Policy", Journal of Human Resources.

Hamermesh and Grant survey a number of studies which have examined the substitability of various categories of labor within the production process. The possibility of substituting capital for each type of labor as well as the possibility of substituting within the labor categories is discussed. Types of labor are distinguished by (1) age, (2) occupation and (3) educational attainment. The conclusions of this body of literature are not as consistent as Hamermesh found in his short run demand survey. Most important conclusions of the survey are: (1) workers with large amounts of education and training are less substitutable with capital inputs than other workers, (2) workers are fairly easily substitutable across age categories; and (3) the wage elasticity of demand for young workers exceeds unity. This last conclusion is the most important for MUPS analysis as it suggests young (and perhaps unskilled workers) will be more adversely affected by MUPS, even if both young and old workers currently had equal rates of pension coverage.

3) Kim Clark and Richard Freeman (1980), "How Elastic Is the Demand for Labor", Review of Economics and Statistics.

Clark and Freeman examine several econometric problems in specifying and estimating quantitative relationships among employment on the one hand and the prices of labor and capital on the other. They find that previous efforts to estimate long run wage elasticities may have employed inappropriate assumptions and restrictions. Clark and Freeman conclude that in the long run wage elasticity in manufacturing is -0.5 and is not very sensitive to alternate ways to specify the relationship. They find short run wage elasticities to be within the range specified by Hammermesh (1976).

4) Bridger Mitchell and Charles Phelps (1975), "Employer-Paid Group Health Insurance and the Costs of Mandated National Coverage", Journal of Political Economy.

This report provides a useful analog to the analysis of MUPS by examining the effects induced by a very similar policy, national health insurance. A weakness of the approach is the assumption that in the long run wage alterations will fully offset all increased health insurance premiums so that the incidence of the policy falls entirely on labor. That is, Mitchell and Phelps assume full substitutability within the compensation package. The employer-paid NHI premium is ultimately borne fully by workers (within one year). They do present estimates of (1) total program cost in terms of initial increases in premiums, (2) short run employment effects and (3) lost tax revenue. Their procedure for estimating short run employment changes relies on Ronald Ehrenberg's study of Fringe Benefits and Overtime Behavior. The same incentives for increased overtime exists in both national health insurance and a MUPS. Mitchell and Phelps estimate that employer-paid NHI premiums of of between .7 percent and 2.9 percent would result in an increased aggregate unemployment rate of between .3 percent and 1.4 percent. The largest effects were found in the agriculture service, and the transportation and communication industries.

5) Emery, Long and Mutti (n.d.), "Payroll Taxes, The Minimum Wage, and National Health Insurance Premiums: Short-Run Employment Impacts by Industry".

The paper estimates the employment impacts of three government policies that increase employment costs: (1) social security payroll tax increase of .52 percent, together with an increase of $3,800 in the contribution base; (2) minimum wage increase of $.25 or 8 percent over the current $3.10 level, and (3) mandatory employer premium payments for National Health Insurance that average $6.30 per worker (about 10 percent for a full-time, minimum wage worker). The key methodological assumptions are that increased costs of employing labor are all passed through to consumers in higher prices and there

is no change in the ratio in which labor and capital are used. (The higher product prices result in lower consumer demand and therefore less employment.) In effect, it is assumed that all of the increased labor costs of the policies are paid by employers. These restrictive assumptions are typical of studies that use an input-output framework to distribute employment shifts among industries, as this study does. The results are of somewhat limited utility since, essentially, they deny any response to the labor cost increase by employers, other than the product price increase. Other studies suggest such responses would take place. The results are of interest in allocating the employment change among three policies and across 83 industries. The results are: (1) in the aggregate, employment declines by 1.26 percent; (2) of the aggregate decline in employment, 60 percent, 23 percent, and 17 percent, respectively, is caused by the health insurance, social security, and minimum wage policies; (3) prices rise by 1.17 percent; and (4) the largest employment declines occur in footwear (2.8%), apparel (2.72%), personal services (2.07%), and agricultural services (1.83%). Methodologically, the study uses price elasticities of demand for goods and services to estimate the effects on demand of the policies and then an input-output model to distribute the reduced output and thus employment across industries. The models had been developed for other purposes.

6) Brown, Gilroy and Cohen (1980), "Effects of the Minimum Wage on Youth Employment and Unemployment", (draft; for the Mininum Wage Study Commission) .

The paper is a critical survey of voluminous literature on employment effects of the minimum wage on youth. Its relevance to MUPS analysis is: (1) the results summarized are broadly consistent with the survey undertaken by Hamermesh (1976) and (2) a broad literature has found that raising the costs of hiring low wage workers reduces their employment. Its principal conclusions are as follows (reproduced from the paper):

- A ten percent increase in the minimum wage is typically estimated to reduce employment of teenagers, 16-19 years old, by one to three percent, with most studies at the low end of this range.

- Estimates of the impact of a 10 percent increase in the minimum wage on the unemployment rate of teenagers are more varied, ranging from essentially no effect to an increase to three percentage points. Most studies show an increase of less than one percentage point.

- It is often asserted that the minimum wage has a larger effect on the labor force status of black teenagers than of white teenagers. Our review found no support for this view with respect to employment, but some evidence that the unemployment effects of the minimum wage are larger for black teenagers than for white teenagers.

- Youth 20-24 years of age have been studied less intensively. The handful of available studies generally find that the minimum wage reduces employment and increases unemployment for this group. These effects tend to be smaller than for teenagers, but there are too few studies to determine a "consensus" estimate.

7) Finis Welch (1974), "Minimum Wage Legislation in the United States", Economic Inquiry.

Welch concentrates his analysis on the effects of the minimum wage on teenage (14-19 years of age) employment. The empirical content of the study therefore has little relevance to a MUPS which exempts these workers from coverage. The analytic structure would be of assistance to any analysis of a MUPS which covered only a portion of the economy. Welch finds the selective coverage of minimum wage legislation has significantly shifted teenage employment toward uncovered sectors. He also concludes that minimum wage legislation has reduced total teenage employment and heightened teenage vulnerability to cyclical fluctuations in the economy.

APPENDIX II

DERIVATION OF THE FORMULA FOR LONG RUN EMPLOYMENT CHANGES

This appendix presents a simple derivation of a formula capturing the final equilibrium established after a MUPS is imposed on the labor market. Initially we assume that MUPS acts like a tax on payroll levels. Later we show how the results might change if employees view MUPS mandated pension contributions as a portion of compensation. To aid the exposition we use the function notation f(·) to represent the logarithmic derivative dx/x.

Derivation

Assume the labor market is initially in equilibrium. At this point E_o units of labor are employed at a compensation level of C_o per unit (See Figure II-1). Consider the mandated MUPS contribution rate to be simply a tax t on wages--initially comprising all of compensation. Then at this point:

$$C_d = D_o(E) \qquad \text{(Demand Function)}$$

$$C_s = S_o(E) \qquad \text{(Supply Function)}$$

$$C_d = C_s \qquad \text{(Equilibrium Condition)}$$

Define the demand and supply elasticities as:

$$e_d = f(E)/f(C_d) \qquad \text{(Negative)}$$

$$e_s = f(E)/f(C_s) \qquad \text{(Positive)}$$

A condition of the new equilibrium must be that the productivity of the marginal worker equal the gross compensation equal to the wage plus the MUPS payment and

$$tC_1 = dC_d - dC_s$$

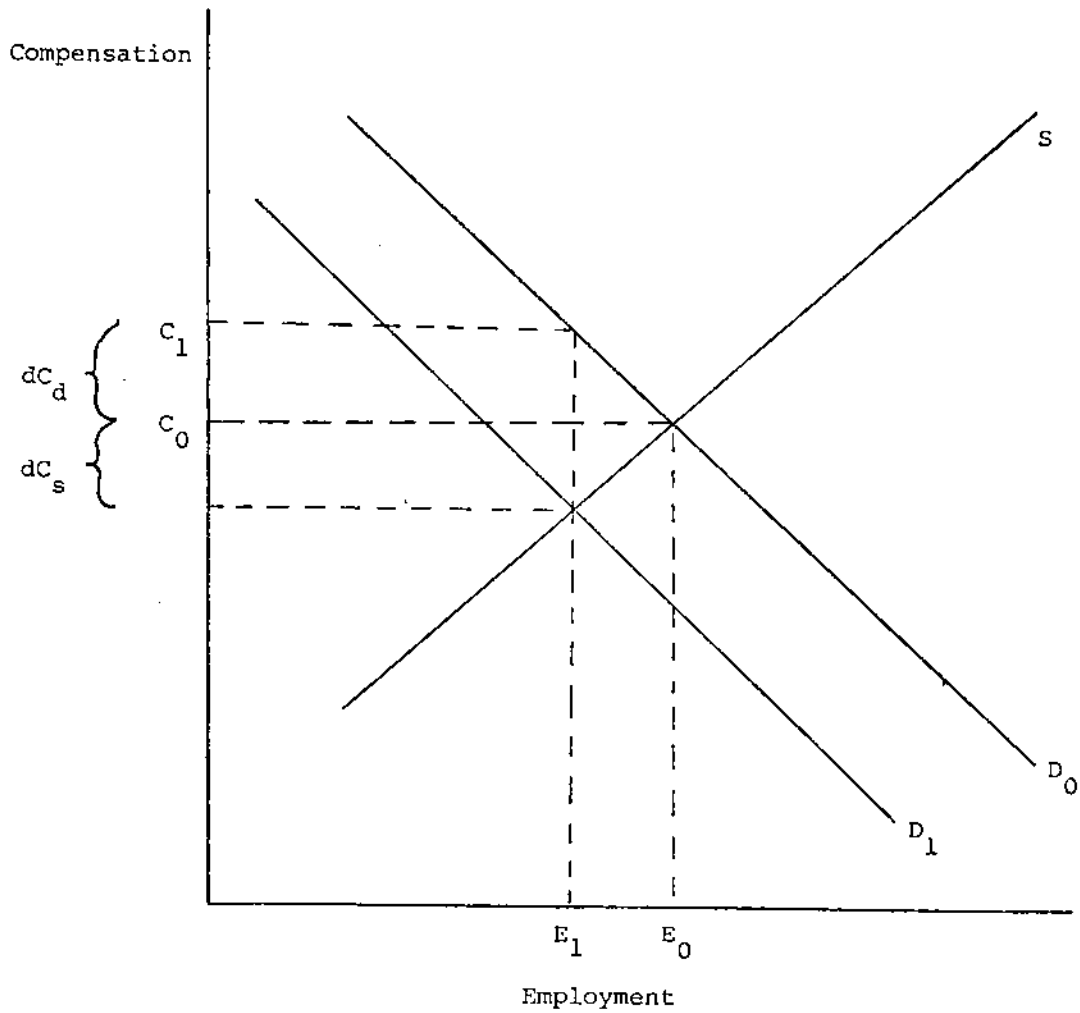
because the shift in the net demand curve induces a distance tC_1 between wages and productivity which must be reached through movements along both S and D_o. Then

$$C_o + dC_d = C_1 \qquad \text{(Definition of } dC_d\text{)}$$

$$t(C_o + dC_d) = dC_d - dC_s$$

$$tC_o = (1 - t)dC_d - dC_s$$

Figure II-1



Another condition of the new equilibrium is that

$$f(E) = e_d f(C_d) = e_s f(C_s)$$

Since $C_s = C_d = C_o$ initially,

$$dC_d = e_s dC_s / e_d$$

$$tC_o = ((1 - t)e_s/e_d - 1)dC_s$$

$$f(C_s) = te_d/((1 - t)e_s - e_d)$$

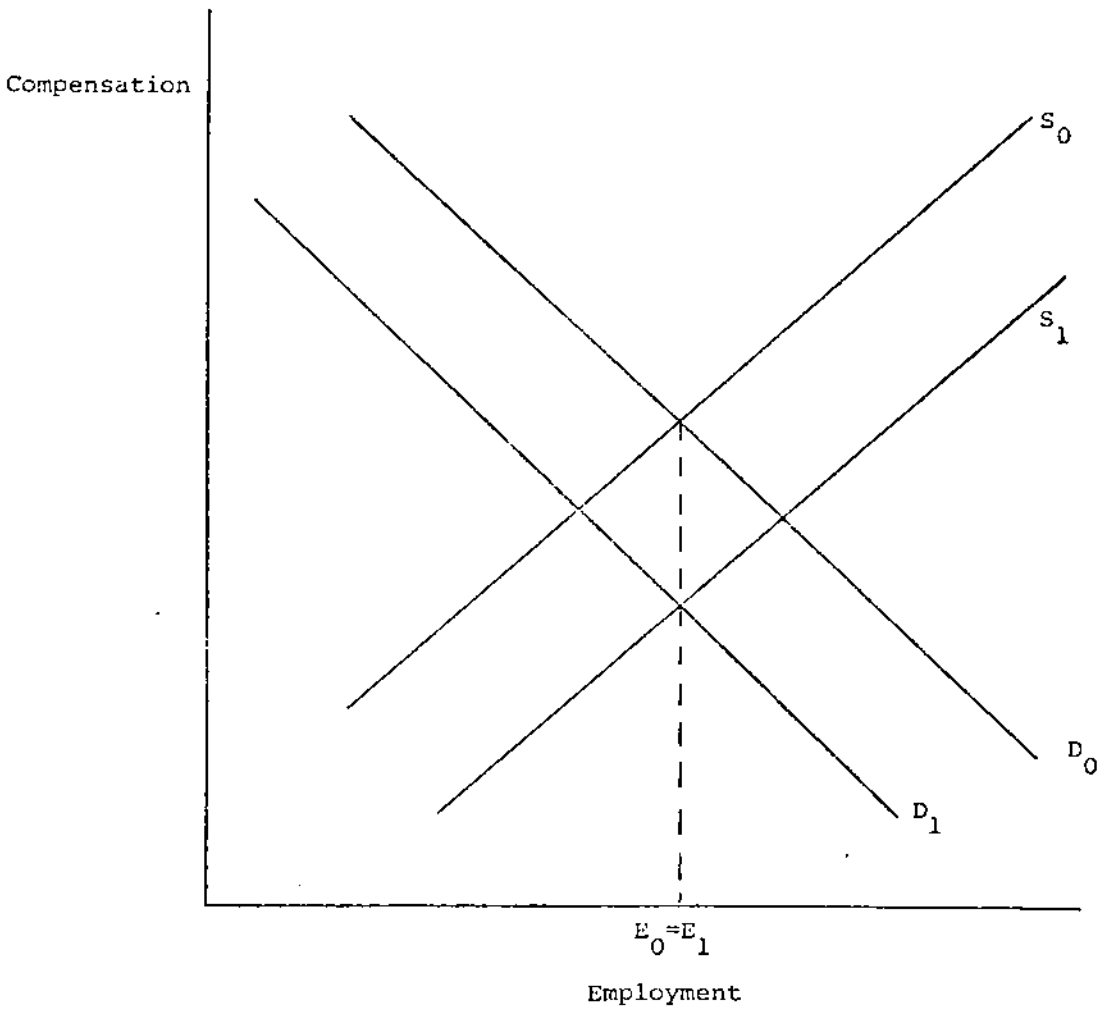
$$f(E) = te_d e_s/((1 - t)e_s - e_d)$$

It is this formulae for f(E) which we employ in the long run analysis of Section IVB.

Discussion

In the case of MUPS acting as a pure tax, some of the employer's payments are shifted onto labor as wages decrease in response to decreased demand. In reality the shifting of MUPS burden onto laborers would be greater than this simple tax example because supply would shift out simultaneously (see Figure II-2). The magnitude of this shift depends on plan vesting provisions and workers' relative preferences for immediate as opposed to future consumption. Consequently we cannot include any precise measure of the effect of this supply shift in our analysis. It is not difficult to imagine a case (as shown in Figure II-2) where the supply shift is great enough to make the wage decrease equal to the additional MUPS payments. This is precisely the case of full substitution of wages for pension contributions which is consistent with the empirical evidence described in Appendix I. In this case, no employment decline occurs. Thus to the extent a supply shift does occur our long run formula may overestimate the actual employment decrease which will result.

Figure II-2



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CHAPTER 27: THE WAGE/PENSION TRADE-OFF

Ronald Ehrenberg and Robert Smith

When the government passes legislation which requires that pensions be made more generous or more widely available, it it natural to ask just who will pay the costs of such reforms. Economic theory, as we will show, is quite clear on this point. It suggests that when pensions increase, wages will decrease. Other things equal, this implies that it is workers themselves who will pay the costs of pension reform legislation.

This view that wages and pensions are negatively related (if other things are held constant) is not widely held. Casual observation, in fact, yields quite the opposite view. The highest wage workers receive the best pensions, and high-wage firms are the very ones with the most generous pensions. Even sophisticated studies which attempt to control for "other things" which influence total compensation sometimes find that wages and pensions are positively related (Blinder, et. al., 1979).

Other studies, however, yield results more in keeping with the predictions of economic theory. Ehrenberg (1980), Schiller and Weiss (1981), and Smith (1981) have all found evidence that wages and pensions are negatively related, once other factors influencing total compensation are controlled for. The study by Smith even finds that pension underfunding and wages are related in the way theory predicts.

The purpose of this study is to attempt a replication of earlier studies on wage-pension trade-offs, using a unique set of private sector data. In the course of this paper we will outline economic theory as it pertains to this issue and attempt to explain how the apparently contradictory results noted above are generated. We will, of course, present our own results.

The Theory of the Wage-Pension Relationship

Economic theory of the wage-pension starts with the notion that it is total compensation that matters to employers. They are trying to maximize profits, and in so doing will endeavor to assemble a labor force of sufficient quality and size to enable them to produce output that they can sell at competitive prices. To attract the desired quantity and quality of labor requires that they offer a compensation bundle the total value of which is at least as good as other employers are offering. However, if they offer total compensation that is too high, they will find their costs are such that they cannot compete in the product market. The result of these forces is that they will, in theory at least, offer total compensation that is no more or less than is offered by other employers to workers in the same labor market. In short, for every type of worker or skill grade, there will be a "going rate" of total compensation that firms must pay.

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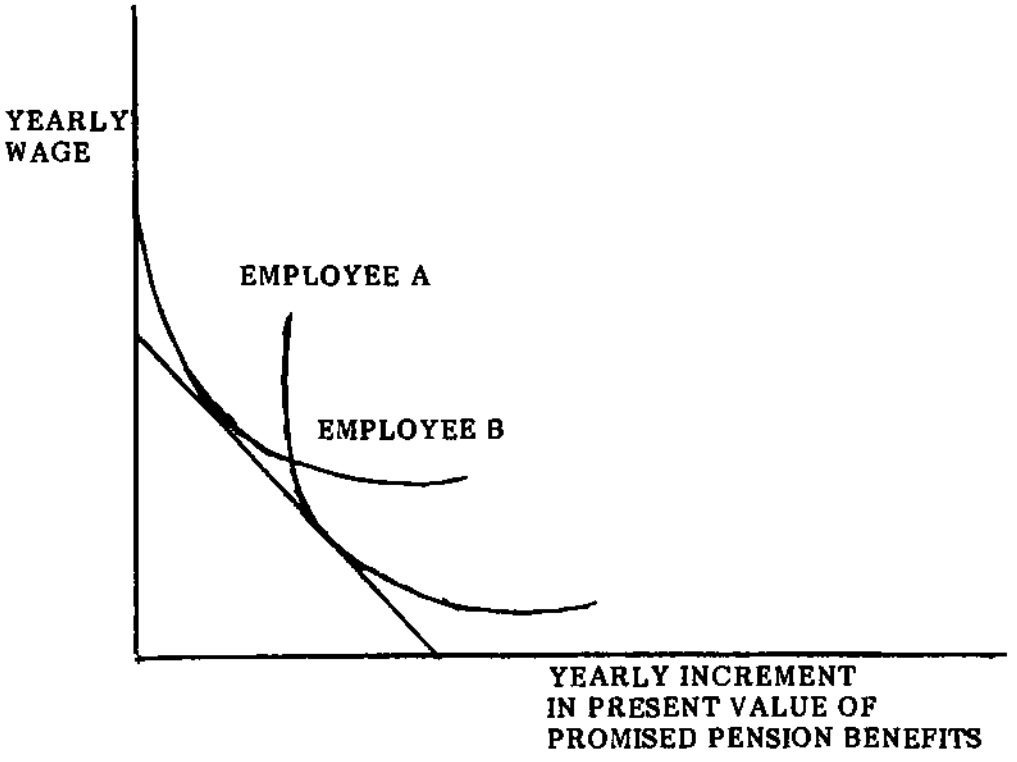
Employees, on the supply side of the market, will of course want to obtain offers that are as large as possible. They will find, however, that firms are unwilling to offer compensation packages that are more in total value than the going rate. Their problem, then, is to choose the package whose compensation bests suits their tastes.

The employer and employee sides of the market, discussed above, are summarized graphically in Figure 1. This graph looks at the relationship between pensions and wages and it implicitly assumes all other job characteristics or elements of compensation are controlled. We have argued that employers must pay the "going rate" in terms of total compensation, and that at this compensation level they will be competitive in both the labor and product markets.[1] The employer side of the labor market can thus be represented by an "isoprofit curve"—a curve along which any combination of wages and pensions yields equal profits to the firm. The isoprofit curve shown, XX, is the zero-profit (competitive) curve, and it implies that the firm must pay $X in total compensation to be competitive in the labor market. Because the firm's total costs are the same whether the firm spends $X on wages or $X on pensions, the isoprofit "curve" shown is a straight line with a slope of -1.

FIGURE 1



The employee side of the market can be represented by indifference curves. All employees view wages and pensions as giving them utility, and if wages are reduced utility can only be kept constant if pensions are increased. If wages are high, a wage reduction of $Y for example, could be accompanied by a small increase in pensions and utility would be held constant. This is because high wages imply high marginal tax rates, and employer pension contributions are not taxed immediately. However, as wages continue to be cut in decrements of $Y, more and more pension contributions would be required to hold utility constant (pension contributions are not currently spendable). Thus, employee "isoutility" curves—along with utility is constant—are convex. Employees like A have relatively flat curves, which imples they do not value pensions highly. Employees like B. have steeper isoutility curves, and they are willing to give up more in wages to get an increase in pension benefits than is A.

Both A and B in Figure 1 are are in the same labor market and have the same skills. They both find, then, that they can do no better than obtain wage-pension offers whose value totals $X. They will get a variety of such offers falling along the employer isoprofit, or "offer," curve: XX. Their problem is to choose the mix of wages and pensions they prefer. Employee A chooses a mix more heavily oriented toward wages than employee B. However, since all offers are along XX, A's higher wage is made up for a lower pension than B receives. In fact, the dollar value of A's wage advantage over B is exactly equal to B's dollar advantage in the present value of yearly pension accruals.

Figure 1 and the associated theory behind it suggests two things about the question of who pays for improved pension benefits. First, it suggests that employees pay for their own pensions through a lowered wage. That is, theory suggests a negative wage-pension relationship once other things which affect compensation have been controlled for (as they have by assumption in Figure 1). Second, theory suggests that the above relationship is very close to one-for-one. That is, if the government requires employers to increase pension benefits so that their yearly pension costs rise by $200 per worker, theory suggests that wages would eventually end up being $200 lower than they would otherwise be.

One of us has shown elsewhere (Smith, 1981) that reasoning similar to the above leads to the conclusion that we might reasonably expect wages and pension underfunding to be positivey related, other things held constant. Employers might be able to offer higher wages if they underfund, because they might perceive underfunding to save them costs in the short-run. Employees would probably require higher wages to work for an underfunded employer, because an underfunded pension is a risky promise. Indeed, this positive relationship appears to hold in at least one public sector labor market (see Smith, 1981).

Similar reasoning about how labor markets work leads us, more generally, to expect that "good" employment characteristics will be offset to some extent by lower salaries, and that "bad" ones will be made up for by higher salaries, other things equal. Thus, companies with a more generous fringe benefit package will tend to pay lower wages (cet. par.), while those that require workers to contribute to their own pensions (for example) will have to pay higher salaries.

The theoretical considerations noted here suggest the outlines of an empirical study. If the theory is correct, we should observe that wages and pension promises (and other fringe benefits) are negatively related—and wage/underfunding and wages/employee pension contributions positively related—holding other things constant. A relatively simple empirical test is suggested by the theory, wherein the determinants of wages are studies. In particular, theory suggest that the following equation be estimated:

$$(1)\ W = a_o + a_1 P + a_2 U + a_3 F + a_4 R + a_x X + e,$$

where W = the wage or salary paid to workers;

P = the present value of yearly pension accruals ("normal cost");

U = underfunding per worker;

F = the level of other fringe benefits;

R = the pension contribution required of employees:

X = a vector of all other factors which influence wage rates; and

e = a random error term.

The coefficients a_i are to be estimated, and it is predicted that $a_1 = -1$, and that a_2 0, a_3 0, and a_4 0.

Data Requirements

While equation (1) appears to offer a rather simple empirical test, it requires data that do not normally exist in standard household or firm surveys. In particular, equation (1) imposes three data requirements that are difficult to meet. First, the variable P and UF require the availability of actuarial data on pensions. That is, we need to have access to actuarial estimates of "normal cost" (the present value of yearly increments in pension benefits which accrue to workers). We also need to have access to levels of funding. Data on Both P and UF are only found in employer-based data sets-and even there only rarely.

Second, we also need detailed information on the characteristics of pension plans in order to estimate (1) in an unbiased way. W and P in equation (1) are closely related for more than the behavioral reason suggested by theory. They are related in a very technical sense, because pensions are normally calculated as some fraction of wages. We are interested in the behavorial relationship, not the technical one, but the latter relationship (which is a positive one) may obscure the former (which we hypothesize to be negative). We must therefore find a way to filter out the technical from the behavorial relationship.

The filtering process consists of specifying that P (normal costs) is a function of W and a vector (Z) of all pension characteristics (vesting, replacement rates, COLA adjustments, etc.):

$$(2)\quad P = b_o + b_1 W + B_z Z + u.$$

We then proceed to estimate equations (1) and (2) using a two-stage, least squares estimator. What this essentialy involves is regressing P on all independent variables in (1) and (2) except W. Using these regression estimates, an estimate of P (call it P) is calculated and entered as an independent variable in equation (1). The variable P is an estimate of normal costs that is "purged" of the effects of wages. Using P in (1) thus allows us to observe the behavioral relationship.

Variables that belong in vector Z are likewise hard to come by in most data sets. They, too, are only found in employer data sets (when they can be found at all).

The third need is for measures of the variables in vector X--the "other things" that influence wages. Economists normally use data on education, age, race, sex, marital status, and so forth to control for these things, but such variables are not found in employer data assets. Thus, we must either find controls that are available in employer data or find ways to match employer and household data sets.

Our "solution" to these problems in this piece of research is to employ data provided us by Hay Associates, a large compensation consulting firm. Hay conducts its own survey of cash and noncash compensation within client firms and was able to provide us with a sample of roughly 250 usable observations. The sample has several rather unique characteristics. First, it contains the cast value of all fringe benefits--pensions, paid vacations and holidays, medical-dental plans, death and disability benefits, and profit-sharing or stock options.

Second, salary and fringe benefits were provided to us at three different white collar job grades within a company. Hay evaluates each job within a company using three principal criteria: required "know-how," accountability, and the degree of problem-solving involved. It assigns point values to each job characteristic and totals them. They then us these "Hay Point" evaluations as points of reference when comparing compensation within and across firms.

We were interested in obtaining the compensation associated with given Hay Point levels as one means of controlling for the "other things" that influence wages. Thus, we asked Hay to provide us with data at three different Hay Point levels in each of the 250 firms: 100 Hay Points (entry level white collar job for someone with a Bachelor's degree), 200 Hay Points (supervision of a small staff section), and 400 Hay Points (lower middle management position or a department head in a small organization). It normally takes three to six years to go from a 100 to a 200 Hay Point job, and seven to fifteen years to go from a 100 to a 400 point position within an organization.

A third essential feature of our data set is that it contains information on several crucial pension variables: employee contribution rate, integration with social security, eligibility and vesting provisions, replacement rate, cost of living adjustments to benefits, death benefits, and retirement age. It also contains data on unfunded vested liabilities and the 1978 difference between actual and required contributions.

Finally, the data contain information on firm size (number of employees) and industry—two additional elements of the vector (x) of "other things" that is so important. Companies in the sample tend to be large (12,360 employees at the mean), and 50% were in manufacturing industries. All data were for white collar employees in 1978, and all averages were computed on a company-wide basis. While compensation data related to specific Hay Point levels, pension and funding characteristics were common to each level within the same firm.

Mean levels of the components of total compensation are presented in Table 1. It is interesting to note that the range of salaries in each grade overlap and are quite large. It is also interesting that the value of the largest fringe benefit—paid vacations and holidays—tend to rise as a fraction of wages as one moves from 100 to 200 Hay Points and then falls after that (it goes from 8.8% to 9.5%, then to 7.7%).

The fringe benefit of most interest to us is pensions. Simple calculations (from Table 1) of the pension value expressed as a fraction of the wage rate show that they rise from 5.4% of salaries (100 Hay Points) to 6.6% and 7.7% for 200 and 400 Hay Points, respectively. Since replacement rates tend to fall as incomes rise,[2] this rise is probably due to vesting of more experienced employees and to the cost-reducing effects of social security integration on the pensions of lower-salaried employees.[3] Some summary statistics on pension plan characteristics within our sample are presented in Table 2.

Initial Estimates of Equation (1)

The initial estimates of equation (1) offer a striking example of the perils of testing the economic theory of wage-pension trade-offs. They also offer a strong illustration of why it is so widely believed that high pensions and high wages go hand in hand—a view that does nothing to discourage the notion that the mandated costs of pension reform will be provided "free" to employees. Fortunately, these initial results also provide us with an instructive lesson on the data needed to do insightful research on this important wage-pension issue.

Before discussing the results of our various estimations of equation (1), a word must be said concerning procedures used. We have already indicated that a two-stage, least squares procedure is necessary to purge P of its actuarial dependence on W, so that the behavioral relationship between W and P can be observed. The same would be true for any other fringe benefit which is actuarially dependent on the salary level. Death and disability benefits are typically expressed as a fraction of salaries, for

example, and the value of capital accumulation plans is normally related to salary. If they are to be used as independent variables they too must be purged of their technical dependence on salaries.

TABLE 1

Means (Range) of Hay Compensation Data
(Per Year)

	HAY POINT LEVEL		
	100	200	400
Salary	$13,328	$20,324	$34,774
	(7,700-26,100)	(12,000-31,000)	(24,700-55,200)
Pension Value	714	1,342	2,682
	(0-5,724)	(0-8,830)	(0-14,490)
Value of Vacations and Holidays	1,180	1,924	3,391
Death Benefit Value	207	325	577
Disability Benefit Value	396	653	1,194
Capital Accumulaton Value	308	523	937
Medical-Dental Plan Value (Same for all H.P. levels)	1,086	1,086	1,086

Unfortunately, the actuarial calculation of capital accumulation values and death and disability benefit values is highly complex, and we were not provided with sufficient data to purge meaningfuly them of the "salary effects." Our solution to this problem was to move the value of these three fringe benefits to the other side of the equation and add them to W, forming a new dependent variable, W W , which is then regressed against P, U, R, the days of paid time off, and the value of the firm's medical-dental plan. The vector X (which controls for those "other things") contains firm size, dichotomous variables indicating that firm size and/or underfunding data are missing in some cases, and dichotomous variables identifying industry affilitation.

The results are indicated in Table 3, and in general they run counter to the expectations generated by economic theory. The estimated wage-pension trade-off is positive at all three Hay Point Levles, as are most other wage-fringe trade-offs. Only the coefficients on underfunding (U) and required contributions (R) are generally in line with our expectations, although they rarely reach standard levels of statistical significance. The results presented in Table 3 were qualitatively unchangd when equation (1) was estimated by industry or firm size level.

What went wrong? We are inclined to think that, despite our controls for industry, firm size and level of job difficulty, our X vector did not contain a complete list of the "other" variables that influence compensation. This creates an "omitted variables" problem and seriously biases the results, as we will explain below.

Let us say that some firms have hiring and promotion policies that attract and keep only the most dynamic and motivated of workers. These workers may hold down jobs rated at (say) 400 Hay Points, but because they are so efficient they command a higher level of compensation than is received by their less efficient counterparts in other firms. Now we cannot measure "motivation" within our data set (and indeed it is almost never measured in any data set). Since "motivation" is positively associated with salaries and all other fringes, its omission means that the fringe benefit variables will pick up the effects of "motivation" on salaries in estimats of equation (1). All estimated coefficients of fringe benefits (including pensions) are thus biased in a positive direction.

We believe that the casual observation that pensions and salaries are positively related is due to this omitted variables problem, and we also believe that our more formal findings reported in TAble 3 also suffer form this problem. Our belief is strengthened by a quick look at the tremendous range of salaries within each of three Hay Point levels (Table 1). Firms that pay lower middle managers $25,000 per year must have very different employees than those paying $55,000!

In our past work, where we have found a negative wage-pension relationshiip in the public sector, we have worked with employers whose personnel probably did not vary much in quality. We worked with data on police officers, fire fighters, or nonuniformed local government workers. They all serve roughly the same function and the same clientele. Hiring standards and personnel practices in Dayton, Ohio or Harrisburg, Pennsylvania, for example, are unlikely to be as disparate as they are in (say) IBM or the Santa Fe Railway. Thus, our prior results are much more credible than those in Table 3. There is a way, however, to cope with the omitted variables problem with our data set, and we turn to this in the next section.

TABLE 2

Summary Statistics on Selected-Pension Plan Characteristics

Percent of plans with full vesting after 10 years	71%
Percent integrated with Social Security	87%
Percent with formal or informal COLA	46%
Mean replacement rate for 30-year employee with a salary base of $25,000	54%
Mean replacement rate for 30-year employee with a salary base of $50,000	47%
Percent with disability retirement	35%

Estimates of Within-Firm Wage Profiles

If we are correct that our data set fails to capture the effects of company-specific hiring and retention policies on worker quality, we should still be able to test our theory by looking at salary profiles within companies. We can thus exploit the fact that we have salary and fringe benefit "readings" at three different points along each company's job ladder, as we demonstrate below.

Let us assume that salaries are determined by the following equation at the 100 Hay Point level:

$$(2)\quad W_{100} = a_o + a_1 P_{100} + a_2 U_{100} + a_3 F_{100} + a_4 R_{100} + a_x X + a_m M + e,$$

where M stands for worker motivation (which we cannot observe) and X contains other measureable variables that influence wages. M and X are assumed to be constant for each Hay Pont level within a firm. Let us assume that a simiar equation describes wages at (say) 400 Hay Points:

$$(3)\quad W_{400} = a'_o + a_1 P_{400} + a_2 U_{400} + a_3 F_{400} + a_4 \$_{400} + a'_x X + a_m M + e'.$$

TABLE 3

Selected Coefficents from Initial Estimates of Equation (1)
(Dependent Variable = W)

Coefficients (Standard Errors) on:		HAY POINT LEVEL 100	200	400
Pension Value	(P)	1.036 (.501)	1.069 (.486)	.456 (.511)
Underfunding	(U)	.156 (.089)	.152 (.120)	.070 (.224)
Paid Vacations and Holidays		-42.550 (10.219)	66.028 (78.701)	157.947 (106.278)
Medical-Dental Plan Value		1.776 (.810)	1.680 (1.028)	.428 (1.902)
Required Employee Contribution To Pension Fund	(R)	4.634 (3.605)	-1.212 (4.975)	10.532 (8.964)
R^2		.59	.49	.30
Mean of Dependent Variable		$14,945	$21,890	$ 37,530

The assumptions underlying (2) and (3) are that the wage-fringe trade-offs (a_1, a_2, a_3, and a_4) are the same at each Hay Point level, but that the constants of the equations (a_o and a_o') differ. We also assume that the coefficients on the variables in the X vector differ, but that the X variables (firm size, industry) are the same at each Hay Pont level within a firm. The effects of motivation (M) are assumed to be the same in each equation.[4]

The next step is to subtract equation (2) from (3) in order to arrive at an equation which explains the difference in salaries across Hay Point levels within each firm:

$$(5)\ W_{400} - W_{100} = (a_o' - a_o) + a_1 (P_{400} - P_{100}) + a_2 (U_{400} - U_{100}) + a_3 (F_{400} - F_{100}) + a_4 (R_{400} - R_{100}) + (a_x' - a_x) X + e.$$

One can note from (5) that the unobservable effects of motivation drop out of the equation, (we are explaining within-firm wage profiles now).

It should also be noted that the underfunding variable drops out of (5) because underfunding in our data set is the same for every worker within a given firm. The value of the firm's medical-dental plan also drops out of F, since it is the same for each Hay Point level within a firm. Further, for reasons cited above, the capital accumulation and death/disability benefit variables were moved to left-hand side of (5) by adding them to the salaries at each Hay Point level.

The respecified estimating equation used to test our theory is reproduced as equation (6) below:

$$(6)\ \Delta W = a_o'' + a_1 (\Delta P) + a_3 (\Delta F) + a_4 (\Delta R) + a_5 (S) + a_6 (T) + a_d D + e.''$$

The variables in (6) are defined as follows:

$\Delta W'$ = the change in salaries plus death, disability, and capital accumulation fringe benefits from one Hay Point level to another within a firm;

ΔP = the change in pension value from one Hay Point level to another, (an instrumental variable, P, is substitued for P by our two-stage least squares estimating technique);

ΔF = the change in days of paid leave from one Hay Point level to another;

ΔR = the increase in required pension contributions by employees;

S = firm size (a variable in the X vector);

D = a vector of industry dummy variables (which also includes a dummy variable indicating if firm size data were missing); and

T = a dichotomous variable taking the value of 1 if the firm has a mandatory retirement policy and 0 if it does not.

The mandatory retirement variable T is included because it is thought that firms with mandatory retirement have steeper earnings profiles than those who do not.[5]

Theory leads us to the following expectations regarding the estimated coefficients in (5):

$a_1 = -1$

$a_3 = 0$

$a_4 = 0$

$a_6 = 0$

a_5 and a_d (no a priori expectations).

One problem in estimating equation (6) is that $\Delta R = r^{*}\Delta W$, where r is the percent of salaries employees are required to contribute to their own pension. The term ΔW, however, is an important component of $\Delta W'$, and lacking satisfactory instruments of ΔR we are faced with a simultaneous equations problem. We dealt with this problem in two ways.

First, because there are good theoretical reasons for supposing that coefficient a_4 in equation (6) is equal to unity, we constrained a_4 to equal +1 and subtracted ΔR from both sides of equation 6. Letting $\Delta W_n'$ stand for $W - R$, we then have the following regression equation:

$$(7)\quad \Delta W_n' = a_o'' + a_1(\Delta P) + a_3(\Delta F) + a_5(S) + a_6(T) + a_d D + e.$$

The disadvantage of this formulation, of course, is that its validity rests on an assumption about a_4 that we would really like to test.

Our alternative specification of equation (6) involved replacing R by r and estimating the following equation:

$$(8)\quad \Delta W' = a_o'' + a_1(\Delta P) + a_3(\Delta F) + a_4(r) + a_5(S) + a_6(T) + a_d D + e.$$

The justification for this approximation of equation (6) is that as r increases, the amount of employee pension contributions will rise for given changes in salary. Thus, the coefficient on r should clearly be positive, but equation (8) must be regarded only as an approximation to the "true" relationship.

Equations (7) and (8) were estimated using a two-stage least squares procedure which recognizes the technical dependence of P on W. Three versions of (7) and (8) were estimated: differences between 200 and 100 Hay Points, differences between 400 and 200 Hay Points, and differences between 400 and 100 Hay Points. The results for equations (7) and (8) are presented in Tables 4 and 5, respectively. Because the results are so similar [6] we discuss only the results in Table 5.

The result of most interest for our current purposes is, of course, the estimated coefficient on the pension variable. All three estimated are negative, although only one (in the 400-100 equation) is significant at conventional levels. This coefficient of -1.38, however, is also very close to the expected value of -1, and is in fact insignificantly different from -1. The coefficient in the 200-100 equation is -3.39 and is larger than its standard error (it is significantly different from -1, although the size and accuracy of its point estimate lessen the support it gives to the theoretical prediction. The estimate of a_1 in the 400-200 equation, while negative. obviously gives no support to the theory.

Of some interest are the estimated coefficients on the "paid days off" and "employee contribution" variables. If these aspects of fringe benefits have their expected signs, some other support for the theory put forth here will have been registered. In general, these coefficients do conform to expectations. In the 200-100 and 400-100 estimates, the "paid days off" variable has a significantly negative coefficient. The size of the estimate in each case suggests that one more paid day off lowers one's yearly salary by \$140-150—a daily rate of pay which implies yearly compensation of about \$38,000. Since \$38,000 is within the range of salaries observed in our sample, we believe the two estimates to be essentially credible.

The estimated coefficient of "paid days off" in the 400-200 equation clearly gives no support to our theory, but the coefficient on "employee contributions" in that equation does. It, like the other two estimates, is positive (as expected), but unlike the other two its point estimate is significantly different from zero. Moreover, its size suggests that there is the expected one-for-one trade-off between salaries and required pension contributions at a yearly salary of about \$37,000 per year. This implied yearly salary is remarkably consistent with the implied values above, and while a bit on the high side, it does fall into the range of what might be considered credible.

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TABLE 4

Estimates of Equation (7)
Determinants of the chage in Salary Plus Selected Fringe Benefits
(Net of Employee Pension Contributions) Across Hay Poitn Leels Within Firms

(Method: Two-Stage Least Squares)

	Coefficients (Standard Errors) of Independent Variables		
	100 -- 200 H.P.	200 -- 400 H.P.	100 -- 400 H.P.
Change in Paid Holidays (Days)	-149.09(38.10)**	16.69(62.44)	-141.62(42.72)**
Change in Pension Value (Dollars)	-3.43(2.86)	-.10 (.40)	-1.38(1.00)*
Presence of Mandatory Retirement	404.15(1165.61)	254.36(399.75)	752.67(1350.23)
Firm Size (Number of Employees)	.019(.015)	.009(.006)	.009(.016)
Industry-Wide Effects (Financial, Insurance, Real Estate Omitted): Durable Mfg.	1682.46(1350.08)	215.70(450.56)	2158.76(1507.72)
Non-Durable Mfg.	3063.27(1527.78)**	1745.35(532.90)**	5142.42(1765.96)**
Transportation, Communications and Public Utility	3561.75(2007.85)*	-513.05(663.29)	2721.59(2232.49)
Service	2950.47(1954.53)	-182.24(657.17)	2865.05(2213.37)
Firms With Missing Data On Firm Size	-901.60(1475.13)	342.53(503.53)	-839.17(1690.34)
Constant	6821.82(1754.43)**	14,704.20(578.43)**	22,147.46(2012.29)**
R^2	.09	.09	.09
Number of Observations	246	241	241

** indicates significance at the .05 level and * at the .10 level, with one-tail tests on all variables except firm size and the industry dummies.

TABLE 5

Estimates of Equation (8)
Determinants of the Change in Salary Plus Selected Fringe Benefits Across Hay Point Levels Within Firms

(Method: Two-Stage Least Squares)

	Coefficients (Standard Errors) of Independent Variables		
	100 -- 200 H.P.	200 -- 400 H.P.	100 -- 400 H.P.
Change in Paid Holidays (Days)	-149.08(38.18)**	19.29(62.95)	-141.62(42.84)**
Change in Pension Value (Dollars)	-3.39 (2.85)	-.11 (.40)	-1.38(1.00)*
Employee Pension Contribution Rate (Percent)	.10 (7.32)	3.69 (2.50)*	2.45(8.36)
Presence of Mandatory Retirement	380.75(1170.15)	299.98(402.53)	746.97(1355.13)
Firm Size (Number of Employees)	.019(.015)	.009(.006)	.009(.015)
Industry-Wide Effects (Financial, Insurance, Real Estate Omitted):			
Durable Mfg.	1693.69(1354.65)	177.27(455.30)	2149.38(1518.28)
Non-Durable Mfg.	3067.55(1531.12)**	1734.50(536.56)**	5138.52(1772.55)**
Transportation, Communications and Public Utility	3572.31(2033.69)*	-600.34(674.06)	2694.58(2265.16)
Service	3009.76(2051.88)	-182.99(693.13)	2869.77(2328.45)
Firms With Missing Data On Firm Size	-912.19(1478.58)	353.57(507.07)	-848.37(1696.06)
Constant	6814.33(1763.84)**	14,675.95(587.50)**	22,137.66(2032.65)**
R^2	.09	.10	.09
Number of Observations	246	241	241
Mean of Dependent Variable	$6,977.00	$15,348.00	$22,371.00

** indicates significance at the .05 level and * at the .10 level, with one-tail tests on all variables except firm size and the industry dummies.

Of minor interest are the results concerning the effects of firm size and mandatory retirement. Salaries are normally believed to be higher in larger firms, and it appears that there is some evidence that suggests salary increases over time are larger in big firms too. The mandatory retirmeent variable has its expected sign but is not significant.

Overall, there were 12 coefficients (in the three versions of equation (8) for which we had sign expectations. In 11 of these 12 cases the signs matched expectations, and in four of these the estimated coefficients were statistically significant at conventional levels (all four of these cases involved fringe-benefit variables). In one additional case involving pensions, an estimated coefficient was "close" to conventional levels of significance.

It is not entirely clear why the compensation changes occurring between 200 and 100 Hay Points and 400 and 100 Hay Points should offer more support for economic theory than the differences between 400 and 200 Hay Points. A purely statistical factor is that the variance in ΔW_1 and ΔW_0 is much smaller for the 400-200 comparison than for the others. However, an economic reason for the lesser consistency with theory may have to do with the element of mobility. The theory of compensating wage differentials rests on an assumption that workers have a reasonably wide set of job choices, and the small the actual set the less likely it is the labor market outcomes will correspond to theory. We noted earlier that workers will typically rise from jobs at the 200 H.P. level to those at the 400 level around their fifth to tenth or twelfth year of tenure. Given that most firms (71% in our sample) offer pensions that vest after 10 years, workers will progress from 200 to 400 H.P. in their least mobile years. Workers progressing from 100 to 200 H.P. are young, and while unvested, lose very little of accumulated pension rights if they quit. By the time they reach 400 H.P., however, they will typically be vested and may feel more mobile once again.

Summary and Conclusions

An important issue for those in the business of proposing or legislating pension reform is who will pay the costs of any reforms. It is widely believed that firms will bear these additioanl costs, and this view is buttressed by an apparent positive relationship betwee wages and pensions. Since "good" firms pay good wages and have good pensions, it seems to be a small step in logic to conclude that all firms can be forced to be "good" and that employees will clearly benefit if they are.

Economic theory, however, suggests a less optimistic view of pension reform. It suggests that for any one individual, wages and pensions are negatively related. Each worker, or class of workers, can obtain only so much compensation at any time—the level of compensation being limited by how much they are worth to firms. If firms are forced to increase the value of pensions offered to employees, they will have to offer less in wages or salaries than they would otherwise. Thus, it may well be the workers who wind up paying the costs of pension reform.

This paper has explored the relationship between wages and the value of pensions (and other fringe benefits). Our reasearch has utilized a data set that is unique in several ways: it contains the dollar evaluation of all fringe benefits for 250 firms, it has information on the pension characteristics which underlie "normal costs" of each plan, and it contains compensation levels for each firm at the same three points along their promotion ladders. These data have allowed us to estimate the wage-pension trade-off in both the conventional and an unconventional way.

Our "conventional" estimate invovled analyzing the determinants of salary levels across firms for three diffeent job levels. Pensions and other fringe benefits were included among the list of independent variables, as were pension funding levels and required employee pension contributions. The results appeared to indicate support for the "conventional wisdom" that pensions and wages are positively related.

It is our belief, however, that the above results are the product of "omitted variables bias." Employees differ across firms in significant, but unmeasureable, bias. Those who are highly motivated and efficient will obtain higher wages and higher pensions. Since motivation and efficiency are unobservable, their effects on salaires will be "picked-up" by an independent variable with which they are correlated--and pensions and other fringe benefits are prime candidates. Thus, the estimated coefficients on these variables are probably positively biased.

To test our suspicions about the effects of omitted variables, we formulated a test of our theory concerning wages and pensions that is free of the problem. Because within each firm workers on the same job ladder should display roughly the same levels of motivation, we analyzed the wage-pension trade-off within the context of compensation differences along the job ladder within firms. Our results are generally supportive of the predictions made by economic theory. While we cannot claim they are strongly supportive, they are clearly more in line with the view of the world advanced by economic theory than they are of what we have called the "conventional" view.

Where estimates of statistical significance at (or close to) conventional levels are obtained, the coefficients are also of credible (expected) size. All four statistically significant fringe benefit coefficients (one on pension value, one on pension contributions, and two on paid days off) suggest that workers pay for fringe benefits on close to a dollar-to-dollar basis. The trade-off suggested by a fifth coefficient, which barely missed attaining conventional levels of significance, cannot be said to differ from unity. Further, in the cases where statistical significance was not obtained, the coefficients at least tended to have their expected sign.

We thus conclude that, at a minimum, it would be unwise to rule out the possibility that workers will pay the costs of pension reform. Indeed, we have advanced some evidence suggesting that they pay for fringes on a dollar-to-dollar basis--evidence that is consistent with results we have found in earlier work on public sector labor markets.

(The data file used for this study can be found in Appendix F of this volume.)

Notes

1. If they were noncompetitive in either, they would go out of business and wages and prices would change toward their equilibrium levels.

2. The sample data show that the mean replacement rate for 30-year employees with a salary base of $10,000 is .62. The corresponding figures for salary bases of $25,000 and $50,000, respectively, are .54 and .47.

3. If a vested employee at 200 Hay Points quits, the firm will not have to pay a pension based on a very high salary base. For people now at 200 Hay Points who remain with the firm this is, of course, not true.

4. Motivational characteristics are assumed to add some constant amount to salaries, with the constant equal at each Hay Point level.

5. See Edward Lazear, "Why Is There Mandatory Retirement?" Journal of Political Economy (September/October 1979).

6. Only 10% of the firms in our sample required employees to contribute to their own pension plan. However, it is reassuring to find that the results are insensitive to our alternative ways of handling the problem posed by employee contributions.

7. The standard deviation was 9146 for $\Delta W'_{400-100'}$ 8170 for $\Delta W'_{200-100'}$ but only 2777 for $\Delta W'_{400-200}$.

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CHAPTER 28: COLLECTIVE BARGAINING FOR RETIREE BENEFITS

Richard Bank

Introduction

Today, nearly 20 million workers in the private sector are participants in defined benefit pension plans that are negotiated as a result of collective bargaining agreements. These 20 million workers represent nearly two-thirds of all private sector workers participating in defined benefit pension plans.

Defined benefit pension plans promise a specific benefit for the worker at the time of retirement. Defined benefit plans are preferred over other types of pension plans by a majority of both workers and management, according to a 1979 Louis Harris poll.[1]

Basic to the philosophy of defined benefit plans is the guarantee of a benefit of a specific dollar amount. The high inflation rates of recent years have begun to weaken the value of this guarantee. For example, with only a 5 percent inflation rate, the value of a $100 pension declines to $61 in 10 years; with a 15 percent inflation rate it declines to $39.

The most common type of collectively-bargained defined benefit plan calls for a fixed dollar benefit per month for every year of service. This is the so-called "flat benefit" plan. The fixed amount in the formula is subject to bargaining each negotiating session—usually every three years—and frequently this number is increased through what is called an "ad-hoc adjustment" so that the defined benefit provides what is considered by the bargaining parties to be an adequate replacement of preretirement earnings.

Another, less common type of private sector collectively-bargained defined benefit plan, is the "final-average-pay" plan. This type of plan usually provides a benefit based on the workers' final (or high) three or five years of salary or wage. The benefit is therefore automatically increased as the level of salary or wages increases. Because of this automatic process, changes in the benefit formula in final average pay plans are much less frequent than in flat benefit plans. Nevertheless, once a worker retires under a "final-average-pay" plan, the worker's need for adjustments to make up for the erosion over time of pension value is the same as that of a worker who retires under a "flat benefit" plan.

Several private sector surveys indicate that fewer than 5 percent of all private sector plans provide for automatic pension benefit increases for retired workers, and even in these plans a "cap" of less than a 3 percent to 5 percent increase in the Consumer Price Index is common.[2] Thus, most workers, regardless of the type of defined benefit plan under which they retire, must rely upon ad hoc increases from time to time to stabilize the value of their pensions as inflation increases.

The author was a consultant to the Commission. This paper was completed in November 1980.

The current high rate of inflation in the United States economy force reappraisal of the current mechanisms for providing inflation protection for retired workers. The purpose of this paper is to explore whether the collective bargaining process, in its present form or with certain modifications, is adequate to the task of providing retired workers with meaningful protection against inflation.

The Pittsburgh Plate Glass Decision

The discussion over the viability of the collective bargaining process to protect retiree interests often centers around a Supreme Court decision known commonly as "Pittsburgh Plate Glass" (hereinafter called PPG). Before 1971, unions were not explicitly barred from forcing employers to bargain over increased benefits for workers who had already retired or from striking if employers refused union demands in behalf of retirees. In 1971, however, the U.S. Supreme Court ruled in the landmark case of Allied Chemical & Alkaline Workers v. Pittsburgh Plate Glass Co.,[3] that unions could not force employers to bargain over such benefits for retirees, and consequently, that unions could not strike over demands for such benefits.

This conclusion rested on two critical findings. First, the Supreme Court found that because retirees had severed themselves from employment, legally they were no longer "employees." Second, the Court found that because the interests of active workers and the interests of retirees may well collide, retirees cannot be included within a unit of active workers represented by a union in collective bargaining negotiations.

The Court held that because retirees are not "employees," an employer has no legal duty to bargain about benefits for them when a union raises the issue. Moreover, because retirees are not "bargaining unit members," a union does not even have a legal duty to attempt to raise the issue of benefits for retirees. As a practical matter, PPG left retirees without any real representation at the bargaining table and left them ultimately reliant upon the good will of their former employers for possible post-retirement pension benefit increases.

Identical legislation has been introduced in both houses of Congress to overrule PPG.[4] The proposed legislation would not explicitly alter the legal status of retirees as nonemployees and nonbargaining unit members. It would, however, make their benefits "a mandatory subject of bargaining."[5] This means that if a union placed the question of retirees' benefits on the table during the course of collective bargaining, the employer would be under a legal obligation to negotiate them, and if the parties could not reach agreement on the question of such benefits, the union would have the right, which it does not have now, to strike to enforce its demands on behalf of retirees.

While legislation to make retiree benefits a mandatory subject of bargaining would give unions new power to push for retirees' benefits, the effectiveness of this or other attempts to provide a mechanism for protecting retirees against inflation through the collective bargaining process is open to question. The following section assesses the collective bargaining process and its ability to apportion fairly benefits for active workers and retirees.

Collective Bargaining as a Mechanism to Protect the Value of Pensions

Background

In collective bargaining, the parties come to the bargaining table with demands and expectations but not with guarantees. To reach agreement with the employer, a union must necessarily balance, compromise, and trade off interests of the groups it represents. Thus, the bargaining process results inevitably in agreements in which some groups do better than others.

If the goal is to protect retirees' benefits from inflation on a consistent basis, the question becomes whether a freewheeling, give-and-take process like collective bargaining is adequate to the task. Putting aside the crucial role of the employer who is free, with some exceptions, to veto union proposals because they are not in the union's interest, the answer depends upon whether unions have as strong an institutional interest in representing retirees as they do in representing active workers.

The Internal Political Dynamics of Unions and the Interests of Employers

Unions undoubtedly feel strong moral obligations to retirees, many of whom helped build the union movement in its infancy. Nevertheless, the institutional political structure of many, if not most, unions dictates that any conflicts between the interests of active workers and retirees be resolved in favor of active workers. While the law requires that union officers must be elected,[6] unions generally do not extend voting membership to retirees. Consequently, to stay in office, officers of most unions must respond predominantly to the interests of active workers. Nowhere are those interests more important than in the collective bargaining arena where the economic welfare of workers and their families is at stake.

Moreover, in many unions, tentative collective bargaining agreements must be approved by rank and file members before becoming effective. Since retirees generally may not retain union membership, they have no right to vote upon proposed agreements, even upon those provisions that affect their benefits.[7] Because only those who are union members, and thus active workers, vote under a ratification system, the likelihood of contract approval is negligible unless the expectations of active workers are satisfied. The upshot is that where ratification is the rule, to assure the successful conclusion of a collective bargaining agreement, union negotiators must tailorit to the needs of active workers, regardless of the equities.

Nor is there any incentive for unions to allow retirees to vote on ratification, because, since the decision in PPG, unions may not strike over the issue of retiree beneits. If retirees were allowed to vote, especially where they composed a large part of a union's jurisdiction, or where balloting over contract approval was likely to be close, they could defeat a proposed collective bargaining agreement if dissatisfied with provisions made for them. The union would then be on the horns of an insoluable

dilemma because any attempt to force the employer to renegotiate provisions for retirees would violate the law, and in the absence of such an attempt, ratification might become impossible.

This is not to say that active workers and retirees share no common interests. For example, active workers will someday be retirees and have a real interest in seeing, through periodic benefit increases, that retirees pensions are adequate. This is particularly true of older workers.

Nevertheless, it is wages and nonretirement fringe benefits that directly and immediately benefit active workers. Thus, it is predictable that these will be the highest financial priority of active workers during collective bargaining. This tendency should logically be strongest during periods of high inflation when immediate financial pressures upon active workers are the heaviest. Yet, it is precisely at such times that retirees will also need the greatest relief through ad hoc benefit increases. With the internal structural dynamics of most unions favoring the needs of active workers, the result is that when retirees need substantial pension increases the most, they may be least likely to receive them.

Employers have no inherent self-interest in granting benefits to retirees either. Because retirees have severed themselves from active employment, they do not contribute to the productivity or success of the employer's business. Thus, the satisfaction of retirees with their lot has no practical consequence for an employer's day-to-day operations. In contrast, the satisfaction of active workers with their wages and working conditions has direct bearing upon their morale, and consequently upon the employer's operations in terms of productivity and labor relations.[8] Thus, it should usually be to the employer's benefit to favor the interests of active workers over those of retirees.

The Doctrine of Fair Representation

Background

With the institutional forces promoting the collective bargaining interests of retirees so weak, a question arises as to how retirees could be guaranteed proper representation at the bargaining table even if union's were given real power to represent them. The traditional mechanism for promoting proper representation has been a judicially erected doctrine requiring unions to represent fairly those for whom they bargain. This doctrine is known as the duty of fair representation.[9]

Those Entitled to the Right of Fair Representation

The duty of fair representation is a broad equitable corollary of the grant to unions of exclusive power to represent collective bargaining interests. As such, the doctrine simply requires that the power delegated to unions be exercised fairly in behalf of whomever a union has been empowered to act.

The right of active workers who are "employees" within a "bargaining unit" represented by a union to fair representation is the most familiar application of this general equitable principle, but the right to fair representation is theoretically applicable to whomever the union represents. For example, in Steele v. Louisville & Nashville Railroad Co.[10], the landmark case announcing the doctrine of fair representation, the Supreme Court defined its scope in the broadest possible terms:

> We hold that the language of the Act to which we have referred, read in light of the purposes of the Act, expresses the aim of Congress to impose on the bargaining representative of a craft or class of employee or the duty to exercise fairly the power conferred upon it in behalf of all those for whom it acts without hostile discrimination against them. (Emphasis supplied)[11]

The Supreme Court has since confirmed wide sweep of the duty of fair representation in Railroad Trainmen v. Howard.[12] There, the Supreme Court held that, even against employees it did not represent, a union may not exercise power to bargain unfairly.

More recently, in Nedd v. United Mine Workers,[13] the Third Circuit Court of Appeals ruled that a union must represent fairly the interests of retirees, notwithstanding the fact that retirees are neither "employees" nor "bargaining unit members," and notwithstanding the fact that the union had voluntarily undertaken to represent retirees even though the union had no legal duty to do so. Basing its reasoning on the Supreme Courts' decision in Howard, the Court held:

> (F)ederal common law implied from the statutory authority conferred upon collective bargaining representatives has recognized the need to place limitations upon the power of the recognized bargaining representative inside and outside the bargaining unit." (Emphasis supplied)[14]

Consequently, whether or not retirees are considered "employees" or "bargaining unit members", they should under existing law, still be entitled to the right of fair representation.

The Application of the Doctrine of Fair Representation in the Context of Collective Bargaining

Fair representation issues arise at every stage of the bargaining process—in the formulation of contract demands, in agreement upon contractual provisions, and in the administration of the agreed upon contract. The Supreme Court set the parameters of a union's duty of fair representation in the negotiating context in Steele. The Court required that any "unfavorable affects" upon particular groups the union represents and which result from bargaining be based upon "relevant differences"[15] between those groups and other groups the union represents.

While requiring unions to premise distinctions upon "relevant differences, the Supreme Court, nevertheless, has recognized that unions must have significant leeway--a "wide range of reasonableness"--in bargaining. Thus, in upholding preferential seniority provisions negotiated for returning veterans, the Court said:

> Any authority to negotiate derives its principal strength from a delegation the negotiators of a discretion to make such concessions and accept such advantages as, in light of all relevant considerations, they believe will best serve the interests of the parties represented. A major responsibility of negotiators is to weigh the relative advantages and disadvantages of differing proposals....Inevitably differences arise in the manner and degree to which the terms of any negotiated agreement affect individual employees and classes of employees. The mere existence of such differences does not make them invalid. The complete satisfaction of all who are represented is hardly to be expected. A wide range of reasonableness must be allowed a statutory bargaining representative in serving the unit it represents, subject always to complete good faith and honesty of purpose in the exercise of its discretion.[16]

By and large this standard is concerned with how a union negotiates, and above certain minimum standards not with what a union negotiates. Under any existing standard of judicial review, the leeway allowed unions is large indeed. Thus, at the least, a union may agree to anything, so long as it refrains from bargaining decisions based upon internal politics or outright hostility or bad faith. At most, a union must show a rational basis for bargaining decisions -- that is, it must demonstrate that the provision bargained for furthers some legitimate union objective. Indeed, some courts go so far as to require a union to consider the views of political minorities within the union before setting bargaining goals.

While existing requirements may prevent unions from actively ignoring the needs of those whom unions represent, they do not require unions to bargain for substantive provisions for minority union groups who are by some objective standard minimally adequate to their needs.[17] In the absence of hostility or irrationality, courts have approved clauses requiring the forced retirement of older workers,[18] super-seniority for union officials,[19] differential seniority systems favoring the rights of some union members over others,[20] differential seniority systems favoring union over non-union employees,[21] and the termination of non-vested pension rights,[22] so long as the union could show furtherance of some legitimate union objective.

In short, the duty of fair representation is not linked with a duty to negotiate provions that are substantively "fair." Consequently, even assuming retirees were entitled to a duty of fair representation, it would be difficult to argue successfully that unions must attempt to negotiate pension increases for retirees at any particular level -- for instance, one which would offset inflation or one equal to benefits of active workers.

Probable Inadequacy of Relief Under the Traditional Doctrine of Fair Representation

Background

The problems described above are exacerbated by the difficulties connected with the relief which retirees might reasonably expect even if they could establish a violation of their rights. Although the Supreme Court ruled early that breach of the duty of fair representation entails "the usual judicial remedies of injunction and award of damages,"[23] applying these remedies where future financial benefits are at stake might be difficult for several reasons. First, the measure of damages would be unclear. Second, in cases covering large numbers of retirees, courts might be faced with the problem that if they award appropriate damages to retirees, the union's fiscal viability—and thus its future bargaining capacity—will be destroyed. Third, employers have a legitimate business interest in protecting their pocketbooks, and it is difficult to see how damages could be awarded against an employer merely for striking a hard bargain that affects retirees adversely.

Awarding Damages Against Unions

Fair representation decisions overturning union collective bargaining actions have usually involved cases where previously accrued rights have been bargained away.[24] In such cases, the remedy is clear because preceding collective bargaining agreements provide a readily ascertainable measure of relief. Thus, where previously existing seniority rights have been forfeited, courts need only order their restoration.[25]

If a court found that a union had unfairly represented the interests of retirees in bargaining over future benefit increases, there would be no such norm. The court would have to step into the shoes of the parties and decide what new rights by way of increases for retirees should have been negotiated. Past agreements might provide some guidance, but because financial benefit packages are negotiated in the context of the current fiscal picture, such guidance would certainly not be determinative. In essence, the court would have to decide how the union should have split what it obtained from the employer between active workers and retirees. This is a speculative judgment, certainly well outside the normal range of judicial expertise, and it can be assumed that courts would entertain such deliberations only with the greatest reluctance.

It is also likely that courts would be reluctant to make large damage awards jeopardizing the fiscal stability of offending unions. A good indication is the reasoning of the Supreme Court in Electrical Workers v. Foust.[26] In Foust, the Supreme Court addressed the issue of whether punitive damages could be awarded against unions breaching their duty of fair representation. Punitive damages are those awarded as punishment in addition to damages necessary to compensate persons injured by the union's breach. The Supreme Court rejected the possibility of punitive damages in fair representation cases on the grounds that punitive damages:

> (C)ould impair the financial stability of unions and unsettle the careful balance of individual and collective interests which this court has previously articulated in the unfair representation area.[27]

Similarly, in a case involving issues analogous to fair representation, the U.S. District Court for the District of Columbia was faced with the task of assessing purely compensatory damages against a union which had used retirees. The court limited the union's liability expressly because:

> In the longer view of matters, the Union's strength protects the interests of the beneficiaries, past and prospective; the Union should not be weakened to a point where its stance at the bargaining table will be substantially impaired.[28]

Awarding Damages Against Employers

Balancing the right of individual retirees to fair compensation against the collective need of all those a union represents for a viable bargaining representative would be easier if the employer could be required to contribute in compensating retirees. Courts have routinely awarded damages against employers in fair representation suits, but this has generally been in circumstances where there is an independent ground of employer liability. For example, in instances where an employer violates a collective bargaining agreement, and employees file a grievance which a union fails to process fairly, damages may be awarded against both the union and the employer. The damages awarded against the union are for failure to represent the employees fairly. Awards against the employer, however, are for breach of the collective bargaining agreement and must be limited to the provable damages occasioned thereby.[29]

Some courts have indicated that even where there is no independent ground of liability, employers may be joined in fair representation suits to afford "complete relief."[30] In the context of most decided cases, affording "complete relief" means requiring employers to reinstate previous seniority or job status to employees injured by discriminatory contractual provisions advocated by the union and agreed to by the employer, and to contribute in compensating the victim.[31]

Several courts have allowed joinder of employers in fair representation suits on the broader theory that the employer had a duty analageous to that of the union to refrain from conduct at the bargaining table that discriminates against particular classes of employees. For example, in the case of Richardson v. Texas and New Orleans Railroad Co.,[32] the union and the employer had agreed to contractual terms discriminating against black employees who were not union members but whom the union represented. The plaintiffs brought suit against both the union and the employer. In ruling that action against the employer should not be dismissed, the court held the employer jointly responsible for violating its independent duty to represent the black employees fairly:

> It takes two parties to reach an agreement, and both have a legal obligation not to make or enforce an agreement or discriminatory employment practice which they know, or should know, is unlawful. Unless financial responsibility for a joint breach of such duty is required from both sides of the bargaining table, the statutory policy implied under Steele will be impracticable of enforcement. For the foregoing reasons, we think the Brotherhood's obligation under the statute does not exist in vacuo, unsupported by any commensurate duty on the part of the carrier.
>
> The Railroad may not have been the Brotherhood's keeper for bargaining purposes, but we think that under the allegations of this complaint, it can be required to respond in damages for breach of its own duty not to join in causing or perpetuating a violation of the Act and that policy it is supposed to effectuate.[33] (Emphasis Supplied).

Although the theoretical distinction is clear, the practical difference in breach of fair representation cases between joining an employer incidentally to afford complete relief and joining an employer independently as one who aids and abets the union is hazy at best. Regardless of the theory, courts tend to find employer conduct culpable where a union proposal constitutes clearly identifiable discrimination against a class, and the employer has no legitimate business reasons for agreeing to it. Such cases often involve racial discrimination,[34] discrimination against nonmembers,[35] or destruction of the accrued benefits of particular employees.[36] Some courts have ruled that an employer may be held liable even where it may have a legitimate business reason for agreeing to the offending clause.[37]

Nevertheless, it is highly questionable that under present law courts would penalize employers for agreeing to inadequate union proposals for retiree benefits for two reasons. First, employers agreeing to inadequate increases would not deprive anyone of accrued benefits. Second, by its very nature, collective bargaining presupposes an important and legitimate employer interest in protecting its pocketbook. Therefore, courts would certainly be reluctant to penalize employers for acting in their self-interest.

Other Alternatives Which Would Strengthen the Rights of Retirees Within the Bargaining Process

Background

It is clear that making the subject of retirees' benefits a mandatory subject of bargaining will not by itself provide any reliable guarantee of adequate benefit increases for retirees. Both the internal political dynamics of most unions and employer interests dictate that retiree benefits be given only secondary consideration at the bargaining table. Yet

the doctrine of fair representation gives unions wide latitude in settling upon their bargaining priorities. Moreover, whether retirees could expect adequate compensation even if they were able to provide a breach of the duty of fair representation is higher speculative.

In order for mandatory bargaining over retirees' benefits to be meaningful, additional protections would have to be extended to retirees. There are a number of alternatives, each of which will be discussed below.

Increased Retiree Role in the Process of Union Bargaining

There is little doubt that retirees would fare best if they had an official voice in developing and approving collective bargaining agreements. Under the law, however, "subject to reasonable rules and regulations," only union members are guaranteed the right to equal participation in union affairs, including collective bargaining matters.[38] Thus, unions, in their capacity as collective bargaining agents, may exclude nonmembers they represent from official participation in decisions affecting collective bargaining.[39] Furthermore, unions are free to set their own conditions of membership.[40] Since unions generally deny membership to retirees, retirees are effectively denied official participation in union affairs bearing upon collective bargaining.

To guarantee retirees an official voice in union decisions on collective bargaining would require novel and massive intrusions into the traditional legal hegemony accorded to unions over conditions of membership and execution of their duties as bargaining agents. Nothing, however, prohibits the imposition of an explicit duty upon unions to consult with retirees they represent before and during collective bargaining negotiations. In fact the position that unions should consult nonmembers is already inherent in existing judicial precedent. The Supreme Court in Steele stated:

> While the statute does not deny to such a bargaining labor organization the right to determine eligibility to its membership it does require the union, in collective bargaining and in making contracts with the carrier, to represent non-union or minority union members of the craft without hostile discrimination, fairly, impartially, and in good faith. Whenever necessary to that end, the union is required to consider requests of non-union members of the craft and expressions of their views with respect to collective bargaining with the employer and to give them notice of an opportunity for hearing upon its proposed action. (Emphasis supplied)[41]

A Higher Than Ordinary Standard of Fair Representation

Greater involvement by retirees in the bargaining process would not, by itself, insure larger or more frequent benefit adjustments. In fact, greater involvement in the bargaining process would mean little if the union, after consultation with retirees, did not make retirees' interests a high priority. To insure that unions make the interests of retirees a high priority in bargaining, it might be appropriate to apply a higher than ordinary standard of fair representation to the negotiation of benefits for retirees.

Precedent for a Higher Standard

There is some precedent for higher than ordinary standards of fair representation in two lines of cases, the first of which involves raclally discriminatory contractual provisions. Relying upon the applicability of the Civil Rights Act of 1964, which prohibits unions from encouraging employers to discriminate on a racial basis,[42] several circuits have required unions, not merely to refrain from racial discrimination, but to negotiate actively for equal treatment of racial minorities.[43] In the second line of cases, courts have indicated that union representation of non-members, especially those to whom union membership is categorically denied, is subject to special scrutiny.[44]

The principle embodied in the first line of cases is that there are important public policies, the vindication of which must take precedence over the union's normal right to compromise and trade off interests of groups it represents during bargaining. The principle implied in the second line of cases is that because unions have little institutional motivation to promote the interests of non-members, efforts in behalf of non-members should be subject to close review. These two principles are complementary and conjoined in their applicability to retirees.

First, just as equal opportunity for minorities is a paramount public concern, so is pension stability. Thus, in justifying the passage of the Employee Retirement Income Security Act of 1974 (ERISA), Congress found that:

> (T)he growth in size, scope and numbers of employee benefit plans in recent years has been rapid and substantial...that the continued well-being and security of millions of employees and their dependents are directly affected by these plans; that they are affected with a national public interest; that they have become an important factor affecting the stability of employment and the successful development of industrial relations...[45]

Under ERISA, Congress has protected the soundness of private pension plans "by requiring them to vest the accrued benefits of employees with significant periods of service, to meet the minimum standards of funding, and by requiring plan termination insurance."[46] Yet, without measures such as a special standard of fair representation adequate to

ensure the stability of pension values over time, these protections are meaningless.

Second, retirees generally are not members of the unions representing them. Even where retirees are union members, they have limited bonds with the union representing them. The Supreme Court recognized this in PPG and grounded its conclusion that retirees were not "bargaining unit members" upon the lack of a real "community of interest" between active workers and retirees which might tempt unions to favor the interests of active workers.[47]

The Supreme Court relied upon this lack of a community of interest deny retirees effective bargaining representation, ruling that unions could not force employers to negotiate about retiree benefits, but the Supreme Court's logic is curious. Concluding that because retirees might not receive adequate representation from unions, the Supreme Court ruled they should not receive any. The lack of strong bonds between unions and retirees leads more logically to the opposite conclusion --that unions should be held to higher than ordinary standards of representation to insure proper advocacy of retiree interests.

Precedent for a Rebuttable Presumption

A special standard of representation for retirees' rights might take the form of a "rebuttable presumption." A rebuttable presumption places the burden on the bargaining party to justify its performance on behalf of those it represents.

There is precedent for applying such a presumption to union bargaining conduct. Several cases hold that where a union attempts to cancel or reduce benefits already conferred upon a minority in a pre-existing agreement, the union breaches its duty of fair representation to the minority unless it demonstrates "some objective justification for its conduct."[48] The equity of this requirement is applicable to pension increases negotiated for retirees because, in a very real way, union failure to attempt to adjust pensions for inflation on some equitable basis denies accrued benefits to retirees."

Defining a Higher Standard of Fair Representation

Assuming a higher than ordinary standard of fair representation for measuring bargaining conduct affecting retirees, and assuming a rebuttable presumption, a specific "yard stick" against which bargaining conduct could be measured would be in order. Such a yard stick might require unions to strive for retiree benefit increases sufficient to offset the effects of inflation over the preceding contract, or if increases at this level would outstrip those to which active workers would be entitled, to attempt at a minimum to achieve benefit increases equal to wage increases negotiated for active workers.[49] Benefits not meeting these standards would be presumptively invalid and require a union to justify its actions by reference to some legitimate union objective. Deciding what constitutes a "legitimate union objective" is open to controversy and would vary with the

circumstances. It suffices to say that the union would be required to demonstrate specifically why it could not comply with the presumptive standard.

Applying the Standard to Employers

Even with a buttressed right to fair representation, retirees would have little real protection if employers were allowed at will to refuse to agree to union proposals complying with the presumptive standard, or were allowed to agree to inadequate union proposals. Since there is ample precedent for holding bargaining employers liable to vindicate employee rights involving important public policy, such as racial equality, the Commission might also consider extending the presumptive standard to cover employers bargaining over issues affecting pension stability.

In opposition, it could certainly be argued that imposition of a presumptive formula for pension increases infringes upon an employer's legitimate business interests in a way that a duty to refrain from racial discrimination does not. Nevertheless, a presumptive standard dictates only the shape -- not the size -- of settlements. Furthermore, the standard could allow for deviations, which in the case of employers could include those deviations justified by legitimate business concerns.

Holding employers liable for breaching a duty to negotiate adequate pension increases for retirees would allow the courts to spread the risk of damages where inadequate increases were negotiated. This would lessen the possibility that courts would have to choose between awarding adequate compensation to retirees and crippling a union financially, rendering it unable to function effectively in the future as a bargaining agent.

A Yardstick for Compensation

A presumptive standard that benefits for retirees should be enough to offset inflation or should equal benefits negotiated for active workers would provide an objective criterion against which to measure damages. This would free courts from the unbridled speculation in which they would otherwise be required to determine what should have been negotiated.

Using the presumptive standard as a yardstick does not mean that the courts would award damages equivalent to the presumptive standard in every case. Rather, the presumptive standard would be a starting point for deliberation, and the courts would be free to award lesser damages if appropriate after taking into account mitigating conditions confronting the union and employer at the time of bargaining.

The Right of Retirees to Bargain for Themselves

Another alternative, and one strongly supported by some advocates for retirees,[50] is to amend the law to allow retirees to bargain directly with employers. Presumably, retirees and active workers would be

members of separate bargaining units, and each would be free to choose its own bargaining agent.

Under such a structure, troublesome technical questions would arise. For instance, who would be included in a retiree unit? Would the unit include only retirees actually receiving pensions, or would it also include retirees who had never qualified for pensions but felt they should be entitled to them? If those in the latter category are to be included, is there to be some minimum duration of employment with the employer prerequisite to inclusion in the unit? These questions are not theoretical, because if retirees are empowered to choose their own bargaining agent, who is allowed to vote on that choice must be determined.

A more fundamental problem is that separate bargaining units with the right to separate representation would structurally create an adversary relationship in which retirees and active workers overtly compete for benefits. Under such a system, retirees would be at a severe disadvantage.

By striking, active workers can directly shut down the employer's operations. Retirees cannot command such direct action in support of their demands. Thus, common sense dictates that an employer should resolve separate and competing demands made upon it in favor of active workers.

Retirees dissatisfied with an employer's offer would be forced to rely upon indirect pressures, perhaps in the form of consumer boycotts and informational picketing. However, consumer boycotts are difficult to mount, and informational picketing is a relatively weak form of pressure. Moreover, the public would almost certainly become confused by conflict between retirees and active workers, further diminishing the effectiveness of these tactics.

In the event active workers were still on the job when retirees reached impasses with an employer, retirees might picket job sites in the hope active workers would walk out in sympathy. Yet retirees and active workers would be competing for benefits. By walking off the job, active workers would gain nothing for themselves, and they would lose their paychecks. Needless to say, the incentives to ignore retiree pickets would be substantial.

It is common for unions while negotiating simultaneously with an employer to coordinate their efforts. Bargaining and striking in tandem enhances their strength while bargaining and striking separately dilutes their strength. Therefore, cooperation measurably increases the chances for success.

There would be little reason, however, for a union representing active workers to agree to coordinate bargaining with retirees. Retirees, having no jobs, can neither participate in a joint strike, nor detract from the strength of unilateral action by active workers. Therefore, there is little reason for a union representing active workers to agree to coordinate bargaining with retirees, since retirees can do little to help or hurt active workers and are competing with them for benefits.

Automatic Cost-of-Living Adjustments

Another alternative to relying on the present collective bargaining structure to gain ad hoc benefit adjustments protecting pension values is to make automatic adjustments in retiree benefits which are indexed either to inflation or wage increases for active workers.

Automatic cost-of-living wage adjustment (COLA) has long been a goal of unions. Today, while many labor contracts contain some form of automatic wage adjustment process, COLA protection for retirement benefits has not been as high a priority. Why this is so is open to some speculation.

One theory holds that the collective bargaining process itself places a premium on the ad hoc adjustment process. Ad hoc adjustments permit both parties to an agreement to demonstrate that improvements have been granted. The fact that most collectively bargained private sector pension plans are of the flat benefit type rather than the final pay type is evidence of this. Final pay plans provide for automatic increases in the benefit levels in a pension plan as the salaries or wages of the participants increase. Neither type of plan, however, protects against value loss due to inflation after retirement.

In its May 1980 Interim Report, the President's Commission on Pension Policy concluded that steps should be taken regarding tax policy to encourage individuals, companies, and unions to make voluntary arrangements for cost-of-living protection. While the Commission did not believe that a recommendation for mandatory cost-of-living protection was appropriate at this time, its tax proposals reflected the awareness on the part of the Commission of the need for cost-of-living proteciton. Whethere these proposals would affect the bargaining process in the future is a matter for future research and public comment.

Conclusion

Reliance solely upon the current collective bargaining structure to assure pension increases adequate to offset inflation is probably misplaced for three reasons. First, even where a union vigorously pursues the interests of retirees at the bargaining table, the employer is under no legal obligation to discuss the issue of pension increases for retirees. Second, the dynamics dictated by the internal structures of most unions do not encourage special attention to the needs of retirees. Third, prevailing standards of fair representation, even assuming their eventual applicability to retirees, are inadequate to enforce a level of representation for retirees that would produce consistent protection from inflation.

One suggestion has been to allow retirees to bargain for themselves. While independent bargaining would put retirees in charge of their own fate, it would also put them in overt competition with active workers for benefits. Since in comparison to active workers retirees have little power to enforce their demands, this suggestion is quite likely self-defeating.

Another possibility is to grant retirees the right to participate in official union decision making processes connected with the formulation of bargaining demands and the approval of collective bargaining agreements. Undoubtedly, this would greatly enhance the control that retirees have over collective bargaining deliberations which vitally affect their welfare. Nevertheless, to extend this right to retirees would require Congress to infringe directly upon the hegemony over internal affairs traditionally accorded to unions.

There is, however, judicial precedent for:

- Requiring union officials to consult with non-members and political minorities within the union before making collective bargaining decisions affecting them;

- Holding unions to a higher than normal standard of fair representation when bargaining on employee rights involving important public policy;

- Holding unions to a higher than normal standard of fair representation when bargaining in behalf of non-members, especially those categorically excluded from membership;

- Requiring unions to justify their actions where they have bargained away accrued employee rights; and

- Holding employers liable for participating with unions in depriving employees of accrued rights, or rights involving important public policy.

Whether these innovations would be sufficient to maintain pension values is, at this time, purely speculative. Consequently, serious consideration should also be given to additional or alternative reforms outside of the collective bargaining process -- such as required automatic cost-of-living adjustments for pensions -- which directly support the living standards of retirees without reliance upon intermediaries.

Notes

[1]Louis Harris and Associates, "1979 Study of American Attitudes Toward Pensions and Retirement," conducted for Johnson & Higgins.

[2]Robert J. Myers, Indexationof Pension and Other Benefits, Richard D. Irwin, Inc., pp. 116-128.

[3]Allied Chemical & Alkaline Workers v. Pittsburgh Plate Glass Co., 404 U.S. 157 (1971).

[4]H.R. 1145 and S. 1473 in 96th Congress. Similar legislation has been introduced in previous sessions of Congress.

[5]It should be noted that the bills are so broadly drafted that unions would not be limited to bargaining for catch-up pension increases for retirees. Under their provisions, a union could press for extension of benefits in any area affecting retirees (such as medical benefits), and presumably even press for the institution of pensions and other benefits for groups of retirees who previously had not been entitled to them.

[6]Title IV, 401, Landrum-Griffin Act (1959) (Labor Management Reporting and Disclosure Act), 29 U.S.C. 481 (1959) (hereinafter cited as LMRDA), requires the election of international, intermediate, and local union officials by convention or referendum at specified intervals.

[7]Under the law, the manner of union approval of collective bargaining agreements is a matter for the union to decide. 9(a), National Labor Relations Act of 1935, 29 U.S.C. 159(a) (1959); Abood v. Detroit Board of Education, 431 U.S. 209 (1977); NLRB v. Wooster Division of Borg-Warner Corp., 356 U.S. 342 (1958). Because under the law the union is the exclusive bargaining agent for those it represents, the union may restrict the right to approve or disapprove tentative agreement to union members, and within limits not applicable to this discusssion, a union may prescribe its conditions for membership, 3, LMPDA, 29 U.S.C. 411(a)(1) (1959); Moynahan v. Para-Mutuel Employees Guild of California, Local 280, 317 F.2d 209 (9th Cir. 1963), cert. den., 375 U.S. 911 (1963).

[8]Employers do, however, grant pension increases to retirees. Regardless of self-interest and the fact that PPG ruled that pension increases for retirees was a permissive subject of bargaining, numerous employers have granted pension increases for retirees either unilaterally or as the product of collective bargaining. The question here is whether employer good will is a reliable source of increases sufficient to protect pensions against inflation.

[9]The reciprocal terms "duty of fair representation" and "right to fair representation" will be used interchangeably here depending upon the context.

[10]Steele v. Louisville & Nashville Railroad Co., 323 U.S. 192 (1944). In Steele, the Supreme Court appealed the duty of fair representation to unions under the jurisdiction of the Railway Labor Act (hereinafter cited as RLA). The Supreme Court later extended the duty to unions under the jurisdiction of the NLRA. Ford Motor Company v. Huffman, 345 U.S. 330 (1953).

[11]Steele, supra at 202-3.

[12]Railroad Trainmen v. Howard, 343 U.S. 768 (1952).

[13]Nedd v. United Mine Workers, 556 F.2d 190, (3rd Cir. 1977), cert. den., 434 U.S. 1013 (1978).

[14]Id. at 200.

[15]Steele, supra at 203.

[16]Ford Motor Co. v. Huffman, supra at 337-38. This "wide range of reasonableness" is, of course, circumscribed by the duty to act upon "relevant considerations," which some lower courts have interpreted to require giving "fair consideration" to the views of minorities and giving "valid reasons" for differentiating treatment of groups of employees.

Beriault, supra at note 24. Cf. Hargrove v. Brotherhood of Railroad Locomotive Engineers, 116 F. Supp. 3, 8(D.D.C. 1953) ("Here the discrimination based on prior employment and geography alone...are irrelevant and invidious." Other lower courts have hewed the more restrictive line and refused to overturn union bargaining conduct in the absence of explicit allegations and proof of bad faith or hostile discrimination.

Gainey v. Brotherhood of Railway and Steamship Clerks, 313 F.2d 348 (3rd Cir. 1963); Hardcastle v. Western Greyhound Lines, 303 F.2d 182 (9th Cir. 1962), cert den., 371 U.S. 920 (1962). Several courts have outlawed discriminatory procedural conduct that would be especially harmful to the interests of retirees were retirees to become entitled to the right of fair representation. For instance, retirees, because they generally are not entitled to vote in union matters, are weak politically, and several courts have explicitly ruled that unions may not make negotiating decisions on the basis of the relative political power of factions within the union. Ferro v. Railway Express Agency, Inc., 296 F.2d 847, 851 (7th Cir. 1961) ("(I)t is not proper for a bargaining agent in representing the employees to draw distinctions among them which are based upon ther political power within the union."); Barton Brands, Ltd. v. NLRB, 529 F.2d 793, 798 (7th Cir. 1976) ("D)ecisions may not be made solely for the benefit of a stronger, more politically favored group over a minority group."); see also Truck Drivers and Helpers Local 568 v. NLRB, 379 F.2d 137, 142-3(D.C. Cir. 1967) (union's duty of fair representation breached where its advocacy of a position preferred by a majority group is supported only by the "purely political motivation of winning an election"). Likewise, discrimination by unions against non-members is uniformly condemned. Branch 6000, National Association of Letter Carriers v. NLRB, 595 F.2d 808 (D.C. Cir. 1979); Jones v. Trans World Airlines, Inc., 495 F.2d 790, 797 (7th Cir. 1974). Because retirees generally are not allowed to participate in the contract notification process, active workers decide what benefit increases retirees will receive in any given collective bargaining agreement. Consequently, should majority approval of contract provisions which discriminate against retirees legitimize them, the right to fair representation would become meaningless for retirees. A few courts have indicated that majority approval of discriminatory contract provisions does not insulate unions from charges of unfair representation. Barton Brands, Ltd. v. NLRB, supra at note 31; see also Branch 6000, National Association of Letter Carriers v. NLRB, supra at note 31. Another court has taken the contrary view. Roberts v. Lehigh & New England Railway, 323 F.2d 219 (3rd Cir. 1963).

[17]Contra, O'Connell v. Pabst Brewery Co., 12 Wisc. 2d 491, 500, 107 N.W.2d 484, 489 (1961) ("The overall consideration is whether the bargaining...was in good faith and reached a fair and reasonable solution to the merger problem").

[18]Roberts v. Lehigh & New England Railway, supra at note 33; Goodlin v. Clinchfield Railroad, 229 F.2d 578 (6th Cir. 1950), cert. den., 351 U.S. 953 (1956).

[19]Aeronautical Lodge 727 v. Campbell, 137 U.S. 521 (1949).

[20]Deboles v. Trans World Airlines, supra at note 28.

[21]On rehearing, Beriault v. Local 40, Super Cargoes & Checkers, I.L.&W. 445 F.Supp. 1287 (D.Ore. 1978).

[22]Dwyer v. Climatical Industries, Inc., 554 F.2d 307 (9th Cir. 1977), cert. den., 430 U.S. 940 (1977).

[23]Steele, supra at 207; Mount v. International Brotherhood of Locomotive Engineers, 226 F.2d 604, 608(6th Cir. 1955).

[24]See, e.g., Jones v. Trans World Airlines, supra at note 32; Mount v. International Brotherhood of Locomotive Engineers, supra at note 40.

[25]Mount v. International Brotherhood of Locomotive Engineers, supra at note 40; Hargrove v. Brotherhood of Locomotive Engineers, supra at note 29.

[26]Electricial Workers v. Foust, _____U.S._____, 60 L.Ed.2d 698 (1979).

[27]Id. at 705.

[28]Blankership v. Boyle, 329 F.Supp. 1089, 11/2 (D.D.C. 1971).

[29]Vaca v. Sipes, supra at note 21; Barrett v. Safeway Stores, Inc., 395 F. Supp. 161 (W.D.Mo. 1973).

[30]Vaca v. Sipes, supra at note 21; Glover v. St. Louis-San Francisco Railway Co., 393 U.S. 324, 329 (1969); Cunningham v. Erie Railroad Co., 266 F.2d 790 (7th Cir. 1974); see Carroll v. Brotherhood of Railroad Trainmen, 417 F.2d 1025(1st Cir. 1969).

[31]Glover v. St. Louis-San Francisco Railway Co., supra at 329; Jones v. Trans World Airlines, supra at 798-9; see Cunningham v. Erie Railroad Co., supra at 816.

[32]Richardson v. Texas & New Orleans Railroad Co., 242 F.2d 230 (5th cir. 1957); Jones v. Trans World Airlines, Inc., supra at 798.

[33]Richardson v. Texas & New Orleans Railroad Co., supra at 236; in Glover v. St. Louis-San Francisco Railway Co., supra at 331, a subsequent Supreme Court case involving negotiation of racially discriminatory provisions, Justice Harlan, concurring, enhanced the vigor of Richardson, stating:

I believe that Richardson v. Texas & N.O.R.Co., 242 F.2d 230 (1957), decided by the Fifth Circuit some years ago before the decision in the present case also supports today's holding that the federal courts may grant relief against an employeer who aids and abets (the) union in breaching its duty of fair representation.

Richardson was also cited by the Supreme Court favorably in Vaca v. Sipes, supra at 186.

[34] See, e.g., Steele, supra at note 11; Richardson v. Texas & New Orleans Railroad Co., supra at note 49. These cases were decided prior to the 1964 Civil Rights Act, 42 U.S.C. 2000(1964), which imposed an independent duty upon employers to refrain from racial discrimination. Therefore, relief against the employer was not premised upon any independent source of liability.

[35] Jones v. Trans World Airlines, supra at note 32.

[36] Id., Barton Brands, Ltd. v. NLRB, supra at note 31.

[37] Barton Brands, Ltd. v. NLRB, supra at note 31 (legitimate business concerns inherently destructive of important employee rights do not excuse discriminatory conduct); Jones v. Trans World Airlines, supra at 798 (regardless of motive, employer liable as "direct cause" of plaintiffs' injuries by violating seniority rights accrued under previous contracts); see Robinson v. Lorrilard Corporation, 444 F.2d 791, 799 (4th Cir. 1971); and compare, Ferro v. Railway Express Agency Inc., supra at 851 (employer dismissed from suit in absence of allegation that employer had acted with a motivation to discriminate or with knowledge that the union was discriminating).

[38] Title IV, 401, LMRDA, 29 U.S.C. 411(a)(1)(1959).

[39] Abood v. Detroit Board of Education, supra at 217-23; NLRB v. Wooster Division of Borg-Warner Corp., supra at note 8.

[40] Moynahan v. Pari-Mutuel Employees Guild of California, Local 280, supra at note 7. There are some limitations on union discretion. For instance, under Title VII, 703 of the Civil Rights Act of 1964, 42 U.S.C. 2000e-2(c)(1976), it is unlawful for a union to use race, color, religion, sex or national origin as a basis to deny or classify membership.

[41] Steele, supra at 204.

[42] Title VII, 703 of the Civil Rights Act of 1964, 42 U.S.C. 2000e-2(c)(1976).

[43] Patterson v. American Tobacco Co., 535 F.2d 257, 270 (4th Cir. 1976); Macklin v. Spector Freight Systems, Inc., 478 F.2d 979, 989 (D.C. Cir. 1973); see also United States v. N.L. Industries, Inc., 479 F.2d 354, 379 (8th Cir. 1973).

[44] On rehearing, Beriault v. Local 40, Super Cargoes & Checkers, I.L.&W.U., supra at 1295 (unions must be especially careful to represent interests of those to whom it categorically denies membership); see Jones v. Trans World Airlines, Inc., supra at note 32.

[45]Title I, 2(a), Employee Retirement Income Security Act of 1974, 29 U.S.C. 1001(a)(1974).

[46]Title I, 2(c), Employee Retirement Income Security Act of 1974, 29 U.S.C. 1001(c)(1974).

[47]Pittsburgh Plate Glass, supra at 173.

[48]Barton Brands, Ltd. v. NLRB, supra at 800; Deboles v. Trans World Airlines, supra at 516.

[49]Defining the criteria for "increases sufficient to offset the effects of inflation" and "increases proportionate to wage increases" would obviously entail extended discussion.

[50]See testimony of Jay W. Tower, attorney for the Pension Rights Center, before Subcommittee on Labor Management Relations, U.S. House of Representatives (July 18, 1979).

[51]This leaves aside questions concerning the legality of such picketing which need not be discussed here to make the basic point that sympathy strike efforts would probably be unsuccessful in any event.

CHAPTER 29: PENSIONS AND PERSONNEL MANAGEMENT

Judy Olian, Stephen J. Carroll, Jr., Craig Schneier

Executive Summary

Introduction

Most analyses of pension plans focus on either legal or financial aspects. Pension plans can be viewed, however, from the personnel/human resource management perspective. This perspective considers the impact pensions might have on such work outcomes as job choice, performance, satisfaction or turnover. This report:

- Focuses on the relationship of pensions to personnel management outcomes, policies, and programs;
- Reviews existing literature on the impact of pensions on personnel management;
- Builds a rationale for considering the impact of pensions on personnel management policy decisions and research; and
- Identifies future research that would fill gaps in our knowledge and understanding of the role pensions might have on personnel outcomes, programs, and policy.

To accomplish this, this paper develops a personnel management model which provides a framework against which to view and assess pension plans. Factors and environmental conditions both internal and external to organizations, as well as the administration of pension plans, are addressed.

The Personnel/Human Resource Management Perspective and Pensions

All organizations engage in several activities (e.g., training programs, reward systems) to procure, develop, and utilize their human resources. These activities are intended to affect various work outcomes at the individual, unit, and organizational level. Outcomes include job choice, job satisfaction, job performance, and length of service.

A major focus of behavioral science research has been to investigate the relative degree to which personnel management activities actually affect various work outcomes. The body of research is voluminous, complex, and often problematic regarding design and methods. In general, the documented effect personnel management activities have had on outcomes has not been very high. Various external factors (e.g., labor

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unions), affect personnel outcomes greatly, often mitigating the impact of traditional personnel management activities.

A considerable amount of research has examined the impact of reward and/or pay systems on work outcomes. Since pensions can be viewed as a form of pay which is deferred until retirement, this research is relevant. The impact of pay on one personnel management outcome, performance, seems to be more a function of whether or not the pay is made contingent on desired performance (e.g., commission plans), than the absolute amount of pay received (i.e., the pay level). Research indicates that pay level can influence workers' satisfaction to the extent that money is valued as a reward.

Importance of Pensions

Unlike most other personnel management activities (e.g., training), pension plans are not administered, implemented, or addressed on a continuous basis as work is performed. Generally they do not require constant attention from managers, workers, or personnel management professionals.

Pensions are, however, of enormous importance due to their cost, employees' expectations that pensions will provide financial security, the high proportion of U.S. workers covered by various types of pensions, and the impact large pension funds have on financial institutions and investment.

Major Objectives and Assumptions Underlying Pensions

There are several reasons why organizations design and implement pension plans. One instrumental objective is based on the assumption that the availability of a pension plan will attract and motivate workers, an objective corroborated in polls taken of employers but not in research. Pensions are also established for "moral" or paternalistic reasons, to provide financial security to employees in exchange for their long years of effort and loyalty. Pension plans are sometimes developed because additional wage increases to workers are not politically feasible. Unions, for example, may agree to an increase in pension plan contributions as a form of deferred compensation, an alternative less visible than a wage increase when the government is pressuring for wage restraint. In other instances, firms provide pensions simply to keep up with the frings benefit offered by their competitors.

The Effect of Pensions on Employee Behaviors

Pension plan characteristics have a potential impact on employee behavior of concern to personnel managers. These include job choice behavior, employee performance, employee satisfaction, turnover, and the decision to retire. Although it is often assumed that characteristics of a pension plan will influence job choice, there has been virtually no direct

research on this issue. If pension benefits are to influence job choice decisions, plan provisions must be easily understood by the job applicant at the point of choice. Moreover, comparisons among pension benefits offered by different firms must be possible and apparent if the candidate is to use alternative levels of pension benefits as one of the criteria along which the job choice decision is made. Because most presentations of the firm's pension options are very complex, it is unlikely that pension benefits assume an important role in job choice.

Many organizations believe that pension systems can have a favorable effect on performance, but no rigorous research has assessed the veracity of such a relationship. Currently, certain legal barriers, such as requirements that qualified pension plans not discriminate in favor of higher paid employees and not provide retirement benefits in excess of $102,000 annually, prevent the linkage of pension provisions to performance.

There is little research illuminating the effects of pensions on job satisfaction. One theory (the two-factor theory) would suggest that pensions could have only a negative effect on satisfaction and, at best could raise job satisfaction to a neutral level. Another relevant theory, the equity theory, however, indicates that pensions may have the potential for increasing pay dissatisfaction if pension benefit plans do not compare favorably to those perceived as comparable.

There is a small body of research relating pension plan characteristics to employee turnover. In theory, there could be a relationship between pensions and turnover to the extent that the present job offers unfavorable fringe benefits relative to those available elsewhere. Alternatively, pensions may discourage turnover if large pension benefits are lost upon quitting. Research suggests that as employees approach full vesting, (typically after 10 years of continuous employment within a firm), turnover tends to decline; conversely, after full vesting has been achieved, the probability of turnover tends to increase. It is unclear whether pensions discourage turnover among all categories of workers approaching full vesting or whether pensions succeed in retaining the less desirable employees within the firm. It is likely that any effects pensions have on turnover may differ depending on the job level and/or occupational background of the employee since it has been shown that different types of employees leave jobs for a variety of reasons.

Several contaminating factors in the pension-turnover research are noted, such as the tendency for organizations with better pension systems to be superior in other employment aspects as well. Hence, it is difficult to identify the unique effect of pensions on turnover in some of this research. Conversely, private pension plan characteristics such as benefit levels and early retirement provisions do seem to increase the propensity to retire. Aggregated analyses, however, indicate that the effects of private pensions on retirement decisions are much weaker than the effects of social security benefits.

Preferences for Pensions

Research has indicated that younger employees attach less importance to pensions than to other fringe benefits although the importance of pensions increases with age. Virtually no research on employee preferences for different components of a pension plan have been conducted. Surveys of retired employees, however, indicate a strong preference for cost-of-living increases, pension benefit levels that will allow a maintenance of pre-retirement standards of living, pension fund protections, vesting, and other pension safeguards.

Several studies show little relationship between employee preferences for different pension plan benefits and assessments of such preferences by business and union leaders. There is considerable disagreement in the literature on whether employee preferences or managerial knowledge should prevail in the design of pension systems given the objectives of such systems.

Increasing the Effectiveness of Private Pension Plans

The cafeteria approach to providing fringe benefits has been widely advocated as a means of increasing the effectiveness of pensions and other fringe benefits by enabling employees to select the desired mix of benefits. However, the research has not demonstrated a positive effect of this approach on job choices, employee satisfaction or performance. A clear communication of pension plan characteristics to employees appears to be a prerequisite for achieving favorable reactions to a pension plan such as higher job satisfaction and improved performance. In spite of this, many organizations have kept this area of compensation shrouded in ambiguity.

Discussion and Future Research

There is an urgent need for more sophisticated research on the consequences of varying pension plan characteristics. Some recent work which has attempted to relate different configurations of pension plan characteristics to turnover points to the direction this research might take. Additionally, firms attempting some creative changes in their pension systems provide unique opportunities for assessments of these innovations in field settings.

Better integration of the design and implementation of the pension plans with the rest of the personnel program is called for. There is a tendency to assign responsibility for the pension program to the organization's financial subunit; the unit to which responsibility for the pension system is assigned may determine the primary objectives of the program. Recent proposals for mandating private pensions and for an integration of the private pension and social security systems may reduce managerial discretion over pension plan characteristics.

Introduction

A considerable amount of information is currently available on the subject of pensions. The topic receives attention from researchers, policymakers, theorists, legislators, management, and, of course, the working population — particularly those at or nearing retirement. The vast majority of what is known and written about pensions has either a legal or a financial focus. Benefit size, vesting requirements, and portability receive considerable attention, as does the erosion of the purchasing power of those on fixed incomes, particularly in periods of high inflation.

There is, however, another perspective from which to view pensions: the impact pensions may have on employee performance levels, on job satisfaction, and on such crucial decisions as whether or not to join or leave an organization and when to retire. These issues can be termed the personnel/human resource management (P/HRM) perspective. As explained more fully below, the P/HRM perspective refers to the procurement, development, and utilization of people in an organ-ization. How the presence or absence of a pension plan, as well as the plan's particular characteristics, facilitate or impede P/HRM is a primary focus of this report.

The report will first introduce the P/HRM perspective and describe how pensions, as one of many types of financial benefits offered by organizations, fit into P/HRM programs. Next, the overall impact of P/HRM programs on employee behavior (e.g., turnover) will be addressed before introducing a discussion of the impact of pensions in particular on such behavior. Specific features of pension plans and those of organ-izations and their environments will each be described as to their differential effects on pension plan administration and employee behaviors. In addition, this report will develop a rationale for the consideration of individual differences related to pension plan design and administration.

Little has been written which directly relates pensions to such individual-level decisions as whether or not to join an organization, perform at desired levels, or leave an organization. Yet, there is both research and theory relevant to this issue. There are numerous important research questions yet to be answered which would shed further light on the impact of pensions on P/HRM programs. This paper reviews the available literature and identifies gaps which must be filled in order to increase our knowledge of the impact of pensions on P/HRM.

This paper addresses several issues pertinent to the notion that pensions represent one aspect of Personnel/Human Resource Management programs. As such, pensions are seen to have potential impact on employee behavior such as performance and turnover. The model developed in the next section of this paper provides a framework with which to view pension plans which differs from that developed solely with financial or legal considerations in mind.

Behavioral science theory and research which has documented a link between personnel management programs and policies and employee behaviors is used to develop models of how pension plans might also impact such behavior. An important part of this paper is an investigation into the degree to which pension plans conform to available models linking personnel management programs to employee behavior. Future research needs are identified and considerations for the design and administration of pension plans are provided.

Much of the literature surrounding the non-financial and non-legal aspects of pensions is decidedly prescriptive in nature. There are, for example, pleas for employers to develop pension plans to enhance the loyalty or morale of their workers. Data are seldom, if ever, provided to support such supposed benefits of pension plans. This paper has taken note of such literature but has emphasized the research which is available as it discusses the possible links from pension plans and their characteristics to employee behavior and policy.

The paper's focus is not one of weighing the purported advantages and disadvantages or costs and benefits of pensions to employees, organizations, or society. The focus is rather to identify, organize, and synthesize available information on pensions, their impact on issues, and the impact of programs on them.

To the extent that such topics as the importance of pensions and the various characteristics and types of pensions are addressed in subsequent sections of this paper, they are included solely to develop background for what is to follow. No attempt was made here to provide a comprehensive review of the historical development of pensions, the importance of pensions, the varying characteristics of pension plans, or the legal requirements governing pensions.

The objectives of this paper are:

- To describe a model of personnel management in which the role and impact of pensions on employee outcomes can be addressed.
- To delineate both the goals pension plans are purported to attain and the assumptions underlying their development and use.
- To review relevant literature and analyze the impact, both documented and potential, of pension plans on job choice, job performance, job satisfaction, turnover, and the decision to retire.
- To discuss the impact of individual differences among employees on their preferences for various fringe benefits, as well as the impact of such preferences on policies governing pension plan design and administration.

- To discuss how organizations' internal structure and other characteristics (e.g., size), their perceived external environment, their perspectives on personnel management, and their willingness to communicate with employees influence pension plan administration.

- To identify gaps in our current knowledge regarding pension plans and areas for future research which would speak to the objectives stated above and advance knowledge of the impact of pensions on personnel management.

The Personnel/Human Resource Management Perspective and Pensions

The Personnel/Human Resource Management Model

Organizations, public and private, large and small, engage in many activities in order to procure, develop, and utilize their human resources (see Beatty and Schneier, in press, 1981; Heneman, Schwab, Dyer, and Fossum, 1980). These activities can be grouped into programs such as human resource planning, job analysis, wage and salary administration, and training and development (see Figure 1). Their scope and degree of formality would, of course, depend upon such factors as the size of the organization. These programs differ somewhat from ongoing managerial and supervisory activities directly related to the day-to-day monitoring of subordinates' work. Programs are often developed by staff departments and specialists who work with managers to facilitate their implementation. For example, the final responsibility for filling a vacancy may reside with the supervisor in charge of a unit but the Personnel Department may assist by recruiting qualified applicants and screening them.

Activities, or programs, are meant to have an impact on various outcomes at the individual, unit, and organizational levels. As Figure 1 indicates, these outcomes include job choice, job behavior and performance, job satisfaction, length of service or turnover, and absenteeism. The effect activities might have on any of the outcomes would obviously depend on numerous factors, some unique to each organizational setting and some more pervasive in their impact. These influences can be separated into those internal and external to the organization. As shown as Figure 1, for example, the effect a compensation system might have on job performance would depend not only on whether or not a union is present and what constraints its contract might have on wages, but also on characteristics and backgrounds of the particular workers involved, the size of the organization, its industry, its location, etc.

Activities are also affected by each other. No program is developed or implemented in isolation. In order to design an effective training system, the deficiencies of the trainees must be identified, perhaps by evaluating their performance level through a performance appraisal system. In order to select the appropriate people for jobs, the tasks and duties of the jobs must be assessed through job analysis activities.

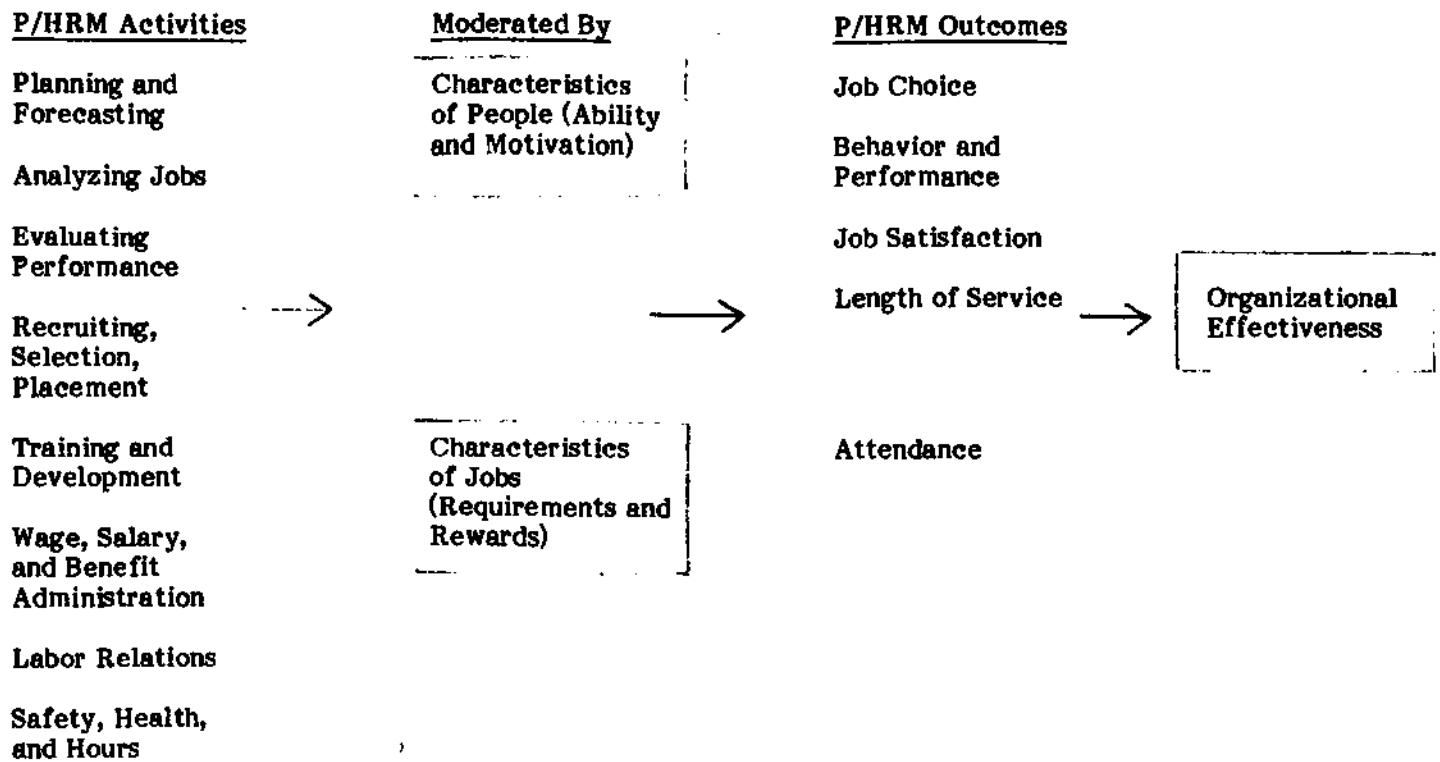
FIGURE 1

Personnel/Human Resource Management (PHRM) Activities and Outcomes*

Environmental Influences

External - Laws and regulations; unions; labor markets; sociocultural, political, and economic conditions, etc.

Internal - Organizational size, structure, location, product and/or service, etc.



* Adapted from Beatty and Schneier (in press, 1981) and Heneman, et al., (1980).

This perspective is thus one which views individual, unit and/or organizational outcomes, such as performance or productivity, as dependent on a set of activities designed to procure, develop, and utilize people. The activities themselves are effected by certain factors internal and external to the organization, as well as by each other. Just as an organization has an accounting system to manage its funds and a production system to produce its goods or services, it has a system to manage its people.

The Impact of Activities on Outcomes

Before a specific discussion of the role and impact of pensions on outcomes can be developed, the general extent and nature of the impact of activities on outcomes must be addressed. Researchers in the area have been utilizing behavioral sciences theory and research for several years to ascertain, for example, the degree to which job behavior could be influenced by task design or attendance could be influenced by rewards.

The research,* while voluminous, particularly in recent years, is difficult to review and summarize. First, the relationships themselves are quite complex. As Figure 1 depicts, a direct cause-effect relationship between activities and outcomes cannot be assumed. Environmental influences, as well as individual and job differences, moderate any hypothesized relationship. Second, much of the research here is correlational in nature. That is, rather than develop research designs which address how training programs cause changes in job behavior, most research, albeit for legitimate and practical reasons, assesses the relationship or co-occurrence between, say, changes in job behavior and the acquisition of training. There may be a high correspondence or correlation between the receipt of training and job behavior changes but stating that the former caused the latter is not warranted given the type of available data. Third, much of the research takes place in the laboratory as opposed to the field, often with subjects who share few characteristics with those who work in organizations. Generalizations to the actual work setting are thus questionable.

Fourth, external influences, such as union agreements and legislation, have had an enormous impact on outcomes and on programs themselves. Equal Employment Opportunity (EEO) guidelines, court decisions, and legislation have significantly altered such activities as employment interviewing and testing, promotion decisions, and pay decisions. Such influences as union contracts have a direct impact on outcomes as they specify what work employees must do, what wage rates they are to be paid, and delineate procedures for changing a worker's duties.

* Behavioral science research on P/HRM issues is contained in numerous books and articles. A representative sample of overviews, collections, and/or summaries can be found in Dunnette (1976); Staw and Salancik (1977); Katz and Kahn (1978); Cascio (1979); Staw (1979).

Compared to what is known in other areas of scientific endeavor (e.g., the physical sciences), behavioral science contributions to insights into outcomes via research and theory are not extensive. The general degree of predictability is moderate at best and the causal relationships which have been established with confidence are small indeed, despite the volume of research projects and results.

Nevertheless, behavioral science theory and research has made some significant contributions to our knowledge of and predications of outcomes. We are beginning to understand the nature of the complex relationships and moderators of the relationships are being identified. Those groups of people, organizations, and/or job settings for which our models are valid are being made more and more definitive. Our research designs, data analysis techniques, and measurement tools are undergoing closer scrutiny and are being improved continually.

This brief discussion of behavioral science research is, by its nature, general and selective. Its purpose is to present a context in which to evalute the relative impact activities have on outcomes. In this way the impact of pensions — the particular activity of interest in this report — on outcomes can be evaluated.

The Extent Wage, Salary and Benefits Impact P/HRM Outcomes

As noted in Figure 1, one activity is that of wage, salary, and benefit programs. Of obvious importance in an organization, the impact of various forms and levels of payments on outcomes has been researched widely (see e.g., Opsahl and Dunnette, 1966; Lawler, 1971; Nash and Carroll, 1975; Mahoney, 1979). As Dyer, Schwab, and Fossum (1979) note, pensions are an indirect form of pay. Employees can receive pay in wages directly or in the form of various fringe benefits such as pensions.

Pay has been shown to have an impact on outcomes. Recent reviews of research by Heneman, Schwab, Dyer, and Fossum (1980) and Dyer, Schwab, and Fossum (1979) support the following general summary statements which are amplified in subsequent sections of this report:

- Most job seekers establish a minimum pay level criterion which is satisfied before accepting a job offer. This level will be set, however, after taking into consideration other job attributes such as type of work being offered and the knowledge the job seeker has of other aspects of the prospective position.

- Except in extreme cases of very high or low pay magnitudes, changes in the level of pay do not significantly influence job behavior or performance. Rather, whether or not the receipt of pay and changes in pay are made contingent upon specific behaviors or performance levels and whether or not money is valued by an employee seem to be the crucial characteristics of pay plans which influence behavior and performance.

- There is a weak relationship between pay level and job satisfaction. The relationship is determined in part by the standard each person has regarding the amount of pay he or she should receive, given their inputs (e.g., effort) on the job. The form of pay (direct versus indirect) would seem to impact satisfaction levels but would depend upon individual worker's characteristics (e.g., older workers might prefer pensions to other forms of pay).

- Pay levels are a potentially important influence on length of service because employees do compare their pay levels with those available elsewhere. If the pay form includes pensions which are nonvested (i.e., the employee loses the accrued value of the pension if he or she leaves the organization before retirement), there could be a potential impact of pensions on length of service and retirement age.

- As with job behavior and performance (see above), the impact of pay level or form on attendance would seem to hinge or whether or not pay was valued by the worker and made contingent upon attendance.

In summary, pay level and pay form do appear to have an influence on outcomes. While research is scant, it is perhaps more conclusive than that available regarding the effect of other activities on outcomes. As with the other activities, however, the impact of pay on outcomes is both a complex one and one which is moderated by several variables and conditions.

Pensions and Personnel Management Outcomes

The discussion above is meant to provide a perspective and framework within which to view pensions and activities on the one hand, and pensions and outcomes on the other. Within the broad grouping of wage, salary and benefit programs, it can be seen that pay has been documented to have an impact on outcomes subject to the general conditions outlined above. (A later section of this report will assess the degree to which pensions as a particular form of pay impact outcomes. Available research will be reviewed and gaps in research relevant to this issue will be noted followed by recommendations for advancing our knowledge about pensions and outcomes.)

Prior to the discussion of pensions and outcomes, the importance of pensions and the salient characteristics which distinguish them will be addressed briefly to provide additional background.

Importance of Pensions

The Day-to-Day Administration of Personnel Management Programs

In an organization's system, pensions do not require continual attention as do, for example, training programs, selection systems, or the wage and salary aspects of compensation systems. These other programs and their resultant policies affect members of organizations continually and have the advantage over pensions of immediacy of impact. That is, being selected for a training program might determine whether or not a preferred job assignment is received. The pay level set for a job based upon a job evaluation process would determine the amount of take-home pay a worker receives each week. The standards set in an appraisal system would determine a worker's overall rating and hence merit pay levels.

A pension plan, however, has more subtle and delayed influences. The particular characteristics of the plan, such as the immediacy of vesting benefits, may not yield discernible short-term effects on employee behaviors or turnover decisions. As noted above, the impact of pensions on employees themselves may be indirect, variable and delayed. Certain characteristics of pension plans and policies governing their administration would, coupled with individual and job differences, vary in their effects on employee behaviors at work. This is discussed in detail below.

Costs, Size, and Coverage

Pensions are a significant aspect of most overall compensation packages in terms of size and coverage. Pension plans are complex mechanisms, creating obligations for organizations that may not be discharged until decades into the future. They involve costs which can only be estimated and forecasted with probability, not certainty (McGill, 1975). Added uncertainty comes in the form of inflation. It has been estimated that inflation adds ten percent to total pension costs each time it increases by one percent (Business Week, May 12, 1980). It is not uncommon for organizations to have more retirees receiving pensions than current employees receiving wages (Dun's Review, January 1980).

According to most estimates (Munnell, 1979, an exception) private pension plans, as opposed to social security, for example, will increase in importance and coverage because, in part, the social security system does not attempt to guarantee an adequate lifestyle for retirees. Employees place an enormous burden on a pension plan, using it as their major financial defense against old age and its effects on their earning power. They also place a heavy psychological burden on their pension plans, using them to assuage their natural feelings of insecurity as economic conditions become more unstable and as they approach retirement age. Polls (e.g., Harris and Associates, 1979) continually point to perceptions of financial security during retirement as the most important factor in retirees' satisfaction with retirement. Financial security is, of course, tied directly to pension benefits' size and provisions for benefit adjustments in order to maintain purchasing power.

Approximately ninety percent of the entire American work force is covered by social security or state and/or municipal pension programs. Approximately half of the work force in non-farm business organizations is covered by private pension plans (President's Commission on Pension Policy, 1980; Ture, 1978). Although exact figures vary across the numerous reports available, according to a 1978 survey, pensions cost organizations $1,697 on the average per employee per year and account for 6.3 percent of total payroll expenses (Chamber of Commerce of the United States, 1979). Benefit payments are steadily increasing, and accumulated reserves of private pension plans number in the hundreds of billions of dollars (Ture, 1978). Savings through pension plans account for about one-third of consumer savings in this country (Klemkosky and Scott, 1974). Pensions are also a major force in financial markets and in contributions to capital formation.

The magnitude of these figures is not only noteworthy on a national or aggregate level, but also has significant impact on an organization's financial stability. Erroneous projections regarding the size and amounts of benefits can adversely impact an organization's ability to meet obligations to suppliers and creditors. The organization's ability to raise capital could be hindered.

Pension plans, due to their scope of coverage and cost, are of undeniable importance. Their economic impact in an aggregate sense on our economy and financial structure is obvious. The economic impact of pension on organization's financial situation, as well as that of individual retirees, is also indisputable. However, this report addresses the nonfinancial, that is, behavioral and affective, impact of pensions at the organizational and particularly individual levels. Such an analysis is required not only in order to fully appreciate the financial impact on various outcomes but also to evaluate and recommend changes in organizational pension policy.

Characteristics of Pension Plans Addressed in this Report

Pensions Defined

A pension can be defined as a series of periodic payments to persons who have retired from employment due to advanced age or disability.

Deferred Compensation

As payments to former employees, pensions are not necessarily the same as deferred compensation. The latter term usually refers to compensation for past or current services which is postponed to some future date. Some argue (see McGill, 1975), however, that a purpose of pensions, due primarily to favorable tax advantages, is to defer compensation to employees until they are in a lower income tax bracket.

Public Pension Plans

Difficulties with the individual approach to providing for financial security in old age (e.g., high taxes, inflation, etc.; see McGill, 1975), have in part prompted the development of governmental pension programs. Such programs as Old-Age, Survivors and Disability Insurance (OASDI) created by the Social Security Act of 1935, Medicare, the Civil Service Retirement System, and other plans covering certain groups of government employees cover an ever-increasing proportion of the work force as public sector employment increases (see McGill, 1975). In addition, state and municipal governments have developed pension systems to cover such groups of workers as teachers and law enforcement officials.

These public sector pensions are, of course, mandated by law. Each specific agency or organization has no choice whether to use the pension plan and, except through labor contract negotiation and the indirect influence of the political process and lobbying, has no participation in the establishment or change of the major provisions.

Plans for Self-Employed Persons or Those Not Covered by Other Pensions

Different types of plans have been developed to provide for periodic payments after retirement to those who are self-employed and/or not covered by other plans. Individual Retirement Accounts (IRA), administered by a trustee (i.e., a bank or other type of organization or a person), allow tax deductible cash contributions, not to exceed $1,500 in any year. KEOUGH plans, available for self-employed persons, allow contributions up to fifteen percent of earned income, not to exceed $7,500 in any year. No laws require participation in these plans, but legislation governs their establishment and administration.

Private Pensions

Plans established by private organizations of any type, profit or non-profit, fall into this category. As with the plans described above, these plans are not mandated by law but legislation governs their administration. Their existence is technically voluntary, but various pressures for their development, such as union influence, the existence of public pensions, tax regulations, and other reasons have induced a large number of organizations to design and install pension plans.

These private pension plans are the focus of this report. Within certain limits, discretion is given to individual firms as to: a) whether or not to have a plan and, b) what the characteristics of the plan will be.

THE ESSENTIAL REQUIREMENTS FOR QUALIFICATION - The essential requirements for qualification as a private pension plan were developed in the early 1940s. These were not principally altered by the Employee Retirement Income Security Act (ERISA) of 1974 (discussed below), except in participation and vesting requirements. Various related regulations and rulings have interpreted the requirements through the

years. By and large, the requirements were developed to help ensure that the pension plan was not created for the exclusive benefit of select groups of employees.

The specific requirements for qualification are the following (see also McGill, 1975):

a. Terms of the plan must be set forth in a written document;

b. The plan must be established with the intent that it be a permanent and continuing arrangement;

c. The assets of the plan must be legally separated from those of the employer or other sponsoring organization;

d. The plan coverage must benefit employees in general;

e. Plan contributions and benefits may not be discriminatory;

f. Participation and vesting requirements outlined by ERISA must be met;

g. The plan must provide definitely determinable benefits; and

h. Remaining provisions of ERISA (e.g., reporting, fiduciary standards, etc.) must be met.

THE EFFECT OF ERISA ON PRIVATE PENSION PLANS - In addition to the broad characteristics of private pension plans noted above, other features have been mandated by ERISA. The major provisions of ERISA were written to correct problems with pensions, including losses. Principal provisions now required of private pensions include the following:

a. Participants must be vested after a certain period of service (see Spector and Schulz, 1979);

b. Plans must allow for coverage of employees at age 25 after one year of service;

c. The Pension Benefit Guaranty Corporation insures pension benefits if a defined benefit plan is terminated;

d. Employers must fund pension credits for current service as they are earned;

e. Funds for benefits must be held in trust and used only for benefits and appropriate costs; and

f. Extensive reporting and disclosure to various federal agencies, participants and beneficiaries is required.

Major Dimensions Along Which Private Pension Plans Vary

While certain legislatively determined (i.e., ERISA) requirements apply to private pension plans, plans vary considerably. Broad characteristics which differentiate plans are noted below. These are relevant because of their varying impact on personnel management outcomes, (e.g., employee satisfaction and employee work behavior), addressed in detail in succeeding sections of this report.

VESTING PROVISIONS - Vesting refers to an irrevocable right to receive accumulated pension benefits at a future date. Plans must have vesting provisions which satisfy at least one of the following three rules:

a. Full vesting by the tenth year of participation;

b. Twenty-five percent vesting after five years of participation, increasing by 5 percent for the next five years, then by 10 percent per year until full vesting is reached at 15 years; or

c. A "rule of forty-five" under which employees with at least five years of service would have their pensions 50 percent vested when the sum of their age and years of service equals 45; all employees, regardless of age, must be 50 percent vested after 10 years of service, with 10 percent vesting for each year thereafter (see also Spector and Schulz, 1979).

As will be discussed below, vesting requirements and characteristics may have an impact on turnover, as well as the overall perceived utility of the plan to workers of varying years of service. Since the passage of ERISA, most employers have utilized the full vesting at 10 years option.

PROVISIONS FOR PORTABILITY - Pension entitlements which are both vested and portable accompany an employee as he or she moves from employer to employer. Although portability is not mandated by ERISA, it is strongly supported. Those opposed to portability argue that it deters the development of new plans, entails rigid, costly controls and standardization, and necessitates technical problems in determining the value of pension credits as employees change employers (Srb, 1971).

Reciprocity agreements sometimes exist between plans that permit transfers between the plans without losing pension credits (Srb, 1971). Some argue that liberal vesting may preclude the necessity for portability since participants could receive deferred benefits or earlier benefits in lump sums when they leave a system. Problems with portability and reciprocity center around their costs, the lack of uniformity among plans, and organized labor's resistence to broadening its protection beyond union jurisdiction to nonunion organizations with whom reciprocal arrangements could be made. The impact of portability on labor turnover is addressed, given the available literature, in a subsequent section.

EMPLOYER VERSUS EMPLOYEE CONTRIBUTIONS - Most private pension plans are funded solely by contributions from employers (Ture, 1978). A Harris Poll (1979) indicated that a significant number of

employees would be willing to make contributions or increase their contributions if liberalized benefits (e.g., cost-of-living increases) were made available to them. The relative contribution made by employers and employees obviously has an impact on the plan's cost and may impact the perceived importance of the plan and/or its ability to influence work behaviors.

FINAL-AVERAGE PAY VERSUS CAREER-AVERAGE PAY PLANS - Numerous specific formulae are utilized in order to determine the size of benefits due beneficiaries of various pension plans (see e.g., McGill, 1975). Most, however, are variants of final or career-average plans. The latter use formulae which average earnings throughout one's career, thereby possibly lowering final pension entitlements. The former generally average only the last several years' annual earnings, thus reflecting higher earnings as well as inflation.

Summary

There are a great variety of pension plans. The vast majority, however, share certain major characteristics. Many of these characteristics are now mandated by ERISA and related legislation. In addition, private plans can vary along the broad dimensions outlined above.

The impact of pensions on personnel management will depend to a large degree on the broad characteristics noted above, as well as the basic assumptions under which the plan was developed and the objectives it was designed to attain. These assumptions and objectives are reviewed in the next section.

Major Objectives and Assumptions Underlying Pensions

Why do companies provide pensions to employees? What is their purpose? What explicit or implicit objectives are accomplished with a pension plan? These questions are important since it is difficult to evaluate a program without objectives. Programs must be evaluated against what they are supposed to do or accomplish.

The Instrumental Perspective

Of 10 currently popular personnel management textbooks which were examined to determine the purposes of pensions, only one discussed the purpose of pensions at all. Glueck (1978) indicated that pensions were provided by the organization as a means by which older and less productive workers could be retired and also to provide an incentive for younger and more productive workers to stay with the firm. This view stressed the "instrumental" value of pensions. Here pensions are considered to be an aid to the accomplishment of the human resource goals of the organization (i.e., the attraction of competent people to the organization, motivating them to perform at a higher level, and encouraging them to remain with the organization as long as they continue to be productive).

This "instrumental" perspective is congruent with the results of a poll taken of a representative cross-section of 212 companies in 1979 (Harris and Associates, 1979). One of the questions used in this poll focused on the perceived advantages of pensions to companies. The responses given to this question are presented in Table 1. As can be seen, the two most frequently mentioned advantages — attraction and retention of employees — involve this "instrumental" perspective. As Table 1 indicates, other advantages were to produce better morale and to provide an incentive to work harder.

The Moral Perspective

The third and fourth most frequent advantages for pensions listed in Table 1 reflect the provision of pensions for "moral" reasons. Under this perspective, pensions (and other fringe benefits) are provided to employees to give them the security they are entitled to because of their lengthy contribution to the organization. Under the "moral" perspective, such benefits are a simple case of justice or reciprocity. The traditional norm of "paternalism" in many U.S. companies has led some companies to voluntarily provide pensions.

Under a "paternalistic" approach, employees are to be protected in exchange for their obedience and loyalty to the organization. This system views the organization as an extended family. U.S. firms such as Nunn-Bush Shoe Company, Proctor and Gamble, IBM, and Eastman-Kodak have emphasized this approach as have virtually all of the major Japanese companies. There are U.S. companies which, like their Japanese counterparts, provide their retired employees with extra help and assistance if this is needed, even though the company is not obligated to do so (Heaton, 1977; Kneen, 1978).

The Political Perspective

It would appear that many pension plans were initiated or accepted as a means of deferring current wage increases that were considered threatening at the time for one reason or another. This is a "political" use of pensions in so far as pensions are used as a compromise. This was most likely to occur when unions demanded a wage increase which was deferred into the future by offering a pension. At times the U.S. government has pressured companies to give pensions in lieu of wage increases when inflation was a major concern. This occurred in 1946 when the government supported negotiations for the first real pension plans for blue collar workers on an industry-wide basis with the United Mine Workers (Farwell, 1964).

Similarly, in years when profits were down, companies often found that negotiation of a pension plan with the union representing their employees could prevent a strike from occurring without jeopardizing their current financial situation by putting the problem off until a future time. Certainly many public officials in some of our leading cities also found they could buy labor peace for a time by granting their employees pension benefits that would not fall due until after they had left office.

TABLE 1

Advantages of Pension Plan to Companies
(Asked of business leaders)

Q: Overall, what would you say are the main advantages to your company of a pension plan?

Number of Respondents	Total (212) %
Can compete with other companies for best employees bargaining tool	54
Retention of employees, incentive to stay with firm	52
Good/orderly future security benefit plan for employee	33
Sense of security for employee and employer	24
Satisfies company's moral/social responsibility to employee	15
Key/major/standard part of wage/compensation package/plan	10
Incentive to work/be productive	9
Better employee-management relations/morale	9
Money put in can grow, allow employee to build capital for future	8
Incentive to participate and profitability of company	3
Tax benefits, earnings are tax free	3
All other reasons3	
None	*
Not sure	

* Less than 0.5%

Source: Harris and Associates, 1979

This tendency to defer payment until a later date may solve problems in the short run but can create long-run problems. Sometimes this approach is effective in that the short-run problem solved may be worse than the long-run problems created by the solution, as when a firm staves off bankruptcy through this procedure. Often, however, the pension plan solution may create far greater problems than those initially faced.

The Competitive Perspective

Organizations are competitive. They compete in the market for human resources. The rewards or privileges granted by one firm may have become mandatory to other firms competing for labor. Thus, one firm in an area might grant pensions for moral reasons due to union pressure for deferred wages. Other firms then must grant pensions in order to attract workers in sufficient quantity and quality. The actions of other firms in terms of wages and fringes due to the nature of markets create pressures whereby other organizations are obliged to match those actions.

Employees commonly evaluate their job benefits in terms of what other employees doing similar work receive (Nash and Carroll, 1975). The competitive explanation underlying pensions partially overlaps instrumental purposes. Under the competitive perspective, a minimum level of pensions and other fringes become considered as a "right" since so little variation exists among firms.

Pensions might be best evaluated against these four purposes. If granted for instrumental purposes, do they actually help organizations attract, motivate, and retain competent employees? If granted for moral purposes, such as providing loyal and dedicated former employees with security in their old age, do they actually provide this security? If given for strategic or political reasons to avoid a short-run problem, does the trade-off between long- and short-run considerations seem worthwhile?

Pension plan goals are also necessary for evaluating the many alternative forms or characteristics of pension plans. There are different options available for establishing an employee's right to contributions made by the firm, for paying out benefits to retirees and their families, for establishing retirement ages, etc. Which option is best in a particular situation will depend on the plan's objectives. A particular pension plan's characteristics will vary depending on whether it was initiated for instrumental, moral, political, or competitive reasons.

The Effect of Pensions on Employee Behaviors

The primary purpose of this paper is to address the impact provision of pensions and pension plan attributes has on employee behaviors, as documented in or suggested by the personnel management literature. Such a review will at least partially illuminate the question of which of the purported objectives underlying the provision of pensions is realized given current personnel management research.

The following section summarizes the evidence pertaining to the direct link between pensions (and their attributes) and employee outcomes while ignoring, for the moment, potential moderating effects of differences in individuals and jobs. The potential moderating effect of differences in preferences for pensions on the impact of pensions is addressed in a subsequent section.

Pensions and Job Choices

MODELS OF JOB CHOICE IN THE PERSONNEL MANAGEMENT LITERATURE - While consideration of the occupation choice decision has preoccupied numerous researchers in the personnel management field (see Holland, 1976 for a review of this literature), few studies — theoretical or empirical — have examined the job choice decision. The literature that exists on this topic concerns two aspects of the job choice activity: what is the decision model that job choosers typically apply when evaluating alternative job offers and what job attributes play an important role in the decision to accept a job?

Regarding the first issue, two competing models of the decision process underlying the job choice process have been proposed. The compensatory model, traceable to Adam Smith in the Wealth of Nations (1937), underlies most classical and neo-classical economic analyses of labor market behavior. In contrast is the satisficing model, generally attributed to the work of March and Simon (1958).

According to the compensatory model, job offers are evaluated by assessing the level of attractiveness (or utility) of the job attributes comprising each of the offers. Each job alternative is thereby assigned an attractiveness rating and the job with the highest overall rating from among the total list of job alternatives is ultimately accepted. This model is termed compensatory since a job characteristic with a sufficiently high attractiveness rating can offset (or compensate for) a job characteristic with a low attractiveness rating. The main implications of this model for job choice decisions are that job choosers are presumed to evaluate all available job offers prior to making a decision and that each job is evaluated by examining the levels of all of its attributes. Furthermore, many different combinations of attribute levels can yield a job offer that is perceived attractive by the applicant.

Satisficing theory states that the information processing requirements implicit in a compensatory model are too complex for the average decision maker. Hence most decision makers, of which job choosers are a subset, simplify the decision process by applying rules that reduce the amount of information that needs to be evaluated. In the context of a job choice, satisficing implies that applicants evaluate job offers against minimum standards that must be met for a small number of the attributes comprising a job. Jobs for which the critical attributes do not exceed minimum required levels are immediately removed from consideration with no compensation among attributes possible. Once a job successfully meets the minimum standards on the relevant attributes, the job offer is accepted without further examination of alternative openings.

Hence, an individual adopting this decision strategy could be expected to examine fewer job openings along fewer attributes than would the applicant adopting a compensatory strategy. Not only is satisficing more appropriate for decision making given human information processing limitations, but, according to March and Simon (1958), it also recognizes that the decision maker possesses incomplete information about the alternatives in question.

PERTINENT RESEARCH - While there is not a wealth of studies which can be drawn on to evaluate the validity of each of these models, it appears that job choosers make their decisions using less than complete information about the alternatives. In fact, probably the most salient job attributes determining job choices are the pay and nature of the work (Shepard and Belitsky, 1966). Dyer, Schwab and Fossum (1978) further contend that of the various pay components, the pay level will be the only pay attribute for which minimally acceptable levels are set in most instances. The other components of the pay package assume at best a marginal role in the job choice decision, probably because information about such items as promotional opportunities (pay structure), pension plans (pay form) and merit evaluations (pay system), is either not available from a credible source or is simply too complicated to examine systematically at the point of job acceptance. There is also evidence to suggest that individuals differ in terms of the number of job openings they examine with some clearly preferring to accept jobs very early in the search process (Shepard and Belitsky, 1966), or at least to psychologically commit themselves fairly early within the search process to a preferred opening without necessarily explicitly accepting the offer (Soelberg, 1967).

Hence, for many individuals engaging in job search and choice, the satisficing model appears to characterize them more aptly than does the compensatory model both in terms of the selective approach to examination of job openings in general and in terms of the focus on but a few job attributes. It should be noted, however, that there may be certain categories of job seekers for which the compensatory model is a more accurate reflection of the choice process. For example, skilled professionals and more veteran job seekers may be more sensitive to a greater variety of information about job attributes in deciding on a job offer than would be the case, perhaps, for less skilled and inexperienced job seekers (Heneman, Schwab, Dyer and Fossum, 1980). Similarly, under favorable labor market conditions, job searchers can be expected to examine a larger number of job openings than would be the case when job opportunities look bleak.

An additional issue that has benefited from at least some research attention and has been indirectly alluded to above is the substance of job choice decisions. What makes a job more attractive than its counterpart in the eyes of a job applicant? The general approach that has been adopted in such studies has been to request respondents to rank or rate various job attributes in terms of their attractiveness or importance (see Jurgensen, 1947, 1978 for the most exhaustive examples of such studies). Methodological criticisms of these studies aside (for a discussion of these problems see Lawler, 1971 or Olian and Rynes, 1980), it is difficult to come up with a consistent hierarchy that represents the job attribute preferences

of American workers. Lawler (1971), for example, examined the relative importance of pay in 49 such studies and found that the rank order of importance of pay ranged from one to nine with a median rank of three. Myers and Shultz (1951) reported that the most important factors in reemployment decisions were scarcity of other jobs, the physical characteristics of the job and steadiness of employment. Reynolds (1951) found wages followed by the job's physical characterictics as most important in the decision to accept or leave a job; Parnes (1954) concluded that economic factors other than wages (such as steadiness of employment) were of primary importance in job acceptance decisions.

Many of these inconsistencies may be attributable to the differences in instructions confronting respondents. For example, some studies asked individuals to rank attributes in order of their importance (or attractiveness) in their current job, in choosing a new job, for their ideal job, in deciding to quit, or in determining morale on the job. Hence, it is very difficult to draw any firm conclusions from these studies about preferences for job attributes in the abstract or about the importance of job attributes in the specific context of job choice decisions.

It is probably safe to conclude that job choice decisions are based on very incomplete information about the opening. The pay level does influence the job choice (Dyer et al., 1978). Whether this is because the pay level is actually important to job choosers, whether it serves as a signal of other important job attributes that vary consistently with the pay level, or because it is one of the few items of information that can be obtained with a small margin of error and serves easily as a yardstick for comparison of alternative offers, is unclear. An additional job attribute that comes up fairly consistently in studies of job choosers is some gross descriptor of the nature of the work. Geographical location should be added to this short list for those jobs which can vary along that dimension. Unique characteristics of labor markets and of particular samples of job searchers may impose limitations on these generalizations.

EFFECTS OF PENSIONS ON JOB CHOICES - As was mentioned previously, one of the primary motivations underlying the provisions of pensions, according to various business leaders, is the belief that their availability will be instrumental in attracting a qualified labor force (e.g., Harris and Associates, 1979; McGill, 1975; Lake, Rubin and Wiseman, 1979). Indeed, in the 1979 Harris poll, (see Table 1) the most frequently mentioned benefit of pension plans (according to 54% of the business leaders surveyed) was that pensions enabled the company to ". . . compete with other companies for best employees, bargaining tool."

Despite the plausibility of this conjecture and the considerable pension expenditures that follow, in part, from this belief, we have been unable to locate a single empirical study that addresses the impact of pension availability or plan characteristics on job choices in the personnel management literature. Extrapolating from the literature on job choice, however, leads us to conclude that the presumed impact of pension benefit availability on job choices may be an overestimation.

The reader will recall that evidence suggests many job choosers use a satisficing strategy whereby they set minimally acceptable levels on a small number of job attributes and proceed to search for a job that successfully meets these standards. If pensions are to be used to differentiate among alternative offers, applicants must possess information about a variety of dimensions along which pension plans may differ, they must be capable of comprehending this information at the point of job choice and further, they must be able to reduce this information to a single dimension of net worth (or attractiveness) of the plan. It appears that few applicants would be in a position to judge pensions in this way and proceed to use this information as a yardstick for evaluation of alternative job offers. This proposition would probably be less true of individuals with more familiarity with the specific dimensions along which pension plans may vary. Such individuals (potentially older workers who place more emphasis on, and are therefore more familiar with, the content of pension benefits) may consider pension benefits as one of the critical job attributes along which offers are to be evaluated. They may be in a more informed position to solicit data on those aspects of a pension plan which provide accurate signals of its worth. For such individuals, pensions may figure as one of the critical job attributes which must be satisfied prior to job acceptance.

While pension plan provisions do not appear to be particularly useful as a decision rule in making job choices, they may actually be important to job choosers though not relied on for decision purposes. Several studies (to be discussed later) have shown that pensions vary in importance relative to other fringe benefits for various categories of workers depending on -- among other things -- respondents' age, marital status, sex and tenure (e.g., Nealey 1963, 1964; Chapman and Otteman, 1975). None of these studies, however, addressed the importance of pension benefits relative to other fringes or relative to other job attributes in the specific context of job choice decisions. Furthermore, the specific dimensions along which pensions can vary (e.g., vesting formula, benefit formula, benefit level, option for employee contributions) were not related to the propensity to accept a job in any study to date.

FUTURE RESEARCH - Studies focusing on the pensions/job choice linkage are needed for several reasons, not the least of which being an assessment of the uniformly held, yet uniformly untested, assumption that pension expenditures improve the quality of the organization's members. If firms are to utilize pensions as a job attribute distinguishing them from their competitors, it will be through attention to those specific components of a pension package which applicants have indicated constitute salient features of an offer in their decision to accept a job. What is needed, therefore, are simulation studies of job choice decisions in which different aspects of the pension plan package as well as other features of the job offer are systematically varied and subsequently related to employment outcomes (e.g., job choices, performance and turnover). It is important to recognize that the impact of pensions or pension plan attributes on job acceptances cannot be assessed in a context other than the job choice decision since it is entirely plausible that the importance of pensions varies, depending on the employment stage at which it is measured. It would be erroneous, for example, to conclude that a relationship between

turnover and pensions, if observed, implies also that pensions have an impact on the decision to join an organization. Models of turnover (e.g., March and Simon, 1958) suggest a set of factors which do not necessarily overlap with the considerations involved in choosing a job. Given what the personnel management literature suggests regarding the job choice decision process, organizations would be well advised to examine the specific impact, if any, of various components of pension plan packages on job acceptance decisions. For large segments of job choosers, the presumed impact of pension benefit availability may be ill-founded.

Pensions and Job Performance

MODELS OF PERFORMANCE IN THE PERSONNEL MANAGEMENT LITERATURE - Much of the personnel management literature is aimed at enhancing employee performance through various personnel programs such as the selection of competent employees, employee training and development, performance appraisal for remedial purposes, physical protection of employees through safety management, and compensation policies designed to reward past performance and provide incentives for improved future performance. Compensation policies in particular attempt to increase performance levels through their influence on the motivation to perform. The assumption is that motivation, coupled with the relevant ability, will lead to on-the-job performance. Since employee abilities are not readily changeable, personnel managers have directed their efforts towards influencing motivation in their attempts to improve performance.

Motivation theories can be classified into two broad categories: those describing the process simulating an individual to perform in the organizational context, and those describing the content (e.g., organizational outcomes or internal states) that will encourage performance.

Expectancy theory (Vroom, 1964) — which is a process model — is probably the most widely accepted motivation theory in the industrial organizational psychology literature today. An individual will be motivated to perform, according to expectancy theory, provided s/he believes that by investing effort, the desired behavior will actually follow, and provided the behavior is rewarded with valued outcomes. Hence, if a reward (e.g., pay) is to motivate performance, it must be important to the employee, s/he must believe that good performance does in fact lead to pay increments, and that if s/he tries hard, performance will indeed improve. According to expectancy theory, the motivational process will be hampered if any of the three linkages is weak or nonexistent. While motivation is necessary, the employee must also have the appropriate ability if effective performance is to result. Placing pensions into this framework, motivation will suffer to the extent that pension benefits are either not important to the employee or if the employee sees no necessary connection between performance levels and receipt of pension benefits. Expectancy theory predictions have been tested in a variety of contexts (e.g., in job choices, academic choices or on the job itself). In general, the theory has successfully predicted the behaviors in question (for reviews of this literature see Mitchell, 1974, or Schwab, Olian and Heneman, 1979).

The two-factor theory (Herzberg, 1966) is a theory of motivation focusing on the specific content of organizational outcomes that are likely to increase satisfaction and the motivation to perform. Accordingly, there are two types of organizational outcomes: intrinsic and extrinsic factors to the job. Intrinsic factors (e.g., achievement, recognition or advancement), if present, will enhance satisfaction and employee performance. In their absence, however, employee satisfaction or performance will not suffer. The presence of extrinsic outcomes on a job (e.g., good pay, status, job security or supervision) cannot increase performance or satisfaction, while their absence will lower satisfaction or performance. Accordingly, extrinsic factors (of which pension benefits are a part) can exert only a negative, not positive, influence on job performance. While it is fairly reasonable to conclude that some benefits, in general, will be more valued than others, the theory has been primarily criticized for its failure to acknowledge the possibility for pervasive individual differences in preferences for various classes of outcomes (Schwab and Heneman, 1970).

EFFECTS OF PENSIONS ON PERFORMANCE - The implications of expectancy theory and the two-factor theory concerning the impact of pensions on performance differ markedly. Expectancy theory suggests that pensions can increase motivation to perform provided they are valued and their award is linked to differential levels of performance. Conversely, the two-factor theory implies that pensions cannot increase motivation (or satisfaction); their effect can only be to lower motivation if the employee deems such benefits as unsatisfactory. Unfortunately, it is impossible to assess the validity of each of these models given the absence of any empirical evaluations of the effect of pensions on performance.

POTENTIAL EFFECTS OF PENSIONS ON PERFORMANCE - If pensions have any potential for influencing performance, a marked change in the philosophy underlying their provision is called for based on expectancy theory. Namely, if organizations obtain information indicating that pensions are indeed important to their employees, employer contributions to pension plans could be based — at least in part — on merit or performance. Otherwise, if pensions are awarded indiscriminately, there is no theoretical reason to expect their provision to motivate people to performance. Evidence derived from other personnel management programs suggests that rewards made contingent on performance (or merit) can enhance the motivation to produce (see Mitchell, 1974 or Heneman and Schwab, 1972).

Supplemental contributions to pension plans based on differential levels of performance may not represent as radical a shift in philosophy as the proposal may imply. Many large corporations already do just that by using nonqualified deferred compensation plans for their upper level executives. This additional fringe benefit represents a bonus for superior performance.

In the present day business climate, there are two major impediments to the introduction of supplemental contributions to pension plans based on merit. The first concerns the requirements for qualification of pension plans (with the associated tax exemptions) under IRS guidelines. Plans not subject to the collective bargaining process cannot discriminate in favor of

highly compensated individuals if they are to benefit from a qualified status. Furthermore, there is an upper limit on annual pension benefits that can be drawn by a recipient (currently $102,000) if the plan is to remain qualified. Both requirements may be violated, in theory, if employer contributions are partially based on merit.

The second, perhaps more serious, barrier to performance based pension contributions is that of the philosophy underlying award of fringe benefits in general and pension benefits in particular. If pensions constitute a moral obligation of the employer for past membership in the organization, it follows that membership should be measured in years of service rather than in units of performance. Given such an assumption underlying pensions, it seems hardly defensible to condition their award on a performance evaluation. If, however, pensions are provided for more instrumental purposes (e.g., to attract, motivate and retain employees) employers may try to realize this objective through various motivational techniques. Alternatively, some employers have viewed pensions as one type of cash payment. As such, pensions are a form of compensation, albeit deferred to a later date, which can be awarded consistent with the pay system in the organization. If the system is performance based, perhaps pensions, as part of the compensation package, could be similarly awarded.

There are strong arguments in favor of providing all employees with some means of an adequate livelihood following retirement, drawn from employer contributions, in view of past services provided by these employees. In view of the enormous costs of pensions, performance based supplements to a basic level of contribution to qualified pension plans may be of potential benefit to management. Less obvious but equally plausible is the possibility that some employees may actually opt for this form of bonus payment over other merit rewards, particularly given current concerns over the inadequacy of retirement income. According to expectancy theory, only through such an operational linkage between performance and retirement contributions can pensions realize any of their purported influence on performance.

Implementing a merit based pension program would not, however, be free of problems; a major problem would be overcoming initial resistance to the proposal. Employees and unions may fear a loss of pension benefits for the below average employee. This concern could be alleviated if bonus contributions to a pension plan were made over and above employers' regular contributions. Additionally, such a plan rests on the existence of a valid and accepted performance appraisal system, a condition frequently unmet in many organizations.

These ideas, while based on theory, are largely conjecture; whether they are ultimately acceptable to employees and prove cost-effective to employers can be answered only by future research. It should be recognized that an alternative theoretical formulation — the two factor theory — would cast a more pessimistic prediction on the possibility for influencing performance through pensions. According to this formulation, pensions are necessary not to encourage above average performance but for the purpose of insuring against poor performance. Therefore, even with

changes in the basis for awarding pension benefits, pensions may act only as a hygiene factor in maintaining steady performance.

In summary, while some believe in the favorable effects of pensions on performance, no quantified research has assessed the veracity of this assumption. Theoretical predictions, in one case, offer the promise for a positive influence of pensions on performance if organizational practices are appropriately modified. An alternative theoretical formulation views the role of pensions on performance as far more limited.

Pensions and Satisfaction

THEORIES OF SATISFACTION IN THE PERSONNEL MANAGEMENT LITERATURE - The two-factor theory described above uses the terms motivation and satisfaction almost interchangeably. Hence, if a job outcome is satisfying, it will be also motivating and vice versa. As such, pensions cannot satisfy, they can only assure against dissatisfaction.

An alternative theory views satisfaction as a consequence of social comparisons. Equity theory (Adams 1963, 1965) considers the nature of a person's inputs (e.g., effort, skill, education) relative to the outcomes (e.g., pay, recognition, promotions) obtained in an exchange relationship. A sense of equity or inequity will occur ". . . when a person compared his or her outcome/input ratio, either consciously or unconsciously, to what is perceived to be the ratio of another person or persons" (Campbell & Pritchard, 1976, p. 105). It should be noted that dissatisfaction will theoretically occur if a person feels either over- or under-rewarded. The evidence consistently supports the existence of dissatisfaction when individuals feel under-rewarded. Less significant and consistent evidence substantiates the hypothesized effect of over-rewarding on equity perceptions (see Campbell and Pritchard, 1976, for a review of this literature).

Based on equity theory, pensions will lead to pay dissatisfaction to the extent that an individual feels that his/her outcomes (among them pension benefits) compare unfavorably or too favorably with those of another individual (real or hypothetical) whose inputs are equal. Comparisons can be made both within and across organizations; there is no way to know who the comparison object will be for any given individual because equity perceptions are so individualized.

There are numerous possible consequences to perceptions of inequity and it is hard to assess which alternative will be chosen in a given circumstance. For example, if an individual feels that his/her pensions are inequitable, s/he may try to alter them in the desired direction, s/he may change the level of inputs (e.g., increase or decrease performance), may distort perceptions thereby convincing himself/herself that pensions are actually equitable, or may — as a last resort — quit the job. Hence, in theory, pensions may cause dissatisfaction, but the theory does not enable specification of the conditions under which inequity will occur, nor does it predict what the exact consequences will be, if any, of perceptions of inequity.

EFFECTS OF PENSIONS ON SATISFACTION - The presumption of the salutory effects of pensions on satisfaction is largely untested. As in the area of the pensions/performance linkage, much of what will be said about satisfaction is conjecture, based on predictions derived from the two-factor and equity theories.

The two-factor theory suggests that pensions can protect only against dissatisfaction. Increases in pension benefits or designing pension plans in response to expressed employee preferences will at most raise satisfaction to a neutral level but will not lead to above-average satisfaction.

Personnel management literature provides no direct evidence on the effects of pension on pay satisfaction. What can be ascertained is that pay in general, particularly pay level and structure, has an impact on pay satisfaction (Heneman and Schwab, 1975). The influence of pay on satisfaction, while not strong, does not appear to be restricted to the negative range of the satisfaction continuum as would be predicted by the two-factor theory (Nash and Carroll, 1975).

As mentioned, equity theory views direct and indirect pay as an outcome potentially influencing satisfaction both favorably or unfavorably. While much of the research on equity theory addresses issues of questionable practical relevance, some does provide implications for pension policy. In particular, the nature of the referrent person (or object) has been debated in recent articles. Heneman and Schwab (1975) suggested that comparisons to individuals external to the organization were more likely in the case of direct, rather than indirect, pay. This is probably more true of professional rather than blue-collar workers (Parnes, 1970) and younger relative to older managers (Andrews and Henry, 1963). In the case of indirect pay, the complexity of fringe benefit information probably precludes comparisons with employees of other organizations who have a different mix of benefits. Since fringes are generally based on easily quantified characteristics (e.g., length of service or base pay), it is very likely that their allocation will be perceived as equitable relative to rewards distributed on the basis of more ambiguous indices.

Some writers have suggested that there may be other factors, additional to social comparisons, that influence the perceived adequacy of financial rewards (Locke, 1976). These include the person's financial status, family situation, perceptions of the employer's ability to pay, and assessments of the nonpecuniary rewards from the job itself. A Harris poll (Harris & Associates, 1979) found that a significant proportion of the respondents (28 percent of current and retired employees and 5 percent of business leaders) felt that retirement income should be based on need, rather than on traditional variables such as pre-retirement earnings or length of service. This suggests that even though pensions may be awarded indiscriminately based on fairly objective indices, individuals may differ in their assessment of the equity of pensions if they use a variety of standards in formulating their outcome/input ratios.

A recent study assessed the importance of various pay comparison factors in influencing satisfaction with salary, benefits, and pay raises (Henemen, Schwab, Standal and Peterson, 1978). The various factors rated

on importance were personal (involving comparisons to family, friends and relatives); cost-of-living; historical (comparisons to individual's past earning trends); internal (intra-organizational comparisons); and external (inter-organizational comparisons). The results indicated that more than any other factor, the cost-of-living was the most important dimension influencing satisfaction with benefits. Second and third in importance were external and internal comparisons respectively, a result the authors found somewhat surprising. The high intercorrelation among internal and external comparisons indicated that respondents did not make large distinctions between the referrent persons located within versus outside the organization. Heneman et al. (1978) also found that internal comparisons of benefits increased with length of service suggesting that there is a tendency to turn inward as individuals become more socialized to and more acquainted with organizational practices. External comparisons increased the higher the salary level. For those with a greater likelihood of quitting, personal comparisons for fringe benefits purposes became important. It should be noted that all ratings of importance were characterized by substantial variability, indicating that individuals differ in their choice of comparison object. The implications for organizations are that regardless of the openness of the pay policy and its degree of acceptance by employees, there will be substantial differences in perceptions of equity because individuals apply a variety of standards in forming their attitudes toward fringe benefit packages.

CONSEQUENCES OF DISSATISFACTION WITH PAY - What of the evidence concerning the consequences of pay inequity? First of all, pay satisfaction does appear to bear a relationship to overall job satisfaction (Carroll and Brunner, 1973; Lawler, 1971) but the relationship is not necessarily strong. This is probably explained by the fact that pay is but one facet of the global construct of job satisfaction (Smith, Kendall, and Hulin, 1969). Other aspects of the job, such as satisfaction with the social environment, with the supervisor, the work itself, with mobility opportunities and with the work schedule, may contribute substantially to the individual's job attitude, thereby weakening the unique impact of pay on satisfaction.

While there is fairly consistent evidence of a moderate relationship between overall job satisfaction and turnover (the average correlation between the two is usually less than .40 (Locke, 1976), there are some studies suggesting that pay alone may have a detectable impact on termination decisions (Lawler, 1971). Since turnover is a very complex decision, influenced by, among other things, family commitments, personal characteristics, and alternative job opportunities, as well as satisfaction with the current job, it is not plausible to expect the direct impact of pay on turnover to be substantial. Unfortunately, none of the studies assessing the consequences of pay dissatisfaction have distinguished between direct and indirect pay, let alone identified the impact of special forms of indirect pay.

The hypothesized process through which pensions could directly impact performance was previously presented. Many writers in this area, however, have suggested that pensions may have an impact on performance through their favorable influence on job satisfaction (see for example

Allen, 1969; McGill, 1975; Coffin, 1977). Hence, it is important to verify the existence of the satisfaction-performance connection.

EVIDENCE REGARDING THE SATISFACTION-PERFORMANCE LINKAGE - Locke (1976) observes that, "Just as reviews of the literature have shown consistently that job satisfaction is related to . . . turnover, they have been equally consistent in showing negligible relationships between satisfaction and level of performance or productivity" (p. 1332, emphasis ours). Herzberg, Mausner & Snyderman (1959), despite their claim that satisfying experiences increase job performance, presented no acceptable evidence in support of this assertion. Studies focusing on the more specific linkage between pay satisfaction and performance have yielded equally unimpressive findings. In a hospital where pay was seniority-based Schneider and Olson (1970) observed no relationship between pay satisfaction and performance while the same study found a positive relationship in a hospital where pay was performance-based. Carroll and Tosi (1973) reported a slight but negative relationship between pay satisfaction and goal success for a sample of managers who were awaiting rewards for their performance. These findings raise questions regarding the causal linkage between pay satisfaction and performance. Rather than being causally linked, pay satisfaction and performance may be influenced by a third variable such as the nature of the reward system (Cherrington, Reitz and Scott, 1971). To the extent that the reward system has a favorable influence on both pay satisfaction and performance, a positive relationship between the latter two variables may be expected. In any event, the multitude of research on the issue of the satisfaction-performance association does not support a direct link between the two. It is somewhat puzzling, therefore, to encounter the repeated assertion that workers who are more satisfied — for whatever reason — will reflect this job attitude in increased productivity. The evidence in the personnel management literature does not lend justification to providing of satisfying pay policies if the ultimate purpose of these benefits is to influence performance through their influence on satisfaction.

In summary, there is very little research illuminating the effects of pensions on satisfaction. At least according to equity theory, pensions may increase satisfaction if the individual deems his or her pension to be equitable. Research suggests that such feelings of equity are partially determined by the cost-of-living and by comparisons to the benefit packages of individuals external to the organization. While findings do support the existence of a pay-satisfaction-turnover relationship, no consistent evidence substantiates the hypothesized pay-satisfaction-performance relationship. Needless to say, studies examining the particular role of pensions within this framework are greatly needed.

Pensions and Turnover

MODELS OF TURNOVER IN THE PERSONNEL MANAGEMENT LITERATURE - Most work describing the turnover process point to explanatory variables similar to those included in the March and Simon (1958) model of turnover. March and Simon identify two major determinants of the decision to quit voluntarily an organization: the

perceived ease of job mobility, and the perceived desirability of mobility. Perceptions of the ease of securing alternative employment are influenced by variables such as the level of business activity, the terminator's knowledge of alternative vacancies, and personal characteristics such as skill, age, sex and occupation of the job changer. Perceptions of desirability of movement are influenced primarily by job dissatisfaction and available alternatives within the organization.

The evidence is fairly supportive of this model. Ease of movement, as measured by various economic and personal indicators, does apparently relate to termination decisions. For example, the monthly voluntary quit rate is inversely related to the level of unemployment (Heneman, Schwab, Dyer and Fossum, 1980). Moreover, quit rates decrease the less educated an individual, and the older the job changer (Rosenfeld, 1979). If sex discrimination exists, females should face less employment opportunities than do males, thereby reducing mobility among females. Contrary to expectations, female occupational mobility rates barely differ from those of males (Rosenfeld, 1979).

Regarding the desirability of movement component of the model, as previously mentioned, turnover does appear to be related to dissatisfaction even though the relationship is not strong. On the one hand, the absence of a strong relationship may be explained by the complexity of the turnover decision in which job dissatisfaction is rarely the singular concern. Other factors such as home ownership, community relations, and family commitments may also influence perceptions of desirability of movement (Wynne, 1971). Moreover, as equity theory would suggest — even if dissatisfaction does exist — job termination is but one of several possible solutions to the problem (Heneman and Schwab, 1975).

EFFECTS OF PENSIONS ON TURNOVER - If pensions are to effect termination decisions, it would probably be through their effect on the desirability of movement. More specifically, if alternative employment opportunities offer superior benefits than those obtained on the present job, the probability of turnover may rise. As was suggested in a previous section, pension packages are unlikely to exert a major influence on job acceptances because the informational complexity of the plans precludes their quick assessment prior to job choice. Alternatively, pensions may influence the desirability of movement by imposing opportunity costs on turnover decisions. In other words, pensions may not be an inducement to change jobs but they may actually discourage quitting because of potential forfeiture of accrued retirement rights and benefits.

Prior to considering the evidence on the pensions-turnover linkage, it is worth examining particular facets of pension plans which may be pertinent to turnover decisions:

a. The particular vesting formula applied may influence the probability of quitting. Under ERISA, employers can apply one of three vesting formulas. In theory, up to the point at which vesting occurs, turnover should be lowest under the formula which yields 100 percent vesting after the smallest number of years of service (this is generally the 10-year rule). After full

vesting has been obtained, turnover should increase regardless of the formula for attainment of vesting.

b. Employees stand to lose most from a termination decision when there are no provisions for portability. ERISA does not require portability provisions explicitly, even though some (e.g., Srb, 1971) have argued that requirements for 100% vesting have a similar effect to that of mandating portability. ERISA does encourage voluntary portability by enabling an employee to transfer accrued pension benefits, tax free, from a qualified pension plan to an Individual Retirement Account (IRA) if the particular plan allows for such transfers. Similar tax exempt transfers can be made from IRA's to qualified pension plans (Phillips and Fletcher, 1977) to the extent that provisions for portability of accrued pension benefits exist. The opportunity costs of quitting decrease thereby increasing the probability of turnover.

c. The opportunity costs of a termination decision will be minimized under multi-employer pension plans in which the job change involves a transfer from one participating employer to another (Srb, 1971). Under such plans, no loss of pension rights will occur even if full vesting has not yet been achieved.

d. Similarly, under plans which cover multiple plants of the same employer (i.e., multiple-plant plans), no loss of pension benefits generally occur with job changes. Pensions under such conditions are expected to have no effect on turnover.

e. In some instances, reciprocity agreements exist between employers whereby pension credits (including those not yet fully vested) can be transferred in full from one employer to another. Such agreements may exist in cases in which the insuring company is the same for both employers. Under such agreements, the impact of pensions on turnover decisions is likely to be minimal.

Given the diversity in pension characteristics with the associated differences in their possible impact on turnover decisions, it is unfortunate that most of the existent research has assumed that pensions are a homogeneous good.

Lansing and Mueller (1967) found that workers covered by pension plans had lower turnover rates than those not covered; additionally, the authors reported minimal to insignificant differences in mobility as a function of vested (versus nonvested) benefits. Parnes and Nestel (1974) concluded that pension coverage lowered the probability of voluntary, interfirm labor mobility. Ross (1958) studied the rate of turnover in the manufacturing sector between 1910 and 1956. The major determinant of turnover decisions was the availability of alternative job opportunities according to Ross. Pensions appeared to have little effect on mobility decisions, probably — according to Ross — because high turnover rates generally occur among young, short-tenured workers for whom retirement income is a very distant concern.

Lurie (1965) studied the effects of vested and nonvested pension plans on mobility decisions in the higher education sector. When all types of institutions were grouped together, faculty covered by nonvested pension plans had actually higher mobility rates than those covered by vested plans. Hence, similar to Ross, he concluded that, ". . . for the higher education industry as a whole, nonvested pensions do not hinder mobility" (Lurie, 1965, p. 228). Differences in the effect of vesting on mobility were identified, however, when the sample was divided into colleges versus universities. Lurie found that voluntary separation rates were higher under vested relative to nonvested plans for university faculty while the reverse was true of college faculty. He attributed the divergent results to differences in career opportunities of university versus college faculty.

Moore (1979) studied the determinants of voluntary turnover decisions among 1,040 participants aged 50-64 in the National Longitudinal Survey. The study focused on data collected between 1971-1975, prior to the enactment of vesting requirements under ERISA. Of the numerous variables that might impact on turnover that were examined (e.g., whether the plan was vested, worker satisfaction, age, local and occupational unemployment rates, marital status, home ownership, assets and other income), only two showed a significant impact on the decision to quit: length of service (inversely related to turnover) and earnings (positively related). In a second analysis, in addition to the above two variables, marital status was also related to turnover in that married individuals were more likely to quit. In neither of the analyses did vesting per se have an influence on voluntary turnover decisions.

Schiller and Weiss (1978), in the most informative study to date, examined how structural characteristics of pension plans such as vesting provisions, early and normal retirement ages, mandatory employee contributions, benefit formulae, participation requirements, and availability of supplemental plans effect turnover. The authors relied on large data sets from the Department of Labor and the Social Security Administration which, unfortunately, do not differentiate between voluntary and involuntary turnover. Among other variables, different structural characteristics of pension plans were used to predict turnover in 1969 for various age cohorts.

For the youngest cohort (aged 25-34), requiring employee contributions to pension funds tended to decrease the probability of turnover. Furthermore, there was a negative relationship between the value of unvested pension benefits and the propensity to quit. In other words, the propensity to quit was greatest when the loss of unvested benefits was minimal (i.e., for new employees). Indeed the more stringent the requirements for vesting, the greater the likelihood of termination. It should be noted in this context that the data were collected pre-ERISA (in 1969) when the probability of vesting for younger workers approached zero. Even for older workers (e.g., those aged 45-49), the probability of full vesting following 10 years of service was only .32 in 1969 (Spector and Schulz, 1979). In the 35-39 cohort, the only significant finding was that the promise of high retirement benefits did not restrain quitting, once such benefits were vested. Further support that vesting may actually increase turnover for older workers was found in the 45-54 cohort. Each added

dollar of vested monthly retirement benefits increased the probability of quitting by .002; this effect operated for all benefits in excess of $56 a month. Similarly, for an older cohort (aged 55-61), vested workers were more likely to quit than those nonvested. Schiller and Weiss also found that the probability of quitting in the 62-64 year age group increased if the pension plan awarded early retirement benefits.

The above studies, taken together, do not constitute a consistent body of findings. There are several possible explanations for these inconsistencies. The Schiller and Weiss (1978) study indicated two opposing directions for the influence of vesting on turnover decisions depending on the age of the worker. Younger workers were less likely to quit as the opportunity for vesting approached, while for older workers, termination decisions increased once vesting occurred. It is possible that the zero effect of vested pensions on turnover found in previous research may actually mask these two offsetting trends. Had the data been examined separately for the various age cohorts, the results of Schiller and Weiss may have been replicated.

The data on the effect of pensions per se on turnover decisions are also mixed. On the one hand, there may be little reason to expect pensions to exert any detectable influence on quitting because of the complexity of such decisions. The March and Simon (1958) model, for example, highlights the importance of various nonjob factors (e.g., the level of economic activity), which may effect voluntary turnover decisions regardless of the individual's evaluation of present job conditions and rewards.

Further complicating the relationship between pensions and turnover may be the fact that different classes of individuals may leave jobs for different reasons. Flowers and Hughes (1973), for example, found that the reasons employees gave for job retention differed by skill level. Low and moderately skilled individuals emphasized accrued fringe benefits, family responsibilities, social ties and the security of a current job, while managers emphasized community relations and the difficulty of finding alternative employment as the primary reasons for job attachment. Indeed, if skill level does moderate the pension-turnover relationship, some of the inconsistencies in previous research may be partially attributable to uncontrolled differences in the occupational levels of the samples.

Even if a consistent, positive relationship between pensions and turnover emerges in future research, without acknowledgement of extraneous variables, it may be hard to separate the effects of pensions on retention decisions from those of other variables which tend to covary with retirement benefits. In this regard, Green (1974) has observed that firms with liberal benefit packages tend to be characterized by other features (e.g., good labor relations or a nonauthoritative work climate) which are conducive to increased length of service. In the absence of future studies which control for such artifactual explanations, the possibility must be entertained that other organizational characteristics which coexist with liberal fringe benefit packages may actually account for the lower turnover rates.

FUTURE RESEARCH - Additional research in the context of termination decisions is needed. Despite the plausibility of the conjecture, very mixed evidence supporting the favorable effects of pensions on retention exists. Profitable investment of researchers' time would focus on investigations of the effects of specific characteristics of pension plans on turnover decisions, where a distinction is made between voluntary and involuntary turnover. Of those mentioned at the outset, only vesting provisions have been related to quitting and even that research has been methodologically lacking. What, for example, are the effects on mobility of portability provisions or the existence of multi-employer plans? In the latter context, Srb (1971) has hypothesized that multi-employer plans may actually inhibit occupational mobility or job changes involving geographic transfers since most plans are administered by a single union and are restricted to a given geographical area. Research along those lines would be particularly timely in view of the attention portability and multi-employer plans are receiving in Congress.

A more fundamental issue concerns the question of whether all inhibitory effects of pensions on turnover are desirable from the organization's perspective. Pensions may encourage firm attachment of undesirable employees as well as of those whose continued membership the organization would like to encourage. Lurie (1965), for example, hypothesized that the differential effect of vesting on college versus university faculty may be explained by differences in the career aspirations and mobility opportunities of the two groups. If pensions affect only those who have no alternative employment opportunities while not discouraging the quitting of above-average performers, the presumed role of pensions may be well worth re-examining. A shift towards analyses at the micro level will thus yield useful information on the responses of different employee subgroups to the various characteristics of pension plans.

Pensions and Retirement Decisions

MODELS OF RETIREMENT DECISIONS - The personnel management literature has been largely inattentive to the factors influencing the decision to retire. Several possible explanations for this gap in the literature can be offered: retirement may be viewed as determined more by institutional (e.g., mandatory age requirements) and physical (e.g., health) factors than by psychological and cognitive reasons, as in the case of job choice and peformance. As such, retirement decisions may be less "interesting" to researchers. Alternatively, the consequences of a retirement decision generally have little impact on organizational activities short of a pre-programed exit of an employee. Conversely, job choices, performance and turnover exert a significant influence on ongoing organizational behaviors, thereby necessitating closer attention. Finally, retirement decisions are generally foreseeable in advance and can be readily incorporated into manpower planning strategies. Job choices, performance and turnover behaviors are far less predictable and controllable. The difficulties inherent in understanding and thereby influencing such behaviors have apparently provided researchers with a more enticing challenge than that inherent in the prediction of retirement decisions.

Notable in its exception is a paper by Walker and Price (1974) which proposed a model of the retirement decision. The individual retirement decision is influenced by several factors: environmental, institutional and individual decision variables. Among the environmental influences on the decision to retire are the following: government policies, such as mandatory retirement age; age of eligibility for and level of social security benefits; the state of the economy, which may hinder retirement if retirees fear their income will not keep up with inflation; demographic factors, whereby the retirement decision may be moved forward or postponed depending on demographic trends in the labor force; and cultural values which impose a variety of normative interpretations on the decision to work or not to work.

Institutional variables which may influence the decision to retire are organizational policies to either encourage or discourage retirement among its older workers, the availability of employer provided pension benefits, and the extent to which the firm increases the impending reality of the retirement decision through retirement counseling and preparation. Walker and Price (1974) list the following individual factors which may influence the retirement decision: the employee's health, financial situation, family obligations, attitudes towards work, leisure and retirement and expectations regarding the consequences of retirement.

According to the authors, institutional influences on the decision to retire will prevail where retirement is mandatory. As retirement policies become more flexible (e.g., when early retirement options are offered), individual concerns will play a greater role.

It is difficult to provide a global assessment of the Walker and Price (1974) model since the research to date has been fairly fragmented, addressing one or the other of the determinants of the retirement decision. Relevant empirical research will be presented below.

EFFECTS OF PENSIONS ON THE RETIREMENT DECISION - Several surveys have assessed attitudes towards retirement and the effects of various external factors (e.g., early retirement provisions and changes in the mandatory retirement age) on retirement patterns. The Harris poll (Harris and Associates, 1979) found general consensus in current and retired employees' and business leaders' attitudes towards mandatory retirement, that is, most opposed it (88 percent of current and retired employees and 67 percent among business leaders), provided the employee was still capable of doing the job. Business leaders and employees differed, however, over the productivity of older workers: 57 percent among current employees, 61 percent of retirees and only 33 percent of the business leaders felt that older workers performed as well as they did when they were young. Most employees (54 percent) indicated that they look forward to retirement, with younger workers considerably less enthusiastic about the idea than older age groups. Favorable attitudes towards retirement among 50-64 year olds increased with pension coverage: 64 percent of those with private pension benefits and 71 percent of those covered by public plans had positive retirement attitudes, while a smaller percentage (58 percent) had similar feelings among those not covered by pension programs.

When current employees covered by pension plans were presented with a list of retirement alternatives, 34 percent indicated a preference to retire at the normal age (compared to 29 percent for those not covered by retirement plans), 18 percent preferred to retire early (compared to 11 percent among noncovered employees) while 46 percent indicated a preference for some form of continued employment (relative to 56 percent among employees not covered by pensions). Among the desired work alternatives, 21 percent of those employees with pensions wanted part-time work (compared to 27 percent for noncovered employees), 14 percent wanted to continue indefinitely on the same job (versus 18 percent for noncovered employees), 8 percent wanted to work for a different employer after retirement (versus 4 percent for noncovered employees) and 3 percent (compared to 7 percent among noncovered employees) preferred a less demanding and lower paying job following retirement. When retirees were questioned regarding the adequacy of their retirement planning, an overwhelming majority (70 percent) felt they were inadequately prepared in some way. Among those receiving pension benefits, 42 percent felt they had planned sufficiently, while only 20 percent of those not covered by pensions felt the same way.

The Harris poll seems to indicate that pension coverage tends to increase favorable attitudes toward retirement and the perceived adequacy of retirement planning. Furthermore, receipt of pension benefits tends to increase the propensity to retire early and to lower the desire to continue working following retirement. Somewhat inconsistent with the Harris poll, Ekerdt, Rose, Bosse and Costa (1976) found that the preferred age of retirement rose as the respondents' age increased. Retirement, therefore, seemed to become less attractive as it approached. The authors added, however, that despite the rise in preferred age of retirement for older cohorts, the preferred retirement age was still generally younger than that at which it would actually occur. Over 90 percent of the respondents preferred to retire prior to or at the same age as they would actually be able.

In a somewhat dated study, Meyer and Fox (1971) reported that early retirements constitute only about 10 percent (at the median) of all retirements. If company retirement benefits are actually more lucrative with early retirement than the normal retirement, the median rate of early retirement rises to 40 percent of all retirements. When only the actuarial equivalent of the full pension is available for those retiring early, the median rate of early retirements declines to 5 percent.

Several surveys have attempted to address the impact of the recent amendment to the Age Discrimination in Employment Act (ADEA) which prohibits mandatory retirement prior to age 70, with few exceptions. Meyer (1978) reported that few executives anticipated changes in either early retirement rates or retirements at 65 following the ADEA amendments. Of 12 companies responding, the highest expected reduction in early retirement rates was 6 percent. Similarly, only 8 of 37 responding companies expected a decrease of more than 15 percent in retirement rates at 65.

A Bureau of National Affairs Survey (1980a) reached similar conclusions: 51 percent of the 265 responding felt very little impact of the ADEA amendments, with an additional 35 percent reporting no impact whatsoever. This may be attributable to the fact that only a small proportion of employees have been in the relevant age bracket since passage of the amendments. Seemingly inconsistent with the previous findings, 21 percent of the responding companies reported an increase in number of employees electing not to retire since 1977 but the size of the increase was not specified. Twenty-eight percent of the reporting companies had instituted changes in their programs for preretired and retired employees between 1977-1979. Nine of the companies had increased pension benefits and four had established new pension plans, despite the fact that the ADEA amendments did not mandate any change in employer contribution policies towards retirement benefits.

A survey conducted by Hewitt Associates (1980) reported more significant consequences to the ADEA amendments. Sixty-four percent of the 497 responding companies required retirement at age 70, while 33 percent had no specified mandatory retirement age. Forty-five percent of the companies reported that their 65 year old employees had elected to continue working following the Act's amendments. Forty-eight percent of those companies with defined pension plans were providing some benefit increases for employees working beyond the age of 65, though again, this was not required under the amendment.

Despite the limited experience with the ADEA amendments, the above survey results seem to indicate some delaying influence on retirement decisions of government decrees regarding the mandatory age of retirement. It remains to be seen whether the increase in the mandatory age of retirement will offset the trend, particularly among those covered by private pension plans, towards early retirement.

Legal statutes are but one of a number of the factors that may influence retirement decisions according to the Walker and Price (1974) model. Economic considerations may also exert an influence on the individual's decision to retire. Several studies utilizing aggregated data have considered the relative importance of financial considerations in the retirement decision.

Economists have examined the effects of social security benefits on retirement decisions. Pechman, Aaron and Taussig (1968) and Feldstein (1974) concluded that social security tends to lower the labor supply among the elderly. Whether the inducement to retire is caused by the level of retirement benefits or the "earnings test," which discourages employment among social security beneficiaries, is impossible to tell from the data. Ture (1978) concluded that the social security system and ERISA both serve to retard the growth of private pension plans. What that does, in turn, to retirement decisions is not addressed by the author.

Barfield and Morgan (1969) focused on the decision to retire early and found that planned early retirement was strongly and positively related to expected income from both social security and private benefit sources and to the employee's perception of his or her health. Long (1958), after

examining a variety of data sources, concluded that the decline in the labor force participation of older workers was attributable not to the growth of public or private pension programs, but to the fact that older workers' jobs had been bid away by younger women. Steiner and Dorfman (1959) concluded, from a 1952 Follow-Up Survey of the Aged to the Current Population Survey (U.S. Census), that 79 percent of all voluntary retirements were attributable to poor health of the employees and not to organizational retirement policies. It should be noted that the results were derived from retrospective interviews of retirees.

Boskin (1977) attempted to disentangle the relative effects of health concerns and financial considerations on the decision to retire. He found no support for the assertion that poor health is a primary factor in retirement decision. He actually reported a negative relationship between annual number of hours lost due to illness, and probability of retirement. The effect of social security benefits on retirement decisions was positive and large. An increase in social security benefits from $3,000 to $4,000 per couple raised the probability of retirement from 4.5 to 16 percent. The effect of social security on retirement decisions was seven times as great as that of income from private pensions and other assets.

The above series of studies assessed the impact of financial and health reasons on the propensity to retire. If any general conclusion is warranted it is that social security benefits encourage retirement decisions, at least when data are analyzed at the aggregated level. Some studies suggest that pensions also exert an influence, albeit a weaker one, on retirement decisions. Further research on this issue is warranted.

Walker and Price (1974) suggest additional, nonfinancial factors that may enter into the decision to retire. These include attitudes toward work and non-work, self perceptions and expectations from retirement. Two studies, conducted at a micro-level of analysis, have assessed the impact of various attitudinal variables on the decision to retire. Eden and Jacobsen (1976) examined the impact of various personal attributes (such as subjective assessments of age, effectiveness and health) and job assessments on retirement propensity. Similar to Ekerdt et al. (1976), the older the employee, the less favorable were attitudes toward retirement. Subjective assessments of age were, however, positively related to retirement attitudes, while subjective assessments of health and effectiveness were negatively related. Interpreting the results from an alternative perspective, older executives who felt young, healthy and effective on their jobs were most likely to want to continue working. Contrary to expectations, attitudes towards work had no bearing on the propensity to retire. Unfortunately, the authors did not include financial factors among the variables examined.

Schmitt, Coyle, Rauschenberger and White (1979) attempted to identify differences in demographic, work experience and job attitude variables between a group of early retirees and a similar group of non-retirees. Some differences between the two groups emerged. Early retirees tended to be female, from small communities, with a greater number of job changes, more dependents and nonworking spouses. Few discernible differences in the attitudinal fabric of the groups were

identified. Proxies for economic variables (number of dependents and whether the respondent had a working spouse) generally showed less of an impact on retirement status than that reported in previous studies. By and large, the authors noted the significance of the absence of large distinctions between the groups of retirees and nonretirees more than the few detectable differences.

FUTURE RESEARCH - In the few micro-studies of the determinants or retirement decisions, pensions have been largely ignored as a predictor variable. This is unfortunate for several reasons. First, attitudinal surveys among retirees tend to indicate that pensions make a difference in both the propensity to retire and satisfaction with retirement. If the researcher's objective is to gain insights into the retirement decision, the exclusion of pensions from this model may be an important oversight. Second, in much of the literature pensions are presumed to encourage retirement, thereby increasing the productivity of the remaining work force by painlessly removing obsolete employees and increasing promotion opportunities for younger workers (McGill, 1975). The range of variability of retirement ages is constantly increasing: some people with attractive early retirement provisions may elect to retire as early as 55 while others may stay on until they reach 70 years of age. It is reasonable to expect similar variability in the performance levels of older employees. It is therefore critical to assess whether the effects of pensions on retirement decisions are targeted towards a particular group of employees. It would be most troublesome if organizations discovered, for example, that pensions tended to encourage the early retirement of the most effect employees while not having a similar retirement-inducing effect on the below-average performers. Future research which addresses the pensions-retirement relationship for various employee subgroups is thus much needed.

Preferences for Pensions

General Preferences for Pensions

As repeatedly indicated, if employees are indifferent to pensions, it is hardly plausible that provision of pension benefits will have any effect on work-related behaviors. Hence, it is crucial to assess the importance employees place on provision of pension benefits relative to other components of the fringe benefit package and relative to other job outcomes normally accruing from organizational membership.

While there have been countless studies requesting employees to rank their job preferences in general, few have actually included items relating to the organizational fringe benefit package among the attributes to be ranked. In the few studies that have elicited ranking of fringe benefits, employees have been asked to indicate their preferences for (or to compare) such items as increased pension benefits, health insurance, vacations, or life insurance benefits relative to an increase in pay.

Greene (1964) questioned 801 Portland workers regarding their relative preferences for increases in wages versus increases in benefits. Twenty percent of the respondents preferred to have all of the increases in cash; 22 percent preferred most of the increase in wages and a small part in benefits; 33 percent were equally divided between wage and benefit increases; 11 percent wanted most of the increase in benefits and only a small part in wages; while 12 percent wanted all of the increase in benefits. Unfortunately, Greene (1964) did not elicit relative preferences for specific types of fringe benefits.

Jain and Janzen (1974) found that if employees were asked to choose between a 5 percent pay increase or increases in various fringe benefits, they overwhelmingly chose direct pay increases. For the group as a whole, the order of preference for the remaining fringe benefits was for increases in vacation, pensions, medical insurance, and life insurance. Chapman and Otteman (1975) reported that their group of respondents preferred an additional two weeks vacation over other compensation options. The other rated items, in order of declining attractiveness were a pay increase, pension increase, family dental insurance, early retirement opportunities, ten free Fridays, a four-day work week, and a shorter workday. Nealey (1964) compared preferences for a union shop relative to increments in various compensation options. For the respondent group as a whole, health insurance was the most preferred item followed by a desire for a union shop while preferences for a 6 percent raise, an increase in pension benefits, and an additional three weeks vacation were all similarly ranked, followed by a desire for a shortened work week.

Wagner and Bakerman (1960) assessed the preference for wage increases relative to increases in the level of the fringe benefit package among steelworkers. Participants were asked whether an increase in fringe benefits would satisfy them as much as a direct wage increase if it amounted to the same in dollars and cents. Among the steelworkers, 80 percent responded "yes" in the initial survey and 95 percent answered "yes" in the follow-up interview. In response to a question concerning the relative preference for an increase in wages compared to an increase in fringe benefits, 92 percent favored increases in fringes, 6 percent were in favor of wage increases and 2 percent were undecided. Wagner and Bakerman (1960) also examined preferences for specific components of a fringe benefit package. For a combined group of steelworker and non-steelworker respondents between which no systematic intergroup differences in preferences were identified, the hierarchy of fringe benefits, in order of importance was: pensions, group life and health insurance, group medical, supplementary unemployment insurance, guaranteed annual wages, vacation, and vacation pay.

Two surveys by the Opinion Research Corporation (reported in Lester, 1967) provided additional data on the relative preferences for fringe benefits. In the first survey conducted toward the end of 1949, workers indicated a two-to-one preference for pensions and other benefits over a 10-cent-an-hour wage increase. In a second study of manual workers' preferences conducted in 1958, respondents indicated preferences for increases in various components of the compensation package in the following order: unemployment benefits, hospitalization insurance,

guaranteed annual wages, shorter work week at the same pay, larger company pensions, higher wages, increases in paid vacation, and a profit sharing plan.

It is virtually impossible to come up with any generalizations which apply uniformly to all workers, based on the set of studies reviewed above. Probably the strongest conclusion that can be reached is that in most studies (with the exception of Jaine and Janzen, 1974), respondents indicated strong preferences for fringe benefits even at the expense of increases in direct pay.

There are numerous possible methodological and substantive reasons for the disarray of findings in this area. Parnes (1954) has suggested that methods that elicit hierarchies of preferences for job attributes in abstract contexts are necessarily unreliable, since questions regarding preferences for job attributes are answerable only if the respondent knows the specific ranges within which the attributes can vary. As a case in point, in many of the previously cited studies, fringe benefits were listed in global terms without specification of the dollar change in the fringe benefit which was to be compared against the alternatives. Additionally, the studies differed in terms of the instructions preceding the ranking task, the number of fringe benefits to be ranked, and the labels attached to the fringes. While these methodological inconsistencies may provide a partial explanation for the lack of uniform results across studies, other differences among the surveys (e.g., in economic conditions, occupational background of the respondents or current employment terms) may indirectly point to factors that exert a systematic impact on fringe benefit preferences that should be further explored. Indeed, many researchers have suggested that there is no reason to expect any uniform hierarchy of preferences for components of the compensation package because of the wide range of variability in the personal situation, economic conditions, and labor market opportunities of employees. Accordingly, a more informative approach to the study of preferences for compensation benefits would be through an attempt to identify variables which lead to predictable differences in preferences for fringes for various groups of workers.

Identifiable Differences in Preferences for Pensions

Several of the studies described previously presented findings for various subgroupings of respondents. Jain and Janzen (1974) found that preferences for larger amounts of pension benefits increased with length of service in the organization. Occupational distinctions also appeared to influence preferences for fringes: technical employees preferred pay increases over all other kind of fringe benefits; professional staff had equal preferences for increases in pay and vacations, and rank and file workers showed a marked preference for increases in pension benefits.

Chapman and Ottemann (1975) found that several demographic characteristics exerted a systematic impact on preferences for pension benefits: older workers preferred pensions to all other fringes; married individuals had a stronger preference for pension benefits than did single persons; pension preferences were stronger the fewer the number of

dependents and the greater the years of service in the organization. Employee's sex or job title had no impact on pension preferences.

Nealey (1963) conducted a series of studies of fringe benefit preferences in three organizations, the results of which were presented separately for some of the demographic groups. For example, for males in one study, the importance of pensions increased dramatically with age. This trend, while less pronounced, was also true for females even though females in the oldest age group still preferred increases in pay over pension benefits. Length of service, which is highly correlated with age, had a similar influence on preferences for pension benefits. Income level was related to pensions such that preferences for pensions among male respondents increased dramatically with increases in income level. Similar to the Chapman and Ottemann (1975) finding, pension preferences decreased with increases in the number of dependents. Job type (physical versus clerical) and respondents' attitudes in the areas of promotions, employment security, wages, and supervision did not affect preferences for pensions. In a second related study (Nealey, 1964), place of residence (urban versus rural), skill level, and marital status did not exert a systematic impact on pension preferences. The latter finding is contrary to that reported by Chapman and Ottemann, (1975).

Schuster (1969) studied the importance employees attached to various components of a fringe benefit package. Certain personal factors differentiated among the compensation preferences. For example, consistent with previous findings, younger workers viewed retirement benefits as least important while older workers saw retirement and medical benefits as the most important components of a fringe benefit package. Perceptions of the importance of various fringe benefits varied by job category. For example, retirement benefits were the least important pay component for technical and clerical support workers. All job categories mentioned the medical plan as the most important component of a compensation package while retirement was approximately fourth in importance for exempt employees. The importance of retirement options increased with salary level and company service; but sex, marital status, and number of dependents did not appear to influence perceptions of the importance of retirement. The latter two findings are contrary to previous research.

When preferences for fringe benefits in general and pension benefits in particular are examined separately for various demographic and occupational groups, some consistent findings emerge. In general, older, longer service employees of higher income levels attach greater importance to pension benefits than do their younger, poorer counterparts with shorter job tenure. While more equivocal, it also appears that having more dependents leads to attaching lower importance to receipt of pension benefits. Sex, apparently, does not affect preferences for pensions, while the evidence concerning the effect of marital status and job level or category is mixed.

Preferences for Components of the Pension Package

While the available research does enable some conclusions concerning the preferences of various groups of individuals for pension benefits in general, virtually no examinations of the preferences for different components of a pension plan have been conducted. More useful information would be obtained from surveys that obtained information about the specific trade-offs employees are willing to incur in order to augment the level of one fringe benefit relative to another. In the particular context of pension benefits, with the trend toward their ever increasing complexity, there is a dire need to survey employees regarding their preferences for specific components of the pension package, the trade-offs that could be agreed to among the various aspects of a pension plan, and among alternative components of the compensation package.

The Harris poll of American attitudes toward pensions and retirement (Harris & Associates, 1979) is a notable exception in this regard. Present employees, retirees and business leaders were questioned regarding their attitudes toward specific components of a pension plan. When current and retired employees were questioned regarding the plan characteristic which was of most importance to them, those attributes were, in order of declining importance, provisions for cost-of-living increases, pension benefit levels that maintain preretirement standards of living, survivor benefits, guaranteed pension benefits (regardless of financial performance of the fund), pension benefits that provide an adequate yet lower income than preretirement levels, vesting provisions, and provisions for portability. It should be noted that when business leaders were asked a similar question, cost-of-living increases were rated only fifth in importance.

Current and retired employees preferred pension plans that provided small, guaranteed benefits relative to large, nonguaranteed benefits (75 percent to 6 percent); felt that the benefit received from a private pension plan should be unaffected by the level of social security benefits (55 percent to 37 percent); and preferred vesting over transferral to IRA's over portability as a means of retaining accrued pension benefits when job changes occur (34 percent to 31 percent to 29 percent). Only 2 percent of the respondents would like to see their accrued pension benefits transferred to federal funds in the event of job changes. Current and retired employees and business leaders indicated a preference for defined benefit over defined contribution plans; however, the preference was more marked in the case of business leaders. This attitudinal preference for defined benefit plans seems to be contradictory to a trend to actually move away from defined benefit plans to defined contribution plans (Meier .& Bremberg, 1977).

In the Harris poll, employees clearly indicated that they would be willing to contribute to pension plans (68 percent to 24 percent), and especially if the plans included cost-of-living increases, 74 percent would be willing to contribute; for early retirement provisions 61 percent would be willing, for a 100 percent guarantee that benefits would be received 60 percent would be willing; and for survivor benefits 58 percent would be willing. Respondents were even willing to take a cut in the level of pension benefits only if the plans included the special provisions mentioned

above. A majority, however, indicated that they would not be willing to take smaller pay increases for added pension benefits. When asked how much they would be willing to contribute to their pension plan in order to secure an adequate retirement income, the most common figure mentioned by employees was 9 to 10 percent of their salary.

Business leaders were less inclined to have employees contribute to their pension plans. A clear majority felt that employees should not be required to contribute. Furthermore, business leaders were equally divided in their preference for pension plans with no employee contributions and with voluntary contributions only but were less supportive of plans that required employee contributions (22 percent).

With the increasing variability in pension plan characteristics, it is becoming less likely that all groups of employees will have identical preferences for different pension plan options. Further intra-organizational surveys along the lines of the Harris poll would provide employers with particularly useful information concerning the desirability of specific components of a proposed pension plan.

An additional consequence of the trend toward greater complexity of pension packages is that business leaders may have increasing difficulties in assessing accurately what the needs and preferences of different groups of employees are. In the absence of convergence between employee preferences and employer perceptions of these preferences, business leaders may be providing costly fringe benefit options to their employees which are neither valued nor capable of bringing about any of the desired results in employee behaviors or attitudes. It is important, therefore, to examine the evidence regarding the capabilities of employers (and union leaders) to assess correctly the compensation preferences of their employees (membership).

Assessment of Employment Preferences by Others

Few studies provide evidence, either direct or indirect, regarding the similarity between employer and employee evaluations of components of compensation packages. As mentioned previously, the Harris poll (Harris & Associates, 1979) found marked differences in the importance current and retired employees attached to various aspects of a pension plan relative to business leaders' perceptions of those same items. For example, cost-of-living increases were of most importance to current and retired employees but were ranked only fifth (out of seven) by business leaders. Other divergent rankings were for vesting provisions (ranked fifth by employees versus second by business leaders), for benefit levels that provide an adequate income, yet lower than preretirement levels (ranked seventh by employees versus fourth by business leaders) and for benefit levels that maintain the preretirement standard of living (ranked fourth by employees and sixth by business leaders). Such divergence in opinions does raise questions regarding employers' ability to formulate appropriate responses to employee priorities of these responses are based on employer presumptions about the needs of their workers.

Greene (1964) found that employers frequently estimated incorrectly the importance to employees of cash increases relative to benefit increases in the direction of over-emphasizing the importance of direct pay. Lawler (1971) also reported that managers overemphasized the importance of cash payments for their employees relative to other, less tangible rewards from the work itself.

Howel and Brosnan (1972) examined the ability of union officers, company foremen, supervisors and managers to predict worker preferences for various job rewards including added take-home pay, additional vacation, staff development plans, and improved social amenities. Company representatives as a group were generally superior to union officers in predicting worker preferences even though both groups provided reasonably accurate predictions. The correlations between worker preferences and managers', foremen's, supervisors' and union officers' predictions were .78, .82, .78 and .68, respectively, in firm A and .93, .78, .91 and .80, respectively, in firm B. While union officers apparently lacked self insight (correlations between officer's predictions and officer's preferences were .36 and .07 in firm A and B, respectively), in fact, their preferences for organizational rewards were fairly similar to those of the workers (correlations between worker and union officer's actual preferences were .83 and .51 in firm A and B, respectively). Unfortunately, no data are presented regarding the similarities in actual preferences among company representatives and their employees.

When the results were analyzed on an individual rather than group basis, less favorable conclusions could be reached. Only 17 percent of individual union or company representatives could provide accurate predictions of dollar allocations among various rewards by workers, and only 34 percent could successfully predict employees' rankings of the importance of various rewards. Hence, marked individual differences in predictive accuracy existed among the various union and company representatives. The implications of this finding are particularly troublesome if organizations make compensation policy decisions based on the fringe benefit choices of individual company or union representatives. In a follow-up study using a similar methodology, Borsnan (1975) generally replicated the findings of the original investigation.

Some business leaders have argued that even if managers' perceptions of employee fringe benefit preferences do not converge with those of the workers themselves, managers' judgments should prevail. Proponents of this position contend that employees cannot be expected to exercise informed judgment in evaluating various compensation options given the extreme complexity of these issues. Employees are frequently propelled by short-term needs, the positive relationship between retirement proximity and preferences for pension benefits being a case in point (McEown, 1975). Furthermore, employees may not appreciate the value of various benefit alternatives nor may they understand the complex trade-offs that exist among them (Goode, 1974). Some data indicate that employees are not aware of even basic information regarding their fringe benefits. According to the Harris poll, 63 percent of the current employees questioned did not know or were not sure of the level of monthly pension benefits they could expect upon retirement. Upper level executives may also possess

incomplete or inaccurate perceptions of their fringe benefits. Lewellen and Hettenhouse (reported in EBPR Research Reports, 12-78) found that upper level executives with an average income of $38,300 at the time seriously misjudged the value of a series of benefits. Pensions were estimated to be worth 165 percent of their real cost, deferred compensation and profit sharing options were valued at 133 percent of their cost, while life insurance was judged to be worth only 68 percent of the real cost of the plan. If executives who are expected to be reasonably attuned to the financial nuances of various compensation options do so poorly in assessing their worth, the argument goes, how can lower level employees be expected to make an informed choice which maximally satisfies their needs?

Hence, proponents of this position argue that managers should provide workers with a basic level of benefits guaranteeing minimum security in various areas (Paine, 1974), even if employees claim no interest in some of these benefits. The lack of convergence between managers' and employee options regarding desirable benefits is probably less a function of managers' insensitivity to employee wants and more a function of managers' superior grasp of those aspects of a compensation package that are likely to promote the well-being of employees and their families in the long run.

In partial response to many of the observations noted above, many writers have proposed a more flexible approach to fringe benefit planning. This approach has become known as the "cafeteria approach" and involves allowing employees to choose how to allocate their fringe benefit dollar among the various types of fringes provided.

Increasing the Effectiveness of Private Pension Plans

A number of proposals for changes in the methods used to administer fringe benefit programs have been proposed by various authorities over the years. Most of these proposals are designed to increase the effectiveness of pension plans by improving their viability, by increasing the amount of security to be achieved by retirees, or by bringing the characteristics of the plan more into line with the personal wants or objectives of the employees and of management. Pension plans, like other organizational programs, are more likely to achieve their objectives when they are congruent with what the participants want. It might also be important to attempt to make the pension plan congruent with the desires and interests of management as well since management is likely to be more supportive of a plan that meets their desires than of one that does not.

The Cafeteria Approach to Fringe Benefits

As previously indicated, several writers have advocated a cafeteria approach to fringe benefits (Lawler, 1976). Fringe benefits typically amount to one-third of the total compensation package (the proportion increases the higher the employee's organizational level) and are generally

awarded uniformly to all employees. Selection of the components of the fringe benefit package is generally made with the "average" employee in mind. The notion of the average employee, many writers claim, is a vacuous concept because of much evidence regarding individual differences in preferences for fringe benefits. Hence, the implementation of a flexible fringe benefit program has been frequently advocated (e.g., see Baytes, 1976; Belliveau, 1972; Lawler, 1976; Rohan, 1974 or Werther, 1974) in which employees have the latitude to select how to distribute the organizational allotment for indirect pay among the various benefit options based on the individual's perception of his or her preferences and needs. Different variants of cafeteria plans have been proposed. Some writers have advocated provision of a core level of fringe benefits for all employees to which each employee can add supplemental benefits that are particularly attractive to him or her (e.g., Paine, 1974); others have suggested broadening the concept of cafeteria plans to include direct pay (e.g., Risher and Mills, 1974), thereby enabling trade-offs not only among the various fringe benefit options but also between levels of direct and indirect pay; and still others have debated the number of benefit options to be offered under a flexible compensation system if the project is to prove cost-effective (Thompsen, 1973).

ADVANTAGES OF THE CAFETERIA APPROACH - The cafeteria approach is purported to have numerous advantages. It explicitly recognizes individual differences in preferences for fringe benefits. By also involving employees in the design phase employee acceptance of the plan may be facilitated (Paine, 1974). Moreover, the veracity of managers' assumptions regarding employee preferences becomes less important since managers, alone, no longer choose components of the compensation package. Additionally, managers can quell their concerns regarding employees' inability to protect their long term interests by designing a plan which guarantees a minimum level on certain critical benefits. The plan may even reduce total expenditures for indirect compensation in the long run by enabling managers to eliminate benefits which are not consistently chosen by the employees. Furthermore, if the bulk of the benefit package is concentrated on purchasing benefits which satisfy employee needs, there will be less pressure for future across-the-board increases in benefit expenditure (Werther, 1974).

Others have suggested that having to consider the trade-offs among levels of various fringe benefits makes employees appreciate the costs the organization incurs in their behalf — even more than if the employees themselves were required to contribute to these plans (Lawler, 1976). Thus, cafeteria compensation, tailor-made to the individual needs of each member of the organization, is expected to increase pay satisfaction. As a result, ". . . firms will get more — more loyalty, more stable employment relationships, more performance, more applicants — for their money" (Werther, 1966, p. 44).

DISADVANTAGES OF THE CAFETERIA APPROACH - Cafeteria plans are not without their problems. Paine (1974) enumerates several: increased costs may result from the expense of computerizing and administering a highly individualized and, therefore, nonstandardized compensation program, and from the possible loss of tax benefits since the

IRS may claim the individual has ". . . constructively received amounts he allocted to benefits . . . which he could have elected to receive in cash" (Paine, 1974, p. 60). A related problem concerns the possible loss of the qualified status of some plans with the associated loss of tax benefits if, for example, a disproportionate number of highly paid employees choose to buy into those plans. Additionally, expenditures may rise because of loss of economies of scale in computing the cost of various insurance policies if segments of the work force opt out of a program. Finally, the distribution of individuals who elect to be covered by a given insurance scheme may be skewed in favor of high risk cases, thereby leading to subsequent increases in insurance premiums. Goode (1974) warned that cafeteria plans may even become serious "demotivators" if employees, guided by short-term concerns, make the wrong choices.

PENSION BENEFITS UNDER THE CAFETERIA APPROACH - Such problems have not deterred some organizations (e.g., TRW, American Can, Xerox Corporation, Educational Testing Service) from experimenting with flexible benefit plans. While judgment of the success of such programs must be withheld until empirical evidence is provided, preliminary evaluations of at least two of the above instances are favorable. Wilkens (1974) reported on a very preliminary evaluation of the TRW cafeteria plan covering approximately 12,000 employees after the first year of its implementation. No serious administrative problems were encountered, probably because of the excellent information processing systems in existence prior to introduction of the program. Further quantitative evaluations of TRW's experience are currently underway. Schlactmeyer and Bogard (1979) conducted a preliminary investigation of the reactions of 9,000 affected employees to a cafeteria plan implemented at American Can some six months earlier. In-depth interviews indicated that ". . . the trial group reacted favorably to the flexible program, to the choices they were exposed to and to the communications materials they received" (p. 16). In general, 90% of American Can's salaried employees covered by the program indicated favorable responses to its introduction.

In the absence of further, empirical and carefully controlled studies assessing the consequences of flexible benefit plans, their numerous purported virtues remain unknown at this point. Somewhat questionable is the assumption that exercising the right to select benefits of one's own choosing will increase pay satisfaction over and above the satisfaction from across-the-board provision of benefits. More troublesome is the assumption that pay satisfaction will have salutory effects on employee attraction, performance, and retention. Specifically, no more than anecdotal descriptions attest to increases in satisfaction given the freedom to choose among various benefit options. Additionally, as argued earlier, the personnel management literature does not lend support to any systematic linkage between pay satisfaction and job choice or performance (see Dyer, Schwab and Fossum, 1976 and Schwab and Cummings, 1970), and provides positive but weak evidence on the relationship between job satisfaction and tenure (Porter and Steers, 1973). Until such linkages are documented in the specific context of flexible benefit packages and weighed against the costs incurred in their design, implementation, and administration, cafeteria plans remain only within the realm of an attractive compensation idea.

It should be noted that further skepticism is warranted when pension benefits are contemplated within the framework of cafeteria plans. Under current provisions of the Internal Revenue Code (as amended in 1978), no form of deferred compensation can be included under cafeteria plans which benefit from tax exemptions. The inclusion of pension benefits within non-taxable cafeteria plans has recently been considered in the Senate Finance Committee; if and when a favorable ruling emerges from the Committee, organizations should carefully consider the utility of converting pensions to optionable benefits in light of the previous discussion.

Whether organizations adopt a flexible compensation approach or simply award standardized fringe benefits to all employes, many of the potential advantages of such compensation policies will be lost unless employees fully appreciate the effort and costs involved in their provision. Hence, much has been written about the importance of communicating to employees the full scope of their fringe benefit options.

Improving Pension Plan Communications to Employees

ERISA sets minimum communication requirements whereby each employee is entitled to a summary of the plan once every 10 years (or every five years if plan changes have been instituted). Among other things, the summary should include requirements for plan participation, normal retirement age, survivor benefits, vesting provisions, identity of the organization that maintains the plan's funds, and whether the plan is insured by the Pension Benefit Guaranty Corporation. In addition, a summary report of the plan's assets and liabilities, receipts, and disbursements are required on an annual basis (Fleming, 1975). According to ERISA all reports must be in a language and format "calculated to be understood by the average plan participant" or beneficiary.

The Harris poll (Harris & Associates, 1979) found that while most employees felt they understood the annual and summary pension reports, the majority of employers felt the same only regarding annual reports. Most employees, unlike business leaders felt that the summary of the plan helped understanding, even though there is definite room for improvement. One-third of the respondents indicated that the summary report was only "somewhat helpful." While there was overall satisfaction with the level of explanation of pension benefits, employees and business leaders differed sharply over the specific informational items that should be included in the report. While business leaders and employees generally shared views on the importance of information concerning expected pension benefit levels and the projected certainty of these payments, differences in opinion were evident on the following issues: information about whether employers were making the necessary contributions to the pension plan (87 percent of the employee group thought it very important compared to 64 percent of the employers); the current financial status of the plan (83 percent of employees thought it very important versus 38 percent of employers); the party responsible for the handling of the plan (60 percent of employees thought it very important versus 17 percent of employers); the return on investments (59 percent of employees thought it very important versus 16 percent of employers); and information concerning the type of pension plan

investments (60 percent of employers thought it very important versus 10 percent of employees).

ADVANTAGES OF EFFECTIVE COMMUNICATIONS - Even without the need to comply with the law, in absence of clear explication of the employee benefits accruing from various indirect forms of pay and their associated cost to the employer, organizations cannot hope to reap any meaningful returns on such pension expenditures. As mentioned earlier, pensions will have a bearing on employee behaviors, (e.g., job choices, satisfaction or turnover decisions) only if (a) pensions are an important determinant of such behaviors and (b) if a concise appreciation of pensions can be formulated, thereby enabling their inclusion as a factor in these decisions. For example, given the probable process of choosing jobs, pensions are less likely to serve as a criterion in job acceptance decisions, regardless of their perceived importance, unless the candidate can come up with a fairly quick and concise impression of the dimensions of a retirement plan. Therefore, the role of an effective communications program is to provide an applicant with a clear and simple description of the major provisions of the pension plan in order to facilitate its inclusion as a relevant factor in the job acceptance decision. Otherwise, pensions will bear no influence on the job choice decision, not necessarily because they are unimportant, but because the job chooser is unable to form an evaluation of the retirement plan given the information and time constraints involved.

The reader will recall, also, that the determinants of satisfaction and turnover are very complex, thus virtually precluding attribution of these outcomes to a single factor in the worker's environment. Here, too, if pensions are to have even a marginal impact, the consequences of receiving or losing such benefits must be clearly understood before they can bear any relevance to such behaviors.

There are other justifications for an effective communications program. An early study by Sheard (1966) found a positive relationship between knowledge of benefits and positive attitudes toward the supplemental compensation program of the organization. Hewitt Associates (reported in Paine, 1974) found that employee appreciation of benefit plans was more influenced by the effectiveness of the two-way communications prior to and during plan implementation than by requiring employee contributions. The level of employer expenditures on indirect pay may even take second place to communications in influencing employee perceptions of the attractiveness of their fringe benefits (Fleming, 1975).

The issue of communications becomes increasingly important the more variable a fringe benefit package. In the case of cafeteria plans writers have emphasized the need to explain extensively components of the package, their costs and trade-offs not only as a means of highlighting employer expenses, but also because in-depth employee understanding of the various options under the plan is a critical prerequisite if employees are to make informed decisions appropriate to their unique needs (Jewett, 1976).

ORGANIZATIONAL PENSION PLAN COMMUNICATION PRACTICES - While open communication of compensation policies seems like good business from both the employer's and employee's perspective, many organizations have not engaged in such practices. In fact, more than any other personnel management function, the area of compensation has been shrouded in secrecy (Miller, 1976). While there may be some merit to pay secrecy in the case of inequitable pay structures, this practice seems much less defensible in the case of fringe benefits which are generally awarded across the board. Under those circumstances, openness regarding fringe benefit distribution could easily lead to charges of unfairness. In fact, some have argued that employers' traditional reticence to publicize their compensation practices have enabled unions to claim for themselves much of the responsibility for benefit achievement (Jewett, 1976). Union members do, in fact, have a higher probability of receiving fringe benefits in general and pensions in particular (Berger, Boudreau and Olson, 1980) so that such union claims are partially justified.

Relating Pension Benefits to Company Profits

An alternative approach to increasing organizational gains from provision of fringe benefits in general and from pensions in particular is to tie their award to organization-wide indices of performance. Several variants of this approach have been employed in different sectors of the economy.

PENSION PROFIT SHARING PLANS - Under a pension profit sharing plan, the employer is not commited to a fixed contribution each year since the company's contribution to such deferred compensation plans typically amounts to between 10 and 30 percent of the company's profits beyond some fixed minimum. Sears-Roebuck has a well known plan of this type. In 1974 there were over 186,000 deferred profit sharing plans in existence (Nash and Carroll 1975). One purpose of such plans is to strengthen the identification employees have with the company. It is hoped that this will motivate employees to perform at higher levels by giving them some return for their extra contributions (Metzger, 1964). Such plans may also improve performance by increasing employees' acceptance of management systems and techniques designed to improve efficiency. Other suggested benefits of profit sharing programs are to improve morale, improve teamwork, reduce waste, improve the quality of workmanship, and to educate workers as to the economic realities of business (Metzger, 1964).

One obvious problem in the effectiveness of such plans in achieving these objectives is the difficulty an individual employee has in seeing a relationship between what she or he does and company profits. This is more true in large companies employing many workers and where such profit sharing distributions are to be paid far into the future rather than currently. However, some companies with such plans claim their plans are successful (Metzger, 1964). Also at least one study indicated that companies with profit sharing plans are more profitable than those companies without industry (Personnel Journal, 1972). It should be noted that a profit sharing plan may be the result rather than the cause of the higher profits.

One may expect employees to prefer cash disbursements from such profit sharing plans over pension payments at a later date. At Motorola, however, employees indicated a preference for a deferred pension plan which was the practiced plan over cash payments (Coletti, 1967). In addition, the Motorola employees said that such a plan made them want to work harder (Coletti, 1967). Other studies do not show this preference for long term deferred benefits. For example, employees working at Quaker Oats were offered a choice between cash payments or long term investments to be paid on a deferred basis. Lower level employees chose cash while higher level and higher paid employees chose the long run benefits (Pigors and Myers, 1977).

EMPLOYEE STOCK OWNERSHIP PLANS - The newest device for relating employee pensions to an organization's stock is the Employee Stock Ownership Plan (ESOP) which has become increasingly popular since its inclusion under ERISA. Under these plans, the company purchases stock for the employees' future pension benefits. Hundreds of such plans have been established since 1974. The plans have been promoted as a means of increasing employee concern with the economic performance of the firm (Pigors and Myers, 1977) and also have been viewed as a useful aid to business organizations in raising the capital they need to expand and to modernize their plants (Stern and Comstick, 1978). Such plans are useful in raising capital because firms may get investment tax credits for sums set aside for employee pensions. Moreover, the stock purchased for the employees' pensions could be used as collateral to obtain loans for the business.

PROBLEMS IN RELATING PENSIONS TO STOCK PRICES - From the employees' perspective, there are certain problems associated with this approach to funding pensions. The value of the company's stock at the time the employees retire may decline from the price of the stock at the time of acquisition. During the 1920s, many employee stock ownership plans were developed in the United States. The vast majority of these plans failed in the 1930s, and the workers affected lost most or all of their savings at a time when they needed these savings to help cope with the widespread layoffs. Another problem with ESOPs is that financial retirement planning is difficult under conditions of unpredictable retirement benefits. A decline in the value of a company's stock may create negative employee attitudes about the organization. For these reasons, there have been several proposals in Congress to allow ESOPs to be used as deferred compensation for employees only when another acceptable pension plan is already in existence in the company. At the present time, the new generation of ESOPs have not been in existence long enough to evaluate their effectiveness. It is clear, however, that they have helped individual companies in poor financial condition to survive by transferring some of the economic risks involved in business to the employees. This may also have helped save some of the employees' jobs, at least temporarily, while at the same time, reducing the future security of these employees.

Adjusting Pension Systems to the Changing Environments of the Organization

Recent writings in personnel management have stressed the importance of matching personnel systems or procedures to characteristics of the situation (Glueck, 1978; Carroll and Tosi, 1976). Such an approach, termed the "contingency" approach, assumes that the outside environments of an organization (technical, market, government, etc.) determine the nature of the tasks in the organization and the type of people employed. The personnel management systems implemented must reinforce good performance on these particular types of tasks and also should be congruent with the values and preferences of the types of persons employed. This means that a pension system, like any other personnel system, should probably vary in its characteristics from one organization to another and perhaps also from one organizational unit to another if such units interface with different environments and as a result, have different task and people demands.

ENVIRONMENTAL DIVERSITY AND PENSIONS - One of the more important responsibilities of the personnel manager is to keep abreast of changing environmental conditions to insure that the nature of the task assignments, people selected, and personnel systems employed are compatible with these outside forces. The fact that this responsibility is probably widely neglected does not diminish its importance. As the outside technological environment becomes more volatile for example, it becomes necessary to employ high level technical personnel who have the capability of coping with this uncertainty (Lawrence, Barnes and Lorsch, 1976). When this occurs, the problem of technological obsolescence often increases and pension systems that provide for early vesting, portability, or incentives for early retirement may become more functional. A "cafeteria" type of fringe benefit program may be most functional in organizations which employ a very wide range of different occupations because of the presumed diversity in the fringe benefit preferences of these heterogeneous groups of individuals. Organizations with tasks or occupations that produce early "burnouts," such as certain public schools or aircraft controllers might also be well served by earlier vesting, portability, or, in some cases, early retirement provisions.

Some environmental changes affect all organizations rather than just a few. These environmental changes must be anticipated and evaluated in terms of their potential impact on the viability of an organization's pension system and its ability to achieve its objectives. In assessing the future outside environment common to all organizations, it would appear important to pay particular attention to changes in demographic and economic factors, in union policies, and in social values.

DEMOGRAPHIC FACTORS AND PENSIONS - Periodic changes in the birth rate have changed the percentage of the population falling into different age categories (Business Week, September 3, 1979). For example, the birth rate before the depression years was much higher than in the 1930s. This has created a higher increase in the proportion of those 45 and older than the increase for the population as a whole. Similarly, there was an increase in the birth rate after World War II which lasted until the early

1960s. This was followed by a period of declining birth rates sometimes called the "baby bust" period. These variations in the birth rates create variations in the ratio of retired individuals to working individuals. Since public pensions such as social security and government employee systems, and also some private industry pensions have been financed on a pay-as-you-go basis, this has created concern for the viability of such systems in the future. Such systems require an intergenerational transfer of payments such that employed workers pay the retirement benefits of those retired. A relatively smaller proportion of workers in the future may find it difficult to meet the retirement needs of a relatively larger group of older people. (For more discussion of these demographic trends, see Chapter 4, "Demographic Shifts and Projections.")

Changes in labor force participation rates also may have a significant effect on the level of pension benefits. The labor force participation rate has dropped for older men in recent years (Rhine, 1978). With older men leaving the labor force at an earlier age, the number and proportion of men receiving retirement benefits is increasing in addition to the lengthier periods when such individuals draw benefits. This may mean that all previous projections of pension fund expenditures may be understated. There are a number of reasons for the rising rate of labor force withdrawal by older males. These reasons lie in legislative, economic, social, and attitudinal developments of recent years (Rhine, 1978).

Private pension plans increasingly allow for early retirement. In 1970, 96 percent of private pension plans surveyed had early retirement provisions (Meyer and Fox, 1971). Private pension plans have also increasingly provided for disability retirements (Rhine, 1978). In addition to allowing early retirement, some firms have actually offered incentives to older workers to retire early (O'Mears, 1977). These incentives include unreduced pension benefits for early retirement or even special supplements to regular pension benefits. These incentives seem especially likely when firms are faced with layoffs due to an economic recession. In such situations, firms and unions seem to prefer early retirement to layoffs of younger workers.

While the length of work life has been decreasing for males it has been increasing for women. The work life expectancy of women born in 1970 is almost 23 years as compared to six years for those born in 1900 (Plumley, 1978). The increased labor force participation rates for women coupled with an easing of vesting requirements will mean that more women will draw retirement benefits of their own. In past years, because of prevailing vesting rules, women in the labor force were often not able to retain retirement contributions made on their behalf by the organizations employing them.

All of these demographic trends together indicate that private organizations will have to spend far more than they have in the past to provide retirement benefits to their former employees. With funding of such plans now required by ERISA, there may be a dramatic increase in the labor costs of major U.S. companies with pension plans in the near future. These increased labor costs may have profound effects on the ability of many firms to compete, especially in light of the increasing portion of the

U.S. market for various products taken by foreign manufacturers. This situation may ultimately increase pressures in industrial firms for less labor intensive technologies.

With respect to pension plan characteristics themselves, several potential consequences to these demographic changes can be expected. Company provisions for early retirement may have to be changed and firms may attempt to make their pension plans more contributory than they have been in the past. Moreover, these developments may increase the reductions currently taking place in existing pension plans. Finally, new firms may be more reluctant to initiate plans.

ECONOMIC FACTORS AND PENSIONS - The economic environment can have a significant effect on private pension plans (Miller, 1976). The economic environment is in some respects similar for all firms in the U.S. and in some ways it is different. The inflation rate for the economy as a whole affects all companies. However, the economic situation facing some firms may be quite different than that facing other firms. For example, the U.S. automobile industry is facing critical problems today with some companies near bankruptcy, while companies in other industries may be quite prosperous.

There has been much written about the effects of inflation on the benefits received by retired workers (Paul, 1974; Schulz, Leavitt and Kelly, 1979; Weeks, 1978). Most private pension plans do not adjust the level of their pension plans automatically with changes in the cost-of-living (Business Week, May 12, 1980). Many private plans, however, do make occasional adjustments in the level of benefits received by their retirees to partially compensate for the changes occurring in the consumer price level (Frumkin and Schmitt, 1979). However, such adjustments are typically insufficient to prevent serious declines in the real value of the pension benefits received (Cassell, 1979). While a possible solution to this problem is automatic adjustments in the level of pensions with increases in the cost-of-living, many feel this would increase the costs of private pensions to "unthinkable" levels that might bankrupt the private pension system (Cassell, 1979). Some writers predict that private pension plans will decrease in importance relative to public pension systems because of increased inflation (Munnell, 1979).

Inflation is not the only economic problem facing pension systems. A study of the development of private pension plans by Lake, Rubin and Wiseman (1979) indicated that the formation of new pension plans is directly related to the financial health of the company, to good economic performance of the firm, to high earnings of employees, and to the ability of the firm to provide stable employment. The authors indicate that none of these factors are influenced by any of the provisions of ERISA. Thus, government actions which effectively improve the economy as a whole or the economic situation facing a particular industry might do more to increase the prevalence of private pension benefit plans. This report would also imply that organizations facing a stable economic and technological environment rather than an unstable market or technological environment are more likely to initiate pension plans for their employees. The personnel profession should evaluate the impact of changing economic

conditions in their particular industries on all personnel management systems including pensions.

CHANGES IN THE LEGAL ENVIRONMENT AND PENSIONS - Pensions are perhaps the most regulated of all the fringe benefits provided to employees. As such, all personnel managers should be familiar with this legislation since changes in these laws will affect the way pension plans must be administered.

We have already described many of the details and potential implications for the management of pension plans of the Employment Retirement Income Security Act of 1974 and amendments to the Age Discrimination in Employment Act of 1967. However, there are other pieces of legislation which are potentially relevant for the management of pensions. These include the Equal Pay Act of 1963 and the Civil Rights Act of 1964. Both contain sections relevant to the provisions that can be included in pensions programs, with particular reference to distinctions between male and female beneficiaries. For example, many pension plans in the past allowed earlier retirement for women than for men (Meyer, 1978), subsequent to which the courts ruled that men had to receive the same rights as women. Another difficult issue in the attempt to achieve equal benefits between men and women retirees arises out of the fact that women retirees tend to live longer than men retirees. If both groups receive the same monthly payment, the women retirees will receive benefits for a longer period of time. The courts have ruled that the organization's contributions to the pension plan cannot differ between men and women but that the benefits paid to men and women retirees can be different since women live longer. Thus the principle of equal contribution to the pension fund seems to have been established although future court cases may arrive at a different interpretation of the law.

Several other legal issues which may significantly affect the viability and/or administration of pension plans are currently undergoing review. There appears to be a movement toward giving spouses rights to the pensions of employed persons. If an employed person is divorced before retirement, the spouse has no claim to the pension and may, therefore, suffer considerable economic hardship in old age. There have been proposals to give spouses an interest in an employed person's pension after a minimum number of years of marriage. This, of course, may affect the right of the new spouse to the employed person's pension benefits. There appears also to be some sentiment for a regulation which would not allow an employed person to sign away survivor benefits for a spouse in order to obtain a higher monthly pension payment. There is a feeling that the present law puts dependent spouses into a very precarious position in terms of the economic security they need in their old age. Finally, even if the employed person died before retirement, some say that a dependent spouse ought to receive retirement benefits which are beyond the lump sum payment often made in such cases. (Spouse issues are discussed in greater detail in Part Eleven.)

It can be seen that although there have been many complaints regarding the complexity of the present pension regulations, these laws are likely to become even more complex. This may well have the effect of

discouraging the formation of new plans and encouraging the elimination of existing plans. At any rate, organizations now require the aid of legal counsel to reduce the possibility of costly mistakes in administering their pension schemes.

CHANGES IN SOCIAL VALUES AND THEIR EFFECTS ON PENSIONS - The problem of loss of ability to support oneself in old age has always existed. Societies have traditionally coped with this problem in a variety of ways. Most societies have traditionally counted on the family itself to care for its aged. People also banded together in fraternal organizations, cooperatives, or labor organizations for mutual help with economic problems including that of old age. In certain societies individual savings have also been traditionally regarded as a means of coping with the problems of old age. Savings were to be produced through "hard work and thrift" (Allen, 1954). In earlier years there was no expectation that government or the employing organization was responsible for care of the aged in their later years except perhaps on a supplemental basis.

In the United States, the Great Depression seemed to have the effect of destroying the confidence of citizens in providing for their own future. Faith in self-reliance was shaken. Since then, with the successful growth of many governmental programs such as social security, many citizens feel that the government and employer have an obligation to provide protection against economic adversity (Altmeyer, 1950; Brown, 1960; O'Meara, 1977). New social attitudes make it extremely unlikely that the U.S. can ever revert back to the previously prevalent ways of coping with the economic problems associated with old age.

Nevertheless there are signs that social attitudes towards retirement may be slowly changing. The Age Discrimination in Employment Act of 1967 which raised the mandatory retirement age from 65 to 70 for most occupations is an indication that many people do not want to retire and perhaps should not be forced to retire. Recent studies of aging indicate that individuals vary significantly in their physical and psychological well-being at the typical retirement ages of 65 or 70 (Carroll and Maxwell, 1979). Thus a general rule may be an injustice to many. In addition, time away from work may not be most needed in old age. Stunkel (1979) has proposed we abolish retirement and substitute a type of system in which all employees can take various amounts of time off depending on their needs at a particular stage of the life cycle. It might well be that having more time off when one is young and raising children is more important than time off in your older years. Even if retirement itself is not eliminated with changes in social attitudes, it is quite possible that social attitudes may change such that early retirement is much less likely in the future than is at present (Burkhauser and Turner, 1978; O'Meara, 1977; Cassell, 1979; Walker and Price, 1974).

CHANGES IN UNION POLICY AND THEIR EFFECTS ON PENSIONS - Some organizations bargain collectively with unions while other organizations do not have organized employees. If a union represents all or some of the employees of an organization, the establishment and administration of the pension plan or any personnel system for that matter, is typically not carried out in a unilateral manner. The impact of the union

is such that limits are imposed on managerial discretion in choosing among alternatives available for any personnel system. Unions for many years did not attempt to negotiate directly pension plans with companies (Slichter, Healey and Livernash, 1960) and many unions had their own pension plans dating from the time they were fraternal organizations. However, unions indirectly pressured many companies into offering a pension plan to their workers because the union would not allow a company to layoff older workers who had high seniority. This forced companies to retire such workers, and to do this they developed pension plans (Slichter, et al., 1964). The government actually led the way for unions to press for pension plans by negotiating a pension plan with the United Mine Workers in 1946 when the federal government was managing the coal mines. Union demands for negotiated pensions were facilitated by a National Labor Relations Board ruling, which was supported by the courts, that companies were required to discuss pensions with unions since they were a proper subject for collective bargaining (Farwell, 1964). A 1973 national sample of almost 1500 workers indicated that the probability of receiving a pension was significantly higher if the employee was a union member (Berger, Bodreau and Olson, 1980).

Unions, over the years, have pressured management not only for the establishment of pensions but for certain pension plan features. For example, union policy has been strongly in favor of noncontributory funds (Slichter, et al., 1960; Farwell, 1964). Unions have taken the position that noncontributory pension benefits are justified under depreciated human assets or deferred wage perspectives. Some employers, on the other hand, argue for contributory types of plans on the grounds that these plans make employees more aware of the costs associated with increasing benefits and because contributory funds can provide higher benefits. As previously indicated, however, the Harris poll (Harris & Associates, 1979) reported that a majority of employers were still of the opinion that pension plans should be noncontributory, even if employee contributions to the plan were on a purely voluntary basis.

Unions have generally favored funding for pension benefits so that workers will be guaranteed future benefits. With some notable exceptions, many companies have similar preferences for funding (Slichter, et al., 1960). Unions have also tended to favor joint administration of pension plans by the union and the company but many companies have resisted these proposals. Company initiated plans have generally favored providing benefits as a percentage of earnings while unions often sought simple dollar plans in which the benefits would be stated in dollar amounts so that employees would know exactly how much they would receive (Slichter, et al., 1960). Conversely, those unions comprised of employees who differed in skills and, therefore, earnings were more in favor of percentage formulas rather than dollar amounts. In general, unions seem to favor a level of benefits that provide retired workers with about one half their preretirement pay when coupled with social security benefits (Slichter, et al., 1960).

Union policy on retirement ages generally favors voluntary rather than mandatory retirement. However, the members of a union seem to vary in their attitudes on this issue depending on their ages. Younger

members favor automatic and mandatory retirement ages to open up promotion opportunities while older members favor voluntary retirement. Unions have also consistently favored early retirement benefits for those workers who have become permanently disabled (Slichter, et al., 1960).

Surprisingly, unions do not seem to have favored strong vesting rights for workers in the past. This may be because the union is primarily concerned about its own members. If employees quit a company and leave a particular union for that reason, the union no longer appears to be interested in his or her welfare (Slichter, et al., 1960). Additionally, vesting can reduce the size of retirement benefits available to retirees. If turnover in an organization is quite high, the absence of vesting provisions may create a situation in which only a small proportion of the employees will ever draw pension benefits from the funds. In the past, female employees leaving the job for marriage were the ones especially likely to lose pension benefits.

Unions have favored survivor options in pension plans which give a spouse the right to a pension after a retired worker has died (Farwell, 1964). In addition, many unions have favored provisions in pension plans which give a spouse a pension if the employed person dies before reaching retirement age so long as the individual worked a certain number of years (Farwell, 1964).

A recent issue in union pension policy relates to the investments made by the pension funds. Some union advocates have proposed that pension funds should not be used to purchase stock bonds from companies that are nonunion or which carry out socially undesirable practices (Washington Post, 11/11/79). Some research has compared the performance of pension funds with such social restraints against the performance of pension funds not restricted in their investment policies. The unrestricted pension funds have been the highest performers in such comparisons (Washington Post, 12/2/79). Nevertheless, some surveys indicate that workers still prefer pension funds that are restricted in their investment policies even if this results in lower pension benefits (Harris & Associates, 1979, p. 63). This may very well mean that companies will have to evaluate their pension plan investment policies on criteria other than the highest possible return or will have to communicate their rationale for their investment policy more clearly than before. (Pension fund investment is discussed more fully in Chapter 13, "The Use of Pension Fund Capital," and Chapter 25, "Non-Traditional Investment of Pension Funds.")

Unions have often attempted to increase pension benefits for those already drawing retirement benefits from the company. Companies have traditionally taken the position that the union has no right to negotiate for retired personnel and court decisions have upheld their position (Farwell, 1964). Despite the support of the courts for their position, many companies have voluntarily increased benefits to those retired, perhaps to help maintain the morale of present employees who are aware of what is happening to those on the retirement rolls. However, one survey of 582 companies in 1979 indicated that almost 60 percent had made no increase in post-retirement benefits in the previous five years (Hewitt Associates, 1980). This was especially true of the smaller companies.

Unions exert a major impact on the compensation package in general within collectively bargained agreements and on pension benefits in particular. While only approximately 20 percent of the labor force is unionized, the impact of unions as trend setters in the determining of a pattern for employment conditions for all workers extends far beyond the unionized sector. As such, it is important for personnel managers in both unionized and nonunionized firms to develop an awareness of the pension provisions that unions have targeted as central to their bargaining efforts for the benefit of their current and retired membership.

Discussion and Future Research

Paucity of Relevant Research

A general assessment of the personnel management literature dealing with pensions is that it is impressive in its paucity. Some conclusions were warranted in view of previous research and were summarized in the body of the paper. In many instances, the literature raised more questions than answers; mention was made where specific items merited further research.

The dearth of studies tracing the impact of pensions on personnel management outcomes is surprising for two reasons: (1) pensions are a tremendously costly item, the provision of which is not mandated by law. Since employers have the liberty of some degree of latitude, at a minimum information concerning the predicted effect of provision of pensions on various organizational indices should be available for consideration prior to the decision to extend such benefits. Yet virtually no examples of cost/benefit assessments exist in the literature. Some writers point to the need to cost various pension plans (e.g., Carlson, 1974) but they fail to relate the various cost levels to anticipated differences in returns on such expenditures. A notable exception is recent work by Chipman and Mumm (1978) in which an attempt was made to model the consequences of various pension plan provisions (e.g., retirement age eligibility, level of vesting or whether provisions for social security offsetting existed) on turnover among naval personnel. While there is no guarantee that such modeling procedures will prove valid against actual retirement behavior, this approach which explicitly acknowledges potential differences in the consequences of various pension provisions is clearly superior to an approach which either totally ignores such consequences or delegates the assessment of the impact of retirement provisions to subjective evaluations.

The absence of personnel research on the impact of pensions is further surprising since the rationale for their provision generally includes some reference to the positive effects of pension benefits on personnel management outcomes such as job attraction, motivation and retention. Pension provision is not justifiable on those grounds unless future research indicates that the effect of such benefits is in the desired direction. As we repeatedly indicated, the mode of distributing pension benefits and their informational complexity lead us to question their relationship to such behavior as job choice and performance.

Responsibility for Pension Policy and Design

The relative inattention to the behavioral consequences of pension benefits from a personnel management perspective may be, in part, attributable to the fact that pension plan design has been relinquished by personnel administrators and has been transferred to the responsibility of financial experts. Klemkosky and Scott (1974) write:

> Pension planning is now looked upon as a significant aspect of overall financial planning. In this light, pension fund management has become the responsibility of the senior financial officer of the enterprise. The pension fund, then, as a financial management problem rather than being under the auspices of the personnel department where wages and fringe benefits are administered can be properly viewed as one of the several profit centers in the company (p. 21).

Even in firms where policy aspects of pension plans are decided within the personnel department, there is frequently a separate benefits director; this individual may have a tendency to emphasize the financial consequences of benefit plans at the expense of other behavioral outcomes which may result from provision of pensions (Farrell, 1976). A recent Bureau of National Affairs survey (1980b) showed that even administration (rather than design) of pension plans is not under the total auspices of the personnel department: 33 percent of the 383 responding companies indicated they had either some or no control over administration (not design) of the pension plan. Sixty-one percent reported total control over administration of the plan while 7 percent did not respond. It may be necessary to restore to personnel directors some control over pension plan design if the personnel management perspective is to have any input in policy decisions regarding retirement plans.

Proposed Revisions in National Pension Policy

Several proposals for revision of national pension policy have been presented recently. These include mandating provisions of private pension plans (see the interim report of President's Commission on Pension Policy, 1980), and integrating private pension benefits with those of the social security system (Schmitt, 1978). Both proposals would appear to reduce the employer's discretion in choosing to provide pensions per se and if so, in selecting the level of such benefits. From the personnel management perspective such proposals bring with them the possibility that employers will have less latitude in designing pension systems with maximum potential effect on employee behavior.

Future Research Issues and Methodologies

If the personnel management perspective on pension issues is to be taken seriously, several important questions need to be illuminated. The data that could satisfy some of these questions are available in one form or another from various aggregated sources (e.g., data collected by the IRS

under the reporting and disclosure requirements of ERISA, or data on plan terminations from the Pension Benefit Guaranty Corporation). For example, what organizational, environmental, occupational, demographic, geographical or industrial characteristics differentiate between firms offering pension packages of certain types versus those offering other kinds of pension packages, or compared to those not providing any form of pension benefits? Can any aggregated effects on employee behaviors be traced to pension benefits per se and to specific provisions of pension plans?

Micro-analyses would be more appropriate for some of the following research issues. For example, does provision of pension benefits based on performance indeed increase productivity for those who view them as important rewards as has been hypothesized here? There may be a unique opportunity to study this question given the discretion employers currently have in continuing their contributions to pension plans for employees over 65. Despite no requirement to do so, Hewitt Associates (1980) showed that 48 percent of employers in fact elected to continue their contributions. By basing pension benefit allocation (or bonus contributions into pension plans) for employees over 65 on differential levels of performance, it may be possible to observe any changes relative to previous effectiveness levels. Assuming that pensions are important to such employees, such a "field experiment" would provide a feasible test of expectancy theory predictions regarding the impact of pensions on performance. It is important to note that performance measures upon which pension allocation is based must be valid and accepted by employees; additionally, such studies should be careful to acknowledge any extraneous factors (e.g., declining health) which may impinge on performance levels.

In other areas pertinent to pensions, ongoing organizational experiments provide opportune field settings in which some of these issues can be addressed. Companies have experimented with a number of different variations of cafeteria compensation and some preliminary and rather crude studies have shown that cafeteria compensation may have some promise. A number of different types of communication systems for pensions have also been utilized by various firms. Some of these systems are custom-made programs designed specifically for a particular company and some are ready-made programs purchased from consulting firms. Some companies have been creative in attempting to relate pension benefits to the firm's economic performance through various types of employee ownership loans. There is now a strong need to evaluate these innovative programs in a systematic way. Organizations that vary with respect to their use of cafeteria compensation or their use of different types of pension communication systems must be compared not only with respect to the ability of the organization to attract, motivate, and retain its employees but also with respect to the effects of such programs on pension costs may make it impossible for most private industrial firms to provide pensions at all.

Micro-analyses would be also profitable in assessing whether the behavioral consequences of pension plan characteristics differ depending on external factors such as the level of unemployment in the economy, the occupational background of plan participants, the demographic breakdown

among plan beneficiaries, the type of industry within which the firm operates, or whether the plan was negotiated by a union. Additionally, do internal factors such as job type or organizational climate moderate the impact of different plan characteristics on personnel management outcomes? We should emphasize that the effect of pensions on one class of behavior (e.g., on job choices) may differ substantially from their effect on other behavior (e.g., on performance or retirement decisions). This complicates future research and practice since there can be no presumption of the generally favorable or unfavorable effects of pensions: it depends what the relevant outcomes are.

We have also made note of several aspects of pension plans which seem to have been considered to this point only from a legalistic or actuarial perspective, yet may have important personnel management implications. For example, what are the consequences on various employee behavior (e.g., motivation, satisfaction and turnover) of employee contributions to pension plans? If such contributions are allowed or even required, should they be equal throughout an individual's career or should back-loading be encouraged in view of the increasing importance of retirement income as the employee ages and the decreasing pressures for take-home pay? Under ERISA, limitations in employer back-loading have been specified; are they indeed optimal from a personnel management perspective? What are the effects on these various outcomes, of employee participation in the design phase and/or selection of particular pension options? Do the benefits of this practice exceed the costs? How do the various vesting formulas effect employee behavior? According to expectancy theory, the longer it takes to vest, the weaker the possible perceptual link between pensions and performance. Along those same lines, do pension levels based on career average have more of an impact on behavior than do those using "final pay" formulas, despite the higher retirement benefit usually resulting from the latter method of computation (Business Week, April 28, 1980)? What are the effects of delaying eligibility to participate in pension plans? ERISA specifies maximal periods for denying employee participation in plans; given that theory would not support delaying eligibility periods for plan participation, is this practice cost efficient?

Some have suggested that there are declining rates of returns to fringe benefit contributions (Lawler, 1971). At what point do increases in the level of contributions to pension plans become inefficient from a personnel management perspective? If the objective is to maximize personnel management outcomes, would fixed benefit plans be more desirable than fixed contribution plans despite their cost disadvantages? Theoretically, this would appear to be the case in view of the higher probability of receiving a given level of retirement benefits under defined benefit plans. Do limitations on the maximum allowable benefit drawn under qualified pension plans (currently $102,000 annually) inhibit the motivating potential of pension plans for upper level executives? In attempting to respond to employee needs, should personnel managers direct their efforts to achieving more liberal vesting formulas or facilitating portability? Despite the recurrence of this topic in Congressional debates, it appears that achievement of the former would largely negate the need for the latter.

The Future of Private Pension Plans

If personnel management objectives are to be included as a significant consideration in the formulation of national policies regarding retirement plans, many of the above questions must be first addressed. At this point, the effects of pensions on a variety of employee behavior remain largely conjecture, despite their plausibility. Bearing that caveat in mind, if the potential impact of pensions on employee behavior is to be maximized, personnel management theory would necessitate some changes in typical organizational practices characterizing the provision of pension benefits.

We recognize that the future viability of the private pension system depends on numerous factors, among which personnel management considerations may be of minimal importance. These include expected changes in demographic factors which will serve to increase greatly increase the costs of pensions, changes in the proportion of the aged, in the labor force participation rate of older men and of women, and increases in the length of work life for women. As indicated earlier, all of these factors will add significantly to the costs of providing private pensions. Future predicted changes in the volatility of the technological and market environments of industrial firms might also make it more difficult to provide private pensions. Uncontrollable inflation rates may be reducing the importance of the private pension system relative to the public pension system. Several of the union pension policies discussed in the report are unlikely to change in the future. These may also contribute to increased complexity and costs for private pension plans. Developments in the outside legal environment may make future private pensions more costly and more complex. These developments not only involve changes in existing legislation affecting pensions but recent court decisions that relate to the characteristics of established pension plans. Despite the increased complexity and costs of private pension plans, projections of past trends in social values held by the population indicate that demands for retirement benefits of all types will increase in the future.

With economic signs pointing towards increasing difficulties of private pension plans to operate with financial success the need is even more pressing to examine the objectives underlying pension benefit availability. We have called for an evaluation of the personnel management costs and benefits associated with provision of pensions. Such an examination would not only provide much needed information but may also provide firms with the means of increasing the viability of their pension plans through the linkage of such benefits to desired employee behaviors.

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INTRODUCTION TO PART SEVEN: SAVINGS

The issue of savings was a chief concern of the Commission for two important reasons. First, savings has long been considered a potential source of retirement income. Second, and more important, savings is a major source of capital formation, both as investment capital and as a measure of our nation's productivity. On closer study, however, savings does not appear to be a significant source of income for most retirees and individual retirement savings is not likely to increase significantly in the future. Tax policy, which has encouraged savings only to a limited extent, is not at all uniform in its treatment of pension contributions and benefits. The incentives for and, consequently, the participation of higher income persons in public and private pensions are greater than lower income persons.

The papers in this section examine different aspects of the savings issue. Chapter 31, "The Impact of Demographic Changes on Household Savings, 1950-2050," investigates the effects that age and family composition will have on individual savings behavior, especially as the baby boom generation ages. The author concludes with positive news: the sharp decline in savings during the last twenty years will be reversed soon, though more gradually, through the first quarter of the 21st century. Chapter 32, "A Review: Social Security, Pensions and Savings," reviews briefly the literature and theoretical arguments concerning the effects of savings on retirement income systems. The authors of Chapters 33 and 34 examine the relationships between social security and private pensions to capital formation while in Chapter 35 they cover and evaluate all the conceptual issues, technical details, and the survey which were the basis for their other two papers. Finally, in the three sections of Chapter 36, the effects of the pension system on private savings and capital accumulation are studied and individual behavoir patterns are established. The authors conclude from their data that the social security system has no significant effect on private savings, but that private pension plans do. The third paper in this chapter shows that a family will tend to hold less risky assets as its pension assets increase.

In its Final Report, the Commission recommended that the tax system--through more uniform tax treatment of pension plans and greater tax incentives to encourage wider particpation by individuals--be used as a major vehicle for enhancing pension coverage in this country. Such changes would obviously have beneficial effects on savings behavior and capital formation.

CHAPTER 30: THE IMPACT OF DEMOGRAPHIC CHANGES ON HOUSEHOLD SAVINGS, 1950-2050

Paul Wachtel

The demographic structure of the household sector is an important determinant of aggregate consumption and savings. However, the emphasis on age and family composition in the theoretical literature is largely overlooked in empirical studies of savings behavior. There are two main reasons for this: the empirical emphasis on very short run fluctuations in savings and the paucity of reliable data for estimating demographic effects on saving. Nevertheless, there are good reasons to attempt to redress the problem. These include the growing concern about the level of savings in the American economy and the effect on capital formation, and the need to understand the economic consequences of the large changes in the demographic structure that have already occurred, and those that will occur in the 21st century.

In this paper the effect of changes in the age structure of the population on saving by individuals is investigated. A methodology for estimating the demographic effects on saving from the available data was developed by the author in an earlier paper (see Charles Lieberman and Paul Wachtel (1980)). Here the methodology is applied to an extended period so that projections of the saving effect on savings of the birth, maturation, and aging of the baby boom generation can be analyzed, as well as the effect of reduced birth rates on savings in the next century.

The results indicate that there are small but perceptible changes in aggregate savings rates as a consequence of demographic change. While the changes in age structure brought about by the baby boom have reduced savings, this effect is now largely past. In fact, the analysis suggests a gradual increase in savings over the next 40 years which eliminates the decline of the last 20 years. There are, of course, large differences in the pattern of demographic effects on the various components of savings. A full discussion of the results and conclusions to be drawn is found at the end of the paper.

The methodology employed here fills the gaps in available data by combining survey data on the savings behavior of demographic groups with Census data and forecasts on the age and income distribution of household units. The most comprehensive survey of savings behavior available is the Survey of Changes in Consumer Finances (SCFF) conducted by the Federal Reserve Board in 1962-63 with a sample of only a little more than 2000 family units. It is unfortunate that the estimates of savings behavior by dempgraphic groups must be taken from a survey which is almost 20 years old.[1] Savings rates were also obtained from the Consumer Expenditure Surveys (CES) conducted in 1960-61 and 1972-73 by the Bureau of Labor Statistics. The method of analysis is to apply savings rates from these

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surveys to the age and income distribution for other periods. In this way the effect on savings of a changing age distribution can be mapped out over time.

The paper is divided into several sections. In the first section, the data are discussed in detail. Various U.S. Bureau of the Census sources are used to construct the age and income distribution projections to 2050. The section that follows presents the methodology for using survey data on savings rates to estimate demographic effects. The third section presents the results, first with the SCFF survey and then with the CES surveys. Finally, in the last section the results are summarized and their implications discussed.

Data Used in the Study

Age Structure

Data on the age distribution of the population are taken from various U.S. Bureau of the Census surveys and forecasts. The household unit used in this study is the total of the Census "family" and "unrelated individuals" categories. The age distribution of the number of families and unrelated individuals for 1948-1978 is taken from various issues of the Current Population Reports, Series P-60. Projections until 2050 were constructed from Census forecasts as outlined below.

For the period prior to the year 2000, there are Census forecasts of the number and age distribution of units which correspond almost exactly to families and unrelated individuals. The estimates are based on the Census Series II Population projections. The proportions of individuals in the various marital status and household categories were projected from the trends in the actual Current Population Survey data for 1964-1978. These data are Series B in Current Population Reports, Series P-25, No. 805, May 1979, "Projections of the Number of Households and Families: 1979 to 2055."[2]

For the period after 2000, the age distribution is constructed from the Census Series II population projections. The number of families and unrelated individuals per person in each age category in the projections for 1995 discussed above are applied to the Census Series II projections of the total population in each age category.[3] The data for the entire period are consistent because both the Series B Household Projections and the population projections used here are based on Series II population forecasts. However, the trends in household formation patterns are extended only until 1995 and then held constant.

The data just described are the standard set of projections of the age distribution of the population used in this study. The distribution of both actual past data and these projections are shown in Table 1.

The projections of the age distributions of the population are, of course, subject to several sources of error. For the remainder of this

century the problem is not severe because the age distribution of the adult population is by and large already determined and errors in projecting death rates and immigration are likely to be small. However, the trends in family formation, living patterns and marital status embedded in the projections could change. The projections for the first half of the next century may be further complicated by any unanticipated changes in birth rates.

TABLE 1

Age Distribution of Families and Unrelated Individuals

AGE OF HEAD:	14-24	25-34	35-44	45-54	55-64	65+
1948	.0625	.2034	.2219	.1984	.1650	.1489
1958	.0577	.1867	.2152	.2034	.1632	.1738
1968	.0774	.1824	.1871	.1931	.1676	.1923
1978	.1078	.1946	.1714	.1667	.1602	.1992
1985	.0932	.2391	.1909	.1386	.1413	.1968
1990	.0830	.2370	.2084	.1457	.1249	.2010
1995	.0783	.2172	.2183	.1685	.1160	.2017
2000	.0821	.1889	.2163	.1889	.1269	.1968
2010	.0812	.1849	.1688	.1986	.1661	.2004
2020	.0735	.1880	.1654	.1560	.1750	.2421
2030	.0766	.1702	.1723	.1570	.1413	.2827
2040	.0749	.1799	.1585	.1665	.1455	.2746
2050	.0744	.1769	.1681	.1543	.1547	.2716

Alternative projections were also developed to test the sensitivity of the results. For the period from the present until 1995, this entails varying the trends in household formation. It is not necessary to consider variation in birth rates during this period because the heads of all adult households in 1995 have already been born. It is difficult to judge whether trends in family formation will be maintained or reversed by social changes in the next century. Thus, these patterns are kept at the 1995 levels. After

2000, the distribution of households is affected by future birth rates. Series II population projections assume a fertility rate (average number of lifetime births per woman) of 2.1. The Census Bureau suggests that this is consistent with surveys of the birth expectations of young women. The rate of growth of the population declines in the Series II projections from about 0.8% per year currently to about half as much in the middle of the 21st century. Population growth stays above zero because of increasing life expectancy and net migration. Since current behavior indicates much lower fertility rates, it is of interest to forecast the age distribution with current behavior extrapolated. For this purpose, the Census Series III population forecasts are used. The ultimate level of the fertility rate in this series is 1.7 and population growth declines to zero by 2020.

The age distributions of families and unrelated individuals with the alternative assumptions are shown in Appendix Table B and C of this chapter. Variation in family formation patterns has a large effect on the total number of families and unrelated individuals, but little effect on the age distribution. On the other hand, variation in fertility rates has a profound effect on the age distribution of families and unrelated individuals in the 21st century, as shown in Table C. By 2050, the proportion of over-65 family units is more than five percentage points higher with the lower fertility series. There are also about four percentage points fewer units with a head of household less than 35.

Income Distribution

Since aggregate saving in this study will be calculated by applying estimated savings rates to the income of demographic groups, it also depends on the distribution of income among the demographic groups. Projections of the relative mean incomes for the age groups are shown in Table 2.

Once again, actual data are available from the Current Population Reports (Series P-60) for the period 1948-78. For the forecast period, trends in the growth of income for each age group are used to project the relative income distribution. The procedure is outlined below.[4]

The smoothed average annual growth rates for families and unrelated individuals income in each age group are shown in Appendix Table A. These growth rates are applied to the actual 1978 mean incomes of families and unrelated individuals in each age category to generate the income distribution data for 1985 to 2010.

The mean incomes of families and unrelated individuals in different age groups have grown at substantially different rates (see Table A) for several diverse reasons. First, changes in labor force participation rates and the extent of part-time employment differ among the demographic groups. Second, the relative income of different cohorts depends in part on the relative supply of each group. That is, if individuals of different ages (and work experience) are not perfect substitutes, then a small cohort might have higher wages because of its relative scarcity.[5] It is difficult to gauge the extent to which the age distribution (cohort size) affects the income distribution.

TABLE 2

Relative Income Distribution

Age of Head:	14-24	25-34	35-44	45-54	55-64	65+
1948	.57	.85	.97	1.00	.88	.56
1958	.56	.87	1.00	1.00	.83	.47
1968	.47	.77	.96	1.00	.82	.45
1978	.40	.72	.93	1.00	.83	.43
1985	.38	.72	.91	1.00	.83	.43
1990	.37	.68	.90	1.00	.83	.43
1995	.35	.65	.88	1.00	.83	.43
2000	.34	.63	.86	1.00	.83	.46
2010	.32	.58	.83	1.00	.82	.42

Note: Entries are ratio of mean income to that for the aged 45-54 group. Data are calculated from Census Sources as described in the text.

Changes in cohort size and labor supply decisions are likely to vary the income growth rates. In the absence of a formal analysis of these issues the trend growth rates in Table A are used. However, in order to avoid any large distortions the relative mean incomes are assumed to be constant after 2010. As a further precaution the savings forecasts will also be shown with an unchanged income distribution. These results provide some indication of the importance of income distribution changes on savings and the extent of possible biases introduced by erroneous forecasts.

Savings Rates

As mentioned earlier, saving projections will be based on cross-sectional savings rates from two sources. The first, which is comprehensive and reliable, although dated, is the SCFF. Savings rates by age groups from this survey are shown in Table 3A, taken from Lieberman and Wachtel (1980). Savings effects are also estimated with savings rates from the last two Consumer Expenditure Surveys (CES). These are shown in Table 3B.

Methodology for Demographic Effects

The methodology for examining the influence of demographic change on saving behavior will be briefly outlined. Savings is defined as

$$S_t = \sum_i R_i \; N_{it} \; Y_{it} \quad \text{where } i = \text{age cohort and } t = \text{calendar year.}$$

The R_i are the cross-sectional savings rates from the survey and N_{it} and Y_{it} are the size and mean income of the age groups respectively. S_t is the level of savings predicted for t which is then compared to the level that would be predicted if the age distribution had been that of t'. This latter savings prediction is:

$$S_{t,t'} = \sum_i R_i N_{it'}(N_t/N_{t'})Y_{it}$$

If t' precedes t we can interpret $S_{t,t'}$ as the level saving would have been in t if the age distribution had remained unchanged from t' to t. The influence of demographic change over that period on saving can then be summarized by the ratio $S_t/S_{t,t'}$. The ratio is the level of saving in t as a fraction of the level it would have been with the age distribution of t'. If the ratio exceeds one, changes in the demographic mix of the population from t' to t tend to increase total savings.

It is also of interest to examine the influence of a changing income distribution on predicted savings. For this purpose, we write:

$$S^*_{t,\,t'} = \sum_i R_i N_{it'}(N_t/N_{t'})Y_{it'}(Y_t/Y_{t'})$$

for the level of savings in t with both the age and income distributions of t'. Similarly, the ratio of S_t to $S^*_{t,t'}$, will be calculated. This ratio can be also written as:

$$S_t/S^*_{t,\,t'} = S_t/S_{t'}(N_t\, Y_t/N_{t'}\, Y_{t'})$$

This implies that the ratio $S_t/S^*_{t,t'}$ exceeds one if

$$S_t/S_{t'} > N_t\, Y_t/N_{t'}\, Y_{t'}$$

That is, demographic change increases saving if the effect on aggregate savings is greater than the effect on total income.

TABLE 3A

SCFF Savings as a Percent of Total Income

Age of Head	35	35-44	45-54	55-64	65+	All
Total Assets	6.56	5.84	8.04	3.51	5.98	6.17
Business Assets	1.75	-0.57	1.21	-1.92	1.43	0.36
Liquid Assets	-0.10	3.58	6.33	3.78	5.16	3.73
Checking Deposits	0.12	0.28	0.83	0.74	0.98	0.54
Saving Accounts	0.35	3.01	4.49	2.60	4.26	2.74
Saving Bonds	0.13	0.29	1.01	0.43	0.22	0.46
Investment Assets	4.37	2.19	-.62	1.12	-1.01	1.41
Miscellaneous Assets	0.05	-0.11	0.07	-0.50	-0.18	-0.10
Retirement Assets	0.50	0.76	1.05	1.03	0.28	0.77
Total Debt	-14.84	-3.25	2.99	0.39	-4.75	-3.64
Home	-12.77	-3.49	2.42	0.38	0.62	-2.85
Investment	1.91	1.23	-0.20	0.27	-5.07	-0.62
Personal	0.16	-0.97	0.78	-0.35	-0.42	-0.12
Installment	0.46	0.52	0.99	-0.69	0.66	0.44
Auto	0.09	0.49	0.67	-0.29	0.10	0.24
Nonauto	0.55	0.03	0.33	-0.40	0.56	0.20
Noninstallment	-0.30	-1.49	-0.21	0.34	-1.08	-0.55
Life Insurance	-0.32	-0.02	-0.02	0.09	0.12	-0.05
Housing Expenditures	19.52	6.31	2.13	3.65	-2.23	6.79
Auto Expenditures	6.21	5.25	4.83	5.90	2.28	5.16
Net Financial Investment	-8.27	2.59	11.03	3.90	1.23	2.53
Total Savings	17.49	11.19	18.29	13.45	1.28	14.47

Sources: Calculated from SCFF data tape (N = 2,159). Income is the total income received in the calendar year by all members of the consumer unit before any payroll or income tax deductions.

TABLE 3B

CES Saving as a Percent of Before Tax Income

Age of Head	25	25-34	35-44	45-54	55-64	65	Total
Survey	Net Changes in Assets and Liabilities						
1960-61	2.56%	2.50%	3.02%	3.98%	4.71%	2.72%	3.19%
1972-73	5.92	8.36	8.18	7.75	9.37	5.62	7.22
	Net Changes in Assets						
1960-61	11.90	14.54	8.39	7.52	5.99	2.00	8.39
1972-73	12.90	22.59	13.13	9.84	9.22	6.30	12.82
	Net Changes in Liabilities						
1960-61	14.46	12.05	5.38	3.53	1.28	0,72	5.20
1972-73	18.82	14.61	4.99	2.09	0.15	0.68	5.60

An alternative methodology, also used below, is to look at predicted aggregate savings rates. The aggregate savings rate is given by:

$$R^*_t = \sum_i R_i \, N_{it} \, Y_{it} / \sum_i N_{it} \, Y_{it} = S_t / \sum_i N_{it} \, Y_{it}$$

It reflects the effect of changes in both the age and income distribution. In order to isolate the former effect, the savings rate is also calculated with the income distribution fixed at its last observed value (1978):

$$R_t = \sum_i R_i \, N_{it} \, Y_{i,78} / \sum_i N_{it} \, Y_{i,78}$$

The two methodologies are, in fact, equivalent. Convenience and ease of understanding will determine which one is used. In the case where changes in both the age and income distribution are allowed the equivalence is exact. That is when $S_t/S_{t,t'} > 1$ then $R^*_t/R^*_{t'} > 1$ because the ratios are exactly the same. However, when changes in the age distribution only are considered there is a slight difference which is analogous to the difference between a Paasche and Laspeyes index number calculation. For the ratios $S_t/S_{t,t'}$ the base year for the income distribution is changing, it is always 't'. However, for the comparison of savings rates, it is fixed at the 1978 values.

Estimates of Demographic Effects

Results with the SCFF Savings Rates

The methodologies just described are applied first with the savings rates from the SCFF survey for a variety of savings components and concepts. In Tables 4 and 5 saving rates as defined by the second methodology are shown. Table 6 shows results with the first methodology for selected years. For both methodologies results are shown of the age effect and the combined age and income effects on saving. As noted in the methodological discussion, the implied trends are the same.

Results are most dramatic in Table 5 which shows aggregate savings rates, with age group rates fixed by the SCFF survey values and the relative income of age groups fixed at 1978 values. The variation in the savings rates shown is due to changes in the age distribution only. Total savings declines in the early part of the period and then does not vary much until the baby boom cohort reaches retirement age around 2020. The decline at that point is much larger than the postwar decline, the bulk of which is already past. When the income distribution is allowed to change, the decline in the later period is quite rapid. The projected demographic effects for the remainder of this century indicate relatively little change in total saving.

It is important to decompose the trend in total savings into its components which can show very different trends. Starting with Table 5 where the last three components plus automobile expenditures (not shown) sum to total savings (with the sign reversed on debt increases), there has been a slight decline in financial asset acquisitions in the postwar period and an increase in the rest of this century, but the difference between the highest and lowest savings rates is only .002 (about 3%). The trend in housing expenditures is much larger. The savings rate rises by more than a full percentage point to a peak in 1985 and declines by as much by the start of the next century. When the income distribution is allowed to vary (see Table 4) the increase to 1985 is not as large and the decline in the next 30 years is much larger. For the last asset category, autos, the savings rate is virtually unchanged until 2020 when a slight decline begins.

The large swings in housing investment are mirrored by changes in the increase in debt which represent dissaving. In the interval from 1958 to 1985, the increase in debt as a proportion of income goes from 3.5% to 5.1% of income. It declines to 3.8% in 2010 before levelling off at 4.1% in the mid-21st century (see Table 5). Thus, the decline in total savings in this century is due to rapid increases in debt which more than offset the increases in housing investment. As with the savings rates for housing, the changes in the debt ratios during the 20th century are moderated when the income distribution is allowed to change (see R^*_t, Table 4). It should be noted that the Table 4 results for the period after 2010 are not strictly comparable to the results for earlier years because the income distribution within age groups for families and for unrelated individuals is held constant by assumption. For this period changes in income distribution are due only to changes within age group in the number of family units relative to the number of unrelated individuals.

The last category in these tables is net financial investment which is an important measure because it is the household surplus available to finance business capital formation or financial deficits elsewhere in the economy. For both R and R* it reaches a minimum in 1985. It has declined dramatically in the last two decades because of the increases in debt. Furthermore, the projected demographic effect on net financial investment indicates a substantial increase in the savings rate between 1985 and 2010. Holding the income distribution at the 1978 level, net financial investment as a proportion of income doubles between 1985 and 2000. As the baby boom ages in the next century, net financial investment levels off at more than 2% income, a substantially larger fraction than current levels.

Very similar results are obtained with the first methodology. These are shown in Table 6 which presents changes in savings behavior for four time periods ranging from 17 to 30 years. The first reflects the past 20 years, the next the remainder of this century, and the last two are in the next century. The clearest pattern that emerges is the reversal in behavior between the past 20 years and the rest of the century. Demographic change since 1958 increased housing and debt and decreased financial asset acquisitions and auto expenditures. Each of these trends are reversed by demographic change in the rest of the century. In the start of the next century the major source of continued demographic effects is in the housing sector.

TABLE 4

Saving Rates, SCFF Data, R^*_t

	Total Savings	Net Financial Investment	Total Financial Assets	Total Debt	Housing
1948	.1456	.0199	.0615	.0427	.0736
1958	.1458	.0218	.0618	.0411	.0720
1968	.1443	.0218	.0616	.0409	.0708
1978	.1440	.0153	.0614	.0473	.0766
1985	.1428	.0114	.0611	.0510	.0792
1990	.1424	.0141	.0616	.0487	.0766
1995	.1428	.0203	.0623	.0432	.0714
2000	.1400	.0225	.0611	.0396	.0666
2010	.1430	.1301	.0617	.0324	.0619
2020	.1368	.0252	.0602	.0358	.0612
2030	.1334	.0257	.0612	.0363	.0585
2040	.1348	.0264	.0614	.0359	.0591
2050	.1341	.0253	.0607	.0363	.0593

Note: Predicted savings rates with both age and income effects

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TABLE 5

Saving Rates, SCFF Data, R_t

	Total Savings	Net Financial Investment	Total Financial Assets	Total Debt	Housing
1948	.1474	.0254	.0617	.0373	.0698
1958	.1453	.0276	.0618	.0351	.0662
1968	.1439	.0250	.0615	.0375	.0674
1978	.1440	.0153	.0614	.0473	.0766
1985	.1428	.0114	.0611	.0510	.0793
1990	.1426	.0132	.0617	.0497	.0777
1995	.1432	.0181	.0624	.0455	.0738
2000	.1439	.0229	.0625	.0407	.0699
2010	.1438	.0248	.0618	.0381	.0677
2020	.1379	.0202	.0604	.0413	.0670
2030	.1346	.0208	.0613	.0415	.0642
2040	.1360	.0213	.0615	.0413	.0649
2050	.1353	.0203	.0609	.0415	.0650

Note: Predicted savings rates with age effects only. The distribution of income among age groups is fixed at the relative size in 1978.

TABLE 6

Age and Income Effects on Saving, SCFF Data

t	1978	1995	2020	2050
t'	1958	1978	1995	2020
AGE EFFECT ONLY, $S_t/S_{t,t'}$				
Total Financial Assets	.95	1.03	.95	1.00
Liquid Assets	.86	1.04	1.02	1.00
Investment Assets	1.12	.99	.87	.94
Housing Expenditure	1.10	.98	.89	.96
Auto Expenditure	.96	1.00	.98	.97
Total Debt	1.29	.97	.89	1.00
Net Financial Investment	.53	1.16	1.06	.99
Total Savings	.94	1.01	.95	.97
AGE AND INCOME EFFECTS, $S_t/S^*_{t,t'}$				
Total Financial Assets	.94	1.02	.94	1.00
Liquid Assets	.90	1.06	1.04	1.00
Investment Assets	1.00	.94	.80	.94
Housing Expenditure	1.01	.93	.84	.96
Auto Expenditure	.95	.99	.96	.97
Total Debt	1.09	.91	.81	1.00
Net Financial Investment	.67	1.33	1.22	.99
Total Savings	.93	.99	.93	.97

The results in Table 6 provide a different emphasis than those in Tables 4 and 5, emphasizing the compositional changes that are of major consequence. These are clearly the housing and debt boom, just past, which levels off over the rest of the century and then declines substantially. The movements of auto investment and financial asset holding are much smaller.

Before drawing any broad conclusions about trends in savings behavior, these results should be compared to those with the CES data on savings rates. It is important to establish that the projected trends in savings behavior due to demographic change are robust because the saving surveys themselves differ a great deal. Both the level of savings and the pattern across age groups are different among the surveys, as can be seen by comparing the SCFF saving rates in Table 3A to the CES rates in Table 3B. This is inevitable because of the large sampling variances in surveys of savings behavior. Nevertheless, the overall patterns across age groups are broadly similar. Thus, it is important to analyze the effects of demographic change with other survey data to see whether our conclusions are robust to known sampling variation in the underlying savings rate data.

Results with the CES Saving Rates

The last two CES surveys were conducted in 1960-61 and in 1972-73. The survey methodologies and the definitions of saving are basically the same in each so that we can view the saving rates from each as two samples on the same measure. Although the level of aggregate saving measured from the two surveys differ a great deal, the results in Tables 7 and 8 indicate that the overall patterns are similar. That is, the decline in total savings is about to come to an end. With the 1960-61 survey the smallest total savings rate is in 1985, while the 1972-73 survey results indicate a minimum in 1978. Both surveys then indicate increased savings until 2010 to 2020. For the most part the results suggest that the peak total saving rates in the next century will be less than the peaks reached in the 1950s. The 1960-61 survey suggests otherwise when the income distribution is allowed to vary, but these results are totally reliable late in the forecast period. The same pattern was indicated with the SCFF survey data—a decline in the total savings rate until 1990, and then a rise to a peak in 2010 which is less than the early post-war levels.

Results with some of the components of savings from the 1960-61 CES survey are shown in Table 8. For this survey the available data allow financial assets and tangible assets to be separated. However, it is clear that there is a severe underreporting of financial asset acquisitions in this survey.[6] Thus, no meaningful calculation of net financial investment can be made. These results do show that the dissaving rate in debt reaches a peak in 1985 and then decline for the rest of the forecast period (exactly the same results are obtained with the 1972-73 CES and were shown earlier for the SCFF). The same pattern is obtained for housing investment and again it is comparable to the SCFF results. Comparisons are more difficult for the financial asset category because of the underreporting of financial asset holdings (particularly saving deposits) in the 1960-61 CES. Nevertheless, the trend is the same as that shown with SCFF data—a decline until 1985 followed by an increase until well into the next century.

TABLE 7

CES Total Savings Rates

	R^*_t		R_t	
Survey:	1960-61	1972-73	1960-61	1972-73
1948	.0316	.0748	.0325	.0764
1958	.0318	.0750	.0328	.0763
1968	.0317	.0737	.0322	.0745
1978	.0308	.0719	.0308	.0719
1985	.0304	.0733	.0302	.0730
1990	.0307	.0740	.0303	.0736
1995	.0312	.0742	.0307	.0737
2000	.0317	.0742	.0312	.0736
2010	.0330	.0747	.0321	.0740
2020	.0328	.0748	.0319	.0741
2030	.0320	.0732	.0312	.0726
2040	.0323	.0735	.0314	.0729
2050	.0323	.0738	.0315	.0732

TABLE 8

1960-61 CES Savings Rates, R_t

	Financial Assets	Own Home and Other Property	Liabilities
1948	.0181	.0669	.0524
1958	.0187	.0643	.0503
1968	.0187	.0637	.0502
1978	.0181	.0659	.0571
1985	.0176	.0697	.0571
1990	.0178	.0694	.0569
1995	.0180	.0678	.0551
2000	.0182	.0656	.0526
2010	.0188	.0635	.0502
2020	.0195	.0615	.0491
2030	.0200	.0592	.0480
2040	.0199	.0600	.0484
2050	.0199	.0598	.0482

TABLE 9

Age and Income Effects on Savings, CES Data

t	1978	1995	2020	2050
t'	1958	1978	1995	2020
AGE EFFECT ONLY, $S_t/S_{t,t'}$				
1960-61 CES				
Total Saving	.89	1.01	1.03	.97
Asset Change	.96	1.04	.93	.97
Liability Change	1.00	1.06	.87	.97
1972-73 CES				
Total Saving	.89	1.04	.99	.97
Asset Change	.95	1.05	.94	.98
Liability Change	1.05	1.06	.86	.98
AGE AND INCOME EFFECTS, $S_t/S^*_{t,t'}$				
1960-61 CES				
Total Saving	.93	1.03	1.03	.97
Asset Change	.95	1.02	.91	.97
Liability Change	.96	1.02	.84	.97
1972-73 CES				
Total Saving	.92	1.05	.99	.97
Asset Change	.95	1.03	.92	.98
Liability Change	.99	1.01	.82	.98

For the major savings groups, our alternative methodology is applied to savings rates from both CES surveys and reported in Table 9. Although the level of savings rates from the two surveys differ because of underreporting and different cyclical conditions in the survey years, the patterns of demographic effects are the same. However, there are some contrasts with the SCFF results, which indicate little change in total savings between the past 20 and the next 20 years. Here, total savings was reduced considerably by past demographic change. Furthermore, the period of increased savings extends over the next two time spans, whereas the SCFF data suggested some declines in the beginning of the next century. The major difference is that the increases in debt ratios early in the period are small, while the 21st century decline is large with the CES data.

Results with Alternative Population Projections

The possibility that the results shown are sensitive to variations in assumptions made about future population growth was noted earlier. As discussed in the data section alternative demographic projections were constructed and are summarized in Appendix Tables B and C of this chapter. Estimates of the demographic effects on savings with alternative demographic projections vary little until well into the next century.

For the rest of this century, the projections of the age distribution vary slightly with different assumptions about trends in patterns of family formation. Variation in birth rates has no effect on the distribution of adult family units until 2000. The effect of these differences on savings rates is shown in Table 10. Series A which reflects a higher rate of family formation generates slightly higher savings rates than the other series. Since the additional family units are concentrated in the younger age groups, there is more housing expenditure and debt. Consequently, there is slightly more savings and less net financial investment.

In the 21st century, age distribution of the population varies a great deal with alternative assumptions about future birth rates. Two series for the demographic distribution were constructed (see Table C). The standard series used above was Series II (fertility rate of 2.1). The alternative (Series III) has lower birth rates and population growth. Savings rates with this series, shown in Table 10, can be compared to the results in Table 5.

The contrast between Tables 11 and 9 is very interesting. Slower population growth implies much less savings by families in the middle of the next century but more net financial investment. With low growth rates there are many fewer young households and therefore housing expenditures goes below 6% of income (the corresponding projection for 1985 is almost 8%). There is also less debt, but the decline is not very large. Financial asset acquisitions are virtually the same with both population projections. The result is that net saving, which was 14.4 % of income in 1978, drops to 13.5% with the standard population data and 13.0% with slower growth by 2030. The corresponding figures for net financial investment (1.5% in 1978) are 2% and 2.5% in 2030.

Comparison to Other Studies

Although the demographic effect on saving behavior is widely discussed, there are very few empirical studies that can be compared to the results presented.[8] In addition there are substantial differences of opinion among various studies. Russell notes that there are time series studies of differences in the propensity to consume across age groups which can support every possible conclusion. These studies are discussed in Lieberman & Wachtel (1980) as well as earlier studies with survey data. The only other study with specific forecasts is by Serow and Spar (1980) who present projections of demographic and income change which indicate that the savings rate increases from 7.7% in 1975 to 10.0% in 2000. Although the magnitude of the increase is inexplicably large, the direction is consistent with the results in this paper.

TABLE 10

Saving Rates in 1995 with Alternative Patterns of Family Formation, R_t

	Series A	Series B	Series C
SCFF Savings Rates			
Total Savings	.1436	.1432	.1426
Financial Assets	.0625	.0624	.0622
Total Debt	.0466	.0455	.0434
Housing	.0750	.0738	.0715
Net Financial Investment	.0171	.0181	.0191

TABLE 11

Saving Rates, R_t, SCFF Data and Series III Population Projections

	Total Saving	Net Financial Investment	Total Financial Assets	Total Debt	Housing
2000	.1436	.0240	.0625	.0395	.0685
2010	.1428	.0283	.0617	.0343	.0635
2020	.1361	.0248	.0602	.0363	.0610
2030	.1305	.0245	.0607	.0371	.0573
2040	.1303	.0250	.0610	.0369	.0567
2050	.1297	.0241	.0604	.0372	.0569

Summary and Conclusion

The numerous tables and results presented above can be summarized succinctly: the worst is behind us. Although it is clear that demographic change has had a depressing effect on savings behavior, the trends will be reversed in the 1980s. Furthermore, demographic change over the ensuing 50 years will tend to increase savings rates. It is reassuring that this overall trend in savings rates is indicated when the underlying savings rates are taken from any of the surveys examined. However, the swings in the savings rates due to demographic change were larger with the SCFF survey than with the CES surveys, and the period of future upswing longer with the CES data.

The picture that emerges is one of sharp declines in savings rates due to demographic shifts in the past 20 years. It is also clear that this decline is about to be reversed. As the baby boom generation reaches middle age in the 1980s, demographic change will tend to increase savings. This latter trend will continue through the first quarter of the 21st century, although it will be more gradual than the declines already experienced and will not push savings rates up to the peaks established at the end of the baby boom. Finally, the aging of the baby boom generation towards the middle of the next century will lead to some decline in savings. Projected changes in the income distribution would modify these conclusions somewhat. In particular, when the income distribution varies, savings rates in the next century do not reach the peaks attained in the mid-twentieth century.

To summarize, given the uncertainties concerning the age and income distribution which involve yet unborn cohorts (i.e., after 2010), it is difficult to distinguish between the projections from different surveys. A decline in savings, as the baby boom ages seems inevitable, but its magnitude uncertain. Thus, although the "worst may be behind us," it should also be noted that such problems are likely to recur.

It is important to examine the major components of saving because the patterns of demographic effects differ. To begin with, housing expenditures will decline from their current peaks over the entire forecast period. Unless current trends are reversed, the 1970s and 1980s will stand out as a period of peak demographic pressure on housing. Total debt which is largely mortgages follows a similar demographic pattern. Financial asset acquisitions follow demographic patterns similar to those for total savings.

As a consequence of these differences, the demographic effects on net financial investment are particularly interesting. For this important savings concept only the SCFF data are reliable. The savings rates currently predicted with the SCFF survey data are about half of those that prevailed in the 1950s and 1960s. However, the decline will be completely reversed between 1985 and 2010. These results also exemplify the importance of changes in the income distribution among age cohorts. For net financial investment, a changing income distribution intensifies the increases in savings projected around the turn of the century. On the other hand, the changing income distribution intensifies the declines forecasted for total savings.

One of the difficulties with the results presented is that they are based on a savings survey that is almost 20 years old. There have been substantial policy changes since that time which may have affected savings behavior. In particular, the growth of social security and private pension schemes may have altered the savings behavior of the over age 65 group. In the SCFF data this group saves little. Although they acquire financial assets, they also acquire a great deal of investment debt. This latter figure may be suspect and, if it is, the rising income and size of this group in the 21st century might not be a serious savings depressant.

Questions can be raised with respect to the validity of the savings data for middle-aged groups. Are the savings rates indicated by the dated surveys too high for these groups? This might be the case if the recent surge in retirement savings by employers displaces personal savings, or if the promise of social security reduces savings. In the first case there is no problem because the private sector pension funds will generate capital formation. Whether this second case is at all relevant is an unsettled issue of great controversy.[9]

Finally, we come to the policy implications of a tidal ebb and flow of projected savings rates. For the most part, a policy response to the demographic effect on savings is not warranted at the present. This is so for the simple reason that demographic changes which have depressed saving for the past 20 years are about to be reversed. Thus, this problem has run its course.

However, it should be noted that many of the policy solutions that would be suggested to offset depressed saving from demographic change may well be warranted even if the evidence of a depressing demographic effect is slim. For example, tax policies and institutional rigidities that make the aftertax return on owner-occupied housing and consumer debt higher than the return on financial assets should be reformed. At the very best, government intervention should treat different types of savings equally and not create any artificial differences among net rates of return. This would promote an allocation of capital resources with greater efficiency and simplify the next policy question which would be to determine whether the tax system creates a bias towards consumption which is greater than society wants.

Notes

1. There have been major changes in the patterns of aggregate saving since then which might affect the demographic distribution too. This situation will be rectified shortly when the saving survey conducted for the Commission becomes available for analysis.

2. The age distribution data for the number of families excludes non-household families which are less than .3% of the total. For unrelated individuals, projections of the age distributions are shown only for primary individuals. For secondary individuals, the age distributions for males and females in 1978 is used to allocate the projected totals. Any biases should be small because secondary individuals were only 17% of all unrelated individuals in 1980 and 11% in 1995.

3. These are found in Current Population Reports Series P-25, No. 704, "Projections of the Population of the U.S.: 1977 to 2050," July 1977.

4. There are some independent projections of income distribution by age cohort which can be compared to those presented here. Anderson's projections to 2000 of labor income from an econometric model of the labor market are in broad agreement with those shown here. Serow and Spar construct estimates on income per household for 1980 to 2000 using a variety of data on projected labor force participation rates and earnings. Their data indicates a decline in the relative income of over 65 households while Table 2 indicates that these shares are constant. The discrepancy could be due to differences in the definition of the demographic groups which are particularly significant for the old. For the other groups, their data are in agreement with ours.

5. Evidence to this effect is found in Joseph Anderson (1978).

6. See the discussion in Lieberman and Wachtel (1980) and in Dorothy Projector (1968), which compare the aggregate saving projections from the SCFF and CES data.

7. In this section, savings rates are shown with only the age distribution allowed to vary and with the income distribution held at 1978 proportions. The results regarding the sensitivity of the results to differences in demographic assumptions are the same in both cases.

8. For a summary see Louise Russell (1980) and Thomas Espenshade and William Serow (1978).

9. For a discussion of the controversy see Paul Wachtel, "Social Security and Saving Behavior," New York Federal Reserve Bank Quarterly Review, Winter 1980/81.

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Appendix Tables

TABLE A

Smoothed Annual Growth Rate of Income For the 20 Years Up to 1977

Age	Families	Unrelated Individuals
14-24	1.25%	2.75%
25-34	2.00	2.00
35-44	2.25	3.50
45-54	2.75	3.25
55-64	2.75	2.50
65	2.50	3.00

Source: Current Population Reports, Series P60, No. 122, "Illustrative Projections of Money Income Size Distributions for Households: 1980 to 1995," March 1980, Table T.

TABLE B

Age Distribution with Alternative Patterns of Family Formation, 1995

	Series A	Series B	Series D
Age of Head			
14-24	.0810	.0783	.0721
25-34	.2227	.2172	.2080
35-44	.2176	.2183	.2205
45-54	.1671	.1685	.1712
55-64	.1125	.1160	.1223
65+	.1990	.2017	.2059
Total Number of Families and Unrelated Individuals (millions)	111224	107976	101711

Note: Series B is based on the Census projections of trends in marital status and household proportions. It is the standard series used in the paper (see Table 1). Series D weights these projections and the 1978 actual levels with weights of 1/3 and 2/3 respectively. Series A provides a weight of 4/3 for Series B and 1/3 for 1978.

TABLE C

Age Distribution of Families and Unrelated Individuals with Alternative Fertility Patterns

Age of Head:	14-24	25-34	35-44	45-54	55-64	65+
Series III (Fertility Rate = 1.7)						
2010	.0683	.1718	.1715	.2068	.1729	.2087
2030	.0581	.1503	.1576	.1576	.1587	.3177
2050	.0558	.1525	.1499	.1542	.1636	.3241
Series II (Fertility Rate = 2.1)						
2010	.0812	.1849	.1688	.1986	.1661	.2004
2030	.0766	.1702	.1723	.1570	.1413	.2827
2050	.0744	.1769	.1681	.1543	.1547	.2716

Note: Constructed from Census Population forecasts. The Series II is the standard series used in the paper (see Table 1). Series III is based on a lower fertility rate but the same mortality and migration data.

CHAPTER 31: TECHNICAL PAPER REVIEW: SOCIAL SECURITY, PENSIONS AND SAVINGS

William S. Cartwright

A major policy question is whether the U.S. has a sufficient level of savings. In the long-run, the higher the savings rate, the higher the future standard of living will be through increased capital accumulation and productivity. International competitiveness also can be maintained or improved through the process of increased capital accumulation. In this context, there is a growing concern with the effects of retirement income systems on individual behavior and the U.S. economy. The critical question addressed in this review is what effect social security and pension plans have on the saving rate of the economy. If savings were found to be insufficient and social security or pensions were found to contribute to the decline, policies to improve the savings rate would have to take this fact into account in the overall set of policies to be adopted. Also, any policy that proposed to switch emphasis from social security to advance-funded pension plans would need to account for any differential savings effects that could be anticipated.

In order to answer the question about the effect of the retirement income system on savings, economists have used a number of models, data bases, and estimation techniques. The life cycle model has been the most appealing approach to analyzing savings behavior. It focuses both on the concept of savings for retirement during the work career and the notion that the retirement income system may have important wealth effects on the determination of saving. Because of the focus on work career length, labor supply behavior also becomes an important determinant of savings. Of course, it is still an open question whether this model is the most desirable method of depicting savings behavior since other motives exist for saving other than retirement. The life cycle model and others are used in studies based on time series, international cross-section, and individual cross-section data. In each case, the empirical research attempts to capture the significant variations in savings behavior over time, among countries or individuals with either social security or pension variables added as important hypothetical determinants.

This paper reviews briefly the theoretical arguments concerning the savings effects of retirement income systems.[1] This question becomes one of empirical validation of the direction and the magnitude of the potential savings effects. Therefore, the empirical literature on the relation between social security and savings is previewed from the point of view of time series, international and individual cross-section studies. The final review section examines the literature on pensions and savings as a whole.

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To a large extent, the study of social security, pensions, and savings has proceeded within the context of the received theory on the consumption function. As a consequence, each new issue is tested as an increment to received theory and the general analytic framework is unquestioned. Economists have been content to study social security and pensions on these terms rather than in a new general analytic framework. To contrast, Modigliani and Brumberg (67, 1954) developed an entirely new framework to study the consumption function in reaction to the Keynesian hypothesis that consumption is based on psychological laws other than rationality (5, Keynes, 1964, p. 96). However, in this case, the debate expanded the foundations of the determinants of saving behavior to rather complicated mechanisms—future expected income and age—not simply current income. So far, research into social security and the consumption function has generated new interest in the theory of intergenerational transfers.

Most work on the empirical relation between savings and social security and pensions reference two papers on the life cycle model of consumption: Modigliani and Brumberg, (67, 1954) and Ando and Modigliani (3, 1963). These papers provide the foundations for a theory of consumption over the life cycle. In this theory, individuals are assumed to be motivated by a rational concern for future consumption levels and so their utility becomes a function of aggregate consumption in current and future periods. Utilizing this utility function, the individual is assumed to maximize utility subject to available resources—the sum of current and discounted future earnings over life and current net worth. Current consumption can then be expressed as a function relating these resources, the rate of return, and age dependent parameters. The individual consumption function is then aggregated into the consumption function for the nation.

In order to proceed to an empirical specification of the consumption function, Ando and Modigliani (3, 1963, pp. 56-60) make two assumptions. First, the utility function is assumed homogenous with respect to consumption at different points in time and secondly, there is no bequest motive for savings. They further stipulate that even if there is a bequest motive, a sufficient set of assumptions exists to insure that its aggregate consumption function may be derived in an unaltered fashion. For a time series, they derive the aggregate consumption function:

$$C_t = B_1 Y_t + B_2 Ye_t + B_3 A_t\text{-}1$$

where C_t = current consumption

Y_t = current labor income

Ye_t = average expected annual labor income

$A_t\text{-}1$ = current net worth at beginning of the year.

With variations in the interpretation of expected income, this function has served as an operational definition of the aggregate consumption function for almost all of the empirical tests, involving time series data as may be seen in Table 1 which is presented later.

At this point, it is appropriate to introduce the highly stylized life cycle pattern of earnings, consumption, and asset accumulation. Figure I exemplifies what is thought to be the typical experience of an individual who has no bequest motive. The individual begins working at time zero and may wish initially to dissave in order to finance consumption early in life. This can be done through assets, intra-family transfers, or loans if perfect capital markets exist. Eventually, the individual begins earning a sufficient amount of income so that the difference between earnings and consumption becomes positive and thus, positive savings begins to occur. At Time R, the individual retires and begins to dissave as represented in Figure I by the downturn in asset accumulation. At death, in a certain world, the individual leaves no assets.[2] In this model, all actions are completely voluntary, based on knowledge of wage and consumption profiles. The purpose of savings in this model is to smooth out the consumption flow for a voluntary planned retirement, known with certainty.

The life cycle consumption function implies that current consumption is related most directly to wealth and age. People do not necessarily save more as they get richer because consumer spending is proportional to wealth. The average propensity to consume out of total wealth for identical individuals of like age is the same regardless of wealth. The wealthier tend to save more because they tend to be older and thus have greater wealth accumulation and total wealth. They consume less because of where they are in the life cycle, not because of an excessive psychological desire to accumulate.

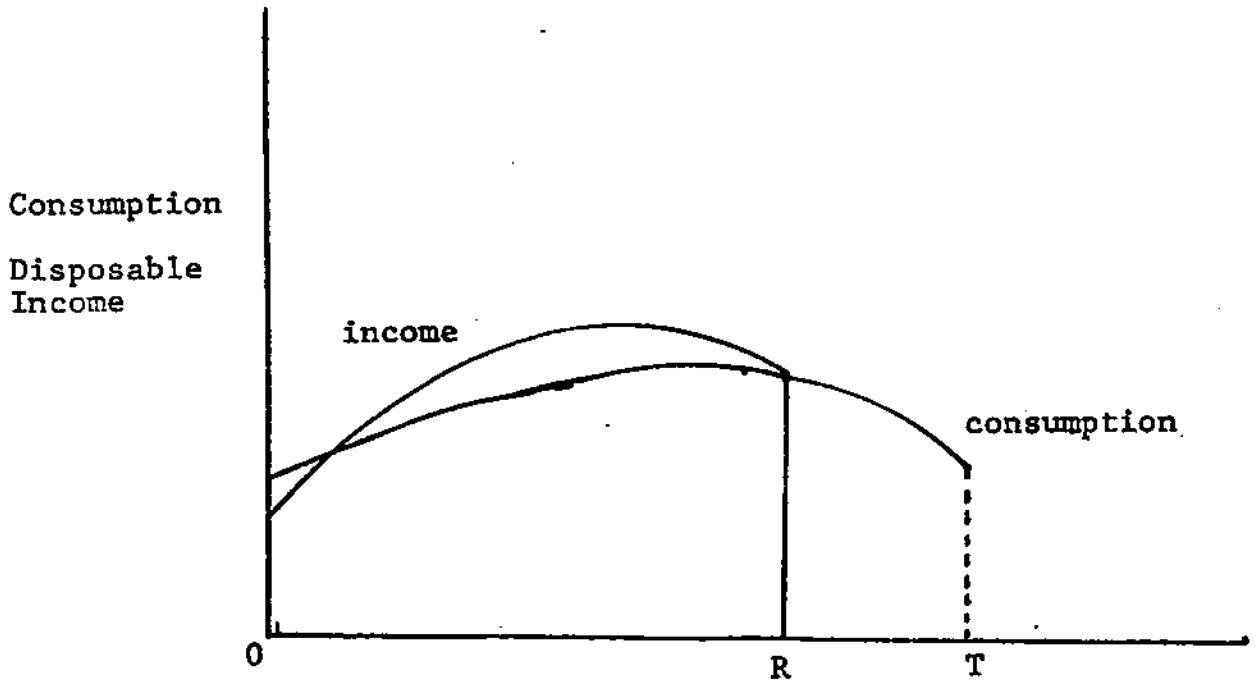
Social Security and the Life Cycle Model

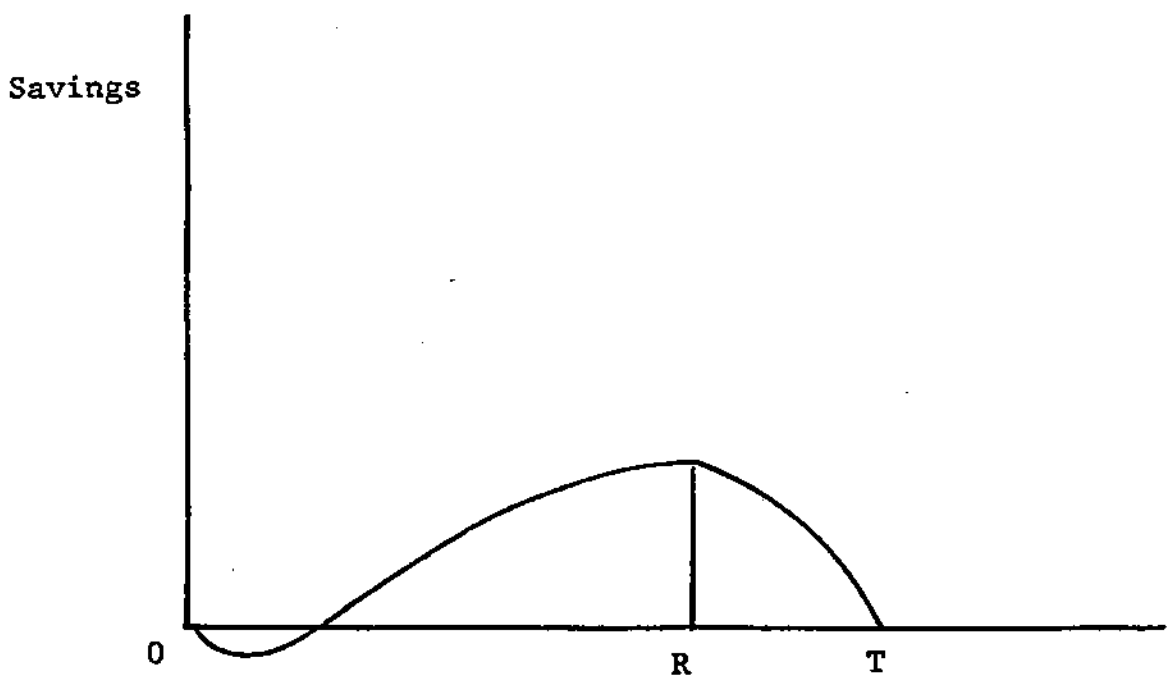
Within the life cycle framework, Feldstein (29, 1974) presents a theoretical statement of the impact of social security, using a two period model of pre- and post-retirement.[3] The introduction of social security has two effects in his model. First, tax collections depress current income but these taxes are then used to finance benefits. Using the market rate of interest, the benefits are assumed to accumulate at a rate just sufficient to return an individual to the original indifference curve. Replacing private wealth with social security wealth has the effect of reducing savings on a dollar-for-dollar basis in this simple model because social security does not accumulate a reserve of assets. Second, social security may affect labor supply behavior. The social security retirement test may cause individuals to retire earlier than planned and may result in an increase in savings (29, Feldstein, 1974, p. 909 and 70, Munnell, 1974, p. 555). Modigliani and Brumberg (62, 1954, p. 40) originally derived for a household in stationary equilibrium the following:

$$C_t = \frac{N}{T - t+1} y$$

where T is the life span, t is age, and if N, the work span, is smaller, consumption is smaller and savings larger. Relaxing the assumption of a fixed labor supply in both periods, the effect on savings is ambiguous (32, Feldstein, 1977, pp. 176-80). The development of the wealth effect and induced retirement effect results in an extended life cycle model.

FIGURE I





R = retirement date
T = death date

There are, of course, some very strong assumptions in this type of model. Social security is on a strictly contributory basis and the market rate of interest is the same for both public and private investments. However, social security in practice has a built-in, noncontributory element by redistributing income to lower, current income groups. This factor has led many analysts to declare that the social system taken together provides a progressive impact on income distribution. This statement could be true if the market rate of interest for low income individuals is not substantially higher than yields on social security.

Next, not all saving is homogeneous. If retirement savings is not a perfect substitute for other motives of saving, an individual may find his private and public savings increased (74, Musgrave, p. 274; 67, Modigliani and Brumberg, pp. 391-393). For example, in addition to income spreading, individuals may save for bequests, childrens' education, unforeseen contingencies (unemployment and illness), houses or other consumer durables. Furthermore, some of these motives may be related to the phenomenon of uncertainty.

The introduction of social security into the life cycle model leads to the creation of new social security wealth variables (29, Feldstein, 1974). Such variables are contructed contingent on an age 65 retirement and on the basis of two concepts, gross social security wealth and net social security wealth. In addition, researchers have used social security contributions as a proxy for the expected benefits. Much controversy has been generated about the correct construction of such wealth variables and which perceptions an individual holds with regards to social security.

Gross social security wealth is the present value in a given year and takes into account survivor probabilities of the different workers. In effect, this capitalizes the social security benefits, ignores present and future tax obligations, and adjusts expectations of the survival probabilities of the covered worker. If individuals perceive benefits as a ratio of annual benefits to per capita disposable income averaged over some years, gross social security as estimated by Leimer and Lesnoy (63, 1980) totaled $2.1 trillion in 1976 and as estimated by Feldstein (40, 1980) totaled $2.4 trillion in 1976. If the current ratio of benefits to disposable income is used instead, Leimer and Lesnoy estimate for 1976 social security wealth of $3.1 trillion. This points out two fundamental problems with any definition of social security wealth. First, different perceptions of how benefits evolve may be used in the calculation, and second, different calculations or algorithms may be used to construct alternative social security wealth variables. Just what approach is appropriate is not clear, nor is it possible to distinguish, on a statistical basis, among all the numerous candidates.

Net social security wealth is simply gross social security wealth minus the present value of all anticipated future taxes at a given time t. In the aggregate, Leimer and Lesnoy have calculated aggregate net social security wealth in 1976 to be equal to $1.6 trillion and Feldstein 1.4. The economic logic is that citizens recognize that social security benefits, now and in the future, will require future taxes to be paid by today's generation. A net social security wealth of zero at entry age, implies an actuarially fair pension program. Thus, an individual would be indifferent to closing

between social security or the opportunity to receive the same risk adjusted after tax market rate of return in alternative savings opportunities. Under past provisions, individuals experienced a net transfer, positive net social security wealth, because of the length of time benefits were received compared to the shorter length of time tax payments were made. If a young worker experienced negative net social security wealth and if it were possible, the worker would like to leave the OASI system.

Intergenerational Transfers and Social Security

Barro (5, 1974; 7, 1978) and Miller and Upton (65, 1974) argue that the only impact of social security is to "socialize" private transfers that would have been made in any case. Barro develops an "overlapping generation" model (80, Samuelson, 1958; and 25, Diamond, 1965) with physical capital. In this model, it is assumed that utility for the ith generation depends on consumption in period 1 and 2 plus the utility level of the immediate descendant. Assuming individuals leave bequests, the introduction of social security induces the current retired generation to raise its bequests sufficiently to maintain its originally planned consumption. The increased level of bequests would be just sufficient to offset the increased tax liability that is imposed on the working generation. Thus, the younger generation is relieved of the financial burden of the transfer to the old that they would have had to make. The crucial assumption is that individuals expect to make transfers, otherwise there would be a savings effect (42, Hagens, 1976; 7, Barro, 1978, p. 39). If individuals are short-sighted or are less concerned about future generations, there could also be a savings effect (79, Ricardo, 1871, p. 252).

This theoretical discourse relates to one of the most controversial issues in economics: is government debt neutral in the macroeconomy? Buiter and Tobin (18, 1980) recently reviewed the theoretical literature and the empirical evidence and concluded that debt neutrality is not well established and thus social security may still have a savings effect. Buiter (17, 1980) extends the overlapping generations model to examine the effect of bequests and gifts and finds convergence problems if the motives are strong, but if motives are not strong, the impact of social security would still be nonneutral, i.e, savings would be affected. No empirical esimate is made in Buiter's contribution, but he concludes that there should be "reasoned concern about the adequacy of our provision for the future."

Social Security: Times Series Studies

Nine time series studies attempt to isolate the impact of social security on private savings, and two studies incidentally find evidence on this impact. Except for Darby, who uses Friedman's permanent income hypothesis in his consumption function, others follow Feldstein's extended life cycle specification but include other variables of their particular interest. The common methodological approach has been the specification

of a multiple regression equation that includes specially constructed social security wealth variables to explain aggregate consumption or savings. Characteristically, all equations contain as the single most important set of variables both current and lagged disposable income except for Darby's specification which includes permanent and transitory income. Equations are typically estimated over two time periods—1929 to an endpoint in the 1970s and excluding the World War II years, and the postwar years after 1947.

Feldstein and Munnell pioneered the development of the extended life cycle model. In Feldstein's first specification of the consumption function (29, 1974), the entire savings effect - wealth substitution and induced retirement - is captured in the social security wealth variable. He concluded that in 1971 personal savings fell about $51 billion in current prices, a 50 percent reduction. Munnell explicitly introduced an induced retirement effect (70, 1974 and 71, 1974) and found about half of the wealth substitution effect was offset by the retirement effect in retirement saving, but social security variables had no statistically significant effect on personal savings.

Barro (7, 1978) performed other tests derived from Feldstein and Munnell's work and concluded social security had no effect on savings. Controversy focused over the role of the unemployment variable in which equations from 1929-1974, that included an unemployment variable, did not have a statistically significant coefficient on social security wealth, but when an unemployment variable was excluded the coefficient social security wealth was significant. Barro's inclusion of a government surplus variable in his study is challanged because it is not an exogenous variable and may bias the estimates. In a reply to Barro, Feldstein again finds a statistically significant effect after updating the data with the national income and product account revisions.

Darby (23, 1979) examines the impact of social security in a permanent income model of the consumption function. Besides social security wealth, consumption is explained by permanent and transitory income, real money balances, the stock of consumer durables, the price of consumer durables relative to nondurables, and the market interest rate. Darby found about a 20 percent reduction in the 1971 saving-income ratio, but the result is statistically significant only at the .20 level of confidence, rather than the usual .05 level.

Because of work done by Leimer and Lesnoy (63, 1980), who attempted to replicate Feldstein's social security variables and empirical results (29, 1974 and 35, 1978), the above analyses must be discounted because an incorrect variable is included in the studies. During Leimer and Lesnoy's replication, a sizable error in the social security gross wealth series appeared to exist. Upon further investigation, Feldstein discovered a computer error in the program used to construct his variables. Thus, consumption or savings equations using this incorrect variable are subject to bias from measurement error.

We shall return to Leimer and Lesnoy's results after reviewing earlier studies which do not exclusively rely on Feldstein's variables. These are

TABLE 1

Time Series Studies of Saving and Social Security

Author	Year of Study	Social Security Variable	Functional Form
Taylor	1971	SSC, Change in Employee Social Security Contributions	$S=B_1S_{t-1} + B_2\ L_t + B_3\ P_t + B_4\ TR_t + B_5\ SSC_t + B_7\ r_t + u_t$
Juster and Wachtel	1972	SSC, Change in Employee Social Security Contributions	$S=B_1S_{t-1} + B_2\ L_t + B_3\ P_t + B_4\ TR_t + B_5\ SSC_t + B_7\ r_t + u_t$
Feldstein	1974	GSSW or NSSW	$C=B_o + B_1YD_t + B_2YDL + B_3RE + B_y\ (GSSW \text{ or } NSSW) + u_t$
Munnell	1974	GSSW, Gross Social Security Wealth NSSW, Net Social Security Wealth SSC, Social Security Contributions (Total)	$S=B_o + B_1YD_t\ (C_1 + C_2\ LF65) + B_2\ (GSSW \text{ or } NSSW) + WL + U_t$
Barro	1978	GSSW, NSSW, SB, Real Social Security Benefits Per Recipient BEN, Benefit payments per OASDI recipients divided by PCE deflator. COV, Number of workers with earnings taxable by social security to total workers	$C=B_o + B_1YD + B_2YDL + B_3RE + B_4SUR + B_5\ (UN\ \ YD) + B_6\ (K \text{ or } WL) + B_7\ D + B_8\ (GSSW \text{ or } SB) + u_t$
Feldstein	1978	Same as 1974	
Darby	1979	GSSW NSSW BENXCOV	$C=B_o + B_1\ YP + B_2YT + B_3M + B_4D + B_5\ (PD/PND) + B_6r + B_7\ (GSSW \text{ or } NSSW) + u_t$
Glassman	1979	GSSW, Discreet linear stochastic process	$C=B_o + B_1YP_t + B_2WL + B_3\ GSSW_t + u_t$ (First differences, levels, and other specifications)

TABLE 1 (continued)

Gultekin and Logue	1980	NSSW SSC, Social Security Contribution	$NS=B_o + B_1 YD + B_2 YDL + B_3 RE + B_4 SUR + B_5 UN + B_6 PEER + B_7 RateB + B_8 (NSSW \text{ or } GSSW) + B_9 TPFA + B_{10} NPFAL + B_{11} FFSLGPFW + u_t$ $SAC_i=B_o + BSA\ C_i L + B_2 YD + B_3 YDL + B_4\ PI + B_5 PIL + B_6 (NSSW \text{ or } SSC) + B_7 (NSSW \text{ or } SSCL) + u_t$
Leimer and Lesnoy	1980	Own Calculation: GSSW NSSW Plus new perceptions and own assumptions	Feldstein's 1974
Feldstein	1980	Extended series to 1976 and corrected calculation: GSSW, NSSW	Feldstein's 1974

TABLE 1 (continued)

Definition of Variables

BEN = benefit payments per OASDI recipient divided by PCE deflator

COV = number of workers with earnings taxable by social security to total worker

D = stock of consumer durables goods at the beginning of the year

FFSLGPFW = fictional federal and state and local government pension fund

i = yield to maturity for long term U.S. government bonds

K = real per capita net stocks of fixed, nonresidential business capital and net stocks of nongovernmental residential housing at the beginning of the year

L = labor income

LF65 = labor force participation of males over age 65 or older

NPFAL = net personal financial assets minus TPFA

NS = net personal saving (flow of funds basis)

P = property income

PD/PND = ratio of prices of durables and nondurable goods

PEER = private expenditures on education and research

PI = price level

r = yield on Baa bonds

RATEB = real rate of return on corporate bonds

RE = retained earnings

S = personal savings

SAC_i = savings allocated to component i

SB = real social security benefits per recipient

SI = employee contributions to social security

SUR = surplus of total government sector

T = personal tax and nontax payments

TPFA = total pension fund assets (private plus state and local)

TR = transfer income

UN = unemployment rate

WL = private wealth per capita

YD = disposable income

YDL = disposable income lagged one period

YP = permanent income

YT = transitory income

Taylor (84, 1971), Juster and Wachtel (46, 1972), (Munnell 66, 1974), and Gultekin and Logue (39, 1980). All included social security contributions as a proxy for expected benefits, implicitly assuming a one-to-one relationship in the aggregate between contributions and benefits. Of course, ex-post calculations of variations in rates of return indicate this is not what individuals actually experience. However use of social security contributions is justified if ex-ante individuals behave as if they expect a fair rate of return on their contributions and do not factor in future taxes in their decisions.

Disaggregating disposable income and postulating a separate short-run marginal propensity to save for each component, Taylor (85, 1971) introduces social security contributions into a linear, time series model for explaining savings. He hypothesizes that if social security contributions substitute perfectly for regular savings, its coefficient should be a -2, since employees' contributions are matched by employers. In fact, he finds this coefficient to be -2.1. In terms of the savings controversy, this supports the assertion that unfunded social security depresses savings. Juster and Wachtel (48, 1972), in re-estimating Taylor's specification over a different time period, found that the coefficient on social security contributions fell to -1.55, making this approach suspect because of instability.

Munnell (71, 1974) extended the life cycle model to include a social security asset effect and a retirement effect on personal savings. In three separate regression results for total personal savings, Munnell found no statistically significant effect for social security contributions, but for regressions on retirement savings she found a statistically significant negative effect for the 1900-1971 and 1929-1971 regressions. In the postwar regression, 1946-71, the coefficient for social security contributions was insignificantly negative.

The methodological problem of Munnell's approach is that the definition of retirement saving is arbitrary. The retirement savings series is defined as the net increase in assets of life insurance companies (net of policy loans), private pension plans, and government insurance and pension plans. On the face of it, this seems an inadequate proxy for all of retirement saving (87, Upton). Second, because personal saving is not decreased by social security contributions, one is led to conclude that the negative effect on retirement savings represents only a portfolio shift and not an adjustment in the level of savings in spite of Munnell's arguments concerning imperfect substitutability between assets. Even if Munnell is correct, and she may well be, the substitution between retirement savings and other savings is neither derived, specified, nor tested.

Gultekin and Logue expand the Feldstein model along several lines and also estimate a stock adjustment model of savings allocation. They introduce social security both through the inclusion of Feldstein's net and gross social security wealth variable and social security contributions (employer and employee). The inclusion of social security contributions assumes that workers pay for all the social security contribution through reductions in their disposable incomes and that these contributions are a form of savings. Estimating over the postwar period on a per capita and household basis, the coefficients on social security contributions are always negative (.7 and .8) and are statistically significant in two of four

equations. Thus, each dollar of increase of social security contribution results in a 70 cent decline in savings, somewhat less than the "Taylor effect" but still of significant magnitude.

Before turning to Gultekin and Logue's interpretation of this finding, there are a number of other interesting results. The unemployment rate was insignificant and negative. Expenditures on education and research were insignificant and perversely positive. Total pension fund asset accumulation had a statistically insignificant, but theoretically correct, negative coefficient. The imperfect substitution found between savings and pensions implies increases in pension assets lead to increases in aggregate saving. The proxy for fictional federal and state and local government pension wealth is perversely negative and insignificant. Also, contrary to Barro's hypothesis and findings, the higher the government surplus, the higher personal savings, although not statistically significant. Feldstein (35, 1978, pp. 44-45) criticizes the inclusion of the government surplus variable because it is endogenous, changing with cyclical variation in consumption.

Gultekin and Logue provide an interpretation of their results on savings through changes in social security contributions and the federal budget. If payroll tax collections are increased by one dollar, the effect on personal savings can be complicated by the funding actions of the budget. In the normal case, a $1.00 decrease is accompanied by a $1.00 increase in disposable income as the $1.00 is transferred and the federal budget deficit is held constant. In this case, there would be an $.74 decrease in personal saving operating through the social security contribution variable. However, if the $1.00 tax is used to increase the trust fund and build up the federal surplus, personal saving would decrease by $.37 as disposable income dropped by $1.00 and would increase $.09 through the government surplus variable. The social security contribution effect would decrease personal savings by $.74. The net reduction in personal saving would be $1.02. If the government surplus variable is omitted as misspecified or irrelevant, personal saving would decrease $1.11. These net reductions in personal savings must be compared to the increase in government saving of $1.00 in the trust fund. The net effect is still depressing on aggregate saving for the economy.

Gultekin and Logue also indicate that savings effects could operate through net social security wealth. An increase in social security contributions while holding benefits constant would reduce expected net social security wealth and, given a negative coefficient on expected net social security wealth, personal savings would tend to rise. This is opposite to the effect experienced when social security contributions are raised and the budget surplus is held constant; personal savings decline in this specification. Gultekin and Logue prefer the latter interpretation because it does not rely on estimates of social security wealth figures and a mismatch of expected benefits and expected taxes, but rather on a belief that individuals cannot escape taxes. Furthermore, they speculate that such an increase in taxes and contributions may be dominated by an uncertainty effect in the wealth formulation so that higher current taxes and trust fund accumulations will reduce uncertainty regarding future benefits and raise expected wealth sufficiently to depress savings. Their

evidence is consistent with the conclusion that increases in social security contributions decrease personal savings.

Using the stock adjustment model, Gultekin and Logue estimate the impact of social security contributions on household portfolios. The savings allocated to the ith component is hypothesized to be, among other things, a function of the change in social security contributions in the current and lagged periods. Quarterly flow of funds data is used for the savings components, and the model is estimated in constant 1972 dollars on a per capita basis for the base period 1952:3 to 1974:2 and other sub-periods. The savings components are personal savings (NIPA), net savings (FOF), net increase in liabilities, net financial investment, life insurance reserves, and pension fund reserves. The short-run coefficients on the social security contributions variables are negative in regressions on personal saving (NIPA), net savings, net financial investment, and life insurance reserves, although only the coefficients in personal savings equation are significant. In the long-run, social security contributions had a negative impact in all equations, but this was statistically signficiant only in the net savings (FOF) equation. In this equation a $1.00 increase in social security contributions results in a long-run $1.40 decrease in net savings, which is rather large.

Also, in the short-run, an increase in social security stimulates an increase in pensions, although this effect is statistically insignificant. This is interpreted to indicate a desire to switch compensation to pensions in order to obtain a favorable tax treatment in the face of an increase in the payroll tax collections. In the long-run, this effect is much smaller. Life insurance companies also experience an insignificant negative effect in both the short- and long-run. This evidence is only suggestive of potential portfolio shifts and is certainly weak given the general pattern of statistical insignificance. More work also needs to be done on the effects of uncertainty in the individual's portfolio and the riskiness of social security benefits.

After correcting for the computer error, Leimer and Lesnoy re-estimated Feldstein's 1978 specification (35, 1978) and found for the 1929 to 1974 sample period an insignificant negative effect on savings for both equations containing net or gross social security wealth. In the postwar sample, the empirical results indicated a significant positive effect on saving, perhaps indicating that the retirement effect of increased saving outweighed the asset substitution effect. Leimer and Lesnoy conclude there is no statistically significant evidence that the introduction of the social security system has reduced personal savings.

Leimer and Lesnoy also construct wealth variables based on nine different benefit perceptions and six tax perceptions within the framework of the Feldstein algorithm. These perceptions represent different methods for calculating both the expected "benefit per beneficiary/disposable income per capita" and "tax on median earnings by sex/disposable income per capita" ratios. The coefficient of social security wealth (net or gross) was small, positive, and insignificant over the 1930-74 sample period. Shifting to the postwar period, the social security wealth coefficient is small, negative, and insignificant. They reject several large, negative, and

significant coefficients as aberrations. Leimer and Lesnoy then constuct their own algorithm and incorporate the same perceptions used previously; the results are similar.

Their work points out two major methodological areas. The first is that data must be thoroughly documented and results must be replicated. While it can be argued that replication is very expensive, it is completely justified in dealing with critical policy issues. Second, perceptions continue to be an extremely important and unfortunately ad hoc feature in model development and estimation. In lieu of an adequate theory of expectations, one must attempt several fomulations; but picking the right formulation is difficult given the nature of time series data. It should be noted that using social security contributions as a proxy for expected benefits is one other way of dealing with individual perceptions.

Feldstein, (40, 1980) in reply to the Leimer and Lesnoy research, extended his analysis to 1976. He corrected his computer error, included the 1972 social security amendments, and extended his samples. After this, he found that gross social security had a positive and significant effect on consumption under his 1974 specification. This effect was also present when using the original 1929-74 sample with the corrected and revised data. Leimer and Lesnoy's replication of perception one, social security wealth, perpetuated Feldstein's previous treatment of the 1972 legislation because they were simply attempting to reproduce Feldstein's results in the first part of their research strategy. They incorporated the 1972 legislation in the other social security variables, created with Feldstein's corrected algorithm, to test various assumptions and found no statistically significant coefficient over the sample period 1929-1974. In the second part of their research, Leimer and Lesnoy created their own algorithm and except for the first variable labeled perception one, they incorporated the 1972 legislation. Using Feldstein's 1974 specification of the consumption function, the new algorithm, and various assumptions on individual perception of future benefits and taxes, they estimated a number of equations over the 1929-1974 sample period that provide no significant savings effect. Although Feldstein has found new supporting evidence for his hypothesis, it should be remembered that it was based on one arbitrary perception of social security wealth and a correction in the incorporation of the 1972 legislation. The results are simply not robust to changes in the ad hoc variable created to capture how economists think individuals might act facing the social security system.

John Glassman (42, 1979) produced one more important piece of evidence concerning the security wealth definition and the results obtained in consumption functions. He correctly points out that there are countless ways in which social security wealth can be calculated using ad hoc assumptions on how legislation can be viewed in household expectations. Feldstein, and Leimer and Lesnoy exemplify this approach. Glassman offers a novel construction: the social security wealth variable is modeled as a linear stochastic process in which time series analysis is used to model expectations. His telling criticism is that Feldstein's variable ignored much information about the benefit structure because it assumed benefits are a constant fraction of disposable income. Using the alternative construction of social security wealth, Glassman finds no statistically significant social security wealth effects.

Summary

At first glance, Gultekin and Logue seem to have reversed Munnell's earlier finding that social security contributions were not related to personal savings. However, this finding is questionable because social security contributions are not a completely exogenous variable. Social security contributions are a function of the state of the economy, and thus income. The only other evidence of a savings effect is in the Taylor, and Juster and Wachtel studies, but these coefficients represent a short-term impact and thus limit the overall applicability. Finally, Lesnoy and Leimer have found no evidence of social security depressing personal savings after re-specifying the wealth variable for several different perspectives. Glassman also found no effect using a completely different approach to specifying the wealth variable. Feldstein still claims to have found the savings effect in his latest regression. In conclusion, the time series models have not provided any overall consensus on the impact of social security on savings.

Social Security: International Cross-Sectional Studies

Research using cross-country data has developed from the first investigations of social security expenditure determinants in regression analysis to incorporation of the life cycle hypothesis of saving and the inclusion of social security variables. These later studies rely on the theory and tests developed in Harrod (44, 1948), Leff (62, 1969) and Modigliani (68, 1966; 69, 1970), and Tobin (86, 1967). The empirical tests focus on whether international differences in the saving ratio can, among other things, be explained by social security expenditures or labor force participation of the aged in which social security may have an indirect positive effect on the savings ratio by reducing labor force participation.

Henry Aaron (1, 1967) examined factors that affect the level of expenditures on social security in a sample of 22 countries in 1957. The dependent variable, social security expenditures, is defined as the sum of old age benefits, unemployment insurance, workmen's compensation, general assistance, health, and family allowances. Aaron's strategy was to test whether the "level of statutory social security expenditures may have common determinants in spite of the bewildering institutional diversity." Thus, the following various economic and demographic factors were thought related to social security and component programs: age of the program, per capita national income, rate of growth of national income, household savings, participation in past wars, source of social security funds, rate of economic growth and various demographic variables. Three variables turned out to be particularly important: per capita national income, the age of the social security system, and household savings behavior. There was a statistically significant negative relationship between social security expenditures and household saving although causality could not be established (1, Aaron, p. 19). The age of the system had a significant positive effect. It is hypothesized that this effect is created by past pressures and attitudes to social security.

TABLE 2

International Cross-Section Studies of Saving and Social Security

Author	Year of Study	Social Security Variable	Functional Form
Aaron	1967	SE, Social Security Expenditure per capita	$SE = B_0 + B_1 Y + B_2 D + B_3 S + B_4 G + B_5 D_w + B_6$ other
Pechman, Aaron, Taussig	1968	Same as Aaron 1976	Plus labor force participation
Feldstein	1977	BPA, Average social security benefits per aged persons divided by average	(1) $S/Y = B_0 + B_1 G + B_2 BPA/Y + B_3 L PAGED + B_4 DEP + B_5 AGE + B_6 LEAGED + B_7 LE65 + B_8 START$
		Per capita income	(2) $LPAGED = B_0 + B_1 100/Y + B_2 B/Y + B_3$ SSPA (or SSPARA) $+ B_4 RT + B_5 LE65 + B_6 START$
Barro, MacDonald	1979	Social security, current real benefits paid relative to the population over 65, divided by real per capita GDP	$C/GDP = B_0 + B_1 GOV/GDP + B_2 OLD + B_3 G + B_4 UN + B_5 GDP_{t-1} GDP_t + B_6 SS + B_7 1/GDP$ (also, $B_0 = D$)
Kopits and Gotur	1980	SSP, social security pension per aged person SSF, social security lump-sum transfer (from provident fund per aged person SSO, other social security transfers per capita SSL, social security loans per capita SST, social security taxes	(1) $SH/YH = B_0 (1/YH) + B_3 NRR + B_4 (WH/YH) + B_5 (RE/YH) + B_6 INQ + B_7 LPAGED + B_8 AGE + B_9 DEP + B_{10} LE65 + B_{11} (SSP/YH) + B_{12} (SSF/YH) + B_{13} (SSO/YH) + B_{14} (SSF/YH) + B_{15} DAGE$ (2) $LPAGED = C_0 + C_1 (1/YH) + C_3 (SSP/YH) + C_4 (SSF/YH) + C_5 DAGE$

TABLE 2 (continued)

Feldstein	1979	SSB, social security retirement pension of a newly retired couple to the average earnings of a worker in manufacturing	(1) $S/Y = B_o + B_1 G + B_2 AGE + B_3 DEP + B_4 (SS\ B/E) + B_5 LPAGED$ (2) $LPAGED = C_o + C_1 (SSB/E) + C_2\ 100/Y + C_3 (Y/100) + B_4\ RET$

TABLE 2 (continued)

AGE = persons 65 and over divided by adults 20 to 65

C = consumption expenditure

D = age of system

DEP = persons under 20 divided by adults 20 to 65

D_W = post war (dummy)

G = rate of economic growth (per capita income)

GDP = gross domestic product

GL = growth rate of labor productivity

GOV = government expenditures

INQ = index of income inequality

LPAGED = labor force participation of persons over 65

LE65 = life expectancy at age 65

NRR = after tax rate of return on SH

OLP = population over 65 divided by total population

OTHER = miscellaneous variables

RE = corporate retained earnings

RT = retirement test (dummy)

S = private savings per capita

SH = real household savings per capita

SAGE = 1970 date of beginning of system

SSPA = pension recipients divided by persons over 65

SSPARA = SSPA in countries with retirement test as pension recipients divided by retired persons over 65 without retirement test

START = age of the system

UN = unemployment rate

WH = real stock of nonhuman wealth per capita

Y = real per capita national income

YH = household real disposable income per capita

Aaron (2, 1967) re-examined the specification used in his 1967 study with 1969 data. The previously significant, negative relationship between social security expenditures and household savings was not confirmed. The age of the system had a strong positive effect on social security expenditures. Although the mechanism through which this operates is still unknown, it may be related to a disequilibrium state of rapid growth in the social security system. Labor force participation was found to decline by those 65 years and older as a result of increases in the ratio of per capita benefits to wages.

Feldstein (32, 1977) developed an extended life cycle model based on original contributions by Harrod (45, 1948), Modigliani and Brumberg (67, 1954), Modigliani (68, 1966) and (69, 1970), and Tobin (86, 1967). Feldstein first makes a direct extension of two period models of Irving Fisher by including labor supply in each period in the separable form:

$$W = U(C_1, L_1) + V(C_2, L_2)$$

Feldstein shows two important results. First if $V_{11} - V_{12}$ O, then the total derivative of savings with respect to the earnings test is positive and it is necessary to control for the effect of endogenous retirement on savings behavior. Second, the effect of benefits on savings is ambiguous. Feldstein therefore specifies a two equation system for the savings rate and labor force participation of the aged in order to separate the effects of wealth replacement with fixed retirement from effects of induced changes in retirement.

The results were consistent with the life cycle model of savings in that coefficients were significant and of the expected sign, i.e., the growth rate is positive, the dependency ratio is negative, and life expectancy is positive. The induced retirement effect is important as indicated by the significant negative coefficient on the labor force participation of the aged. Social security benefits (BPA/Y) had a large negative coefficient. While controlling for benefit level and coverage, there was still a negative impact. In the equation for labor force participation of the aged, social security benefits as a percentage of disposable income had a significant and negative coefficient. The retirement test had no effect. On balance, Feldstein concluded that the positive retirement effect is outweighed by the asset substitution effect so that social security causes a net reduction in savings.

Later, Feldstein (36, 1979) exploited a new source of data on social security benefits developed by the U.S. Social Security Administration. For twelve major industrial countries, the ratio of the social security retirement pension of a newly retired couple to the average earnings of a worker in manufacturing employment is estimated. This variable may not be as susceptible to measurement error as the benefit variable used in the previous 1977 study, although it is clearly a proxy for total expected social security benefits. The regression results confirmed a significant negative coefficient on this variable plus a positive effect from the induced retirement effect. The age since the system began had an insignificant effect on the savings ratio.

Barro and MacDonald (9, 1978) use time series and cross-country data to explain the ratio of consumption to gross domestic product. The data is a pooled sample of annual observations from 1951 to 1960 on 16 industrialized Western countries. This approach varies slightly from other international cross-section studies that use time-averaged data in order to remove cyclical effects. Their specification is a linear, one equation model in which endogenous labor force participation of the aged was not specified. The crucial explanatory variable is social security benefits paid on old age, survivors and disability programs relative to the population over 65 and divided by per capita gross domestic product (GDP). This variable is interpreted to measure both the retirement and wealth substitution effects.

Barro and MacDonald specify two different statistical models and find contradictory results. When estimating their equation with a common intercept for all countries (a random effects model), they find a significant decrease in the consumption ratio caused by the social security variable, which contradicts Feldstein's (32, 1977) findings, but agrees with Stirling's (79, 1977). When the equation is estimated with country specific intercepts, social security causes a significant increase in the consumption ratio. The country intercepts are significant and indicate there are important differences between these developed countries in terms of socio-economic structure and stage of economic development. Given that these 16 countries, upon casual observation, are fairly similar in industrial development, it is of great consequence that there are still significant unobserved differences, and this implies that such equations may be contaminated with spurious correlations and biased parameter estimates. Earlier tests by Modigliani (65, 1970, p. 216-219) attempted to control for broad groups (Latin America, Western Europe), but this may not be enough.

Kopits and Gotur (54, 1980) expand the cross-country investigations to include two groups of 14 industrial and 40 developing countries. The data are country averages of 1969-71 annual observations. They specify a two-equation system and substitute the labor-force participation-of-the-aged equation into the household-saving-ratio equation. They include an old age pension variable and other social security programs such as old-age, lump-sum payments, other transfers, and loans. They experiment with replacing all social security variables with social security taxes on payrolls, but this ignores the fact that general revenue financing is also included in the financing of most social security programs throughout the world.

Their results for the industrially developed countries indicate that in both regressions, weighted or unweighted by population, there was a significant positive relationship between old age benefits and the saving ratio which is also consistent with Barro and MacDonald's results. This was interpreted to indicate that the positive induced retirement effect outweighs the wealth effect. For other social security programs, the wealth effect dominated. In addition, as the social security system ages this depresses savings and suggests that individuals slowly adapt their expectation to the delivery of benefits.

For the 40 developing countries, the results were less satisfactory and less consistent. In the weighted regressions, there was a significant positive effect of old age benefits on the saving ratio, but in the

unweighted regressions the coefficient was insignificant and close to zero. This was interpreted to imply that the retirement effect and wealth effect were in virtual balance for developing countries.

Overall, the cross-country research has not provided any conclusive answer to the impact of social security on the savings ratios. Utilizing various data bases, years, equation systems, and statistical techniques, the sign of the crucial variable has flip-flopped from positive to negative. Furthermore, the threat of unobserved differences between countries implies that parameter estimates may be biased.

Social Security: Individual Studies

Research into the individual's accumulation of wealth has been limited because of the paucity of data sources and correct variables. The information on net worth, assets minus liabilities, has been difficult to assess. The social security wealth variables must also be constructed for each individual under conditions in which the earnings history may be approximated only very roughly on a short-run income concept or in which some observations are available over a longer time period but at irregular intervals. Particularly useful has been the effort to match administrative records of the Social Security Administration on longitudinal earnings to other individual survey data such as the Longitudinal Retirement History Study. The President's Commission on Pension Policy is also developing data on a representative cross-section of individuals. This information must be placed into a properly specified econometric model which has typically been a variant of the life cycle theory.

The relevance of a negative, statistically significant coefficient on social security wealth in a single equation model, explaining individual net worth has been questioned. Robert Barro (7, 1978; 9, 1979) hypothesizes that, since at a point in time a cross-section of individuals holds the scale of the overall social security program fixed and only examines the effect on individual relative positions, it would be false to conclude that the social security variable has any implications for aggregate saving effects. Along similar lines, Kotlikoff (55, 1980) points out that the data are based on households rather than families and so there is no distinction between transfers across generations as opposed to transfers across families. Thus, in household equations, the social security variable is measuring the proposition that larger inter-family transfers will increase consumption and hence decrease private household net wealth. If social security wealth did not depress private net wealth, an alternative hypothesis to Barro and Feldstein is that young households are faced with borrowing constraints. In sum, Kotlikoff warns that the theory of life cycle savings, intergenerational transfers, and social security effects require data on net transfer flows between generations in order to test refutable hypotheses.

Feldstein and Pellechio (33, 1977) estimate a life cycle model using the 1963 Survey of Financial Characteristics of Consumers. They restrict the sample to households in which male heads were ages 55 to 64 and eligible for social security. Thus, individuals would be near the peak of

their accumulation of assets in preparation for retirement and presumably near an equilibrium stock. Feldstein and Pellechio also found it necessary to eliminate the self-employed, females, households with incomes below $3,000, and incomes above $15,000. Of particular concern is that their data have no information on private pensions or life insurance—two variables extremely important in the life cycle theory.

They find a significant negative effect on net wealth in the coefficient on social security wealth in their truncated sample. In the entire full sample, they report that the coefficient on social security wealth is never significantly different from zero, but this is felt to be caused by the behavior embodied in high income individuals. In the 12 estimated equations, the negative coefficients are not significantly different from one, suggesting that induced retirement, transfers, and risk adjustments for asset composition are not as important as the substitution effect on wealth.

Kotlikoff (57, 1979) uses data from the National Longitudinal Survey of men ages 45 to 59 to test the life cycle theoretical response of accumulation to social security.[4] Net wealth is the important variable to be explained, but it is defined without the inclusion of the value of private pension plans, equity in life insurance, or value of consumers' durables. He finds that the present value of accumulated social security taxes has a significant depressing effect on net wealth, but this result cannot be distinguished from a simple Keynesian consumption function. Also, the absolute dollar yield of the social security system to the individual household (present expected value of benefits—present expected value of future social security taxes—value of accumulated social security taxes) is insignificant and positive in its relation to net worth, a contradiction to the life cycle theory. Increased savings attributed to induced earlier retirement is not an important factor in the net wealth equation, requiring a 10.32 year decline in retirement age to offset exactly the average reduction in net worth implied by the accumulated social security taxes. Also, the dummy variable for participation in a private or government pension is insignificant, in contrast to Munnell (72, 1976) who uses the same data set. Overall, Kotlikoff found no evidence to support the proposition that social security reduces savings.

The retirement age regressions find that the ratio of social security benefits lost at full-time work to full time earnings has a positive and insignificant effect, contrary to theoretical expectations. Correcting for sample selection bias did not yield a significant coefficient, but it was negative. He concluded that social security did not significantly influence the expected age of retirement for his sample. Using a retirement age equation in the net worth equation did not change the results. The expected retirement age was depressed by 1.2 years if the individual was covered by a private pension plan and 1.8 years for a government plan, which leads to a very small indirect effect on net worth of $513.6 and $770.4, respectively.

Feldstein (39, 1980) uses the Longitudinal Retirement History Study matched to the administrative records of the Social Security Administration on longitudinal earnings and social security benefit

entitlements for individuals and couples in which the man was between the ages of 58 and 63. This permits a much better construction of lifetime earnings than Kotlikoff's two year average of disposable income plus employers contributions. However, earnings are reported only from 1951 to 1974 up to the taxable maximum under social security law. Feldstein estimates the extended life cycle model under conditions of linearity, nonlinearity, ordinary least squares, instrument variables, and heteroskedastic transformation.

The regression results were sensitive to specification and method of econometric estimation. Of particular concern was the measurement error present in lifetime earnings that could make the OLS estimates biased and inconsistent. After heteroskedastic transformation (division of all variables by accumulated lifetime earnings), the explanatory power dropped dramatically and net social security wealth was negative and significant or insignificant, depending on the specification. In spite of the mixed results, Feldstein concluded that the equations gave "quite strong support" for the hypothesis that increased social security benefits reduce private wealth accumulation.

Blinder, Gordon and Wise (12, 1980) present a life cycle model to test the assumption of lifetime planning in perfect capital markets with an "isoelastic" utility function.[5] To the life cycle model, they add parameters to test for bequest behavior, and the substitution rate for private pension and social security wealth. The data base is extracted from the 1971 Longitudinal Retirement History Survey (LRHS) and is restricted to white men with spouse. To construct the social security wealth variable, they link the LRHS data to the social security earnings history of the individual. Private pension wealth is calculated from either individuals' estimate of future benefits or an imputation based on regressions of pension benefits to wages for those reporting their future benefit. For the development of lifetime earnings data, they created a lifetime profile of both wages and hours, an improvement over the short-run observations used in other studies. The model is estimated with nonlinear least squares with an adjustment for heteroskedasticity.

They found the tightly parameterized version of the life cycle model to be very hard to estimate and so they constrained the wealth elasticity of bequests to one and set the subjective rate of discounting equal to zero. This improved the precision of the estimated parameters.

Their estimate of the social security asset substitution effect is .54, but the standard error is too large to reject either the Barro or Feldstein hypothesis. The coefficient on private pension wealth was positive, but not significantly different from zero. They also discovered that adults seem to be planning for negative bequests although the standard errors are large. They interpret this finding to suggest that wealth accumulation is probably not affected by children.

Considerably more work needs to be done in this area. For example, the currently estimated life cycle models omit problems of uncertainty in decisions concerning asset accumulation. Also, individuals face a variety of pension plans as well as various vesting and coverage experience.

Pension assets should be disaggregated by type of plan because of the various degrees of certainty people have in receiving their pensions from these plans. It would also be useful to estimate savings functions (change in net wealth) as well as the stock versions of net worth. Furthermore, it is necessary to take into account the bequest motive which has been done only in the Blinder, Gordon and Wise study, but only in a special indirect way. Finally, individuals have been assumed heretofore to be in equilibrium throughout their life cycle, but it is likely that people are out of equilibrium or are updating their accumulation pattern. While a full blown model of life cycle and intergenerational transfers is still lacking because of data limitations, there are still important areas to be explored. Finally, the appropriate interpretation of social security in an individual cross-section study must be further explored.

Pension Studies

Within the theory of life cycle saving, private pensions represent an alternative form of retirement income to the individual. Unlike social security, there is an accumulation of a reserve which may or may not fully cover the obligations of the plans. It is argued that one should expect private savings to be depressed as asset accumulation occurs under the individual's experience in the plan. It would be remarkable if there were a dollar for dollar tradeoff given the uncertainty, illiquidity and tax treatment of pensions which make pensions less than a perfect substitute for other forms of wealth. Furthermore, pension plans also affect savings if the individual retires at an earlier age than if there had been no pension plan.

Martin Feldstein (34, 1978) discusses many reasons why national savings may be influenced by private pensions. Employees' savings may be altered through favorable tax treatment, differential rates of return and financial risk, induced retirement, forced savings and incorrect foresight. To the extent that pensions are unfunded in corporate plans, shareholders may increase their savings to offset the unfunded liabilities. The direction and significance of these effects have not been adequately addressed in the available research.

In studies of individual behavior, the pension variable has been limited, with one exception, to a dummy variable reflecting pension coverage. The sign and significance of the coefficient on this variable is taken to be the ultimate test of whether there is an effect on net worth and savings. However, individuals are treated differently under plans concerning the level of benefits, coverage, vesting, and portability. Even if there is coverage, an individual's treatment may vary enormously. Therefore, it will be nearly impossible to obtain unbiased estimates of the pension effect because of measurement error.[6]

Cagan (20, 1965) and Katona (49, 1965) published work on the relationship of savings to private pensions. Characteristic of both studies

TABLE 3

Individual Cross-section Studies of Social Security and Savings

Author	Year of Study	Social Security Variable	Functional Form
Feldstein and Pellechio	1977	SSW, social security wealth for individual retiring at 65	$NW = B_{o_2} + B_1 YL - B_2 SSW + B_3 YL^2$
Kotlikoff	1979	LWI, the absolute dollar yield of the system to the individual in current dollars	(1) $NW = B_1 + B_2 ASST + B_3 LWI + B_4 RETAGE + B_5 LTLABI + B_n Z$
		ASST, present value of combined payroll taxes	(2) $RETAGE = B_1 + B_2 SBENL + B_3 LWI + B_4 LTLABI + B_5 H$
		SBENL, Social security benefits lost at full-time work to full-time earnings.	
Feldstein	1980	SSW, social security wealth for individual retiring at 65	$NW = B_o + (B_1 + B_2 CE/LE)_i + B_4 AGEH + B_5 AGEW + B_6 LE) LE + B_2 NSSW$
Blinder, Gordon, and Wise	1980	SSW, social security wealth	$-1_1 SSW_{t-1_2} PPW_t$

TABLE 3 (continued)

AGEH = husband's age

AGEW = wife's age

$BQ = b_0 (b_1 + b_2 \text{ NKIDS} + b_3 (\text{NKIDS})^2)$, proxy for bequest motive

CE = current income

H = additional variables

LE = lifetime earnings

LTLABI = household's lifetime gross labor income net of income tax

NKIDS = number of children ever born

NW_t = wealth

NSUP = sum of (18-age); summed over any children still supported

P_t = probability of survival at age t

P_{17} = probability of survival at age 17

PPW = private pension wealth, discounted value of future benefit

RETAGE = expected age of retirement

Y_o = initial human wealth of wife and husband

YL = net of tax labor income in final retirement year

Z = additional variables

is that in the survey data bases, there was information on whether the head of the household was "covered" or "noncovered." This permitted an examination of whether behavior was fundamentally different if one was covered under a pension plan within cross tabulations, analysis of variance, or regression equations. In both studies, it was concluded that private pensions increase savings.

In Katona's research, the data was based on personal interviews with a representative sample of 5000 family units that was later restricted to a target sample of 1,853. The pension coverage dummy variable was significantly positive when entered into a regression equation to explain some definition of savings. This finding is interpreted as consistent with a "goal gradient hypothesis" in which one's psychological savings effort is intensified the closer one is to a savings goal, as exemplified in having private pension coverage. This is also referred to as an "endogenous shift in preference model."

In a similar vein, Cagan (20, 1965) used a 15,000 sample from the Consumer Union's Survey of 1958-59. He found in cross tabulations that covered households save .5 to 1 percent more than noncovered. Second, within an age cohort, the ratio of wealth rises with the length of time of coverage. Third, regression analysis on contractual, pension, and discretionary saving indicated an increase of 21 to 28 cents per dollar of pension contributions.

Cagan attributed this positive effect as a "recognition effect" in which individuals are made aware of the need to save for retirement through their pension coverage.

Both of these studies suffer from never directly testing the major hypothesis since neither the "goal gradient" model or "recognition effect" model are derived or specified, yet these are rationalized as the relevant model. In the case of Katona's result, one explanation may be that he did not consider any retirement effects which pension plans could generate. In Cagan's case, Alicia Munnell re-examined his results and reversed them. Finally, both of these studies have been referred to as providing evidence that savings would be stimulated by social security, an inference unwarranted given that the studies are about pensions and coverage and given that Munnell finds an opposite result.

Alicia Munnell (70, 1974), starting with the same data base as Cagan, redid the analysis with a closé re-working of the data and an improved, life cycle specification of the savings-income ratio relation. Munnell adds dummies for pension coverage and social security coverage and finds an insignificant negative coefficient on both variables. Adding a variable for expected private pension benefit, and an interaction term of expected private pension benefit with a vesting dummy variable produced results consistent with conventional views, that savings would be depressed. For individuals aged 55-65, the expected benefit variable was marginally significant and negative and the interaction term was also negative and insignificant. This led Munnell to conclude, "Guaranteed retirement benefits appear as the single most important explanatory variable in the savings function of this age group."

Munnell (72, 1976) investigated the impact of private pension coverage on the savings behavior of men ages 45-59, using the five year (1966-71) Department of Labor panel study (Parnes). Specifying an extended life cycle model with dummy variables for private pensions and social security coverage, both variables were found to have a statistically significant negative savings effect. Other specifications were consistent with this finding. Social security coverage tended to have a larger and more significant effect than pension coverage. Note that explicit data on expected pension income were not available.

Munnell calculated in 1973 that for the nation as a whole private pensions reduced savings about $13 billion while total contributions to private pension reserves amounted to $21.1 billion. Thus, the net effect is to stimulate capital accumulation because of the imperfect offset. On the other hand, Munnell found social security reduces capital accumulation because no reserves are set aside. With regard to the social security effect, Barro (7, 1978) and Barro and MacDonald (9, 1979) maintain that such an effect is not relevant because of the nature of the cross section data.

Martin Feldstein (34, 1978) added a pension variable, "increase per capita real book value of pension fund reserves during calendar years," to his extended life cycle model in a time series analysis. This variable was positive, but statistically insignificant; thus one might conclude that the growth of pensions did not have an adverse effect on saving. Also, social security wealth had a significant negative impact in only one equation out of the estimated four. The results of the study are questionable because of the faulty construction of social security wealth.

Munnell (73, 1979) conducted a time series analysis of the interaction of private pensions and social security in retirement saving. Using a stock adjustment model, Munnell hypothesizes and finds statistical support for the proposition that social security and private pensions have acted as almost perfect substitutes for the provision of retirement income. This implies a reduction in savings and capital accumulation because of the different financing mechanisms, but a direct test on personal savings is not done. Regardless of the savings issue, her empirical results suggest that the role of private pensions will be reduced as social security benefits expand.

Gultekin and Logue (43, 1980), in their social security study, perform two regression experiments in which private pension funds are involved. Using an extended life cycle model, they add total pension fund assets (private plus state and local) and fictional federal and state and local government pension fund wealth. The coefficient on total pension fund assets is insignificant and negative and the coefficient on fictional government pension fund wealth is positive, contrary to expectations, and insignificant. In their asset allocation model, they find that social security contributions lagged and unlagged, and have a positive and insignificant effect on pension fund reserves.

As previously discussed, Blinder, Gordon and Wise (12, 1980) found that their pension variable, actuarial present value of expected future

TABLE 4

Private Pension Studies and Savings

Author	Year of Study	Pension Variable	Functional Form
Cagan	1965 cross section	PP, pension coverage dummy	1. ANOVA 2. $\frac{CS}{Y} = \frac{PS}{Y}$ 3. $DS/Y = B\frac{PS}{Y} + B_2\frac{CS}{Y}$
Katona	1965 cross section	PP, pension coverage dummy	$\frac{S}{y} = B_1 + B_2Y + B_3A + B_4PP$
Munnell	1974 cross section	PP, pension coverage dummy	$\frac{S}{Y} = B_o + B\frac{1}{Y} + B_2\frac{(R-t)}{Le+1-t)}\frac{Y^e}{Y}$
Munnell	1976 cross section	PEN, expected pension benefits using pension and social security dummies as proxies, PP and SS	(1) (2) $S=B_o + B_1\ Y-B_2PP-B_3SS-B_4A$
Feldstein	1978 time series	SPEN, increase in book value of pension fund reserves during calendar year	$SPRIV=B_o + B_1YD_t + B_2\ YDL + B_3RU + B_4A + B_5SSW + (1 + B_6)\ RE + B_7\ SPEN + u_t$
Munnell	1979 time series	PENASS, book value of pension assets at end of year	$PS=B_o + B_1YD_t + B_2YDL + B_3(LF65\ YD_t) + B_4(SSW + PENASS)_{t-1} + B_5\ (A-PENASS)_{t-1} + B_6\ OASI_t + B_7SO_t + B_8RU_t + u_t$
Gultekin and Logue	1980 time series	Total pension fund assets	See Table 1 for net savings equation
Blinder, Gordon and Wise	1980 cross section	PPW, private pension wealth	See Table 3

Table 4 (Continued)

A = wealth

CS = contractual savings (life insurance and annuities and real estate)

DS = discretionary savings (cash and securities minus mortgage debt)

DR = age at death minus age at retirement

LE = life expectancy

LF65 = labor force participation rate of males aged 65 and older

OASI = net total contributions to the trust fund

PPW = private pension wealth

PS = pension savings (equity in pension fund)

RE = retained earnings

RU = unemployment rate

S = savings

SO = other savings

SPER = personal savings

SPRIV = real per capital savings (SPER + RE)

SSW = social security wealth

Y = current income

Y^e = expected future income

YD = disposable income

YDL = disposable income lagged

benefits from private and/or government pensions, entered their net worth equation with a positive coefficient: each additional dollar of individual pension wealth stimulates non-pension assets of $.33. This coefficient is not significantly different from zero.

The studies on pension and capital accumulation have not provided strong evidence on the implied trade-off between pensions and savings. In only the Munnell 1974 and 1976 study are results significant. In the 1974 study, the effect on savings is restricted to the 55-65 age group and in the 1976 study to the 45-59 age group. In both studies, a pension coverage dummy variable was the critical variable of interest, and in the 1974 expected pension benefits and vesting were considered. Other studies have not replicated this finding. As to the question of policy trade-offs between advance-funded pensions or social security, there is no agreement on the overall savings effect, however pensions and social security appear to be substitutes for the provision of retirement income.

Conclusion

As noted in the introduction, research in this area touches on one of the most important areas of controversy in the economics profession: the neutrality of deficit financing on the macro economy. In the case of social security, deficit financing is not apparent because it appears in the form of hypothetical off-budget benefit promises and scheduled contribution rates. Nevertheless, the potential effect is enormously important if the net debt passed to future beneficiaries is not innocuous. Burro has argued that savings cannot be altered because households are sufficiently rational to undo government policy.

Examination of studies on the effect of social security and pensions on savings has uncovered a number of problem areas for future research. In time series studies, a fruitful path would be to include the consumption function within a complete model of the economy with particular concern to the various ways the government may interact with the household sector. This would require detailed accounting work on both sectors and appropriate modifications in the equations of the system. In international cross-sectional study, more attention must be paid to the problems of unobserved differences in these models as well as the consistency of the variables across countries.

In individual cross-sectional studies of social security and pension impacts on saving, a number of important approaches should be undertaken. First, the pension variable should be more adequately defined in terms of a person's expectations of pension wealth under various plan types rather than coverage. Second, econometric models should be expanded to include areas of uncertainty in decisionmaking—future wages, interest rates, health, retirement and life expectancy. As data become available, intergenerational transfers may be incorporated and new hypotheses tested on saving behavior. Extensions will also occur in areas of risk and portfolio adjustments to pensions and social security.

Notes

1. The author is indebted to Selig Lesnoy and Paul Wachtel for helpful comments. They are not responsible for any remaining errors.

2. Yaari (88, 1965) extends the model to uncertain life in a functioning annuities market, 1965.

3. Musgrave and Elizabeth Liefman-Keil suggest a wealth effect in their analysis of social security (20, Musgrave, 1959, p. 273-74).

4. See Gultekin and Logue (43, 1980, pp. 95-95) for additional comments.

5. Isoelasticity refers to the characteristic that $U'(X) / U''(X)$ is proportional to X. The factor of proportionality may be interpreted for a utility function in consumption as the reciprocal of the elasticity of marginal utility with respect to consumption.

6. In a 1980 household survey for the President's Commission on Pension Policy, an effort is being made to match individuals to the various retirement plans and expected value of pension benefits to the participant. See Chapter 36 for the results of this effort.

7. Results using Feldstein's variables are not considered.

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CHAPTER 32: PRIVATE PENSIONS AND CAPITAL FORMATION

Mordecai Kurz and Marcy Avrin

Introduction

Does the rapid growth of private pension capital have any net effect on the overall rate of savings in the U.S. economy? Are there compelling reasons to expect that the accumulation of capital at the hand of private pensions should have a net effect on aggregate savings and capital accumulation? Both the empirical as well as conceptual questions do not as yet have satisfactory, accepted answers. Since the issues involved are rather complex, the discussion will be divided into two parts. First, a conceptual analysis will review the theoretical issues associated with the effect of private pensions on savings, and second, a review of the limited empirical evidence will be provided.

Theoretical Evaluation

The Net Effect of Tax Benefits

Let us start with a hypothetical worker with an individually-defined contribution plan in which he is fully vested, the funds are portable, and he can freely and without penalty convert the funds in his plan to cash or other securities in his portfolio and later return the funds to the plan. Under these idealized conditions, any contributions made into the plan by the worker or the employer are fully convertible into other forms of capital that the individual may own. The distinct feature of the pension plan is that it pays no income tax on income generated in the plan, and all the contributions are tax exempt. Since taxes are paid when the funds are released to the pensioners, who are usually in a lower income tax bracket, the pension plan provides a means of holding assets which yield a higher rate of return due to the special tax treatment. Under these conditions, the individual should always prefer to shift as much of his assets as possible into the pension plan in order to take advantage of the tax benefits. Because of this incentive, the IRS code sets limits on the amounts the individual can place in the pension plan. However, the preference of an individual to hold his stock of assets in the pension plan does not mean that the individual will increase his total annual flow of savings. Restating this idea, an individual will prefer to hold as much of his assets as possible in the plan and, therefore, for any one dollar placed into the pension plan, the individual may reduce his private savings by the same amount. General economic theory that explains the effect of increasing the rate of return on the flow of savings can be used to explain this conclusion.

The authors of this and the next two chapters served as consultants to the Commission. Dr. Kurz is also a professor of economics at Stanford University. These papers were completed in September 1979.

General economic theory tells us that the net effect of the above plan on savings and capital accumulation is ambiguous: The plan involves tax savings that generate income effects which tend to induce more consumption and less savings. On the other hand, due to the difference in the marginal tax rates at the time of saving and the time of retirement, and the fact that the plan's income is tax free, the net rate of return on savings is increased, inducing a substitution effect that favors increased total savings. This shows that the tax incentive component of the private pension plans has an ambiguous net effect on aggregate savings. This does not alter the great incentive to concentrate as much of an individual's portfolio as possible in the pension plan. While the great accumulation of pension capital in the U.S. does not mean that the tax treatment has in fact increased the total flow of savings, it has certainly influenced the form in which these assets are held as evidenced by the growth of private pensions.

In practice, the IRS tax code establishes penalties on early withdrawal of funds from approved plans before retirement, but these penalties reduce the incentive to contribute to the plan. This negative effect on incentives counters the pure tax effect that provides strong incentives to hold assets in the pension plan and, perhaps, to increase total savings. Taking into account, however, both the pure tax effect and the penalty effect on savings, one may conclude that the combined theoretical effect on private savings is even more ambiguous.

What is very important to note is the fact that even if tax incentives have limited influence on the aggregate level of savings, they have induced an extensive institutional structure that has probably contributed to the income security of the retired. To state it differently, even if the net effect of tax incentives on aggregate savings is open to question, such incentives may significantly contribute to average income security. To see this, note that the main effect of tax incentives has been to place private pension capital at the hand of trustees who are required to be "prudent" and to diversify their portfolios. The combination of penalties of withdrawal of this capital from pension funds and the requirement to diversify the portfolios assures that pension capital is not subject to the risks of individual actions and thus increases the probability of being available for retirement income. This increased security occurs even if the tax incentives do not alter the aggregate amount of private savings.

The Effect of Private Pension Constraints

The reality of our private pension system is far more complex than the simplified picture described above. There are four features of most private plans that have significant implications for capital formation:

- Most plans establish contributions or benefits that are not necessarily set by individual choices.

- Most plans have complex rules of vesting and eligibility requirements.

- Most plans are managed by trustees who may or may not represent the true interest of individual participants for whom the plans were established.

- Most plans have limitations on portability, inheritability, and other transfer characteristics.

These factors have a unified effect on capital formation which we shall now explore. This combined effect is rather paradoxical in nature and is reflected in the probability that every one dollar in the private pension system is subjectively evaluated by potential pensioners as being worth far less than one dollar. Moreover, there are some indications that workers act as if a one dollar capitalized value in their pension plans is worth about 60¢ to 70¢. What is being said here is that although the real amount of capital in the private pension system is rising rapidly, the individuals who, technically speaking, own this capital undervalue it at 60% to 70% of its market value! This means that if a worker has a life savings objective, then any deficiency in the subjective evaluation of his private pension must be made up in private noninstitutionalized savings. If this is true, the net effect of the private system is to induce more aggregate savings. This means that those rigidities and restrictions of the private pension system that cause underevaluation of the stock are the causes that may induce an aggregate increase in private savings! This paradoxical conclusion needs some detailed exploration:

- Compulsory Savings. For many workers, the level of savings induced for them by the plan may exceed the total amount they would save to meet their life savings objectives. In fact, there is some body of evidence to indicate that for a significant fraction of the population the income received from their corporate plan in addition to social security is the total amount of retirement income available. Since "compulsory" savings imply that some people would have preferred to consume some of their retirement income earlier, it is clear that, for them, an underevaluation of the stock exists. Thus for these individuals the private system causes an actual increase of savings.

- Vesting, Years of Service and Other Eligibility Requirements. Based on the law of large numbers, every firm can forecast the number of workers who would become eligible for pension income and, thus, can plan its expected savings obligations for these employees. Furthermore, the firm is likely to be risk neutral with respect to the risk factors which influence the qualification and vesting of individual workers. On the other hand, the workers are likely to be risk averse with respect to these same risks and to put greater weight on the risk of not attaining their pensions. Thus, although the firm may be valuing its pension benefits on the basis of statistical expectations, the workers facing the risk of not being vested or of not meeting the eligibility requirement will discount the value of this capital below its statistically expected valuation. Therefore, the fundamental difference in evaluating future risks will induce a lower valuation by the participants relative

to the true value of the capital contributed by the firm to the plan, where this true valuation is made on the basis of statistical expectations.

- Risks Associated with Pension Fund Management and Mismanagement. Mismanagement of pension funds has been part of the history of pensions in this country, particularly prior to the passage of ERISA. Loss of pension benefits due to mismanagement or corruption has generated a high level of uncertainty among workers concerning future receipt of benefits. This attitude, however, appears to be changing in the direction of increased confidence by workers in receiving benefits currently promised by the private pension system. Even with ERISA's reforms concerning fiduciary standards, prudent investments, and benefit guarantees (through the Pension Benefit Guarantee Corporation), workers are still subjected to the risk of not receiving their full benefits. Workers are not guaranteed full protection of vested benefits (due to the five-year phase-in rule) and once a plan is terminated, further benefit increases do not take place. It should also be pointed out that the 7.5 million workers covered by multi-employer pension plans are not currently protected by the benefit guarantees of ERISA Title IV.

  Another management issue that arises in pension funds is whether the risk and return characteristics of a plan's portfolio coincide with those that would have been chosen by individual participants. To illustrate, consider an older worker who is cautious with respect to his retirement income. He would prefer that the assets of the fund be invested in very secure financial instruments rather than, say, in common stocks. If the trustee invests the portfolio in common stocks, the participant may view the portfolio as too risky relative to his needs. Due to their higher risk characteristics, common stocks would be viewed as less valuable assets than secure instruments like government bonds. Thus, in general, a conflict of views between the participants and the trustees may lead to an underevaluation of the capital fund by the owners-participants.

- Portability, Inheritability and Other Transferable Characteristics. Private plans have varying degrees of nontransferable characteristics such as lack of portability, lack of inheritability and lack of transferability of benefits to other family members. Each one of these restrictions lowers the subjective valuation of money invested in the plans and affects the financial planning of some people.

The Effects of Underfunding

The massive amount of unfunded liabilities of corporate pension funds may have a very complex effect on savings behavior. For workers less than full funding creates a potential threat to the promised benefits in case of

bankruptcy or financial hardship to the firm. This means that the risk of loss of part of the expected pension benefits due to less than full funding reduces the value, to the participants, of the pension obligations of the firm. On the other hand, the existence of unfunded obligations may strengthen the bargaining power of the firm in wage negotiations and thus increase the firm's value to the stockholders. Thus the net effect of underfunding is not clear due to its dual effect on workers and stockholders.

The various conceptual issues regarding the effects of the private pension system on savings and capital formation have now been summarized. The small amount of empirical evidence available is of interest and is summarized below.

The Empirical Evidence

In separate studies, Phillip Cagan (1965) and George Katona (1965) found that those covered by private pension plans saved more than those not covered. Cagan's explanation of his results, which were based on the savings response of over 15,000 members of Consumers Union in 1958-59, was that pension coverage calls attention to retirement needs and prospects and thereby fosters a "recognition effect" that counteracts individuals' disinclinations to plan for the future.

In addition to Cagan's explanation, Katona explained his results, which were based on personal interviews with representative samples of all American families in 1962-63, by a possible "goal feasibility" effect, wherein people intensify their savings efforts the closer they get to their retirement goal. Katona's results must be interpreted cautiously since he focused on a very narrow concept of saving — changes in financial assets.

Munnell (1974a) analyzed a subsample of Cagan's data and found directly contradictory results. She estimated separate saving equations for three age groups, (30-39, 40-54, and 55-64), and included variables for home ownership, education, savings preference, income, wealth, family size as well as pension coverage. The coefficient of the pension variable was consistently estimated to have a negative sign, and the size and significance of the coefficient increased with age. Additional equations were estimated for those aged 55-64 including the value of expected benefits and the value of vested benefits instead of the simple pension coverage variable. Both benefit variables were estimated to have a negative coefficient, but the size and significance of the vested benefit was substantially greater.

Munnell provides three explanations for the contradictory results: 1) the subsample included was subject to more elaborate screening and consistency checks than was Cagan's original sample; 2) the studies used different methods of analysis; and 3) the analysis of the subsample placed significant emphasis on those persons whose saving is primarily for retirement, individuals aged 55-64.

In another study, Munnell (1976) further supports the conclusion that future retirement benefits lead to reduced personal savings. In this work she used a sample of men in their pre-retirement years (ages 45-59) over the period 1966-71 based on a series of surveys conducted by the Department of Labor. These data allowed the inclusion of information on expected retirement age in the analysis. The results, using this additional information, indicated that the surprising conclusion in the Cagan and Katona studies may have been due, in part, to the fact that pension coverage is usually accompanied by compulsory retirement and that covered employees may simply have increased their saving in anticipation of an involuntary retirement.

Munnell's data included only dichotomous information of whether individuals had private pension rights or not. This specific data problem is typical, since most people do not know the exact monetary value of their pension rights, and thus most data sources report only the existence or nonexistence of such rights.

With the above limitation in mind Munnell found that private pensions caused a mean reduction in personal savings of about $671 in 1966 and $2,431 in 1971. Given that the average contribution to private pension plans was $1,550 in 1966 and $1,684 in 1971, the above results are inconsistent. They imply that the mean effect of every one dollar put in private pension plans:

- increased aggregate savings by $.57 in 1966
  ($1,550-$671)/$1,550 = $.57;
- decreased aggregate savings by $.44 in 1971
  ($2,431-$1,684)/$1,684 = $.44.

Munnell attempts to clarify this picture a bit but her analysis is not conclusive.

A very general approximation to this problem was made by Feldstein (1977) who estimated an aggregate consumption function based on the life cycle theory of consumption, which included a variable measuring total wealth of private pensions. Due to the usual problems of time series analysis, his standard errors are very large, making the coefficients insignificant. Yet his point estimates, ranging from .32 to .40 for the post-war period, imply that for every one dollar put in private pension funds on behalf of an employee, the employee will reduce his own savings by 60 to 68 cents, resulting in a net increase in aggregate savings of 32 to 40 cents.

Indirect evidence comes from a recent public opinion survey, 1979 Study of American Attitudes Toward Pensions and Retirement, taken by Louis Harris and Associates, Inc. In that survey people were asked to evaluate the changes of their failure to receive the pension income which they should receive. A majority, 68 percent, have a great deal of confidence that their plans will pay them the benefits to which they are entitled when they retire, 25 percent have some confidence, 6 percent have hardly any confidence, and 1 percent are not sure.

In conclusion, the research into the effects of institutionalized private pension plans on the national economy is in its infancy. However, in the long run its findings will be essential to the information of a rational public policy in this area.

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CHAPTER 33: SOCIAL SECURITY AND CAPITAL FORMATION: THE FUNDING CONTROVERSY

Mordecai Kurz and Marcy Avrin

The social security "crisis" has occupied a central place in the public debate concerning our pension system since the total benefit payments by the system exceeded total receipts thus raising the question of how to finance the growing deficits. Many argue that the "pay-as-you-go" feature of social security financing is detrimental to the economy. Besides causing the immediate financial "crisis," this feature is alleged to have a much deeper effect in causing a decrease in the total real capital stock of our stock of our economy, thereby inducing a lower level of economic activity. Because of these undesirable ramifications, a growing number of responsible people are demanding that social security develop a "fund" or an "endowment" of assets whose value equals the total financial oblications of the system. Full funding, it is argued, will make the system actuarially sound, eliminate deficits, and induce the accumulation of "missing" real private capital into our economy.

In this section, we will evaluate this controversy by presenting the arguments for and against full funding along with the supporting evidence. All arguments center around the issue of capital deficiency.

The Capital Deficiency Argument for Full Funding

The Theoretical Argument

The capital deficiency argument can readily be explained in terms of individual behavior. According to this argument, the individual views the government obligation to provide, upon retirement, a social security pension as a good substitute for his own retirement savings. Therefore, he regards the future flow of social security payments as "real" personal capital and reduces his own private savings accordingly. With pay-as-you-go financing, the social security tax is adjusted periodically to generate the revenues needed to make current social security tax is adjusted periodically to generate the revenues needed to make current social security payments. However, contrary to the private outlook of these pensions as real capital, There does not exist a real social capital stock to back them up. Since each individual reduces his personal savbings by the amount he expects to receive from social security, there exists less real capital than would be the case had the system been fully funded. A smaller capital stock means lower productive capacity, lower output, and therefore a lower standard of living. Feldstein (1974) estimates that the total capital deficiency induced by the social security system of the U.S. is about two trillion dollars!

The above theoretical argument is strikingly simple and it shall be evaluated below when the arguments against full funding are discussed. Let us first turn to the empirical evidence that has been proposed to support the deficiency hypothesis.

The authors were consultants to the Commission. This paper was completed in September 1979.

The Empirical Evidence

In his basic study on the subject, Feldstein (1974) examined aggregate U.S. time sheet series of income and consumption from 1929 to 1971. He estimated ten regression models of the consumption function that included a variable measuring the present actuarial value of the retirement and survivor benefits to which the eligible population was entitled. The author distinguished between gross social security wealth (SSWG) and net social security wealth (SSWN), which is gross wealth minus the present actuarial value of the payroll taxes. Feldstein notes that social security can have two opposite effects on private savings. On the one hand, the "wealth effect" will tend to reduce private savings since it measures the effect of the availability of this new wealth at retirement. On the other hand, the inducement for early retirement that is caused by the increased availability of pension income, will increase the tendency to save while working to accommodate a longer retirement period.

Due to their central role in the funding debate, regression coefficients from Feldstein's study are shown in Table 1. The variables are defined as follows:

SSW = Social security wealth

SSWGI = Gross social security wealth using a discount factor of 1.01

SSWG5 = Gross " " " " " " " 1.05

SSWN5 = Net " " " " " " 1.05

YD_t = Disposable income at time t

YD_t1 = Disposable income at time T - 1

RE_t = Retained earnings (corporate savings)

W_t-1 = Lagged private wealth

U_t = The unemployment rate

TABLE I

Feldstein's (1974) Estimated Consumption Function[1/]

		Consumption Function with Social Security Wealth									
	Period[1]	SSW Definition	YD_t	YD_{t-1}	RE_t	W_{t-1}	SSW_t	U_t	Const.	SSR	D-W Statis.
1	1929–71	SSWG1	0.550 (0.047)	0.120 (0.033)	0.356 (0.074)	0.014 (0.004)	0.021 (0.006)	...	223 (31)	3,618	1.82
2	1929–71	SSWN1	0.528 (0.047)	0.137 (0.034)	0.376 (0.073)	0.013 (0.004)	0.032 (0.009)	...	218 (27)	3,548	1.85
3	1929–71	SSWG5	0.530 (0.048)	0.136 (0.035)	0.400 (0.075)	0.008 (0.003)	0.051 (0.016)	...	244 (37)	3,714	1.82
4	1929–71	SSWN5	0.538 (0.049)	0.163 (0.037)	0.432 (0.079)	0.009 (0.006)	0.075 (0.027)	...	204 (29)	3,944	1.71
5	1929–71	SSWG1	0.675 (0.047)	0.046 (0.041)	...	0.009 (0.003)	0.024 (0.008)	...	204 (40)	6,289	1.43
6	1929–71	SSWG1	0.553 (0.050)	0.154 (0.043)	0.436 (0.096)	0.013 (0.004)	0.010 (0.011)	1.170 (0.892)	155 (44)	3,422	1.69
7	1929–71	SSWG1	0.549 (0.047)	0.149 (0.037)	0.423 (0.079)	0.012 (0.004)	0.012 (0.004)	1.020 (0.663)	169 (30)	3,430	1.82
8	1947–71	SSWG1	0.535 (0.097)	0.139 (0.097)	0.414 (0.163)	0.015 (0.009)	0.014 (0.030)	...	193 (152)	3,087	1.63
9	1947–71	SSWN1	0.515 (0.085)	0.119 (0.085)	0.349 (0.170)	0.013 (0.007)	0.035 (0.030)	...	232 (104)	2,926	1.78
10	1947–71	SSWG1	0.531 (0.058)	0.106 (0.103)	0.423 (0.164)	0.008 (0.012)	0.029 (0.035)	2.786 (3.237)	252 (175)	2,[illegible]	1.80

The coefficients in the column entitled "SSW" show the net effect of social security wealth on aggregate consumption. For example, in equation 1, an increase of the social security wealth by $1 billion increases consumption by $.021 billion and thus reduces aggregate private savings by the same amount. While the size of the effect of social security wealth on private consumption depends upon the definition of the social security wealth, the effect is positive and significant in most of the equations.

Feldstein concludes that the net effect of the social security system, due to its pay-as-you-go feature, is to reduce the propensity to accumulate private wealth. More specifically, he concludes:

- the estimated marginal propensity to consume from the unfunded social security wealth has the same order of magnitude as the marginal propensity to consume from ordinary wealth;

- using the estimated marginal propensities, one can show that the existence of unfunded social security wealth reduces total private savings by 38 percent; and

- when restricted to the post-1947 period (equations 8-10), the coefficients remained large but statistically significant for both social security and private wealth.

The original contribution was followed by a sequence of papers which we shall summarize briefly here.

In two papers, Munneil (1974a) and (1974b) sought to test explicitly for the separate "retirement effect" and the "wealth effect" on private savings. She modified the consumption function so that the marginal propensity to consume depends upon the participation rate of men over 65. Her intention was to capture with this interaction variable the expected future retirement of current workers. Having made this adjustment, Munnell estimates the "wealth effect" of social security on aggregate private savings to be 50% higher than Feldstein. Munnell also estimates the direct early retirement effect; more specifically, according to her estimates, the wealth effect in 1969 reduced private savings by $54 billion while early retirement increased personal savings by $26 billion.

In a separate study, Feldstein (1976a) examined the effect of social security wealth on personal savings in different countries. Again, using the earlier model developed by Modigliani, Feldstein introduced two sets of variables:

- a measure of retirement behavior indicated by the labor force participation rate of men over 65 and life expectancy at age 65; and

- social security wealth measured by the ratio of social security benefits per aged person to the average per capita income in the country.

The parameters of the above model were estimated using a cross section of 15 developed countries. The coefficient of the social security wealth variable was statistically significant; this result is consistent with Felstein's earlier time

series study. The quantitative implication of the parameter estimate is that social security benefits reduced the U.S. savings rate by 4.2 percentage points, which is one-third of the average private savings rate.

Approaching the problem from the micro-economic viewpoint, Feldstein and Pellechio (1976) estimated the effect of social security wealth on private wealth using a sample of consumers surveyed in 1962 by the Federal Reserve Board, (Survey of Consumer Finance). While the study found strong substitution of social security wealth from private wealth among people aged 55-64, the nature of the sample and data raises serious questions about the reliability of the estimates.

With this accumulated evidence, Feldstein felt convinced enough to state:

> With less capital accumulation, there is a lower level of productivity and therefore a lower national income. The parameter estimates in my study of U.S. time series data implies that social security would eventually reduce the U.S. capital stock by some 40 percent of what it would otherwise have been. If the nation's capital stock is now 30 percent lower bexause of social security, national income is reduced by about 11 percent or, for 1975, $165 billion. To put this number in perspective, note that $165 billion was nearly one-fifth of total consumer spending and nearly equal to all of gross private domestivc investment. Viewed somewhat differently, $165 billion is $750 per person or more than $2,000 per family. Let me emphasize that this reflects the pay-as-you-go nature of the social security system and not social security as such. (Feldstein (1976b), p. 17).

The Capital Deficiency Doctrine Rejected

Theoretical Argument

The theoretical discussion against the capital deficiency thesis and its importance can be developed with three separate but interrelated arguments. The first argument will show that even if the capital deficiency thesis is theoretically correct, it is not operative today and thus the alleged problem is one of the past and is not being aggrevated at present. The second argument will show that, based on the substitution between private and public transfers, no capital deficiency occurred even in the past. The third argument will show that even if a capital deficiench occurred in the past, it has no bearing on our decision in the present and thus, the thesis is irrelevant.

First, consider an individual with an intial wealth W_O at a time when no social security system exists. Suppose now that a social security system is introduced anf the individual is promiosed a pension with a present value (using the market interest) of P_O. This increases his wealth to $(W_O + P_O)$, and if this is the only effect present the person would, infact, reduce his sabings since increased wealth causes increased consumption. Now let us assume that the individual is told that he must pay a payroll tax during his working years which will have a present value (using the market interest) of t_O. Thus, his true wealth is $(W_O + P_O - t_O)$. If the individual receives the same value as he paid, then $P_O = t_O$ and the introduction of the social security system does not affect hjis total wealth and savings. This simple analysis implies the following general proposition: If an individual receives from the system the same present value as he pays into it, the system will have no effect on his savings. It is clear that if

all individuals are in this position, then the system will be fully funded. Since we know that the system is not fully funded, it means that the relation $P_O = t_O$ does not hold for all individuals. We do know, however, that the payroll tax in the U.S. has now been increased to a point that a young worker who just enters the labor force will be paying more taxes than he will be receiving in benefits.

This leads us to the second argument in which we recognize that during the start-up period of the social security system, a whole generation was awarded benefits in excess of the present value of their tax payments. It appears that this initial generation received a large capital transfer and as a result, members of the generation may have reduced their savings and caused the claimed capital deficiency.

Those who reject the deficiency thesis find a flaw in this argument as well. For example, visualize how we would have functioned without a social security system: poor retired parents would be supported by their children and relativesa, while rich retired parents would continue to support their children aand leave them the family estate as an inheritance. When social security was introduced, this traditional pattern was altered. The working young pay a social security tax that is then paid to the parents as a pension. Therefore:

- if the parents are poor, the children reduce their support of the parents by the amount of the tax which they pay; and
- if the parents are rich, they will increase their support of the children who have the additional tax burden.

In either of the two cases the transaction, from the point of view of the family, would leave the family's private savings unaltered.

This analysis applies even when there are older people without children or working young without older parents, since relatives and non-profit welfare organizations fulfill the intermediation function and would support older people in the absence of social security is intyroduced. Thus, opponents of the capital deficiency thesis conclude that the entire social security system is nothing but an orderly rearrangement of the transfer of funds across generation and the net effect of the system on private savings is nil.[37]

If the second argument is not correct and a major capital consumption occurred in the past, did it cause the economic system of the present to operate inefficiently? The third argument of the theoretical analysis involves this question of efficiency. It originates in the fact that there exists a set of circumstances in which <u>every</u> generation will pay less into the system than it will receive and thus be better off. Modern growth theory shows that such a situation can arise in an economy with a growing population in which the growth rate of the population is larger than the interest rate. In such a case, the growing population of young people will support a relatively smaller population of retired people. Since the benefits rise in proportion to the size of the population while the discounting of the taxes is based on the lower interest rate,

it always appears that the value of the promised pension P_o is larger than the tax burden t_o for all generations. This theoretical possibility is interesting but not practical since the interest rate has been higher than the growth rate of the population. Furthermore, if the growth rate were higher than the interest rate, this would represent a major source of economic inefficiency which would be removed within a short periuod. This means that given the assumption that our present economy is operating efficiently, any past consumption of capital is not relevant to society's current decisions. Thus under these circumstances, the "capital deficiency" thesis is irrelevant.

The three arguments can be summarized in the following way:

- Most of the young working people in the U.S. today are paying in payroll taxes as much as they will receive from the social security system and thus the present generation would not be expected to reduce its private savings due to the system. Thus, today's generation should not be contributing to the capital deficiency, if it exists at all.

- A capital deficiency might have been created by the start-up generation of the social security system, many of whom are already retired and others of whom will be retired in the next few years. They may have received an initial capital transfer which may have reduced their savings and caused the deficiency. Even this is a doubtful proposition in view of the possibility that the effect of the so-called windfall on aggregate savings may have been neutralized by rearrangement of the private transfer system.

- The theoretical possibility of a "Social Security Paradox", according towhich all are better off by lowering savings, is simply an unrealistic case.

The Empirical Evidence: The empirical evidence against the capital deficiency thesis was compiled by Barro (1977) who introduced additional vairables into the Feldstein model in an attempt to put greater emphasis on permanent income and rational expectations rather than the simple variables YD_t and YD_{t-1} used by Feldstein. To accomplish this, Barrow used the following variables:

YD_t = disposable income at time t

YD_{t-1} = disposable income at time t - 1

RE_t = retained corporate earnings

SUR_t = The surplus of the total government sector reflecting the rational expectations of the taxpayers

U_t = unemployment

U_tYD_t = interaction of the unemployment rate with disposable income

W_t = aggregate measure of household wealth

K_{W_t} = aggregate measure of capital stock which is an alternative proxy for

DUR_t = stock of durable goods (exclusive of housing) owned by the households

SSW_t = the Feldstein definition of social security wealth

The estimated regression coefficients for these variables are shown in Table 2.

Inspection of the coefficients on the SSW_t variables reveals that they are significant from the statistical viewpoint and large from the economic view point only for the 1929-1940 period[4] and only when the unemployment variable is excluded as in equations 3 and 6. When the unemployment variable is included, the effect of SSW_t becomes small and insignificant.[5]

Barro's main point is that the unemployment varable captures a transitory component of consumer expenditures and, therefore, should be part of the specification of the consumption function. It is accidental that the SSW_t variable is in part negatively correlated with the unemployment rate. This arises from two facts: the unemployment rates during the depression years were high but then declined towards the Second World War. Second, the SSW variables take the value of zero until 1936 and then rise rapidly until 1941. This correlation reduces the credibility of the Feldstein results and Barro concludes that the empirical evidence does not suport the capital deficiency thesis.

In a conference held at Stanford University in January 1977, Feldstein replied to Barro and did not strongly dispute Barro's point on the time series analysis. The conference consensus was that in this type of analysis all variables are so correlated with time that it is hard to test such subtle effects with this type of analysis. Feldstein's main defense of the deficiency thesis centered around the "cumulative evidence" from other micro sources, international comparisons, and other studies, all of which point in the direction of the existence of a negative aggregate effect of social security on savings.

In addition to the econometric estimates, there are two observations which should be classified as "casual empiricism" that seem to argue against the capital deficiency thesis. One observation is that the private savings ratio in the U.S. has been rising since the early 1960s. The fraction of disposable income saved by the private sector has risen from the 4½%-6% range in the 1960-1965 period to the 7%-8% range in the early 1970s (and rose above 8% in 1971). At the same time the profit rate in the U.S. economy has been falling since the mid 1960s. A fall in the profit rate would be unlikely if the economy had a deficiency of two trillion in its capital stock.[6]

Why Capital Deficiency, Even If It Exists, Does Not By Itself Justify Full Funding

All sides to the capital deficiency argument now agree that the question of whether a deficiency exists must be settled by further examination of the statistical evidence. But, although this is an interesting question, its significance has been misunderstood. As we argued earlier, since today's generation is paying more into the social security system that it will receive in

TABLE 2

Barro's (1977) Consumer Expenditure Equations* 1920-1940, 47-74, Sample; Constant Included

Eq	Const.	YD_t	YD_{t-1}	RD_t	SUR_t	$U_t \cdot YD_t$	K_t	W_t	DUR_t	SSW_t	R^2	D.W.	$\hat{\sigma}(\sigma/C)$	SSE
(1)	80 (72)	.76 (.06)	.19 (.05)	.29 (.12)	.23 (.06)	.36 (.09)	-.002 (.027)		.006 (.104)		.9995	2.01	13.0 (.0079)	5423
(2)	146 (33)	.71 (.07)	.06 (.04)	.27 (.12)	.22 (.06)	.27 (.11)	.005 (.027)		-.016 (.103)	.015 (.010)	.9995	2.15	12.9 (.0078)	5060
(3)	272 (73)	.63 (.06)	.06 (.04)	.21 (.13)	.19 (.07)		.003 (.030)		.040 (.109)	.028 (.009)	.9994	1.97	13.9 (.0085)	6153
(4)	57 (49)	.76 (.05)	.10 (.04)	.25 (.12)	.21 (.07)	.35 (.09)		.004 (.007)	-.023 (.064)		.9995	2.01	12.9 (.0079)	5363
(5)	138 (74)	.70 (.06)	.09 (.04)	.25 (.12)	.20 (.07)	.27 (.11)		.004 (.007)	-.019 (.063)	.014 (.010)	.9995	2.13	12.7 (.0078)	5021
(6)	254 (63)	.63 (.06)	.06 (.04)	.18 (.13)	.18 (.07)			.004 (.007)	.026 (.065)	.028 (.009)	.9994	1.97	13.8 (.0081)	6086

1947-74 Sample, Constant Included

Eq	Const.	YD_t	YD_{t-1}	RE_t	SUR_t	$U_t \cdot YD_t$	K_t	W_t	DUR_t	SSW_t	R^2	D.W.	$\hat{\sigma}(\sigma/C)$	SSE
(1)	-111 (163)	.74 (.08)	.22 (.09)	.27 (.15)	.22 (.07)	.32 (.15)	.057 (.052)		-.234 (.210)		.9991	1.90	13.4 (.0071)	3585
(2)	-24 (275)	.70 (.13)	.19 (.11)	.26 (.16)	.21 (.08)	.32 (.15)	.051 (.055)		-.220 (.218)	.013 (.033)	.9991	1.94	13.7 (.0075)	3555
(3)	-85 (296)	.70 (.14)	.22 (.12)	.24 (.17)	.21 (.08)		.060 (.058)		-.279 (.234)	.011 (.036)	.9989	1.75	14.8 (.0078)	4367
(4)	36 (61)	.73 (.08)	.15 (.07)	.23 (.18)	.20 (.08)	.36 (.15)		.007 (.009)	-.049 (.065)		.9991	1.96	13.6 (.0072)	3695
(5)	113 (214)	.69 (.14)	.13 (.09)	.24 (.19)	.20 (.08)	.36 (.15)		.005 (.010)	-.050 (.064)	.014 (.036)	.9991	1.98	13.9 (.0074)	3663
(6)	176 (236)	.65 (.15)	.11 (.10)	.23 (.21)	.19 (.09)			.003 (.011)	.011 (.090)	.017 (.040)	.9988	1.72	15.4 (.0082)	4767

*These estimates are taken from Table 2 of Barro [1977], page 34 and Table 4 of Barro [1977], page 36.

benefits, it follows that the social security system has no adverse effect on aggregate saving patterns today and thus is not contributing to the capital deficiency if such deficiency exists at all. This brings us, therefore, to the critically important conclusion that if there is a social security-related capital deficiency in our economy, it is entirely due to the large transfer that the generation of yesterday received. This transfer leads to several outcomes. First, the current generation may now have less capital, less output, and less consumption than it would have had without making that transfer. In addition, insofar as current workers are paying more into the social security system thatn they will receive from it when they retire, the system is a net burden rather than a "good deal". Thus, the capital deficiency can be seen in a slightly different light. It would not exist if yesterday's generation had not voted itself that capital transfer and the present generation did not go along with it. but, in fact, our society made this transfer and the capital which was involved has been consumed rather than accumulated. This simply means that the working young of today and tomorrow are not as rich as they would have been if that transfer were not made. Do we have to correct this situation?

Proponents of the capital deficiency thesis conclude from the above that full funding of the social security system is called for. They propose raising dramatically the social security tax rate for a few years, lowering the standard of living, and raising the national savings. During this period, the real capital stock would build up and with it the social security fund would increase until it is fully funded. Then we should lower the tax rate to that level at which the amount that each one of us pays into the system is exactly equal to the amount we receive as benefits and the system will in fact operate as if it were a fully funded private pension plan.

In effect, the supporters of full funding are saying that since large costs were incurred in starting the system, it should be the present generation that reduces its standard of living and works harder to pay for the gift given yesterday.

Taking the past social transfer as a starting point, our economy is in reasonably good health and without any major structural defects. All decisions regarding the reaccumulation of this give must be made rationally where the decision to accumulate it now is only one among many options. In fact, such a proposal is the most extreme and costly option with regard to the current generation. Another option is simply to acknowledge that the capital is gone and to not make any extra effort to recaptureit. This means that the current generation continues to go about its business of producing, consuming and investing but at a lower capital base than without the transfer. By accepting a lower base for current and future generations, and thus experiencing a lower level of consumption, the present and all future generations would be sharing the cost of the transfer. This proposal, of doing nothing special about the past transfer, is diametrically opposed to the full funding proposal since it suggests that the cost of the past transfer be shared by the present and all future generations. This is contrary to the full funding advocates who want the current generation and only the current generation to pay for the cost. Is there a logical or ethical reason why the current generation should be the only one to pay for the transfer of yesterday?

Note that there are intermediate options of dividing the burden by beginning some accelerated program of funding the social security system in order to make up the deficiency by raising slightly the social security taxes. Another option would be to create a gradually rising fund that can be rebuilt to full funding within 50, 100, or perhaps 150 years.

The point is that from the economic view all these proposals are equally viable. None of them follows logically from the deficiency thesis because the existence of a deficiency does not imply the superiority of any of these proposals. The choice among these depends essentially on how we value the welfare of the present and future generations. Those in favor of full funding are, in fact, arguing that future generations should not share the burden with the current one although they will, most likely, be much richer than today's generation.

It should now be clear that it has been a basic misinterpretation of the capital deficiency calls for full-funding. The condition of the social security system today should not be viewed as "inefficient" or "structurally defective" since the decision of how to finance the system is basically an ethical decision and should be based on what we believe to be a fair and just distribution of the burden of initially starting the system with a capital transfer. The "full-funding" proposal which requires us to carry all the cost is neither fair nor just.

The Side Issue of Income Taxation

Frequently, the issue of the so-called double taxation of capital income is confused with the debate concerning the effect of social security on savings behavior. A brief discussion is therefore provided on this side issue.

In spite of the arguments presented here, the "private capital shortage" debate has continued. Feldstein (1976c) also has agreed that not only does the economy have a lower capital/labor ratio with the social security system than without it, but also that inadequate savings are due to heavy and double taxation on capital income. To clarify this point, recall the standard argument that the heavy taxation of capital income creates a large gap between the social and private rate of return on capital, and this inefficiency leads to a nonoptimal amount of savings relative to the true investment opportunities of this society. The nature of this nonoptimality is seen at the level of the individual saver who, in the absence of taxation, may end up saving more less relative to the current situation (with taxes). Thus, the argument against heavy taxation is not based on some general goal of expanding the social capital stock but rather on the economic analysis that shows that each saver would be better off paying the same amount of taxes as a lump-sum while removing the high marginal tax rate on capital income.

In our opinion, the distortions due to income taxation should not be linked to the social security issue. Feldstein (1976c) argues that the social security system "aggravates" a difficult situation, and here Feldstein's argument is not social security came to be and this inefficiency remained after the social security system was created. The lack of capitalization of the social security system did not change the basic wedge between private and social returns to capital, and thus, the social security security system did not help to aggravate the loss of individual welfare due to that gap. To convince himself of this point, the reader may just imagine that the U.S. Social Security System is fully funded. Would this remove the wedge due to taxation of capital income? If the entire issue of the "shortage" of capital is due to the heavy taxation on capital income, it is clear that full funding of the social security system is not a logical remedy for the problem at hand.

Notes

1/ Felstein (1974), Table 2, page 917.

2/ The years 1941-46 are excluded from the sample. The Durbin-Watson statistic is adjusted for this gap. Standard errors are shown in parentheses.

3/ Feldstein and Pellechio (1976) considered these theoretical issues. They do not reject the theoretical points explained here, but argue that the intra-family private transfers being replaced by social security could not add up to the huge sum of 100 billion dollars which was paid out by the Social Security Administration in 1977. We have no empirical evidence on the size of the private intergenerational transfers thatr would have taken place in the absence of the social security system.

4/ This conclusion can be seen by comparing the coefficients of the SSW_t variables in the top and bottom parts of Table 2: When the unemployment variable is excluded they are statistically significant in the top of the table but statistically insignificant in the bottom.

5/ In his own results, Felstein also noted that the inclusion of the unemployment variable reduced the effect of the SSW_t variables and in this respect the issue between Feldstein and Barro revolves around the interpretation of the unemployment variable.

6/ Since the profit rate is equal to the marginal productivity of capital, it then depends on the capital/labor ratio. With a major capital deficiency and a growing labor force, the capital/labor ratio would be relatively lower and the profit rate relatively higher than what has been the norm in recent U.S. history.

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CHAPTER 34: TECHNICAL PAPER: THE FUNDING ISSUE AND MODERN GROWTH THEORY

Mordecai Kurz and Marcy Avrin

This Technical Paper aims to provide the technical details and the survey of the literature which were the basis for the Commission's Working Papers entitled "Private Pensions and Capital Formation: (Chapter 32) and "Social Security and Capital Formation: The Funding Controversy" (Chapter 33). The desirability of covering the fine technical points arises from the fact that in some quarters more heat than light has been generated on these issues to a point where some formal review of the basic arguments would be desirable. This paper provides such clarification. We will attempt to cover all the conceptual issues and evaluate them in view of the basic results of modern growth theory.

The Social Security Paradox When The Growth Rate Exceeds The Interest Rate

In the expanding literature on the social security problems, the early contributions by Samuelson (1958) and his controversy with Lerner are often mentioned. A later paper by Aaron (1966) is also frequently cited. To clarify this literature let us examine each contribution separately. We start with Aaron due to the simplicity of his exposition.

The Algebra of the Paradox (Aaron (1966))

This Aaron paper has been quoted rather often in connection with the issue of pay-as-you-go program of social security. It has been argued that Aaron provided (as Samuelson did earlier) the economic conditions under which one can determine which method of financing social security is superior: full funding against pay-as-you-go.

What we shall try to do is clarify precisely what Aaron's paper says with the intention of defining the above so-called "conditions." We cover the Aaron analysis before the analysis of Samuelson's (1958) paper since Aaron's paper can be understood as a simple exercise in algebra while Samuelson's paper deals with a deeper issue of economic efficiency. Once we get the algebra out of the way the deeper issue of efficiency will attain a new dimension.

Aaron (1966) makes the following assumptions:

- Each person lives n periods: during the first m periods, (1,2,...,m), he works and during the last (n-m) periods, (m+1, M+2,...,n), he is retured. The population as a whole grows at a constant rate g, and thus each age group grows at the same rate. Define $t = 1 + g$ to be the growth factor.

- The wage rate rises at the rate h, and after retirement each person continues to receive the market wage rate until he dies. Define $s = 1 + k$ to be the growth factor.

● The market interest rate i is constant. Define r = 1 + i to be the interest factor. In terms of modern "Growth Theory" Aaron analyzes the problem as one of Balanced Growth with a growing population, and we shall return to this issue later on in order to evaluate the analysis.

To carry out Aaron's exposition, note that in a state of Balanced Growth, any point in time can be declared as 0 (the starting point). Thus select such a point. At that time the total population is P(0), which is composed of a great many age groups:

P_0 = the number of people of age (n-1) in the last year of life;

P_0t = the number of people of age (n-2);

.
.
.

P_0t^{n-m} = the number of people of age (m-1) in the last year of work;

.
.
.

P_0t^{n-1} = the number of people of age 0 just born

where each age group is proportional to its older neighbors by the growth factor t. The above age distribution of the population is assumed stationary so that at 0,

$$P(0) = P_0\ 1 + t + t^2 + \ldots\ t^{n-1}$$

and at any time k 0 the population is simply

$$P(k) = p_0t^k\ 1 + t + t^2 + \ldots + t^{n-1}$$

What is important, however, is that the above population is composed of the working population and the retired population, as follows:

$$\text{Retired population at k} = p_0t^k\ 1 + t + t^2 + \ldots + t^{n-m-1},$$

$$\text{Working population at k} = p_0t^k\ f^{n-m} + t^{n-m+1} + \ldots + t^{n-1},$$

and thus the retirement ratio f defined by

$$f = \frac{\text{retired population at k}}{\text{working population at k}}$$

is in fact, constant, the same for all, and is equal to

$$f = \frac{1 + t + t^2 + \ldots + t^{n-m-1}}{t^{n-m} + t^{n-m+1} + \ldots + t^{n-1}}$$

this model Aaron defines:

PV_p = the "present value," at the time of retirement, of all the contribution that a worker makes to the fund.

PV_B = the "present value," at the time of retirement, of all future benefits paid the worker after retirement and which grow at the growth rate of the wage rate.

Aaron then shows that:

PV_p PV_B if i $g + h$

PV_p PV_B if i $g + h$

It then follows that if $i < g + h$, the present value of the benefits received by each worker exceeds the present value of the contributions into a pay-as-you-go social security system. Aaron's conclusions can then be stated as follows:

- If $i < g + h$, then <u>all generations</u> will be better off if they operate a pay- as-you-go security system.

- If $i > g + h$, then a pay-as-you-go social security system will leave each generation in a position of receiving less in benefits than the value of their real contribution into an equivalent, fully funded system whicxh earns an interest rate i. Thus, if investment opportunities exist which yield r, each individual contributor would prefer to have his contributions ivnested by an organization which will be fully funded and thereby able to pay him benefits which exceed the market wage.

What is crucial to understand is that the argument here, in favor of a pay-as-you-go system, is entirely based on the fact that if

$$i \quad g + h,$$

then the growing number of young people with their rising wage rate will be able to finance—with increased benefits--a fixed fraction of the population which is retired.

The basic problems involved in this exercise are two:

- Why should there be a condition of balanced growth at which $i < g + h$? We will show later that this expectation is unreasonable.

- Why should we assume that the population grow at a constant rate? If a sudden decline in the rate of growth of population occurs—which is in fact the reality of the last 20 years--then all the calculations above become irrelevant.

Thus, either when $i > g + h$ or when fluctuations in the growth rate of population occur, the pay-as-you-go social security system entails intergenerational transfers of wealth and these must be real.

To provide an important insight into the issue of intergenerational transfers, let us now introduce Samuelson's analysis.

The Samuelson Analysis of Intergenerational Transfers: Evaluation of a Simple Model (Samuelson (1958))

Samuelson's contribution is an involved theoretical piece. Since our objective here is rather limited, let us provide a simple exposition of his model which captures all the underlying conceptual issues. Thus, consider the following assumptions:

- Each consumer in the economy lives two periods: one when he is "young" and the second when he is "old."

- Each consumer receives an endowment of two units when he is yound and 0 when he is old and retired.

- Each consumer has a utility function which exhibits diminishing marginal utility of consumption in each period.

- No production is included in the analysis.

- The overlapping generation structure is such that at any moment of time, a certain fraction of the population is "young" and another fraction is "old." The economy starts off with both young and old where the young have an endowment of two, and the old have a "left over" savings of one. (This assumption has no effect on the analysis.)

The table below gives the flow of endowments to members of various generations (where a "generation" is identified by the time in which it is born).

Flow of Endowments

Generation \ Time	2	3	4	5	6	7	8
1	1						
2	2	0					
3		2	0				
4			2	0			
5				2	0		
6					2	0	
7						2	0
							etc.

Samuelson now makes the observation that when left to their own devices, members of each generation can trade among themselves but cannot make trades with members of the older generation since the older people are unable to make contracts. For example, in period 2 the young members of generation "2" have nothing to trade with the old members of generation "1" since the interest of the young is to move some of their income into period 3 (when they retire), while the interest of the old members of generation "1" is to consume right then since they are expecting to die.

This paradox leads to the conclusion that in a competitive economy (without production), members of each generation will have no choice but to divide their endowment of two units between the two periods of their lives. Samuelson, in fact, assumes that the endowment is not storable, but we make the assumption that it is. It then follows that in a stationary equilibrium, each consumer will select a^* and b^* such that $a^* + b^* = 2$ which maximize a utility function of the type

Thus, the table of consumption flows will take the form

Competitive Consumption Flows

Generation \ Time	2	3	4	5	6	7	8
1	1						
2	a*	b*					
3		a*	b*				
4			a*	b*			
5				a*	b*		
6					a*	b*	
7						a*	b*
							etc.

But now we can make the critical observation that the above competitive allocation is not efficient. To show that this allocation is not efficient, we demonstrate another allocation which is feasible and better for at least one generation and no worse for any other. This is accomplished in the following manner: each generation t when they are young transfers the amount b* to the older generation. This results in the following table of consumption flows:

Efficient Consumption Flows with Intergenerational Contract

Generation \ Time	2	3	4	5	6	7
1	1+b*					
2	a*	b*				
3		a*	b*			
4			a*	b*		
5				a*	b*	
6					a*	b*
						etc.

It is clear from this table that generation "1" increases its consumption from 1 to (1 + b*) while all future generations are no worse off. This is accomplished by postponing forever the time at which society "pays" for the increased consumption of generation 1.

Thus, the "social contract" between successive generations resulted in a better allocation only because the competitive allocation was not efficient. This is not an accident of the numerical example, it is a fundamental principle. What is a bit peculiar in the Samuelson analysis is the special role played by the "start-up" configurations which makes it possible to capitalize on the fact that at time 2 there is a possibility of improving the lot of generation 1. In principle one would want to have an analysis of a situation in which the economy has been in equilibrium for a long time and for which special start-up configurations are not available. We shall return to this issue later.

The Samuelson Example with Capital and Population Growth

One way of itnerpreting the previous analysis is to assume that commodities have no productivity and thus capital accumulation cannot improve output. Samuelson assumed that commodities are perishable and durable capital was not allowed into the world. If, however, we allow capital accumulation and a positive interest rate, no stationary equilibrium can exist unless the population grows or technical progress takes place. We shall carry out this analysis here since Samuelson does nto do it. Thus, let us assume:

- The population grows at the rate n, thus, the growth factor is (1 + n).
- Capital accumulation is possible since capital is productive with an equili- brium interest rate r and itnerest factor of 1 + r.

The total social endowment is pictured in the following table.

Total Social Endowment

Generation \ Time	2	3	4	5	6	7
1	1					
2	2	0				
3		$2(1+n)$	0			
4			$2(1+n)^2$	0		
5				$2(1+n)^3$		
6					$2(1+n)^4$	0
						etc.

Thus, the growing number of people increases the endowment by a growth factor of (1 + n).

Now if an interest rate r is offered in the market, the typical consumer will allocate his endowment between the two periods of his life. Suppost that his allocation is c* in the first period and d* in the second. This means that

c* = consumption when he is young,
d* = (2 - c*)(1 + r) = consumption when retired

It is clear that since the population is growing at the growth rate n, the amount of capital in the economy will grow like $(2 - c^*)(1 + n)^t$, i.e. at the growth rate n. Thus, with production and capital accumulation the consumption flows become

Competitive Consumotion Flows

Generation \ Time	2	3	4	5	6
1	1				
2	c^*	$(2-c^*)(1+r)$			
3		$c^*(1+n)$	$(2-c^*)(1+r)(1+n)$		
4			$c^*(1+n)^2$	$(2-c^*)(1+r)(1+n)^2$	
5				$c^*(1+n)^3$	$(2-c^*)(1+r)(1+n)^3$

Now the question is raised: is this program efficient or is there a possibility of intergenerational contract that will improve upon the allocation?

To answer this question, suppose that generation 2 gives generation 1 a fraction x of its savings. Thus tha amount $x(2 - c^*)$ is transferred from "2" to "1" and this increases the consumption of "1" by the amount $x(2 - c^*)$. Note, however, that this reduces the amount of investment in this economy by the amount $x(2 - c^*)$. Now, each member of generation "2" invests the amount
$(1 - x)(2 - c^*)$. and receive in the next period the income

$$(1 - x)(2 - c^*)(1 + r)$$

On the other hand each member of generation "3" will transfer to generation "2" the amount $x(2 - c^*)$ in the same way that "2" gave to "1". But since there are $(1 + n)$ members of "3", the total transfer is

$$x(2 - c^*)(1 + n)$$

This means that with these transfers, total income of "2" when they retire is

(*) $$(1 - x)(2 - c^*)(1 + r) + x(2 - c^*)(1 + n)$$

Would they agree to the compact? Recall that without the compact their income would have been

(**) $$(2 - c^*)(1 + r)$$

and comparing (*) and (**) we conclude that they will agree to the compact if

$$(1 - x)(2 - c^*)(1 + r) + x(2 - c^*)(1 + n) > (2 - c^*)(1 + r)$$

or

$$(1 - x)(1 + r) + x(1 + n) > (1 + r)$$

or

$$1 + n > 1 + r$$

or

$$n > r$$

And here again we find that if the interest rate is smaller than the growth rate, then the compact will be agreed to. But now notice that if $n > r$, all members of all generations will want to raise the contributions as large as they can since by raising the contributions they are all better off. However, by raising the contributions, what all generations are agreeing to is that they should eat up part of their initial capital stock and thus give generation "1" (the "present" or "initial" generation) a very large windfall. If we assume that the marginal productivity of capital is declining as in Diagrams (1a) and (1b), then the declining capital stock will necessarily cause the interest rate to rise until $n = r$. At this point, no turhter increases in the intergenerational contributions are beneficial to all generations. In fact, when $n = r$, the only benefiting generation is the "present" generation who receives a windfall.

The analysis thus shows that when $n > r$, the society at hand has initially "too much" capital, and the source of the economic inefficiency involved means that society will be better off consuming part of its capital stock and proceeding with this reduced stock. When $n = r$, the growing economy of this section is similar to the stationary economy of the previous section, and transfers from all generations to the "1" (present) generation is possible causing an initial windfall to the present generation.

Typical Production Function

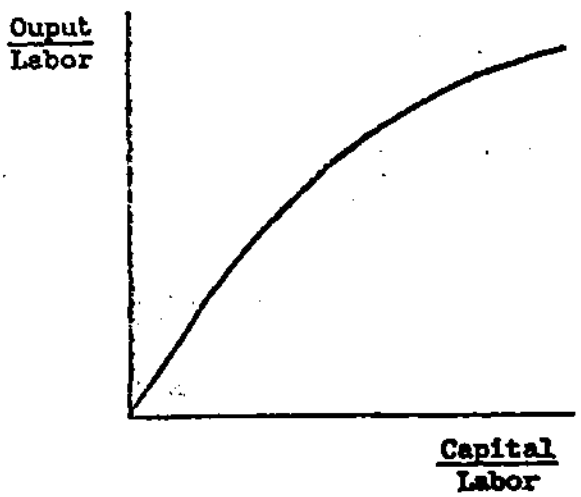


Diagram (1a)

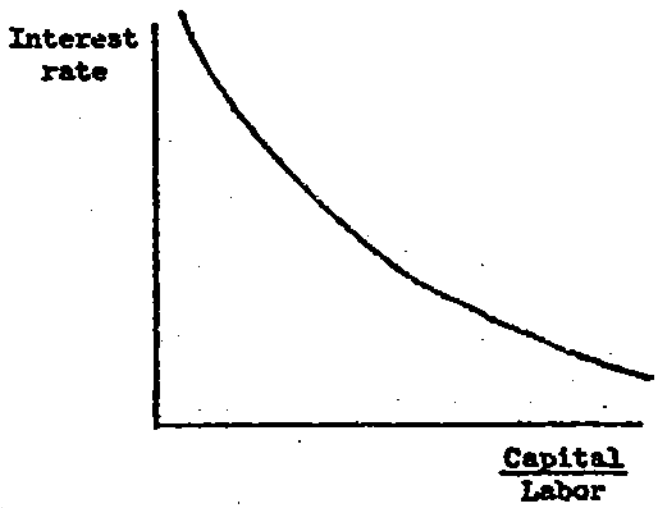


Diagram (1b)

Let us now consider the empirically relevant case $n < r$. If generation "2" gives generation "1" the amount $x(2 - c^*)$, then members of generation "1" consume $1 + x(2 - c^*)$ and they are clearly better off. But now comparing (*) with (**) above we note that each person in each future generation suffers a reduction in consumption of the size

$$R = (1 - x)(2 - c^*)(1 + r) + x(2 - c^*)(1 + n) - (2 - c)(1 + r)$$
$$= x(2 - c^*)(n - r)$$

and since $n - r < 0$ it is clear that $R < 0$. This means that when $n < r$, then the introduction of a pay-as-you-go social security system while maintaining a stationary equilibrium creates an initial windfall to the first generation and a permanent decline in the consumption level of all future generations. If a stationary equilibrium is not desired, a gradual reaccumulation of the intital lost capital is possible.

Conclusion

We may conclude that in comparing balanced growth paths with and without a social security syste, economic theory provides the following insights:

- If the growth rate n exceeds the interest rate r, a pay-as-you-go intergenerational transfer system will make all generations better off. The reason is that in such a syst em the benefits from social security are growing at the rate n while private capital grows at the lower rate r.

- If $n = r$, then the introduction of an intergenerational transfer system will benefit only the first generation but not all the subsequent ones.

- If $n < r$, then the introduction of an intergenerational transfer system on a pay-as-you-go basis will benefit the first generation but will reduce the welfare level of all subsequent generations who will have to contend with a lower capital stock than they would have had without the initial transfer. If subsequent generations decide to abandon the stationary equilibrium, they can, with additional sacrifice, reaccumulate the lost capital.

Social Security and Modern Growth Theory

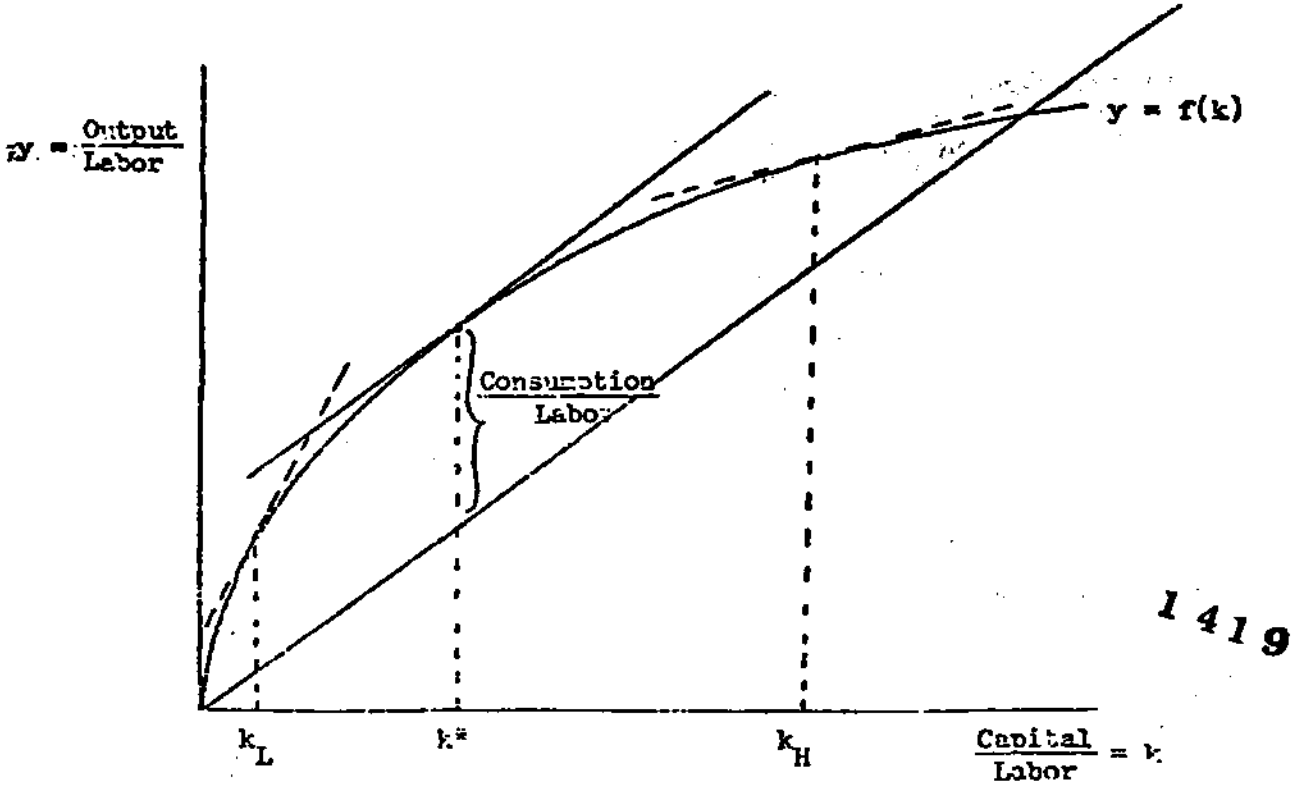
The extensive controversy induced by Feldstein's (1974) paper on the effects of the pay-as-you-go feature of the social security system requires an examination on the theoretical as well as the empirical level. In the present appendix, we examine the theoretical questions.

Feldstein's theoretical views are very simple and they have been discussed in the Commission Working Paper: "Social Security and Capital Formation: The Funding Controversy," (Chapter 33). We can state them here again very briefly: When individuals receive a promise from the government for retirement benefits, they view this pension as a capital asset, and they reduce their own savings by a certain amount. If the social security program operates on a pay-as-you-go basis, then the reduction in private savings generates a deficiency in social capital which Feldstein estimated for the U.S. at two trillion dollars. This argument of "deficiency" in the U.S. capital stock seems to have been contrasted by the Aaron-Samuelson type of arguments which hold that an inter-generational contract could be beneficial to all generations ro, perhaps, to the initial generation at the time of the contract without harming future generations. It is our intent to show precisely under what conditions there exist such a conflict.

The Golden Rule and Economic Efficiency

To fix ideas, let us start with the notion of "The Golden Rule." Using the standard diagram from growth theory, note that at k* - the Golden Rule capital labor ratio - the level of comsumption per capita is maximized. However, note also that at k* the slope of the production function is the same as n. This means that at k*, r = n. Thus, when balanced growth consumption per capita is maximized, then n = r. Moreover, if society had accumulated a larger capital stock, say k_H, then the level of the sustainable consumption percapita for all generations is lower than at k*, and the interest rate of k_H (the slope of f(k) is smaller than n. Thus, r < n means that a social inefficiency was created by accumulating. $k_H > k^*$, and society can simply run down its capital stock by increasing consumption percapita of all generations. If, ont he other hand, society has capital sotck of $k_L < k^*$, then it will have to be content with a lower sustainable consumption per capita for all generations with a higher interest rate. Thus, r > n means that $k_L < k^*$, and society has an amount of capital less than needed to sustain the Golden Rule consumption per capita.

DIAGRAM 2
Analysis of the Golden Rule



The essence of the analysis is to be seen in the fact that at k_H, society is operating its resources inefficiently while at k_L, the allocation is efficient. To understand this curcial principle note that at k_H, society has too much capital and thus by increasing the consumption level of the current generation, society runs down its capital stock while raising its permanent consumption level to the Golden Rule level. Such an option is not available at k_L. A poor economy with $k_L < k^*$ can increase its stationary consumption per capita only by engaging in an extensive program of inducing its current generation to reduce its consumption and save in order to raise the capital stock and raise the consumption level of future generations. In other words, alt ering the level of stationary consumption from that associated with k_L calls for intertemporal choices: lowering the standard of living of some generations in order to raise the level of other generations. The necessity of making such choices is the indication of intertemporal efficiency.

We can now use the above reasoning to evaluate the so-called "Social Security Paradox." The analysis below will, in essence, dispose of the "Paradox" as irrelevant and suggest that in the relevant case of r n, the economy is operating efficiently and all decisions to increase private savings imply intergenerational distribution of wealth.

Note again that according to Aaron and Samuelson (analysis with capital and growth), a pay-as-you-go social security system will benefit all generations if

$$r < n$$

But we have seen that if $r \leq n$, then society is operating its capital stock inefficiently since it has "too much" capital, and it needs to run it down a bit. In this case, social security or any other social program that will induce consumption will be beneficial. This means that the government could, in this case, achieve the same objectives by taxing savings or subsidizing consumption. Why the burden of correcting social inefficiency should fall on the shouldes of the social security system is not obvious at all. What is clear is that whenever $r < n$, the economic environment will favor consumption over savings as an overall social objective, and transferring funds from the young to the old in order to induce consumption is only one of many ways of functioning in this environment.

Consider now the case of $n = r$. In this case, economic efficiency prevails and society cannot increase the sustainable consumption level of all generations, and thus, a pay-as-you-go social security system will not represent any increase in welfare from the point of view of intergenerational transfers of capital.*

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*It is important to distinguish the insurance aspect of the social security syst em from the issues related to the intergenerational transfers of resources involved with the so-called "Social Insurance Paradox." In this paper, we deal only with the issue of the resources transfer and do not discuss at all the insurance aspect.

We note that in this case a pay-as-you-go system will remain feasible without building excessive reserves or surpluses. Finally, consider the case in which the system was only "recently" started. It is clear that if after the start up r = n, a pay-as-you-go social security system could have generated a windfall which was received by the initial generation. If that "initial" generation occurred many years ago, its significance for public policy is nil.

We can now provide a preliminary evaluation of the "Paradox" for the case r < n:

> If r < n then the Samuelson and Aaron analysis can demonstrate that a social contract increasing consumption will be beneficial because the economy is operating in an inefficient stationary equilibrium, and any consumption inducing policy will improve economic allocation. If r = n, the only beneficiaries are the people receiving the initial windfall, and this may have taken place in the remote past. It is also clear the Feldstein's concern with the "deficiency of social capital" means that he does not believe that our society has "too much" capital which it needs to run down but rather, the amount of social capital is such that r >n.

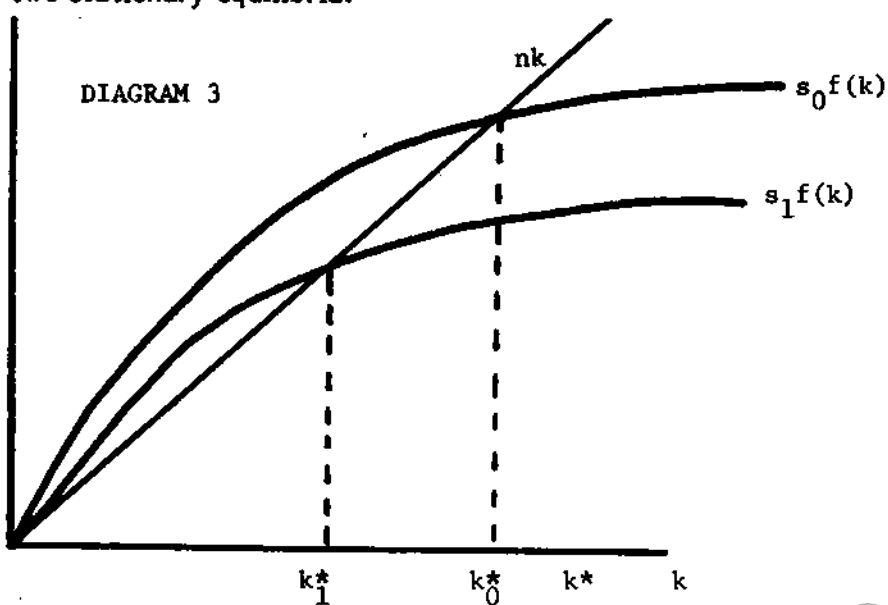
We can thus dispose of the "Paradox" and move on to consider the case r n which presumably interests Feldstein.

Capital Deficiency with a Permanent Reduction in the Savings Rate

Feldstein's conceptual framework for his "capital deficiency" doctrine leaves unclear the issue of whether the decline in private savings ratio declined or that the decrease in the amount of private capital was only due to the initial windfall given to the "start up" generation as in the Samuelson analysis of intergenerational transfers. We shall see below that it all depends upon the way people capitalize their social security taxes.

Thus assume that we adopt a pay-as-you-go social security system and allow the first generation to receive a large windfall gain. But in addition, members of each subsequent generation proceed to capitalize the pension payments which they will receive from the following generation and by acting as if they own a large capital asset they also permanently reduce their savings ratio. In Diagram 3 assume that the introduction of the social security system has indeed reduced the savings rates from s_0 to s_1 where $s_1 < s_0$. Thus we have two stationary equilibria:

DIAGRAM 3

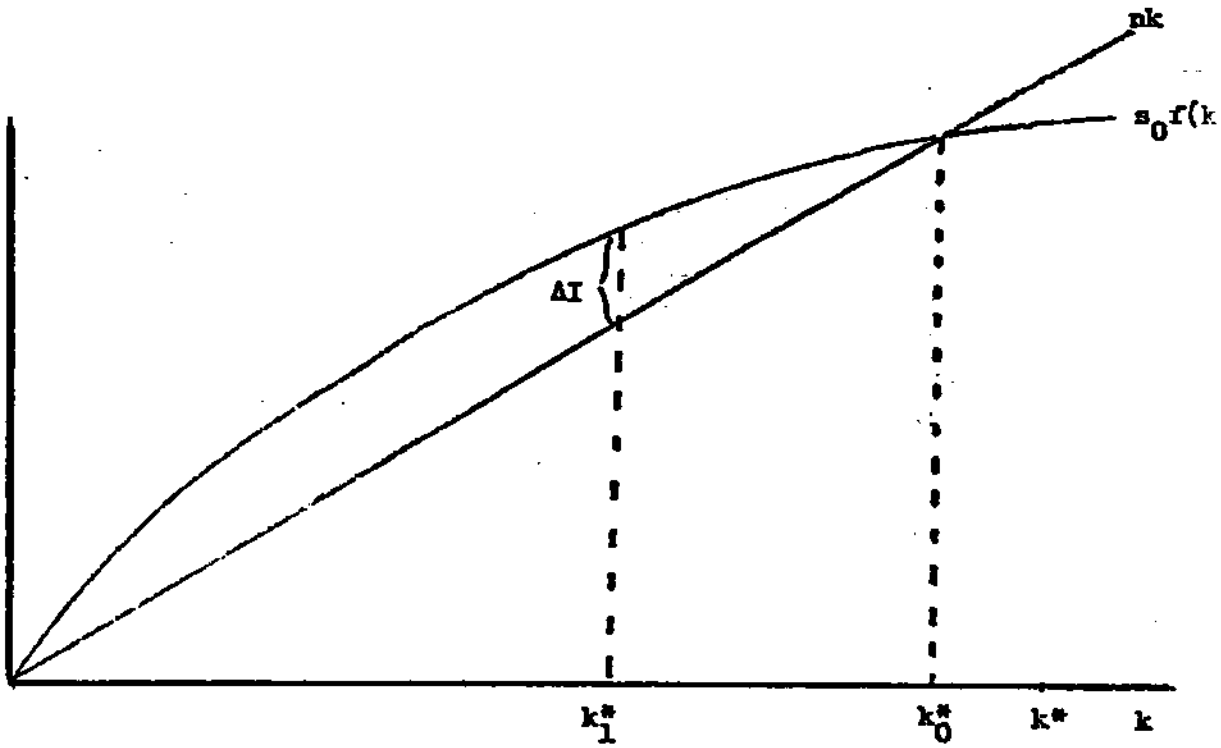


the initial k^*_0 and the "post-social security" equilibrium k^*_1. Note that the initial equilibrium is efficient since $k^*_0 < k^*$, but now note that so is k^*_1. Again assume for the moment that the social security system has been in operation for a long time, and we can disregard the impact of initially introducing the system. It is then clear that both the pre-social secrity and the post-social secuirty equilibria are efficient. If we thus associate the existing social security system with a point like k^*_1, we may note first that at this point the social rate of return on capital is higher than the growth rate. But this means that any alteration in the flow of consumption of old against young people simply represents an income redistribution across generations making one generation better off at the expense of another. Some poeple, including Feldstein, concluded that this implies that the social security system should become fully funded by reaccumulating the "deficiency" ($k^*_0 - k^*_1$). But our analysis clearly shows that such an accumulation will require the present generation to reduce its consumption in favor of future generations who will enjoy the greater abundance of capital. Somehow one senses that behind the "full funding" argument there is the hidden assumption that the present generation should do the reaccumulation since it is this generation that received the windfall to gebin with. This is the reason we conducted the analysis under the assumption that the "initial" generation (the one for whom the social security system was started) occurred a long time ago. Even in the reality of our life, it is obvious that the great windfall could have been experienced by the generation of workers in the 1930-1960 period. Given the fact that the generation of 1979 pays into the social security system what, (on an actuarial basis calculated on the basis of the current interest rate), it will be receiving in return, there is absolutely no ethical or logical basis to demand that the present generation should be the one to reduce its current consumption in order to compensate for the large windfall which may have been experienced by some earlier generation. Moreover, the grgument showing that $k^*_1 < k^*_0$ does not imply that any reaccumulation should be undertaken by any specific generation and no government intervention is called for.

Capital Deficiency with Only an Initial Reduction in the Stock

Since the social security system in the United States was introduced during the depression era, the pay-as-you-go method of finance was viewed as having both counter cyclical advantages as well as the advantage of encouraging the retirement of elderly workers who did not have pension or retirement income. During this initial phas an extensive windfall may have been given to the starting gerneration but as the system matured the situation has changed: the social security tax rates have been raised to a point where the present and future generations will pay more than the actuarial value (discounted by market interest rate) of the pensions which they will receive. The difference will represent the lingering obligations of the system to those who received the initial gain. Given that, people note the excessive tax rates which they and their children need to pay above and beyond the value of pensions which they will receive, they do not reduce their private savings rate but rather continue to save at their own traditional rate. This situation is shown in Diagram 4 where the introduction of the pay-as-you-go system causes an initial decline in the amount of social capital form k^*_0 to k^*_1 but the savings rate remains at s^0. In this case the deficiency of capital will induce additional capital formation at the annual rate of ΔI making the economy move slowly back to k^*_0. In this case people have already accepted a standard of living lower than the one implied by k^*_0 and they are reaccumulating the deficiency at their own private page. The path which is selected by the private sector is clearly efficient and the argument presented above holds equally well: there is absolutely no logical or ethical reason why

DIAGRAM 4



today's generation should be made to suffer doubly for the windfall of yesterday's generation, by being required by itself to fully fund the social security system faster than it wishes, rather than share the buden with other generations.

If Taxpayers Capitalize Taxes, No Capital Deficiency Can Arise

In his objection to Feldstein's analysis, Barro (1977) raised both theoretical and empirical questions. Let us look here at the theoretical issues. Let us note first that Feldstein's original view on the effect of capitalizing the social security benefits was based on individuals ignoring their present and future tax obligations. Barro holds the view that individuals recognize that the provisions of social security benefits mean that some future taxes will have to be imposed in order to pay for the promised benefits. These taxes may be paid by today's generation, then people today will increase their savings in a way corresponding to the rise in the promised benefits, in order to pay the taxes which will be used to pay the benefits. If the taxes will be imposed on tomorrow's generation, then both the parents (today) and their children (tomorrow) will save more to pay for the future taxes to be imposed on the children. In either case, complete capitalization of future taxes will neutralize the capital "deficiency" proposed by Feldstain.

Barro pointed out that, in practice, an extensive amount of private intergenerational transfers have been taking place in our economy and the only real effects of the social security system has been to formalize these transfers via the public sector. More specifically we need to keep in mind that:

- Before the introduction of social security, children used to take care of their parents when parents became old and did not have any assets. This drained the children's resources and the introduction of social security enabled old people to live on their own, inducing the children to save more.

- For older people with assets who intend to bequeath their wealth to their children, the introduction of social security means less drain on their own capital thus enabling them to save more from their own income from assets, and thus to increase their bequest to their children.

Thus, Barro's point centers around the fact that the aggregate analysis which was presented earlier did not take into account the fact that for families who engage in intro-family intergenerational transfers, the appearance of social security may induce rearrangement of these private transfers.

To put this discussion in perspective, we note that it is related to a deep controversy in the profession related to the issue of "rational expectations." This doctrine implies that when economic agents forecast the activities of the public sector they simply rearrange the pattern of their own economic behavor and this results in the neutralization of the actions taken by the public sector. Thus in an earlier paper, Barro (1974) proposed that government debts and obligations should not be viewed by the totality of taxpayers as true assets since such obligations must be matched by future tax obligations required to pay off such debts. This "rational expectations" approach led Barro to argue that in relation to the social security obligations of the government, individual taxpayers rationally rearrange their private intergenerational trtansfers so as to neutralize the effect of social security altogether. With this conceptual framework, Barro and others (see, for example, Kochin (1974)) insist that, in general, the aggregate consumption function should depend upon the deficit or surplus of the public sector since individuals capitalize future tax payments implied by such deficits and this influences their consumption. This issue suggested that some of Feldstein's econometric specification was to be questioned.

Synthesis and Summary

We are now ready to put together the above arguments and draw the needed conclusions with regard to the social security system.

It is a basic premise of the theory that the amount of individual savings is detemined, among other things, by the wealth of the individual. If the present value of ayroll taxes paid by an individual is equal to the present value of the benefits received from the social security system, the system has no effect on the wealth of the individual and thus has no effect on his savings. At today's rates of taxes and benefits, an individual worker probably pays in taxes about what he will receive in benefits and thus contemporary workers certainly do not aggravate the problems of the social security system.

Next consider the previous generation that appears to have paid in taxes far less than the benefits that it has received (and some is still being received). The "rational expectations" view of Barro proposes that rearrangement of private savings was done so that the transfer via the social security system was completely offset by changes in the private transfer system. There are two possible arguments which can be made at this point:

- The private system does not have all the options of the social security system and thus the offset was not complete.

- The social security system came as a surprise to many people who never made the private adjustments.

The above arguments lead to the conclusion that it is possible that the initial generation received a windfall and thus caused some consumption of its capital stock. However, since the savings propensities of today's generation are not influenced by social security, the savings rate today is acting to move the economy slowly back to its equilibrium as in Diagram 4. This movement of the economy is intertemporally efficient and is based on individual preferences. This means that any government intervention to speed up the rate of capital accumulation will penalize the current generation and benefit future generations. In the framework of this theory, there seems to be no justification for such an action.

Let us, in the final step of this synthesis, consider the compound case in which:

- some generations pay in taxes a different amount than they receive in benefits;

- no complete offset of private intergenerational transfers takes place.

In this case, it is possible that the aggregate rate of savings can be influenced but since the interest rate is higher than the growth rate, this change in savings pattern simply represents an intergenerational redistribution of income. It is incorrect to view this situation as one of economic inefficiency calling for public action sicne the choice of the stream of benefits and taxes which are not offset by private transfers do not entail loss of real resources but only their transfer from one generation to the other. Any choice of public action in such a case must be justified on the grounds of income redistribution rather than on the basis of economic efficiency.

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CHAPTER 35; PART I: THE EFFECTS OF PENSIONS ON CAPITAL FORMATION: A FRAMEWORK FOR SAMPLE ANALYSIS

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Objectives

The purpose of this project is to evaluate the patterns of individual responses to the various components of the retirement system in the U.S. More specifically, we want to stufy how the individual pattern of capital accumulation is influenced in our time by the characteristics of our social security and private pension systems.

Two important specifications stated above need to be explained. First, we concentrate here only on the effects of the pension system on private savings and private capital accumulation and not on other economic phenomena. Second, we seek to establish behavioral patterns in 1979-1980. These two restrictions are not to be understood as an effort to narrow the range of the investigation but rather as an attempt to ensure the proper focus of the research. This means, for example, that although the effect of social security on labor supply in general and retirement in particular is a very important issue, we shall study it only in its relation to the problem of private capital accumulation and as part of the effect of the pension system on private savings. Similarly, the social insurance system has developed dramatically in modern time and may have gone through some radical changes. Its past parameters have probably influenced individual behavior in earlier times. However, our panel data consist of only two snapshots of a random sample in Septembr 1979 and September 1980. It then follows that our research can concentrate only on the effects of the retirement system as it is constituted on the current population.

Before proceeding it is important to distinguish between the micro effects of the retirement system (on individual behavior) and the macro aggregation of these effects. The analyses of these two problems are drastically different and are carried out with different techniques. Although our ultimate goal is to discover the aggregate effect of the retirement system on the social rate of capital accumulation, the methods adopted here aim to study only the micro effects of the system on the individual rate of capitgal accumulation. Aggregation of these effects will be carried our in Part II of this chapter.

The Theory of Household Saving Behavior

In this theoretical section we shall review the basis for the alternative econometric models proposed in the following section. This does not mean that we have one unified theory from which alternative

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hypotheses may be proposed. The contrary is true. We have a range of theories which make different predictions and imply different econometric models. However, most of the models which have been discussed in the literature fall into the "life-cycle" family of models and the range of alternative theories to be discussed falls mostly within this family.

A distinct exception is a Keynesian type of savings theory. The typical aggregate Keynesian savings function is written:

$$S_t = f(Y_t, r_t)$$

where

S_t = level of aggreagate savings

Y_t = level of aggregate income

r_t = level of the interest rate

Thus an individual savings function will be postulated as being of a similar character. Such an individual savings function will be based on the idea that except for their current income, consumers do not have a source of financing for their purchases since their assets are invested in forms which do not lend themselves to easy conversion from stocks to flows. Also, accordng to this theory, due to capital market inperfections consumers cannot borrow enough to reallocate consumption over time by using projected accumulated assets as a base.

In the development below we will suggest a simple Keynesian model as a first econometric model to be estimated. Most of the development and the differences of views will take place within the life-cycle theory of savings.

The Life Cycle Theory Without a Pension System

The theoretical development in this and following sections will relate to a very extensive literature availability. Some of the contributions which can be mentioned included Ando and Modigliani (1963), Baro (1977), Feldstein (1974), (1976), Feldstein and Pellechio (1977), Kotlikoff (1979), Munnel (1974), and others. Thus, we shall present here a rather general model of individual behavior. The discussion below relates to a typical individual i and since this index is never used, it will be omitted. Thus,

ignoring for the moment all tax considerations (or thinking of all magnitudes as net taxes), let

c_t = consumption of the individual at time t

e_t = level of work effort of an individual at time t. This is measured by fractions since 1 will be assumed to be the level of full time work per unit of time.

w_t = wage rate at time t

r_t = interest rate at time ti

w_t = wealth of the individual at time t

B = bequest received by the individual at the start (before t = 0) or during the life of the individual but discounted to time 0.

B_T = bequest to be ieft by the individual at time T

T = length of life.

Writing the utility function of the individual as

(2.1) $u((c_0,e_0), (c_1,e_1), (c_2,e_2),\ldots,(c_T,e_T), B_T)$

we define

$$\epsilon_t^\rho = \begin{cases} 1 & \text{if } t = \rho \\ (1 + r_{\rho+1})(1 + r_{\rho+2}),\ldots,(1 + r_t) & \text{if } t > \rho \end{cases} .$$

Now using (2.2) we write the budget constraint of the individual as

$$(2.3) \qquad B + \sum_{\rho=0}^{T} \frac{e_\rho w_\rho - c_\rho}{\epsilon_\rho^0} - \frac{B_T}{\epsilon_T^0} = 0$$

If $r_t = r$ = constant, then this constraint becomes

$$(2.3') \qquad B + \sum_{\rho=0}^{T} \frac{e_\rho w_\rho - c_\rho}{(1 + r)^\rho} - \frac{B_T}{(1 + r)^T} = 0$$

If the household maximizes (2.1) subject to 2.3) it determines its optimal levels of (c_t,e_t) and B_t. These can then be written as

$$(2.4a) \qquad c_t = \psi_t(B,w_0,w_1,\ldots,w_T,r_0,r_1,\ldots,r_T)$$

$$(2.4b) \qquad e_t = \Psi_t(B,w_0,w_1,\ldots,w_T,r_0,r_1,\ldots,r_T)$$

$$(2.4c) \qquad B_T = \phi(B,w_0,w_1,\ldots,w_T,r_0,r_1,\ldots,r_T) \quad .$$

From (2.4a)-(2.4c) we can derive the individual's real, non-human, wealth function W_t which is defined recursively as follows:

$$
\begin{aligned}
W_0 &= B + e_0 w_0 - c_0 \\
W_1 &= W_0(1 + r_1) + e_1 w_1 - c_1 \\
&\vdots \\
W_t &= W_{t-1}(1 + r_t) + e_t w_t - c_t
\end{aligned}
\tag{2.5}
$$

similarly, defining current income y_t as

$$y_t = W_{t-1} r_t + e_t w_t$$

it follows that savings s_t must be

$$
\begin{aligned}
s_t &= y_t - c_t \\
&= W_{t-1} r_t + e_t w_t - c_t \\
&= W_{t-1}(1 + r_t) + e_t w_t - c_t - W_{t-1} \\
&= W_t - W_{t-1}
\end{aligned}
\tag{2.6}
$$

It is then clear that both s_t and W_t may be thought of as sequences of endogenous variables which depnd upon the stream of r_t and w_t. Thus, we can write

$$(2.7a)\quad s_t = S_t(B, r_0, r_1, \ldots, r_T, w_0, w_1, \ldots, w_T) \quad t = 0,1,2,\ldots T$$

$$(2.7b)\quad W_t = W_t(B, r_0, r_1, \ldots, r_T, w_0, w_1, \ldots, w_T) \quad t = 0,1,2,\ldots,T$$

It is important to note here that both savings and the wealth profiles of the individual in (2.7a)-(2.7b) are functions of the initial conditions and the entire profile of life-time interest and wage rates. This underscores the fact that in the analysis at hand the individual knows with certainty all future wage and interest rates. If the consumer does not know with certainty the interest and wage rates, then the analysis above must be understood in terms of the expections of the decision maker.

A deeper problem is related to the way which the individual will act if some time was allowed to pass and he may have an occasion to update his decisions. To put it differently, the set of savings decisions specified in (2.7a) for t = o,1,2,...,T must be understood to constitute a plan. If dates (0,1,2,...(t-1)) had already occurred, what should the individual do?

The motivation for our question is the fact that we rarely observe or interview an individual who is just making up his entire life's plan. We usually observe individuals in the middle of their cycle when some past decisions have been made and the individuals are currently making their decisions. Thus, we need a conceptual framework to explain what individuals do in the middle of their life cycle.

One simple answer to the above question is that at time t the individual simply carries out the plans ( ) as specified in (2.4) and (2.7). The justification for this view follows from the "principle of

optimality" which is no fundamental dynamic analysis. According to this principle, given the assumption of full information and given the fact that the individual acted optimally up to time t, it is then optimal to proceed at time t according to the plan (2.4)-(2.&) which was drawn up at t = 0.

Now suppose that in reality the individual makes his plans without full information nd as time passes he attains new information. Moreover, over time some unexpected changes may occur in his marital status, health, mental state, etc. Given such changes, the individual may reconsider the optimization (2.1)-(2.3) at all time points after the initial date (at which the plan was drawn) as an ongoing flexible update procedure. Thus, at time t, when past $(\bar{c}_\rho, \bar{e}_\rho, \bar{w}_\rho,\ \rho < t)$ are given, the individual utility is is

$$(2.8)\quad u((\bar{c}_0,\bar{e}_0),(\bar{c}_1,\bar{e}_1),(\bar{c}_2,\bar{e}_2),\ldots,(\bar{c}_{t-1},\bar{e}_{t-1}),(c_t,e_t),\ldots,(c_T,e_T),B_T)$$

where only $\{(c_t,e_t),(c_{t+1},e_{t+1}),\ldots,(c_T,e_T),B\}$ are free variables. consumer would maximize (2.8) subject to the budget constraint

$$(2.9)\quad (1+r_t)W_{t-1} + \sum_{\rho=t}^{T} \frac{e_\rho w_\rho - c_\rho}{\varepsilon_\rho^t} - \frac{B_T}{\varepsilon_T^t} = 0 \quad .$$

This will lead to the set of decision functions defined by

$$(2.10a)\quad c_t = \hat{\psi}_t(W_{t-1},r_t,\ldots,r_T,w_t,\ldots,w_T) \quad , \quad t = 0,1,2,\ldots,T$$

$$(2.10b)\quad e_t = \hat{\psi}_t(W_{t-1},r_t,\ldots,r_T,w_t,\ldots,w_T) \quad , \quad t = 0,1,2,\ldots,T$$

$$(2.10c)\quad B_T = \hat{\phi}(W_{t-1},r_t,\ldots,r_T,w_t,\ldots,w_T) \quad , \quad t = 0,1,2,\ldots,T$$

$$(2.10d)\quad s_t = \hat{S}_t(W_{t-1},r_t,\ldots,r_T,w_t,\ldots,w_T) \quad , \quad t = 0.1,2,\ldots,T$$

$$(2.10e)\quad W_t = \hat{W}_t(W_{t-1},r_t,\ldots,r_T,w_t,\ldots,w_T) \quad , \quad t = 0,1,2,\ldots,T$$

The decision rules (2.10a)-(2.10e) should be, strictly speaking, written as depending upon $[(\bar{c}_0,\bar{e}_0),(\bar{c}_1,\bar{e}_1),(\bar{c}_2,\bar{e}_2),\ldots,(\bar{c}_{t-1},\bar{e}_{t-1})]$ but these can be subsumed as part of the utility function (2.8). The nice thing about (2.10) is that in a world of full information without uncewrtainty these decision rules will yield exactly the same actions as the decision rules (2.4)-(2.7). However, in a world of uncertainty and unexpected changes, the procedure of (2.10) permits the individual to update his plan in view of the new data on his wealth W_{t-1}, his expectations of future wage and interest rates, and, perhaps, his preferences.

In terms of an empirical analysis it should be clear that one can base the analysis on decision rules type (2.4)-(2.7) or (2.10) and these two may or may not yield the same results. The existence of such a difference does not have to be declared as a failure of the life-cycle theory of savings but rather, it may be a result of two different applications of the theory. Conditions (2.4)-(2.7) assume that individuals are always observed carrying out a plan which they had drawn up earlier in life while conditions (2.10) permit individuals to carry out, at each time, the update of their life-cycle plans and where the updates incorporate the learned experience and changes in the state of their information.

We are exploring here the differences between the two approaches since they represent two fundamentally different ways in which the empirical analysis can be carried out. These differences also help explain some different approaches taken to the problem by different authors; we shall return to this matter in the next section.

The Introduction of a Pension System

In introducing a pension system, the life-cycle budget constraint of the individual is altered. To see this, denote

z_t = the tax rate or contribution rate at t imposed on wage income for the pension system, (thus we include here the nonvoluntary contribution or tax).

b_t = the flow of benefits at t from the pension system to the individual.

Thus, the new budget constraint is

$$(2.19) \qquad B + \sum_{\rho=0}^{T} \frac{e_\rho(1 - z_\rho)w_\rho - c_\rho + b_\rho}{\epsilon_\rho^0} + \frac{B_T}{\epsilon_T^0} = 0$$

where

$$\epsilon_t^\rho = \begin{cases} 1 & \text{if } t = \rho \\ (1 + r_{\rho+1})(1 + r_{\rho+2}),\ldots,(1 + r_t) & \text{if } t > \rho \end{cases}$$

This new budget constraint leads to optimal conditions (similar to (2.4a)-(2.4d)) in which the endogenous variables (c_t, e_t, B_T) are defined

$$(2.12a) \quad \hat{c}_t = \hat{\psi}_t(B,(1 - z_0)w_0,\ldots,(1 - z_T)w_T,r_0,\ldots,r_T,b_0,\ldots,b_T)$$

$$(2.12b) \quad \hat{e}_t = \hat{\Psi}_t(B,(1 - z_0)w_0,\ldots,(1 - z_T)w_T,r_0,\ldots,r_T,b_0,\ldots,b_T)$$

$$(2.12c) \quad \hat{B}_T = \hat{\Phi}(B,(1 - z_0)w_0,\ldots,(1 - z_T)w_T,r_0,\ldots,r_T,b_0,\ldots,b_T)$$

However, we can simplify these conditions. To do this the budget constraint (2.11) can be simplified.

Let

$$(2.13a) \quad SW_0 = \sum_{\tau=0}^{T} \frac{b_\rho - z_\rho e_\rho w_\rho}{\varepsilon_\rho^0}$$

$$\vdots$$

$$(2.13b) \quad SW_t = \sum_{\rho=0}^{T} \frac{b_\rho - z_\rho e_\rho w_\rho}{\varepsilon_\rho^t}$$

Thus, one can decompose total wealth W_t into two components

PW_t = private wealth at time t

SW_t = pensions wealth at time t

and by definition

$$W_t = PW_t + SW_t$$

As in (2.5) we define:

$$PW_0 = B + e_0(1 - z_0 w_0 - c_0 + b_0$$

$$PW_1 = PW_0(1 + r_1) + e_1(1 - z_1)w_1 - c_1 + b_1$$

$$PW_t = PW_{t-1}(1 + r_t) + e_t(1 - z_t)w_t - c_t + b_t$$

Finally, as in (2.6) we define private savings at t

$$s_t = y_t - c_t + b_t$$

$$= PW_{t-1}r_t + (1 - z_t)e_t w_t - c_t + b_t - PW_{t-1}$$

$$= PW_t - PW_{t-1}$$

How we rewrite the budget constraint (2.100) as follows:

$$(2.15) \quad B + SW_0 + \sum_{\rho=0}^{T} \frac{e_\rho w_\rho}{\varepsilon_\rho^0} = \sum_{\rho=0}^{T} \frac{c_\rho}{\varepsilon_\rho^0} + \frac{B_T}{\varepsilon_T^0}$$

Since we maximize u subject to (2.15) we obtain the optimum conditions

$$(2.16a) \quad c_t = \bar{\psi}_t(B, SW_0, (1 - z_0)w_0, \ldots, (1 - z_T)w_T, r_0, \ldots, r_T)$$

$$(2.16b) \quad e_t = \bar{\psi}_t(B, SW_0, (1 - z_0)w_0, \ldots, (1 - z_T)w_T, r_0, \ldots, r_T)$$

$$(2.16c) \quad B_T = \tilde{\phi}(B, SW_0, (1 - z_0)w_0, \ldots, (1 - z_T)w_T, r_0, \ldots, r_T)$$

where in (2.16a)-(2.16c) we replace the vector $(b_0, b_1, \ldots, b_T)$ with the single stock measure SW_0. Note that from the definition of S_t and the definition (2.14) we can work out the backward recursion to establish that both s_t and PW_t are determined by optimum conditions like:

$$(2.16d) \quad s_t = S_t(B, SW_0, (1 - z_0)w_0, \ldots, (1 - z_T)w_T, r_0, \ldots, r_T)$$

$$(2.16e) \quad PW_t = W_t(B, SW_0, (1 - z_0)w_1, \ldots, (1 - z_T)w_T, r_0, \ldots, r_T)$$

These last two results are critically important to the specifications below. The level of savings at any time in the life cycle and the stock of private capital are both functions of the exogenous conditions of the entire life cycle: the level of inheritance, the net capital value of the pension system at the initial date, the profile of net wages, and the profile of interest rates.

In a recent study, Kotlikoff (1979) utilized a system like (2.16) to estimate the effect of social security on capital formation. Kotlikoff (1979) made the following simplifications:

- in (2.16) he proposes to replace the wage profile $((1 - z_0)w_0, \ldots, (1 - z_T)w_T)$ by a single measure of the present value (at t) of the household life-time labor earnings.

$$(2.17) \quad Y_t = \varepsilon_t^0 \left[\sum_{\rho=0}^{T} \frac{e_\rho w_\rho}{\varepsilon_\rho^0} \right]$$

  In our treatment here Y_t is an endogenous variable ut Kotlikoff ignores this fact in spite of the fact that he allows for expected early retirement age RA_t to explain some changes in assets.

- Since he uses cross section data, the interest profile $(r_0, \ldots, r_T)$ does not enter the analysis and is ignored.

- The pensions asset SW_0 is divided into two components:

  (a) $T_t = \left(\sum_{\rho=0}^{t} \frac{z_\rho e_\rho w_\rho}{\varepsilon_\rho^0} \right) \varepsilon_t^0$ which is the value at t of the capitalized social security taxes up to t.

  (b) NB_t = net capital balance of the social security system for the individual at t. Formally NB_t is defined by $NB_t = (SW_0) \cdot \varepsilon_t^0 - T_t$

  Kotlikoff suggests, as a working hypothesis, that under the life cycle hypothesis individuals should have exchanged each one dollar of T_t for one dollar of PW_t while the net capital balance

NB_t should have acted as a general increment in the assets of the individual, part of it to be consumed at each time between 1 and T. Thus, by time t the decrease in PW_t due to NB_t would have amounted to only a fraction of NB_t.

- Kotlikoff (1979) proposes a linear specification of (2.16c) to read

(2.18) $$PW_t = \alpha_0 + \alpha_1 T_t + \alpha_2 NB_t + \alpha_3 RA_t + \alpha_4 Y_t + \alpha_5' Z_t + v_t$$

Where Z_t is a vector of other exogenous variables and v_t is the error term. On page 406, Kotlikoff (1979) makes the suggestion that in order to estimate the flow version of (2.18), one needs to differentiate the variables. It is clear from (2.16d) that this is not the case and one should estimate both the flow and the stock equations from the specifications (2.16d)-(2.16e).

In summary, we note that Kotlikoff (1979) provides an example of how the effect of social security on private savings can be measured via the mechanism of (2.16e). Without discussing the detais of his contribution it may be useful to sum up our main objections to the approach taken it that paper:

- Since Kotlikoff does not have data on bequests and gifts (i.e., on B), he simply ignores the variations in B which may be an important explaining variable of PW_t. It is clear from (2.16d)-(2.16e) that this is not a completely satisfactory way of approaching the problem. To assume B = 0 as part of the life-cycle hypothesis is unreasonable.

- If we allow the individual to select an optimal profession and occupation, the profile of wages proposed in (2.16a)-(2.16e) is endogenous. However, replacing it by a discounted value of life-time labor income (correcting for periods of no income due to training) is only partially satisfactory since it leaves labor supply itself an an endogenous variable and life-time income is still endogenous. Kotlikoff employs the least acceptable procedure by using the sum of labor incomes at t and t + 1 as a proxy for the discounted sum of life-time labor income. It is not surprising that his estimated coefficients are very sensitive to the inclusion of thse income variables.

- Kotlifkoff does not seem to be aware of the fact that one may estimate the flow equation (2.16d) with the same variables used in the stock equation (2.18).

- The view of the life-cycle theory taken by Kotlikoff does not allow any updating or correction. We have already suggested that the "principle of optimality" itself can be a basis for a different procedure than the one taken here.

Proceeding from the last point above we now consider how the consumer may update his decision making process at time t if p=o,1,2,...,t - 1 had already occurred. We have discussed this issue before and will simply

apply our earlier stated procedure to the model with a pension system. To accomplish this we use (2.13), (2.14), and (2.15) to write the sequence of budget constraints implied by them:

$$\begin{cases} B + SW_0 + \sum_{\rho=0}^{T} \dfrac{e_\rho w_\rho - c_\rho}{\varepsilon_\rho^0} - \dfrac{B_T}{\varepsilon_T^0} = 0 \\ \\ PW_0(1 + r_1) + SW_1 + \sum_{\rho=1}^{T} \dfrac{e_\rho w_\rho - c_\rho}{\varepsilon_\rho^1} \\ \vdots \\ PW_{t-1}(1 + r_t) + SW_t \sum_{\rho=t}^{T} \dfrac{e_\rho w_\rho - c_\rho}{\varepsilon_\rho^t} - \dfrac{B_T}{\varepsilon_T^t} = 0 \end{cases}$$

The "principle of optimality" or the procedure of rational update suggests that if the optimum plan at 0 is defined by the sequence of functions $(c_t^*, e_t^*, S_t^*, PW_t^*)$, then it will be optimal for the updating consumer to maximize, at each time t, the utility function defined by

$$(2.19a)\quad u((c_0^*, e_0^*), (c_1^*, e_1^*), \ldots, (c_{t-1}^*, e_{t-1}^*), (c_t, e_t), \ldots, (c_T, e_T), B_T)$$

subject to the constraint

$$(2.19b)\quad (1 + r_t)PW_{t-1} + SW_t + \sum_{\rho=t}^{T} \frac{e_\rho w_\rho - c_\rho}{\varepsilon_\rho^{t-1}} - \frac{B_T}{\varepsilon_T^{t-1}} = 0 \ .$$

This optimization problem yields the sequence of decision functions

$$(2.20a)\quad c_t^* = \psi_t^*(PW_{t-1}, SW_t, (1 - z_t)w_t, \ldots, (1 - z_T)w_T, r_t, \ldots, r_T)$$

$$(2.20b)\quad e_t^* = \Psi_t^*(PW_{t-1}, SW_t, (1 - z_t)w_t, \ldots, (1 - z_T)w_T, r_t, \ldots, r_T)$$

$$(2.20c)\quad B_T^* = \Phi^*(PW_{t-1}, SW_t, (1 - z_t)w_t, \ldots, (1 - z_T)w_T, r_t, \ldots, r_T)$$

$$(2.20c)\quad s_t^* = S_t^*(PW_{t-1}, SW_t, (1 - z_t)w_t, \ldots, (1 - z_T)w_T, r_t, \ldots, r_T)$$

$$(2.20e)\quad PW_t^* = W_t^*(PW_{t-1}, SW_t, (1 - z_t)w_t, \ldots, (1 - z_T)w_T, r_t, \ldots, r_T)$$

This system provides a new and different view of the individual choice problem in comparison with (2.16). The critical advantages of (2.20) over (2.16) can be summarized as follows:

- An analysis based on (2.20) does not require the entire history; it is sufficient to have data to two points in time. It is not necessary to know B.

- In (2.20 there is a difference between t (i.e., young people) and T (old people). For young people, occupation and professional choices make the wage profile endogenous while, from the point of view of an update process, such decisions are given facts to older people. Clearly, for a model with full information, no uncertainty, and no unanticipated changes, these distinctions are not basic. However, it we view (2.20) as updating decision rules, then the above distinctions are important.

On the other hand, and analysis based on (2.16) has one drastic advantage over (2.20). The variance of PW_t is large and so are the variances of the wage profile and SW_t. Conversely, the errors in measurement in PW_t may be so large relative to the level of savings defined by $s_t = PW_t - PW_{t-1}$ that a very large same will be needed to carry out an analysis of (2.20) while a smaller one will suffice for (2.16).

One conclusion is very important at this state: that analysis based on (2.20) may yield different results than an analysis based on (2.16). If the strict life-cycle theory of savings is correct, these two models should yield the same results. However, if we take a more flexible approach to this theory of savings is correct, these two models should yield the same results. However, if we take a more flexible approach to this theory and assume that individuals are functioning in a random environment with many unanticipated changes, then the difference between (2.15) and (2.20) will not necessarily be a basis for the rejection of the life-cycle theory but rather a reflection of the added mechanism of updating in response to unanticipated changes. Admitting the need for some additional formalization of the anticipatory mechanism, we shall leave this point for the moment.

Labor Supply and the Early Retirement Issue

From the formulation above it is clear that we did not define "retirement" in any explicit way. For convenience of modeling a date, t_R is called "retirement age" if: $e_t = 0 \quad \text{for} \quad t \geq t_R$

$$b_t = 0 \quad \text{for} \quad t < t_R$$

$$b_t > 0 \quad \text{for} \quad t \geq t_R.$$

However, it is possible that t_R itself is subject individual choice and in this sense it is possible that different choices of t_R will induce different values of SW_t. However, if the retirement system does not encourage early retirement, the values of SW_t will be invariant to t_R. If the system is approximately actuarially fair with respect to early retirement, SW_t may be viewed as an exogenous variable. If the system is not actuarially fair,

SW_t has an endogenous component influenced by the date of retirement.

An alternative way of considering labor supply and the retirement decision is to note that one can view the expression

$$(2.21) \qquad EW_t = \sum_{\rho=t}^{T} \frac{e_\rho w_\rho}{\varepsilon_\rho^t}$$

as the capitalized residual wage earnings at t. One may also take the view that individuals make professional and occupational choices early in life which aim to maximize EW_0. In that sense, EW_0 is determined by ability and is to be taken as an exogenous variable, as would the entire sequence EW_t, which is determined by the occupational and profesional choice. Putting it differently, one's ability determines one' occupational and professional choices and these have normal working hours and normal retirement dates, making EW_t exogenous. According to this view, we may combine (2.19b) with (2.21) to obtain a new budget contraint

$$(2.22) \qquad PW_{t-1} + SW_t + EW_t = \sum_{\rho=t}^{T} \frac{c_\rho}{\varepsilon_\rho^t} + \frac{B_T}{\varepsilon_T^t}$$

Thus, maximizing (2.19a) subject to (2.22) and taking HW_t as exogenous bypasses the entire question of labor supply and early retirement.

If one rejects the above view and wishes to introduce a planned early retirement into the anlysis, one needs to hvae firm observations on planned early retirement. All indications are that even when people reveal their plans for early retirement there is little association between planning and execution. An empirical analysis based on expressed plans which we know to be unlikely to materialize makes very limited sense to us. Moreover, even if we take a random sample of identical individuals who have different amounts of public pensions available to them, variations in SW_t cause variations in PW_t or s_t in accordance with models like (2.20). If an increase in SW_t causes a reduction in the retirement age which inturn causes an increase in savings and capital accumulated PW_t, then it will be observed directly in the relationship between SW_t and PW_t; no intermediate step of "planning for early retirment" is needed We find, for example, Kotlikoff's introduction (in (2.18)) of the expected retirement age as a separate exogenous variable to be a rather peculiar, and perhaps unnecessary, step.

Econometric Specifications for the Capital Formation Study

The General Work Program

The development in the second section was intended to motivate our econometric specifications and, in preparation for that, let us recapitulate the three broad decision functions which we discussed earlier:

- Keynesian decision fuctions were discussed in the introduction to the second section above.
- The decision functions defined in (2.16) are based on an assumed fixed plan throughout the life of the consumer. We shall refer to them as the "fixed accumulation plans" model.
- The updating procedure was defined by (2.20) and we shall refer to it as the "updated accumulation plans" model.

With these terms at hand we can now specify the five models which we shall propose here as a basis for the empirical investigation. These are the basic five variants which we hope to estimate. We expect to cover as wide a spectrum of ideas as possible with in the limited time at our disposal.

- Model 1: A Keynesian savings function.
- Model 2: A flow version of a savings functions based on a "fixed accumulation plan" model. This equation (2.16d).
- Model 3: A stock version of an accumulation function based on a "fixed accumulation plans" model. This is equation (2.16e) and is exemplified in Kotlikoff's (1979) work.
- Model 4: A flow version of a savings function based on an "updated accumulation plans" model. This equation (2.20d).
- Model 5: A stock version of an accumulation function based on an "updated accumulation plans" model. This is equation (2.20e).

Evaluation of Common Exogenous Variables

Although the above is a broad spectrum of models which we shall test, there will be some variations and specific restrictions within each one of these models which we shall examine. In the following sections we shall discuss these specific issues. First, we will explore the common characteristics of all five models.

FUTURE INTEREST AND WAGE RATES - In the estimated equations, the rate of accumulation depends upon the subjective estimates of future interest rates. In some models where we do not use the method of

estimating the capitalized residual earnings EW_t defined in (2.21), we need the profile of future wage rates. The fact is that we do not have adequate information to establish the expected future interest and wage rates. As for interest rates, we shall assume that all individuals assume constant interest rates over time. In order to allow for differences in the subjective interest rates in the cross section we shall introduce the following variables:

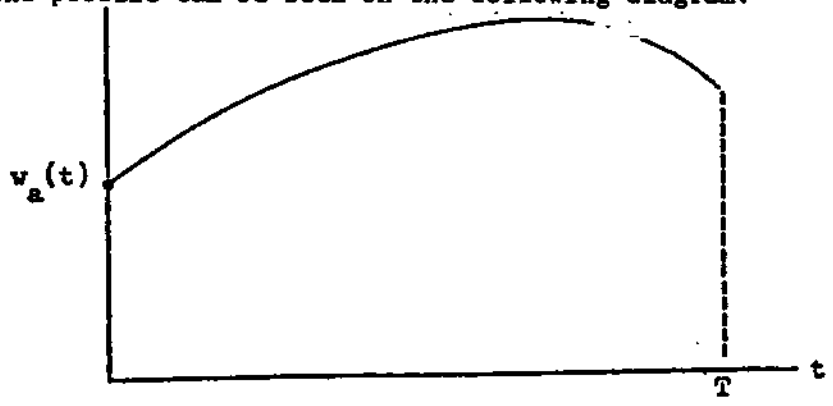
- Home ownership
- total debt

The idea is that individuals with large debts may be unable to borrow any further or may be facing steep credit supply functions. For people with limited borrowing ability, an increase in social security taxes will automatically imply a reduction of consumption. Similarly, a net capital transfer in the form of a future retirement pension may not result in increased present consumption due to the inability to borrow against future assets.

The situation is different with respect to those cases in which we use the wage profile as an exogenous variable. Consider an individual who has wage profile as an exogenous variable. Consider an individual who has a wage rate $w_a(t)$ at calendar time t at which time his age is a. There are standard methods of estimating the future wage profile of such a person where the profile is a sequence like

$$w_a(t), w_{a+1}(t+1), w_{a=2}(t+2), \ldots, w_{a+(T-t)}(T)$$

The profile can be seen on the following diagram:



In fact, this wage profile is constructed by considering first the profile

$$w_a(t), w_{a+1}(t), w_{a+2}(t), \ldots, w_{a+(T-t)}(t)$$

and then estimating $w_{a+k}(t+k)$ from $w_{a+k}(t)$ by projecting it on the basis of productivity increases.

What is unique about this procedure is that for any (a,t) pair, the future wage profile is uniquely determined by the initial condition $w_a(t)$. This means that instead of the entire future wage profile specified in any of the models, one can simply use the current wage-age combination as the basic exogenous variable.

MARITAL STATUS - We shall treat the marital status as exogenous variable but we are not sure how to treat the difference between families and individuals. It is clear that one can aggregate such things as "income" and "assets" but one cannot aggregate "age" or "wage rates" of family members. In principle we need a savings function for individuals as distinct from a savings function for families. On procedure which we may follow is to define a decision model which would be comparable for individuals and families but allows the coefficients to be different for individuals and families. By a proper sequence of F-tests, one can establish which parameters can be regarded as similar and which are different. By combining the data for individuals and families we obviously gain in efficiency. To illustrate the procedure we can write a general function like:

where

s_t = savings

w_t = the wage rate

X_r = other variables

Now we define:

w_t^H = wage rate of the main earner

w_t^W = wage rate of the secondary earner

$$m_t = \begin{cases} 1 & \text{if observation is a two headed family at } t \\ 0 & \text{if observation is not a two headed family at } t \end{cases}$$

Then we can define a new model:

$$(3.2) \qquad s_t = \alpha + \beta w_t^H + \gamma(w_t^W \cdot m_t) + \delta' X_t + \nu_t$$

Comparing (3.1) with (3.2) one sees that (3.2) can accomodate either unrelated individuals for whom we set $m_t = 0$ with s_t as their individual savings, or families for whom $m_t = 1$ and s_t are regarded as family savings. The critical question revolves around the test that (α, β, δ) are common parameters so that if the sample were split into individuals and families, the data generated by each subsample separately will imploy common estimated values of some or all of the parameters (α, β, δ).

INCOME TAX - Thus far in the discussion we have ignored the issue of income taxes. In the empirical work, proper care will be taken to take the exogenous marginal tax rates into acount.

SOCIOECONOMIC VARIABLES - In panel data, extensive care is taken to control for large variations in the population. The following is a provisional list of variables which we intend to incorporate into the set of exogenous variables:

- Race.
- More on marital status: heads who are separated, divorced, or widowed individuals.
- Information on other family members: who they are and their ages.
- Nonwage transfer payments including food stamps, welfare payments, veteran's payments, alimony payments, etc. These will be entered as a separate flow of resources outside of wages and capital incomes.
- Occupation, profession, and level of education.
- Information about status of health, disability.

We shall finalize this list only after completing the review of the quality of the data and the design of the second wave instrument. Of particular concern to us is the problem of expected retirement age as possibly expressed by the respondents and its econometric treatment. We hope to resolve this matter before completing the design of the second wave instrument.

SHORT TERM CYCLICAL PATTERNS - The issue of liquidity, market restrictions, and the distribution of market interest rates faced by individuals are all intimately connected to the problem of cyclical or temporary and unexpected changes in income flows. More specifically, how does the behavior of an individual change if at some point in time he faces an unexpected changes in his circumstances, such as losing his job in a recession, winning a big prize in a lottery, or being seriously injured in an accident. This issue is vital to our study due to the expected recession in 1979-1980, affecting the response of our population and, perhaps, casting a doubt on the validity of the conclusions.

In general, unexpected changes, such as winning a prize or losing part of one's capital simply mean discontinuous changes in assets but behavior may still follow equations (2.20d)-(2.20e) with an appropriate change in PW_{t-1}. An unexpected injury changes future wage rates or the maximum amount of work the individual can do (in (16d)-(16e) it is assumed that $e_t \leq 1$ while a disability may change this. Both life-cycle and Keynesian savings functions will indicate some effect of such changes in assets on current consumption and savings, with the life-cycle theory probably indicating a larger effect.

The much more complex issue is related to an unexpected, temporary reduction in income due to unemployment. A Keynesian type of savings function would anticipate a large change incurrent consumption while a life-cycle consumption function will indicate an effect on current consumption based on the capitalized loss due to involuntary umemployment. More precisely, if the individual was involuntarily unemployed h hours during a year while his unemployment compensation was u per hour, his loss for the year was $(h - u)w_t$ which is an unexpected reduction in his planned wealth. In the context of modeling the savings function, unexpected unemployment first represents a reduction in PW_{t-1} see (2.20) and implies a corresponding decrease in savings. However, note that a change in the aggregate unemployment rate may signal a more risky environment to each individual. In such an environment we might observe a rise in the level of individual savings due to factors not expressed in the models developed above.

The possibility of a recession in the 1979-1980 represents both a promise and a problem. The promise arises from the fact that many individual incomes will experience transitory components and thus enable a sharper test of a Keynesian type savings function, which predict a large effect of transitory factors on current consumption as against the life-cycle type consumption function which would anticipate little effect of transitory income on consumption. The problems are to be found in the fact that our estimated savings level will be abnormal. This does not mean that the estimated effects of the pension system on savings will necessarily be "incorrect," but neither do we have an assurance that the effects were correctly estimated. A few ideas are worth keeping in mind in this connection:

- If the life-cycle type model appears to be satisfactory and a permanent income hypothesis consumption function is estimated, one can use published data to estimate the marginal propensity to consume from transitory income. By constructing the "normal" income and consumption levels, we then could estimate the effects of the pension system on the "projected" normal savings and estimate the effects of the pension system on savings in a "typical" rather than abnormal year. Obviously, following this course of analysis may reduce the reliability of the conclusions.

- If we know the regional location of our sample families, we could introduce an exogenous variable measuring the unemployment level ine ach one of the regions of residence. This will help correct for the transitory components.

- The stock equations based on Model 3 are less sensitive to current conditions since they measure lifetime accumulation. Thus, if the unemployment situation becomes truly serious, a two-period formulation of this model may be useful in order to test for the transitory components.

THE TREATMENT OF AGE - The analysis so far related to a specific individual with a specific age. Clearly, two individuals who are identical in all respects, including all assets, but different in age will exhibit different

savings patterns. This means that for different age groups one would expect essentially a different savings function.. Some people deal with age by assuming that the life-cycle theory implies that consumers simply select their consumption to be a constant equal to a fraction of their assets in proportion to the remaining part of their life. (for example, see Munnell (1967)) We cannot assume this since we are permitting endogenous bequest. We also regard this to be a highly restrictive assumption.

On the other hand, age being a continuous variable implies a very extensive information requirement, something which cannot be easily accommodated by a sample of 3,500 families. Our solution to this problem will be to parametrize age as a separate variable but to allow it to interact with the key assets and wage (or income) variables. Such parametrization will be associated with testing for different functional forms.

Specification of Pension Assets

In this study we shall make a sharp distinction between private assets which we denote by PW_t and pension assets, assets which are not fully convertible into cash and are designated by some legal or institutional constraint to be used for the provison of retirement resources. The total amount of pension assets designated by SW_t is composed of a large variety of plans in which the individual may have acquired some assets. For this study we expect to distinguish four categories of pension assets, and these will constitute the basis for the study:

SSW_t = assets accumulated at social security

GSW_t = assets accumulated in public plans,

CSW_t = assets in "defined contributions" private plans,

BSW_t = assets in "defined benefits" private plans.

An important difference among these assets is the degree of confidence people have in ultimately receiving their pensions from the assets in addition to the degree by which these assets are substitutable for private marketable assets. For example, in the Keogh or IRA plans, the individual may even take possession of the funds after paying the appropriate penalty. In others, such as some corporate plans, the individual may feel very insure of his ultimate ability to receive a pension from the plan.

An important difference among some of the plans is the amount of taxes or contributions made by the individual towards the formation of the asset. In some cases the value of the assets exceeds the contributions and in others in the value of the contributions may exceed the value of the asset. The extent of past contributions is important in some models below and it may be useful to clarify the account ing side of this matter. From the definitions of s_t and PW_t in (2.14) note that:

$$(3.3a) \qquad s_t = [PW_{t-1} r_t + e_t w_t - c_t] - z_t e_t w_t$$

$$(3.3b) \qquad PW_t = [B\varepsilon_t^0 + \sum_{\rho=0}^{t} e_\rho w_\rho - c_\rho)\varepsilon_t^\rho] - \sum_{\rho=0}^{t} z_\rho e_\rho w_\rho \varepsilon_t^\rho$$

Where (3.3b) was obtained from (2.14) by recursion. Now denote that:

$$A_t = B\varepsilon_t^0 + \sum_{\rho=0}^{t} (e_\rho w_\rho - c_\rho)\varepsilon_t^\rho$$

$$TW_t = \sum_{\rho=0}^{t} z_\rho e_\rho w_\rho \varepsilon_t^\rho$$

and (3.3b) can be written as

$$(3.4) \qquad PW_t = A_t - TW_t$$

Note that A_t can be interpreted as the potential gross value (before taxes) of accumulated assets of the individual and TW_t is the total capitalized taxed or contributions made by the individual into his pension system. Obviously, the fact that an individual made a contribution does not assure him the accumulation of pension capital. Specifically, the expression

$$(3.5) \qquad \Delta_t = (SW_t - TW_t) = W_t - A_t$$

represents the net gain the individual received from the system, relative to his actual potential private assets A_t. We can write

$$(3.6) \qquad PW_t = (W_t - TW_t) + \quad _t.$$

In some instances, it is useful to discuss the effect of TW_t holding Δ_t constant, in which case taxes paid may be substituted for private assets, dollar for dollar. In other cases, one discusses changes in Δ_t holding TW_t constant, in which case the individual may not choose to maintain W_t constant and elect to consume parts of the gain over his lifetime.

Without discussing the way we formulate it specifically, the objective is to study the effect each of the pension assets has on the private rate of capital formation. In estimating any of the savings or accumulation equations below we shall aim to discover the way each component of the pension system affects savings and capital formation.

The Keynesian Savings Function

The formulation of a Keynesian-type savings function is our first task. To do that let:

o_t = payments at t into the pension system

$= z_t e_t w_t$

y_t = net income (including transfers)

$= d(1 - z_t)e_t w_t \quad r_t PW_{t-1} + I_t$

I_t = transfer income

Then, a simple savings function will be written as

$$(3.7) \qquad s_t = \alpha + \beta y_t + \gamma \theta_t + \delta PW_{t-1} + \mu' X_t + \nu_t$$

where X_t is a set of all other variables. In (3.7) savings respond to current net income, current payments into the pension system, some propensity to save out of private assets, and other variables X_t. The essence of the Keynesian-type savings function is seen in the fact that contributions to the pension system (primarily social security taxes) are simply reductions from income and as such they will reduce both consumption and savings by the appropriate marginal propensities. Thus, the null hypothesis of the Keynesian formulation is $\beta = \gamma$.

We do not specify here the set of variables X_t and their interaction with the pension or income variables; this procedure was discussed earlier in the section on exogenous variables.

The "Fixed Accumulation Plans" Model

Given the definition of savings in the second section, the flow version of the "fixed accumulation plans" model can be formulated as:

$$(3.8a) \qquad s_t = \alpha_0 + \alpha_1(B \cdot \varepsilon_t^0) + \alpha_2(SW_0 \cdot \varepsilon_t^0) + \alpha_3 \theta_t + \alpha_4 w_t + \alpha_5' X_t + \nu_t^1$$

or

$$(3.8b) \qquad s_t = \alpha_0 + \alpha_1(B \cdot \varepsilon_t^0) + \alpha_2(SW_0 \cdot \varepsilon_t^0) + \alpha_3 \theta_t + \alpha_4 Y_t + \alpha_5' X_t + \nu_t^1$$

where

$B \cdot \varepsilon_t^0$ = value at t of the initial inheritance

$SW_0 \varepsilon_t^0$ = value at t of the net gain from the pension system

θ_t = the contribution at t to the pension system

Y_t = value at t of the net capitalized life time labor income

The difference between (3.8a and (3.8b) is found in the fact that in (3.8a) we use only w_t while in (3.8b), Y_t.

The idea of the flow version is that at any time the savings plan is rmined by the initial wealth (B), the total lifetime gain from the ion system, the profile of tax rates measured by θ_t, the profile of labor me measured by Y_t, and other variables.

The stock version of the "fixed accumulation plans" model can be ulated on the basis of (2.16e) and the definition (2.14). It can take the oximate form as follows:

a) $$PW_t = \alpha_0 + \alpha_1(B \cdot \varepsilon_t^0) + \alpha_2(SW_0 \cdot \varepsilon_t^0) + \alpha_3 TW_t + \alpha_4 w_t + \alpha_5' X_t + v_t^2$$

b) $$PW_t = \alpha_0 + \alpha_1(B \cdot \varepsilon_t^0) + \alpha_2(SW_0 \cdot \varepsilon_t^0) + \alpha_3 TW_t + \alpha_4 Y_t + \alpha_5' X_t + v_t^2$$

e again $(B \cdot \varepsilon_t^0)$ and $(SW_0 \cdot \varepsilon_t^0)$ as defined before. TW_t is the present ue of all past taxes paid into the system.

Note that in both (3.8) and (3.9)

.0) $$SW_0 \cdot \varepsilon_t^0 = (SSW_0 \cdot \varepsilon_t^0,\ GSW_0 \cdot \varepsilon_t^0,\ CSW_0 \cdot \varepsilon_t^0,\ BSW_0 \cdot \varepsilon_t^0)$$

e (3.10) is a vector of initial net values of the different components of ension system. In a sharper way this brings out one difficulty with the d accumulation plans" model where the individual at age 20 already into account the present value of each one of the components of his on system without necessarily even knowing for which firm he may be ng and what occupation he may have when he is fifty years old.

Both (3.8) and (3.9) propose that accumulation and the savings plans ch individual be dependent upon the various values of assets making up lan plus the profile of the tax rate and wage rates.

ets

Updated Accumulation Plans" Models

In the same way that (3.8)-(3.9) derive their specifications from , the "updated accumulation plans" derive their econometric fications from (2.20). The flow version of (2.20.d) proposes the ring specifications:

1a) $$s_t = \alpha_o + \alpha_1 PW_{t-1} + \alpha_2' SW_t + \alpha_3 \theta_t + \alpha_4 w_t + \alpha_5' X_t + v_t^3$$

1b) $$s_t = \alpha_o + \alpha_1 PW_{t-1} + \alpha_2' SW_t + \alpha_3 \theta_t + \alpha_4 Y_t + \alpha_5' X_t + v_t^3$$

Where SW_t is a vector of pension assets:

(3.12) $$SW_t = (SSW_t, GSW_t, CSW_t, BSW_t)$$

Similarly, the stock version, derived from (2.20e), can be specified as follows:

(3.13a) $$PW_t = \alpha_o + \alpha_1 PW_{t-1} + \alpha_2' SW_t + \alpha_3 TW_t + \alpha_4 w_t + \alpha_5' X_t + \nu_t^4$$

or

(3.13b) $$PW_T = \alpha_o + \alpha_1 PW_{t-1} + \alpha_2' SW_t + \alpha_3 TW_t + \alpha_4 Y_t + \alpha_5' X_t + \nu_t^4$$

The specifications (3.11)-(3.13) represents an updating process of the specifications (3.8)-(3.9)

It is vital to see the difference between (3.8)-(3.9) and (3.11)-(3.13). In the formulation (3.8)-(3.9) the individual is committed to a fixed course of action, and the amount of savings or the level of capital accumulated as of time t are determined by the entire profile of wages, interest rates, and net asset position at the initial point.

In the updating version (3.11)-(3.13), the individual decision maker takes all past events as given and proceeds to make his choice only on the basis of current and expected information.

We believe that the models specified here cover the relevant range hypotheses to be tested.

Some Remarks On Data Limitations

It should be clear from the text that models of the "fixed accumulation plans" type require a great deal of information about the past of each individual, particularly the capitalized value of all bequests, gifts, and other transfers; we combined all these in the term B. In the earlier cited paper by Kotlikoff (1979) equations like (3.9b) were estimated without data on . The interpretation of such a procedure is either that B = 0 or that the distribution of B is included in the error term . Neither of these assumptions is reasonable. B is not uniformly small and not normally distributed across the population. These critical comments do not help our study since we do not have date on B. What it does serve is to indicate that the main weakness of proceeding with models of "fixed accumulation plans" is the lack data on B.

Conversely, attempting to use the flexible updating models like (3.11a)-(3.11b) requires data on savings s_t and assets PW_{t-1} which are reasonably accurates. Serious errors in measurements, extensive missing data, or widespread refusals to provide assets data will render the file relatively useless for the estimation of a reliable savings function. Moreover, even the greatest effort on the part of sampled households may still result in large errors in individual measurement or evaluation of their

TABLE 1 (continued)

U. S. Capital Market Total Annual Returns 1947-1948

	Compound Return	Standard Deviation
U.S. Government Securities		
U.S. Treasury bills	3.51	2.11
U.S. Treasury notes	3.65	3.71
U.S. Treasury bonds	2.39	6.17
Agencies	4.01	3.92
Total	3.17	3.78
Municipal (State and Local) Bonds		
Short-term	2.44	1.37
Long-term	1.69	8.20
Total	1.75	7.62
MARKET TOTAL	6.88	4.65

Tabular Presentation of Asset Holdings

The pension survey provides a uniquely detailed description of the wealth holdings of American families. Appropriate cross-tabulations will permit a descriptive evaluation of the relationship between percent of wealth in pensions, total wealth of families, and distribution of assets by type and age of the family head. In the presentation, these variables will be grouped into a small number of classes, the number dependent on the density of the information, and various combinations of two-way and four-way tables will be provided.

Empirical Tests of the Effect of Pension Assets on Portfolio Risk

The first step is to test all hypothesis drawn from the theoretical literature. Merton (1969) has proposed a multi-asset model which assumes constant relative risk aversion for the individual. The Merton Model is:

$$\bar{w} = \theta\Omega^{-1}(\alpha - r) \tag{4.1}$$

where $\bar{w}$ is the vector representing percent of individual's nonpension portfolio in each asset; Ω is the variance-covariance matrix; $(\alpha - r)$ is the vector of excess returns expected over the riskless rate r; and $1/\theta$ a measure of relative risk aversion.

Equation one can be manipulated to yield a testable relationship. Using (1) note that portfolio variance

$$\bar{w}'\Omega\bar{w} = \theta^2(\bar{\alpha} - r)'\Omega^{-1}(\bar{\alpha} - r) \tag{4.2}$$

- Group three - real assets (net of mortgage): farms, house and other real estate,

- Group four - higher risk assets: stock, options, partnerships, IOUs, expected bequest from some source, patents, rights.

For each group, an asset on which historical data is available will be picked and used to represent the variance of each asset in the group. Intragroup covariances are assumed to the zero.

The representative asset chosen for Group 1 is cash. The analysis will be performed using nominal returns, so cash has a zero variance. Although the data we will use reflect nominal rates of returns, these data can be corrected for inflation, thereby permitting analysis in real terms, which we will also consider. The surrogate for low-risk assets will be variance of 50% T-bill/50% T-bond composite. Real estate risk wi-l be represented by the historical variation of farm and residential housing returns. Higher-risk asset variation will be represented by common stock.

Data for Variance Estimation

The historical performance of the representative assets, returns as well as covariances and variances, is found in Ibbotson and Fall 1079. The data are annualized monthly observations from 1947-1948. The mean and variance data are shown in Table 1 below. These means are market-to-market rates of return; that is, the return includes changes in asset value from holding the asset over the period of a year,

TABLE 1

U. S. Capital Market Total Annual Returns 1947-1948

	Compound Return	Standard Deviation
Common Stocks		
NYSE	10.16%	17.73%
OTC	12.63	21.79
Total	10.34	18.02
Fixed-Income Corporate Securities		
Preferred stock	2.92	9.20
Long-term corporate bonds	2.21	6.72
Intermediate corporate bonds	3.87	5.48
Commercial paper	4.27	2.37
Total	2.89	5.53
Corporate Securities Total	8.19	13.84
Real Estate		
Farms	11.69	6.79
Residential housing	6.88	3.28
Total	8.14	3.53

$$a = \theta^2 \frac{\bar{a}_1}{V_{p1}}$$

$$b = \theta^2 \frac{\bar{a}_2}{V_{p2}}$$

$$c = \theta^2 \frac{\bar{a}_3}{V_{p3}}$$

$$d = \theta^2$$

$$e = V_{p1} \quad , \quad f = V_{p2} \quad , \quad g = V_{p3}$$

A Chow test of (1) against (2) will test the hypothesis that the holding of pension assets affects decisions about the individual's non-pension portfolio mix. In addition to providing a test of the hypothesis, this technique has the desirable feature of providing for a test of the effects of different kinds of pension assets and for the estimation of the relative risk coefficient, θ.

While the test above offers the best opportunity to test the effect of pension assets on portfolio composition, it requires assumptions that may not be justified; namely:

- A constant relative risk aversion utility function may not be appropriate.
- The model may be misspecified due to the exclusion of important determinants of portfolio risk, e.g., demographic data about the individual.

To make the results of the study more robust, we propose to test the hypothesis with an alternate model that does not embody these assumptions. That model is of the form:

(4.5) Portfolio variance (exclusing pension assets)

$$= a + b(\% \text{ of pension wealth to total}) + c \quad f(\text{wealth}) + dX$$

where d is a vector of coefficients and X is a vector of demographic variables.

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(4.5) Portfolio variance (exclusing pension assets)

$$= a + b(\% \text{ of pension wealth to total}) + c \quad f(\text{wealth}) + dX$$

where d is a vector of coefficients and X is a vector of demographic variables.

Hypothesizing that this relationship explains this individual's choice of assets, we can estimate the relative risk coefficient, θ, by regressing the weighted variance on a quadratic form involving asset variances and expected returns. We will estimate this relationship first excluding pension assets from the portfolio.

In expanding the model to include pension wealth, we will assume pension returns are uncorrelated with returns from non-pension wealth. This is a reasonable assumption for social security and private defined benefit pension plans, because their return to the individual is unaffected by market fluctuations. Only for defined contribution plans might the assumptions of zero correlation be a questionable one. Merton's model can be expanded so that $w'\Omega w = \bar{w}'\Omega\bar{w} + W_p^2 V_p$ is the percent of the portfolio in pension assets and V_p is the variance of the return to the pension asset. If a similar substitution is also made on the righthand side of (4.2) we have,

(4.3) Portfolio variance

$$= \bar{w}'\Omega w + W_p^2 V_p = \theta^2[(\alpha - r)'\Omega^{-1}(\alpha - r) + (\alpha_p - r)^2 V_p^{-1}]$$

where α_p is the expected return on the pension asset.

Transposing the $W_p 2V_p$ term to the righthand side produces a linear form that can be estimated by ordinary least squares. To test the hypothesis that the pension return characteristics influence the risk level of the remainder of the individual's portfolio, it is necessary to make further assumptions about the unobservables V_p and α_p to take account of variation in risk of different kinds of pension assets. For example, suppose households can be divided into three groups (those with social security benefits only, those with social security plus defined benefit pensions, and those with social security plus defined contribution pensions) and that V_p and α_p are constant within each group. Arguments could be made for other disaggregations of pension assets. Our final choice will be determined after examining the date. This suggests the following specification that can be estimated by ordinary least squares:

$$(4.4) \qquad \bar{w}'\Omega\bar{w} = aG_1 + bG_3 + d(\bar{\alpha} - r)'\Omega^{-1}(\bar{\alpha} - r)$$

$$+ eW_p^2 G_1 + FW_p^2 G_2 + gW_p^2 G_3 + \epsilon$$

where G_1, G_2, G_3 are group dummies and:

mechanism and the process of savings for retirement purposes, this theory notes that without public pensions the private system would have established an allocation which is optimal for the private sector. Since any increase in the pension benefits of older people must be paid by the younger people who pay the bulk of the social security tax, such a change tends to cause a redistribution among generations. Since this redistribution alters the optimum of the private sector, this theory proposes that both the old and the young will rearrange their private transfer system so as to cancel out the redistributive effect of public pensions. This will take place in the following way:

- For families in which the young support (or expect to support) the old, the amount of support will be reduced by the amount of the tax on the young.

- For families in which the old are rich and do not receive support from their children, they will increase their support of the young (or will increase their inheritance) so that the young will have enough resources to pay the taxes.

Since by readjusting the private transfer system no change would occur in any of the private budgets, it follows that the original private optimum would be preserved and the public pension could not have the claimed effect on private savings.

It is important to note that the argument above does not apply to private pensions. That is, an increase in private pension benefits awarded a worker by a firm will be viewed by that individual as an increment of his private wealth. It is only natural that any changes in private wealth induce some transfers across generations. Thus, changes in private pension benefits will involve intergenerational transfers in the same way changes in the asset portfolios of the family change intergenerational transfers.

The unique feature of a social security system which is financed on a pay-as-you-go basis is that an increase in the benefits of one generation induces in the social security tax rate of the subsequent generation. Thus, increased benefits to the parents combined with the increased taxes paid by the children are the cause for a private rearrangement of transfers across generations.

This theory proposed that if we test directly the existence of an extensive substitution between private transfers and public pensions, we shall be testing the effect of social security on capital formation. The more substitutable private transfers are with public pensions, the smaller the effects of public pensions on private capital formation.

The Empirical Difficulties

In order to test the above hypothesis, the investigator needs an extensive data file on private transfers among family members and the amount of accrued public pension benefits they have. In addition, the file must contain some variations in the amounts of accumulated public pension

The statistical test of pension significance to portfolio risk is a t-test on the b coefficient. The following is an example of one of the variations on (4.5) that will be tested:

(4.6) Portfolio variance (excluding pension assets)

$$= a + b(\% \text{ of pension wealth to total} + \sum_{i=1}^{n} l_i W_i$$

$$+ \sum_{i=1}^{n} m_i A_i + \sum_{i=1}^{n} o_r S_i + \sum_{i=1}^{n} t_i R_i + \epsilon$$

where W_i is net wealth class; A_i is household head age class; S_i is sex of household head; R_i is race of household head.

Wealth and age were treated as discrete groups rather than as continuous variables to deal with the probable non-linearity between wealth and age and the dependent variable. This is similar to Feldstein's method (1976). Other variations on (4.5) will be explored as appropriate.

The Effects of Public Pensions on Intergenerational Transfers

The Issue

Although a great deal of the debate on the effects of social security on capital formation centered around the direct functional relation between the value of social security pensions available to a typical family and the amount of private savings by this family, the basic theory of household behavior suggests an alternative route to this problem; this route is the examination of the structure of intergenerational transfers.

The hypothesis that social security afffects private savings is fundamentally challenged by the theory that individual welfare depends upon the level of the family's own material provisions as well as the level of the material provisions of their parents and children. Because of these family interconnections, the absence of public pensions will induce a complex system of private transfers; parents would take care of their children (including their educational and material needs), and when the parents reach the age of retirement only a few of them would be rich enough to take care of all their own needs. Therefore, the children will be called upon to support them. If the parents are rich enough, they might even leave an inheritance to their children. According to this view (for example, see Barro (1978)), the emergence of a public transfer system is simply a replacement of the private transfer system that would have operated in society anyway. In order to see the connection between this

R_i = total value of transfers which family i received during the period in question from other members of the extended family.

G_i = total value of transfers which family i gave during the period in question to other members of the extended family.

HR_i = { 1 if family i shares the same dwelling with other members of the extended family but family i does not own the dwelling and pays no rent for its use.
0 otherwise.

HG_i = { 1 if family i shares the same dwelling with other members of the extended family but family i either owns the dwelling or pays all the rent or expenses of the dwelling.
0 otherwise.

HI_i = { 1 if family i by itself.
0 otherwise.

HS_i = { 1 if family i shares its dwelling with other members of the extended family on the fasis of cost sharing.
0 otherwise.

We now can propose various empirical tests using the above variables. The proposal here concentrates on two but may add some tests later on.

Test 1: General Effect of Assets on Transfers

We consider the entire sample and, holding constant all other variables such as age, income, health status, own pension rights, etc., the general hypotheses can be stated as follows:

R_i declines with the own wealth of family i.

G_i rises with the own wealth of family i.

The reason for this preliminary test is to establish if owned wealth has any effect on transfers. A more complex hypothesis will propose that transfers between i and j depend upon the wealth of i as well as the wealth of j. However, we do not have data on matched families unless they share a

benefits among families in the sample (hopefully ranging from some who have no pension rights at all to some who have maximal benefits). The problem is that such a file does not exist. Furthermore, as time goes by and full social security (or other public pensions) coverage becomes almost universal, it will become impossible to have a file like the one described above since there will be insufficient variations in the availability of public pension rights among families. Therefore, the desired analysis could not be carried out.

We think that our present file has a significant change of being usable for the purpose at hand. This is so for two reasons:

- It appears that there are still some variations in the availability of public pension benefits in the U.S. population of 1980 to enable some analysis since the coverage is not complete as yet; and even among those covered, there are some variations in the level of coverage.

- We have included in our survey a section that seeks to identify direct private transfers between members of the extended family. We do not think it is feasible to obtain data on lifetime private transfers and for this reason we have concentrated on a relatively short period around the date of the interview (one month or one year). Each member of the household is asked to provide the amounts of all forms of private transfers (inheritance, gifts, paying bills or expenses, cash transfers, etc.) which the individual received from or gave to any other member of the household. All members of the extended family outside the household are aggregated but the amounts are provided. Also data on transfers from non-family members are available. This, however, will be treated as all other cash transfers rather than intergenerational in nature. We also have reasonable information on sharing arrangements between children and their parents, particularly as related to living arrangements and household expenses.

A study of this information can be extremely valuable in establishing the extent of the effects of public pensions on the total private system of intergenerational support. Moreover, if public pensions have important influence on such supports, they would provide important indirect evidence against the hypothesis that public pensions cause a reduction in the rate of capital formation. Conversely, if public pensions do not influence the private support system, they would provide additional important support to the view that public pensions do influence private capital formation.

Research Strategy

Since the data we have do not provide a satisfactory evaluation of in-kind transfers, we do not propose to make imputations of these in-kind transfers (mostly those provided in the form of shared home services). Instead, we may rely upon the following dummy variables to measure the effects of in-kind transfer. Thus define the following variables:

If intergenerational transfers are feasible, the individual has a utility function like the following (two generation case):

$$u_t = U(c_t, u_{t+1})$$

where u_t is the utility level of member of generation born at time t and c_t is the consumption level of generation t.

This means that the level of savings s_t^* depends upon the optimal utility level of generation t + 1 which depends, in turn, upon the utility level of t + 2 etc. this means that s_t^* depends upon all the contemporaneous variables in (4.1) but also upon the expected consumption level of all future generations.

Within the model of a family, the savings rate of each person depends upon variables as in (4.1) but also upon the expected consumptin level of his children. Obviously, we do not have data on the expected consumption level of the children. This difficulty cannot be solved by a direct extension of model (4.1).

An alternative modeling of the process of intergenerational transfers will start with the fact that at any moment in time people give and receive under conditions of ignorance of what the future will bring. Thus, an individual i's utility is written as

$$u^i(c_i, g_1^i, g_2^i, \ldots, g_M^i)$$

where c_i is the consumption level of i and g_j^i is the amount i gives to j. Formalizing a rational process of private transfers will lead to the statement that

$$g^i = \sum_{j=1}^{M} g_j^i$$

is a function of all the exogenous variables of i. Thus, g^i is treated as a decision variable symmetric to c_i.

dwelling; most of the transfers in our sample occur between a given sampled family and other nonsampled families (about whom we know nothing).

The interest in the above test focuses on the general quetion of the effect of wealth on transfers. If no such effect can be established, it is unlikely that public pensions will have any effect on private transfers. Thus, the value of the present test is in its ability to reject the hypothesis at hand.

Test 2: Examination of Older Families

Since the sample is random, if we consider a group of heads of families within the sample above 55 years old owning the property, we obtain a random sample of that population. Controlling for other variables such as age (within a given age group), incoe, health status, wealth, etc., the proposed theory suggests that on the average older people with a great deal of public pensions will tend to receive less support from other family members. Similarly, after controlling for all other variables, older people who receive more public pensions will tend to transfer more to the younger generation. The hypotheses are:

- R_i decreases with the value of public pension rights family i has.
- G_i increases with the value of public pension rights family i has.
- The probability that $HR_i = 1$ (denoted by $P\ HR_i = 1$) decreases with the value of public pension rights family i has.
- $P\ HG_i = 1$ and $P\ HI_i = 1$ will rise with the value of family i's public pension rights.

The construction of the data files to estimate the above conditional means and probabilities is not a complex problem and should be done as part of the whole process of file creation. Once this is done, the testing of hypotheses can be done at the same time the analysis of the savings function is conducted.

An Extended Family Modeling

A more complex approach to the problem at hand is to expand the theoretical model proposed earlier. This is not a trivial matter since it involves setting up an intergenerational equilibrium for formulating it.

To understand the difficulty, let us consider the optimal behavior of the individual at time t under the update procedure laid down in equation (2.20c).

$$(5.1) \qquad S_t^* = S_t^*(PW_{t-1}, SW_t, (1 - z_t)w_t, \ldots, (1 - z_T)w_T, r_t, \ldots, r_T) \ .$$

CHAPTER 35, PART II: THE EFFECTS OF SOCIAL SECURITY AND PRIVATE PENSIONS ON FAMILY SAVINGS

Mordecai Kurz

The Life-Cycle Hypothesis

The life-cycle theory of savings was developed in the mid 1950s by Modigliani and Brumberg (1954) and until recently provided the conceptual foundations of almost all modern work on the savings pattern of the family. It is rather unfortunate that over the years the life cycle hypothesis received so many different interpretations leaving too much room for ambiguity in its theoretical meaning. For example, in a recent paper Blinder, Gordon and Wise (1980) interpret the hypothesis to be identified with the "permanent income theory" and more specifically express the life cycle hypothesis by the mathematical statement:

$$c_t = c_o (1 + g)^t$$

where consumption at time t(i.e. c_t) is assumed to grow exponentially over the life cycle. We do not accept this interpretation.

It is generally agreed that the "life cycle theory" is a statement of how an economic unit, like a family, allocates its resources intertemporally between consumption and capital accumulation during the life cycle. However, in our view, what distinguishes this theory is the idea that each family should not be viewed as part of an infinite chain of families, each with ties to the past and obligations to the future, but rather it should be viewed as a single (and selfish) decision maker, without any inheritances from past generations and no bequests to future generations. Within this conceptual framework each family selects a consumption and accumulation plan based on the present value of the anticipated flow of its own lifetime incomes. Such a plan may entail the creation of debts early in life followed by a process of accumulation of family capital to be used for the retirement period and the anticipation of leaving no bequests.

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and a budget contraint

$$(2.b) \qquad \sum_{t=o}^{T} \frac{w_t(1 - \ell_t) - c_t}{\rho_t} = k_T$$

where k_T is interpreted as the level of bequest. It is our view that (2.a) - (2.b) is not a theory of family intergenerational transfers and, as an approximation for the desire of a family to leave a bequest to its children, this a meaningless formalism.

To clarify this statement, note that if a family desires to leave a bequest to its own children then the object of concern is the utility level of the children. This means that the formal model for a bequest motive is the interdependence of utilities between parents and their children. Since the utility level of the children depends upon the utility level of their children, it follows that such a model of behavior implies that the utility level of each generation depends both upon the inheritance it receives from the previous generation as well as the utility levels (and consumption levels) of all future generations. This means that a family acting within such an environment has very complex ties to the past and obligations to the future and these require an explicit statement and imply a whole set of restrictions on behavior. It is clear that the model (2.a) - (2.b) contains no such formal statement and if k_T is a "bequest" then the model does not distinguish between a bequest to the family's own children and a bequest to a charitable institution. Moreover, as a form of charitable behavior, the model (2.a) - (2.b) does not require a distinction between charity during the life of the family and charity after the end of its life.

In rejecting (2.a) - (2.b) as a model of bequest and intergenerational transfers, we insist that it is the model (1.a) - (1.b) of the individual optimizing family which represents the life-cycle hypothesis as distinct from a more complex intergenerational equilibrium theory of family behavior which takes into account both past and future generations.

This clarification of the life-cycle hypothesis is made here since the theoretical foundations of the social security controversy is to be found in this hypothesis. The idea that an increase in the family's social security wealth will cause a reduction in the family's savings follows from the assumption that the family will spend all its assets (including the social security wealth) during its own lifetime. Now, since social security benefits are paid after retirement, then, holding the retirement age constant, any increase in social security wealth must ultimately reduce the amount of the family's accumulated savings one dollar for one dollar. This conclusion is correct only if the life cycle theory of saving is true and to that extent testing the effects of social security and private (corporate) pensions on savings requires an equivalent test of the life cycle theory itself.

This paper reports the results of a statistical test in which both the life cycle theory and the effects of social security and private pensions on family savings are evaluated. This analysis is based on a new and most comprehensive data file compiled from a random sample of families in the U.S. taken in September 1979 by the President's Commission on Pension

A non-stochastic version of a model which expresses the essence of the life cycle hypothesis can be stated as follows. Let

t = both time and the age of the earner

c_t = the consumption level of the family at t

w_t = the wage rate of the earner at t

ℓ_t = the amount of leisure of the earner at t

T = the length of life

r_t^τ = the interest rate at t

p_t = the interest factor from to t defined as followed:

$$\rho_t^\tau = \begin{cases} (1 + r_\tau)(1 + r_{\tau+1}).....(1 + r_t) & \text{for } t > \tau \geq 1 \\ 1 & \text{for } t = \tau \end{cases}$$

and for convenience we denote

$$\rho_t^t = \rho_o = 1$$

$$\rho_t = \rho_t^1$$

Now the family is assumed to have a life-cycle utility index

$$(1.a) \qquad U\left((c_o,\ell_o),(c_1,\ell_1),(c_2,\ell_2),.....,(c_T,\ell_T)\right)$$

and a life-cycle budget constraint

$$(1.b) \qquad \sum_{t=o}^{T} \frac{w_t(1 - \ell_t) - c_t}{\rho_t} = 0 \quad .$$

This family will then select an optimal plan of consumption - c_t, leisure - ℓ_t and thus savings $(w_t(1-\ell_t) - c_t)$, so as to maximize it's life time utility U.

In some formulations of the life-cycle theory, the family is also assumed to have some "taste" for bequest and such a motivation is often expressed by a utility function like

$$(2.a) \qquad U((c_o,\ell_o),(c_1,\ell_1),(c_2,\ell_2)....,(c_T,\ell_T)) + v(k_T)$$

$NSSW_t$ = $SSB_t - FSST_t$ = the net present value of social security wealth at t

$NNSSW_t$ = $NSSW_t - PT_t$ = the present value at t of lifetime social security benefits minus taxes.

$LH_t = \sum_{\tau=0}^{t-1} w_\tau \rho_t^{\tau+1} + \sum_{\tau=t}^{T} \frac{w_\tau}{\rho_t^\tau}$ = total lifetime "full" wage income of the wage earner, discounted to time t.

$FH_t = \sum_{\tau=0}^{t-1} w_\tau \rho_t^{\tau+1}$ = present value of past "full" wage income of the earner discounted to time t.

PP_t = present value at t of life time private pensions to which the family is entitled.

A_t = total discretionary assets of the family at time t.

The assets exclude private pension wealth and social security wealth. These asets are not under the control of the family.

Given the above notation we can now write the basic budget constraint of a non retired family at time t:

$$(3) \qquad A_t + \sum_{\tau=t}^{T} \frac{w_\tau(1 - \ell_\tau) - c_\tau}{\rho_t^\tau} + NSSW_t + PP_t = 0$$

hence

$$(4) \qquad A_t = -\sum_{\tau=t}^{T} \frac{w_\tau}{\rho_t^\tau} - NSSW_t - PP_t + \sum_{\tau=t}^{T} \frac{w_\tau \ell_\tau + c_\tau}{\rho_t^\tau}$$

$$= -[LH_t - FH_t] - (NNSSW_t + PT_t) - PP_t + \sum_{\tau=t}^{T} \frac{w_\tau \ell_\tau + c_\tau}{\rho_t^\tau} .$$

The key simplification in our theoretical development entails the omission of the routine first order conditions resulting from maximizing (1.a) subject to (4). Instead we postulate that the family selects an optimal program for which the total value of leisure and consumption goods consumed (i.e. $c_\tau + w_\tau \ell_\tau$) is a linear function of the life time variables. More specifically we postulate that

Policy. This data file has a distinct advantage over all previous data files used to carry out a similar analysis: it contains direct measurements of the key economic characteristics of each family and its members. These characteristics include incomes, wages, work history, private discretionary assets, private pension assets and entitlements, social security wealth and entitlements (obtained by matching the file with the social security record) and other socio-economic variables. Extensive examination of this file at SRI International enabled us to edit most coding errors and reconcile information obtained from various sources. A second wave of interviews in August 1980 enabled an extensive recovery of missing data from the first wave.

We may note that all other studies which utilized micro data files to study the problems at hand were based either on limited segments of the population (e.g. Kotlikoff (1979) study of male household heads between the ages of 45 and 59), or on samples which had major data defects like missing valuation of private pensions and social security wealth (e.g. Munnell (1976), Feldstein and Pellechio (1979)). The study of Blinder, Gordon and Wise (1980) which does utilize excellent valuation of social security wealth is based on a sample of males who were, in 1969, between the ages of 58 and 63. In addition, their sample originates in the Retirement History Survey which has had very serious problems of missing data.

Given the significant advantages of the file at hand we feel that an extensive effort of micro testing of the life cycle hypothesis and the effects of social security and private pensions on private savings is needed. The present paper is only the first step in this direction and further results will shortly be reported.

Formal Modeling With Linear Specifications

General Conceptual Development

We develop our model for a given family with a wage earner of age t and for convenience of exposition we can identify "age" with calendar "time." Special problems arise for two-earner families with two ages, two wage rates, two incomes but a single set of common family assets. The adaptation of the model to this case will be carried out below.

We start with Model (I) above and increase it's realism by introducing a pension structure. To do this let

SSB_t = present value at t of all future social security benefits at t

$FSST_t$ = present value at t of all future social security taxes to be paid

PT_t = present value at t of all social security taxes paid in the past, prior to t.

where ε is a random term.

This means that

$$(9) \quad A_t = \gamma_t^o - [1 - \gamma_t^1]LH_t + FH_t - [1 - \gamma_t^2]NNSSW_t - PT_t - [1 - \gamma_t^2]PP_t + \varepsilon \ .$$

Constructing Tests Of The Life Cycle Hypothesis

Since γ_t^1, γ_t^2 and γ_t^3 are all marginal propensities to consume leisure and consumption goods, the life cycle hypothesis predicts that any increment in LH_t, $NNSSW_t$ or PP_t will be consumed during the lifetime of the family and thus must ultimately result in equivalent reduction in the rate of accumulation of the family assets. This means that although for small ages t it is possible that γ_t^i may be positive or negative, it must also be true that at a later age some consumption must take place and thus becomes positive but smaller than 1 in absolute value. As the unit ages the accumulated consumption rises and γ_t^i should converge to o. This we may sum up with the statement that the life cycle hypothesis predicts that

$$0 < [1 - \gamma_t^i] \leq 1 \quad \text{and for large ages} \quad t \quad [1 - \gamma_t^i] = 1 \ .$$

To test these ideas we shall use the simplest linear approximation for $\gamma^{0,2,3}$ allowing the coefficient to rise or fall with age. Because of the importance of γ^1, we test the simplest quadratic form as follows:

$$(10.a) \quad \gamma_t^o = \alpha_o + \alpha_1 t$$

$$(10.b) \quad \gamma_t^1 - 1 = \beta_o + \beta_1 t + \beta_2 t^2$$

$$(10.c) \quad \gamma_t^2 - 1 = \gamma_o + \gamma_1 t$$

$$(10.d) \quad \gamma_t^3 - 1 = \delta_o + \delta_1 t$$

These specifications lead to the equation

$$(11) \quad A_t = [\alpha_o + \alpha_1 t] + [\beta_o + \beta_1 t + \beta_2 t^2]LH_t + \mu_1 FH_t + [\gamma_o + \gamma_1 t]NNSSW_t + \mu_2 PT_t + [\delta_o + \delta_1 t]PP_t + \varepsilon \ .$$

$$(5) \qquad w_\tau \ell_\tau + c_\tau = g_\tau^0 + g_\tau^1 LH_t + g_\tau^2 NNSSW_t + g_\tau^3 PP_t$$

This specification is made in the spirit of the life-cycle hypothesis in which the key decision variables are functions of the lifetime exogenous variables, however the actual decision profile depends upon age. Here g^0_τ, g^1_τ, g^2_τ and g^3_τ are profile functions.

The linear specification (5) also bypasses the issue of the "expected retirement age" and the effects on savings of this variable. If one treats "retirement" as a discontinuous variable then it acquires a distinct character, different from ℓ_τ which is the privately optimal level of leisure at age τ. In some other studies (see for example Kotlikoff (1979) an endogenous variable called "retirement age" is defined to mean the "expected age of retirement." In estimating the model, this expected age is estimated simultaneously with assets (or savings) since they are both determined by the same lifetime variables. In order to carry out such a program one needs to obtain data on the "expected date of retirement" and such information was, in fact, obtained by the Commission. Using this information we present later a linear model of the retirement decision and estimate it simultaneously with the accumulation equation. The objections to this procedure are two and the first one has already been mentioned: for many people, "retirement" is a process rather than a discountinuous event. The process may start by changing career and lowering the work effort itself. Only at the end of the process does the person withdraw completely from the labor force. Second, the data obtained from people about their expected retirement date is extremely volatile. The "Retirement History Survey" enabled the comparison of the expected date of retirement of men age 58 to 63 in the year 1969 and the actual age at which they later declared themselves as "retired." The correlation between these two variables is surprisingly low.

For the above reasons we concentrate first on the specification (5) of the demand for consumption and leisure. From (5) we have

$$(6) \qquad \sum_{\tau=t}^{T} \frac{w_\tau \ell_\tau + c_\tau}{\rho_t^\tau} = \sum_{\tau=t}^{T} \frac{1}{\rho_t^\tau}\left[g_\tau^0 + g_\tau^1 LH_t + g_\tau^2 NNSSW_t + g_\tau^3 PP_t\right]$$

Now let

$$(7) \qquad \gamma_t^i = \sum_{\tau=t}^{T} \frac{g_\tau^i}{\rho_t^\tau}, \quad i = 0,1,2,3$$

and thus (5), (6) and (7) imply that we can now write a stochastic equation like

$$(8) \qquad A_t = -(LH_t - FH_t) - (NNSSW_t + PT_t) - PP_t + \gamma_t^0 + \gamma_t^1 LH_t + \gamma_t^2 NNSSW_t + \gamma_t^3 PP_t + \varepsilon$$

where X is a vector of other variables which we now specify. These fall into two categories:

- Public Pensions (except social security), These include various civil service and military pension plans and the present value of the sum of all such plans is designated PVPUB.

- Socio-economic variables. These include education, number of children which the family has, race, and disability charcteristics of a head.

A special problem arises with respect to the adaptation of Model (12) for families with two earners. This we shall specify in the next section.

Estimation of Model (12)

Our results will be introduced first for single-earner families and next for two-earner families. The estimated regressions will also aim to examine the sensitivity of the specifications to age and thus three basic versions are investigated:

- Version 1 - follows the specifications of equation (12).

- Version 2 - eliminates from (12) the higher level interactions with age: Y79 x $(Age)^2$, LH x $(Age)^2$, NNSSW x Age and APB x Age.

- Version 3 - eliminates from (12) both the higher level interactions with age (as in version 2) and also the proxy income variable for 1979 (Y79).

The estimates from single-earner families will be presented both for a model that combines male and female heads and also for separate models of families with single male earners and single female earners.

Single Earner Families

Before presenting the estimated coefficients we introduce the notation of some additional variables. This notation was not introduced before although the variables were discussed there and they will be included in the estimates below:

NUMKIDS= the number of children that the family has

EDYRS = number of years of education completed

EDYRSSQ= $(EDYRS)^2$

WHITE = a dummy variable taking the value 1 if the head is white

BLACK = a dummy variable taking the value 1 if the head of the family is black.

The direct estimation of equation (11) enables us to specify those restrictions implied by the life-cycle hypothesis. These are:

2. $\mu_1 = +1$

3. $-1 \leq [\gamma_o + \gamma_1 t] < 0$ and for old ages t the expression should be close to -1.

4. $\mu_2 = -1$

5. $-1 \leq [\delta_o + \delta_1 t] < 0$ and for old ages t the expression should be close to -1.

Some Data Limitations And Other Variables*

The data file contains direct information on A_t, $NNSSW_t$, PT_t and PP_t. A slight problem exists with respect to the valuation of "profit sharing" plans which are apart of the "defined ocntributions" plans and these have been excluded from A_t. The file does have one serious defect in that it lacks complete work and wage history for every member of the sample. Instead we have the following three pieces of information: (a) the wage rate in 1979, (b) earnings in 1979 and (c) specification of all years in the past in which the person worked. With this limited information we projected the 1979 wage rate forward and backward to time to obtain

$$w_\tau = (1.02)^{\tau - t} w_t$$

where t is identified with the age in 1979. Next we proceeded to use w_τ to calculate LH_t and FH_t. This is not a completely satisfactory procedure and for this reason we also introduce Y79, the family wage earnings in 1979, as a proxy which, for a given age cohort tends to be proportional to the lifetime present value of earnings. The interaction of earnings with age follows a similar pattern as in (10.b) and with this we have the specification

$$\begin{aligned} (12) \quad A_t = {} & [\alpha_o + \alpha_1 t] + [\beta_o + \beta_1 t + \beta_2 t^2] LH_t + \mu_1 FH_t \\ & + [\gamma_o + \gamma_1 t] NNSSW_t + \mu_2 PT_t \\ & + [\delta_o + \delta_1 t] PP_t \\ & + [\eta_o + \eta_1 t + \eta_2 t] Y79 \\ & + \zeta X + \varepsilon \end{aligned}$$

*The sample for this study includes all single heads who are not retired and have some work history, and all two-headed families in which at least one head meets this condition.

TABLE 1

Estimated Parameters of Model (12) Single Earner Families
(standard errors in parentheses)

	Version 1			Version 2			Version 3		
	Both Sexes Combined	Male Heads Only	Females Heads Only	Both Sexes Combined	Male Heads Only	Female Heads Only	Both Sexes Combined	Male Heads Only	Female Heads Only
Intercept	-23,466.9 (13,253.8)	38,881.8 (27,959.2)	-32,537.5 (11,464.9)	-27,396.7 (12,591.2)	48,429.4 (26,105.1)	-36,242.3 (10,474.3)	-19,390.2 (12,834.2)	64,208.9 (26,926.4)	-31,907.3 (10,505.0)
Y79	-8.77341 (2.31828)	-6.19711 (4.96919)	-5.94975 (2.44026)	-2.76906 (.82684)	-8.01750 (1.75844)	-.81843 (.75407)			
Y79 x Age	.46789 (.11884)	.21660 (.29138)	.32930 (.12430)	.13781 (.02131)	.01775 (.05119)	.05371 (.01739)			
Y79 x $(Age)^2$	-.00387 (.00134)	.00111 (.00399)	-.00304 (.00135)						
LH	.08272 (.08429)	-.12915 (.15799)	.09785 (.08933)	.02509 (.02153)	.01423 (.04632)	.01509 (.01989)	-.00785 (.01623)	-.12824 (.03240)	-.00017 (.01579)
LH X Age	-.00222 (.00460)	.01275 (.00927)	-.00558 (.00475)	.00078 .00093)	.00499 (.00195)	-.00113 (.00084)	.00241 (.00092)	.00987 (.00187)	-.00005 (.00080)
LH x $(Age)^2$	.00005 (.00004)	-.00006 (.00009)	.00005 (.00004)						
FH	-.18905 (.09682)	-.61046 (.17745)	.05972 (.09206)	-.12301 (.05309)	-.48544 (.09841)	.06501 (.04796)	-.10966 (.05296)	-.43497 (.09923)	.03964 (.04801)
NNSSW	-.00276 (.10774)	.35633 (.21345)	.03660 (.12377)	-.00729 (.03818)	-.04737 (.06278)	.09882 (.03733)	-.00246 (.03902)	-.06501 (.06472)	.10734 (.03742)
NNSSW x Age	.00015 (.00338)	-.01516 (.00812)	.00147 (.00316)						
PT	1.53408 (.37618)	3.08472 (.67946)	.41131 (.33395)	1.55521 (.37576)	3.09759 (.66985)	.45930 (.33149)	2.92777 (.34400)	4.67902 (.63914)	1.18195 (.29431)

PVPUB = total present value of public pension wealth where "public" includes civil service and military.

APB = total value of public and private pension wealth which the family has. APB is thus the sum of PVPUB and PVPRI which is the value of private pension wealth.

Table 1 presents the results for the nine estimated equations: three basic versions and for each we present the results for the combined sample as well as for the samples of male earners and female earners separately.

Comparing first the three versions presented we note that a comparison of version 1 with version 2 reveals that the higher level interactions with age add only little, with the possible exception of single male earners. On the other hand, the omission of the income proxy in version 3 does seem to reduce the quality of the estimates, thus supporting our earlier supposition that the life-time variables LH and FH as constructed do not provide complete information on the "full income" potential of the family.

A rather interesting pattern arises in the comparison between males and females. In general the asset accumulation of males is far more responsive to income and life-time earnings variables than females. On the other hand, female accumulation is more sensitive than male accumulation to socio-economic factors. More specifically we detect the following pattern:

- larger NUMKIDS contributes to the accumulation of single women but not to the accumulation of single men,
- education contributes to the accumulation of single women but not to the accumulation of single men,
- white women tend to accumulate more than single women of other racial groups but this pattern is not present among white single men, and
- holding all variables fixed, single women have a significant propensity to accumulate further with age while single men have a significant propensity to decumulate with age.

Turning now to the critical tests of the life-cycle hypothesis, we shall examine each one of them separately.

Test #1: The Coefficient of LH - Versions 1 and 2 yield essentially the same results. Thus using version 2 we have the following functions:

For the combined sample: .02509 + .00078 x Age.

For male earners only: .01423 + .00499 x Age.

For female earners only: .01509 - .00113 x Age.

Thus for the selected ages of 20, 40 and 60 we have:

The Effects Of LH

	Age = 20	Age = 40	Age = 60
Combined sample:	.04069	.045629	.07189
Male earners only:	.11403	.213830	.31363
Female earners only:	-.00751	-.03011	-.05271

The life-cycle hypothesis predicts that the coefficient is negative and approach the value -1 as age advances. The values estimated above clearly do not support the life-cycle hypothesis.

Test #2 The coefficient of FH - The life-cycle hypothesis predicts FH to have a coefficient equal to +1. The estimated coefficient for males is negative and statistically significantly different from o while for females it is positive but not significantly different from o.

Test #3: The coefficient of NNSSW - Here Version 1 and Version 2 give different results and the conclusions are different for male and female earners. Recall that we are testing against the hypothesis that the coefficient of NNSSW is negative and tends to -1 with rising age.

First, for the combined sample the effect of social security is measured as follows:

- .0027 + .00015 x Age	for Version 1
- .00729	for Version 2
- .00246	for Version 3

Thus for the combined sample the estimate is approximately -.01 (Version 2).

Next for female earners, the coefficient is always positive and rises with age in Version 1. For example, at age 40 the coefficients for female heads are:

.09540	for Version 1
.09882	for Version 2
.10734	for Version 3

For families with a single male earner the coefficient is negative and declining with age in Version 1.

TABLE 1

Estimated Parameters of Model (12) Single Earner Families
(standard errors in parentheses)
(continued)

	Version 1			Version 2			Version 3		
	Both Sexes Combined	Male Heads Only	Females Heads Only	Both Sexes Combined	Male Heads Only	Female Heads Only	Both Sexes Combined	Male Heads Only	Female Heads Only
PVPUB	-.00857 (.06015)	-.03777 (.08535)	.13985 (.08572)	-.00817 (.05847)	-.05428 (.08238)	.14043 (.08370)	-.01888 (.05974)	-.06470 (.08528)	.11408 (.08439)
APB	-.05041 (.09492)	.12694 (.14077)	-.06937 (.13785)	-.05869 (.04404)	-.09896 (.06200)	.05298 (.08347)	-.04281 (.04494)	-.07811 (.06411)	.07218 (.06393)
APB x Age	-.00037 (.00248)	-.00658 (.00393)	.00265 (.00297)						
NUMKIDS	2,110.8 (1,614.4)	-2,187.8 (8,142.3)	1,447.5 (1.117.4)	2,604.4 (1578.6)	384.2 (8,080.9)	1,665.8 (1,065.8)	3,446.5 (1,609.4)	4,682.3 8,835.9)	2,307.0 (1,068.4)
EDYRS	2,114.2 (1,893.8)	-1,908.7 (3,794.4)	2,647.6 (1,524.1)	1,449.1 (1,803.2)	-4,030.3 (3,644.1)	2,637.9 (1,440.2)	-534.5 (1,827.7)	-7,664.3 (3.732.9)	1,933.3 (1,447.1)
EDYRSSQ	-99.04222 (97.40785)	-86.81442 (187.23744)	-42.44321 (81.69846)	-45.20718 (85.69846)	42.20629 (166.05305)	-36.08475 (71.16135)	60.59525 (86.67791)	250.6 (169.2)	-5.34662 (71.54679)
WHITE	6,388.8 (3,933.0)	1,351.6 (7,304.9)	8.661.1 (3,255.9)	6,438.9 (3,938.2)	1,779.3 (7,326.7)	8,698.7 (3,254.4)	6,254.7 (4,024.3)	2,636.9 (7,564.1)	8,233.5 (3,287.6)
BLACK	-1,618.6 (4,808.0)	7,240.8 (9,610.4)	1,866.0 (3,799.0)	-1,881.6 (4,816.5)	-6,635.0 (9,635.0)	1,415.9 (3,794.8)	-1,212.3 (4,992.2)	-4,164.8 (9,965.8)	1,327.2 (3,836.0)
AGE	77.98619 206.62929	-552.8 (473.9)	130.5 (184.9)	165.2 (172.4)	-891.3 (381.1)	198.8 (142.7)	96.06426 (175.96230)	-1,907.4 (392.2)	184.7 (143.5)
R^2	.2590	.3454	.2989	.2542	.3366	.2939	.2198	.3044	.2767
D. F.	1588	687	881	1592	691	885	1594	690	887

We first note that apart from the results related to male earners in Version 1, all the coefficients are not statistically significantly different from o. The results do exhibit different patterns for males and females; while for females the coefficients are positive and rising with age, for males they are negative and declining with age. Altogether, these results are very surprising.

If we use -.07 as an estimate of the effect of private pensions on the accumulation of single-earner families, it says that a one dollar increment of pension assets in the private sector causes a reduction of only $.07 in the private rate of accumulation. This leaves $.94 as a net increment to the social capital stock. Even if we consider the extreme value of -.26786 estimated for single male earners at the age of 60 (Version 1), we can concluded that about $.73 of each one dollar in private sector pension wealth does not get consumed by single male earners before they retire and thus represents a net increment to the social capital stock. It is important to note that we are not computing here the fraction of private pension wealth which is consumed after retirement (a certain part of this capital may be left as a bequest). The reason is that our present sample excludes families in which either the single head is retired or, in the case of two earners, both are retired.

Turning now to public sector pensions, we examine first their effect on the combined sample. These effects are

-.05898 - .0037 x Age	for Version 1
- .06686	for Version 2
- .06169	for Version 3

Using Version 1 we calculate the effect of public pension wealth to be -.08 at the age of 60 and this is in line with the results of Versions 2 and 3. Considering now the differences between the male and female earners we have the following results:

Effect of Public Pensions on Family Savings

	Age = 20		Age = 40		Age = 60	
	Male	Female	Male	Female	Male	Female
Version 1	-.04243	.12248	-.17403	.17548	-.30563	.22848
Version 2	-.15324	.19341	-.15324	.19341	-.15324	.19341
Version 3	-.14282	.18626	-.14281	.18626	-.14281	.18626

Here the coefficients for females are positive and statistically significant in all cases. This result is obviously unexpected by the life cycle hypothesis.

For example, at age 40 the coefficients are:

- .For example, at age 40 the coefficients are:

- .25007 for Version 1

- .04737 for Version 2

- .06501 for Version 3

In Version 1 the negative coefficient is statistically significantly different from o while in Versions 2 and 3 they are not. We also remark that at age 60 the value of the coefficient in Version 1 declines to - .55327.

We thus conclude that both the combined sample the female sample yield estimates which contradict the life-cycle hypothesis. This is not the case with the sample of single male earners: The estimated effect of social security is negative this effect rises (i.e. becomes more negative) with age. Both these results are consistant with the life-cycle hypothesis.

Test #4: The Coefficient of PT - The null hypothesis holds that this coefficient is - 1. The estimated coefficient is positive for all groups and for all three versions and in most cases it is significantly larger than +1.

Test #5: The Coefficient of Private Pensions - Here we distinguish between pensions of public institutions (civil service and military pensions) and private sector pensions. The fact that APB is the sum of PVPUB plus the value of private pension wealth slightly complicates the exposition.

We start with the effect of private pensions wealth on the combined sample. This effect is measured by

- .05041 - .00037 x Age in Version 1

- .05869 in Version 2

- .04281 in Version 3.

Using Version 1, we see that at age 60 the effect is - .07261, which is in line with the estimates of Versions 2 and 3. The situation is a bit more complex in the comparison between male earners and female earners.

For ages 20, 40 and 60, the results are as follows:

Effect of Public Pensions on Family Savings

	Age = 20		Age = 40		Age = 60	
	Male	Female	Male	Female	Male	Female
Version 1	-.00466	-.01637	-.13626	+.03663	-.26786	+.08963
Version 2	-.09896	.05298	-.09896	.05298	-.09896	.05298
Version 3	-.07811	07218	-.078111	.07218	-.07811	.07218

In Table 2 we present the results for the three versions model (12). One notices that the fit of the two earner equations is not as good as was the case for the single earner equations.

Comparing Version 1 with Version 2, we note that the higher level age interactions did make a significant contribution indicating that important age non-linearities are present. On the other hand dropping the Y79 variable in Version 3 did not alter the quality of the estimates in a material way.

Before approaching the five specific tests of the life-cycle hypothesis we note that the specifications of equation (12) do not yield a very statisfactory explaination of the distribution of savings and assets in our society. However, the life-cycle variables do seem to explain some of the variations in asset holdings and some of the interesting socio-economic factors:

- The number of children and the male education have little effect on the rate of accumulation but the wife's education does contribute to increase savings. This confirms the results from the single earner equations.

- The pure age effects are similar to those found in the single earner equations: the male's age contributes to the decumulation of family assets while the wife's age is a cause for further net accumulation.

- The retirement status of any of the earner/heads contributes surprisingly little to decumulation: In both cases the effect is not statistically significantly different from o and in the case of the retirement status of the female earner, the amount itself is neglible ($275.2).

Turning now to the critical tests of the life-cycle hypothesis we shall again discuss them one at a time.

Test #1: The Coefficient of LH - Using Version 1 the coefficient of LH is

$$.12732 - .00481 \times \text{Age} + .00009 \times (\text{Age})^2$$

The values this function takes at different ages are:

.06712 at age 20

.07892 at age 40

.16272 at age 60.

This function reaches a minimum at age = 26 at which point it takes the value .0631. Thus the coefficient of LH is always positive and rises after the age 26. It is then clear that this coefficient does not converge to -1 which is the hypothesis we are testing.

As for males, the coefficients are always negative and significant. They indicate that male earners consume before retirement some $.15 of every dollar saved for them in a public pension. Even according to Version 1, they consume no more than $.31 of that dollar by the time they reach the age of 60.

Two-Earner Families

In order to adapt equation (12) to a family with two earners, all the income and assets variables were first converted into family concepts. Two special problems arose in the construction of the variables LH and FH when one of the earners did not work. A wage equation was developed to impute the missing wage rates needed for the calculations of LH and FH. Because of this approximation we introduced a variable FYRHIST which measures the total number of past years of employment of the female earner and that variable was introduced into the equation. The social security wealth variables for the family were constructed on the basis of the legal provision which specify the entitlements of each head. As for the interaction of Y79, LH, NNSSW and APB with "Age," the age of the male earner was used.

Additional variables were included in the two earner equations in order to take account of a few, potentially important, factors. The notation of these variables is as follows:

MEDYRS = male earner education: the number of years completed.

FEDYRS = female earner education: the number of years completed.

MAGE = age of the male earner

FAGE = age of the female earner

FYRHIST = the number of years of past employment of the female earner

MDISABLD = a dummy variable taking the value of 1 when the male earner is disabled.

FDISABLD = a dummy variable taking the value of 1 when ther female earner is disabled.

MRETRD = a dummy variable taking the value of 1 when the male earner is retired

FRETRD = a dummy variable taking the value of 1 when the female earner is retired.

Our sample is composed of all families in which at least one of the earners was in the labor force in September 1979. Thus no family had two retired or two disabled earners.

TABLE 2

Estimated Parameters of Model (12): Two-Earner Families
(standard errors in parentheses)
(continued)

Variable	Version 1	Version 2	Version 3
MEDYRSSQ	-21.33002 (199.19709)	23.38376 (189.53923)	72.67246 (186.61461)
FEDYRS	2,176.7 (1,405.8)	2,508.9 (1.394.4)	2,664.2 (1,380.1)
MAGE	-2,963.7 (1,205.2)	-1,642.4 (940.5)	-1,616.5 (901.2)
FAGE	2,958.5 (1,130.6)	2,978.3 (954.7)	2,807.3 (925.4)
FYRHIST	352.5 (389.3)	278.3 (390.4)	215.7 (386.2)
WHITE	509.4 (10,694.0)	1,101.1 (10,741.6)	-704.6 (10,677.2)
BLACK	-19,314.9 (13,900.0)	-21,249.4 (13,947.1)	-23,355.5 (13,835.5)
MDISABLD	4,763.0 (36,025.1)	6,434.4 (36,027.3)	3,018.2 (30,621.9)
FDISABLD	51,875.5 (43.726.7)	55,368.4 (43,915.5)	37.325.8 (38,174.4)
MRETRD	-27,107.2 (21,184.5)	-24,457.8 (20,816.5)	-18,920.7 (20,434.6)
FRETRD	-275.2 (130,216.2)	-5,803.8 (130,741.7)	-1,866.8 (130,550.7)
R^2	.1446	.1347	.1316
D. F.	1781	1785	1799

TABLE 2

Estimated Parameters of Model (12): Two-Earner Families
(standard errors in parentheses)

Variable	Version 1	Version 2	Version 3
Intercept	-33,835.1 (36,555.8)	-87,881.8 (33,719.9)	-79,592.1 (33,111.1)
Y79	-10.54351 (4.07097)	1.34714 (1.24621)	
Y79 x Age	.51957 (.18166)	-.00859 (.02621)	
Y79 x $(Age)^2$	-.00519 (.00187)		
LH	.12732 (.08973)	-.05641 (.02606)	-.03073 (.01995)
LH x Age	-.00481 (.00441)	.00356 (.00106)	.00322 (.00105)
LH x $(Age)^2$	-00009 (.00004)		
FH	-.16262 (.07978)	-.16076 (.05878)	-.15524 (.05562)
NNSSW	-.73248 (.24961)	.02878 (.07233)	.02624 (.07203)
NNSSW x Age	.01794 (.00562)		
PT	1.99030 (.43180)	2.10610 (.42272)	2.33528 (.39981)
PVPUB	-.07767 (.07440)	-.07180 (.07372)	-.10072 (.07194)
APB	.24104 (.16765)	-.00194 (.04380)	.02375 (.04019)
APB x Age	-.00535 (.00344)		
NUMKIDS	-1,488.0 (2,657.0)	-964.3 (2,599.7)	-596.8 (2.571.9)
MEDYRS	1,488.4 (3,987.9z)	611.0 (3,868.9)	50.88463 (3,826.24200)

We think it is a fair summary that no large positive or negative effects are found. Public pensions seem to have a coefficient of around -.1 and private pensions have a small coefficient which may drift towards -.1 at around the age 60. This supports our results from the single earner families, which suggest that private sector pensions are not substitutes for private capital accumulation and are not consumed before the age of retirement. The accumulation of such pension wealth is likely to be mostly net addition to social capital stock.

The Effects of Early Retirement

As part of the life-cycle plan, an individual may retire earlier and thus choose to accumulate a larger stock of capital during each of the working years prior to retirement. This larger stock is designed to finance longer retirement. In estimating the effect of "planned age of retirement," one needs to take into account the fact that the age of retirement is an endogenous variable and thus a simultaneous equation procedure is called for. We have already indicated our reasons for initially ignoring this retirement age effect. Here we briefly present the results of a simultaneous equation model in which an additional variable call PLRET, the planned retirement age is explicitly introduced. In Table 3 we present the results for single-earner families and in Table 4 the results for two-earner families. The models presented here are based on Version 2 of those presented above.

A comparison of the estimates presented in Table 3 and those for Version 2 in Table 2 reveal that the introduction of "Planned Age of Retirement" has a negligible effect on the structural parameters. The coefficient of PLRET does have the "right" negative sign in both the equations for the combined sample and the sample of single male earners. The negative sign means that extending the retirement age reduces the accumulation since less captial is needed to finance the shorter retirement period. In the case of the sample of families with single female earners, the sign is positive and not insignificant in magnitude.

Turning now to families with two earners, we present the results in Table 4. In this table we have only one equation which provides the specifications of Version 2 of Table 2 except that we have excluded the last four dummy variables (regarding the state of retirement or disability of one of the heads). Inspection of the parameters in Table 4 and comparing them to "Version 2" in Table 2 reveal that the introduction of PLRET, the planned retirement age, has almost no effect on the main structural coefficients. Moreover the critical coefficient of PLRET is large and significantly different from o but it has the wrong sign[Also, for th sake of brevity we do not present here all the corresponding first stage estimates of the reduced form. We can point out, however, that in that equation the planned retirement age itself is not affected by any of the pension variables.

These results support other researchers (see for example Kotlikoff (1979)) who found that the "planned retirement age" does not add much to the explanation of the distribution of accumulation rates among individuals.

Test #2: The Coeeficient of FH - This coefficient is estimated to be about -.16 and significantly different from o, contrary to the hypothesis that it is equal to +1.

Test #3: The Coefficient of NNSW - Using Version 1 we see that the effect of social security is reflected in the function

$$-.73248 + .01794 \times \text{Age}$$

This function takes the values of

-.37368 at age 20

-.01488 at age 40

-.34392 at age 60.

This suggests that for younger people the social security system depresses savings while it encourages savings for older people. More specifically, for each one dollar of social security assets, a 60 year old person would have increased his cumulative private savings by $.34. This result is contrary to the result which we obtained earlier for families with a single male earner. If we thus turn to Versions 2 and 3 we find that the social security system has no effect on private accumulation.

Test #4: The Coefficient of PT - Here an expected coefficient of -1 is estimated to larger than +2 and highly statistically significant.

Test #5: The Effects of Private Pensions - Concentrating on the coefficients of PVPUB and APB we present the following summary:

Effects of Private Sector and Public Sector Pensions on Private Savings

		Age = 20	Age = 40	Age = 60
Version 1	Private	.13404	.02704	-.07996
	Public	.05637	-.05063	-.15763
Version 2	Private	-.00194	-.00194	-.00194
	Public	-.07374	-.07374	-.07374
Version 3	Private	.02375	.02375	.02375
	Public	-.07697	-.07697	-.07697

TABLE 4

2SLS Estimates of Model (12) With Planned Retirement: Two Earner Families (Version 2)

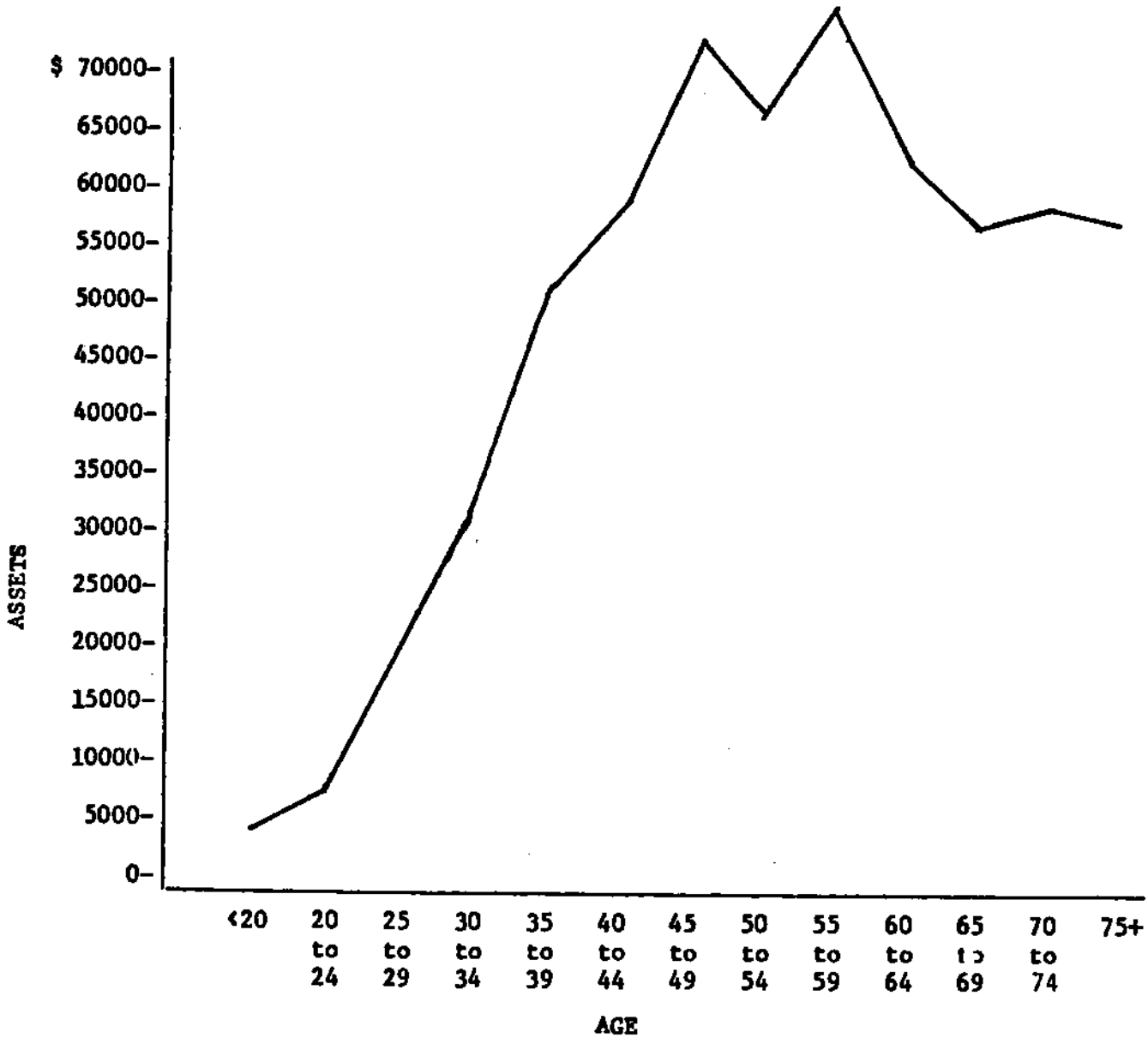
Intercept	-572,576.0 (250,017.3)
Y79	-2.34634 (1.68429)
Y79 × Age	.09786 (.03894)
PLRET	8,355.2 (3,812.7)
LH	-.04753 (.03822)
LH × Age	.00467 (.00188)
FH	-.26667 (.10195)
HHSSW	.01293 (.08760)
FT	2.51385 (.60048)
PVPUB	-.06393 (.09036)
APB	.01168 (.05120)
NUMKIDS	631.9 3,190.7
MEDYRS	5,849.9 (5,051.4)
MEDYRSSQ	-273.8 (244.2)
FEDYRS	1,911.2 (1,788.5)
MAGE	-4,619.7 (4,346.2)
FAGE	4,076.3 (1,499.2)
FYRHIST	341.8 (503.8)
WHITE	2,207.5 (13,548.4)
BLACK	-9,850.5 (19,212.2)
R^2	.1286
D.F.	1521

TABLE 3
2SLS Estimates of Model (12) With
Planned Retirement: Single Earner Families
(Version 2)

Variable	Both sexes combined	Male Heads only	Female Heads only
Intercept	41,305.0 (146,682.5)	347,796.2 (169,190.8)	204,927.0 (90,164.7)
Y79	-2.15524 (1.06133)	-7.49707 (2.33511)	-.05013 (1.07491)
Y79 × Age	.13676 (.02587)	.32980 (.06779)	.04841 (.02235)
PLRET	-1,059.0 (2,306.8)	-4510.4 (2743.6)	2250.5 (1360.4)
LE	.06023 (.02612)	.13832 (.06202)	.02436 (.02416)
LE × Age	-.00237 (.00061)	-.00539 (.00175)	-.00109 (.00048)
FH	.08168 (.02045)	.12584 (.04794)	.05934 (.01574)
MESSW	-.05238 (.04502)	-.13232 (.07706)	.08151 (.04843)
PT	-.22972 (.55381	-.21789 (1.21353)	-.82142 (.49183)
PVFUB	-.01177 (.06613)	-.06112 (.10101)	.02674) (.10396)
APB	-.07361 (.05117)	-.11869 (.07436)	.15596 (.08823)
NUMKIDS	2,868.3 (2,243.5)	-3,038.8 (10,896.4)	2,298.7 (1,569.9)
EDYRS	-1,011.3 (2,360.1)	-10,180.9 (4,979.5)	5,120.1 (2,022.0)
EDYRSSQ	78.87714 (108.29951)	406.0 220.2	-163.33623 (95.99419)
WHITE	8,680.4 (5,413.8)	9,006.4 (11,044.1)	9,811.9 (4,585.1)
BLACK	-3219.2 (7706.7)	-18,721.1 (15,787.9)	5,309.3 (5,861.7)
Age	559.9 (2,208.9)	-478.5 (2,635.0)	648.1 (1,332.8)
R^2	.2698	.3153	.2882
D.F.	1170	526	625

FIGURE 1

MEAN VALUE OF DISCRETIONARY FAMILY ASSETS BY AGE OF PRIMARY EARNER 1979



Source:
Survey of the President's Commission on Pension Policy

Wealth Profile Evidence

The behavioral approach taken in the previous sections demonstrates that the life-cycle hypothesis cannot be the basic underlying theory to explain the savings behavior of the family. This conclusion is also supported by a growing list of studies which directly examines the aggregate wealth profile of the population and finds that the actual profile cannot be explained by the life-cycle hypothesis. These studies are of three types: The first examines the personal distribution of wealth, the second computes the aggregate life-cycle stock which is implied by the age profile of consumption and earnings, and the third examines the tendency of terminal wealth.

Atkinson (1971) and Oulton (1976) examined the personal distribution of wealth in Britain and found that after taking into account the age profile of earnings and realized rates of return, the life-cycle hypothesis explained a very small fraction of the observed inequality of wealth ownership.

White (1978) Darby (1979) and Kotlikoff-Summers (1980) estimate directly the fraction of U.S. total wealth which is due to life-cycle considerations. White (1978) uses a simulation model to find this fraction to be at most 60% while Darby (1978) finds this ratio to be between 13% and 29%. The study of Kotlikoff and Summers (1980) finds this ratio to be about 20%, thus confirming Darby's main conclusion.

The third group of studies focuses on the tendency of terminal wealth of the aged. The life-cycle hypothesis predicts that family wealth should reach a peak around retirement time and then decline rapidly with age reaching negligible amount at the time of death. Mirer (1979) presents evidence that wealth tends to rise with age even after retirement and the two studies by Menchik (1978) and Menchik and David (1980) lend support to the view that wealth at the time of death is close to lifetime peak. We now present some of our evidence in support of this last group of studies.

Since the Commission's file is based on a random sample of the U. S. population in 1979, a direct inspection of the relationship between mean family assets and age provides a simple test of the life-cycle hypothesis. In Figure 1 below we present the mean value of family discretionary assets in 1979 by age groups. As before, "discretionary" assets exclude social security wealth and private pension wealth (private, civil service and military), since these categories of nondiscretionary wealth decline with wealth by their own nature.

The results of Figure 1 are clear and direct: family wealth does not show significant signs of decline after the age of 45-55, although peak wealth does occur between the ages of 55 and 60.

In a policy environment in which we wish to accelerate the rate of capital formation, our results strongly support the policy of encouraging the development of the private pension system. Each one dollar added to this system is likely to result in a net increment of 90 cents to the social capital stock.

Our conclusions here stand in sharp contrast to the dramatic empirical and policy conclusions claimed by Feldstein (1974) and others. However, the rejection of tghe machinary of the life-cycle theory of savings together with its logical implications leaves us with no coherent theory of family savings and the motive to accumulate wealth.

One suggestion is that a much deeper study of the process of intergenerational transfer must be made. One may note that if a motive to accumulate is related to the motive to bequeath, then the theoretical framework for optimal family behavior will require a major reformulation and development; the need to carry out this kind of analysis is clear and urgent.

An opposing view suggests that even if we add up all the possible sources of measureable intergenerational transfers in our society, the total will not reach even half of the amount of the capital which is being transferred annually from older people to the rest of society. This suggests that although the motive to bequeath to one's own children may be present, it is far less comprehensive than one would think. This veiw holds that the motive to accumulate wealth is only marginally related to intergenerational considerations and the real forces behind this motive are yet to be understood.

Implications and Conclusions

The present study, complementing previous studies cited earlier, shows that the life-cycle hypothesis should not be regarded as providing a significant scientific basis for the explanation of the process of capital accumulation in our society. All the evidence suggests that the life-cycle theory is based on a simplistic and perhaps naive view of the motive to accumulate wealth. The hypothesis completely neglects complex intergenerational transfer questions; it also neglects the mystique of the accumulation of wealth in our society and the powerful private urge to succeed and accumulate assets. Wealth, ever on a modest scale, is viewed in our society as far more than the command over consumption; it provides its owner a sense of pride, availability of options, respect of peers and power over others. Thus the drive to accumulate far more than one can possibly consume in one's lifetime is a motive shared by the owners of most of the capital in our society.

With the discarding of the life-cycle hypothesis we must also discard its misleading conclusions with respect to the effects of social security and private pensions on family savings. In this study we find no evidence for the view that social secirty and private pension wealth are substitutable for private capital formation. The evidence suggests that each one dollar increment in social security wealth or private pension wealth results in a negligible decrease in private accumulation before the age of retirement. More specifically we find that

- A one dollar increment in private sector pension wealth reduces private accumulation of wealth before retirement by: $.08 for two-earner families and by $.07 for one-earner families. (This figure may rise to $.27 for families with a single male earner.)

- A one dollar increment in public sector pension wealth (civil service and military) reduces private accumulated wealth before retirement by: $.16 for two-earner families, and by $.08 for one-earner families. (This figure may rise to $.31 for families with a single male earner.)

- A one dollar increment in social security wealth reduces private accumulated wealth before retirement by: $.105 for two-earner families at the age of 40 (this reduction disappears with age) and by $.01 for single-earner families. (For families with a single female earner, the effect of social security seems to raise the accumulation rate, while the results for single male head indicate a negative effect with a rising decumulation rate with age.)

The results for two-earner families and for families with a single male earner are contradictory: the negative effect of social security wealth on the accumulation of single male heads seems to intensify with age while the effect is reversed and turns positive for two-earner families after the age of 40.

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CHAPTER 35, PART III: THE RELATIONSHIP BETWEEN PENSION WEALTH AND RISKINESS OF FAMILY PORTFOLIOS

Philip W. McCleod

Introduction

The concern addressed by this report is the affect a family's pension wealth has on its attitude towards risky non-pension investments. More specifically, the report examines the relationship between a family's pension assets and the riskiness of its portfolio investments. The study used portfolio variance as a measure of a family's risk attitude, and assumed a linear relationship exists between this variance and the family's pension assets along with a number of variables. The other variables included in the analysis are total net wealth, age, sex, and education of the family head along with the family's size and total wage rate. Using the pension survey data, we were able to approximate this linear relationship with a number of regression equations.

The results indicate that there is a definite relationship between a family's pension asset and the riskiness of its other investments. However, the surprising finding is that an increase in pension assets does not encourage a family to hold more-risky assets, as one might expect. Instead, the results suggest that the opposite relationship holds. In other words, a family will tend to hold less-risky assets as its pension assets increase.

We do not have a solid explanation for this result at present. That answer will require further research. However, the results of this study indicate that this relationship is an accurate reflection of investors' behavior. In all of the models analyzed, the statistical analysis indicated that the model explained at least 24% of the variance of the dependent variable, i.e. portfolio variance. This is a very good fit, given the gross assumption of a linear relationship. In addition, the relationship between portfolio variance and the variables other than pension wealth were generally in the direction one would normally have expected.

Model

The objective of this study was to test the hypotheses that a family's pension assets will affect the family's attitude towards risky investments. The approach used to test the hypothesis was to assume that the variance of a family's investment portfolio accurately reflects its risk attitude. In addition, it was assumed that a linear relationship exists between a family's portfolio variance, its pensions assets, its non-pension wealth, and a number of other demographic variables.

Dr. McCleod was a consultant to the Commission. This paper was completed in April 1981.

TABLE 1

Asset Categories

1. Risk-Free Assets

- cash in house
- deposits with financial institutions
- employer's savings plan value
- cash value of all whole life insurance
- value of all annuities if cashed in today
- value of automobiles
- value of household content

2. Low-Risk Assets

- value of savings bonds
- value of government bonds, treasury bonds, corporate
- bonds and municipal bonds
- value of money market funds

3. High-Risk Assets

- stocks, options, futures contracts value
- value of notes, mortgages, and land contracts
- value of family-owned patent rights
- value of mutual funds and capital asset funds
- value of limited partnerships other than in real estate
- value of miscellaneous investments and assets
- value of life insurance benefit form death of older relatives

4. Real Estate Assets (net of mortgage)

- value of primary residence
- value of other property
- value of real estate limited partnership

The model had the following basic form:

(1) Porfolio Variance (PV) = a+b (pension assets) + c (non-pension wealth) +dX

Where d is a vector of coefficients and X is a vector of demographic variable. In the model, pension assets are not included in the assets used to calculate portfolio variance.

To obtain a regression approximating this linear relationship from the survey data, a number of assumptions had to be made. These assumptions, along with a detailed discussion of the model variables, are discussed in this section.

Portfolio Variance

The variance of a family's portfolio is the weighted average of the variances of the different assets included in the portfolio. Throughout this report, variance refers to the square of the standard deviation of returns from an asset. Using this definition of variance, it is easy to prove the following defintion of portfolio variance.

(2) Portfolio Variance = $\sum_{j}^{N} \sum_{i}^{N} w_i w_j \sigma_{ij}$

where:

w_i = percent of the family's wealth reprsented by asset i

σ_{ij} = covariance between asset i and J

σ_{ii} = variance of asset i

N = number of assets in the portfolio

This definition is usually presented in the literature in the following vector form:

Portfolio Variance = $\overline{w}^T \Omega \overline{w}$

Where $\overline{W}$ is a vector of the w_is and

Ω is the variance/covariance matrix for the portfolio's assets.

In order to use the above formulation, one has to determine σ_{ij} for all the assets within each family's portfolio. It is possible to estimate some σ_{ii} from historical returns, but data are not available for most family assets. To solve this problem, the family's assets, other than pension and social security assets, were placed into four groups; risk free, low risk, real estate, and high risk assets. The values that comprise each group are listed in Table 1.

TABLE 2

	Expected Return	Standard Deviation	Correlation Coefficients		
			Low-Risk	High-Risk	Real Estate
Low-Risk	3.17	3.78	1.0	-.244	.141
High-Risk	10.34	18.02	-.244	1.0	-.231
Real Estate Assets	8.14	3.53	.141	-.231	1.0

The net wealth variable is the sum of each family's assets, minus liabilities. This variable is segmented into five categories to differentiate families with little or no wealth (W_1), those with modest wealth (W_2), those with appreciable wealth (W_3 and W_4), and those with substantial wealth (W_5).

The age variable is the age of the head of the family. An underlying assumption is made that the head of the family is the main decision maker when choosing investments. Therefore, the age of the decision maker can be expected to impact his or her investment decisions. This variable is segmented into five categories which are designed to delineate the major periods in an individual's adult life. This segmentation (Table 3) has frequently been used before and is identical to the one used in SRI's study of consumers' investment behavior.

The wage rate variable is the hourly wage rate of the family head at the time of the survey. This variable is included in the model to determine if families with comparable wealth, but with different earnings potential, select different portfolios. Such a differentiation is assumed to be important for your families whose investment behavior is more likely to reflect their potential for future earnings instead of their current wealth. The main problem with this variable is that the wage rate is recorded as zero if the family head is not employed at the time of the survey. In this case, the wage rate variable may not be truly indicative of the family's earnings potential and therefore may bias the regression. This problem will not exist if the wage rate is insignificant in the equation, or if currently unemployed family heads actually make decisions as if their true wage were zero. An alternative approach to dealing with this distortion is to exclude those families whose household head is not employed.

A wage rate variable that considers only the earnings of the head of household does not capture the earnings potential of those two-parent,

For each group, a representative asset was chosen for which historical data were available, and was used to represent the variance of each asset in the group. The representative assets used as surrogates for low-risk, high-risk, and real estate assets are government bonds, common stock, and general real estate, respectively. For convenience, intergroup covariance was assumed to be zero.

Data on the representative assets are contained in a study by Roger G. Ibbotson and Carol L. Fall on the United States capital market values and returns from 1947 to 1978.[1] The study is a time series analysis of yearly aggregate market values and returns of five major categories of capital market securities, including (1) common stocks, (2) fixed corporate securities, (3) real estate, (4) U.S. Government bonds, and (5) municipal (state and local) bonds.[2] Information is presented on the annual compound (geometric mean) return of each security group and the interrelationship among their various returns is given in the form of a cross-correlation matrix. Extracting the information relating to government bonds, real estate, and common stock, we were able to develop Table 2.

It should be noted that return to high-risk assets is negatively correlated with both low-risk and real estate assets. Therefore, even though it is much riskier than low-risk and real estate assets, this negative correlation makes it valuable in reducing overall portfolio variance and risk.

From Table 2, we can calculate the elements of the variance - covariance matrix, and, using equation (2), we can develop the following approximation for a family's portfolio variance as a function fo the wealth in each asset category (w_i).

$$(3)\quad PV = 14.28w_1^2 - 33.24w_1w_2 - 3.76w_1w_3 - 324.72w_2^2 - 29.38w_2w_3 + 12.48w_3^2 \quad [3]$$

Where w_1 - percent of the family's wealth represented by asset i (i= 1,2,3)

Non-pension Variables

The independent variables on the right-hand side of equation (1) consist of all those variables one expects to have an effect on a family's investment behavior. Besides pension assets, variables included are family's net non-pension wealth, family size, family head's wage range, age, sex and highest educational level. To avoid the constraining assumption of a linear relationship between variance and continuous independent variables over the whole domain space and to facilitate comparision among family groups with different attitudes toward risk, all continuous variables in the model were segmented into a number of categories. The categories were selected to partition the sample into family groups with different attitudes toward investment risk. The categories used are a result of consultation with other researchers who have studied the investment behavior of American families.[4] All independent variables analyzed are listed in Table 3 with their segmented categories.

two-earner families. To capture roughly the impact of an employed spouse on the family's portfolio variance,the variable "working spouse" is added as an indicator of a spouse's contribution to family earnings.

The variable "family size" was included in the analysis to capture the impact of children on an investor's portfolio decision, irrespective of the other variables. It is assumed that increasing the number of dependents will increase the consumption requirements imposed on given amounts of wealth, and thus increase the unexpected contingencies that must be considered in the investment plan. As a result, one would expect larger families to require more guarantees of a secure return on their investments. Therefore, portfolio variance should decrease with an increase in family size.

Since it is assumed that the family head makes all financial decisions, it would seem logical to expect his (or her) education to have an effect on those decisions. Discussions with other researchers indicate that he only factor that has consistently affected an individual's behavior is whether or not he/she achieved certain educational milestones. The most significant milestone is graduation from high school. To incorporate this information into the model, we segmented the educational variable into three categories of education achievement of the family head: (1) those who did not finish high school; (2) those who finished high school; and (3) those who obtained some education beyond high school. The distributon of the families surveyed are 34%, 35%, and 30% in categories E1, E2, and E3, respectively. This is very close to the national distribution of 37%, 35%, and 28%, which again confirms the representative nature of the surey.

The other variable included in the model, and listed in Table 3, is sex of family head. The segmentation of this variable is self-explanatory.

Pension Variables

Two approaches were taken in characterizing a family's pension assets. The first was to describe a family by the type of pension plan it held. There are three types of pension plans; social security, a private defined benefit plan, and a private defined contribution plan. Since a family can have more than one pension plan, the categories included combinations of plan types (see Table 3).

One problem with our characterization of a family's pension plan is that the survey data use a more-detailed definition of private pension plans than the three types stated above. Therefore, a translation had to occur between the survey statistics and those definitions used in the model. In determining the needed translation, the following definitions in Table 3 were used: A defined contribution pension plan is one in which the company's contribution rate is fixed and benefits to be received after retirement depend mostly upon these contributions and their earnings. No specific benefit is assigned. A defined benefit pension plan is one that states either (a) the benefits to be received after retirement or (b) the method of determining such benefits. In the case of defined benefit plans, the expected benefits are usually tied to the worker's salary and length of

TABLE 3

Categories

Variable	1	2	3	4	5
Pension Plan - PGi	Social Security only	Social Security and Defined Benefit	Social Security and Defined Contributions	Defined Contributions or Defined Benefit only	No Pension Plan
Wealth - Wi	$0 to $5 Thousand	$5 Thousand to $25 Thousand	$25 Thousand to $100 Thousand	$100 Thousand to $500 Thousand	$500 Thousand and above
Age - Ai	18 years to 25 years	25 years to 35 years	35 years to 54 years	54 years to 64 years	65 years and above
Wage Rate - WRi	$0/hr	$ 0/hr to $3.75/hr	$3.75/hr to $7.50 /hr	$7.50 /hr to $15.00/hr	$15.00/hr and above
Family Size - FSi	1 member	2 members	3 members to 5 members	6 members and above	
Education - Ei	Up to some high school	Graduated from high school	Education beyond high school		
Sex - Si	Male	Female			
Working Spouse - SWi	Yes	No			

Incorporating both pension variables into separated regression models, we get the following:

Model 1:

$$PV = \alpha_0 + \alpha_1 PG - \alpha_2 W - \alpha_3 A + \alpha_4 WR + \alpha_5 FS + \alpha_6 R + \alpha_7 E + \alpha_8 S + \alpha_9 WS$$

Model 2:

$$PV = \alpha_0 + \alpha_1 PA + \alpha_2 W + \alpha_3 A + \alpha_4 WR + \alpha_5 FS + \alpha_6 R + \alpha_7 E + \alpha_8 S + \alpha_9 WS$$

Where:

α_I - are coefficient vectors

PG - pension group indicator vector

PA - pension asset as a percent of total wealth

W - non-pension wealth group indicator vector

W - total wealth group indicator vector
(non-pension wealth plus present value of pension benefits)

A - age group indicator vector

WR - wage rate group indicator vector

FS - family size group indicator vector

R - race group indicator vector

E - education group indicator vector

S - sex group indicator vector

WS - working spouse group indicator

All variables except PA are vectors of indicator functions each specifying whether or not a family falls in a specific category. In doing the regression analysis, one indicator function from each vector had to be excluded in order to obtain a unique solution.

All of the excluded variables describe a distinct group of families whose estimated portfolio variance is captured in the intercept (α_0) of the resulting equation. The coefficient of the variables included in the regression indicates the difference in portfolio variance if a specific characteristic of the excluded group is changed. For example, in all the regressions, the female head of family variable (S_2) was excluded from the analysis. Therefore, the coefficient of S_1 in the model indicates the difference in portfolio variance in having a male as the head of the family instead of the female, if all other variables remain the same.

service. The translation from the pension plans, as described in the survey, to the categories used in the model is illustrated in Table 4.

The second approach taken in this study was to create a continuous variable representing pension assets (defined as the present value of its expected pension benefit). The pension variable in this case in the fraction of the family's total wealth in pension assets. This variable will allow a direct analysis of the effect of the proportion of wealth held in the form of pension assets on portfolio variance. The ratio of wealth held in the form of pension assets is the principal superior to the "pension plan type" dummy variables used as representation of a family's pension asset. However, the survey data on pension asset value are less accurate and less complete than the information on the type of pension plans held by a family.

Information on the type of pension plan(s) held by a family could be obtained directly from the survey data. However, many respondents did not know the net value of their pension assets, thus a variety of sources were used to approximate the value of pension assets for each family. The file created with this data and the methods used in deriving it is documented in another report ot the commission on pensions and capital formation.[3]

TABLE 4

Pension Plans

Model Categories	Survey Categories
Social Security	Social Security
Defined Contribution	Thrift Sharing Plan Executive Compensation Plan Differed Compensation Plan Profit Sharing Plan IRA and Keough Accounts
Defined Benefits	Defined Benefit Retirement Plan Target Benefit Plan Insurance Company Pension Plan Fraternal Organization Pension Plan

The first explanation is that a family views its pension assets as part of its investment portfolio. Since many pension fund have a large percent of their capital invested in stocks and corporate bonds, these funds may be considerd high-risk investments by families. Such families would be expected to decrease the riskiness of their other investments to compensate for any increase in the share of their assets held in the form of pensions.

The second explanation is that a family treats its pension assets as being independent of its other investments; however, both investments woudl reflect the family's risk attitude. A risk averse family would have relatively large pensions to cover long term needs and a non-pension asset portfolio with low variance. A family willing to take risks may have little interest in pension for the long-term and place its non-pension wealth in high risk assets. As a result, an inverse relationship will exist between pension assets and portfolio variance. This relationship would be "decoupled" if an independent measure of risk aversion could be included in the model.

A third possible explanation is that large pension assets will encourage some family heads to retire early. The prospect of early retirement, in turn, will spur these families to secure a nest egg by increasing their savings and other riskless assets. The net effect might be a decrease in the family's portfolio variance.

Further research will be necessary to determine if the model's results can be attributed to one of the above or some other explanation.

The complete results of the analyzed models will be discussed on a case-by-case basis in the following sections.

Case I

In the first case, model 1 is used in a regression analysis of the survey data. All families in the sample population are used in Case 1A to estimate the model parameters. In Case 1B, only families with an employed head are used. The variables eliminated from the program (and, therefore, captured in the constant) to ensure a unique solution are:

PG_1 - family with no pension plan

W_1 - poor family with net wealth in the \$0 to \$5 thousand range

A_5 - family head is over 65

E_1 - family head did not finish high school

FS_1 - family has a single member

S_2 - family's head is a female

WS_2 - spouse is not working

The Statistical Approach

The Statistical Analysis System (SAS) of the IBM 360 was applied to the survey data to estimate the models. The subroutine uses the standard least square methods to estimate the coefficients. In addition, it is designed to eliminate any bias that may exist when any of the independent variables and the dependent variables are jointly dependent. This factor will become important when we examine the results.

This subroutine used the standard R-square measure to assess how accurately the regression equation fits the data. One would not expect a high R-square value with these models since we are attempting to ascribe perfectly rational behavior to the actions of human beings; in addition, the family's attitude toward investment risk is an unobserved variable. Therefore, an important consideration is whether any relationship exists between the dependent variables and pension assets. An F-test is used to determine goodness of fit. The F-test tests the hypothesis that the independent variable in the models are related to the dependent variables. The higher the F-value, the lower the probability that "unrelatedness" is a correct hypothesis.

To test the hypothesis that the dependent variable is a function of each independent variable, the program uses a "student T-test". This test determines the probability that any one of the independent variables could be replaced by zero without affecting the accuracy of the model. We will use these T-test probabilites to detemine if portfolio variance is a function of a family's pension asset.

Results

The results of the regressions using both models were very consistent, but indicated a relationship between portfolio variance and pension assets contrary to general assumptions. The results in all cases had an F-test probability of less than (.0001) while the pension variables had a T-test probability of less than (.05).[6] This is a strong indication that a family's pension assets are related to the family's willingness to assume risk as measured by portfolio variance. However, the surprising fact is that the relationship indicated by the pension variable coefficient is that the family's portfolio variance will decrease with increases in pension assets. This result runs contrary to the assumption that a family would be willing to hold more risky assets as its future becomes more secure with an increase in its pension assets.

There are three plausible explanations for the resulting relationship between portfolio variance and pension assets. One explanation assumes a direct relationship between a family's pension assets and its other portfolio assets with the former considered a high-risk security. The second explanation assumes there is only an indirect relationship between these two asset groups as a result of their mutual dependence on the family's risk preference. The final explanation assumes that increased pension assets encourage individuals to retire early. Each explanation is discussed more fully below.

FIGURE 1

Case 1A:

PV = -21.1 (.0001)	$-8.0PG_1$ (.0301)	$-26.0PG_2$ (.0004)	$-16.5PG_3$ (.0005)	$-26.3PG_4$ (.0135)
	$+29.8W_2$ (.0001)	$+72.9W_3$ (.0001)	$+86.5W_4$ (.0001)	$+132.0W_5$ (.0001)
	$+66.7A_1$ (.0001)	$+46.1A_2$ (.0001)	$+21.7A_3$ (.0001)	$+8.6A_4$ (.0376)
	$+2.7WR_2$ (.4169)	$-3.8WR_3$ (.2104)	$-23.2WR_4$ (.0001)	$-26.8WR_5$ (.0009)
	$-19.6FS_2$ (.0001)	$-22.5FS_3$ (.0001)	$-29.6FS_4$ (.0001)	
	$-5.3E_2$ (.0462)	$+4.5E_3$ (.1307)	$-9.1WS_1$ (.0023)	$-3.8S_1$ (.0956)

$R^2 = .2466$

Note: Numbers in Parenthesis is Associated T-Test Probability

Case 1A and 2A:

WR_1 - family head is not employed

Case 1B and 2B:

WR_2 - family head earns up to $3.75 per hour

These parameters describe a base group against which all other groups can be easily compared. In Cases 1B and 2B, the variable WR_1 does not apply to the sample used to generate the model; therefore, to avoid the base group being a null set and of no value, the variable WR_2 was eliminated from the program instead of WR_1.

The results of this regression are shown in Figure 1. The R-square term indicates that the function could account for 25% of the variation of the value of the dependent variable. This can be considered a good fit, given the fact that the portfolio variance function used is an approximation of the family's actual earnings variance. In addition, portfolio variance is an approximate indicator of an individual's risk preferences.

An analysis of the model coefficients indicates that the function's intercept is a negative 21, which is at odds with the fact that portfolio variance cannot be negative. This is explained by the fact that the results in Figure 1 derive from a linear model, rather than a model with the dependent variable constrained to be non-negative. As a result, one can expect areas of divergence between the real function and its approximation. Therefore, the negative intercept indicates a zero variance for all practical purposes.

The intercept represents the average variance of a portfolio held by families characterized by the missing varibles (i.e., all other variables equal zero). These families consist of poor single old ladies with zero portfolio variance. To approximate the portfolio variance of "single rich old ladies" the variable W_5 should be set to one, which indicates that the family's total wealth is above $500.000. The coefficient of W_5 implies that the change in portfolio variance would be 132. Since variance is the square of the standard deviation, this result means that a rich, old lady will have a portfolio with a standard deviation of the return 11.5% greater than that of the portfolio of a poor old lady.

The coefficients of the W_i variables indicate that a family's portfolio variance will increase as its wealth increases. As one would expect, this is the most important variable in determining portfolio variance. Similarly, the coefficients indicate that the variance is an increasing function of the family head's age and a decreasing function of the family size. In the case of the education variable, the results imply that graduating from high school is significant, and it will make the family head more cautious in his investment behavior. However, going to college does not seem to alter the portfolio variance from that of a high school dropout.

The second modification was to remove the value of the family's primary residence from the real estate-asset portion of the portfolio to the risk-free portion. Again, there were no significant changes in the regression results.

The third modification was to elimate from the sample population all families whose head was not employed. The results of this regression are reported in Figure 2 as Case 1B. An examination of the R^2 statistics will show some improvement in the model's fit, from 25% to 27%. The relationship between the coefficients of each variable group remained unchanged, but the intercept decreased by about 60% and became less significant as measured by its T-statistics. The net effect is that failing to exclude families with the head unemployed does distort the model's result. However, the distortion is minor and the general implications of the results are unaffected.

Case 2

In the second case, model 2 is used in the regression analysis of the survey data. As in the earlier case, there are two sub-cases, Case 2A using all families, and Case 2B, using only families whose head member is employed.

As in Case 1, these results imply that a family's portfolio variance will decreae when its pension assets increase. For example, in Case 2A, if pension wealth were half of the family's total wealth, portfolio variance would decrease by 42 than if none of its assets were in this form. (This represents a decline of about 6.5% in the standard deviation of portfolio earnings.) A further comparison with the model in Figure 1 will show that the coefficients of the non-pension variables have remained relatively unchaged except for W_2.

Model 2 was also modified to take into account different possible categorizations of non-financial assets, with no significant improvement in the results. As in Case 1, a regression model was developed leaving out of the sample those families with an unemployed family head. The result, illustrated in Figure 4 as Case 2B, shows a small improvement in the data fit, from 27% to 28%.

In conclusion, we believe that the evidence from this study indicates a tendency for families with relatively greater amounts of pension wealth to choose less risky assets in selecting their portfolios of non-pension wealth.

Compared to low wage workers and persons not employed, high wage workers (WR_4 and WR_5)—those with wage rates over $7.50 per hour— tend to have lower risk portfolios. This is a counter-intuitive finding, since it implies that a family with higher earnings potential will invest in less risky assets than a similary situated family with lower potential. The implication may be that the principal investers in stocks and business ventures are welathy non-workers, but more analysis would be needed to make sense of this finding. A similar anomaly exists with the working spouse variable, since it also indicates that, other things being equal, a working spouse in the family tends to increase risk aversion.

A similar non-intuitive result was obtained for the coefficient of the sex variable indicating male-headed families have less risky assets than female-headed families. Again, we must take into consideration the fact that we are comparing families with comparable wealth and other demographic factors. Therefore, the model is saying that a family headed by a female doing as well as one headed by a male will feel more confident and will be inclined to take more risk with its investments.

The coefficients of the pension variables are negative, which implies that a family with a pension plan, regardless of the type, will have a less-risky portfolio than a family without a pension plan. In addition, the coefficient of the pension variable indicates that a family with a private pension plan and social security will have a portfolio with a lower variance than a similar family with only social security. In fact, families with what is intuitively the most secure pension assets, those with a defined benefit plan (PG_2 and PG_4), have the least-risky portfolios. In all cases, the T-test probabilities are below 3% which indicate the variables are significant. The results, however, are contradictory to the common belief that increased pension assets will allow a family to take greater risks with its portfolio of investments. More research will be needed to uncover the true meaning of these results.

The analysis of pensions using Case 1 is compounded because the wealth variable represents only non-pension wealth. Thus, the effect of a positive value for the pension variables is a compounding of a total increase in wealth and the pressence of some of that wealth in the form of a pension. Since we observe that added wealth increases portfolio variances, we expect that the negative effect of pensions on portfolio variance is understated in Case 1. This problem is dealt with in Case 2, discussed below.

A number of modifications of the model in Case 1 were analyzed using the survey data to see if any modifications affected the results. One modification was to exclude the value of a family's household contents and automobiles from its portfolio as opposed to assuming they were riskless assets. The assumption behind this modification was that families do not view these assets the same way they view other investments. Both of these assets can be considered essentials a family must acquire to function normally. The result of this new regression had an R-square of (.2284) which means it did a worse job of explaining the data than the initial model; and had no effect on the coefficient of the pension variable.

FIGURE 3

Case 2A:

PV =	-24.8 (.0001)	-84.7PA (.0001)	$+63.5W_2$ $(.0001)^2$	$+89.9W_3$ $(.0001)^3$	$+101.3W_4$ $(.0001)^4$	$+125.8W_5$ $(.0001)^5$
			$+60.8A_1$ $(.0001)^1$	$+40.0A_2$ $(.0001)^2$	$+21.4A_3$ $(.0001)^3$	$+9.5A_4$ $(.0213)^4$
			$+4.4WR_2$ $(.1920)^2$	$-2.2WR_3$ $(.4505)^3$	$-17.0WR_4$ $(.0001)^4$	$-22.6WR_5$ $(.0043)^5$
			$-15.1FS_2$ $(.0001)^2$	$-21.2FS_3$ $(.0001)^3$	$-27.8FS_4$ $(.0001)^4$	
			$-4.7E_2$ $(.0713)^2$	$+5.7E_3$ $(.0481)^3$	$-6.2WS_1$ $(.0283)^1$	$-3.5S_1$ $(.1179)^1$

$R^2 = .2659$

FIGURE 2

Case 1B:

PV =	-12.4 (.2536)	$-7.5PG_1$ (.1335)	$-28.7PG_2$ (.0009)	$-17.1PG_3$ (.0029)	$-21.2PG_4$ (.0079)
		$+37.9W_2$ (.0001)	$+91.9W_3$ (.0001)	$+108.3W_4$ (.0001)	$+133.7W_5$ (.0001)
		$+53.8A_1$ (.0001)	$+34.4A_2$ (.0004)	$+5.5A_3$ (.5627)	$-11.8A_4$ (.2418)
		$-8.8WR_3$ (.0169)	$-30.8WR_4$ (.0001)	$-33.9WR_5$ (.0002)	
		$-20.9FS_2$ (.0001)	$-28.2FS_3$ (.0001)	$-31.9FS_3$ (.0003)	
		$-4.6E_2$ (.2133)	$+5.7E_3$ (.1600)	$-8.4WS_1$ (.0198)	$-5.8S_1$ (.0681)

$R^2 = .2728$

FIGURE 4

Case 2B:

PV =	-27.1 (.2580)	-102.8PA (.0001)	$+88.9W_2$ (.0001)^2	$+114.7W_3$ (.0001)^3	$+129.9W_4$ (.0001)^4	$+149.0W_5$ (.0001)^5
			$+50.4A_1$ (.0001)^1	$+32.4A_2$ (.0007)^2	$+12.8A_3$ (.1766)^3	$-0.3A_4$ (.9768)^4
			$-7.7WR_3$ (.0295)^3	$-23.5WR_4$ (.0001)^4	$-29.8WR_5$ (.0007)^5	
			$-17.3FS_2$ (.0001)^2	$-25.8FS_3$ (.0001)^3	$-28.8FS_4$ (.0008)^4	
			$-3.2E_2$ (.3637)^2	$+6.9E_3$ (.0696)^3	$-4.6WS_1$ (.1802)^1	$-5.1S_1$ (.0952)^1

$R^2 = .2777$

Notes

1. Roger G. Ibbotson and Carol L. Fall, "The United States Market Wealth:" The Journal of Portfolio Management, Fall 1979.

2. A detailed list of information sources is contained in Ibbotson and Fall.

3. Since we are assuming that risk-free assets are independent of the other assets, they will not affect the portfolio variance because its variance is zero by definition.

4. SRI's Financial Industry Group has an on-going study of Consumers' Financial decisions in the United States.

5. See Mordecai Kurz's "The Effects of Pensions on Capital Formation: A Framework for Sample Analysis," January 1980, Part I of this chapter.

6. I.e., less than 1 chance in 20 that the implied relationship in the model occured by chance.

TABLE 15

RETIREMENT PLAN VESTING RATES IN INITIAL YEAR OF IMPLEMENTATION

Group	Millions of Workers	Current Policy	Mandatory Plans with Participation Standard of 25/1/1000 and: 10 Yr. Vesting	5 Yr. Vesting
Worker Group:				
• Private, non-farm wage and salary	69.2	27%	33%	44%
• Agricultural	1.6	10%	20%	30%
• Public, wage and salary	15.4	60%	62%	70%
• Self employed	8.3	14%	39%	53%
Worker Age Group:				
• 25-64	73.5	38%	47%	61%
• 35-64	48.2	45%	57%	69%
• 45-64	29.8	48%	64%	75%
Full Time/Full Year Worker Age Group:				
• 25-64	45.4	44%	51%	66%
• 35-64	28.0	53%	64%	76%
• 45-64	16.3	58%	70%	82%
25-64 Year Old Workers with Hourly Wages of: (In $ 1979)				
• Less than $4	28.7	11%	18%	26%
• $4-$7	37.3	30%	38%	50%
• More than $7	28.4	51%	58%	71%
All Workers	94.4	30%	38%	48%

SOURCE: ICF estimates based upon May 1979 CPS data.

- retirement plan availability for the age 25 to 29 cohort with no change in policy would increase primarily in accord with the age and sex specific coverage rates indicated in the May 1979 CPS; however, the model also incorporates a set of factors that permits policymakers to examine alternative trends in plan availability as a function of the assumed rate of increase in indexed wages.

- retirement plan characteristics would change in several ways; defined benefit plan formulas were indexed to changes in wages for flat and unit benefit formulas; the Social Security wage base was assumed to change in accord with current policy; however, final pay defined benefit and all defined contribution plan formulas were held constant over the forecast period; and, no changes in participation, vesting or other plan provisions were assumed over the forecast period.

- real wages would increase at 1 percent per year over the forecast period.

- retirement for all workers occurs at age 65 under both current policy and the MUPS alternatives; although MUPS may be expected to influence labor force participation and retirement age, identifying and incorporating those potential shifts was beyond the scope of this project.

These and other assumptions were developed jointly with Commission staff. In a number of specific cases, these assumptions were relaxed or changed to test their sensitivity, or to examine the effects of other policies. To the extent that alternative assumptions are appropriate, the microsimulation model can incorporate these assumptions in simulating benefits.

1. Impact on Average Benefits

Initially, we examined the impact on average initial retirement benefits of the MUPS Alternatives 1,2,4 and 5. In the case of defined benefit Alternatives 1 and 4, we estimated the impact of a defined benefit MUPS with a one-half of one percent per year of service benefit accrual rate. In the case of the defined contribution Alternatives 2 and 5, we estimated retirement benefits for a three percent MUPS contribution rate.

For each alternative, we initially examined three sets of participation and vesting rules:

- participation at age 25, one year of service and 1,000 hours of work annually (25/1/1000) and five year vesting.

- participation at age 30, one year of service, and 1,000 hours of work annually (30/1/1000) and three year vesting.

- participation at age 40, one year of service and 1,000 hours of work annually (40/1/1000) and three year vesting.

For these policies, we simulated the work histories for individuals currently age 25-29 through retirement at age 65 and calculated their expected Social Security and pension benefits. These estimates are based upon the actual Social Security and pension plan benefit formulas currently in effect, modified as indicated above. Due to the Commission's concern about individuals expected to rely solely on Social Security, we presented estimates separately for these individuals and those expected to rely on both Social Security and employer pensions.

In addition, using Commission staff assumptions, the estimates presented here reflect no increase in plan availability under current policy. Although other estimates were prepared under alternative assumptions relating increases in plan availability to increases in real wages, the likely trends in plan availability are uncertain and highly dependent upon a range of economic factors. Under the assumption specified here, Table 16 presents estimates of the potential effect of the MUPS alternatives on average retirement benefits in the initial year of retirement for individuals who are now age 25 to 29 under the 25/1/1000 participation and five year vesting case.

The estimates suggest that:

- the three percent defined contribution MUPS and the one-half of one percent defined benefit MUPS have similar affects on retirement benefits in the initial year of retirement for both couples and individuals.

- the liberalization of ERISA participation and vesting increases benefits by less than either of the two MUPS alternatives.

- the MUPS alternatives significantly increase the retirement benefits of households who currently might not expect to receive private pension benefits (approximately 27 percent of all households). In particular, the retirement benefits of unmarried individuals who do not expect to receive retirement benefits are increased by approximately 40 percent under the MUPS alternatives.

- those households which are already expected to receive pension benefits under current policy (approximately 73 percent of all households) also receive increases under the MUPS alternatives. In fact, approximately 65 percent of all retirement benefits attributable to MUPS go to these households.

These results are consistent with the participation and vesting analyses presented above. Although many uncovered, older, workers with long periods of service can now expect to receive pension benefits as a result of the MUPS, other workers do too. In particular, MUPS provides benefits to workers based

TABLE 16

POTENTIAL EFFECT OF MUPS ON AVERAGE INITIAL RETIREMENT BENEFITS
AT AGE 65 FOR WORKERS CURRENTLY AGE 25-29 1/
(Age 25/1 Year Participation and 5 Year Vesting)

Household Status at Age 65 (Percentage of All Households)	Average Benefits At Age 65 under Current Policy	Average Initial Benefits (Percentage Increase from Current Policy under MUPS Alternatives) 1 and 4 (1/2% DB)	2 and 5 (3% DC)	6 (ERISA Liberalization)
Couples expected to:				
• Receive Employer Pensions Under Current Policy (40%)				
-- Social Security benefit	$10,500	$10,500 (0)	$10,500 (0)	NA
-- Employer pension benefit	5,200	6,800 (30%)	6,300 (21%)	NA
Subtotal	$15,700	$17,300 (10%)	$16,800 (7%)	NA
• No employer pension under current policy (10%)				
-- Social Security benefit	$ 8,500	$ 8,500 (0)	$ 8,500 (0)	NA
-- Employer pension benefit	0	2,500 (NA)	2,100 (NA)	NA
Subtotal	$ 8,500	$11,000 (30%)	$10,600 (25%)	NA
• All couples	$13,300	$15,000 (12%)	$14,600 (9%)	$13,800 (4%)
Unmarried individuals expected to:				
• Receive Employer Pensions Under Current Policy (33%)				
-- Social Security benefit	$ 6,200	$ 6,200 (0)	$ 6,200 (0)	NA
-- Employer pension benefit	5,000	6,500 (30%)	6,600 (32%)	NA
Subtotal	$11,200	$12,700 (14%)	$12,800 (14%)	NA
• No employer pension under current policy (17%)				
-- Social Security benefit	$ 5,200	$ 5,200 (0)	$ 5,200 (0)	NA
-- Employer pension benefit	0	2,100 (NA)	2,000 (NA)	NA
Subtotal	$ 5,200	$ 7,300 (41%)	$ 7,200 (38%)	NA
• All Unmarried Individuals	$ 9,200	$10,900 (15%)	$10,900 (13%)	$ 9,600 (4%)

NOTE: These estimates include Social Security and employer pension benefits only. These estimates are in $ 1980 and assume retirement at age 65 and an average real growth in wages of one percent per year.

1/ Under MUPS Alternatives 1, 2, 4, and 5 all private and public employers must offer a retirement plan with participation standards no stricter than age 25, one year of service, and 1,000 hours of work annually and a vesting standard no stricter than five years of service. Under Alternative 6, existing plans can have vesting standards no stricter than five years of service.

SOURCE: ICF estimates based upon microsimulation estimates of retirement benefits.

upon service early in their careers when job change is more frequent, wages are lower and part-time employment more likely. MUPS also provides improved joint and survivor's benefits which increase benefits to some who are expected to receive employer benefits as well as to those who are not. It also increases benefits for some who expect to receive benefits because the MUPS benefits cannot be integrated with Social Security. Thus, while MUPS improves the benefits for those expecting to rely only on Social Security, it also operates to supplement the expected pension benefits of other workers and their survivors.

We also examined the impact of alternative combinations of participation, vesting and minimum benefit and contribution rates. Estimates for selected cases are presented in Appendix C (tables 9-17). In general, these estimates indicate that shifting to less liberal participation and vesting standards will reduce the MUPS benefits for all groups, but the reduction is substantially less for individuals not currently expected to receive a pension. These tables illustrate the interaction among all aspects of plan design. They also serve to illustrate the use of a simulation model in examining the impact of participation, vesting and other provisions on the actual level of benefits received.

Subsequent to this analysis, the Commission refined the MUPS proposals to require full and immediate vesting and a participation standard of age 25, one year of service, and 1,000 hours of work annually (25/1/1000) under a three percent defined contribution plan. In addition, the Commission adopted a shift in the Social Security retirement age from age 65 to 68 beginning in 1990. To estimate the potential impact of MUPS under these refinements, we first estimated the expected benefits at age 68 for workers assumed to retire at age 65 under current policy. Then, we estimated the change in benefits under the Commission staff's assumption that all workers would continue to work under their employer sponsored plans until age 68. Although the actual worker response to this policy is uncertain, these estimates provide an initial benchmark for evaluating the combined impact of both MUPS and Social Security proposals.

The results of this analysis are shown in Table 17. Because the characteristics of MUPS and the retirement age assumptions used here are different from those in Table 16, the two tables are not strictly comparable. (Table 9 in Appendix C presents the impact of MUPS with full and immediate vesting assuming retirement at age 65.) The estimates in Table 17 suggest that couples and individuals not expecting to receive pension benefits under current policy may expect to receive higher benefits as a result of MUPS. Couples may expect a total benefit approximately 29 percent higher, and individuals may expect one approximately 56 percent higher. As with earlier estimates, this MUPS proposal also benefits those individuals already expecting a pension benefit.

Under the assumption of retirement at age 68, the proportion of workers expecting pension benefits under current policy and the average level of these benefits will be higher than estimates assuming retirement at age 65. As a

TABLE 17

POTENTIAL EFFECT OF MUPS ON AVERAGE RETIREMENT BENEFITS AT AGE 68 FOR WORKERS CURRENTLY AGE 25-29 1/
(Assumes Retirement at Age 65 under Current Policy and at Age 68 under PCPP Recommendations)

Household Status at Age 68 (Percentage of All Households)	Average Benefits At age 68 under Current Policy ($1980)	Average Benefits (Percentage Change) At Age 68 under PCPP Social Security Retirement Age Recommendation and: No MUPS		MUPS (3% DC)	
Couples expected to:					
• Receive employer pensions under current policy (35%)					
-- Social Security benefit	$10,500	$10,800	(+ 3%)	$10,800	(+ 3%)
-- Employer pension benefit	4,500	5,800	(+29%)	7,400	(+64%)
Subtotal	$15,000	$16,600	(+11%)	$18,200	(+21%)
• No employer pension under current policy (10%)					
-- Social Security benefit	$ 8,400	$ 8,400	(0)	$ 8,400	(0)
-- Employer pension benefit	0	0	(0)	2,500	(N.A.)
Subtotal	$ 8,400	$ 8,400	(0)	$10,900	(+29%)
Unmarried individuals expected to:					
• Receive employer pensions under current policy (41%)					
-- Social Security benefit	$ 6,200	$ 6,200	(0)	$ 6,200	(0)
-- Employer pension benefit	4,600	5,300	(+15%)	7,500	(+63%)
Subtotal	$10,800	$11,500	(+ 6%)	$13,700	(+27%)
• No employer pension under current policy (14%)					
-- Social Security benefit	$ 4,900	$ 4,900	(0)	$ 4,900	(0)
-- Employer pension benefit	0	0	(0)	2,800	(N.A.)
Subtotal	$ 4,900	$ 4,900	(0)	$ 7,700	(+56%)
Total (100%)	$11,400	$12,100	(+ 6%)	$14,100	(+25%)

NOTE: These estimates include Social Security and employer pension benefits only. They are based upon the assumption that workers retire at age 65 under current policy and at age 68 under the PCPP Social Security retirement age recommendations. They also assume an average real growth in wages of one percent per year.

1/ The PCPP Social Security retirement age recommendations would not allow unreduced benefits until age 68. Under MUPS, all private and public employers must offer a retirement plan with participation standards no stricter than age 25, one year of service, and 1,000 hours of work annually and full and immediate vesting. This MUPS plan is a three percent of earnings defined contribution plan.

SOURCE: ICF estimates based upon microsimulation estimates of retirement benefits.

CHAPTER 36: ANALYSIS OF THE POTENTIAL EFFECTS OF A MINIMUM UNIVERSAL PENSION SYSTEM (MUPS)

ICF INCORPORATED

INTRODUCTION

The President's Commission on Pension Policy (PCPP) asked ICF to investigate the potential effects of a Minimum Universal Pension System (MUPS) in the United States. Understanding the implications of such a change in U.S. retirement income policy requires estimates of MUPS' effects on retirement plan coverage, benefits and costs, as well as its impact on the economy, employment, and savings. This report presents a range of estimates of these effects used by the Commission in evaluating the MUPS alternatives.

Due to restrictions on time and data, this report is limited primarily to an assessment of the apparent impact of MUPS assuming no other policy changes. It should be recognized that other policies considered by the Commission may have important offsetting or reinforcing effects on the estimates presented here. As a result, caution should be used in interpreting the findings.

This report also draws heavily upon existing sources of data and economic research in estimating the impact of a MUPS. It was not intended to break new theoretical ground regarding the potential impact of retirement income policies. Its primary contribution is the development and application of Monte Carlo simulation techniques to estimate work histories and retirement income benefits under alternative policies.

We emphasize that the results presented here, as well as in previously submitted working documents, are subject to inherent limitations. The stringent deadlines for conducting the project made it impossible to examine all aspects of a MUPS in a comprehensive fashion. In particular, the results presented here are quite sensitive to:

- assumptions regarding potential changes expected in the absence of a MUPS, especially:
  - -- trends in pension plan formation,
  - -- trends in individual work patterns, especially for women,
  - -- trends in real wage growth, and
  - -- other broad economic characteristics.

This paper was prepared under contract to the Commission by ICF Incorporated. Work was completed in April 1981.

- assumptions regarding how employers and workers will respond to a MUPS, especially:

  -- how existing plans are modified to complement or offset the effects of a MUPS,
  -- how workers change their work and savings behavior in light of potentially higher retirement wealth under a MUPS, and
  -- how employers modify job, wage and benefit offerings to reflect the impact of a MUPS.

- assumptions regarding the potential effects of changes in other retirement income policies, including:

  -- Social Security benefits, retirement age and funding,
  -- overall tax policy, and
  -- other programs for the aged such as Medicare and Medicaid.

The reader should be sensitive to these areas of uncertainty in evaluating the results. In addition, a more detailed review of the impact of these assumptions on retirement incomes should be an important area for continuing research.

Despite these inherent limitations, the estimates of MUPS effects presented here provide a sound basis for assessing the order of magnitude of its benefits and costs on the elderly. The analytical framework developed during the project is ideally suited to examine changes in specific aspects of both Social Security and pension plans. The models and data bases are also well suited to examine both the aggregate effects as well as the distributional implications of a broad range of policies. This framework provides a convenient way to examine the impact of alternative policies and assumptions for comparison with the MUPS estimates presented here.

POLICY ALTERNATIVES

After reviewing the current status of employer sponsored plans, the Commission turned to the identification of alternatives for addressing perceived inadequacies. Initially, the Commission staff identified a range of pension policy alternatives for consideration in its final proposals. A detailed description of these alternatives, including the proposals for a Minimum Universal Pension System (MUPS), is included in Appendix D. Over the course of the project, some alternatives were selected over others for refinement and closer examination. After selecting its final MUPS proposal, the Commission asked us to examine further the three percent defined contribution approach. As a result, a wide range of policy alternatives under numerous assumptions were examined. The summary results of these analyses are provided in the following sections of this report. Additional estimates are included in the Appendices and in previously submitted working papers.

In general, the initial range of policy alternatives provided for:

1. Mandatory employer administered MUPS plans, where all workers are covered by:

   a. Defined benefit plans (Alternative 1)
   b. Defined contribution plans (Alternative 2)
   c. Mandatory savings plan with voluntary participation (Alternative 3)

2. Mandatory government administered MUPS plans, where all workers are covered by:

   a. Defined benefit plans (Alternative 4)
   b. Defined contribution plans (Alternative 5)

3. Voluntary employer administered plans, where existing plans must meet more liberal participation and vesting rules (Alternative 6)

For each alternative, we examined the impact of a range of characteristics for participation rules, vesting rules, benefit accrual rates, contribution rates and survivors benefits. Over the course of the project, the Commission narrowed the range of alternatives as estimates of MUPS effects were examined. After the selection of its final proposal in January, the Commission asked us to develop revised estimates of the impact of its proposal. The final MUPS proposal would require all public and private employers to provide workers:

- a mininum three percent of payroll contribution,
- plan participation at age 25, with one year of service and 1,000 hours of work per year, and
- full and immediate vesting.

The costs of this proposal would be mitigated by a three year phase-in of the minimum contribution rate and by a program of tax credits for private employers.

In evaluating the range of alternatives identified above, a number of interpretive assumptions were made. First, we assumed that MUPS would be implemented in 1982. Because data were available on workforce and pension plan characteristics only for the 1977-79 period, we adjusted these estimates to reflect expected changes in these characteristics between 1979 and 1982. While subject to some uncertainty, these adjustments do not have a major impact on the results.

Second, under Alternatives 1 through 5, MUPS will have two major effects: 1) it will provide a new plan of retirement benefits for workers not now participating in a plan; and 2) it will provide additional benefits for members of existing plans that do not meet the MUPS minimum requirements. We estimated the impact of MUPS separately for these two groups. However, due to limitations in available data, the estimates of the impact of MUPS on existing plans are subject to greater uncertainty than the estimates of the impact on currently uncovered workers.

Specifically, we assumed that current plan sponsors would not establish a new plan of benefits under MUPS, but simply treat the MUPS benefit as a minimum benefit under their current plan. This approach was feasible primarily because we employed a microsimulation approach for estimating retirement benefits. Nevertheless, the results are sensitive to the characteristics of the 275 representative plans used to estimate benefits for individual workers. If plan characteristics change differently than we have assumed here, the benefit estimates may be different. However, because MUPS has a more significant impact on workers who are currently uncovered, these uncertainties have a relatively minor impact on overall levels of benefits and costs.

Third, the mandatory savings plan (Alternative 3) does not require universal participation. Therefore, the estimates of its impact are directly affected by assumptions regarding worker participation rates in these plans -- assumptions for which little, if any, data are available. Although we obtained some data on employer thrift plan participation rates and IRA participation, none of this information corresponded with the characteristics of the MUPS savings plan alternative.[1/] Due to the lack of a satisfactory basis for estimating voluntary response under the savings plan alternative, we

1/ See Table 27 in Appendix E.

did not make detailed estimates of the potential effects of this MUPS policy. However, the potential impact of savings plan alternatives should be a continuing topic of research in the future.

Fourth, under each alternative, plan sponsors are free to make some changes in existing plans to offset the potentially higher costs of MUPS, while meeting the minimum standards of both ERISA and MUPS. Employers might seek to make these changes under each alternative, but especially under the ERISA liberalization alternative (Alternative 6). Employers might be tempted to terminate their plans, or not establish new ones, in cases where the increases in plan costs are high. Whether and how these offsetting adjustments are made is highly uncertain. Where possible, we attempted to identify some of these effects. However, in this analysis, we concentrated primarily on estimating the direct impact of each policy alternative, reserving further analysis of offsetting effects for future research. This does not imply that these effects will be small.

Finally, this paper addresses primarily the impact of the policy alternatives alone on the retirement income system and the economy. It does not address the combined effects of these and other policies considered and adopted by the Commission. This is a major limitation of the study. However, the results presented here provided assistance to the Commission in evaluating the potential problems of existing retirement programs and in selecting those policy alternatives which are most effective in addressing these problems. Future research should examine the combined effects of these proposals.

IMPACT OF MUPS ON RETIREMENT PLANS

After reviewing the current status of retirement plan participation and identifying the preliminary MUPS alternatives, we undertook an analysis of the potential effects of the MUPS alternatives. The analysis drew quite heavily upon the retirement income simulation model developed by ICF for this purpose and upon the May 1979 CPS data and the 1977 BLS Survey of Expenditures for Employee Compensation. This section discusses the impact of selected MUPS alternatives on retirement plan participation, benefits and costs. The estimates presented here assume that MUPS will be implemented in 1982.

A. Impact on Workers

To evaluate the impact of MUPS on participation and vesting, we assumed that the workforce in 1982 would have approximately the same characteristics as the workforce represented in the May 1979 Current Population Survey. Although the overall level of participation and vesting may be expected to change slightly over this period, this data base provided substantial cross-sectional detail that was not available in aggregate forecasts of participation and vesting. This assumption will tend to overstate slightly the effect of MUPS on plan participation and vesting.

1. Participation

The MUPS alternatives would affect three groups of workers:

- those who are not participants because no pension plan is available.
- those who are not participants because they do not meet the participation requirements of an existing plan.
- those who currently are participants but who would receive a higher benefit or a vested benefit after shorter service under a MUPS.

In this section, we examine primarily the number of new participants that would arise from establishing new plans and changing minimum participation standards. We also examine the increase in vested workers under each case. These estimates are based upon the May 1979 CPS data. However, due to a lack of data on the distribution of pension plan benefits, the estimates of workers affected solely by the minimum benefit provisions of MUPS are more uncertain. These estimates are based primarily upon 1977 BLS Survey of Expenditures for Employee Compensation data.

To estimate the number of participants under each alternative, we estimated the number of workers in the May 1979 CPS sample that would meet

each of the participation standards in the initial year of implementation. These standards were assumed to apply to both public and private sector workers. As indicated in Table 12, the number of affected workers in the initial year of each policy alternative's implementation varies substantially from one case to another. Specifically, if all employers were required to establish a pension plan:

- a participation standard of 25 years of age, one year of service and 1,000 annual hours of work (25/1/1000) would result in the addition of over 20 million new participants and would increase the percentage of workers who participate from 48 percent to 70 percent in the initial year of implementation.

- a more liberal participation requirement of 20 years of age, one year of service, and 1,000 annual hours of work (20/1/1000) would increase the percentage of workers who participate to 75 percent in its initial year of implementation; this standard would affect existing as well as new MUPS plans.

- less liberal age standards for participation only in the new MUPS plans, such as the 30/1/1000, 35/1/1000, or 40/1/1000 standard would still increase substantially the percentage of workers who participate: to 66 percent under the 30/1/1000 standard, to 63 percent under the 35/1/1000 standard, and to 60 percent under the 40/1/1000 standard.

Although not indicated in this table, we estimate that approximately five million current participants in pension plans would have to have their benefits improved to meet a three percent defined contribution requirement, assuming no change in participation and vesting requirements.

Table 12 also indicates that if only existing plans were required to liberalize their participation standards to age 20, one year of service, and 500 hours of annual service (20/1/500), approximately five million new participants would be added and the percentage of workers who participate would increase from 48 to 53 percent. Because this alternative would not mandate any more stringent benefit requirement, it would have no direct effect on current participants. It thus appears that MUPS could affect approximately thirteen to twenty-seven percent of the entire workforce through the establishment of mandatory coverage, participation, and minimum benefit requirements. Liberalizing ERISA participation and vesting rules would affect approximately five percent of the workforce.

To indicate the potential impact of adding these workers to retirement programs, we examined the patterns of participation for different groups of workers under each alternative. As shown in Table 13, the largest effects of the MUPS in its initial year of implementation would be on self employed and agricultural workers, two groups which currently have extremely low participation rates. Retirement plan participation rates for self employed

TABLE 12

POTENTIAL EFFECTS OF POLICY ALTERNATIVES ON PLAN PARTICIPATION IN INITIAL YEAR OF IMPLEMENTATION

Alternative Policies	Plan Participants (Millions) Current	Additional	Total	Change	Participants As a Percentage of All Workers
1. Current Policy	45.0	--	45.0	--	48%
2. MUPS with Participation at:					
-- 40/1/1000	45.0	12.0	57.0	+27%	60%
-- 35/1/1000	45.0	14.5	59.5	+32%	63%
-- 30/1/1000	45.0	17.7	62.7	+39%	66%
-- 25/1/1000	45.0	21.4	66.4	+48%	70%
-- 20/1/1000	45.0	25.6	70.6	+57%	75%
3. Current Policy with Participation at 20/1/500	45.0	5.0	50.0	+11%	53%

SOURCE: ICF estimates based upon May 1979 CPS data.

TABLE 13

RETIREMENT PLAN PARTICIPATION RATES
IN INITIAL YEAR OF IMPLEMENTATION

	Millions of Workers	Current Policy	MUPS Plans with Participation Standards of: 25/1/1000	30/1/1000
Worker Group:				
• Private, non-farm wage and salary	69.2	46%	67%	63%
• Agricultural	1.6	14%	48%	41%
• Public	15.4	79%	86%	85%
• Self employed	8.3	14%	71%	65%
Worker Age Group:				
• 25-64	73.5	56%	85%	79%
• 35-64	48.2	58%	87%	87%
• 45-64	29.8	58%	89%	89%
Full Time/Full Year Worker Age Group:				
• 25-64	45.4	66%	91%	85%
• 35-64	28.0	69%	94%	94%
• 45-64	16.3	70%	96%	96%
Hourly Wage Level: (In $ 1979)				
• Less than $4	28.6	22%	46%	42%
• $4-$7	37.3	49%	74%	69%
• More than $7	28.4	72%	90%	87%
All Workers	94.4	48%	70%	66%

SOURCE: ICF estimates based upon May 1979 CPS data.

workers would increase from 14 percent to 71 percent and from 14 percent to 48 percent for agricultural workers under the 25/1/1000 participation standard. Private, non-farm wage and salary workers would also be heavily affected. Participation rates for these workers would increase from 46 to 67 percent under the 25/1/1000 participation standard. These results are consistent with the analysis of characteristics of non-participants presented above.

Table 13 also shows that both the 25/1/1000 and 30/1/1000 participation standards would increase participation rates for 45 to 64 year old workers to 89 percent and would increase participation rates for full time, full year workers in this age group to 96 percent. The table shows that almost 90 percent of higher wage workers (assumed to be those earning more than seven dollars per hour in 1979) would participate under the two MUPS participation standards.

These estimates provided a useful preliminary basis for the Commission to identify the potential tradeoffs inherent in designing a MUPS policy. After a review of preliminary estimates of MUPS effects, the Commission in January adopted a MUPS participation standard of age 25, one year of service, and 1,000 hours of work annually (25/1/1000). Based upon the estimates presented above, this policy would increase the number of participants in public and private employer sponsored plans by approximately 21 million, raising overall rates of participation from 48 percent to 70 percent.

2. Vesting

The MUPS alternatives would also have an effect on vesting. As Table 14 shows, a three year vesting standard with the 30/1/1000, 25/1/1000 or 20/1/1000 participation standard would increase substantially the percentage of workers who are vested in the initial year of implementation. Vesting rates would increase from 30 to approximately 54-58 percent under these standards, if one assumes that the vesting rules were effective immediately and applied to prior service. Under each of these alternatives, approximately three-quarters of all plan participants would be vested. Under alternative participation requirements such as the 40/1/1000 requirement with three year vesting, the percentage of vested workers would still increase to approximately 50 percent, or more than 80 percent of all participants. Although these estimates provide a useful picture of vesting in the initial year of implementation, they may change over time as the workforce ages.

We also examined the impact of a more liberal participation and vesting standard applied only to existing plans (Alternative 6) under three alternative vesting schedules. The five year vesting standard would increase the percentage of workers who are vested to 38 percent (73 percent of plan participants) and the three year standard would increase it further to 42 percent (81 percent of all participants). Under the one year standard all participants would be vested and 52 percent of all workers would be vested.

TABLE 14

POTENTIAL EFFECTS OF POLICY ALTERNATIVES ON PLAN VESTING
IN INITIAL YEAR OF IMPLEMENTATION

Alternative Policies	Additional Vested Workers (In Millions)	Percentage of All Workers Vested	Percentage of All Participants Vested
1. Current Policy (28.7 million vested workers)	--	30%	64%
2. MUPS with:			
• 40/1/1000 Participation			
--10 year vesting	6.1	37%	61%
-- 5 year vesting	13.9	45%	75%
-- 3 year vesting	18.5	50%	83%
• 30/1/1000 Participation			
-- 10 year vesting	6.9	38%	57%
-- 5 year vesting	16.4	48%	72%
-- 3 year vesting	22.2	54%	81%
• 25/1/1000 Participation			
-- 10 year vesting	7.1	38%	54%
-- 5 year vesting	17.0	48%	69%
-- 3 year vesting	23.2	55%	78%
• 20/1/1000 Participation			
-- 10 year vesting	7.2	38%	51%
-- 5 year vesting	17.9	49%	66%
-- 3 year vesting	25.8	58%	77%
3. Current Policy with Participation of 20/1/500 and			
-- 5 year vesting	7.4	38%	73%
-- 3 year vesting	11.3	42%	81%
-- 1 year vesting	21.3	52%	100%

SOURCE: ICF estimates based upon May 1979 CPS data.

In order to illustrate the impact of alternative vesting standards on different groups of workers, we estimated vesting rates for selected groups under a MUPS participation standard of 25/1/1000. These estimates are presented in Table 15. As shown, the vesting alternatives would increase the proportion of vested workers in all categories in the initial year of implementation. However, comparing Table 15 with Table 13 provides some insight regarding the relative contribution of mandatory coverage, minimum participation standards and shorter vesting to the potential increase in vested workers. For example, the estimates indicate that requiring mandatory plans with a participation standard of 25/1/1000 increases the number of participants by approximately twenty-one million, but only about eight million (approximately one-third) of these would be vested under ten year vesting. This is well below the 64 percent of current participants who are vested. This suggests that many of the newly covered workers have substantially fewer years of service with their current employer. Thus, while the percentage of vested workers increases with more liberal participation rules, the percentage of vested participants will decline.

Based upon a review of preliminary estimates, the Commission adopted a MUPS standard of full and immediate vesting. Although not presented in the tables above, this policy would assure immediate vesting of the MUPS benefit for all participants. This would apply to new and existing plans. As a result, the proportion of vested workers would increase from 30 percent to 70 percent under an immediate vesting standard. The application of this standard would affect the new MUPS plans more heavily than existing plans due to the greater proportion of shorter service workers who do not currently participate in pension plans.

B. Impact on Pension Benefits

Although the estimates of MUPS impact on participation and vesting are helpful, they do not permit an assessment of the impact of alternative standards on benefit receipt. We thus undertook an analysis of a range of MUPS alternatives on pension and Social Security benefits. The MUPS alternatives seek to improve retirement incomes for all groups in the population, especially those currently dependent primarily on Social Security. To estimate the impact of MUPS on retirement benefits, we simulated the work and wage histories for the group of workers age 25 to 29 in 1979, based upon the characteristics reported in the May 1979 CPS. By estimating their retirement benefits both with and without MUPS, it is possible to evaluate the role that MUPS might play in the retirement income system under a wide range of assumptions.

In estimating retirement benefits under current and alternative policies, we developed and used the dynamic microsimulation model described in Appendix C. In making the simulations, a number of simplifying assumptions were required. Specifically, we assumed that:

result, substantial caution should be used in interpreting the combined effects of a MUPS and a shift in Social Security retirement age. Although MUPS has a favorable impact on benefits during retirement, not all workers may elect to defer retirement to age 68 in light of their increased retirement wealth.

2. Distributional Effects

Although the estimates above indicate that MUPS achieves the Commission's objective of improving retirement benefits, it is important to examine the distributional effects of the alternatives to ensure that the increases help the desired groups. Using the simulation model, we estimated Social Security and pension benefits as well as average replacement rates for retirees in different income classes.

Initial estimates show that a three percent defined contribution MUPS by itself has a favorable impact on most groups of retirees, but particularly those with pre-retirement incomes above $10,000. The estimates presented in Appendix C reflect higher than expected replacement rates for all categories due to the fact that pre-retirement income is defined as the highest five of the last ten years before retirement. This has the effect of understating the estimate of pre-retirement income used in the denominator. Nevertheless, the potential relative impact of MUPS by income class can be observed.

To further illustrate the distributional impact of MUPS, we analyzed the proportion of households with different Social Security and pension benefits for two MUPS alternatives: (1) a three percent defined contribution plan, with participation of 25/1/1000 and vesting after five years; and (2) a nine percent defined contribution plan with participation of 25/1/1000 and immediate vesting. Figure 1 presents estimates for married couples in retirement and Figure 2 presents estimates for unmarried individuals. In both cases, the MUPS tends to improve the level of retirement benefits. However, this improvement is more significant for couples with $10,000 or more in retirement benefits; those below this level are less affected by a MUPS of this design.

After the Commission's review of the preliminary MUPS proposals, we examined the impact of the recommended three percent defined contribution MUPS with a participation standard of age 25, one year of service and 1,000 hours of work annually (25/1/1000) and full and immediate vesting. Assuming retirement at age 68, we estimated the combined effects of a MUPS and a change in the Social Security retirement age. To illustrate the potential effect of these proposals, Figures 3 and 4 indicate the proportion of households with different retirement incomes at age 68. Although not all individuals would necessarily retire at this age, these figures indicate what their retirement incomes would be if they did.

In general, these findings indicate that a MUPS will improve retirement incomes for all retirees, but especially for those groups currently dependent primarily upon Social Security. Because the MUPS benefits are distributed among all retirees, additional refinements could target the benefits to

FIGURE 1

POTENTIAL EFFECTS OF MUPS ON INITIAL RETIREMENT INCOMES
FOR MARRIED HOUSEHOLDS CURRENTLY AGE 25-29
(25/1 Participation and 5 Year Vesting)

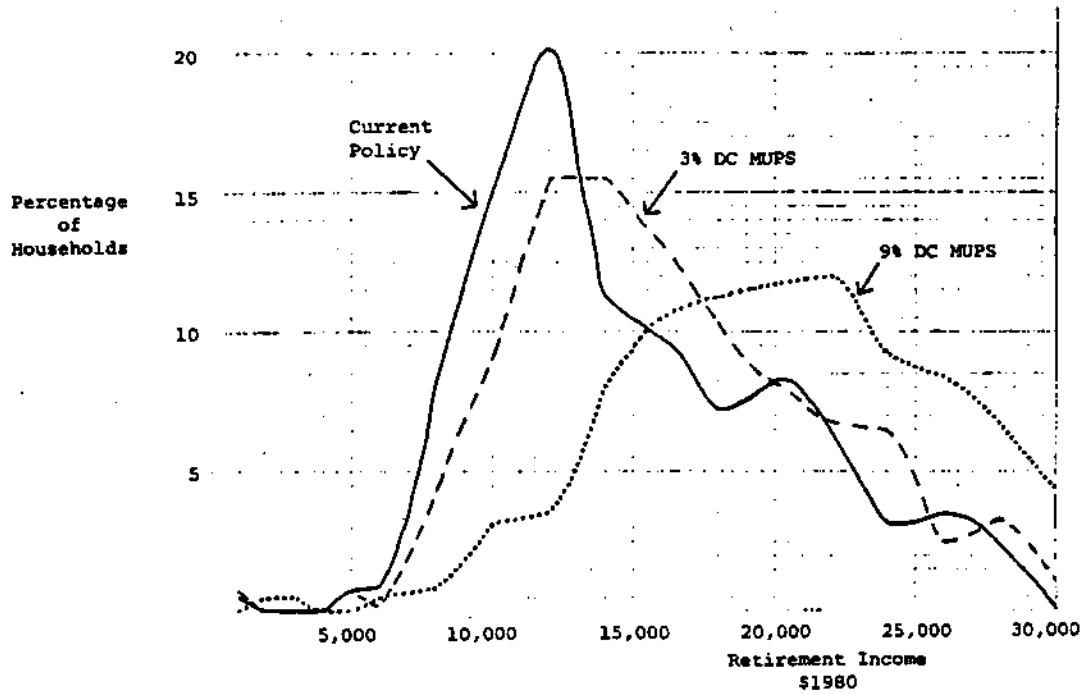


FIGURE 2

POTENTIAL EFFECTS OF MUPS ON INITIAL RETIREMENT INCOMES
FOR UNMARRIED INDIVIDUALS CURRENTLY AGE 25-29
(25/1 Participation and 5 Year Vesting)

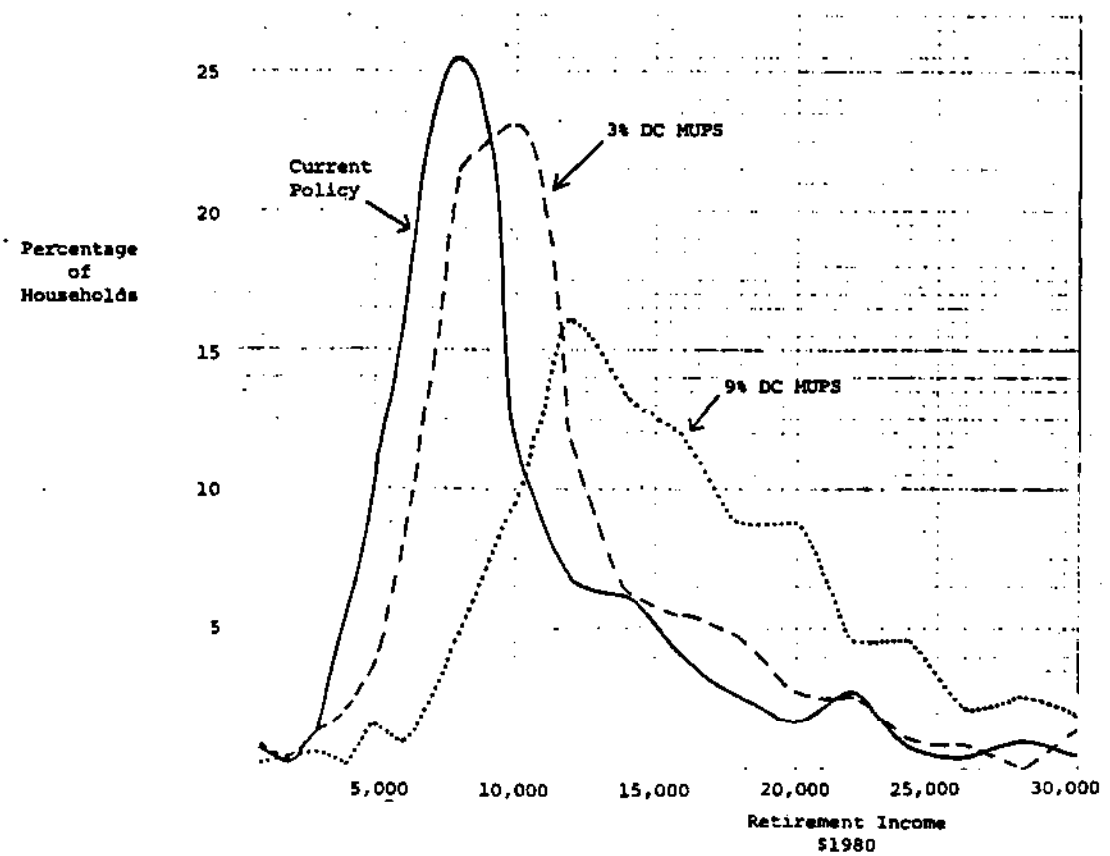


FIGURE 3

POTENTIAL EFFECT OF MUPS AND A 3-YEAR SHIFT IN RETIREMENT AGE ON INITIAL RETIREMENT INCOMES FOR MARRIED HOUSEHOLDS CURRENTLY AGE 25-29
(Assumes Retirement at Age 65 under Current Policy and at Age 68 under the PCPP Recommendations)

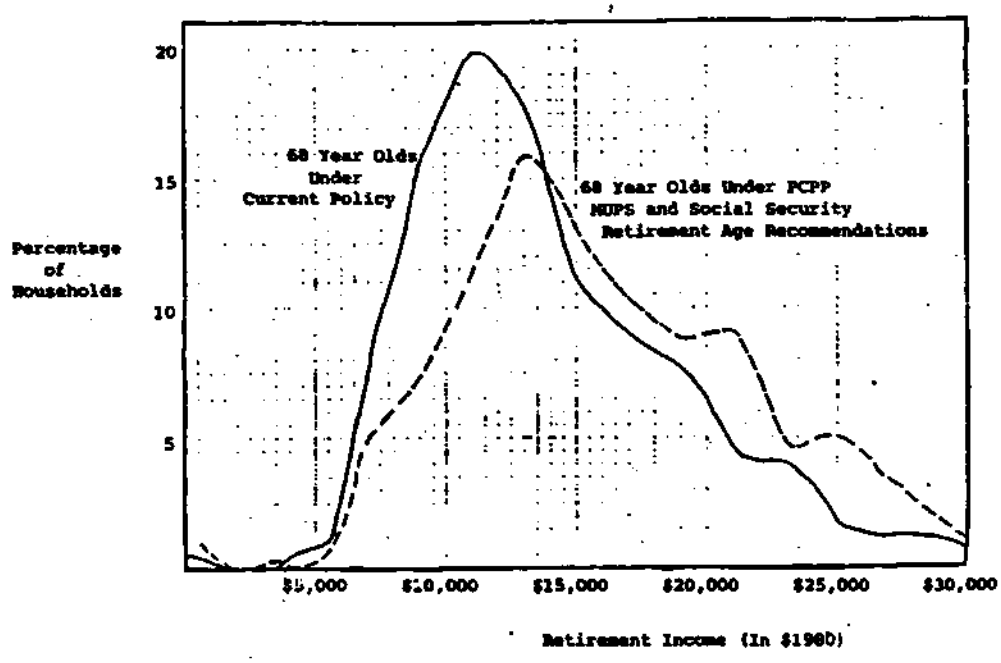
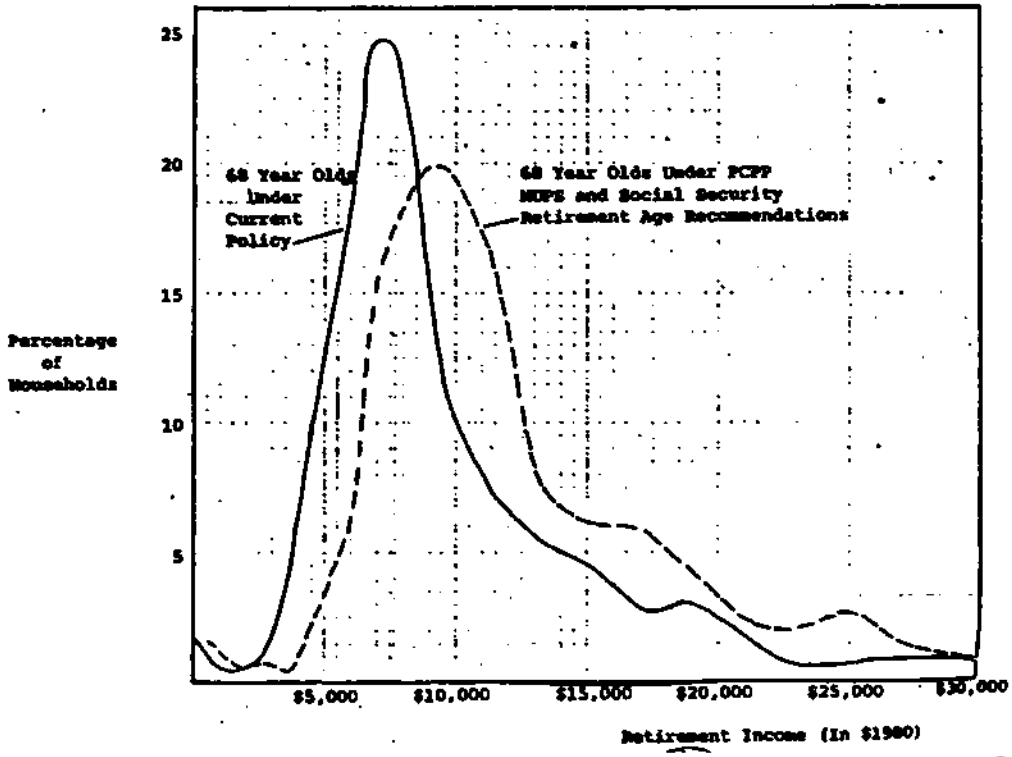


FIGURE 4

POTENTIAL EFFECT OF MUPS AND A 3-YEAR SHIFT IN RETIREMENT AGE ON INITIAL RETIREMENT INCOMES FOR UNMARRIED INDIVIDUALS CURRENTLY AGE 25-29
(Assumes Retirement at Age 65 under Current Policy and at Age 68 under the PCPP Recommendations)



specific subsectors of the retired population. For example, one approach, consistent with the MUPS concept, would be to establish a limit on the annual earnings subject to a MUPS contribution. This could focus the MUPS benefits on lower and middle income workers. However, even this approach may have a limited impact. Many workers accrue MUPS benefits during periods of employment currently not widely covered by retirement plans. MUPS benefits for these workers are based heavily upon their early careers, when income and labor force participation is generally lower and less certain. Nevertheless, these estimates illustrate the potential impact of MUPS benefits on retirees, and permit policymakers to identify potential areas for further refinements.

3. Adequacy of Retirement Benefits

Although MUPS will tend to increase retirement incomes for many workers, it is difficult to assess the potential adequacy of Social Security and pension benefits in the future. As shown below in Table 18, families and individuals over age 65 in 1979 received their income from a variety of sources. This suggests that the estimates presented above tend to understate the total income available to retirees. They also do not reflect the value of in-kind benefits such as Medicare or Medicaid available to retirees. Unfortunately, time and resources did not permit us to incorporate all sources of retirement income into the simulations conducted during this project.

Nevertheless, in order to assess the potential adequacy of Social Security and pension benefits in the future, we examined the proportion of families below different standards of adequacy. The standards selected by Commission staff include the poverty level index and the standard family budget levels developed by the Bureau of Labor Statistics (BLS).

Initially, we examined the percentage of married and unmarried households currently age 25-29 that might fall below these standards at retirement in the future. Table 19 presents these estimates for the preliminary MUPS proposals identified by the Commission. As indicated, MUPS generally reduces the proportion of households expected to be below each standard. The magnitude of this shift is more significant for unmarried individuals than couples.

However, these estimates are quite sensitive to the expected rate of growth in real wages and the manner in which the adequacy standards are adjusted for inflation over the period. If real wages are assumed not to increase over the period, the proportion of households falling below the standards for all cases would increase substantially.

These estimates are also quite sensitive to the concept of adequacy applied. If the standards are indexed to prices and wages grow more rapidly than prices, one would expect the proportion of households below a standard now to decrease in the future without any new policies. This reflects an absolute standard of adequacy. Alternatively, if the standard is indexed to wages, the proportion of households below a standard would tend to decline more slowly, if at all. This reflects more of a relative concept of poverty. Both of these concepts are illustrated in Table 19.

TABLE 18

RELATIVE CONTRIBUTION OF INCOME SOURCES FOR FAMILIES, HEAD AGE 65 AND OVER, 1978[a/]

Source	Family Income Level in 1978			
	$3,000-5,000	$10,000-15,000	$25,000-50,000	All Incomes
Earnings	3.9%	27.2%	61.4%	38.2%
Social Security	75.2	36.2	10.5	31.7
Pension Benefits	3.5	16.7	9.4	10.9
Savings	7.3	16.4	17.0	15.5
Public Assistance	9.7	2.9	1.1	3.1
Other	0.4	0.6	0.6	0.6
Total	100.0%	100.0%	100.0%	100.0%
Average Income	$3,917	$12,242	$33,358	$11,183

a/ The March 1979 CPS understates the amount of income received from unearned sources by between 10 and 25 percent because some survey respondents were either unwilling or unable to provide accurate information on their incomes.

SOURCE: ICF analysis of March 1979 CPS data.

TABLE 19

ESTIMATED PERCENTAGE OF HOUSEHOLDS CURRENTLY AGE 25-29
WITH RETIREMENT INCOMES BELOW DIFFERENT LEVELS OF INCOME ADEQUACY[1]/
(Age 25/1 Year Participation and 5 Year Vesting)

Absolute Adequacy Levels 2/ (Indexed to Prices)	Current Policy	MUPS Alt. 1,4 (1/2% DB)	MUPS Alt. 2,5 (3% DC)	ERISA Liberalization
Couples				
• Poverty Line	1%	1%	1%	1%
• BLS Lower Level	2%	2%	2%	2%
• BLS Intermediate Level	8%	4%	4%	7%
Individuals				
• Poverty Line	3%	2%	3%	3%
• BLS Lower Level	3%	2%	2%	3%
• BLS Intermediate Level (Individual Level Adjusted)	21%	8%	7%	18%
Relative Adequacy Levels 3/ (Indexed to Wages)				
Couples				
• Poverty Line	3%	2%	2%	2%
• BLS Lower Level	8%	4%	4%	8%
• BLS Intermediate Level	15%	7%	8%	13%
Individuals				
• Poverty Line	10%	6%	5%	9%
• BLS Lower Level	10%	5%	5%	8%
• BLS Intermediate Level (Individual Level Adjusted)	66%	47%	49%	61%

NOTE: These estimates assume an average real growth in wages of one percent per year and retirement at age 65.

1/ These estimates include income from only Social Security and retirement plans. They do not include income from SSI or other income support programs. The MUPS alternatives shown here are not equivalent to the Commission's proposal. Under MUPS Alternatives 1, 2, 4, and 5 all private and public employers must offer a retirement plan with participation standards no stricter than age 25, one year of service, and 1,000 hours of work annually and a vesting standard no stricter than five years of service. MUPS Alternatives 1 and 4 are 0.5 percent accrual defined benefit plans. MUPS Alternatives 2 and 5 are three percent defined contribution plans. The ERISA liberalization alternative would require that existing plans have vesting standards no stricter than five years of service.

2/ Absolute adequacy levels are 1978 standards adjusted for assumed price increases (six percent per year) to the 2015-2019 period. The adjusted BLS intermediate level budget uses the intermediate level budget for couples and two-thirds of that amount for individuals. Therefore, the rate of growth in real wages by itself can be expected to reduce the proportion of individuals and couples below these standards.

3/ Relative adequacy levels are 1978 standards adjusted for assumed wage increases (seven percent per year) to the 2015-2019 period. The adjusted BLS intermediate level budget uses the intermediate level budget for couples and two-thirds of that amount for individuals.

SOURCE: ICF estimates based upon microsimulation estimates of retirement benefits.

After the original MUPS proposals were refined, we estimated the potential impact of the Commission's recommendations for a MUPS and a shift in the Social Security retirement age on the adequacy of retirement income. Using a relative standard of adequacy, the estimates in Table 20 indicate that the combined proposals tend to improve the adequacy of retirement benefits for individuals though not for couples, which remain about the same under both current policy and a MUPS. The table also illustrates the potential importance of a MUPS in offsetting the reduction in Social Security benefits implied by a shift in the Social Security retirement age.[1/] However, these estimates assume that retirement plan benefits commence at age 68 under the proposed policy. Because it is not certain how pension plans and workers will change in response to a shift in Social Security retirement age and a MUPS, further research is required before drawing firm conclusions from these estimates.

4. Limitations of Estimates

The benefit estimates presented above were developed from a microsimulation model. This model, described in Appendix C, incorporates the specific benefit and plan provisions of current Social Security law and actual retirement plans in 1980. Although the more obvious changes in these provisions over the period were made (e.g., taxable wage base, changes in flat benefit plans, etc.), we have no historical basis for predicting just how individual plan sponsors or Congress would make changes in these programs. Employer decisions to establish and terminate pension plans in the future assuming no change in current policy will affect the results of this analysis. If pension plan availability increases, the benefit increases attributable to MUPS will be less; conversely, if plan availability declines, the benefits attributable to MUPS will be higher. As a result, the estimates presented here should not be considered forecasts of future benefits per se, but rather a baseline for purposes of evaluating the relative effects of alternative policies. While these forecasts appear to be reasonable, the models were not developed explicitly for this purpose.

Many of the proposals considered here will have an apparent favorable effect on retirement benefits. While these improvements address the policy concern over potentially inadequate retirement benefits for certain population groups, it should be clear that: 1) individuals possess a wide range of income sources for retirement, not all of which were addressed here; and 2) many may elect to use the apparent increase in retirement wealth under MUPS to retire earlier, rather than later. As a result, additional research on the potential impact of such offsetting actions will improve the confidence we have in understanding the impact of MUPS.

1/ Under current policy, individuals receive unreduced Social Security benefits at age 65. Under the Commission recommendations, individuals could receive reduced benefits at age 65, but could only receive unreduced benefits at age 68. Consequently, if workers who now retire at 65 do not change their age of retirement, their benefits will be reduced under the Commission proposal.

TABLE 20

ESTIMATED PERCENTAGE OF HOUSEHOLDS CURRENTLY AGE 25-29
WITH INITIAL RETIREMENT BENEFITS BELOW DIFFERENT
LEVELS OF INCOME ADEQUACY
(Assumes Retirement at Age 65)

Relative Adequacy Levels 2/ (Indexed to Wages)	Current Policy	PCPP Social Security Retirement Age Recommendations and: No MUPS	MUPS
Couples			
• Poverty Line	3%	4%	3%
• BLS Lower Level	8%	21%	9%
• BLS Intermediate Level	15%	31%	17%
Individuals			
• Poverty Line	10%	27%	8%
• BLS Lower Level	10%	23%	6%
• BLS Intermediate Level (Individual Level Adjusted)	66%	72%	45%

NOTE: These estimates are based upon the assumption that workers retire at age 65. They include income from Social Security and retirement plans only. They do not include income from SSI or other income support programs. These estimates assume an average real growth in wages of one percent per year.

1/ The PCPP Social Security retirement age recommendations would not allow unreduced benefits until age 68. Under MUPS all private and public employers must offer a retirement plan with participation standards no stricter than age 25, one year of service, and 1,000 hours of work annually and full and immediate vesting. The MUPS plan is a three percent of earnings defined contribution plan.

2/ Relative adequacy levels are 1978 standards adjusted for assumed wage increases (seven percent per year) to the 2015-2019 period. The adjusted BLS intermediate level budget uses the intermediate level budget for couples and two-thirds of that amount for individuals.

SOURCE: ICF estimates based upon microsimulation estimates of retirement benefits.

C. Impact on Pension Costs

Because MUPS tends to increase the retirement incomes for a broad group of workers, the Commission's proposals will increase the costs of employee benefits. We estimated the potential costs of the MUPS proposals using Bureau of Labor Statistics' estimates of current contributions to employer sponsored pension and profit sharing plans.[1/] In developing these estimates, we made the following simplifying assumptions:

- employers without plans were assumed to establish the MUPS plan specified for any specific alternative; thus, for a three percent defined contribution MUPS, costs were estimated as a function of the number of workers subject to the participation and vesting standards and their wage rates.

- employers with plans that did not meet individual MUPS minimum standards were assumed to meet the MUPS standards, but not to offset the costs by reducing benefits that exceeded the MUPS.

- current retirement plan costs were assumed to continue to increase at the rate of increase in wages, reflecting our assumptions for trends in benefits and other plan provisions used to estimate benefits; administrative costs associated with MUPS were not included in the analysis.

1. Initial Estimates

In developing the cost estimates, we first examined recent levels of pension costs under current policy. In 1977, the BLS survey indicates that private, non-farm employers contributed approximately $37 billion to existing pension and profit sharing plans. The survey indicates that these costs were distributed by establishment size as shown in Table 21. These estimates provide a starting point for estimating the impact of MUPS on private employers.

Next, we examined the number and average wage level of workers at establishments with and without pension and profit sharing plans in order to determine the types of changes required to comply with MUPS standards. We also identified those workers covered by plans where current pension costs fell below the costs of various MUPS standards. Although we examined the costs of all of the preliminary MUPS options, the MUPS costs varied primarily as a function of participation and vesting standards. As a result, most of our cost estimates reflect the application of a three percent defined contribution MUPS (Alternatives 2 and 5) under different assumptions.

1/ BLS Survey of Expenditures for Employee Compensation, 1977.

TABLE 21

ESTIMATED CONTRIBUTIONS TO PRIVATE RETIREMENT PLANS, 1977[1/]
(In $ Billions)

Size of Establishment	Amount	Percent of Total
Less than 100 employees	$13.7	37%
100-500 employees	8.8	24%
500 or more employees	14.7	39%
Total	$37.2	100%

1/ Note this table includes only private, non-farm wage and salary workers. Public sector workers, agricultural workers and the self employed are excluded.

SOURCE: ICF analysis of 1977 BLS Survey of Expenditures for Employee Compensation.

Specifically, we initially estimated the potential costs of a MUPS in 1982 under three sets of participation and vesting requirements:

- 25/1/1000 -- participation of 25 years of age, one year of service and 1,000 annual hours of work and five year vesting.
- 30/1/1000 -- participation of 30 years of age, one year of service and 1,000 annual hours of work and three year vesting.
- 40/1/1000 -- participation of 40 years of age, one year of service and 1,000 annual hours of work and three year vesting.

These estimates, presented in Table 22, provided a preliminary basis for the Commission to assess the potential magnitude and distribution of MUPS' costs. These estimates suggest that:

- small establishments are likely to be more heavily affected than large establishments; in fact, smaller establishments may expect initial cost increases of approximately 19-28 percent in the absence of other offsetting policies.
- the addition of new participants will create the largest increase in pension costs under the assumptions of this MUPS proposal; although there are some costs associated with improving benefits for existing participants, these appear to be substantially lower than the costs associated with adding new participants; the cost estimates for improving benefits for existing participants are also more uncertain.

TABLE 22

ESTIMATED COSTS TO PRIVATE EMPLOYERS OF A 3 PERCENT DEFINED CONTRIBUTION MUPS IN 1982 1/
($ 1982 Billions)

Participation Requirement and Size of Establishment	Current Policy	Added Costs For: New Participants	Existing Participants	Total	Percent Increase
25/1/1000 Participation and 5 Year Vesting					
Less than 100 employees	$21.1	$5.2	$0.7	$5.9	28%
100-500 employees	13.4	1.1	0.4	1.5	11%
500 or more employees	22.3	0.7	0.3	1.0	5%
Total	$56.8	$6.9	$1.4	$8.4	15%
30/1/1000 Participation and 3 Year Vesting					
Less than 100 employees	$21.1	$4.8	$0.7	$5.5	23%
100-500 employees	13.4	0.9	0.4	1.3	10%
500 or more employees	22.3	0.5	0.3	0.8	4%
Total	$56.8	$6.2	$1.4	$7.6	13%
40/1/1000 Participation and 3 Year Vesting					
Less than 100 employees	$21.1	$3.3	$0.7	$4.0	19%
100-500 employees	13.4	0.6	0.4	1.0	7%
500 or more employees	22.3	0.3	0.3	0.6	3%
Total	$56.8	$4.2	$1.4	$5.6	10%

1/ The estimates apply to private wage and salary workers only. The costs exclude potential increases in administrative costs and the effects of MUPS tax credits and the three year phase-in.

SOURCE: ICF estimates based upon May 1979 CPS and 1977 BLS Survey of Expenditures for Employee Compensation (EEC) data.

We also examined the potential imact of MUPS on public employee plans and self-employed workers. In general, the impact on public employee plans was relatively small (less than $1 billion in 1982), whereas the added costs for the self-employed were substantial (approximately $2 billion in 1982).

Combining these estimates for all workers in 1982, we developed an overall estimate of the costs for the preliminary MUPS alternatives identified by the Commission. These estimates are presented in Table 23. The defined benefit MUPS alternative includes an indexed benefit at 80 percent of the CPI and is thus somewhat more expensive than the defined contribution alternative. As shown, overall costs to public and private plan sponsors may increase by 11-15% under the defined benefit MUPS or by 8-11% under the defined contribution MUPS with 5 year vesting. These increases will be much higher for some individual employers, particularly those with fewer than 100 workers and the self-employed who do not sponsor retirement plans.

TABLE 23

ESTIMATED ANNUAL COSTS FOR ALL EMPLOYERS
OF MUPS ALTERNATIVES IN 1982
(In $ 1982 Billions)

	Current Policy Costs	Increase in Costs Under: 1/2% Defined Benefit MUPS 1/		3% Defined Contribution MUPS	
MUPS Participation and Vesting Requirement					
25/1/1000 and 5 Years	$98	$15	(+15%)	$11	(+11%)
30/1/1000 and 3 Years	$98	$14	(+14%)	$10	(+10%)
40/1/1000 and 3 Years	$98	$11	(+11%)	$ 8	(+ 8%)

1/ Retirement benefits indexed at 80% of CPI. Excludes potential increases in administrative costs and effect of MUPS tax credits and the three year phase-in.

SOURCE: ICF estimates based upon May 1979 CPS and 1977 BLS (EEC) data.

2. Costs of Recommended MUPS

Drawing upon the preliminary results of the impact of MUPS on benefits and costs, the Commission recommended a MUPS proposal providing for a mandatory three percent defined contribution plan with a participation standard of 25/1/1000 and immediate vesting. Although the three percent contribution was

less generous than an indexed one half of one percent defined benefit plan, the adoption of a requirement for immediate vesting increased the generosity and cost of the program substantially. As shown in Table 24, the initial costs of the MUPS program for private employers alone could be approximately $18.9 billion in 1982, almost a one-third increase over the current policy.

TABLE 24

ESTIMATED ANNUAL COSTS TO PRIVATE EMPLOYERS OF 3 PERCENT DEFINED CONTRIBUTION MUPS IN 1982 1/
(In $ 1982 Billions)

Establishment	Current Policy Costs	New Participants	Existing Participants	Total	Percent Increase
Less than 100 employees	$21.1	$ 6.3	$3.3	$ 9.6	46%
100-500 employees	13.4	1.5	1.8	3.3	25%
500 or more employees	22.3	0.9	2.1	3.0	14%
Self-employed workers	2.1	3.0	--	3.0	143%
Total	$58.9	$11.7	$7.2	$18.9	32%

1/ Includes private sector employers only. Excludes administrative cost increases. These estimates do not reflect the Commission's proposed MUPS tax credits or the proposed three year phase-in of the MUPS.

SOURCE: ICF estimates based upon May 1979 CPS and 1977 BLS (EEC) data.

Recognizing the potential burden that MUPS could represent for employers, especially small firms, the Commission recommended a three year phase-in for the contribution rate and a program of refundable tax credits to plan sponsors. These credits would be available to:

- employers with annual earnings of less than $100,000 -- they would receive a business tax credit for the first three percent of payroll contributed to any qualified pension plan.
- all employers -- they would be eligible to receive the higher of the tax credit or the normal tax deduction for all contributions associated with MUPS.

Based upon estimates of the impact of these tax credits provided by Commission staff, we estimated the net costs to private employers over the first three years of the MUPS program. These estimates are shown in Table 25. Combining these estimates with the impact on public employees of over $1 billion

TABLE 25

ESTIMATED NET COSTS TO PRIVATE EMPLOYERS OF A
PHASED-IN 3 PERCENT DEFINED CONTRIBUTION MUPS, 1982-84
(In Nominal $ Billions)

Year (MUPS Contribution Requirement) by Size of Establishment	Current Policy Costs	Added Costs For: New Participants	Added Costs For: Existing Participants	Added Costs For: Total	Business Tax Savings 2/	Net Cost Increase
1982 (1% of Pay)						
Less than 100 employees	$21.1	$ 2.1	$1.1	$ 3.2	$ 2.5	$0.7
100-500 employees	13.4	0.5	0.6	1.1	0.7	0.4
500 or more employees	22.3	0.3	0.7	1.0	0.5	0.5
Self employed workers	2.1	1.0	0	1.0	0.7	0.3
Total	$58.9	$ 3.9	$2.4	$ 6.3	$ 4.4	$1.9
1983 (2% of Pay)						
Less than 100 employees	$23.0	$ 4.7	$1.6	$ 6.3	$ 4.1	$2.2
100-500 employees	14.6	1.0	0.9	2.0	1.2	0.8
500 or more employees	24.3	0.6	1.1	1.7	0.8	0.9
Self employed workers	2.3	2.2	0	2.2	1.3	0.9
Total	$64.1	$ 8.4	$3.6	$12.2	$ 7.4	$4.8
1984 (3% of Pay)						
Less than 100 employees	$24.7	$ 7.5	$2.0	$ 9.5	$ 5.7	$3.8
100-500 employees	15.7	1.6	1.3	2.9	1.7	1.2
500 or more employees	26.2	0.9	1.7	2.6	1.2	1.4
Self employed workers	2.5	3.6	0	3.6	1.9	1.7
Total	$69.1	$13.6	$4.9	$18.6	$10.5	$8.1

1/ All private and public employers must offer a retirement plan with participation standards no stricter than age 25, one year of service, and 1,000 hours of work annually and full and immediate vesting. These estimates assume a phase-in of MUPS requiring a one percent of earnings contribution by employers in 1982, a two percent contribution in 1983 and a three percent contribution in 1984.

2/ Estimates provided by PCPP staff, reflecting the MUPS tax credit and the small business credit for 3 percent of payroll contributions to any qualified plan.

SOURCE: ICF estimates based upon May 1979 CPS and 1977 BLS (EEC) data.

indicates that, when fully implemented in 1984, the annual contributions for MUPS benefits will be approximately $20 billion. Assuming business tax savings of approximately $10.5 billion, the net increase of over $9 billion represents an approximately eight percent increase in sponsor costs.

3. Limitations of Estimates

These cost estimates were developed on the basis of extensive discussions with Commission staff and available data. Due to the stringent deadlines of this project, not all MUPS alternatives were estimated in the same level of detail. In addition, it was not possible for us to reflect the full range of Commission proposals and potentially offsetting actions by employers and workers. As a result, substantial caution should be used in interpreting these estimates.

In particular, these estimates may tend to overstate the potential cost impact under a MUPS by:

- understating the costs of future benefit improvements or increases in plan availability that would occur without a MUPS.
- overestimating the number of existing plans that must change to comply with MUPS.
- overestimating expected wage levels in the future under a MUPS.

Alternatively, these estimates may tend to understate the potential cost impact by not considering administrative costs or the liquidity premium potentially required for MUPS-related investments. All of these costs simply could not be addressed during the project and represent important areas for future research. Nevertheless, the estimates presented above provide a useful benchmark for evaluating MUPS in relation to other retirement income policies.

INTRODUCTION TO PART NINE: RESEARCH ON MICRO/MACRO ECONOMIC ISSUES

After extensive study of the current and feature inadequacies, inequities and financial instability of our nation's retirement income system, the Commission issued its recommendations and Final Report. These recommendations included both broad, long-range retirement income goals and specific, shorter term initiatives required to meet those goals. These goals are important because our retirement income system often determines the quality of life of millions of retirees. The Commission also recognized that retirement income is a significant component of the nation's economy: policies and reforms that alter the makeup, size and allocation of this income has an enormous effect on other factors in the economy such as capital formation, employment, and savings. The Commission had to consider these implications when formulating new policies that could afffect the lives of so many individuals and the overall well-being of our nation.

Fortunately, a great body of work was underway in most of these areas which provided the basis for further analysis. In Chapter 37 and 38, "The Development of a Demographic Macroeconomic Model of the U.S. Economy" and "Findings on the Impact of Pension Policy on the Economy," new paths for study were established. The Commission developed, in cooperation with other agencies, an economic growth model that integrates the retirement income system with the macroeconomy. Major Commission recommendations--the establishment of a Minimum Universal Pension System (MUPS); changing the tax treatment of social security contributions and benefits and implementing other tax changes to encourage retirement savings; and raising the social security retirement age by three years and other policies to delay retirement -- were simulated with the model.

The Commission undertook this major project in order to insure that their formulation of a sound retirement income policy would be consistent with the needs of the national economy. The findings, reported in Chapter 38, show that the Commission's policy recommendations have a significant, positive influence on savings, investment, and economic growth. Also, retirees' benefits would increase, pension coverage would expand greatly, and pension funds themselves would grow.

Another broad measurement of the impact of pension policies can be found in Chapter 39, "Intergenerational Distribution of Income," a more subtle, and often overlooked feature of retirement income policy. The distribution and redistribution of income between different generations occurs in many differnt ways because of the noncompulsory nature of the private pension system (i.e., the tax code) and the lack of correspondence between contributions and benefits under various retirement programs. For example, redistribution occurs in the social security system between lower- and higher-income individuals, between older and younger workers under private pension plans, as well as a very subtle shift between labor and shareholders. This chapter presents the various theories of income distribution and how under each theory, different retirement policies may potentially affect redistribution. The authors conclude that, while the

various theories of income distribution are helpful in providing a composite framework from which to consider the income distributional gains and losses under various policies, the long-term impact of pension policies on income distribution are difficult to determine until a comprehensive theory is developed.

The research contained in the papers in this section will grow in importance, and refinement, in the years ahead. The Commission's macroeconomic model will now enable policy makers to develop retirement policy that is consistent with other objectives of national economic policy. Policy simlations with the model have already shown unanticipated effects on the macroeconomy by retirement income policy. Interest in the issue of income distribution will continue to grow in the years ahead as well, when the retiring "baby boom" generation brings about an unprecedented demographic shift, with perhaps prohibitive costs to the working population. However, the Commission believes that its recommendations will enable this nation to achieve a more adequate, rational, and viable retirement income system that is also consistent with our overall economic goals.

CHAPTER 37: DEVELOPMENT OF A DEMOGRAPHIC MACROECONOMIC MODEL OF THE U.S. ECONOMY

Thomas C. Woodruff

Introduction

The President's Commission on Pension Policy has developed an economic growth model that integrates the retirement income system in the United States with the macroeconomy. The model was developed by ICF Incorporated under contract to the Commission. Begun in March 1980, the model and studies for the Commission will be completed in May 1981.* A federal interagency group was created through a memorandum of understanding and cooperation in which the participating agencies agreed to undertake cooperative efforts to assist in the development of the macroeconomic and demographic growth model and to share pertinent data and analyses regarding the model. The following agencies signed the memorandum: the Department of Health and Human Services, (National Institute on Aging, and the Office of Planning and Evaluation), the Office of Management and Budget, the Department of Housing and Urban Development (Office of Policy Development and Research), and the Department of Labor (Pension and Welfare Benefit Programs).

The goals of this undertaking are consistent with the Commission's mandate under Executive Orders 12100 and 12071. First, studies were conducted concerning the present financial ability of private, federal, state and local government retirement, survivor, and disability systems to meet their future obligations.

* The National Institute on Aging (N.I.A.) joined with the Commission to fund the model development and will receive all contract deliverables and maintain the model after the Commission completes its work.

Second, research was done on the relationships among the retirement income system, private capital formation, and economic growth. Third, some of the implications for the economy of policies recommended by the Commission were examined. This paper reports on the findings of the third area of inquiry: the effects of the Commission's retirement income policies on the economy.

The Need for a Comprehensive Model

No comprehensive model that depicts interactions between retirement programs and the economy or population existed. Naturally, the economy and population affect retirement income programs. For example, the larger proportion of aged individuals in our population projected for the future will create pressures to allocate proportionately more of our total income to this group through social security or private pensions. However, retirement income programs may alter individual behavior and cause effects on the economy or population. For example, the social security retirement test affects labor supply and the level of national income. The lack of feedback from the retirement income system into the economy represents a major gap in model development for policy analysis purposes.

Dr. Woodruff was Executive Director of the Commission. This paper was completed in April 1981.

The New Model's Theoretical Foundations

The theoretical framework of the model is the neoclassical theory of economic growth. This theory provides an analysis of determinants of long-run productivity and economic growth. It explains the determination of investment, consumption, and output; aggregate relative factor shares (labor and capital); substitution between factors; and productivity change. A central role is given to the theory of production and capital. Under the theory of production, outputs are related to inputs in the mathematical expression of a "production function." Capital is viewed as a homogeneous, aggregate factor that depreciates and is replaced and accumulated through investment. Prices and quantities of outputs and factor inputs are determined through the interaction of supply and demand in competitive markets. This theory predicts that the lower the rate of interest, others things equal, the greater the capital intensity of production and the greater the net national product per worker. Thus, policies which change savings and the interest rate have direct effects on the net national product per worker. Also, policies which affect supplies of labor and capital have direct effects on economic growth.

Use of a long-term model is entirely appropriate for analysis of the interaction of the retirement income system and the economy. Social security and other pension systems represent long-term commitments, and the level of benefits depends fundamentally on the productive performance of the nation's economy. Short-run, Keynesian type models are less appropriate because of their focus on the determinants of aggregate demand given a fixed capital stock, rather than the long-run determinants of the nation's income and wealth.

The Components of the Comprehensive Model

The comprehensive model of the retirement income system and the economy developed by ICF Incorporated integrates the Hudson-Jorgenson Macroeconomic Growth Model and the Anderson Labor Market Model and models of each of the major components of the retirement income system. The following is a list of all models included in the comprehensive model:

1. Hudson-Jorgenson Macroeconomic Growth Model
2. Anderson Labor Market Model
3. ICF Population Model
4. Private Employee Pension Model
5. Public Employee Pension Model
6. Social Security Model
7. Supplemental Security Income Model
8. Medicare Model

The integration of these models into one comprehensive model represents a significant and new achievement in the development of macroeconomic models of the U.S. economy. The administrative coordination of the participating agencies ensures wide dissemination of this model throughout the federal government and to the public.

Hudson-Jorgenson Macroeconomic Growth Model

This model is a neoclassical model of the U.S. economy. It depicts household behavior in formulating spending and work plans and producer behavior in formulating production, investment, and employment plans. The model assumes that the forces of demand and supply determine prices, quantities, wages, and interest

rates. The model permits the investigation of the determinants of long-term growth, savings and investment, labor and capital supplies, and productivity.

The Hudson-Jorgenson Macroeconomic Growth Model has four sectors. Producer and household sector behavior is modeled endogenously, and government and foreign sector behavior is given outside the model. The interaction of producer and household behavior determines the quantities and prices of the inputs and outputs. There are two output goods, consumption and investment, and two productive factors, capital and labor.

The model assumes that producers maximize profits or minimize costs subject to the available technology that is described by an aggregate cost function. Linking inputs to outputs, the aggregate cost function permits the demands for labor and capital and the supply of consumption and investment goods to be determined, given the prevailing prices that the producer faces. Furthermore, substitution between capital and labor and the level and change of economic productivity may be determined.

The household maximizes its welfare over time subject to its available resources. The household chooses how to distribute its expected wealth over all years, and, for each year, chooses how much leisure and consumption goods and services it desires to consume. Thus, the household determines how much labor it will supply and how much consumption goods it will demand, given prevailing prices. Savings is the residual between current income and consumption and represents the net change in wealth.

The government sector demands goods and labor services, and government enterprises supply some goods and services. All of these are determined outside the model. The level of taxes and transfer payments are determined in the model, with tax rates given and tax bases modeled. In the foreign sector, net exports of consumption goods and services and of investments goods, purchases of labor services by the foreign sector, and net private claims on the rest of the world are given outside the model.

Over time, conditions of each market change in response to changing technology and availability of factor inputs. As market conditions change, the household sector alters its labor-leisure choice and its consumption and savings, while producers alter the mix of inputs and outputs. Investment and capital accumulation lead to change in the available supply of capital services; population growth and tastes alter labor supply; and production efficiency changes over time. These forces determine the nation's productive capacity. In order to represent the growth path of the economy, the market system is solved each year within the constraints of productive capacity and the behavioral characteristics of the producer, household, government, and foreign sectors. Economists call such a system a "dynamic, general equilibrium model" — dynamic because of the savings-investment mechanism, general because it deals with the whole economy, and equilibrium because all markets clear in each year.

Hudson and Jorgenson used statistical techniques to estimate the parameters of this model. They developed a simulation computer program to solve the simultaneous system of non-linear equations which result from such a dynamic, general equilibrium model.

Anderson Demographic Labor Market Model

In addition to the neoclassical determinants of economic growth, the model focuses on changes in population and labor market behavior and the implications for social security, the pension system, government transfer payments, and Medicare expenditures of these changes. In order to model this aspect of the economy, a population model and a demographically disaggregated labor market model are integrated with the macroeconomic model.

The demographically disaggregated labor market model depicts the demand for labor, the supply of labor, the simultaneous determination of labor and capital service factor inputs, compensation, and unemployment by age and sex. The producer sectors' demand for labor is modeled by disaggregating inputs into four factors--capital services, age 14-24 labor services, age 25-54 labor services, and age 55 and over labor services. The household sector's supply of labor is modeled for twenty age-sex groups. Labor supply in total manhours for each group is determined by population size, labor force participation, employment, and average annual hours-worked per person employed. The demand and the supply of labor are integrated and solved with the macroeconomic model.

Population Model

The composition and size of the U.S. population has important implications for the economy. A population model similar to that of the Census Bureau is incorporated into the macroeconomic model to project the population.

The population model projects the size and composition of population with a probability (Markov) structure. Assuming a fixed set of fertility rates, mortality rates, and number of immigrants, population is dynamically projected for each year by race, age, and sex. This population feeds into the macroeconomic model and labor market model, but there is no feedback from economic activity to the population model.

The user is able to vary the demographic parameters--cohort fertility rate, survival rates, and immigration. Starting with a base case population, e.g. a recent Census Bureau estimate, the implications of changing the demographic assumptions can be determined. Such flexibility is an important analytical tool in assessing how the retirement system will be affected by demographic factors.

Private Employee Pension Model

The model of the private pension system permits the study of interactions between economic and demographic changes and the pension system. Three categories of private pensions are modeled--defined benefit programs, defined contribution programs, and individual arrangements. The private pension model estimates the number of workers covered by private pension plans, the number of retired and separated vested participants, the average benefit per retiree, total benefits and contributions, and the level of assets for each category of pension program. The impact of the pension and social security system on the process of asset accumulation and savings, on labor force behavior, and on output is depicted.

Public Employee Pension Model

The retirement income programs for public employees include the federal civil service and military retirement programs, plus state and local government programs. The models of military and federal civilian programs take into account

the demographic composition of the armed services and the federal civilian work force. The state and local government retirement systems are modeled for general administrative workers, hazardous duty workers, state and local educators, taking into account the demographic characteristics of the different work forces. The public employee pension model predicts the number of participants and beneficiaries, average contribution rates, average benefit per retiree, and total benefits, contributions, and assets. This model permits investigation of changes in the level and demographic composition of public employment on the overall retirement income system.

Social Security Model

The model of the social security retirement and disability systems explores the relationship between changes in the U.S. age structure and economy and the financial flows of the system. The model incorporates not only direct age structure effects, but also changes in age group incomes and factor shares, savings, rates of return, and labor force participation and employment behavior that are affected by age structure and will influence the financial condition of the social security system. Given the forecast of future wages and incomes, the model determines the contribution and benefit bases and the total contributions and benefit payments corresponding to alternative statutory provisions. The model's capability to show the way these respond to alternative demographic scenarios is useful for analysis of the actuarial status of OASDI. The Social Security Model also permits investigation of the impact of social security on the economy, especially the implications for savings and the interaction between social security and employee pensions.

Supplemental Security Income Model

The retirement income system must take into account the Supplemental Security Income (SSI) program designed to assist the low-income elderly population. This model projects the size of the low-income population at retirement ages and estimates the number of SSI beneficiaries. Determined by current statutes and forecast average wage and income levels, the model estimates average SSI benefit payments and total SSI benefit payments by age and sex. The SSI Model is integrated with the macroeconomic model and labor market model.

Medicare Model

The level of Medicare benefits is closely related to retirement income needs and is modeled to reflect demographic and economic factors. The medicare model includes information on average Medicare benefit payment by age-sex group for each of six services, total Medicare expenditures, and total health insurance tax collections. Thus, outlays and revenues can be compared over time in the context of the performance of the economy and demographic trends. There is no attempt to model the complete demand and supply of the health care industry.

Studies

The complete model has been used to study three areas of concern to the President's Commission on Pension Policy. First, pensions, savings, and investment have been studied. Second, the relationship of retirement income programs and labor force participation has been examined. Third, the impact of alternative pension policy proposals on the pension system and the economy has been simulated. The complete model will be a valuable tool for other agencies of the federal government to use in current and future research on the retirement income system.

The first study examines pensions, savings, and investment. The complete model depicts the feedback of the retirement income system on the aggregate economy, as well as the impact of the population and economy on the retirement system. Of particular importance to policy analysis is the question of how private pensions and social security affect savings and the growth of the economy. Given estimates of the effects of private pensions and social security on savings, the overall performance of the economy may be evaluated. The investment in the economy is disaggregated into three components: 1) additions to the productive capital stock; 2) purchases of housing; and 3) purchases of consumer durables. Finally, the effect of the changing age structure on savings is examined.

The second study examines the relationship of retirement income programs and the labor market. In this study, the labor market model plays an important role because the effect of national wealth is incorporated in the labor supply equations. In addition, social security and pension system variables in the labor force participation equations of younger and retired workers permit an assessment of their impact on labor force participation Employee compensation and unemployment is also studied.

The third study examines alternative pension policies and economic-demographic scenarios. As the age-sex structure of the population changes, it has an impact on the pension system. Also, policies to change vesting rules or expand coverage of private pensions and implement new retirement age and tax policies is examined.

Caution Concerning the Use of Economic Models

Any mathematical model of the economy by necessity attempts to simplify economic behavior into quantifiable relationships. This model is no exception. The building of such mathematical models is a process of blending economic theory with empirical research. The success of such efforts is often limited by the appropriateness of both.

Commission and ICF staff have attempted to incorporate the findings of Commission-sponsored research as well as other recent empirical studies into the model. As more empirical studies are completed, the model will hopefully be further improved under the guidance of staff at the National Institute on Aging.

This model should prove useful to policymakers in suggesting retirement policy that is consistent with other objectives of national economic policy. The specific numerical forecasts of the model, however, should be used with caution. The primary usefulness of a model such as this one is to predict the order of magnitude and direction of economic effects, not specific values. Too many uncertainties exist in the real world that render specific long-term forecasts unreliable.

In its use to date, however, this model has proved to be extremely useful. Some of the policy simulations have yielded findings that show that retirement income policy can have a much larger effect on the macroeconomy than many of us expected at the outset of the model-building effort. This suggests that further development of the model by the Federal government might be money well spent during the next several years as retirement income policy is debated.

Policy Simulations

With the model constructed, Commission and ICF staff performed a series of policy simulations to estimate the effect of the Commission's proposals on a number of economic variables. These variables were divided into three groups: macroeconomic variables, labor market variables, and pension and social security variables. The macroeconomic variables studied include savings, investment, consumption, and Gross National Product (GNP). Labor market variables included labor input (measured in total hours worked), total compensation, and unemployment. Pension and Social Security variables included participation, level of benefits, and pension contributions. A number of additional variables were estimated but are not discussed in the paper.

The Commission's final report, issued on February 26, 1981, contained over fifty proposals that would lead to a coordinated national retirement income policy. The Commission made proposals for national policy with regard to employee pensions, social security, savings for retirement, and employment of older workers.

The proposals that would have the most significant effect on the economy if enacted are retirement age policy, the establishment of a minimum universal pension system, and changes in the tax treatment of contributions to and benefits from retirement income programs. These three areas for policy simulations can be summarized as follows:

RETIREMENT AGES AND EMPLOYMENT-The Commission suggested that the age of eligiblity for benefits be raised for all retirement programs and that employment policy be changed to encourage and enable older workers to remain in the labor force. Specifically, the Commission's major recommendations were:

- The normal retirement age of 65 for social security should not be raised for working people who are now approaching retirement. However, an increase in the normal retirement age to 68 should be phased in over a 12-year period beginning in the year 1990. The social security early retirement age, now 62, should be raised to 65, in tandem with the changes in the normal retirement age. Disability benefits should be available through the normal retirement age.

- ERISA should be amended to permit private pension plans, on a voluntary basis, to increase their normal retirement age in tandem with social security.

- As in the private sector, public employee pension plans should increase their normal retirement age in tandem with social security. A retirement age policy that parallels that of social security is recommended for all federal retirement programs. Under this recommendation, the current social security normal retirement age of 65 would be phased in for new retirees. This age would increase in tandem with increases in the social security normal retirement age. Early retirement benefits would be actuarially reduced for new retirees.

- The social security earnings test should be removed. The earnings test limits should be phased out as the Commission's proposal concerning the exclusion of social security contributions and inclusion of benefits in taxable income is phased in.

- Information on alternative work patterns should be encouraged and developed through research and demonstration programs in existing federal employment programs. Job retraining and job redesign for older workers in private industry also should be encouraged.

For purposes of the model, the net effect of all of these policies was assumed to lead to a delay of retirement of three months a year for twelve years beginning in 1990 (when the increase in the age of eligibility for Social Security benefits begins). By the year 2002, all individuals in the labor force would retire three years later than they would have without the introduction of the retirement age and employment policies.

MINIMUM UNIVERSAL PENSION SYSTEM-The Commission recommended that a Minimum Universal Pension System (MUPS) be established for all workers. The system should be funded by employer contributions. The Commission further recommended that a 3 pecent of payroll contribution be established as a minimum benefit standard. All employees over the age of 25, with one year of service and 1,000 hours of employment with their employers, would be participants in the system. Vesting of benefits would be immediate.

To the macroeconomy, the MUPS proposal acts like a compulsory savings program. Contributions made by employers to funded employee pension plans serve to reduce consumption.

TAXATION OF RETIREMENT CONTRIBUTIONS AND BENEFITS-The Commission made a number of a proposals to provide greater tax incentives to encourage retirement savings and to make the tax treatment of retirement contributions and benefits more consistent. The major proposals were:

- Contributions to and benefits from social security should receive the same tax treatment as do those of other retirement programs. At the time of filing, the employee would choose the higher of a tax deduction or a tax credit for the social security employee contribution. Social security benefits would be included in taxable income. As this tax treatment is phased in, the social security earnings test should be phased out.

- Favorable tax treatment should be extended to employee contributions to pension plans. A refundable tax credit for low and moderate income people to encourage voluntary individual retirement savings and employee contributions to plans is recommended. At the time of tax filing, the employee would choose the higher of a tax deduction or a tax credit.

- Contributions and benefit limitations for all individuals should be treated more consistently for all types of retirement savings.

- The tax treatment of savings specifically for retirement should be the same as the tax treatment of pension plans.

- Employers would be eligible for a tax credit equal to 46 percent of their contribution to a qualified employee pension plan, up to a limit of 3 percent of payroll.

All of the above tax proposals would lead to a very large tax cut for individuals and businesses. In addition, the Commission recommended one tax increase: to move the scheduled January 1, 1985 social security payroll tax to January 1, 1982. The net effect of all of these proposals, if enacted, would be to reduce federal taxes to individuals and businesses by approximately $30 billion in 1982.

For purposes of the model, effective tax rates were changed such that federal tax collections were reduced by $30 billion in 1982 and corresponding amounts for years beyond 1982. Separate reductions and taxes on labor earnings and capital income were calculated based on estimates provided by the Department of the Treasury and the Commission, and implemented in the model. For all of the simulations, government spending was reduced by an amount equal to the tax reductions, so that the government deficit was not changed directly.

CHAPTER 38: FINDINGS ON THE IMPACT OF PENSION POLICY ON THE ECONOMY

Thomas C. Woodruff

Computer simulations using the demographic macroeconomic model of the U.S. economy were conducted testing each of the sets of proposals discussed in the previous chapters separately and all of them together. In its final report, the Commission indicated that the proposals should be considered as a package rather than separately, due to the interrelationships among them. In addition, many proposals were specifically tied to each other by the Commission. For example, introduction of the Minimum Universal Pension System (MUPS) was specifically linked to a number of the proposals.

The tables in this paper show the combined effects of all of the proposals. References will be made, however, to the individual simulations when they help explain the economic effects of the policy simulations more clearly.

Savings and Growth Effects

Tables 1-7 show the impact of the Commission's policies on savings, consumption, investment, Gross National Product, capital input, labor input and compensation.

Introducing a minimum universal pension system has the direct effect of reducing consumption and directing the reduction into retirement savings. The Commission's tax reductions, however, more than offset the decreased consumption. Therefore, the net effect is that total consumption increases slightly even with the compulsory savings program. The phase-in of the retirement age policy further increases total consumption. By the year 2000, consumption is up approximately 4%, by 2030 over 7%, and by 2055 over 10%.

In the early years (before 1990) savings increases largely due to the minimum universal pension system. Savings increases by nearly 20 billion dollars in 1985 and 26 billion dollars in 1990 (all values are in 1981 dollars). While this represents a large increase in individual and family savings, it represents a relatively small increase in total savings in the economy.

Increased savings also makes more capital available for investment purposes. In the early years investment increases 2-3% due to the proposals. The effect of the total program is cumulative, however, so that investment continues to increase--by over 10% by the end of the forecasting period.

The Hudson-Jorgenson-Anderson (H-J-A) model is a neoclassical general equilibrium model. Therefore, when savings and investment capital are increased, interest rates (a measure of the cost of capital) tend to decline. While this effect is modest, it is also long-term.

Dr. Woodruff was Executive Director of the Commission. This program was completed in April 1981.

Both capital and labor inputs to the economy are increased by the proposals. This leads to a modest increase in GNP in the early years and cumulative increases in the later years. In the early years, the MUPS and tax proposals promote mild (less than 1%) increase in GNP. As the retirement age policies take effect after 1990, GNP increases considerably, due in large part to increased labor input in the economy.

By the year 2000, GNP is estimated to grow by an additional 2% due to Commission recommendations. In 2015 GNP is 5% greater, and in 2050 it is 8% greater in the simulation of the Commission's recommendations.

Labor Market Effects

Total hours of labor input into the economy are predicted to increase due to the Commission's proposals, particularly the three year increase in the retirement age.

Average compensation to workers also is predicted to increase significantly. By the year 2000, average annual compensation has increased about 2% due to the proposals. By 2020, this increase equals 4% and continues at approximately that level for the remainder of the forecast period.

In earlier Commission research, concern was expressed about potential increases in unemployment due to Commission recommendations. One set of concerns centered around the costs of the MUPS program to employers and employees. The economic literature indicates that, in general, increased labor costs are either directly passed on by the employer to workers in the form of smaller wage increases or to consumers in the form of higher prices or are absorbed by the employer, resulting in some degree of unemployment. This prediction would apply to increases in social security payroll taxes as well as increased payroll costs due to a MUPS or any other program.

The Commission, therefore, adopted a series of offsetting payroll-related tax reductions to individuals and businesses. In each year of the forecast period (1982-2055) these tax reductions exceed the increased payroll-related costs of a MUPS program. Therefore, employers and employees should be able to share the costs of the MUPS program without experiencing either an increase in after tax payroll costs or a reduction in take-home pay.

While the combined MUPS and tax proposals should not have a significant effect on total employment, the Commission's retirement age policy might. Raising retirement ages has the effect of increasing the labor supply of older workers. Unless the demand for the labor of older workers increases by a similar amount, either unemployment will result or the average wage of these workers will not increase as much as they would otherwise.

TABLE 1

GROSS PRIVATE SAVINGS*

	BASE CASE	POLICY SIMULATION	DIFFERENCE	PERCENT DIFFEREN
1970	502.0	502.0	0.0	0.0
1975	699.4	699.4	0.0	0.0
1980	605.1	605.1	0.0	0.0
1985	880.4	900.0	19.6	2.2
1990	1220.0	1246.2	26.2	2.1
1995	1549.5	1586.0	36.5	2.6
2000	1919.2	1965.7	46.6	2.4
2010	2420.4	2489.0	68.6	2.8
2020	2555.4	2654.9	99.5	3.9
2030	3074.0	3209.2	135.2	4.4
2040	4401.5	4577.4	175.9	4.0
2050	5951.6	6174.1	222.5	3.7

*Expressed in billions of 1981 dollars.

TABLE 2

CONSUMPTION *

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	1216.776	1216.776	0.0	0.0
1975	1462.235	1462.204	-0.031	-0.0
1980	1811.562	1811.509	-0.052	-0.0
1985	2134.549	2143.620	9.070	0.4
1990	2454.158	2473.219	19.061	0.8
1995	2692.386	2747.028	54.721	2.0
2000	2942.914	3044.546	101.633	3.5
2005	3244.484	3386.778	142.295	4.4
2010	3564.266	3752.958	188.692	5.3
2015	3927.199	4165.973	238.773	6.1
2020	4285.215	4576.004	290.789	6.8
2025	4632.848	4968.895	336.047	7.3
2030	4983.840	5345.293	361.453	7.3
2035	5338.250	5733.645	395.395	7.4
2040	5679.473	6142.727	463.254	8.2
2045	5976.848	6530.645	553.797	9.3
2050	6299.887	6936.176	636.289	10.1
[illegible]	6648.184	7324.273	676.090	10.2

*Expressed in billions of 1981 dollars.

TABLE 3

INVESTMENT*

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	293.633	293.633	0.0	0.0
1975	361.391	361.380	-0.011	-0.0
1980	284.412	284.391	-0.021	-0.0
1985	456.630	467.414	10.784	2.4
1990	663.086	676.808	13.722	2.1
1995	842.212	868.466	26.255	3.1
2000	1026.437	1068.957	42.520	4.1
2005	1144.998	1201.413	56.416	4.9
2010	1190.867	1263.023	72.156	6.1
2015	1184.002	1273.342	89.340	7.5
2020	1202.344	1309.752	107.408	8.9
2025	1275.045	1398.668	123.622	9.7
2030	1409.760	1543.077	133.317	9.5
2035	1605.181	1752.562	147.381	9.2
2040	1777.497	1950.345	172.848	9.7
2045	1940.312	2147.014	206.702	10.7
2050	2093.799	2332.890	239.091	11.4
2055	2266.862	2525.832	258.969	11.4

*Expressed in billions of 1981 dollars.

TABLE 4

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	1985.428	1985.430	0.002	0.0
1975	2362.084	2362.042	-0.042	-0.0
1980	2660.486	2660.414	-0.072	-0.0
1985	3186.919	3194.014	7.095	0.2
1990	3787.295	3807.137	19.843	0.5
1995	4286.848	4354.691	67.844	1.6
2000	4817.250	4947.242	129.992	2.7
2005	5334.004	5517.609	183.605	3.4
2010	5810.426	6055.371	244.945	4.2
2015	6261.949	6573.422	311.473	5.0
2020	6742.418	7123.203	380.785	5.6
2025	7274.949	7716.410	441.461	6.1
2030	7882.891	8358.652	475.762	6.0
2035	8593.980	9116.934	522.953	6.1
2040	9286.266	9901.746	615.480	6.6
2045	9931.707	10670.809	739.102	7.4
2050	10612.273	11465.457	853.184	8.0
2055	11358.359	12270.418	912.059	8.0

*Expressed in billions of 1981 dollars.

CAPITAL INPUT * TABLE 5

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	800.895	800.895	0.0	0.0
1975	975.505	975.505	0.0	0.0
1980	1149.354	1149.354	0.0	0.0
1985	1290.423	1299.140	8.717	0.7
1990	1580.263	1596.823	16.560	1.0
1995	1959.813	1989.823	30.009	1.5
2000	2421.964	2477.100	55.137	2.3
2005	2948.470	3040.585	92.116	3.1
2010	3497.300	3634.671	137.371	3.9
2015	4057.840	4252.379	194.539	4.8
2020	4604.793	4867.660	262.867	5.7
2025	5190.383	5533.602	343.219	6.6
2030	5841.500	6266.344	424.844	7.3
2035	6646.602	7159.668	513.066	7.7
2040	7609.242	8220.340	611.098	8.0
2045	8723.707	9467.180	743.473	8.5
2050	9969.965	10882.281	912.316	9.2
2055	11320.363	12417.918	1097.555	9.7

*Expressed in billions of 1981 dollars.

TABLE 6

LABOR INPUT: TOTAL*

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	192.094	192.094	0.0	0.0
1975	211.599	211.599	0.0	0.0
1980	234.986	234.986	0.0	0.0
1985	252.588	252.680	0.093	0.0
1990	268.681	269.733	1.052	0.4
1995	275.370	280.128	4.758	1.7
2000	277.579	285.581	8.001	2.9
2005	275.095	284.297	9.202	3.3
2010	269.846	280.573	10.728	4.0
2015	264.599	276.677	12.078	4.6
2020	259.943	273.082	13.139	5.1
2025	256.105	269.903	13.797	5.4
2030	253.415	266.582	13.167	5.2
2035	251.183	264.091	12.908	5.1
2040	246.593	260.621	14.028	5.7
2045	239.442	255.067	15.625	6.5
2050	231.773	248.298	16.526	7.1
2055	225.078	240.905	15.827	7.0

*Expressed as millions of hours.

TABLE 7

AVERAGE ANNUAL COMPENSATION: TOTAL *

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	14233.625	14233.625	0.0	0.0
1975	14133.562	14133.562	0.0	0.0
1980	14144.891	14144.891	0.0	0.0
1985	14907.641	14934.074	26.434	0.2
1990	15534.457	15577.883	43.426	0.3
1995	16368.953	16565.305	196.352	1.2
2000	17252.539	17618.809	366.270	2.1
2005	18187.098	18685.531	498.434	2.7
2010	19329.336	19959.930	630.594	3.3
2015	20564.090	21317.402	753.312	3.7
2020	21864.922	22752.281	887.359	4.1
2025	23167.641	24094.648	927.008	4.0
2030	24525.113	25465.336	940.223	3.8
2035	26007.191	26945.527	938.336	3.6
2040	27572.344	28605.078	1032.734	3.7
2045	29175.254	30370.359	1195.105	4.1
2050	30797.047	32109.207	1312.160	4.3
2055	32458.484	33829.172	1370.687	4.2

*Expressed in billions of 1981 dollars.

In its final report, the Commission expressed concern about the employment problem of older workers due to its retirement age recommendations. In its final report the Commission stated:

> "In conjunction with its recommendation to raise the retirement age, the Commission recognizes the problem of long-term unemployment among older workers and the use of early retirement under social security to solve this problem. Rather than utilize the social security system, consideration should be given to improving unemployment benefits to provide both short-term income maintenance for these workers and to keep them in the labor force."

The Commission's concerns about employment conditions among older workers is born out by the model. While wages and unemployment of most age groups are generally unaffected, the model does show the effects of the increased supply of older workers. In the simulations for the report, age groups 55-64 and 65+ do experience a significant drop in average hourly wages relative to the base case. This drop increases significantly (from 8% to 13%) as the post-World War II baby boom enters the older age groups and delays its retirement beginning in the year 2000.

In the policy simulations for this paper, fertility rates were assumed to slowly increase to 2.1 children per female of child-bearing age by the year 2000. Currently, the fertility rate equals approximately 1.8. The potential older-worker labor supply problems cited above might be reduced or eliminated if fertility rates remain at current levels and the total labor force shrinks after the year 2000. Additional model simulations will test this sensitivity.

For all age groups, excess supply of labor does not appear to be a significant problem. Even with an increase in the fertility rate to 2.1 children/female by the year 2000, the labor force after year 2000 is not expected to grow. As the capital stock grows, therefore, labor will become relatively scarce. If the demand for the labor of older workers could be adjusted--through public and private policies--to look more like the demand for workers in general, then the labor supply problems raised by raising the retirement age would be alleviated. If not, then other measures, such as those suggested by the Commission regarding special unemployment benefits for older workers, may be necessary.

Pension and Social Security Effects

Introduction of a minimum universal pension system immediately increases the number of participants in the private pension system by about 50%. Female participants are increased by nearly 70% and male participants by approximately 40%. These increases remain throughout the forecasting period.

Even more significant than the increase in participants is the increase in new retirees who receive private pension benefits. Under current policy, approximately 60% of new private sector retirees may retire with a pension by the year 2000, and approximately 40% may not. If there is no change in the existing private pension system, in the year 2000 about 250,000 private sector workers may enter retirement without pensions. This number may increase to about 460,000 private sector retirees without pensions retiring in 2025. After the year 2000, the number of private sector retirees without pensions may increase from about 3.5 million people in the year 2000, to a peak of nearly 6 million pensionless retirees (out of a total of about 15 million private sector retirees) by the year 2030.

The introduction of a MUPS nearly eliminates the problem of private pension entitlement. Nearly 96% of those who would have retired without a pension retire with one under the Commission's proposals. The proportion of those entering retirement with a pension increases by nearly 50% by the year 2000. During this period, only about 2% of all private retirees enter retirement without a pension benefit under the Commission's program.

The reason for the sharp reduction in those without pensions is twofold. First, pensions are made available to all workers over the of age of 25, with more than a year of service with the employer and with more than 1,000 hours of work. Even with these eligibility standards, most workers eventually qualify for benefits. Second, forefeitures of benefits by workers in existing plans are reduced. Under current policy, a private sector worker may have to be employed for 10 years prior to vesting in a pension benefit. The MUPS proposal would make at least the minimum benefit vested immediately upon participation.

TABLE 8

AGGREGATE HOURLY WAGES (1981 $), AGES 55-64

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	9.317	9.317	0.0	0.0
1975	9.984	9.984	0.0	0.0
1980	10.588	10.588	0.0	0.0
1985	11.315	11.311	-0.004	-0.0
1990	12.251	12.179	-0.072	-0.6
1995	13.609	13.180	-0.429	-3.1
2000	14.672	13.854	-0.818	-5.6
2005	15.466	14.455	-1.012	-6.5
2010	16.401	15.202	-1.199	-7.3
2015	17.496	16.120	-1.376	-7.9
2020	18.925	17.309	-1.616	-8.5
2025	21.208	19.014	-2.194	-10.3
2030	23.651	21.102	-2.549	-10.8
2035	25.947	23.166	-2.781	-10.7
2040	27.680	24.727	-2.953	-10.7
2045	30.168	26.517	-3.651	-12.1
2050	33.620	29.153	-4.467	-13.3
2055	37.303	32.519	-4.784	-12.8

TABLE 9

AGGREGATE HOURLY WAGES (1981 $), AGES 65+

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	5.977	5.977	0.0	0.0
1975	6.387	6.387	0.0	0.0
1980	6.863	6.863	0.0	0.0
1985	7.274	7.265	-0.009	-0.1
1990	8.050	7.933	-0.117	-1.5
1995	9.072	8.347	-0.725	-8.0
2000	9.910	8.606	-1.305	-13.2
2005	10.290	8.879	-1.410	-13.7
2010	10.680	9.261	-1.420	-13.3
2015	11.268	9.789	-1.478	-13.1
2020	12.263	10.563	-1.699	-13.9
2025	13.809	11.724	-2.084	-15.1
2030	15.474	13.084	-2.390	-15.4
2035	17.005	14.413	-2.592	-15.2
2040	18.170	15.417	-2.753	-15.1
2045	19.794	16.603	-3.191	-16.1
2050	21.991	18.289	-3.702	-16.8
2055	24.404	20.387	-4.018	-16.5

TABLE 10

AGGREGATE HOURLY WAGES (1981 $), AGES TOTAL

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	8.942	8.942	0.0	0.0
1975	9.179	9.179	0.0	0.0
1980	9.429	9.429	0.0	0.0
1985	9.914	9.920	0.006	0.1
1990	10.460	10.450	-0.009	-0.1
1995	11.201	11.139	-0.062	-0.6
2000	12.044	11.943	-0.100	-0.8
2005	12.984	12.876	-0.108	-0.8
2010	14.052	13.915	-0.138	-1.0
2015	15.172	15.004	-0.168	-1.1
2020	16.354	16.163	-0.191	-1.2
2025	17.602	17.394	-0.208	-1.2
2030	18.933	18.736	-0.196	-1.0
2035	20.396	20.192	-0.204	-1.0
2040	22.065	21.799	-0.266	-1.2
2045	23.951	23.606	-0.346	-1.4
2050	26.007	25.592	-0.415	-1.6
2055	28.218	27.782	-0.436	-1.5

Initially, the level of benefits under a MUPS program would be relatively small unless past service credits were granted by the system. For a number of years, therefore, the average benefit paid by private pension plans would actually decline. As the system matures, however, average pension benefits would begin to increase significantly. As the baby boom approaches retirement age in the year 2010, average benefits would have increased over 7%. During the peak baby boom retirement period (2020-2035) average benefits are predicted to be about 25% greater than they would be without the Commission's recommendations.

Total benefits paid by funded private pension plans increase dramatically. Private pension fund contributions increase by over 30% initially and steadily grow to an increase of over 60% by the end of the forecast period. The size of the increase is due to the MUPS as well as the extension of the working years and the growth of the economy as a whole.

As more contributions are made to private employee pension plans, fund balances continue to grow. By 1985 they would have increased by nearly $60 billion, an increase of over 3%. By the year 2000 private pension funds would have increased by an additional $300 billion, additional growth of about 11%. After that time, fund balances are predicted to increase an additional 13-15% for the duration of the forecast period. By the year 2040, Commission policies are predicted to add an additional $1 trillion to private pension fund accounts.

Total benefits paid by funded private pension plans increase modestly at first, but by the year 2000 have increased by 40%. The private pension payments increase as the baby boom retires, peaking at an increase of 83% in the year 2035.

TABLE 11

PRIVATE PENSION SYSTEM, PARTICIPANTS MALE TOTAL (MILLIONS)

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	20.200	20.200	0.0	0.0
1975	21.800	21.800	0.0	0.0
1980	24.000	24.000	0.0	0.0
1985	25.900	36.600	10.700	41.3
1990	27.100	38.300	11.200	41.3
1995	27.800	39.000	11.200	40.3
2000	28.200	39.300	11.100	39.4
2005	28.200	39.100	10.900	38.7
2010	28.100	38.900	10.800	38.4
2015	27.700	38.400	10.700	38.6
2020	27.300	37.800	10.500	38.5
2025	27.000	37.500	10.500	38.9
2030	27.000	37.500	10.500	38.9
2035	27.300	37.900	10.600	38.8
2040	27.300	38.000	10.700	39.2
2045	27.100	37.700	10.600	39.1
2050	26.800	37.500	10.700	39.9
2055	26.800	37.400	10.600	39.6

TABLE 12

PRIVATE PENSION SYSTEM, PARTICIPANTS FEMALE TOTAL (MILLIONS

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	7.800	7.800	0.0	0.0
1975	9.500	9.500	0.0	0.0
1980	11.200	11.200	0.0	0.0
1985	12.400	20.600	8.200	66.1
1990	14.400	24.200	9.800	68.1
1995	15.700	26.200	10.500	66.9
2000	16.300	27.100	10.800	66.3
2005	16.500	27.300	10.800	65.5
2010	16.500	27.200	10.700	64.8
2015	16.700	27.500	10.800	64.7
2020	16.900	27.900	11.000	65.1
2025	16.900	28.100	11.200	66.3
2030	16.800	28.000	11.200	66.7
2035	16.900	28.100	11.200	66.3
2040	16.900	28.300	11.400	67.5
2045	16.900	28.300	11.400	67.5
2050	16.800	28.200	11.400	67.9
2055	16.800	27.900	11.300	68.1

TABLE 13

PRIVATE PENSION SYSTEM, PARTICIPANTS TOTAL (MILLIONS)

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	28.000	28.000	0.0	0.0
1975	31.300	31.300	0.0	0.0
1980	35.200	35.200	0.0	0.0
1985	38.300	57.200	18.990	49.3
1990	41.600	62.400	20.800	50.0
1995	43.500	65.200	21.700	49.9
2000	44.600	66.500	21.900	49.1
2005	44.800	66.300	21.500	48.0
2010	44.600	66.100	21.500	48.2
2015	44.400	65.900	21.500	48.4
2020	44.100	65.700	21.600	49.0
2025	43.900	65.600	21.700	49.4
2030	43.900	65.500	21.600	49.2
2035	44.100	66.000	21.900	49.7
2040	44.200	66.300	22.100	50.0
2045	44.000	66.100	22.100	50.2
2050	43.600	65.600	22.000	50.5
2055	43.400	65.200	21.800	50.2

TABLE 14

PRIVATE PENSION SYSTEM, NEW RETIREES WITH PENSIONS (MILLIONS)

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	0.289	0.289	0.0	0.0
1975	0.323	0.323	0.0	0.0
1980	0.378	0.378	0.0	0.0
1985	0.418	0.672	0.254	60.8
1990	0.417	0.670	0.253	60.7
1995	0.400	0.633	0.233	58.3
2000	0.396	0.593	0.197	49.7
2005	0.461	0.628	0.167	36.2
2010	0.555	0.752	0.197	35.5
2015	0.639	0.960	0.321	50.2
2020	0.709	1.033	0.324	45.7
2025	0.719	1.117	0.398	55.4
2030	0.650	1.083	0.433	66.6
2035	0.610	0.969	0.359	58.9
2040	0.582	0.905	0.323	55.5
2045	0.658	0.934	0.276	41.9
2050	0.704	1.067	0.363	51.6
2055	0.696	1.093	0.397	57.0

TABLE 15

PRIVATE PENSION SYSTEM, NEW RETIREES WITHOUT PENSIONS (MILLIONS

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	0.185	0.185	0.0	0.0
1975	0.206	0.206	0.0	0.0
1980	0.242	0.242	0.0	0.0
1985	0.267	0.013	-0.254	-95.1
1990	0.267	0.013	-0.254	-95.1
1995	0.256	0.013	-0.243	-94.9
2000	0.253	0.012	-0.241	-95.3
2005	0.295	0.012	-0.283	-95.9
2010	0.355	0.015	-0.340	-95.8
2015	0.408	0.019	-0.389	-95.3
2020	0.453	0.021	-0.432	-95.4
2025	0.460	0.022	-0.438	-95.2
2030	0.416	0.022	-0.394	-94.7
2035	0.390	0.019	-0.371	-95.1
2040	0.372	0.018	-0.354	-95.2
2045	0.421	0.019	-0.402	-95.5
2050	0.450	0.021	-0.429	-95.3
2055	0.445	0.022	-0.423	-95.1

TABLE 16

PRIVATE PENSION SYSTEM, ALL RETIREES WITH PENSIONS (MILLIONS)

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	4.918	4.918	0.0	0.0
1975	4.867	4.867	0.0	0.0
1980	4.983	4.983	0.0	0.0
1985	5.009	5.964	0.955	19.1
1990	5.305	7.366	2.061	38.9
1995	5.483	8.338	2.855	52.1
2000	5.452	8.568	3.116	57.2
2005	5.534	8.113	2.579	46.6
2010	6.058	8.200	2.142	35.4
2015	7.028	9.197	2.169	30.9
2020	8.128	10.703	2.575	31.7
2025	9.038	12.216	3.178	35.2
2030	9.345	13.200	3.855	41.3
2035	9.085	13.155	4.070	44.8
2040	8.540	12.579	4.039	47.3
2045	8.301	11.867	3.566	43.0
2050	8.629	11.993	3.364	39.0
2055	9.049	12.634	3.585	39.6

TABLE 17

PRIVATE PENSION SYSTEM, ALL RETIREES WITHOUT PENSIONS (MILLIONS)

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	4.635	4.635	0.0	0.0
1975	4.114	4.114	0.0	0.0
1980	3.729	3.729	0.0	0.0
1985	3.332	2.164	-1.168	-35.1
1990	3.393	1.155	-2.238	-66.0
1995	3.507	0.495	-3.012	-85.9
2000	3.488	0.167	-3.321	-95.2
2005	3.540	0.158	-3.382	-95.5
2010	3.875	0.164	-3.711	-95.8
2015	4.495	0.187	-4.308	-95.8
2020	5.199	0.217	-4.982	-95.8
2025	5.780	0.247	-5.533	-95.7
2030	5.976	0.263	-5.713	-95.6
2035	5.810	0.259	-5.551	-95.5
2040	5.462	0.246	-5.216	-95.5
2045	5.309	0.233	-5.076	-95.6
2050	5.518	0.239	-5.279	-95.7
2055	5.787	0.253	-5.534	-95.6

TABLE 18

PRIVATE PENSION BENEFIT, AVERAGE BENEFIT (1981 DOLLARS)

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	1728.482	1728.482	0.0	0.0
1975	2159.947	2159.947	0.0	0.0
1980	2649.770	2649.770	0.0	0.0
1985	3173.652	2826.958	-346.693	-10.9
1990	3537.450	2948.338	-589.112	-16.7
1995	3794.709	3159.718	-634.990	-16.7
2000	4068.035	3613.650	-454.385	-11.2
2005	4364.750	4269.012	-95.738	-2.2
2010	4669.605	5012.109	342.504	7.3
2015	4948.859	5770.047	821.187	16.6
2020	5204.324	6410.645	1206.320	23.2
2025	5479.898	6884.230	1404.332	25.6
2030	5795.742	7353.285	1557.543	26.9
2035	6169.734	7795.852	1626.117	26.4
2040	6605.465	8186.156	1580.691	23.9
2045	7145.906	8614.371	1468.465	20.5
2050	7733.266	9180.508	1447.242	18.7
2055	8312.242	9789.746	1477.504	17.8

TABLE 19

PRIVATE PENSION BENEFIT, TOTAL BENEFITS (BILLIONS 1981 DOLLARS)

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	8.496	8.496	0.0	0.0
1975	10.516	10.516	0.0	0.0
1980	13.197	13.197	0.0	0.0
1985	15.897	16.860	0.963	6.1
1990	18.767	21.712	2.945	15.7
1995	20.806	26.356	5.551	26.7
2000	22.184	30.963	8.779	39.6
2005	24.148	34.645	10.497	43.5
2010	28.301	41.102	12.801	45.2
2015	34.777	53.072	18.295	52.6
2020	42.310	68.610	26.300	62.2
2025	49.522	84.091	34.569	69.8
2030	54.167	97.062	42.895	79.2
2035	56.055	102.556	46.501	83.0
2040	56.413	102.971	46.558	82.5
2045	59.321	102.235	42.914	72.3
2050	66.722	110.108	43.386	65.0
2055	75.218	123.683	48.465	64.4

TABLE 20

PRIVATE PENSION SYSTEM, TOTAL CONTRIBUTIONS (BILLIONS 1981 DOLLARS)

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	37.817	37.817	0.0	0.0
1975	39.969	39.969	0.0	0.0
1980	42.310	42.310	0.0	0.0
1985	45.539	60.303	14.764	32.4
1990	48.880	65.627	16.747	34.3
1995	52.316	71.536	19.220	36.7
2000	39.818	61.587	21.769	54.7
2005	42.998	66.816	23.827	55.4
2010	45.803	71.706	25.903	56.6
2015	48.858	75.992	27.942	58.2
2020	50.202	80.221	30.019	59.8
2025	52.449	84.431	31.983	61.0
2030	55.602	89.348	33.739	60.7
2035	59.472	95.306	35.834	60.3
2040	63.172	101.499	38.326	60.7
2045	66.258	107.371	41.121	62.1
2050	69.195	112.714	43.518	62.9
2055	72.782	118.227	45.444	62.4

TOTAL 21

PRIVATE PENSION SYSTEM, TOTAL FUND BALANCE (BILLIONS 1981 DOLLARS)

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	925.969	925.969	0.0	0.0
1975	1182.605	1182.605	0.0	0.0
1980	1465.729	1465.729	0.0	0.0
1985	1781.403	1838.610	57.207	3.2
1990	2133.722	2269.791	136.068	6.4
1995	2529.844	2753.383	223.539	8.8
2000	2912.900	3230.745	317.844	10.9
2005	3329.374	3751.436	422.062	12.7
2010	3790.518	4329.031	538.514	14.2
2015	4285.437	4943.215	657.777	15.3
2020	4808.316	5570.426	762.109	15.8
2025	5360.160	6206.023	845.863	15.8
2030	5955.844	6859.383	903.539	15.2
2035	6621.023	7567.836	946.812	14.3
2040	7374.355	8374.410	1000.055	13.6
2045	8220.371	9306.492	1086.121	13.2
2050	9144.109	10349.539	1205.430	13.2
2055	10142.559	11471.312	1328.754	13.1

TABLE 22

TOTAL OASDI BENEFICIARIES*

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	25.898	25.898	0.0	0.0
1975	31.547	31.547	0.0	0.0
1980	36.250	36.250	0.0	0.0
1985	39.911	39.911	0.0	0.0
1990	43.254	43.254	0.0	0.0
1995	45.620	45.660	0.040	0.1
2000	47.175	47.197	0.022	0.0
2005	48.955	48.349	-0.606	-1.2
2010	52.206	50.425	-1.781	-3.4
2015	56.995	53.957	-3.038	-5.3
2020	62.251	58.342	-3.909	-6.3
2025	66.836	62.668	-4.168	-6.2
2030	69.102	65.546	-3.556	-5.1
2035	69.808	65.967	-3.841	-4.4
2040	67.503	64.888	-2.615	-3.9
2045	66.797	63.602	-3.195	-4.8
2050	67.654	63.880	-3.774	-5.6
2055	69.051	65.336	-3.715	-5.4

*Expressed in millions of people.

TABLE 23

AVERAGE OASI BENEFIT*

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	2567.600	2567.600	0.0	0.0
1975	3077.563	3077.563	0.0	0.0
1980	3660.017	3660.017	0.0	0.0
1985	3778.750	3790.935	12.185	0.3
1990	3691.571	3733.561	41.989	1.1
1995	3578.767	3676.941	98.174	2.7
2000	3499.320	3517.473	18.153	0.5
2005	3521.396	3417.109	-104.288	-3.0
2010	3670.881	3626.545	-44.336	-1.2
2015	3822.734	3953.094	130.359	3.4
2020	3857.264	4114.156	256.892	6.7
2025	3829.342	4172.695	343.353	9.0
2030	3742.227	4148.402	406.176	10.9
2035	3624.586	4021.282	396.776	10.9
2040	3583.255	3982.892	399.637	11.2
2045	3652.983	4034.474	381.491	10.4
2050	3845.636	4353.602	507.966	13.2
2055	3921.711	4539.141	617.430	15.7

*Expressed in 1981 dollars.

TABLE 24

AVERAGE DI BENEFIT *

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	3702.954	3702.954	0.0	0.0
1975	4942.352	4942.352	0.0	0.0
1980	5011.687	5011.687	0.0	0.0
1985	4821.656	4822.168	0.512	0.0
1990	4834.930	4839.512	4.582	0.1
1995	4902.539	4872.570	-29.969	-0.6
2000	5032.867	5039.871	7.004	0.1
2005	5172.242	5204.090	31.848	0.6
2010	5319.797	5366.195	46.398	0.9
2015	5494.145	5555.316	61.172	1.1
2020	5683.121	5744.281	61.160	1.1
2025	5878.402	5942.957	64.555	1.1
2030	6074.797	6141.656	66.859	1.1
2035	6269.937	6336.668	66.730	1.1
2040	6476.957	6542.711	65.754	1.0
2045	6682.121	6749.988	67.867	1.0
2050	6869.828	6951.871	82.043	1.2
2055	7049.371	7145.023	95.652	1.4

*Expressed in 1981 dollars.

TABLE 25

TOTAL OASI PAYMENTS*

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	49.528	49.528	0.0	0.0
1975	69.331	69.331	0.0	0.0
1980	95.952	95.952	0.0	0.0
1985	112.255	112.617	0.363	0.3
1990	120.838	122.212	1.374	1.1
1995	123.747	125.939	2.192	1.8
2000	123.360	119.718	-3.642	-3.0
2005	127.147	116.223	-10.924	-8.6
2010	141.623	126.843	-14.779	-10.4
2015	163.958	149.514	-14.443	-8.8
2020	185.396	172.431	-12.965	-7.0
2025	202.741	194.107	-8.634	-4.3
2030	207.599	207.295	-0.304	-0.1
2035	200.947	203.156	2.209	1.1
2040	192.072	195.976	3.904	2.0
2045	192.366	191.117	-1.250	-0.6
2050	205.788	207.004	1.216	0.6
2055	215.411	222.741	7.329	3.4

*Expressed in billions of 1981 dollars.

TABLE 26

TOTAL DI PAYMENTS*

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	7.624	7.624	0.0	0.0
1975	18.414	18.414	0.0	0.0
1980	22.633	22.633	0.0	0.0
1985	23.841	23.843	0.002	0.0
1990	24.553	24.576	0.023	0.1
1995	27.102	28.724	1.622	6.0
2000	31.762	38.049	6.287	19.8
2005	36.865	44.842	7.977	21.6
2010	41.034	51.170	10.137	24.7
2015	43.832	55.596	11.764	26.8
2020	44.742	58.113	13.371	29.9
2025	44.060	57.962	13.901	31.6
2030	44.393	56.851	12.459	28.1
2035	46.899	58.503	12.484	26.9
2040	50.476	62.657	12.181	24.1
2045	53.510	68.191	14.681	27.4
2050	54.724	70.602	15.878	29.0
2055	55.715	71.770	16.056	28.8

*Expressed in billions of 1981 dollars.

TABLE 27

TOTAL OASDI PAYMENTS *

	BASE CASE	ALTERED CASE	DIFFERENCE	PERCENT DIFFERENCE
1970	57.152	57.152	0.0	0.0
1975	87.745	87.745	0.0	0.0
1980	118.585	118.585	0.0	0.0
1985	135.296	135.660	0.364	0.3
1990	145.391	146.788	1.397	1.0
1995	150.847	154.663	3.816	2.5
2000	155.122	157.767	2.645	1.7
2005	164.012	161.065	-2.947	-1.8
2010	182.658	178.014	-4.644	-2.5
2015	207.788	205.110	-2.677	-1.3
2020	230.138	230.544	0.406	0.2
2025	246.801	252.069	5.268	2.1
2030	251.991	264.146	12.155	4.8
2035	247.047	261.660	14.613	5.9
2040	242.548	258.633	16.086	6.6
2045	245.876	259.307	13.431	5.5
2050	260.512	277.606	17.094	6.6
2055	271.126	294.511	23.385	8.6

*Expressed in billions of 1981 dollars.

While private pension participants increase under the Commission's proposals, beneficiaries of the Social Security (OASDI) System actually are decreased due to the retirement age policy. This decrease becomes significant by the year 2005 and peaks at about a 6 percent decline in beneficiaries by the year 2020.

As a result of the decline in beneficiaries, total OASI (Old Age and Survivors) payments decline significantly, the largest decline coming by the year 2010. After that time, however, increased economic growth and labor force input into the economy lessen the decrease; and by 2035, the total payments actually begin to be higher than the base case.

The simulations also show that increases in disability benefits (DI) tend to offset some of the decreased OASI payments. Disability rates among older workers are relatively high, and increased disability payments should be expected to result from a policy to increase the age of eligibility for OASI benefits.

Total OASDI payments, however, decline for approximately a twenty year period starting shortly after the turn of the century until about 2020. After that time, total payments increase due to the increase in average OASI benefits resulting from increased labor input, wages, and economic growth.

Tax Reductions and the Commission's Proposals

Currently, Congress and the Administration are proposing various measures to reduce individual and business taxes. Stated objectives of these proposals include the increase in personal savings and investment funds.

The Commission has proposed tax cuts that are comparable to those of the administration. As the following tables show, combining a tax reduction with a MUPS and the Commission's retirement age policies is a much more effective way of increasing savings and investment than implementing the Commission's tax reduction by itself.

Initially, the MUPS and tax programs combine to provide an initial boost to private savings that is about $20 billion in 1985 (in 1981 dollars). The tax program alone is estimated to increase savings about $1.6 billion in 1985. The increase in investment in 1985 is about $3 billion (or about 40 percent) greater under the Commission's proposals ~~than under~~ the Commission's tax cut alone.

In the later years the differences in both savings and investment continue to increase. Under the Commission's tax cut alone, savings increases by only $0.2 billion in the year 2000 and $3.2 billion in the year 2020. Under the full set of the Commission's proposals, savings increases by over $47 billion in the year 2000 and $100 billion in the year 2020, the latter being 30 times as great as under the tax cut alone.

Investment also is much greater under the Commission's combined approach than under the tax cut alone. More than four times as much ($43 billion) is invested in the year 2000 and more than six times as much ($108 billion) in the year 2020.

In addition to these positive macroeconomic effects, of course, the Commission's proposals also provide for a greater availability of savings for retirement purposes. Under the Commission's program, a large portion of the additional savings would be set aside to alleviate the retirement income crisis that will exist as the post World War II Baby Boom enters retirement.

TABLE 28

Increased Gross Private Savings Due to Tax Reductions and Other Commission Policies

Year	Tax Reduction Alone Increased Saving*	Tax Reduction with MUPS and Retirement Age Policy Increased Saving*
1985	1.6	19.6
1990	1.2	26.2
2000	0.2	46.6
2010	1.6	68.6
2020	3.2	99.5
2030	5.1	135.2
2040	8.6	175.9
2050	10.8	222.5

* Billions of 1981 dollars. This includes business and personal savings.

TABLE 29

Increased Investment Due to Tax Reductions
and Other Commission Policies

Year	Tax Reduction Alone Increased Investment*	Tax Reduction with MUPS and Retirement Policy Increased Investment*
1985	7.5	10.8
1990	8.1	13.9
2000	10.3	42.9
2010	13.9	72.2
2020	17.2	107.3
2030	20.8	133.4
2040	26.7	173.1
2050	33.1	239.2

* Billions of 1981 dollars.

Appendix

Assumptions Used in the Simulations

1. MUPS Simulations

   a. Persons not covered by a pension plan may be covered by a MUPS, according to proportions obtained from the PCPP MUPS microsimulation model.

   b. The MUPS is a 3 percent defined contribution plan covering all persons 25 years of age and over, with one year's tenure and 1,000 hours of service. Vesting is full and immediate upon participation. Benefits/contributions are fully portable.

   c. The presence of a MUPS causes an increase in expected pension benefits for other pension recipients of 19 percent. This estimate is based on PCPP MUPS microsimulation model.

   d. The average number of year's tenure for some one solely in a MUPS at retirement is 35 years.

   e. MUPS participants earn the average wage in their age/sex groups.

   f. 89 percent of all new pension contiributions represent new private savings. This estimate is based on Professor Mordecai Kurz's work for the Commission using the Pension and Savings Household Survey. His final report is entitled "The Effects of Social Security and Private Pensions on Family Savings."

2. Delayed Retirement Simulation

In order to implement the delayed retirement simulation, indices of probability-of-new-retirement arrays were moved up by an amount IDEC:

$$IDEC = \begin{cases} 0 & \text{if before 1990} \\ \dfrac{YEAR - 1989}{4}, & \text{if 1990-2012, rounded to the nearest integar} \\ 3 & \text{otherwise} \end{cases}$$

Additionally, the social security section of the model keeps track of the maximum age for disability eligibility. In the base case, it is 61; in the delayed retirement case, it increases with the minimum age to qualify for retirement benefits.

Labor force participation rates' indices are moved to correspond to the change to retirement behavior.

3. Tax Simulations

a. Corporate Tax Collections

Corporate tax revenues decrease due to the deductibility of MUPS contributions. The tax revenue changes cited in Table 23 of the PCPP Final Report were adjusted as follows:

Year	Nominal	CPI	Real (1972=1.0)	Capital Price Index	Estimates
1982	$ 4.4	2.385	1.84	1.75	3.22
1983	7.4	2.595	2.85	1.92	5.47
1984	10.5	2.798	3.75	2.05	7.69
1985-2055	1984 changes are applied proportionately to all future corporate tax rates.				

b. Deductibility of Social Security Contributions

The effective tax rate on personal income is decreased in 1982 sufficiently to decrease income tax revenues $25.6 billion as shown in table 21 of the PCPP Final Report. In the simulation we adjust tax rates to decrease revenues $22.6 billion ($25.6 billion deflated to 1972 real dollars then inflated by the exogenous price of labor). The adjusted tax rate remains in effect in all future years.

c. Favorable Treatment of Retirement Savings

The effective tax rate is decreased (in addition to the change from Social Security Deductibility) as follows:

Year	Nominal	CPI	Real (1972=1.0)	Labor Price Index	Estimates
1982	$ 10.0	2.385	4.2	2.11	8.86
1983	12.1	2.595	4.7	2.26	10.62
1984	14.1	2.798	5.0	2.41	12.14
1985-2055	1984 changes are applied proportionately to all future labor income tax bases.				

Figures for nominal tax losses were obtained from Treasury estimates done for the Commission.

d. Taxation of Social Security Benefits

All social security benefits of the previous year are taxed beginning in 1982. The tax is phased in -- initially it is 1/15 of the marginal tax rate (set at 10 percent) and it increases in equal increments until it equals the marginal tax rate in 1996.

e. Changes in the Social Security Tax Rate

The 1985 payroll tax increase is implemented in 1982.

f. Phase Out of the Retirement Earnings Test

The effect of the earnings test is phased out in equal increments. In 1982 we eliminate 1/15 of all earnings test effects. In each succeeding year we eliminate an additional 1/15 of earnings test effects until all effects disappear in 1996. Hours worked for all 65-71 year olds increases 9.2 percent when the test is fully phased out. This estimate is consistent with the analysis of Gordon and Schoeplein in their Social Security Bulletin article of 1979. Social Security benefits are increased by 2.65 percent upon full phase out. We obtain this estimate of a 2.65 percent increase when the earnings test is eliminated by dividing $2.1 billion (the OASI Actuary's estimate of the cost of the earnings test) by $79.2 billion, an estimate of OASDI benefits paid in 1978.

g. Federal Government Expenditures

Federal government expenditures were reduced by an amount equal to the Commission's tax reductions. The government deficit, therefore, would not be changed directly by the tax policies.

h. Savings

In the basic H-J-A model, savings is "endogenous", that is, it is a function of other variables in the model. (Savings is a function of income, income transfers and consumption.) When corporate and individual taxes are changed, total savings changes in response.

CHAPTER 39: INTERGENERATIONAL DISTRIBUTION OF INCOME

Marcy C. Avrin and Thomas C. Woodruff

Introduction

The various components of annual average family income such as wages, interest, royalties, and pensions, vary in importance to individuals over the life cycle. Table 1 shows that the percentage of average annual family income from wages and salaries drops from 88 percent in the under 25 age group to 80 percent in the 45-54 age bracket to 24.2 percent for those families with head over age 65.

For the elderly, income from public and private pension plans and income and dividends from savings provide a large proportion of total income. Eighty-seven percent of families whose head is over age 65 report income from social security and railroad retirement and 20.2 percent report income from pensions and annuities.

In a world without public and private pensions, either a large percentage of the elderly would be poor or other sources of income would replace pensions in the total. In the absence of pensions and social security, elderly individuals might work more and increase their earnings, save more over their working years and increase their income from capital in retirement, receive private income transfers from other family members or receive welfare payments.

Whatever would be the case, the distribution of income, both between generations and within a given generation, would be considerably different than it is now. To a lesser extent, any changes in pension policy also would alter income distribution.

Because of the recent shift in public sentiment against redistribution programs that benefit the nonworking segments of society, there is considerable interest in the redistributional components of our retirement system and the redistributional effects of future policy. This interest will be increasing as the ratio of retired to workers increases rapidly in the near future, making it impossible to redistribute income in favor of the retired without prohibitively high cost to workers.

The issues to be considered in the income distributional context fall into three broad areas. The first is equity. What goals should a "fair" system achieve? What are the appropriate criteria of fairness? What is the desired level of income adequacy and income security?

Dr. Avrin was a consultant to the Commission; Dr. Woodruff was Executive Director of the Commission. This paper was completed in April 1981.

TABLE 1

Sources of Family Income by Age of Head* (In Dollars)

Family Income Before Taxes, Total	All Families	Under 25	25-34	35-44	45-54	55-64	65 and Older
Annual Average	11,420	6,724	11,764	14,197	15,529	12,286	6,292
Percent Reporting	98	99	99	98	97	97	98
Wage and Salaries							
Annual Average	8,540	5,946	10,168	11,998	12,369	8,719	1,524
Percent of Total Income	74	88	86	84	80	80	24
Percent Reporting	78	92	93	92	90	80	31
Self Employment Income							
Annual Average	875	190	649	999	1,547	1,230	402
Percent of Total Income	7.6	2.8	5.5	7.0	10	10	6.4
Percent Reporting	12.9	5.5	11.4	15.3	15.4	16.8	10.4
Rental Income, Royalties & Income from Roomers							
Annual Average	121	6.43	39.70	79.36	145	201	201
Percent of Total Income	1	.09	.33	.55	.93	1.6	3.2
Percent Reporting	8.6	1.5	4.7	7.3	9.4	12.6	12.7

Table 1 (Continued)

Interest from bonds, trust accounts & other	All Families	Under 25	25-34	35-44	45-54	55-64	65 and Older
Annual Average	273	28.61	65.44	119.24	239.79	467.62	587.26
Percent of Total Income	2.3	.42	.55	.83	1.5	3.8	9.3
Percent Reporting	61.4	54.9	61.6	60.1	61.5	65.1	62.0
Dividends from Stock, Mutual Funds & Other							
Annual Average	140.12	9.49	22.72	56.56	99.96	234.75	345.61
Percent of Total Income	1.2	.14	.19	.40	.64	1.9	6.0
Percent Reporting	15.2	4.8	10.5	15.8	17.4	19.2	18.7
Social Security, Railroad Retirement							
Annual Average	578	18.15	63.05	151.45	247.96	468.47	2085.02
Percent of Total Income	4.9	.26	.54	1.0	1.6	3.8	33
Percent Reporting	25.0	2.0	2.3	5.9	11.0	24.8	87
Federal, State and Local Retirement							
Annual Average	101.90	1.80	5.59	10.26	50.51	167.36	313.43
Percent of Total Income	.90	.03	.05	.07	.32	1.4	5
Percent Reporting	2.8	.2	.4	.4	1.4	3.8	8.8

Table 1 (Continued)

Pensions, Annuities & Retirement	All Families	Under 25	25-34	35-44	45-54	55-64	65 and Older
Annual Average	129.00	-	4.28	9.41	23.25	200.56	449.71
Percent of Total Income	1.1	-	.04	.07	.15	1.6	7
Percent Reporting	5.7	-	.4	.7	1.3	7.7	20.2
Veterans Payments							
Annual Average	149.91	62.13	106.64	126.18	241.96	205.40	123.39
Percent of Total Income	1.3	.92	.9	.88	1.6	1.7	2
Percent Reporting	8.6	4.7	7.2	6.8	12.1	9.4	9.5
Unemployment Insurance							
Annual Average	40.84	38.62	47.62	55.30	48.64	43.58	13.58
Percent of Total Income	.35	.57	.36	.38	.31	.35	.2
Percent Reporting	4.7	6.2	5.9	5.2	5.8	4.8	1.4
Welfare and Public Assistance							
Annual Average	107.30	142.12	131.62	137.46	75.24	71.07	100.63
Percent of Total Income	.93	.02	.01	.96	.48	.57	2.0
Percent Reporting	6.4	7.4	6.4	5.9	4.6	5.2	9.0

Table 1 (Continued)

Regular Contribution for Support	All Families	Under 25	25-34	35-44	45-54	55-64	65 and Older
Annual Average	70.38	69.26	95.80	129.58	79.33	26.33	23.01
Percent of Total Income	.60	1.0	.81	.90	.51	.21	.3
Percent Reporting	4.0	5.8	6.2	6.2	3.2	1.5	2.0
Other Money Income, & Worker' Compensation							
Annual Average	38.01	25.32	16.84	47.69	50.74	55.63	30.73
Percent of Total Income	.33	.37	.14	.33	.33	.45	.4
Percent Reporting	2.8	2.2	2.2	3.6	3.8	3.5	1.6
Exchange Value of Federal Food Stamps							
Annual Average	40.89	37.16	52.46	69.21	29.42	24.59	30.73
Percent of Total Income	.36	.55	.45	.48	.19	.20	.40
Percent Reporting	6.9	9.8	7.7	7.1	5.0	5.2	7.6
All Other Income							
Annual Average	235.10	166.44	321.57	342.57	294.13	182.06	77.52
Percent of Total Income	2.1	2.5	2.7	2.4	1.2	1.5	1.0
Percent Reporting	56.4	65.4	73.8	69.2	61.5	52.0	23.2

* This is the average annual income for all families regardless of whether the families had such income. The table shows the average annual income from various sources and the percent of families reporting such income. Derived from U.S. Department of Labor, 1972-73 Consumer Expenditure Survey.

Second, the redistributional consequences of administrative features of the retirement system must be considered. How do we establish efficiency criteria for the trustee function? How do we insure minimum administrative difficulties for workers in receiving pensions? How do we reduce corruption and mismanagement of pension funds?

Third, the redistributional consequences of political decisions regarding the retirement system must be considered. For example, how should we deal with the capital ownership distortion that results from the increasing power of financial institutions? How do pensions affect the relative power of groups in society in general and do we want to change this?

A thorough consideration of all of these issues must include or even focus on an analysis of who gains and who loses under various policies. In determining who gains and who loses, it is important to avoid the trap of considering only the immediate short term effects of a given policy. The more complicated effects of pension policy on factors such as the rate of capital accumulation and capital markets, age of retirement, distribution of wages and labor-management relations also must be analyzed. Without such analysis, groups may find themselves supporting policies that are in the long run against their best interests. They may in fact be doing so at this time.

The complexity of the current system makes it difficult to determine the extent of the redistribution that it fosters. Basically, two features of the system -- the noncompulsory nature of the private pension system and the lack of correspondence between contributions and benefits under various retirement programs -- cause a chain of effects that, in total, result in some sort of redistribution that is not obvious upon cursory analysis.

Because the private pension system is noncompulsory, tax incentives are used to induce adequate savings. The IRS code is complex with regard to private pensions. The income distributional effects of this code are potentially substantial and are far from clear. Tax incentives change corporations' costs of any policy and change the value of benefits to the recipients by shifting some of the cost burden. An evaluation of who bears the burden of these shifted costs is complicated.

Second, the lack of correspondence between contributions and benefits causes a redistribution among generations at the start-up of a system when benefits are provided individuals who made no or few contributions. As the system matures, a redistribution occurs when benefits are increased so that the average member of a given generation receives from the young workers of today more than the capitalized value of the contributions he made.

In the social security system, redistribution occurs within a generation to the extent that lower-income individuals receive proportionately more social security benefits than high-income individuals due to the minimum benefit and progressive nature of the system. Also, the facts that certain employment is not covered by the system, that spouses have benefits independent of their own contribution and that benefits are

reduced due to earnings over a given amount, cause intragenerational redistribution.

In a private system of defined benefits, inter- and intragenerational redistribution occurs because of benefit changes, vesting, restrictions on portability of benefits, pension rights of spouses, and integration with social security. The unfunded portion of the system results in redistribution between workers of different generations, with older generations receiving benefits in excess of the contributions made for them as part of their benefit package while working. This is due either to the start-up of the system or benefit increases over the years. Redistribution occurs among workers of a given generation who receive different levels of benefits in spite of the fact that corporate contributions are the same for all employees.

The redistribution between labor and shareholders that this lack of correspondence between contributions and benefits under the private system causes is more subtle. The degree to which a plan is unfunded may affect stock prices and labor-management negotiations, influencing wage rates. Potential bankruptcy with regard to pensions may also affect such income redistribution.

Any lack of correspondence between contributions and benefits under the private system also affects income distribution between capital and labor because of the ambiguity as to who owns the capital. The growth of private pensions has accelerated the evolution of financial management as an important influence with regard to the use of private capital. Are the managers accountable to the shareholders, to the workers, or to themselves?

An Analytical Framework

In order to consider somewhat systematically all of these implications, a theoretical or organizational framework is essential. An ideal framework would encompass all potential effects, integrating behavioral choices that are directly or indirectly affected by retirement schemes (i.e. investment in human capital, work effort, savings, and labor-management relations). Unfortunately, a general theory of income distribution that is complete enough to incorporate all of these considerations does not exist. Although the current work on the subject attempts to establish more general models, most theories are piecemeal and partial despite claims of generality. They are based on divergent political ideologies and social philosophies. Each school of thought seeks the validity of its theory by reference to the empirical field. Longitudinal surveys of cohorts that are necessary to test the theories are now becoming available and more are being compiled. These will be useful in formulating the specifications of more general theories that incorporate combinations of the others.

In spite of this inconclusive state of the art, the various theories of income distribution will be useful in providing a composite framework from which to consider the income distributional implications of various retirement policies. This framework will aid us in determining how a specific policy change translates into the answer to the question: who gains and who loses? The potential effects will be analyzed in terms of all the relevant theories, clearly stating the "view of the world" from which each is derived. Such an approach will insure consideration of all primary, second order, static and dynamic effects in both the short and long run.

Besides presenting the possible effects derived from the theoretical analysis, the paper will present what empirical evidence is available as to their validity. The reader should be cautioned that in most cases no conclusive evidence exists.

The major theories of income distribution that will provide the framework by which to consider the income distributional consequences of various retirement policies are presented in the next section. The terms of these theories will be clearly defined and the views of the world from which they operate will be clearly described in order to evaluate the implications that they suggest.

Sections 3 and 4 are exercises in the theory of income distribution. Based on the analysis of the various theories, they will trace the complex processes by which retirement policies could potentially affect distribution. The third section will utilize these theories in discussing the income distributional effects of certain policies with regard to social security and other pay-as-you-go public plans. The potential effects will be enumerated and all empirical evidence as to the existence of these effects will be presented. The unresolved issues will be noted. The fourth section will analyze the income distributional effects of changes in the provisions of a universal private pension plan. As in the case of public plans, the potential effects will be determined and any empirical evidence as to their validity will be presented.

In general, the paper will show that given the complex nature of the income distributional implications of any pension policy, cursory analysis of the effects with regard to the objectives of income adequacy and income security is potentially dangerous and could be extremely misleading.

Theories of Income Distribution

There are many theories as to what variable factors have the most significant influence in determining how income is distributed among members of a society. Some theories emphasize economic variables, such as the levels of investment and employment. Other theories emphasize behavioral variables such as individual choices concerning education and training. In turn, any policy or event that affects these variables thus affects income distribution.

This chapter summarizes the theories of income distribution noting variables that are or can be affected by pension policy. A detailed explanation of the theories and their formulas appears in Appendix 1 of this chapter.

It is generally recognized that all or most of the variables included in the different theories must be integrated under one theory if the effect of policies or events, including pension policy, on income distribution is to be measured precisely. Although some theories have directly conflicting approaches as to how the world functions, many of the theories do not conflict but merely concentrate on different issues, and these theories could at some point be merged into a more general theory.

Until a complete theory of income distribution is developed, we must consider the distributional impacts of pension policy under each theory separately. Although this piecemeal approach may not provide an accurate picture of the scope of distributional effects of pension policy, it will ensure that potential undesirable impacts are not ignored in the formation of pension policy.

Stochastic Theory

The stochastic theory of income distribution is largely inappropriate for our purposes in that it is, with the exception of one specific application, devoid of economic content. The theory is based on the statistical law of probability. It states that even if a generation started from a state of strict equality of income and wealth, inequalities could emerge due to random occurrences. Given its basis, the stochastic model contributes very little to an economist's understanding of income distribution. Assuming a stochastic mechanism, no matter how complex, to be the sole determinant of income inequality is antithetical to the mainstream of economic theory which seeks to explain complex phenomena as the end result of deliberate choices by decision-makers.

Various papers by Friedman (1953), Sargan (1957) and Wold-Whittle (1957) have attempted to add economic interpretation to the stochastic process theories in analyses of the accumulation of risky capital. In Friedman's model, every person has a certain income and an opportunity to participate in a "lottery" by accumulating risky capital. The less risk averse people enter the lottery while the more risk averse do not. As a result, there are three distributions, or groups of people — lottery winners, lottery losers, and nonparticipants. In this theory, random elements are likely to predominate although there are still economic considerations in choosing an optimal portfolio.

Thus, the stochastic theory (or the Friedman version of it) can be used to assess the impact of pension policy on income distribution only if the policy affects the relative sizes of the three groups or the level of risk aversion inherent in the various portfolios.

Theories of the Functional Distribution of Income

The various theories of the functional distribution of income are concerned primarily with distribution among different classes of the economy, namely laborers, proprietors and the owners of capital. These theories are more global than the behavioral theories of personal income distribution because they are based on certain viewpoints as to how the economy functions and the constraints which the economy places on individuals. They provide a useful framework for analyzing the impact of pension policy on income distribution because they deal with major variables which that policy may affect, such as wages, return to capital and capital ownership.

Four functional theories will be discussed here — orthodox theory, bargaining power theory, theory of accumulation, and Marxian and radical theories.

ORTHODOX THEORY - The orthodox "neoclassical" theory of income distribution states that the distribution of income among the three different classes or factors of production is an outcome of the competitive mechanism depending on prices and marginal productivities of the factors. The theory is usually introduced as part of a general equilibrium analysis of the economy, with the factor shares of income being determined as part of an overall explanation of the prices of the different factors and products.

This theory provides a broad framework that can be used in the analysis of the effect of various pension policies on income distribution. Pensions can alter the supply of labor, the relative price of labor and capital, including the wage rate, and the marginal product of labor, that is partly dependent on the capital/labor ratio. Pension policy also can alter the ownership of capital and affect capital investment. These applications will be discussed in the following sections of the paper with regard to specific policy alternatives.

BARGAINING POWER THEORIES - The bargaining power theories of income distribution may be divided into those concerned with the monopoly power of firms and those concerned with collective bargaining and union power. The former are represented by the work of Kalecki (1939), who argued that the share of labor depends inversely on the degree of monopoly. The theories concerned with collective bargaining, which are less precisely formulated, in general lead to the prediction that the share of wages increases with trade union strength.

Pensions have become a major bargaining element in labor-management negotiations. Thus, a pension plan's provisions regarding eligibility, vesting, portability and benefits have a potential effect on labor supply, labor mobility and, in the end, real wages. Each of the provisions of the pension system may cause an alteration of behavior that will induce a change of the market wage rate. Thus, given a bargaining framework, any policy with regard to these provisions will affect income distribution. Specific hypotheses as to how this occurs will be considered in the following sections.

THEORY OF ACCUMULATION - This theory, associated with Nicholas Kaldor and other Cambridge (U.K.) economists, allows the share of income of each of the factors of production to be determined from the equilibrium of planned savings and investment, without regard to the rest of the economic system. Thus, according to the framework, pension policy would affect income distribution through these two variables.

Two assumptions of the Kaldor model -- that the ratio of investment to incremental output is constant and that savings propensities are given -- are questionable for many reasons, one of which is the fact that pension policy may cause them to vary.

However, the Kaldor model and the criticisms of its assumptions serve as a useful framework for analyzing the income distributional effects of pension policy. The effect of pensions on both corporate and private savings and investment clearly need to be considered.

MARXIAN AND RADICAL THEORIES - Theories of income distribution expounded by radical economists have tended to emphasize the exploitation of labor by capital and the role of economic and political power in determining factor shares of income. Radical interpretations of profit and wages emphasize the sociological facts that the capitalist class owns only its own labor power. The capitalists receive a large share of national income while putting forth no effort by 'exploiting' the workers. Because there is no straightforward way to relate the concept of exploitation to actual changes in money profits and wages, the application by modern radical economists has tended not to work within the formal theoretical framework but to take over qualitative elements stressed by Marx, in particular the relative bargaining power of capital and labor. Thus, utilizing the radical framework, the income distributional effects of pension policy can be considered in terms of relative bargaining power.

Aumann-Kurz Theory of Income Distribution

The Aumann-Kurz theory (1977) of income distribution is rather unorthodox because it can be considered a part of either the functional or the behavioral or personal theory of income distribution. It involves the political behavior of individuals. Under this theory, each individual is endowed with certain resources which can be used for consumption and production but in addition, the individual has his vote and the right to his own property. A redistribution is achieved by individuals acting via political mechanisms such as pressure groups, political parties, and other associations. Such coalitions work to legislate redistributive laws. In the process of social bargaining, the formation of alternative coalitions is always a threat of potential alternative actions which may be taken by other groups. Aumann-Kurz assume that each majority coalition may pass redistributive proposals it may wish to enact, and these represent sets of alternative threats that it has against its opponents. Aumann-Kurz assume, however, that the minority may refuse to cooperate with the majority and call for a general strike of its members against the majority. Thus, the idea of "property rights" is translated into the right of a potentially oppressed minority to refuse to work or make its capital or other resources available to the system as a whole.

Thus, the theory combines aspects of competition, bargaining and property rights to provide an explanation of income redistribution. Such a framework is useful in analyzing the possible effects of pension policy on income distribution since such policy may potentially have considerable influence on property rights and, therefore, power. Rather than influencing factor shares directly, pension policy in this context can influence the power position of various coalitions of employees and employers and change the composition of the various coalitions. It may, therefore, influence the bargaining outcomes among coalitions. By changing the relative property rights among groups, policy could also influence the coalitions that form.

Human Capital Theory

Becker (1962, 1964), Mincer (1958) and their followers focused on the general theory and the earnings distribution theory of human capital. They clarified the relevant costs of human investment (including the cost of time); analyzed school and postschool investment; spelled out the optimizing decision rules for such investment; and derived implications for earnings differences among skill categories across occupations and over age categories. Human capital theory is based on the postulate that individuals make investment decisions on the basis of estimates of the effect of the investments on the probable present value of alternative life-cycle income streams, discounted at some appropriate rate.

Since the inception of the modern human capital theory, human investment analysis has been addressed to any spending on persons that enhances their future earnings capacity, including expenditures on human migration, human health, schooling, on-the-job training, job search, information evaluation, and more recently, preschool investment in the nurture of children, family and population, etc. Education has emerged as a key to several other forms of human investment and therefore the hard core of human capital theory has turned out to be education.

Although the theory has been criticized, the human capital theory and its opposing models and extensions provide a fruitful framework from which to analyze the components of pension policy that affect income distribution. The models measure many phenomena that are potentially affected by pensions, including earnings, labor supply decisions, investment in human capital as opposed to material capital and returns to such investments taking account of depreciation which is affected by retirement. Analyzing the implications of pension policy for income distribution from a human capital point of view would provide entirely different considerations than would analyzing them from a bargaining point of view or power-conflict premise.

Life Cycle Theory

The life cycle theory of income distribution is based on a view of the world that explains earnings inequalities at any point in time as resulting from the fact that life cycle earnings of individuals rise with age and then

decline near the retirement age.* Because of inequalities, individuals attempt to smooth consumption over their lifetime by saving for retirement during their working years. Thus, an individual's total wealth increases with age until he begins living off his capital. In this model individuals allocate their consumption over their own lifetime and do not consider other generations.

The important idea of lifetime consumption theory is that consumption plans are made so as to achieve a smooth or even level of consumption by saving during periods of high income and dissaving during periods of low income.

Thus, during the working years the individual saves to finance consumption during retirement. The savings build up assets, thus an individual's wealth or assets increase over working life and reach a maximum at retirement age. From that time on, assets decline because we assume the individual sells assets to pay for current consumption. Wealth and earnings from wealth can be incorporated into this basic model in a straightforward way, basically using them as a source of finance for lifetime consumption. The impact of pension policy on income distribution with regard to the timing of lifetime consumption given this framework must definitely be considered.

A model developed by Feldstein (1976) extends the life cycle theory by making the period of retirement endogenous. In this extended life cycle model, the change in any endogenous variable has two separate effects on saving: first, it changes savings directly as it would in the traditional life cycle model, and second, by changing retirement, it alters savings indirectly. Given that pensions and pension policy potentially affect savings behavior and work effort, the extended life cycle framework is important to consider in evaluating the effects of pension policy on income distribution. (More discussion of the life cycle theory can be found in Chapter 35.)

Intergenerational Transfer Theory

This theory is based on the existence of implicit support agreements among different generations of the same family. These agreements include transfers in the form of parental expenditures on children's education, bequests, etc. They also include transfers in the opposite direction, either cash or in-kind, from children to parents — that is, the use of children's earnings to finance retirement consumption. This view of the world is particularly relevant to the analysis of effects of pension policy on income distribution in that the introduction of social security could result in reductions in private transfers from children to parents, increases in bequests and other offsetting adjustments to private transfers. This effect is not a consideration in the life cycle model advocated by Feldstein.

* In terms of explaining life cycle income inequalities, there are two schools of thought. One is the human capital school, according to which schooling and on-the-job training, rather than age or sheer experience, account for the observed life cycle inequalities. The rival school consists of family-environmentalists according to whom maturation and automatic on-the-job learning explain much of the variations of incomes during one's life and ultra-conservative economists, according to whom such factors as abilities and the propensities to saving and work interact multiplicatively over age to cause the inequalities.

This intergenerational theory is complimentary to the theory that inheritance is a major cause of income inequality. Because property income is a significant component of personal income and, because it is more unequally distributed than earnings, inheritance factors deserve a place in any generalized theory of distribution. They provide a useful framework in which to consider the effects of pension policy on income distribution for many reasons, including the possibility that pension policy decreases the inequality in income due to capital ownership by expanding that ownership and could, therefore, influence the distribution of capital bequests and individuals' behavior with regard to intergenerational transfers of wealth.

More Complete Theories

The individual theories presented above are all piecemeal in that they consider only certain factors and aspects of behavior. They do, however, serve to highlight all of the variables that must be considered in analyzing the income distributional effects of any pension policy. The advocates of all schools agree on the need to integrate variables of the others into their theories.

A few studies have appeared that combine two or more of the existing piecemeal theories of personal income distribution in a single synthetic model. These include Becker's (1967) supply-demand model of human investment that relies fundamentally upon the twin analytical techniques of economic theory: on optimizing behavior and the determination of equilibrium. The model is formalized to incorporate various forces determining the distribution, the shapes, and the elasticities of the supply and demand curves of human investment. The interdependence of supply and demand schedules is aptly brought out as one of the crucial sources of earnings inequalities.

Also, Griliches (1977) is doing major work on simultaneous-equations modeling of income inequalities and on integrating education, ability and earnings variables in a human-capital framework.

Among the most comprehensive of the existing synthetic models that do not use the human capital approach, is that by Stiglitz (1969), who integrates the distribution of income among factors with that among individuals. By dividing income into its major sources — wages and profits — Stiglitz examines distributional impacts of nonlinear saving functions, heterogeneity of labor supply, material-capital inheritance policies, variable reproduction rates of different income classes, tax policies and the stochastic elements in the accumulation process. However, he ignores human capital for all practical purposes, does not analyze why and how labor productivity becomes heterogeneous, and does not include intergenerational patterns of the transmission of wealth.

As theories of income distribution become more complete, they will combine a larger number of the elements of the individual theories. Until a complete theory is developed and supported empirically, we must accept the piecemeal approach to distribution theory and use it accordingly. This involves acknowledging the point of view from which each theory derives when using it analytically and showing alternative analyses derived from other theories.

The above description of the theories that attempt to explain the economic and behavioral factors that interact to distribute the income in our society, is intended to establish a framework for considering the distributional consequences of pension policy. Though no one theory is empirically proven to be more accurate than any other, regarding all of them together as a joint framework insures that all of the potential consequences are considered.

An analysis of the potential effects of pension policy in this broad framework allows the distributional implications of policy to be considered in the static and dynamic sense and in the short run and long run. The analysis of the distributional impacts of various pension policies depends on the analyst's view of the world as to which variables are important to consider and the mechanisms by which they work. Given a certain viewpoint, however, only the potential effects of policy can be determined. This is because in most cases the effect of policy on the behavioral and economic variables which the theories incorporate has not been determined.

The remainder of the paper will analyze the potential effects of various pension policies using the above described theories of income distribution as a framework. Conflicting evidence on the potential impacts of pension policy on the variables will be presented where questions have not been resolved. Given the uncertain state of the theory of income distribution, the distributional impacts of policy are easily ignored, causing important potential impacts to be left unanalyzed. This situation could lead to policies that have undesirable income distributional effects that were not even considered when the policy was established. The analysis performed in the following chapters will protect against such an occurrence.

The Impact of Social Security Benefit and Tax Increases on Income Distribution

The current benefit and financing structure of the social security system acts to redistribute income from one generation to another and, within a particular generation, from one person to another. If benefit or financing provisions are changed, the redistribution of income would shift and some persons or generations would be better off than under the current system while others would be worse off than they are now.

This section attempts to identify those who would gain if social security benefits and taxes are increased and those who would lose. First, redistribution of income resulting under the current system is explained. Next, the effect of social security benefit and tax increases on income distribution is examined using the theories of income distribution outlined in the previous chapter.

This exercise provides an insight for policy makers of the consequences for income distribution of increasing social security benefits proportionally for all income groups and of funding these increases on a pay-as-you-go basis by increasing the social security tax paid by employees and employers. The level of covered earnings would not change from current scheduled levels. The precise implications of benefit and tax

increases cannot be measured without more specific details on benefit and tax policy changes. Even with such details, the inconclusive state of income distribution theory and lack of empirical evidence make it impossible to state with assurance the probable effects of a change in social security policy. However, the exercise is useful in underscoring the complexity of the possible effects that should not be ignored in the formation of policy and social security benefit and financing structure.

Redistribution Under the Current System

The social security benefit of a retired person can be analyzed from the redistributional point of view by conceptually dividing it into two components: the annuity component and the redistributional component. The annuity component is simply that amount that would have been generated if the total contributions to social security made by and for an individual had been invested at the market interest rate. The redistributive component is composed of two parts: an intergenerational transfer component and an intragenerational transfer component.

The intergenerational component represents that amount which the average member of a retired generation receives from the young workers of today relative to the actual contribution made by or for the retiree. For example, if retired people aged 69 today have a total pension income as a group relative to their total annuity rights as a group of 1.40, this means that, on the average, 40 percent of their pension represents an intergenerational transfer. The intragenerational transfer measures the distribution of pension income within a given age group in relation to their annuity adjusted for the intergenerational transfer component. If a retired person receives less than this individual standard then obviously his contribution is being used to finance the pension of somebody else whose pension is above the standard. The empirical investigation of these inter- and intragenerational transfers has been rather limited but the findings so far appear to be important.

INTERGENERATIONAL REDISTRIBUTION - Richard V. Burkhauser and Jennifer L. Warlick (1978) provide evidence as to the intergenerational redistribution by comparing the pattern of 1972 OASI benefits with one produced by an actuarially fair system holding all decision variables constant. They found that in 1972, of the $27.1 billion in benefits that were distributed through the OASI system to households with at least one member aged 65 or over, only $7.4 billion can be considered actuarially fair returns.

Further evidence as to intergenerational transfers is provided in a recent paper by Boskin, et. al. (1980) in which they used the social security exact match file to determine what ratio of the present value of OASI benefits can each age cohort expect to receive at age 65 to the accumulated value of lifetime contributions to social security. For an individual, the value of total contributions into a system at the point of retirement is the sum of actual and expected OASI taxes paid both by himself and by his employer compounded by a real rate of interest (3 percent). Calculations use actual and forecasted income, historical and forecasted maximum taxable income limits and historical and forecasted

tax rates. The expected value of OASI benefits over a worker's remaining life is calculated considering the probability of survival and the wage index from the Social Security Bulletin, Annual Statistical Supplement, 1975. A wife receives the larger of benefits based on her own or her husband's earnings record. The calculations made in 1977 assume a 7 percent inflationary earnings increase, a 1.5 percent earnings increase due to productivity, and a 3 percent discount rate. Female income is adjusted for labor force participation. The average net benefits per family by age are as follows:

Cohort 5: Age 65+ = $42,343
Cohort 4: Age 55-64 = $29,294
Cohort 3: Age 45-54 = $22,718
Cohort 2: Age 35-44 = $12,994
Cohort 1: Age 25-34 = $-267
Cohort X: Age less than 25 = large negative

This assumes no change in life expectancies and retirement patterns.

INTRAGENERATIONAL REDISTRIBUTION - The amount of intragenerational transfers in the current social security system is rather massive. These are due both to the structure of benefits and the nature of taxes. With regard to benefits, the first important intragenerational redistributive component is due to the fact that low-income people receive proportionately far more social security benefits than high-income people. This is because the benefit formula includes a minimum benefit and is progressive. This progressivity is illustrated in Table 3, which provides a rough idea of the relationship between Average Indexed Monthly Earnings (AIME) and monthly benefits.

The second intragenerational redistributive component is related to the fact that certain employment, such as that with the federal government, is not covered by social security. Because of this, workers in such jobs can take advantage of the minimum benefit and the tilt in the formula when, in fact, they are not poor. In this situation, a worker can retire from his job, receive his pension and work in the private sector for the minimal number of years needed to qualify for social security. The average monthly earnings on which his benefit is calculated (which depends on the number of years coverage) is quite low.

Combining these two pensions, this worker will, therefore, receive a larger percentage of his average monthly earnings than if he had been covered only by social security during his entire career. This aspect of our pension system allows certain workers with relatively high lifetime earnings to benefit from the redistributive potential of the public sector's pension system whereas high-income workers in the private sector cannot. Within a given generation, we find, therefore, a redistribution in favor of noncovered workers.

TABLE 2

Average Indexed Monthly Earnings	Monthly Benefits	Benefits As a Percent Of Earnings
$ 100	$122	122%
$ 500	$265	53%
$1,000	$425	43%
$1,500	$513	34%
$2,000	$589	30%

In another sense our system causes redistribution between married women who have jobs and those who do not. Married women who work in the home are entitled at age 65 to one-half of their husbands' primary benefits. Upon the death of their spouses, these women are entitled to widow's benefits equal to their spouses' primary benefits. Women who have jobs and obtain their own social security coverage receive old-age benefits based on their own earnings records only if those benefits are higher than their dependency benefits based on their husbands' coverage. As a result, many married women who have jobs pay social security taxes but collect no additional pension benefit. Here, the redistribution operates against married women with jobs and single men and women.

Finally, our system causes intragenerational redistribution between those aged 65-72 who have jobs and those who do not. In order to collect a social security primary benefit, a person must retire from the labor force. If a person otherwise entitled to full social security benefits is under age 72 and earns more than the annual exempt amount, his benefits are reduced by $1.00 for each $2.00 in earnings above the exempt amount -- currently $5,000 and soon to be increased to $6,000. Besides causing discontent with the social security system in general, the income test discourages individuals from working to supplement retirement income and may inhibit the achievement of income adequacy.

On the tax side, intragenerational redistribution occurs from low- to high-income individuals because of the regressive nature of the payroll tax and also because of the nontaxation of benefits. (See Appendix 2 for a discussion of the incidence of the payroll and income tax.) Low-income workers pay a higher proportion of their total wage in taxes and high-income individuals have a greater tax subsidy because benefits are tax-free.

All the above intragenerational transfers are indirect in the sense of being part of the pension and tax system itself. In addition, there exists a direct intragenerational transfer system. Eight to 9 percent of people over 65 receive income from Supplemental Security Income (SSI). SSI provides a basic retirement income for those who do not receive adequate income from other sources. These payments are needs related since applicants must demonstrate a need for additional income after an examination of assets and income. It is financed from general revenues. The outlay for SSI for fiscal 1976 was approximately $5.2 billion.

Boskin et. al. also made some estimates of net intragenerational transfers of the OASI system by age cohort and income class. The results are presented in Table 3. Looking across each cohort, we note that the percentage of net benefits over total benefits (percent break) declines rapidly as income increases. For example, for Cohort 1 (25-34 years old) the percent break goes from slightly over 6 percent for family income under $6,000 to minus 2.5 percent for families with incomes above $10,800. The same pattern is true for each cohort. Also, for Cohort 5, the current retirees, the percent break declines from 87.6 percent to 75.3 percent as we move up the income scale. This particular feature of the relationship between the percent break and income reflects primarily the progressivity of the benefit payment formula. Of course, the total net benefits may be slightly larger for some cohorts for higher income people reflecting both the larger intergenerational transfer and the larger tax payment which higher income individuals make. It should be noted, however, that this analysis does not include the effect of the tax-free nature of the subsidy.

TABLE 3
Net Transfers by Income Class

	Income Class[c]			
	6000	6000-8000	8000-10,000	10,800+
Cohort 1[d]:				
Net Benefits[a]	5,972	3,505	2,267	-1,923
% Break[b]	8.1	4.9	3.1	-2.5
Cohort 2:				
Net Benefits[b]	15,700	15,586	13,185	11,054
% Break	26.7	23.4	20.4	16.3
Cohort 3:				
Net Benefits	24,519	25,645	24,170	20,733
% Break	50.1	46.7	44.5	35.1
Cohort 4:				
Net Benefits	30,446	30,224	29,432	30,292
% Break	69.2	64.3	61.3	57.8
Cohort 5:				
Net Benefits	39,376	36,587	39,671	42,476
% Break	87.6	80.0	81.0	75.3

N.B. Base case with inflation = 7%; productivity = 1.5%; discount rate = 3% net of inflation.

a Net benefits = Benefits for average family in income class where both survive to retirement, in 1977 dollars, discounted to year of retirement, less taxes paid computed analogously.

b Break = Net benefits - benefits paid.

c In 1977 dollars.

d Cohort 1 = 25-34; .... Cohort 5 = 65+.

Effect of Benefit and Tax Increase on Income Distribution

Now that the redistribution of the current social security system has been identified we can speculate as to how it will be affected by an increase in benefits funded through an increase in the payroll tax. Who would gain and who would lose? This question must be answered by cohort and by income class considering both the primary and possible secondary effects. By primary effects we mean effects in the absence of a behavioral response. Secondary effects include a direct behavioral response and less direct implications resulting from that response.

PRIMARY EFFECTS - First of all, consider the cohort of retired workers over age 65. These individuals will receive increased benefits without paying any more taxes. Therefore, as a cohort they will receive a net gain. Within the cohort, those with higher benefits and higher taxes or lower percentage break will increase their percentage break by more than those with lower benefits and taxes, if benefits are raised by a certain percentage across the board. Thus, the higher-income individuals would be benefited more than the lower-income individuals.

The effect on income distribution for the cohorts presently working is not so clear. It depends on the relative increase of benefits and taxes that are decided upon. If, in fact, the taxes are increased in a manner that would fund the benefit increases as they are paid out, the relative populations in the various cohorts will determine the extent of the intergenerational income redistribution and the change in net social security wealth.

SECONDARY EFFECTS. With regard to income distribution theory, the interesting exercise is to consider the potential behaviorial effects of the change in the social security law and the economic consequences of such effects. All of the potential behavioral effects can be considered in terms of the effect on saving and the effect on work effort including the age of retirement.

First, we must expand on the income distribution theory presented earlier with respect to behavioral effects on saving and work effort.

a. Social Security and Savings (Life-Cycle Model). At present, the matter of whether social security affects saving is open to empirical proof. The most current work on the subject suggests that social security could potentially affect savings in the theoretical construct of both the life cycle and intergenerational theories of income distribution. A brief description of the application of these theories to the savings and work effort issues show that judgments as to their validity are necessary to theoretically determine the savings and income distributional effort of the policy change under discussion.

The social security system may affect the savings-income ratio through its effects on either the life-cycle demand for assets or the accumulation of assets for bequests. Social security could alter a person's consumption (and savings since savings is income minus consumption) through three different channels, through induced early retirement and other

changes in hours worked, through the differences in the present value of benefits and taxes and through changes in the precautionary demand for assets. Briefly, the social security program may cause changes in the amount of work a person does because of the earnings test and the payroll tax. Also, the involuntary nature of the system in which taxes must be paid and benefits are conditional on retirement causes people to retire earlier and more fully than they otherwise would have. If the individual would not otherwise retire, the life cycle theory of income and consumption suggests that a larger fund of assets is required to finance old age and savings is increased. If the individual would have retired at the same age anyway, then social security, by providing additional retirement income, will cause savings to be reduced. Thus, aggregate savings could be increased or decreased by social security. This analysis was developed by Martin Feldstein (1974a,b 1976) and Alicia Munnell (1974, 1977) for a zero-bequest life cycle model. They have concluded that the net effect on aggregate savings of income transfers from young to old in social security and of induced retirement is ambiguous as a matter of theory, though Feldstein believes that empirically social security reduces savings. Recently, Feldstein's original empirical work has been proven incorrect causing him to reformulate his empirical models. The reformulation changes the magnitude of his estimates but not his general conclusions.

Regarding the bequest portion of aggregate savings that was not considered by Feldstein and Munnell, induced retirement would reduce savings for bequests -- the opposite of the effect of induced retirement in the Feldstein-Munnell analysis. Earlier retirement would reduce the wealth a person has -- whether allocated to lifetime consumption or to bequests. If, over the life cycle, a fraction of income is devoted to bequests, the reduced income would result in a more or less proportionate fall in consumption, bequests, and savings for bequests. Therefore, considering all possibilities, unless one makes special assumptions, there is no presumption about whether the effect of social security on induced retirement will increase, decrease, or leave unchanged the savings-income ratio.

The above discussion assumes that the social security system is actuarilly fair. If, instead, it is not, then an involuntary social security program could involve a net decrease in the wealth value of life cycle labor income. Such a reduction in wealth would cause the desired levels of both consumption and bequests to fall. The fall in consumption of each individual would increase aggregate savings, but this increase is less in the presence of positive bequests than it would be if consumption was reduced by the full reduction in wealth.

The precautionary motive for holding assets is related to the bequest motive because the value of the potential use of assets in emergencies reduces the cost of bequests. Except for those who would otherwise purchase an equal amount of life annuities in the private insurance market, this forced purchase of a life annuity probably decreases the desired level of bequests. For most people, because social security reduces the danger of outliving one's income, assets for planned bequests lose some of their value as a reserve for emergencies.

On the other hand, since the social security benefits "purchased" with present taxes are uncertain, individuals may save more during their working years and then dissave more during their retirement than would be the case if benefits were certain. The higher savings during working years represents a fall in consumption associated with a fall in expected wealth. Consumption then would rise during retirement years as higher-than-expected benefits are received. The net effect here is to increase the life cycle portion of savings.

Thus, the life cycle portion of aggregate savings may be reduced if the match between income and consumption becomes closer because of the income-shifting or increase due to induced-retirement aspects of the social security program. Also, if the system is not actuarially fair, the shift of income to retirement years through the social security system could increase savings because of the lower wealth value of life cycle earnings for those penalized by the system. On the other hand, it could decrease savings by increasing the wealth value of life cycle earnings for those who gain advantage from the system as it did for the early generations of recipients. However, the uncertain nature of social security benefits may increase savings by decreasing consumption in the working years and increasing consumption during retirement.

b. Social Security and Savings (Intergenerational Transfer Model). The above discussion assumes that the life cycle model of savingss is in effect with or without bequests and that social security does not substitute for private intergenerational support. In order to understand this assumption, it is necessary to review the application of the intergenerational transfer theory to the social security-savings issue. Visualize how society would function without a social security system: poor retired parents would be supported by their children and relatives, while rich retired parents would continue to support their children and leave them the family estate as an inheritance. When social security was introduced, this traditional pattern was altered. The working young pay a social security tax that is then paid to the parents as a pension. The outcome of this is therefore:

- if the parents are poor the children reduce their support of the parents by the amount of the tax which they pay;
- if the parents are rich then they will increase their support of the children who have the additional tax burden.

In either of the two cases, the transaction, from the point of view of the family, would leave the family's private savings unaltered. Thus, social security does not affect savings in that it merely substitutes for private intergenerational transfers.

c. Social Security and Savings - Empirical Investigation. Theoretically, whether one believes in the life cycle theory of income distribution or the intergenerational transfer theory, the effect of social security on aggregate savings is ambiguous. The ambiguity can only be removed by empirical investigation. Darby (1979) has provided the most

recent empirical analysis of this effect. He concludes the following: "The bulk of capital is held and net saving is made in anticipation of bequests. Social security would cause saving for bequests, relative to income, to fall only to the extent that the forced purchase of a life annuity exceeds what would otherwise be purchased and thus reduces the precautionary value of bequest assets.

"Social security, however, may have greatly reduced life cycle saving. Because bequest saving is relatively stable, the percentage effect of social security on total saving is much less than on life cycle saving alone. Even so, the possible reduction in total saving because of reduced life cycle saving is still larger -- 12 percent to 23 percent, depending on the interest rate -- although these estimates are less than Feldstein's original 38 percent reduction. This maximum reduction would be offset by the effects of induced retirement, the low effective yield on social security, and the uncertainty of benefits.

"Since the retirement effect alone apparently swamps the possible reduction in bequest saving relative to income, the reduction in the total private saving-income ratio is probably no more than 10 percent to 25 percent. Time series estimates of the effect of social security on saving imply a reduction ranging from 0 to 30 percent. The higher estimates depend on the functional form and time period used in the estimation and are probably biased upward. None of the estimated reductions differ significantly from zero on standard statistical tests. Taken as a whole, the evidence suggests that the reduction in the saving-income ratio because of social security is probably from 0 to 10 percent rather than higher."

d. Effect of Policy Change on Income Distribution Via Savings and Work Effort. Since the present social security system may affect saving, we must consider the effect of an increase in social security benefits and taxes on savings in hypothesizing about the income distributional effects of such a policy change. As was noted above, savings could be affected both positively and negatively through various channels. The increased taxes could affect savings through induced early retirement and other changes in hours worked, through the differences in the present value of benefits and taxes, and through changes in the precautionary demand for assets. These can be thought of as the wealth, tax, retirement and bequest effects.

For those who are retired, only the precautionary motive may apply. A benefit increase could cause the retired to increase the expenditures relative to their income and assets thereby reducing savings.

For those who are working, all of the effects on savings could occur. It is a matter of empirical evaluation to determine their magnitude and direction. Some interesting speculations can, however, be made. First of all, if one follows the life cycle theory, even with the bequest motive, savings and capital is available to future generations for production and the GNP, and therefore the standard of living of future generations, could decline. However, Darby (1979) presents an interesting qualification of this effect. He finds that, because the U.S. capital market is relatively open internationally, the capital stock owned by the U.S. residents, wherever located, should be distinguished from that, by whomever owned,

used in the United States. Similarly, the income of U.S. residents should be distinguished from the output of the United States. In the long run, reductions in the savings-income ratio and the labor supply will reduce the capital owned and the income received by U.S. residents more than the capital used and the output produced in the United States.

Calculations of the long-run equilibrium effects suggest that owned capital is reduced by between 5 percent and 20 percent and used capital by between 0 percent to 15 percent. The corresponding reductions in income and output range from 2 percent to 7 percent reductions and from 0 percent to 4 percent reductions, respectively.

If the low-income group feels the wealth effect more than the upper-income group, then they will reduce their savings by more and own less capital. This would be so because social security provides a more significant portion of income to the lower-income group and therefore social security impacts of the lower-income group to a greater extent. The increased wealth may be proportionately larger for the upper-income individuals, but social security wealth may be a much smaller proportion of their total wealth and therefore would affect their behavior to a lesser extent. On the other hand, the upper-income group may not need the extra social security benefits and, therefore, according to the intergenerational transfer theory, may increase their bequest savings to help their children who are paying higher taxes. The effects on labor supply of lower- and higher-income individuals cannot be theoretically determined.

Taking this discussion a step further, if the lower-income individuals reduce their savings by more than the upper-income group, less capital will be in their hands. This means that, though the reduced amount of capital increases its return (according to the factor shares theory), the share of this return going to low-income individuals will be smaller. According to the radical theory, this will separate the capitalists from the workers to a greater extent and lead to greater exploitation of workers by capitalists.

Considering the situation across generations, those children who would not have to support their parents in the absence of social security will suffer more from the increase since their taxes will not substitute for private transfers unless parents increase the support of the children by the amount of tax. For lower income retired, their children could reduce the private support that they would provide to the parents by the amount of the benefit their parents receive. According to the intergenerational transfer theory, if all adjustments are made in private support the net effect of the increased benefits and taxes on savings is naught.

According to the human capital theory, if the changes in the social security system increase the return to certain workers, through greater redistribution, those receiving greater benefits will tend to invest more in human capital. Also, the policy would tend to cause earlier retirement for those who have invested less in human capital since their capital depreciates earlier than the others. Other individuals would benefit relatively less from early retirement and therefore the increased social security wealth would not affect their labor supply as much. In the long run, the change in the system could actually affect investment in human capital.

Conclusion

The above discussion makes several things clear. First, we must accept the ambiguity of the primary effects on income distribution of the policy change. This is because the empirical estimates of the benefits implications cannot be worked out without more specificity with regard to the policy and because the tax implications are difficult to determine empirically. This ambiguity must be considered in conjunction with the ambiguity as to the behavioral effects of the policy change on savings and retirement due to the inconclusive state of the income distribution theory and lack of empirical evidence.

The inconclusive nature of the analysis can be summarized in the following example. Since benefits today are progressive, there is a large intragenerational redistribution effect. Therefore, increasing taxes and benefits could have an increased short-run intragenerational income redistributional effect. However, if in the long run, such a policy results in decreased capital formation, decreased wealth ownership and decreased labor supply by the lower-income people, then the total income distributional effect is ambiguous.

The Impact of a Mandatory Universal Pension System (MUPS) on Income Distribution

The purpose of this chapter is to evaluate the effects on income distribution of implementing a hypothetical mandatory universal pension system of defined benefits that is administered by the private sector. Although the system is mandatory, we assume that the current tax incentives to establish pension plans will remain. It should be noted, however, that such incentives may no longer be necessary with a compulsory system. The key provisions of the plan are the following:

1. Eligibility and Participation: Age 25 and one year of service and 1000 hours of employment;

2. Benefit Design:

   - Option 1: Defined Benefit

     a. 1/2 percent per year of service after implementation date times average indexed pay at normal retirement age or disability or at time of termination if vested. (This implies no past service obligations since there are no liabilities prior to implementation.)

     b. Vesting: Five years after eligibility;

     c. Indexed after termination of employment to date of retirement: 80 percent of CPI up to 5 percent per year;

d. Indexed after retirement: 80 percent of CPI up to 5 percent per year;

e. Spouses' survivor benefit:

Death prior to retirement: 3/4 of vested benefit to be paid at surviving spouse's normal retirement age or disability;

f. Contributions: Employer actuarially determined; employee — none;

- Option 2: Defined contribution plan

a. 3% of pay minimum contribution by employer;

b. Vesting: immediate upon participation

3. Funding: Employer sponsored trust fund;

4. Administration: By employer;

5. Application to current employer plans: Added as a minimum requirement to any current qualified plan. Existing plans may change current provisions to reflect new benefits;*

6. Integration: No integration of minimum level; current integration laws apply above the minimum.

The question of the income distributional effects of the above specified plan is strongly tied to the validity of the compensating differences hypothesis, which implies that lower wages compensate for greater pension rights. This theory and the issues surrounding it are reviewed in this chapter before discussing the income distributional effect of the above pension policy on income distribution.

Compensating Differences Hypothesis

The compensating differences hypothesis is based on the standard competitive view of labor-management relations. This hypothesis can be explained quite simply. Suppose one adds up the cash wages that are paid to a worker over a given period of time and the incremental pension rights which the worker receives over this same period. This sum defines the value of all benefits which the worker receives from a firm during a given period. Call this the "value of labor compensation." Now suppose one looks at the cash wages and the value of pension rights of a worker, with a

* The analysis considers the changes that current plans must make applicable "from the date of implementation" of the new rules but does not account for voluntary changes that the firm has the option of making such as reducing benefits to the minimum.

given age and work history and certain socio-economic characteristics, who is holding a specific job. Consider the compensation which this worker receives at different firms with different pension plans (some may have no plans at all). According to the "compensating differences" hypothesis, the total "value of labor compensation" will be approximately the same at all firms, although there may be large differences in the values of the incremental pension benefits. This means that if the firm has a generous pension plan it will tend to pay lower cash wages. If the pension benefits of a given firm are increased, wages will be increased by less than if the pension had not changed.

Whether the compensating differences hypothesis is true has not been determined empirically. Many researchers question its validity since the observed facts seem to contradict the implications of the hypothesis. The hypothesis implies that, for the firm, all wage-pension packages cost the same, therefore, the firm's profits are not affected by the package selected by labor. For labor, the hypothesis implies that the total value of compensation is the same across packages so that even in the extreme case of no pension plan at all, the cash wages are sufficiently high either to allow each worker to buy his own pension rights on the open market or, if there is a union, to set up a union plan that will have the characteristics desired by the workers.

These implications are contradicted by the general belief that neither labor nor management appear to be indifferent to the existence and provisions of pension plans. Until the late 1940's or early 1950's, organized labor was either indifferent to the pension movement or openly antagonistic to it. Many of the older well-established craft unions viewed employer-sponsored pensions as a paternalistic device to wean the allegiance of the workers away from unions to the employer. They also harbored a fear that pensions would be used to hold down wages. Over the years, however, these attitudes changed to such an extent that in 1949, when another round of wage increases seemed difficult to justify, a large segment of organized labor demanded pensions in lieu of wages. The way was paved for such a switch when a federal court ruled that pensions are a bargainable issue.

In spite of the rising cost, there is no evidence that corporations want to opt out of the pension administration and benefit guarantee obligations. The fact that corporations have made only minimal efforts at freeing themselves of the administrative burden of their pension plans implies that firms do not seem to be indifferent between cash wages and pension rights.

This lack of indifference of labor and management suggests that there may be deeper interests involved in the pension system than are suggested by the compensating hypothesis.

Considering the various rationales behind the establishment of pension plans provides some perspective as to what these interests may be. The compensating differences hypothesis is based on the view that pensions are a deferred wage. This view is valid from the participant's standpoint only if funds paid into a pension plan in lieu of a personal wage increase are

administered in such a manner as to insure their ultimate payment to him or his beneficiaries. This implies full and immediate vesting. Since this implication is not met by most current pension plans, it seems that total potential pension benefits are not likely to be considered deferred wages by individuals. Even if an individual views pension benefits, in general, as deferred wages, eligibility and vesting rules may cause him to discount the value of the pension benefits.

For example, the fact that most large private section pension plans have ten-year vesting implies that a higher pension is needed to offset a given wage deferral. A worker may, in fact, discount the future value of pension benefits by the probability of becoming vested. In the case of collectively bargained plans, this process is made explicit by valuing the pension contributions across all workers' wages. Pension commitments are, in fact, frequently expressed in terms of cents-per-hour values in collective bargaining negotiations. There is an explicit trade-off between current wage increases and future pension benefit increases.

Another explanation of pension plans (Squier, 1912) was that a pension compensated an individual for human depreciation -- his occupation exhausted the individual's industrial life and, therefore, the employer should pay for this depreciation. This point of view was adopted by the United Mine Workers and used by that organization in its 1946 campaign to establish a welfare fund. A modification of this depreciation concept is that depreciation is only partially caused by the occupation -- the remainder being physiological. In this interpretation, only the occupational part can be viewed as a cost of production, just as business views depreciation on any capital equipment.

A third rationale for pensions, after deferred wages and human depreciation, is that they are a differential wage given to those who remain in the service of an employer for a long period of time. Pensions are considered to be compensation for the special contribution of a long-service employee to a firm.

Finally, pensions can be considered a duty on the part of business in a private enterprise society to meet the social problems of old-age dependency and also, less altruistically, to limit future growth in social security taxes and benefits.

Thus, given the many conflicting rationales resulting from the complicated sets of interests involved, it is doubtful that the compensating differences hypothesis is totally valid. Pensions have evolved as a result of broad and conflicting forces that do not lend themselves to definitive characterization. They can be summed up in the vague term of business expediency. This expediency can be fostered by such diverse factors as productivity increases, tax, incentives and personnel policy.

The unexplained lack of indifference by both workers and firms, however, implies the existence of intangible as well as tangible benefits that are difficult to measure or assess. The intangible benefits may involve complex phenomena such as the effect of pension obligations on the stock market valuation of the firm or the judgment by shareholders and investors of the way management is conducting business. It may,

therefore, be easier for management to offer an increase in pension benefits than an increase in wages. To the union, an intangible benefit may be that pension benefits complicate total compensation packages in a way that makes them easier to sell to the rank and file. Such intangibles make it conceivable that both workers and management benefit from the existence of a pension plan. Thus, the existence of these diverse factors makes the compensating differences hypothesis seem to apply partially at best.

Countering the above discussion is a study on wage differentials in which Schiller and Weiss (1977) found some support for the "compensating differences" hypothesis in establishing a trade-off between wages and pensions. They found that any improvement in pension provisions leads either to a corresponding wage adjustment or to the entire elimination of the plan by the firm. The authors come to this conclusion after translating all the provisions of the pension plans into a monetary cash equivalent and comparing those values with money wages. Several problems with the study are noted, including the fact that the authors translate provisions such as vesting into estimates of the probability of receiving the pension, with these probabilities being assumed proportional to the length of time to the attainment of vesting. If workers are risk averse, their subjective evaluation of these risks is not correctly represented by the mean value calculations of the authors. In general, the results of Schiller and Weiss are not conclusive despite the fact that a most unique data file rich with detailed information was used. Further analysis is needed in order to clarify the issues addressed in their study.

Unfunded Pension Liabilities

A side issue that affects the validity of the compensating benefits of a corporate pension plan are reflected in the market value of the corporation's stock. Feldstein (May 1977), in citing a study by Oldfield, argues that in total they are not. Feldstein claims that share prices are depressed by substantially less than the total unfunded expected future pension benefits. As indirect evidence of undervaluation, he cites the following situation: Every firm now has the option of funding its pension liability by issuing new bonds and using the proceeds to buy bonds for the firm's pension fund. Although the transaction would only change the form of the firm's debt to the bondholders, this accounting change would have a substantial tax advantage for the firm: the interest cost incurred by the firm on its new debt would be tax deductible while the new interest income received by the pension fund would not be taxed. For example, GM had a $3 billion unfunded vested liability in 1976. Financing it by issuing $3 billion of debt with a 9 percent interest rate would yield an annual tax saving of approximately $35 million, equivalent to a dividend increase of nearly 10 percent.

One explanation for not funding the plan in this way, according to Feldstein, is that the market would recognize the explicit debt in a way that the implicit debt to the pension fund is not recognized. Thus, due to a potential positive effect on stock prices, a corporation may have a reason to prefer compensating employees with pensions rather than wages and may, therefore, offer more total compensation than if wages were the only

form of payment. The compensating differences hypothesis would, in this case not apply to the extent that wages are not reduced by the full amount of the pension benefit. Workers would receive a higher total compensation without all of this compensation being an additional cost to the firm.

A recent study for the National Bureau of Economic Research by Mark Gersovitz (1980) on the economic consequences of unfunded vested pension benefits lends support to this theory in implying that the liabilities above some discrete level do not diminish the value of a firm's shares. This effect seems to be associated with the Pension Benefit Guaranty Corporation's (PBGC) 30 percent rule, implying that the value of a firm's stock may reflect unfunded obligations up to the 30 percent of net worth for which the firm is liable, but does not reflect the obligations above that amount which are covered by the PBGC.

Another effect of unfunded vested benefits on the compensating differences hypothesis is their potential effect on bargaining. Even if pension obligations are not regarded as a substitute for wages they may serve to lessen wage demands to the extend that unfunded benefits align worker interests with the viability of the firm. Underfunding can be viewed as an underlying threat in the collective bargaining process indicating some risk to the workers of not collecting their pension benefits if the firm goes bankrupt. The existence of the Pension Benefit Guaranty Corporation helps but does not completely remove the risk. The PBGC does not insure the full value of benefit improvements that are in effect for less than five years. Insurance of such benefits is phased in at 20 percent per year. Also, the public insurance system could possibly run out of funds (especially if a large firm such as Chrysler went bankrupt) and Congress might be reluctant to pass legislation requiring additional premiums sufficient to cover all benefit guarantees. Thus, workers who have accumulated large pension obligations of the firm have an increased stake in the welfare of the firm and might therefore be reluctant to be too militant in collective bargaining.

Effect of a Hypothetical MUPS on Income Distribution

Given the above discussion, it can be deduced that, at best, the compensating differences hypothesis holds only partially. Given certain parameters of a pension plan, it may hold to a greater degree than with others (i.e. more funding, shorter vesting, union bargained benefits.) This view of the compensating differences hypothesis is assumed in the following analysis. To discuss the income distributional effects of the MUPS, we must first identify those provisions that would, in the absence of any second-order effects, significantly change the cost, benefit levels, and distribution of benefits inherent in the current pension system. Then we must analyze all primary and secondary effects.

The provisions that are significantly different than the current norm relate to mandatory coverage, indexation, (under Option 1, the defined benefit case) integration, and vesting. Before discussing these provisions it is important to note that imposing the mandatory system would in no way increase or decrease the unfunded obligations of the firm. Since the plan applies only to service after the date of implementation, there are no

increases in past service obligations. The assumption that the plan is being fully funded on a current basis corrects immediately for any actuarial inaccuracies on a yearly basis with changes in funding requirements. Also, since the vast majority of participants in pension plans are currently in defined benefit plans, the defined benefit nature of the plan would not cause a major change in the current system. Only 1/5 of all plans have defined benefits but these include the majority of large company plans and all union/employer sponsored multiemployer plans.

Each of these provisions will significantly affect income distribution in the short run by modifying employee compensation and firms' costs. In the long run, individual behavior such as bargaining for wages, work effort, labor mobility, saving and private intergenerational transfers might be affected. Long-run firm behavior might be affected by changing the relative costs of doing business, altering stock prices and modifying the ownership and control of capital. These long-run effects will then modify the initial changes in employee compensation and firm costs.

The various theories of income distribution described earlier can be used as a framework for analyzing the potential long-run effects on savings of workers and stock owners, work effort, intergenerational private transfers, labor mobility, wage distribution, bargaining strategies and ownership and control of capital. All of the provisions essentially serve to increase benefits to workers either by extending coverage or raising benefit levels. We, therefore, begin by carefully analyzing the impact of mandatory coverage with the understanding that these impacts are applicable in one sense or another to the other provisions.

MANDATORY COVERAGE - The mandatory nature of the plan would have a significant effect on income distribution in that, at present, only about 50 percent of non-agricultural workers are covered by private pension plans. Seventy percent of the people with family adjusted gross income of $10,000 or less are not covered by public or private plans; whereas over 70 percent of those with family income over $20,000 are covered. The uncovered individuals are concentrated in certain industries and occupations. A survey sponsored in 1979 by the Social Security Administration and the U.S. Department of Labor shows that the coverage rates were highest in high-wage industries, such as durable goods manufacturing (56 percent) and lowest in low-wage industries such as services (24 percent) and retail trade (16 percent). Forty-four percent of workers in finance, insurance, and real estate were covered. By occupational group, the coverage rates were highest for those in professional, technical (56 percent) or craftsmen (55 percent) jobs. Workers in larger firms were covered more than those in smaller ones. (Non-union firms with under 100 employees had 13 percent coverage whereas those with over 500 employees had a coverage rate of 63 percent.) The rate of coverage for men was generally higher than for women. Thus, a mandatory system would have a differential effect by industry and occupation.

The initial effect of increasing the coverage of private pension plans by making them mandatory is, therefore, to increase the pension rights of the individuals not currently covered. If the compensating differences hypothesis were valid, the new pension rights would only increase the

worker's compensation package to the extent of any tax savings from the future income. Substituting pension obligations for wages could potentially affect the value of the firm in that the interest on the funds in the pension plan compounds tax free to meet future pension obligations whereas wages are paid out of earnings which do not have the advantage of a favorable tax treatment. Thus, on a cash/flow basis, if funding the pension plan costs the firm less than would an equivalent wage increase, a pension plan would increase the earnings of the firm and could, thereby, increase the value of the firm's stock and/or net worth. (Note that newly established plans would have no unfunded liabilities and, therefore, stock prices would not be influenced by such liabilities as discussed above.)

It seems more likely, however, that the compensating differences hypothesis applies only partially, at best. This is especially the case in that the mandatory system has no unfunded liabilities that could serve to reduce demands for increased wages. To the extent that the compensating differences hypothesis is inapplicable, the worker will benefit by an amount equal to the value of the pension rights and the firm would lose by an amount equal to the cost of these rights to the firm. We should note, however, that these costs and benefits may be unequal due to government intervention and imperfect information in capital markets (i.e. the cost to the firm could be less than the benefit to the worker).

It is interesting to consider the potential responses of both individuals and firms to mandatory private pensions and the long-run implications of their actions in the context of the basic theories of income distribution.

The life cycle theory of income distribution, first of all, implies that the new pension rights would affect an individual's savings. According to the theory in its most basic form, individuals save during their working years to finance consumption in retirement in order to have a constant level of consumption over their lifetime. Since pension rights are essentially forced savings for retirement, they may offset a portion of voluntary saving. If, however, the existence of a pension causes an incentive to shorten the working life and extend retirement, it could cause voluntary savings during working years to increase. Early retirement may be encouraged by the firm in order to save pension and wage costs and also to phase out less productive employees. No matter what the effect of pensions on savings and work effort, the effect of the increased pension rights is probably to increase the worker's interest in capital markets in that the pension funds own a significant portion of total capital. In terms of the radical theory of income distribution this increased interest by workers blurrs the distinction between workers and capitalists and lessens the possibility of labor "exploitation."

In the context of the intergenerational transfer theory, forced retirement savings could eventually substitute for children's support of their parents in old age at least in those situations in which parents would not or could not have saved voluntarily and where children have the means to provide support. To the extent that pensions increase total voluntary and involuntary savings above that needed for retirement, they could actually increase transfers from the old to the young in the form of bequests.

In the context of the human capital theory, expansion of pension rights could increase incentives for investment in human capital to the extent that they increase the value of a high wage at retirement and, therefore, increase the return to such investment. However, according to the theory, additional investment would cause a worker's wage to peak later and would influence the timing of his retirement decision.

The effect on the firm of the additional labor cost due to a mandatory pension (if not offset by tax or other public policy) may temporarily increase the share of income paid to labor above that to which it is entitled given the value of its marginal product. Therefore, the firm, in the long-run context of the factor shares theory of income distribution, would tend to increase capital and hire less labor until the value of the marginal product of labor equals the real wage. In the long run this could cause unemployment. (Two consequences of the unemployment are important but are beyond the scope of this paper.)

In the context of the bargaining theory of income distribution, the effects on the firm of mandatory pensions will depend in part on whether the plan mandated is of the defined benefit (option 1) or defined contribution type. A new defined benefit pension plan, in the long run, increases the interest of the worker in the viability of the firm and may serve to mute future wage demands. A defined contribution plan, on the other hand, may not change worker interest in the viability of the firm, but it may increase worker interest in the investment decisions of the pension trust fund.

Depending on eligibility rules, future wage demands could be muted by the complex effect of mandatory pensions on labor mobility. On the one hand, normal industrial practices will tend to promote and raise the wage rates of the long-term workers whose experience is of value to the firm. This policy will tend to give a worker who had been with the same firm for many years a higher wage than he would receive if he began working for a new company and, therefore, discourage him from changing jobs. However, given that pension eligibility reduces mobility, one would also expect it to be less necessary for the firm to raise the wage rate before retirement because a higher potential pension motivates the worker to remain with the firm. Thus, conflicting forces operate within any given firm leading to a complex structure of wage distribution for those close to retirement.

Given only a partially valid compensating differences hypothesis, the compensation of workers who previously did not have pension plans is suddenly increased relative to that of workers who did. This could, in the long run, make the bargaining position of pension recipients before mandatory pensions stronger in that the compensation differential should tend to return to the initial level. This differential could be re-established in two basic ways: (a) workers not entitled to pension benefits kmight face a pension or nonpension fringe benefit adjustment or (b) workers previously entitled to pensions might seek wage or benefit increases. This, of course, implies at least some competition in labor markets.

NON-INTEGRATION OF MINIMUM BENEFIT - The fact that the minumum benefit cannot be integrated would increase the benefits in corporate group plans which are currently integrated (approximately 1/2 of

all plans). These plans contain about 1/4 of plan participants (Schmitt, 1978). The most significant increase in benefits would be realized by lower income workers who have a large percentage of potential benefits offset by social security.

The analysis of the non-integration of the minimum benefit in the context of income distribution theory is much the same as the analysis of mandatory coverage. The difference is that the non-integration rule increases the benefits to workers who are currently in integrated plans, whereas mandatory coverage provides benefits to uncovered workers. The response of these groups of workers regarding savings, work effort, etc. should be similar.

The fact that the integration rule significantly affects firms with existing plans, however, means that they can adjust the plans to compensate for its cost, thereby adjusting the compensation distribution within the firm. Essentially, the integration rule implies increased benefits for all workers, but the rule would benefit low-income employees more in the long run because pension benefits would be more evenly distributed between low- and high-income employees. The fact that pension rights are in some way reduced by social security benefits in firms with integrated plans means that low-income workers are receiving lower pensions in proportion to their income than are high-income employees. Given only a partially valid compensating differences hypothesis, the firm may be forced to reduce effectively the pension benefits of high-income individuals in order to meet the increased obligation to others. Thus, the law would shift the income distribution toward the low-income worker. This effect is complicated by all of the factors mentioned above under mandatory coverage such as capital-labor substitution, etc.

EARLIER VESTING - The five-year vesting provision of Option 1 or immediate vesting of Option 2 would provide benefits to short-term workers. A Bankers Trust Study (1976) found that only two out of 97 surveyed plans has vesting provisions more liberal than those required by ERISA — either 10 years or vesting scaled by years of service. The provision would initially change the intergenerational income distribution in that more retired workers would be drawing pension benefits rather than giving up claim to them, which allows the contributions made on their behalf to be used to reduce the cost to the firm of pension rights for younger workers.

In the long run, shorter vesting, by increasing the probability of receiving benefits, would strengthen the effects described for mandatory coverage. It would most strongly affect job mobility, wages and ownership and control of capital. To understand how vesting influences labor market behavior, the years of service before vesting can be viewed as a gradual accumulation in a risky investment. At any time the worker may lose his investment if he is fired; also, if he changes jobs, he actually gives away this capital. Thus, as time passes and the date of vesting approaches, quitting a job becomes more expensive, increasing the worker's reluctance to quit. When a worker has spent significant time with a company but is not vested, three important factors operate: 1) The worker will not move to another job with a higher wage rate as long as the higher wage does not compensate him for the loss of potential vesting rights; 2) Since the

bargaining power of the worker declines, the employer need not match any higher wage offer that the worker receives. Furthermore, if potential pension rights are so valuable that the worker does not seriously consider alternative employment possibilities, the firm could choose to allow some deterioration of the worker's real wage by slowing normal promotion of progression until vesting is granted; 3) Unvested older workers will be less militant in their attitude towards the company since they may fear retaliation by the firm in case of conflict. Since being fired may entail a larger loss of capital for older as opposed to younger workers, threats of retaliation may cause a serious divergence of views and attitudes within the work force (unionized or not). In this sense the lack of vesting may be used as a factor in collective bargaining because the fear of a split within labor's ranks may prevent workers from taking a more aggressive stand.

Given these factors, we should not be surprised to find that vesting provisions may have significant effects on labor mobility and wages. Shorter periods to obtain vested benefits which the proposal implies are likely to cause an increase in the mobility of workers in that more of them will be near the vesting threshhold thereby lessening the impact of potential pension benefits on their money wage.

INDEXATION - The required benefit level of the option 1 mandatory plan would not significantly affect the level of pension benefits of most already established plans. The required benefit of 1/2 percent per year of service times "salary" is below the 1-2 percent currently found in most plans. It does affect plans, however, in that the "percent of salary" is the percent of average indexed pay at normal retirement age or disability or at time of termination. The indexing of pay may not significantly increase benefits for those retiring at normal retirement age, since a measure of final pay is most commonly used at present. Indexing, however, would increase benefits for those leaving a job before retirement. Also, the indexing of benefits after retirement would increase the benefits of most established plans. At present, only 3-7 percent of private plans have automatic cost-of-living adjustments.

The indexation provision of the pension proposal could potentially have the greatest effect on income distribution in that it makes the impact of inflation neutral with respect to the distribution of the benefits/losses that inflation causes. Today, most retired workers are absorbing the total loss of real income due to inflation and firms are benefiting to the extent that they are paying fixed dollar amounts that decline in real value with inflation. Inflation indexing of most current plans would be costly to the extent that they are unfunded. This means that insufficient funds are earning interest to pay indexed benefits. The MUPS plan, which requires full funding from the day of plan implementation, will be more costly to a firm during inflation than a plan without indexation only to the extent that the firm will not benefit from the high nominal return to fund investments caused by inflation. Rather than using inflation to decrease the cost of funding, the firm would be required to increase benefits to the retired workers. This should present no problem, however, if the return on the funds in the plan keeps pace with inflation.

The MUPS plan could be patterned after the Rockefeller Foundation pension plan which has automatic indexing. In this plan, yearly pension

increases are equal to the average rise in the prime rate — which tends to reflect the rate of inflation — less three percentage points, to provide the plan with a real rate of return.

Indexing the plan in this manner does not cost the foundation any additional money. For example, entering an annuity table with a 3 percent interest factor, assume that it takes $100,000 to produce an annuity of $8,500. Therefore, it takes $10,000 to produce an annuity of $850, $5,000 to produce an annuity of $425, or $1,000 to produce an annuity of $85.

If an individual starts with a pension of $8,500 and inflation during his or her first year of retirement is 5 percent, he or she will need a $425 increase in the pension to maintain the benefit level in real terms. Where will the necessary $5,000 principal come from? With inflation at 5 percent, the principal fund should earn 8 percent, not the 3 percent over which the annuity table is based. In other words, earnings on the principal fund should be $8,000 making an extra $5,000 available to buy another lifetime annuity of $425. The additional annuity imposes no cost on the employer or insurance company other than its initial purchase.

In the absence of inflation, a 3 percent interest assumption is appropriate, and there is no difference between the cost of an indexed pension and one that is not indexed. Both pensions pay the same benefit.

If the pension is not indexed, however, and we move from an inflation-free period to one with inflation, the extra interest earnings go to the employer and the retired person loses an equivalent amount in the value of his pension. This assumes that the investment yield increases with inflation and that there are no ad hoc increases in pension benefits.

Those who point with horror to the enormous cost of indexing pensions are looking at only one side of the picture. Both sides become clear when accounting statements are prepared in units of general purchasing power (as proposed by the Financial Accounting Standards Board). Such statements measure a corporation's gains during an inflationary period when long-term debt is payable in a fixed number of dollars.

When the long-term debt is for pensions, the corporation's gains and its pensioners' losses are exactly equal. If pensions are indexed, neither side of the pension transaction gains from inflation or its absence at the expense of the other side.

Thus, the only cost to the firm of implementing an indexed plan that has no past service obligations is the cost imposed by not benefiting from inflation at the expense of the pensioners. This cost may, however, result in lower stock prices.

With no added cost, we would expect no additional compensating differences in wages than for a nonindexed plan. Thus, the major income distributional effects would be in terms of increased benefits to labor. These would mainly affect savings and work effort and also intergenerational private transfers.

According to the life cycle theory of income distribution, in which individuals save for their retirement, indexing would protect pensions against inflation making it less necessary for individuals to save voluntarily to supplement their retirement income. Indexing would remove the risks of a fixed retirement income during an inflationary period and would reduce the proportion of elderly that are poor. Also, indexing may encourage early retirement in that individuals need need not be fearful of erosion of real income for a long period of time during inflation. Today, casual empiricism shows that individuals may be hesitating to retire because of inflation. By working longer, an individual increases the salary on which his pension is based and shortens the fixed-income period.

Indexation may also reduce intergenerational private transfers in that the elderly will be richer in relation to their children. Wages tend to increase with inflation causing younger generations to be richer than their parents. With mandatory pensions and indexation, the income discrepancy between young and old would not be increased by inflation. Also, in a more complex view of intergenerational income distribution, among members of a given pension plan, if the compensating differences hypothesis is even partially valid, the workers may be potentially sharing in the advantage a firm would gain from reduced pension contributions due to benefit erosion for the retired. With lower pension costs, wages may be reduced less than otherwise. This causes a potentially large redistribution of income from the retired whose pensions are eroded to young workers whose wages are not compromised. Such redistribution would not occur with indexation. Thus, intergenerational transfers could be a major effect of indexation on income distribution.

The MUPS plan of indexation has different income distributional implications than does the Rockefeller plan in that the MUPS is capped at 5 percent a year and is indexed at 80 percent of the CPI. With inflation greater than 5 percent, the firm would probably benefit at the expense of the worker. The firm would not have much financial exposure in that with conservative investing it can fairly easily earn interest on its funds equal to 80 percent of the CPI. The Rockefeller plan, in tying the benefits to the prime rate rather than having a capped rate increase, would make the advantages of inflation more evenly distributed between the retired and the firm.

In the context of ownership and control of capital, pension funds with indexation may have a major impact on capital markets in that plans may change their investment strategy. For example, the Rockefeller plan, rather than attempting to beat inflation, and to take a chance at lowering pension costs, attempts to stay even. To accomplish this, the plan puts the funds allocated to cover pension costs when an employee retires into short-term investments, such as commercial paper. The theory is that the return on these investments will closely parallel the inflation rate, as it has for more than 25 years. The rate of return will decline in a recession, but it can be expected to rise as inflation rises — when a higher return is more necessary. Such investment strategy by all plans could cause huge shifts in ownership of capital in that pensioners would no longer own the large amounts of corporate stock that they own currently. In 1976, for example, the market value of private non-insured pension funds was $173.9 billion.

About 62 percent of these assets were in common stock (President's Commission on Pension Policy, 1979).

Indexation would also affect income distribution in the bargaining context in that, according to the Aumann-Kurz theory, it could cause the power positions and composition of the coalitions to change. Today, without automatic indexing, there is great potential for a split within unions between retired and nonretired members. In bargaining, if the union wins increases in pension benefits for the retired, it may compromise on wage increases. Indexation would change this conflicting situation and would decrease emphasis on pension benefit increases in bargaining. This would make it difficult for firms to use pensions as a means of splitting labor's ranks in bargaining and could strengthen labor's hand on the wage issue. Also, the necessity of a conservative goal for return on investment to ensure that the indexation will not be costly to the firm may mitigate the current bargaining vogue of the union's attempting to control the investments of the pension plans. Unions may be satisfied with a conservative investment strategy for most of the funds.

Conclusion

The analysis above is limited for several reasons. First of all, the theories used to discuss the potential effects of pensions on income distribution are unproven. Each is valid only to the extent that the framework in which it operates is the correct view of the world. Second, the behavioral responses of individuals to the various provisions in terms of bargaining for wages, work effort, labor mobility, savings and private intergenerational transfers, and the responses of firms to changes in the relative costs of doing business have not been determined empirically. Third, the interaction of the various provisions and the actions of firms in terms of changing their current plans to meet the increased costs of the mandated provisions are unknown. For example, a firm could reduce the percent of salary per year of service in its current plan in order to pay for some of the required indexing of the MUPS. The income distributional consequences of such interactions are beyond the scope of the present discussion.

What the discussion does show, however, is that the short-run and long-run effects on income distribution of the proposed MUPS both within generations and across generations is extremely complex theoretically and actually depends on the view of the world to which one subscribes. Theoretically, we can present the menu of potential income distributional effects through specific cases and examples, but it is far too complex and tedious a procedure to present all of the possible permutations and combinations of these effects. Given that the empirical basis for the theories does not exist, this detailed exercise would not even be beneficial. The important result of the discussion is to show that in instituting a MUPS, Congress would be mandating a policy with broad income distributional consequences that may not be obvious upon cursory examination.

In its final report, the Commission adopted a defined contribution plan and offsetting tax reductions that would minimize many of the distributional issues raised by this exercise. The complexities of tracking the distributional effects of mandating added payroll costs without offsetting cost reductions suggest that this was a product approach to policymaking.

Summary and Conclusion

Since social security and private pensions have a potentially large effect on income distribution, it is important to consider the income distributional consequences of any change in pension policy. These consequences must be analyzed in a static sense at any given point in time and in the dynamic sense in a changing society and economy over a number of years. Both direct and indirect effects that occur over both the long and short run must be considered.

The way in which pension policies affect income distribution over time depends upon their effect on the factors that determine how income is distributed among people of a society. Thus, it is necessary both to identify these factors and determine the way in which they are affected by pension policy. Two problems arise in doing this. First, there exists no established theory as to which factors actually determine income distribution and the mechanism by which they do so. Second, even if we are willing to assume such a theory, we do not know the type of interaction between the critical factors and pensions. Thus, in order to identify all of the possible income distributional effects of any policy, many such theories must be considered and various hypotheses must be developed as to the relevant interactions.

In this paper, we began the process of developing this broad long-term perspective. We described the major theories of income distribution and identified the elements in these theories that are potentially affected by pension policy. We then used the various theories as a framework by which to identify all of the potential impacts of both increasing social security benefits and instituting a form of mandatory universal pension system.

The impact of pension policies on income distribution cannot be ignored until a comprehensive theory is developed. Because of the uncertain state of the theory of income distribution, the long-term distributional impacts of policy are difficult to determine, causing important potential effects to be unidentified. The exercises demonstrated in this paper are useful in avoiding such a situation, which could lead to policies that have undesirable income distributional effects that were not considered when the policy was established.

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Appendix 1

Theories of Income Distribution

Any attempt to consider the role of pensions and social security in the income and wealth distribution of the United States is hampered by the fact that there exists no consensus on an appropriate theory of either of these related distributions. Though the current work on the subject attempts to establish more general models, most of the existing theories are piecemeal and partial despite claims of generality. Divergence of theories is as wide as the underlying political ideologies and social philosophies. Proponents of each theory base their analyses on their particular "view of the world."

It is important to note that scarcely any theory denies the validity of the others on the basis of logic or rationality. Many of the theories are nonconflicting in that they concentrate on different issues and could at some point be merged into a more general theory. Others are directly conflicting in their approaches as to how the world functions and empirical tests are needed to determine which is most appropriate. Each theory attempts to explain income distribution based on a certain view of both the functioning of the economy and the behavior of individuals which emphasizes certain factors and ignores others. Despite differences in emphasis, there exists widespread recognition of the need for endogenizing all or most of the variables in the analysis of income and wealth differences which involve behavioral choices, showing how they interact with the structural variables defining the economy. These variables include those that are potentially, directly or indirectly affected by various retirement schemes. Such variables include education and training, savings, work effort and intergenerational and intragenerational private wealth transfers.

Besides endogenizing behavioral variables, more global variables describing the functioning of the economy must also be endogenized. These include the level of investment and employment that affect the return to capital and the distribution of wages, job mobility, labor-management relations, welfare and other government intervention. All of these variables are directly or indirectly affected by retirement schemes.

Given this state of the art of income distribution theory, it is most appropriately used as a framework in which to insure that all of the possible income distributional effects of various pension policies that the Commission may adopt are considered. This can be accomplished by utilizing a given theory in the analysis of all potential effects for which it is appropriate. Such a strategy will provide a framework that insures a consideration of all potential effects and will result in a range of possibilities each of which is dependent on the view of the world on which it is based.

In order to follow such a strategy, it is necessary to first describe the theories that are appropriate for this approach, highlighting the specific aspects of the theories that are particularly applicable to

pension policy analysis. For the purpose of utilizing such theories as a framework for the analysis of the income distributional effects of pension policy, it is important to describe the theories in enough detail to understand the roles and interactions of the variables that are potentially affected by pension policy. Only with this detail will the theories be useful in discussing the income distributional effects of the specific policies to be analyzed in the following sections.

Stochastic Theory

In discussing the theory of income distribution, it is useful to begin with the old (and still popular) stochastic theory if only to dismiss it as inappropriate for our purposes in that it is, with the exception of one specific application, devoid of economic content. Theories, in general, regard systematic forces as the basic cause of income differences and nonsystematic occurrences as unobserved variance components. Paradoxically, stochastic theory relies on the skewed shape of income distribution mainly or solely on chance, luck and random occurrences. With regard to any meaningful economic analysis, such an approach is useless.

The theory is based on the statistical law of probability. It states that even if a generation started from a state of strict equality of income and wealth, inequalities of the degree of the Pareto distribution could emerge due to stochastic forces. The theory thus provides a stamp of scientific respectability for the age-old myths that fortune is blind, poverty hits at random, no one is destined to abjection from birth, and the sons of poor families have the same chance for success as anyone else.

Given its basis, the stochastic model contributes very little to an economist's understanding of income distribution. Assuming a stochastic mechanism, no matter how complex, to be the sole determinant of income inequality is antithetical to the mainstream of economic theory which seeks to explain complex phenomena as the end result of deliberate choices by decision-makers. If one thinks of the deterministic part of any model as "what we think we know" and the stochastic disturbance as the measure of our ignorance, the probabilistic approach to distribution theory allocates the entire variance in income to the latter and is therefore totally useless in terms of policy analysis.

Various papers by Friedman (1953), Sargan (1957) and Wold-Whittle (1957) have attempted to add economic interpretation to the stochastic process theories of size distribution of income by using them to analyze the accumulation of risky capital. In Friedman's model, the income distribution generated is stochastic in that it draws from a random process. Unlike other stochastic models, individual choices by persons differing in risk aversion help determine the shape of the distribution. Friedman views every person as having a certain income and an opportunity to participate in a lottery if he so desires. Each person consults his utility function and the less risk averse enter the lottery while the more risk averse do not. The resulting income distribution is a composite of three distributions, each one of which could be symmetrical: 1) nonparticipants; 2) lottery losers, whose distribution has a slightly lower mean; and 3) lottery winners,

whose distribution has a much higher mean. If the lottery has only a few winners of very large prizes, the resulting overall distribution is positively skewed with an elongated upper tail. In this theory random elements are likely to predominate although there are still economic considerations in choosing an optimal portfolio. This may help to explain why the upper tails of almost all distributions, where returns to capital dominate and earnings play a minor role, exhibit a striking resemblance to the Pareto distribution.

Thus, the stochastic theory (or the Friedman version of it) is applicable to pension policy analysis only in the sense of the policy effect on the number of holders and level of risk of various portfolios. If policy changes the relative weights of the three distributions or the level of risk aversion inherent in the various portfolios, this stochastic view of income distribution provides a means of analyzing the income distributional consequences.

Theories of the Functional Distribution of Income

Classical writing on the subject of the distribution of income was primarily concerned with the distribution among classes. Ricardo (1821), for example, described "the principal problem in political economy" as being to determine how "the produce of the earth ... is divided among three classes of the community, namely, the proprietor of the land, the owner of the stock or capital necessary for its cultivation and the laborers by whose industry it is cultivated." At the time, it may have been reasonable to suppose that these three classes corresponded to different positions on the income scale. Today, the relationship between the shares of factors of production and the distribution of income among persons is more complicated — pensions and social security being one of the complicating factors. Because of the potential effect of retirement schemes on factor shares, the various theories of the functional distribution of income provide some important considerations which must be addressed in analyzing the effect of pension policy on income distribution. They are more global than the behavioral theories of personal income distribution being based on certain viewpoints as to how the economy functions and the constraints which the economy places on individuals. They provide a useful framework for the analysis of the income distributional implications of pension policy in that they deal with major variables which that policy may effect — wages, return to capital and capital ownership. We will note later that certain of the behavioral theories of income distribution have one or another of the theories of the functional distribution of income as their base.

ORTHODOX THEORY - In the "neoclassical" theory or Walrasian competitive equilibrium, the distribution of physical endowment is a given datum and the distribution of income is an outcome of the competitive mechanism depending on prices and marginal productivities. The theory is usually introduced as part of a general equilibrium analysis of the economy, the factor shares being determined as part of an overall explanation of the prices of factors and products. Thus, to build a theory of distribution, a theory of factor prices and quantities is essential. To this end, three assumptions are made:

- Output is determined by an aggregate function of total capital and labor.* This production function allows smooth substitutability between capital and labor with diminishing marginal returns to each factor, and exhibits constant returns to scale.

- All firms and consumers act as perfect competitors, that is they take prices, wages and the cost of capital as given (they cannot exercise any bargaining power) and all firms aim to maximize profits.

- The supplies of aggregate capital and labor are given, a condition which may, for example, be secured by the full employment of a fixed stock of factors.

Given these assumptions, the theory then describes the equilibrium of the economy. If firms maximize profits at given product and factor prices, they hire labor up to the point where the value marginal product of labor is equal to the cost of capital. (The total paid out to the factors is guaranteed to add up to the total value of output by the assumption of constant returns of scale.) Writing w for the wage rate, and r for the return to capital, we have the conditions: w = value marginal product of labor; r = value marginal product of capital.

This gives a relationship between the relative shares of capital and labor and the supply of these two factors (since the marginal products depend on the factor supplies):**

$$\frac{\text{Total profits}}{\text{Total wages}} = \frac{\text{Capital} \times r}{\text{Labor} \times w} = \frac{\text{Capital} \times \text{Marginal product of capital}}{\text{Labor} \times \text{Marginal product of labor}}$$

In general, therefore, to provide a long-run theory of factor shares we need to explain how the factor supplies change over time.*** This necessity may be represented in terms of the elasticity of substitution (denoted by σ), defined as the proportionate change in the ratio of capital to labor associated with a proportionate change in the relative factor rewards (r/w). It measures the ease of substitution, so that if the elasticity

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* In this formulation, land is for simplicity ignored, so that the factor shares considered are those of labor and "property." The assumption of constant returns to scale means that if both capital and labor are increased by a given percentage, output will increase by the same amount.

** Since the value marginal product = price x marginal product, the price term drops out (appearing on both top and bottom) in the substitution to obtain the final expression.

*** It should be noted that where the aggregate production function is a Cobb-Douglas function, the shares of labor and capital are independent of the factor supplies.

is low a change in "r/w" is associated with a small change in the capital intensity of production (by assumption the capital-labor ratio falls as "r/w" rises).

The relevance of the elasticity of substitution may be seen from the fact that the relative shares of capital and labor may be written:

$$\frac{\text{Total profits}}{\text{Total wages}} = \left(\frac{r}{w}\right) \times \frac{\text{capital}}{\text{labor}}$$

If the capital/labor ratio rises by "y" percent, then the relative share of capital rises or falls, depending on whether the associated fall in "r/w" is less than or greater than "y" percent, and this depends in turn on the value of the elasticity of substitution (o). If o is less than 1, then the associated change in "r/w" is more than "y" percent and the share of capital falls; if o is greater than 1, then the share of capital rises; and if o = 1, the relative shares are unchanged (this is the Cobb-Douglas case). The proportionate change in the share of capital can in fact be shown to be:

(1-share of capital) x (1-1/o) x (y percent)*

From the above description, it can be seen that this theory provides a broad framework that can be used in the analysis of the effect of various pension policies on income distribution. Pensions can alter the supply of labor, the relative price of labor and capital including the wage rate and the marginal product of labor that is partly dependent on the capital labor ratio. Pension policy can also alter the ownership of capital and affect capital investment. These applications will be discussed in the following sections of this appendix with regard to specific policy alternatives.

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* This orthodox theory has been the subject of considerable criticism. The criticism, among other things, concerns the assumptions of perfect competition and the aggregate production function. The assumption of perfect competition is one of analytical convenience, but it does not accord with the market imperfections which appear to characterize most advanced economies. A variation of the orthodox theory, in fact, relaxes the assumption of perfect completion by introducing a degree of monopoly power in which a firm hires labor to the point where the wage equals the marginal revenue product rather than the value marginal product.

In terms of assuming an aggregate production function, the main predictions of the theory concerned the relationship between the factor shares and the supply of factors and the link between the increase in the capital-labor ratio and the fall in the ratio (r/w), via the elasticity of substitution. This assumed that r/w fell as the capital-labor ratio rose, but in fact there is no need why this should necessarily happen in a more general model of production. Thus, there is little foundation theoretically for the aggregate production function.

BARGAINING POWER THEORIES - The bargaining power theories may be divided into those concerned with the monopoly power of firms and those concerned with collective bargaining and union power. The former are represented by the work of Kalecki (1939), who argued that the share of labor depends inversely on the degree of monopoly. As Kalecki described it, the analysis begins at the level of the individual enterprise, where prices are set by equating marginal revenue and marginal cost. Marginal cost is assumed constant and taken here to include only wage costs. Aggregating across enterprises, Kalecki concluded that the share of labor is equal to (1-m) where m is the average degree of monopoly.

The theories concerned with collective bargaining have been less precisely formulated, but in general lead to the not unexpected prediction that the share of wages increases with trade union strength.

These bargaining theories provide an interesting framework for pension policy analysis in that pensions have become a major bargaining element in labor-management negotiations. Given the standard competitive view of labor management relations and wage negotiations, it is somewhat surprising that the private sector has established the complex system of private pension plans that exist today. The standard view would embody pensions in competitive theory by what can be represented as the "compensating differences" hypothesis which implies that lower wages compensate for greater pension rights.

Because of the role of pension plan provisions in the compensation package and the debate over the "compensating differences hypothesis," the bargaining framework is important in analyzing the income distributional effects of various pension policies. The criteria for selecting a labor-management bargaining strategy involve a complex mixture of both ethical considerations and corporate interests and thus are not clear cut. A pension plan's provisions regarding eligibility, vesting, portability, and benefits formula should be viewed in terms of these interests because their potential effect on labor supply, labor mobility and in the end real wages in a bargaining framework has income distributional consequences. Because market prices are influenced by any restrictions placed on the participants in the market or by any mechanism that alters their incentive structure, each of the provisions of the pension system may cause an alteration of behavior that will induce a change of the market wage rate. Thus, given a bargaining framework, any policy with regard to these provisions will affect income distribution. Specific hypotheses as to how this occurs will be considered in the following sections.

THEORY OF ACCUMULATION - This theory, associated with Nicholas Kaldor and other Cambridge (U.K.) economists makes the following strong assumptions that permit both aggregation and decomposition of the economic system, in such a way as to allow a straightforward explanation of relative shares. The main assumptions of this model as set out in Kaldor (1955) are:

- Aggregate production relationship may be summarized by a constant ratio of investment to incremental output denoted by v.

- Planned savings are a constant fraction (s_p) of profits and a constant fraction (s_w) of wages, where s_p is greater than s_w.
- The economy is on a long-run growth path with an exogenous rate of growth of output fixed in proportional terms.

In the extreme case where s_w is zero, planned savings are s_p times profits. If they are equal to planned investment, we have

S_p x Profits = Investment = v x (Increase in output) so that the share of profits is given by:

$$\frac{\text{Profits}}{\text{Output}} = \frac{v}{s_p} \times (\text{Proportional growth rate of output})$$

According to these assumptions, the share of profits is determined by the propensity to save out of profits, the exogenous rate of growth and the investment-incremental output ratio. (Where workers save, the share of profits is given by the slightly more complicated relationship $(nv - s_w)(s_p - s_w)$ where n is the rate of growth of output.)

This theory allows the factor shares to be determined from the equilibrium of planned savings and investment, without regard to the rest of the economic system. Thus, according to the framework, pension policy would affect income distribution through these two variables. Two elements, the assumption that the ratio v is constant and the assumption of given savings propensities are, however, questionable for many reasons, one of which is the fact that pension policy may cause them to vary. Besides this influence, in terms of the ratio of investment to incremental output, a weakness in the assumption is that it is not to be influenced by the rate of profit. In terms of the savings assumption, the issue arises as to how far corporate behavior can be viewed independently of personal savings decisions. Where corporate savings leads to a rise in share values of an equal amount, and where capital gain is regarded by shareholders as fully equivalent to personal savings, the higher corporate savings is exactly offset by a corresponding reduction of personal savings. The firms are simply saving on behalf of the shareholders. This takes a rather extreme view of the behavior of shareholders and the stock market, but it may not be inappropriate in a long-run context and points to an important difficulty with the Kaldorian model. It may be important to distinguish between differential savings propensities according to source and type of current and future income.

Thus, the Kaldor model and the criticisms of its assumptions serve as a useful framework for analyzing the income distributional effects of pension policy. The effect of pensions on both corporate and private savings and investment need clearly be addressed.

MARXIAN AND RADICAL THEORIES - Radical economists have tended to emphasize the role of economic and political power and the exploitation of labor by capital. There is not sufficient space to thoroughly analyze this body of theory except to note that the radical interpretations of profit and wages emphasize the sociological facts that the capitalist

class owns all the productive facilities and resources, while the working class owns only its own labor power. The capitalists receive a large share of national income while putting forth no effort by "exploiting" this profit from the workers' product. Because there is no straightforward way to relate the concept of exploitation to actual changes in money profits and wages, the application by modern radical economists has tended not to work within the formal theoretical framework but to take over qualitative elements stressed by Marx, in particular the relative bargaining power of capital and labor. Thus, utilizing the radical framework, the income distributional effects of pension policy can be considered in terms of relative bargaining power.

Aumann-Kurz Theory of Income Distribution

This theory is rather unorthodox because it can be considered a part of either the functional or the behavioral or personal theory of income distribution in that it involves the political behavior of individuals. Aumann and Kurz view it as a theory of redistribution though its elements can be considered in terms of having caused the existing distribution. In their theory, Aumann and Kurz (1977) assume the existence of a democratic process and a basic constitution which defines individual rights, including property rights. As they describe it, each individual is endowed with certain resources which can be used for consumption and production but in addition, the individual has his vote and the right to his own property. In a free market economy where prices are endogenously determined, the distribution of income will be an automatic outcome of the endowment of each person and the prevailing prices. A redistribution is achieved by individuals acting via the political mechanism. They form pressure groups, political parties and other associations, all of which are called coalitions. Such coalitions aim to reach the minimum size that is sufficient to allow the group to enact whatever redistributive laws they wish to make in accordance with the voting rules laid down in the constitution. The power to pass redistributive laws, however, is not irreversible; any politically dominant coalition may find itself displaced by a differently composed majority coalition with correspondingly different legislative proposals. Thus, in the process of social bargaining, the formation of alternative coalitions is always a threat of potential alternative actions which may be taken by other groups. Aumann-Kurz assume that every majority coalition may pass redistributive proposals it may wish to enact, and these represent sets of alternative threats that it has against its opponents. Aumann-Kurz assume, however, that the minority may refuse to cooperate with the majority and call for a general strike of its members against the majority. Thus, the idea of "property rights" is translated into the right of a potentially oppressed minority to refuse to work or make its capital or other resources available to the system as a whole.

As political-economic tactics, strikes are familiar from labor-management relations. The Aumann-Kurz theory accepts the view that such strategies are at the bottom of most economic threats and, combined with the democratic process, they constitute the essential reasons for a social compromise. When formalized into a game of conflict, the solution

is an income distribution which emerges as an endogenous outcome of the game. One may think of other threats and counterthreats which are commonly employed that may influence the final distribution as well.

Thus, the theory combines aspects of competition, bargaining and property rights to provide an explanation of income redistribution. Such a framework is useful in analyzing the possible income distributional effects of pension policy since such policy may potentially have considerable influence on property rights and therefore power. Rather than influencing factor shares directly, pension policy in this context can influence the power position of various coalitions of employees and employers and change the composition of the various coalitions. It may, therefore, influence the bargaining outcomes among coalitions. By changing the relative property rights among groups policy could also influence the coalitions that form.

Human Capital Theory

The modern vintage of the human capital theory was conceived and developed largely but not exclusively by the Chicago School, starting around the turn of the decade of the 1950s under the intellectual inspiration of Theodore W. Schultz. Since then it has grown into a colossus, enriching all branches of economic analysis: microeconomics, labor economics, capital theory, growth theory, and income distribution theories. Research has been focused on two complementary fronts: On one front, researchers used the human capital framework to analyze the sources of productivity and growth. On the other front, Becker (1962, 1964), Mincer (1958) and their followers focused on the general theory and the earnings distribution theory of human capital. They clarified the relevant costs of the human investment process (including the cost of time); analyzed school and postschool investment; spelled out the optimizing decision rules for such investment; and derived implications for earnings differences among skill categories across occupations and over age categories. The basis of this theory is its postulate of optimizing behavior on the part of individuals; investment in oneself is the result of rational optimizing decisions (by individuals or their parents) made on the basis of estimates of the probable present value of alternative life-cycle income streams, discounted at some appropriate rate. In more general terms, it is a theory of permanent earnings.

Since the inception of the modern human capital theory, human investment analysis has been addressed to any spending on persons that enhances their future earnings capacity, human migration, human health, schooling, on-the-job training, job search, information evaluation and more recently, preschool investment in the nurture of children, family and population, etc. Education has emerged as a key to several other forms of human investment and therefore the hard core of human capital theory has turned out to be education.

In its simplest form, the human-capital approach consists of a series of definitions and the hypothesis of lifetime income maximization. First, there is an identity relating potential earnings X_t at age t, to the potential

earnings X_{Ot} of an untrained individual and the returns on past human investments:

$$X_t = X_{Ot} + r_t H_t$$

where H_t is the amount of human capital and r_t is the average rate of return. Actual earnings E_t are derived from potential earnings by deducting the current investment in human capital formation (foregone earnings) I_t:

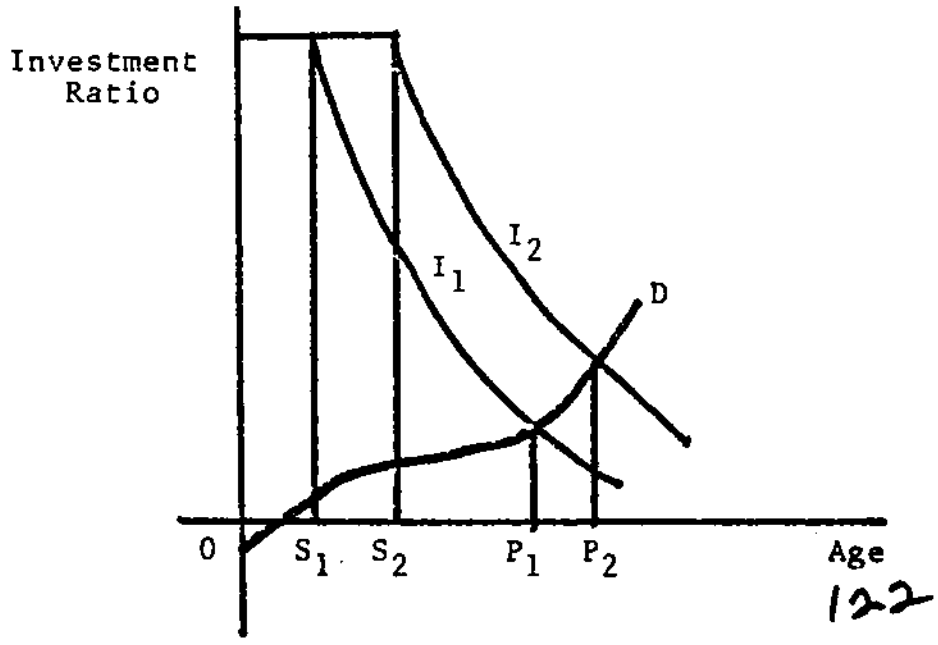
$$E_t = X_t - I_t.$$

And finally, the stock of human capital is derived in the obvious way from past investments:

$$H_t = I_{t-i}$$

where this formula can be modified to allow human capital to depreciate if desired it is assumed that each individual selects the lifetime pattern of I_t which maximizes his lifetime discounted earnings. The implications of depreciation are particularly important in the consideration of pension policy and retirement and are seen in Figure 1.1 (Mincer 1970).

Figure 1.1



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In the above figure, I is gross investment in human capital measured as a fraction of obtainable earnings, and D is the fraction by which such earnings are diminished as a result of depreciation. The net investment fraction is k = I-D, at each age. If retirement were compulsory and investment had no effect on non-market productivities, gross investment would terminate at retirement age. Otherwise, as is assumed in the diagram, gross investment remains positive throughout the expected life span. Retirement here can be viewed as endogenous, its timing being related to the decline in earning power, that is to the time at which depreciation outstrips gross investment.

Depreciation is portrayed as a function of age, initially negative (appreciation), rising slowly, and accelerating at later ages. The diagram shows age profiles of investment of two individuals: Assuming the same life span, it is plausible that I_2 is greater than I_1 at each age. Consequently, net investment k_2 is greater than k_1 at each age. The empirical implication is that earnings of the larger investor grow faster, relatively and absolutely, at given ages. An additional implication shown by the diagram is that earnings of the larger investor decline later in life: the more educated retire at a somewhat older age, though they do not necessarily have a longer working life, since it begins after a longer schooling period.

In the diagram, the schooling period S_2 is greater than S_1, and this is an indication that total "time" invested of individual (2) is larger. It does not follow, however, that individuals who have more schooling also spend more "time" in post-school investment. In the special case of parallel investment profiles illustrated in the diagram, the larger investor spends no more "time" in post-school investment than the smaller investor. If the investment ratio of the larger investor declines faster, the smaller investor may experience faster growing earnings in the age interval S_1P_1 before which the post-school investment period P ends, than the larger investor does in the corresponding age interval S_2P_2. But so long as the age-investment profile I_2 is above I_1, dollar investments are larger at each year of experience, hence the dollar experience profile of earnings of the large investor must be steeper.

Empirical evidence does show that earnings of the more educated peak later, grow faster in dollar terms at given years of age as well as at given years of labor force experience, grow also relatively faster (in logs) at given ages, but no faster at given years of experience.

Though the intention of this section is to present the basic income distribution theories and not to evaluate them, it is important to touch on the major criticisms of the human capital model because some of them highlight qualifications of the theory that are useful in using it as a framework for pension policy analysis.

Three objections can be noted: 1) The discounted value maximization behavior is too far fetched. Do individuals really maximize the present value of lifetime earnings at a uniform discount rate? If so, what role do pensions play in this behavior? 2) Human capital theory is a partial and piecemeal theory. The human capital theory has, until very recently, been a supply theory. The demand side has not received due analytical

treatment. Even as a supply theory, it has neglected the labor-leisure choice. Blinder (1974) has developed a model that he considers complimentary to the human capital approach. His model is derived from explicit utility maximization by households in which labor-leisure choices play an important role. Therefore, it treats separately the wage rate and hours of work, rather than dealing with their product, earnings. It also integrates labor incomes and property incomes into a single model of the size distributions of both income and wealth. Blinder's approach fails however to consider educational choices and the distribution of wage rates. Briefly, households maximize the present value of lifetime incomes, which consists of inherited property and life cycle earned (wage) income. Education and material wealth that are theirs at the time individuals start making their own choices are categorized as inherited, under the assumption that up to that time decisions are made by parents. Earned incomes are determined by inherited human wealth, innate abilities, and tastes — all given exogenously. Tastes enter labor-leisure choices, consumption-savings (and bequeathing) decisions, and occupational preferences. As in other conventional human-capital models, the author abstracts from the demand side altogether. The only endogenous variables are the supply of labor hours and savings. All of the following variables of the model are exogenous (and are known to the individual with certainty at the beginning of his or her economic life): the rate of interest, the length of economic life, inherited material wealth and education up to about age 18, implying an exogenously given wage rate at that age, the trend rate of growth of real wage rates, and tastes which are related to neither wealth nor income. There are seven taste parameters assumed as given: subjective time discount, relative weights attached to consumption, leisure and bequests, and the speed of decline of the marginal utilities of consumption, leisure and bequests. The model includes two policy variables, namely, estate taxes and income taxes. The labor-leisure choice variable is important in that it is potentially influenced by pension policy and this version or addition to the human capital model should be considered in any income distributional analysis.

3) Schooling is merely a screening device. Two classes of these theories should be noted. First are the theories that attack mainly schooling. According to these theories, education serves merely as a signaling device for prospective employers, a filter that identifies persons with pertinent attributes labeling some as more productive. Thus, education plays an important role in reinforcing the class structure and income inequalities. Second are the theories that emphasize demand side and are more critical of the on-the-job training aspect than the formal schooling aspect of human capital theory. These are known as dual or segmented labor-market theories. Generalized education may influence the potential productivity of workers, but actual productivity depends on on-the-job experience, which it is alleged is not open to the underdog even with credentials. Many explanations or interpretations of these theories exist including the socialistic version of the theory of "noncompeting groups," according to which high-salaried managers are closed groups and are paid arbitrarily in relation to each other and unrelated to their productivity. A general implication of these kindred theories is that segmented markets weaken competitive constraints and perpetuate inequalities. Pension policy has very different income distributional consequences in the context of a segmented labor market.

Human capital theory and its opposing models and extensions provide a fruitful framework from which to analyze the income distributional components of pension policy. They include measures of many phenomena that are potentially affected by pensions. These include earnings, a measure of labor supply decisions, investment in human capital as opposed to material capital, and returns to such investments taking account of depreciation which is affected by retirement. Analyzing the income distributional implications of pension policy from a human capital point of view would provide entirely different considerations than would analyzing it from a bargaining point of view or power-conflict premise, for example.

Life Cycle Theory

The life cycle theory of income distribution is based on a view of the world that explains earnings inequalities at any point in time as resulting from the fact that life cycle earnings of individuals rise with age and then decline near the retirement age.* Because of inequalities, individuals attempt to smooth consumption over their lifetime by saving for retirement during their working years. Thus, an individual's total wealth increases with age until he begins living off his capital. In this model individuals allocate their consumption over their own lifetime and do not consider other generations.

According to this theory, there is a consumption function of the form:

$$C = a\frac{W}{P} + cY_d$$

Where W/P is real wealth, "a" is the marginal propensity to consume out of wealth, and "c" is the marginal propensity to consume out of disposable income. Consider an individual who expects to live for L years, work and earn income for N years and be in retirement for (L-N) years. Uncertainty about life expectancy or the length of working life is ignored. Also it is assumed that no interest is earned on savings so that current savings translates dollar for dollar into future consumption possibilities. The model can be used to determine individuals' lifetime consumption possibilities and the way the individual will choose to distribute her consumption over her lifetime.

Considering the consumption possibilities, ignore property income and focus attention on labor income. Denote the annual real labor income by Z. Given N years of working, lifetime income (from labor) is ZN, income per working years times the number of working years. Consumption over the individual's lifetime cannot exceed this lifetime income unless he or she is born with wealth which we assume is not the case.

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* In terms of explaining life cycle income inequalities there are two schools of thought. One is the human capital school, according to which schooling and on-the-job training, rather than age or sheer experience, account for the observed life cycle inequalities. The rival school consists of family-environmentalists, according to whom materation and automatic on-the-job learning explain much of the variations of incomes during one's life, and ultra-conservative economists, according to whom such factors as abilities and the propensities to saving and work interact multiplicatively over age to cause the inequalities.

Assume that the individuals will want to distribute their consumption over their lifetime so that they have a flat or even flow of consumption. Rather than consuming a large quantity in one period and very little in another, the preferred profile is to consume exactly equal amounts in each period. Thus, consumption is geared to lifetime income.

Lifetime consumption equals lifetime income. This means that the planned level of consumption C, which is the same in every period, times the number of years in life L equals lifetime income:

$$CL = ZN$$

Dividing through by L we have planned consumption per year, C, that is proportional to labor income:

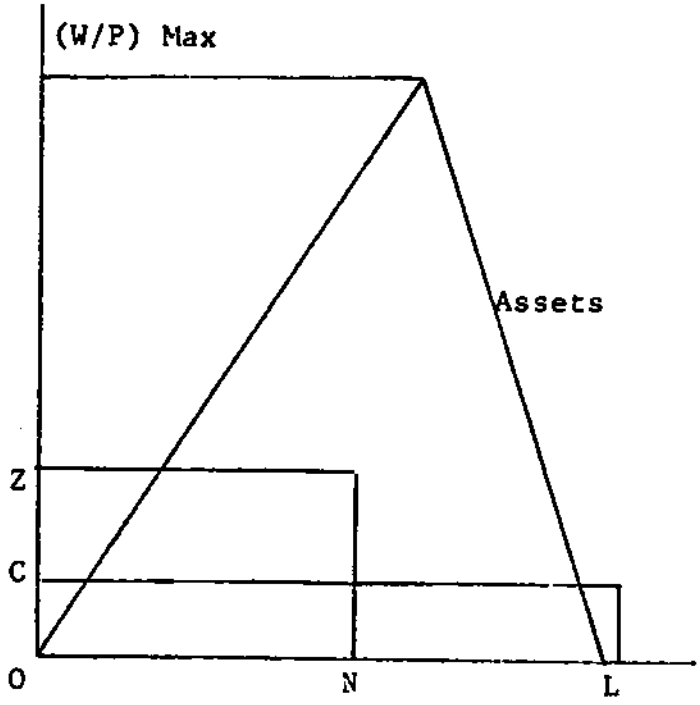
$$C = \frac{N}{L} Z$$

Given that N/L is the fraction of lifetime spent working, each year of life a fraction of labor income is consumed, where that fraction is equal to the proportion of working life in total life. The counterpart of the above equation is the saving function. Since saving is equal to income less consumption, we have

$$S = Z - C = \frac{Z\,(L-N)}{L}$$

This states that saving during the period in which the individual works is equal to a fraction of labor income, where that fraction is equal to the proportion of life spent in retirement. This can be seen in Figure 1.2 developed by Modigliani (1966) which describes the pattern of consumption, saving and dissaving.

Figure 1.2



Over the whole lifetime, there is an even flow of consumption at the rate of C amounting to CL. That consumption spending is financed during working life out of current income. During retirement the consumption is financed by drawing down the savings that have been accumulated during working life. Therefore, the shaded areas (Z-C)N and C(L-N) are equal, or equivalently savings during working years finances dissaving during retirement. The important idea of lifetime consumption theory is apparent from the figure. It is that consumption plans are made so as to achieve a smooth or even level of consumption by savings during periods of high income and dissaving during periods of low income.

Thus, during the working years the individual saves to finance consumption during retirement. The savings build up assets, the figure accordingly shows how the individual's wealth or assets increase over working life and reach a maximum at retirement age. From that time on assets decline because we assume the individual sells assets to pay for current consumption. Consumption during retirement is equal to C(L-N). Further, since consumption is equal to C = ZN/L, the maximum stock of assets is (W/P) max = ZN(L-N)L, which is reached exactly at the point of retirement. From then on assets decline until they reach precisely zero at the end of life. Wealth and earnings from wealth can be incorporated into this basic model in a straight-forward way, basically using them as a source of finance for lifetime consumption. The income distributional impact of pension policy with regard to the timing of lifetime consumption given this framework must definitely be considered.

A model developed by Feldstein (1976) extends the life cycle theory by making the period of retirement endogenous. A general formulation of this model has the individual choose both labor supply and consumption in each year of his life. A restricted specification, more in the spirit of the original life cycle model, would define a preretirement period during which the individual's labor supply is fixed and a "retirement period" during which the individual can vary his labor supply. The individual's preretirement consumption and savings and his "retirement period" labor supply would then be optimized together. In this extended life cycle model, the change in any endogenous variable has two separate effects on saving: first, it changes savings directly as it would in the traditional life cycle model and second, by changing retirement, it alters savings indirectly.

Thus, given that pensions and pension policy potentially affect savings behavior and work effort, the life cycle framework is important to consider in evaluating the income distributional effects of pension policy.

Intergenerational Transfer Theory

This theory is based on the existence of implicit support agreements across different generations of the same family. According to the "rational expectations" school that subscribes to the intergenerational dependence theory, the behavior of each family member is based on an implicit contract between himself and all future, nonexistent members of the same family. These contracts include transfers in the form of parental expenditures on children's education, bequests, etc. They also include

transfers in the opposite direction, either cash or in-kind, from children to parents — that is, the use of children's earnings to finance retirement consumption. This view of the world is particularly relevant to the analysis of the income distributional effects of pension policy in that the introduction of social security could result in offsetting adjustments to private transfers (i.e., reductions in transfers from children to parents or increases in bequests). This effect is not a consideration in the life cycle model advocated by Feldstein.

The basic conceptual framework of this theory is similar to the consumption loan model of Samuelson (1958), with some of its assumptions modified. Each family member of every generation has a working period and a retirement period. A member of generation t earns Y_t during his working years and 0 during retirement. His consumption vector is (C_{Wt}, C_{Rt}) where C_{Wt} is consumption during the working years and C_{Rt} is the consumption during retirement.

Let B_t be the bequest that a member of generation t receives. Although it may look as if the member has "consumable" wealth of (Y_t+B^*_t), this is not the case. This conclusion follows from the underlying assumption that, although a member of t can allocate his consumption between (C_{Wt}, C_{Rt}) as he may wish, he follows an intergenerational contract according to which he will pass a bequest B^*_{t+1} to the next generation. Thus, a member of t selects (C_{Wt}, C_{Rt}) which maximizes his utility function

$$U\,(C_{Wt},\, C_{Rt})$$

subject to the budget constraint

$$Y_t + B_t^* - \frac{1}{1-r} B^*_{t+1} = C_{wt} + \frac{1}{1+r} C_{Rt}$$

$$Y_t + B^*_t \frac{-1}{1-r} B^*_t + 1 = C_w t + \frac{+1}{1+r} C_{Rt}$$

Y_t = Income of generation t

B^*_t = The bequest which a member of generation t receives.

The variables B^*_t and B^*_{t+1} are denoted with the (*) to indicate that these are equilibrium functions (strategies) in an unspecified intergenerational game.

A complete model of intergenerational transfer is needed to determine the functions B^*_t as is a household decision model. Without going into these models it should be noted that at time t-1, the future is not known and thus both Y_t and all future Y_t and $^{\prime}$ t, are random variables. Thus, without specifying the complete model, the basic hypothesis of this theory is:

B^*_{t+1} depends upon B^*_t, Y_t, and the stream of all expected

future values of $(Y_{T+1}, Y_{t+2}, \ldots)$

This hypothesis means that B^*_{t+1} may be positive or negative. If $B^*_{t+1} < 0$, then during his retirement age, the member of generation t is supported by his children who are working at that time. If $B^*_{t+1} > 0$ then the member of t will leave a positive bequest to his children. However, note that in making this choice he will consider the expectation of the entire stream $(Y_{t+1}, Y_{t+2}, \ldots)$.

At any moment of time t there are many families with different values of B_{tj}, J=1, 2, ..., N where N is the number of families at t. The distribution of B^*_{tj} is interesting. Clearly, since private capital is transferred forward from generation to generation, the mean value of B^*_{tj} is positive. However, due to the underlying random process determining its distribution, B_{tj} contains a few large positive values, while the bulk of the values of B^*_{tj} are negative. This is particularly true when the expected value of Y_t rises with time.

Thus, in an economic environment in which the expected value of Y_t rises with time, one would expect that a private structure of intergenerational transfers will induce an outcome in which a large fraction of older people will be supported by their children, while a small fraction will have large enough assets to leave positive bequests. Moreover, it appears that the distribution of private wealth is so skewed that most of it is transferred forward within a small number of families, while the vast majority would have exhibited no bequest or negative bequests in the absence of public intergenerational transfer payments. This intergenerational transfer view of the world has strong implications with regard to the income distributional impact of pension policy. Such policy has a potentially large impact on these transfers.

The intergenerational theory is complimentary to the theory that inheritance is a major cause of income inequality. This theory should be considered in the historical context of the Cambridge (U.K.) theory of functional distribution. Empirical results using this analytic framework show that factor shares do not necessarily correspond with rich and poor classes, investment is not entirely financed out of capitalists' savings, a significant interclass mobility is in evidence and property ownership of homes, cars, household durables, pension and other social security funds and similar assets. Yet, inherited wealth remains a significant factor of income inequalities. Mead (1976 pp. 175-76) states: "The greater ability of the rich to save a higher proportion of their income and to obtain a high yield on what property they do save ... causes great inequalities in capital accumulation. There can be little doubt that these two factors are important contributory causes of the phenomenon of the much greater inequalities in property and incomes from property than in earnings." Support for the importance of inheritance is found in the random-walk model of the distribution of wealth of Thurow (1975). According to this model, most large fortunes are built up, not by a patient process of earning and investing, but by instantaneous fortunes due to chance and luck. Persistent disequilibria in the real capital markets are capitalized into

equilibrium in the financial markets, which is subject to a lottery-like process. But once fortunes are created in the random-walk they are subject to a kind of ratchet effect, so that they are managed by diversification, etc., to earn at least the market rate of return, resulting in highly skewed distributions.

Because property income is a significant component of personal income and because it is more unequally distributed than earnings, inheritance factors deserve a place in any generalized theory of distribution. They provide a useful framework in which to consider the effects of pension policy on income distribution for many reasons including the possibility that it decreases the inequality in income due to capital ownership by expanding that ownership. It could also influence the distribution of capital bequests and individuals' behavior with regard to intergenerational transfers of wealth.

More Complete Theories

The individual theories presented above are all piecemeal in that they consider only certain factors and aspects of behavior. They do, however, serve to highlight all of the variables that must be considered in analyzing the income distributional effects of any pension policy. The advocates of all schools agree on the need for endogenizing variables of the others into their theories.

A few studies have appeared that combine two or more of the existing piecemeal theories of personal income distribution in a single synthetic model. These include Becker's (1967) supply-demand model of human investment that relies fundamentally upon the twin analytical techniques of economic theory: an optimizing behavior and the determination of equilibrium. The model is formalized to incorporate various forces determining the distribution, the shapes, and the elasticities of the supply and demand curves of human investment. The interdependence of supply and demand schedules is aptly brought out as one of the crucial sources of earnings inequalities.

Also, major work in simultaneous-equations modeling of income inequalities and in the endogenization of education, ability and earnings in a human-capital framework is being done by Griliches (1977).

Among the most comprehensive of the existing synthetic models that do not use the human capital approach, is that by Stiglitz (1969), who integrates the distribution of income among factors with that among individuals. By dividing income into its major source, wages and profits, Stiglitz examines the distributional impacts of nonlinear saving functions, heterogeneity of labor supply, material-capital inheritance policies, variable reproduction rates of different income classes, tax policies, and the stochastic elements in the accumulation process. However he ignores human capital for all practical purposes, does not analyze why and how labor productivity becomes heterogeneous, and does not include intergenerational patterns of the transmission of wealth.

As theories of income distribution become more complete, they will combine a larger number of the elements of the individual theories. Until a complete theory is developed and supported empirically, we must accept the piecemeal approach to distribution theory and use it accordingly. This involves acknowledging the point of view from which each theory derives when using it analytically and showing alternative analyses derived from other theories.

The above description of the theories that attempt to explain the economic and behavioral factors that interact to distribute the income in our society is intended to establish a framework for considering the distributional consequences of pension policy. Though no one theory is empirically proven to be more accurate than any other, regarding all of them together as a joint framework insures that all of the potential consequences are considered.

An analysis of the potential effects of pension policy in this broad framework allows the distributional implications of policy to be considered in the static and dynamic sense and in the short run and long run. The analysis of the distributional impacts of various pension policies depends on the analyst's view of the world as to which variables are important to consider and the mechanisms by which they work. Given a certain viewpoint, however, only the potential effects of policy can be determined. This is because in most cases the effect of policy on the behavioral and economic variables which the theories incorporate has not been determined.

Appendix 2

Tax Incidence Theories

The framework of theories on which to base an analysis of the income distributional effects of any public policy with regard to pensions is incomplete without mention of the theories of the incidence of tax policy. Regarding public pensions, this is important in that taxes are used to finance pension schemes. Regarding private plans, taxes are used as incentives to encourage the establishment of plans. Pension-related changes in tax policy affect choices among opportunities and the will, capacity, and incentives to assume risks, to work, and to save.

In the case of pensions and pension financing, both the incidence of government expenditures and taxes are important. If for example, general revenues are diverted to finance social security, the incidence that the other expenditures are reduced is relevant. Discussing the many theories of expenditure incidence is quite complicated and is beyond the scope of this survey. Suffice it to say that empirical measurement in this field has been thwarted by the prevalence of large externalities of public policies and the nonrelevation of individual preference due to the nonrivalness property of public goods. Most empirical studies of the total redistribution of the fisc indicate a redistribution from upper-income classes to lower-income classes. An alternative statement is the so-called director's law formally presented by Stigler. According to this law: 1) the state is used to redistribute income to those who control it; 2) such control, in the American-type democracies, has remained largely in the hands of middle classes, and consequently 3) middle classes are beneficiaries from public finance. Statements 2 and 3 of this law are debatable. Many public finance studies conclude that overall public finance has resulted in a significant redistribution from the rich (and to some extent from the middle-income class) to the poor sections of modern societies. Early postwar studies suggested that the fisc has a significant redistributive effect. Studies done for the period since World War II have found no such evidence.

Individual Income Tax.

The incidence of the individual income tax in both the short run and the long run is highly controversial. The general law is structured to be progressive. However, in recent years, there has been increasing recognition that the definition of taxable income under the United States tax law is deficient. Many of the exclusions and deductions are not essential for effective personal income taxation and have cut into the income tax base unnecessarily. This process of "erosion" has been halted in recent years, but only limited progress has been made in reversing it.

Erosion of the income tax base makes higher tax rates necessary. It puts a premium on earnings and disposing of incomes in forms that receive preferential treatment, thus often distorting the allocation of resources. Erosion also violates the principle that taxpayers with equal incomes should pay the same tax and serves to make the system less progressive than was intended in its original design.

In the long run, the individual income tax affects economic incentives in two different directions. On the one hand, it reduces the financial rewards of greater effort and risk-taking and thus tends to discourage these activities. On the other hand, it may provide a greater incentive to obtain more income because it cuts down on the income left over for spending. There is no basis for deciding which effect is more important on a priority basis.

Corporation Income Tax.

Despite its prominence in the federal revenue system, the corporation income tax is the subject of considerable controversy. In the first place, there is probably less agreement about who really pays the corporation income tax than there is about any other tax. Some believe that the tax is borne by the corporations and, hence, by their stockholders. Others argue that the tax is passed on to consumers through higher prices. Still others suggest that the tax may be shifted back to the workers in lower wages. A substantial number believe that it is borne by all three groups — stockholders, consumers and wage earners — in varying proportions.

One reason for the sharply divergent views is that the opponents frequently do not refer to the same type of shifting. It is important to distinguish between short- and long-run shifting and the mechanisms through which they operate. The short run is a period that is too short for firms to adjust their capital to changing demand and supply conditions. The long run is a period in which capital can be adjusted.

The classical view in economics is that the corporation income tax cannot be shifted in the short run. The argument is as follows: all business firms, whether they are competitive or monopolistic, seek to maximize net profits. This maximum occurs when output and price are set at the point where the cost of producing an additional unit is exactly equal to the additional revenue obtained from the sale of that unit. In the short run, a corporation income tax should make no difference in this decision. The output and price that maximized the firm's profits before the tax will continue to maximize profits after the tax is imposed.

The argument against this view is that today's markets are characterized neither by perfect competition nor by monopoly; instead, they show considerable imperfection and mutual interdependence or oligopoly. In such markets, business firms may set their prices at the level that covers their full costs plus a margin for profits. Alternatively, the firms are described as aiming at an after-tax target rate of return on invested capital. Under the cost-plus behavior, the firm treats the tax as an element of cost and raises its prices to recover the tax. Similarly, if the firm's objective is the after-tax target rate of return imposition of a tax or an increase in the tax rate — by reducing the rate of return on invested capital — will have to be accounted for in making output and price decisions. To preserve the target rate of return, the tax must be shifted forward to consumers or backward to the workers, or be shifted partly forward and partly backward.

It is also argued that the economic models are irrelevant in most markets where one or a few large firms exercise a substantial degree of

leadership. In such markets, efficient producers raise their prices to recover the tax, and the tax merely forms an umbrella that permits less efficient or marginal producers to survive.

Even if this behavior on the part of business firms is accepted, some doubts must be expressed about their ability to shift fully the corporation income tax in the short run. In the first place, the tax depends on the outcome of business operations during an entire year. The businessman can only guess the ratio of the tax to his gross receipts, and it is hard to conceive of his setting a price that would recover the precise amount of tax he will eventually be required to pay.

Second, the businessman knows that if he should attempt to recover the corporation income tax through higher prices, other firms would not necessarily do the same. This would make the attempt to shift part or all of the corporation tax hazardous.

Unless it is shifted in the short run to consumers or wage earners, or both, the corporation income tax influences investment in the long run by reducing the rate of return on corporate equity. The tax may discourage the use of capital altogether or encourage investment in debt-intensive industries and unincorporated enterprises. The result is a smaller supply of corporate products, unless the reduction in equity investment is offset by an increase in borrowing.

The incidence of the corporation income tax depends on whether the tax is or is not shifted in the short run. Short-run shifting means that net after-tax rates of return are maintained at the levels prevailing before the tax; the burden of the tax falls on consumers or wage earners. If the tax is not shifted in the short run, net after-tax rates of return are depressed, and the amount of corporate investment is reduced. After-tax rates of return tend to be equalized with those in the noncorporate sector, but in the process, corporate capital and output will have been permanently reduced. Thus, in the absence of short-run shifting, the burden of the tax falls on the owners of capital.

Social Security Payroll Tax.

It is popularly assumed that the employee share of the payroll taxes is borne by wage earners and that the employer share is shifted forward to the consumer in the form of higher prices. Economists believe, however, that there is no difference in the incidence of the payroll taxes legally levied on employers and employees.

In the short run, producers treat the payroll tax like any other production cost and try to recover it through higher prices. At the higher prices they do not sell as much as they did at pre-tax prices, and output and employment tend to decline.

In the long run, the impact of the payroll tax depends on the reaction of wage earners to reduced wages. Business firms aim at using just the right combination of labor and capital to produce at lowest cost. A payroll tax does not make labor any more productive, so employers have no reason to pay higher total compensation after the tax is imposed unless some wage earners react to their reduced earnings by withdrawing from the labor

force (that is, unless the supply of labor is less than completely inelastic with respect to wages). However, it is generally agreed that the supply of labor is inelastic with respect to wages: low wages will not induce wage earners to withdraw from the labor force. In these circumstances, the same number of workers will be seeking the same number of jobs, wages will be lower by the amount of the tax, and the workers will bear the full burden. Although wages may not actually fall under these circumstances, they will increase less rapidly than they would without the payroll tax, thereby shifting the burden of the tax to the wage earner in the long run.

It is also possible that workers will bear the tax even if the supply of labor is not completely inelastic with respect to wages. Employees may be willing to accept a lower wage after the tax is imposed if they regard the benefits to be financed by the tax as an adequate quid pro quo.

The conclusion that the burden of the payroll taxes falls on the wage earner must be qualified in one respect. The economic model upon which the analysis is based assumes rational behavior in labor markets and takes no account of the possible effect on wages of collective bargaining agreements between large firms and labor unions.

Property Tax.

In spite of widespread and vehement criticism, the property tax continues to be the major revenue source for local governments. Thus, it is key in the financing of the pay-as-you-go state and local pension plans. The property tax has a reputation for distorting allocative effects in that the tax burden on business property varies substantially among industries. After allowing for differences in local rates and coverage, taxes are generally higher in capital-intensive industries or in those that use large amounts of real estate. This encourages the substitution of other inputs for real property and, if such substitutions cannot be made, may divert resources to other firms and industries.

Since the supply of bare land is fixed, owners bear the burden of taxes on the value of sites when they are first levied or increased. The incidence of property taxes on improvements and on business property is in dispute. Some believe that they are shifted forward in the form of higher prices to business customers and to housing occupants, because the taxes tend to discourage investments in business and housing property. On the other hand, if the total supply of savings is not responsive to the return on investment, a partial or general property tax is shifted backward to the owners of capital in general in the form of lower rates of return.

On the traditional assumption that the property tax on improvements is shifted forward, the distribution of the property tax burden is regressive in the lowest income classes, but roughly proportional at higher levels if the federal income tax offset is considered. But the tax is probably progressive if total savings is not responsive to rates of return on investment.

INTRODUCTION TO PART TEN: DISABILITY

Public and private disability programs, which in 1977 paid $42.2 billion in benefits, form an integral part of the retirement income system. They provide critical support to workers who, because of injury or illness, have a limited ability to work or are unable to work at all.

Because of the growing number of beneficiaries, and hence costs, of the programs, and a belief that many beneficiaries could work, there is increasing concern that disability programs are malfunctioning, and being used in place of other more appropriate programs. Disability programs are especially susceptible to such problems when the separation pay is not available or when disability benefits are better than other options. Disability benefits are often more remunerative because they are not usually reduced the way retirement benefits are if paid at early ages. In addition, many disability benefits are not taxed.

Conversely, some individuals take early retirement when they are really disabled. For example, some individuals apply for social security old-age benefits, reduced by as much as 20 percent, when they actually are incapable of working due to poor health but want to avoid the five-month wait for social security disability benefits or have difficulty meeting the program's rigorous standards for medical evidence.

To add to the confusion, there are vast differences among programs in how readily benefits are available. Important gaps and significant overlaps in coverage exist. Replacement ratios vary greatly within individual programs and from one program to another, from less than 33 percent to well over 100 percent. There are also difficult administrative problems in determining disability.

Features of the disability programs which discourage the disabled from continuing or returning to work also are cause for concern. Disability programs focus on paying benefits rather than on rehabilitation or on finding jobs for the disabled that they can perform. It is estimated that perhaps as many as one-fourth of the disabled receive excessive benefits, often because of entitlement under multiple programs. This, plus the fact that most disability payments are tax-exempt, act to discourage some beneficiaries from returning to work. Work disincentives are further reinforced by earnings tests. Many disability benefits are eliminated completely with some minimal level of earnings.

However, the problem of low benefits is far more common than that of excessive benefits. About 27 percent of those who, in a 1974 survey by the Social Security Administration, reported themselves unable to work at all, received no benefits. On average, men who were this disabled had only about one-third of their lost earnings replaced by benefits, and two-thirds or more of them had benefits which equaled less than 55 percent of their earning losses.

There is also growing controversy about the proper government role in providing disability benefits. Although the federal role in disability

seems smaller than in the pension area generally, there has been a rapid rise in the federal share of total disability payments in recent years. In 1977, federal programs accounted for 63 percent of total expenditures by disability programs, while state and local programs and private programs each accounted for about 19 percent.

The interaction between pension and disability programs will mean that attempts to modify or reform one component of the retirement income system will affect the other. For example, any change in the normal retirement age could have a profound effect on disability programs and workers. Because older workers approaching retirement age may have health and unemployment problems, raising social security retirement ages will affect the use of early retirement as a solution to these problems.

In its Final Report, the Commission recommended that the age through which the disability insurance program (DI) is available should move upward from 65 to 68, in conjunction with the recommended changes in social security retirement ages, over the twelve-year period beginning in the year 1990.

The chapters in this section provide some background for the further study of these options. Chapter 40, "Disability: A Comprehensive Overview of Programs, Issues, and Options for Change," by Dr. Jonathan Sunshine, provides the necessary background on existing problems in disability programs, and reviews suggested proposals to address these concerns.

Chapter 41, "Disability Pensions: Four Options for Change" by Drs. Monroe Berkowitz and Jeffrey Rubin, explores the feasibility of a universal disability program, a ceiling on replacement ratios, the use of rehabilitation and job redesign as work incentives, and the development of an occupational disability program for older workers, the four areas recommended for further study and consideration by the Commission. Both papers point up the very different set of difficulties faced in separately assessing our vast array of disability programs.

"Disability" can never be measured with the same objectivity as the measurement of age or years of service in a non-disability pension program; the potential for reversing disabling effects of health conditions also exists in disability programs. Disability programs have different objectives--beyond income replacement--than do pension programs, and therefore they have different effects on employee behavior.

Assessments of the proper role of different types of disability programs depend upon basic views of the appropriate role of government in general and of the federal government in particular. However, it is important to remember that disability is an infrequent, unpredictable event that will not touch most people. People seem, therefore, less likely to prepare appropriately for it by themselves than they do for retirement, which is both predictable and a normal event for most workers. Because of this, some argue that government should assume a larger role in disability protection than in providing for normal retirement.

Eventual resolution of these issues await further study.

CHAPTER 40: DISABILITY: A COMPREHENSIVE OVERVIEW OF PROGRAMS, ISSUES, AND OPTIONS FOR CHANGE

Jonathan Sunshine

Executive Summary

Background

Disability programs form an important and integral component of the pension system. They are very diverse -- possibly even more diverse than other types of programs in the pension system. The appendix briefly describes the major disability programs in the U.S.

Cash payments from disability programs have grown rapidly in recent years, from $9.7 billion or 1.4 percent of the GNP in 1965 to $42.2 billion or 2.2% of the GNP in 1977. Over the same period, the federal share of this total increased from 55 percent to 63 percent. These developments have been a source of serious concern.

Three factors turn out to underlie the rapid growth of disability expenditures. First, new programs were created (for example, Social Security Disability Insurance, DI, in 1956 and Black Lung in 1974), and existing ones were upgraded (for example, federalization and expansion of Supplemental Security Income, SSI, in 1974). Second, benefits were increased through legislation, reflecting a policy view that previous benefits were too low. Third, utilization of programs has grown because of higher benefits (relative to earnings), wider awareness of programs, and a greater willingness of people to regard themselves as disabled. For example, in DI and federal civil service disability retirement, utilization rates approximately doubled between the early 1960s and the early 1970s. Recent data suggest the growth in utilization rates and in disability programs' share of the GNP may be ending. Western European social insurance disability programs, however, have substantially higher utilization rates.

The incidence of disability is highest among older persons, among those with least education, and among those in low-status occupations. Overall, about 15 percent of adults under age 65 report some degree of work disability. About 3 percent meet the strictest progams' definitions of total incapacity for work and the administrative hurdles of qualifying for these programs' benefits.

Issues

Concern about disability programs centers not only on the overall growth of the disability system, but also on specific features of the system.

Dr. Sunshine was a consultant to the Commission. This paper was completed in December, 1980.

Gaps, overlaps and benefit disparities are one major problem area. Both inadequate benefits and excessive benefits are common in the disability system, with the former the more frequent problem. The latest available data (from a 1974 Social Security Administration survey) show that about one-fourth of those unable to work at all received no benefits while about 30 percent of this group received benefits from multiple sources. However, about half the cases of multiple benefits involved SSI, a welfare program, which means that in these cases total benefits were low. Men unable to work at all on average received benefits equal to only about one-third of wages lost.* Among recently disabled men who were this severely limited, about two-thirds had less than 55 percent of lost wages replaced by benefits. At the other extreme, about one-fourth had over 70 percent of wages replaced and about one in ten received benefits greater than 100 percent of lost wages. There is a pro-poor "tilt" to these figures, with low replacement ratios less common among those whose pre-disability earnings were substantially below average. This pro-poor tilt probably results substantially from the pro-poor tilt of DI, the largest single program. The sizable sums paid out under SSI and veterans' pensions, two income-tested programs that provide benefits only to low-income persons, also probably contribute to the tilt.

Variations in replacement ratios within and between programs are one source of disparities in benefits received. In some cases, ratios within a single program range from over 100 percent to less than 40 percent.

Wide differences in the availability of benefits, largely due to differences in the definition and determination of disability and to differences in program coverage, are another source of disparities, gaps and overlaps. Programs' definitions of disability range from the inability to engage substantially in any kind of gainful work that exists in significant quantity in the national economy to the inability to carry out any single one of the essential tasks of the previous job. Some programs recognize only permanent and total disability, others recognize temporary and/or partial disability. Some terminate benefits upon either medical recovery or earnings resumption; others pay benefits permanently regardless of changes in either of these factors. Some pay benefits immediately; others require waits of up to six months.

Unlike retirement programs, disability programs generally do not provide permanent vesting. This can create serious problems for individuals who move, even after many years of coverage, from jobs covered by one program to jobs covered by another.

Work incentives are a particularly important issue in disability programs because it is difficult to identify with assurance those people unable to work. Thus, it is important to maintain work incentives when assigning benefits and developing benefit entitlement rules. Incentive problems are compounded by the tax-exempt status of many disability payments, which make them particularly attractive when compared with either continuing work or taking regular retirement. Incentive problems are also compounded by "notch-structured" earnings tests which cut off benefits suddenly and completely if earnings exceed a specified threshhold amount.

*Adequate data on women are not available.

However, probably the most basic work incentive problem arises from the fact that disability programs focus upon paying benefits rather than upon continuation of work. A focus on continuation of work would mean shifting the disabled to jobs which they remain capable of performing, modifying jobs to fit their residual work capacity, and expanding their work capacity through rehabilitation. For some workers, continued work will not be possible due to the severity of their disabilities. However, the reorientation of disability programs toward continued work seems likely to be most promising for just those programs which seem to be malfunctioning the most -- for example, those covering police and firemen. The reorientation would seem to offer potentially significant cost savings and a substantial reduction in the human waste of human resource inherent in the current system, which encourages people with impairments to hold strongly negative self-images about their ability to work.

Assessments of the proper role of different types of disability programs depend upon basic views of the appropriate role of government in general and of the federal government in particular. However, it is important to remember that disability is an infrequent, unpredictable event that will not touch most people. People seem, therefore, less likely to prepare appropriately for it by themselves than they do for retirement, which is both predictable and a normal event for most workers. Because of this, some argue that government should assume a larger role in disability protection than in providing for normal retirement.

Under the current alignment of roles, the federal government operates general programs (i.e., DI and SSI) that cover only permanent and total disability and provide benefits that are adequate for low wage earners but not for other wage earners. States have important areas of responsibility (e.g., workers' compensation and short-term disability) which vary in their mandates. State programs, unlike federal programs, usually are not direct government operations. Rather, they generally require that employers provide a given coverage, which then is most often purchased from private insurers (or self-insured). Additional, second-tier coverage and general coverage of lesser disability is left to employers and individuals. Total benefits under private employer-sponsored coverage and individually-purchased coverage are relatively small, about one-fifth of all benefits all together. This may be evidence supporting the thesis that the government should assume an unusually large role in assuring disability coverage. Alternatively, however, it may reflect private judgements that governmental-sponsored programs are already extensive and little supplementation is appropriate.

The issue of what replacement ratios are appropriate is a particularly difficult one in the field of disability. On one hand, the importance of work incentives argues for low ratios. On the other hand, high ratios seem appropriate, given arguments similar to those for a more extensive government role. Moreover, disabled persons may be limited in their ability to perform normal chores and household tasks, and therefore may have to pay someone to do this work that most people do for themselves. This too is an argument in favor of high ratios.

Many disability programs have serious administrative problems. Determination of disability is difficult and is rarely, if ever, achieved with great consistency. Excessive processing time is common, although program experience suggests that one to two months is a feasible goal for the interval from claim to first payment. Many programs with earnings tests fail to verify beneficiaries' self-reporting of earnings although verification is readily available through the Social Security Administration.

Among program-specific problems, possibly the most serious is the very deficient coverage which workers' compensation offers for gradual occupational diseases such as hearing loss or black lung.

Options

The options offered for consideration are designed to address the problems discussed in the issues section. They include:

- Dealing with gaps, overlaps and program disparities:
  - Extending DI and SSI to cover relatively severe partial disability, following the Western European social insurance model;
  - Universalizing DI coverage, thereby solving the vesting problem, whether or not other components of social security are universalized;
  - Raising DI and SSI disability benefit levels and/or requiring employment-based supplements to DI to combat low replacement ratios;
  - Mandating employment- based coverage of medium-term disability, as some states now do, in order to cover one important gap;
  - Mandating employment-based coverage of relatively severe partial disability as an alternative to similar extension of DI;
  - Using medical recovery and earnings recovery as criteria for terminating or reducing benefits in all programs, thereby reducing disparities and improving administration;
  - Making earnings tests more uniform; and
  - Eliminating benefits for slight degrees of disability
- Improving work incentives:
  - Reorienting disability programs from an emphasis on cash benefits to an emphasis on continuation in the labor force;

- Modifying earnings tests, eliminating notches;
- Providing more appropriate replacement ratios, perhaps through a ceiling and a floor on replacement ratios based on total benefits from all sources;
- Eliminating job-specific definitions of disability and replacing them by definitions based on employability in broad classes of work, thus combating disincentives to remaining in the workforce by changing jobs; and
- Eliminating tax treatment more favorable than that accorded to "regular" retirement benefits

- Altering government roles:
  - Adopting any of the first five options described with respect to gaps and overlaps, which would generally expand government roles;
  - Reducing the federal role through elimination of veterans' programs on the grounds that they are, arguably, duplicative of other programs; and
  - Reducing DI benefits to 80 percent of the "normal" social security amount, as is done with the social security retirement benefits of early retirees.
- Improving administration by verifying earnings information in programs with earnings tests; and
- Reforming workers' compensation to provide adequate coverage of gradual diseases.

Introduction

Disability[1] programs -- programs making payments to people because they are disabled from work -- form an important and integral component of the pension system.[2] However, disability programs may be even more numerous and varied in their eligibility standards, benefits and financing than are other types of programs within the pension system. The major disability programs, categorized by sponsorship and type, are described in the Appendix. Many of these programs include not only cash benefits, which are the focus of this paper, but also medical care benefits. Some also provide vocational rehabilitation.

Trends in Expenditures and Beneficiaries

The rapid growth of disability expenditures, measured either in dollars or as a percent of the Gross National Product (GNP) is shown, by program, in Table 1. This table also shows a rapid rise in the federal share of the total in recent years. Thus, between 1965 and 1977 disability cash payments grew from $9.7 billion or 1.4 percent of GNP to $42.2 billion or 2.2 percent of GNP, and the federal share increased from 55 percent to 63 percent. The rapid growth of payments has been paralleled by a rapid growth in the number of beneficiaries, at least in some of the largest programs, as shown in Table 2.[3] For example, the number of beneficiaries of Social Security Disability Insurance (DI) almost tripled between 1965 and 1977 while the covered workforce increased by only about 60 percent. However, as shown in Table 3, the growth of disability payments has not exceeded that of pension payments generally. Moreover, the federal role in disability seems smaller than in the pension area generally, and Section II shows that large percentages of severely disabled persons receive low benefits.

In response to growing concerns, the rapid growth of disability programs has been studied in some detail. Three sources of this growth have been identified: program expansion, increased per capita benefits, and increased use of programs.

PROGRAM EXPANSION - U.S. society has been expanding the set of programs which support the disabled. Four programs which were completely or virtually nonexistent in 1950 paid out over 35 percent of all cash benefits in 1975 and supported about half of all beneficiaries. These four large programs are the disability component of public assistance, begun in late 1950 and greatly expanded when federalized as Supplemental Security Income (SSI) in 1974; DI, created in 1956; private long-term disability insurance, which was negligible in amount as recently as 1960; and black lung, established in 1969. Thus, had U.S. society not developed and funded new programs for disability since 1950, expenditures in 1975 would have been less than two-thirds as high as they actually were. This figure, moreover, is conservative for it ignores growth arising from the broadening of programs already in existence in 1950.

TABLE I

Disability Transfer Payments
($ In Millions)

	1950	1955	1960	1965	1970	1975	1977
Programs Covering Work-Caused Disability							
State Workers' Compensation	347	503	730	1,038	1,590	2,855	3,805
Federal Employees Compensation Act (FECA)	13	18	25	36	84	375	570
Black Lung	0	0	0	0	77	592	571
Subtotal	360	521	755	1,074	1,751	3,822	4,946
Workplace-Based Programs Covering Long-Term Disability, Whatever Its Cause							
Social Security Disability Insurance	0	0	568	1,573	3,067	8,414	11,463
Federal Civilian Employees Disability Retirement	41	71	152	279	518	1,307	1,847
Military Disability Retirement	149	209	244	318	538	906	1,023
Veterans' Compensation	1,175	1,440	1,570	1,765	2,555	4,010	4,794
State and Local Government Employees Disability Retirement	24	55	95	155	255	490	630
Private Sector Long-Term Disability Insurance	*	*	*?	7?	115?	500	540
Private Sector Disability Retirement	50?	116?	234?	503?	964?	1,881?	1,995?
Railroad Programs	77	103	147	149	219	403	455
Subtotal	1,516	1,994	3,010	4,749	8,231	17,911	22,747
Workplace-Based Programs Primarily Covering Short-Term Disability							
Private Sector Short-Term Disability Insurance (including State-mandated coverage)	293	551	810	1,037	1,887	2,548	2,926
Private Sector Sick Leave	180	273	400	566	1,066	1,789	2,357

TABLE 1 (Continued)

	1950	1955	1960	1965	1970	1975	1977
Federal Civilian Employees Sick Leave	172	269	348	488	786	1,019	1,343
State and Local Government Employees Sick Leave	143	276	478	776	1,416	2,220	2,522
Military Sick Leave	144	260	260	340	540	590	610
Subtotal	932	1,629	2,296	3,207	5,695	8,166	9,758
Non-Workplace-Based, Public-Assistance-Type Disability Programs							
Welfare for Disabled and Blind, Later SSI	61	203	322	494	1,073	3,276	3,856
Veterans' Pensions	225?	325	220	205	390	690	923
Subtotal	286	528	542	699	1,463	3,966	4,779
GRAND TOTAL	3,094	4,672	6,603	9,729	17,140	33,865	42,230
GRAND TOTAL AS % OF GNP	1.1%	1.2%	1.3%	1.4%	1.7%	2.2%	2.2%
Composition of Total							
% Federal	65%	60%	56%	55%	54%	61%	63%
% State and Local	18%	20%	22%	23%	22%	19%	19%
% Private	17%	20%	22%	22%	24%	20%	19%

* Less than $1/2 million.
Figure approximate.
? Figure highly approximate.

Source: Jonathan Sunshine. Disability. OMB Staff Technical Paper, 1979, page 29, and updates thereto.

TABLE 2

Disability Transfer Payment Beneficiaries
(Thousands of Beneficiaries at a Single Point in Time)

	1950	1955	1960	1965	1970	1975	1977
Programs Covering Work-Caused Disability							
State Workers' Compensation	?	?	?	?	?	1,000*	?
Federal Employees Compensation Act (FECA)	15	15	15	20	25	45	46
Black Lung	0	0	0	0	25	333	298
Subtotal	?	?	?	?	?	500?	475?
Workplace-Based Programs Covering Long-Term Disability, Whatever Its Cause							
Social Security Disability Insurance	0	0	445	988	1,493	2,489	2,834
Federal Civilian Employees Disability Retirement	43	61	102	149	185	258	301
Military Disability Retirement	56	86	90	108	148	163	158
Veterans' Compensation	1,990	2,076	2,027	1,992	2,091	2,220	2,244
State and Local Government Employees Disability Retirement	32	42	55	69	86	128	152
Private Sector Long-Term Disability Insurance	?	?	?	?	40	100	110?
Private Sector Disability Retirement	72?	140?	239?	371?	570?	825?	800?
Railroad Programs	76	87	97	102	95	102	100
Subtotal**	2,269	2,492	3,065	3,779	4,708	6,285	6,700

TABLE 2 (Continued)

Workplace-Based Programs Primarily Covering Short-Term Disability	1950	1955	1960	1965	1970	1975	1977
Private Sector Short-Term Disability Insurance (including State-mandated coverage)							
Private Sector Sick Leave							
Federal Civilian Employees Sick Leave							
State and Local Government Employees Sick Leave							
Military Sick Leave							
Subtotal**						1,000?	1,050?
Non-Workplace-Based, Public-Assistance Type Disability Programs							
SSI - Disability and Blindness	166	345	476	642	1,016	2,024	2,207
Veterans' Pensions	250?	340	219	197	308	430	505
Subtotal**	416?	685	695	839	1,324	2,454	2,712
GRAND TOTAL**						10,200	10,900

*Total beneficiaries during year; all other figures refer to beneficiaries on the rolls at a single point in time.

**Because programs overlap, totals generally include some double counting.

Figure approximate.
? Figure highly approximate or, if no figure presented, unknown.

Source: Same as Table 1, page 31, and updates thereto.

TABLE 3

Disability in the Pension System
($ Billions)

	1950	1955	1960	1965	1970	1975
Total Cash Income Support Payments for Retired, Survivors and Disabled	8.48	15.89	27.44	41.94	74.34	146.57
Percent Federal	65%	70%	73%	72%	69%	72%
Total Cash Disability Payments	3.09	4.67	6.60	9.73	17.14	33.87
Percent Federal	65%	60%	56%	55%	54%	61%
Disability as Percent of Total Retirement Survivors, and Disability Benefits	36%	29%	24%	23%	23%	23%

Source: Same as Table 1, page 36.

INCREASED PER CAPITA BENEFITS - Per capita benefits generally have grown more rapidly than earnings, and the difference in growth rates was particularly large in the first half of the 1970s. (See Table 4 which shows real -- i.e., inflation-adjusted -- rates of growth.) As a rough estimate, total disability cash payments would have been less than three-quarters the actual 1975 amount had the growth of per capita benefits since 1950 merely kept pace with, and not exceeded, the growth of workers' average spendable earnings.

In this context, the normative judgment that benefit levels have increased too rapidly is appropriate only if one holds both that their initial level was correct and that spendable earnings is an appropriate index. Benefit increases have usually been the deliberate result of legislation -- for example, the increase in veterans' compensation which has been enacted each year for the last several years or the 20 percent increase in social security benefits enacted in 1972. Such deliberate increases reflect judgments that benefits should be higher than they have been. Thus, most of the increase in per capita benefits must be recognized to have been the result of deliberate, conscious policy judgments that benefits should increase.

INCREASED USE OF PROGRAMS - The number of beneficiaries also has grown rapidly. Analysis indicates that workers of all ages are more frequently claiming to be disabled and more frequently being awarded disability benefits than in previous years. For DI and federal civil service retirement (the two programs for which data are available), the rate of disability awards for each age and sex group in the early 1970s was about twice the rate of ten years earlier (Eck and Hustead).

To understand the reason for this trend, one must distinguish between "disability" and "impairment." Impairment, the medical concept, means a physiological or mental loss or other abnormality. Disability, the social concept, means a health-related inability or limitation in performing roles and tasks expected of an individual in a social environment. The critical point is that, contrary to common assumptions, there is not a one-to-one correspondence between impairment and disability. For example, one person who loses the use of his legs may be unable to work, but another such person served for 13 years as President of the United States. Among the factors which intervene between impairment and resulting work disability are education, work experience, economic opportunity, social attitudes, and personal attitudes.

Medical evidence, although indirect, shows no increase in impairments. Hence, the observed increase in disability appears to be entirely due to intervening factors.

Economic analysis (Berkowitz, Johnson, and Murphy; Lando, Coate, and Kraus; Chaikind; Hambor) shows that higher benefit levels have been partially responsible for increased use of disability programs because they increase the attractiveness of disability benefits as, for instance, compared with the financial gains from working. Private insurance industry data show claims rates almost 1½ times as high when replacement ratios are near 70 percent than when they are near 50 percent (Health Insurance

TABLE 4

Rate of Growth of Real Per Capita
Disability Benefits
(Compound Annual Growth Rate of Constant Dollar Amounts)

	1950-60	1960-70	1970-75	1970-77
Program				
Social Security Disability Insurance	NA	2.3%	3.5%	3.2%
Federal Civilian Employees Disability Retirement	2.5%	3.7%	5.5%	3.8%
Military Disability Retirement	-1.9%	0.3%	1.9%	1.8%
Veterans' Compensation	0.6%	1.9%	1.4%	2.6%
State and Local Government Employees Disability Retirement	6.5%	2.7%	2.6%	-2.4%
Railroad Programs	2.0%	1.5%	4.3%	1.2%
Welfare for the Disabled and Blind, Later SSI	4.1%	1.7%	1.9%	1.0%
Comparison				
Average Nonsupervisory Worker's Spendable Earnings	1.3%	0.9%	0.1%	1.8%
U.S. Per Capita GNP	1.9%	2.7%	1.5%	4.5%

Source: Jonathan Sunshine. Disability. OMB Staff Technical Paper, 1979, page 29, and updates thereto.

Association of America). The increase in duration among these private insurance claims is even more dramatic. The economic analyses, which are more involved than the insurance industry data display and simultaneously take into account the effects of several variables, find that the use of disability programs also depends on the level of unemployment. Higher unemployment engenders more use of disability programs because the alternative of working is less readily available. In general, however, the economic analyses find higher benefit levels are more important in their effects than unemployment changes.

Because of the economic effect of benefit levels, increased per capita benefits turn out to increase expenditures two ways, both directly through higher expenditures per beneficiary and indirectly by inducing greater program utilization.

Social factors have also been important in increasing program utilization. As already noted, our society, acting through collective arrangements, has done more to support the disabled by creating important additional programs. In a parallel development on the individual level, more and more people in all strata of society are identifying themselves as disabled. As indicated in table 5, the increase occurs across educational levels. Table 10 shows this increase across age levels.

TABLE 5

Self-reported Inability to Perform Usual Major Activity
Among Males Aged 45-64

Year	Did Not Complete High School	High School Graduate	More Than High School Education
1969	10.6%	4.0%	2.8%
1974	15.1%	5.4%	3.5%
1978	17.1%	7.4%	3.9%

Source: National Center for Health Statistics.

This greater acceptance of the label "disabled", and the diminution of the work ethos that it implies, probably lead to substantial increases in disability claims by and awards to people who meet program definitions of disability but in previous years would not have applied for benefits.

Information flows also are an important factor in the influx of beneficiaries onto the disability rolls. There has been a substantial number of the disabled who are unaware of disability programs. Thus, in 1972, more than a decade and a half after the advent of DI, almost half of the persons who could not work regularly or work at all were unaware of the existence of DI, and a quarter of all persons this disabled were unaware of the existence of any government disability program.[4]

The improvement of information beyond the limited base represented by these figures has probably led to increased program use. Thus, for example, when welfare for the disabled was federalized in 1974, the successor SSI program became an operation of the Social Security Administration (SSA), which was already operating DI. There was a sharp but temporary peak in DI claims and awards as welfare and SSI beneficiaries became aware of DI, applied for it, and in many cases were found to qualify.

Thus, disability programs may be repeating the AFDC "welfare crisis" of the 1960s, with the dramatic increase in beneficiaries largely representing a growing percentage of eligible persons claiming benefits. There is some evidence that the rapid expansion phase is over. Claims rates in DI and civil service retirement, for example, have declined substantially from their peaks, as Table 6 shows. And, especially in DI, the number of disabled persons on the rolls has grown much less rapidly in the last few years than earlier in the 1970s and has, in fact, been stable or slightly declining for the past two years.

TABLE 6

Rates of New Disability in DI and Civil Service

Year	DI Claims per 1,000 Insured Workers	Civil Service Disability Retirement Awards per 1,000 Insured Workers
1965	10	8
1966	10	8
1967	10	6
1968	10	6
1969	10	6
1970	12	6
1971	12	8
1972	12	8
1973	13	10
1974	16	11
1975	15	12
1976	14	12
1977	14	12
1978	13	11
1979	13	9

Sources: Lando, Coate, and Kraus; Annual Reports of the Civil Service Retirement System; Civil Service Retirement System Actuary.

However, recovery rates of beneficiaries are still low. Moreover, the decline from peak rates may in part reflect program changes which discourage applicants. For example, 1975 tax law changes reduced the financial advantage of obtaining disability rather than "regular" civil

service retirement, and DI in recent years has been approving a smaller percentage of claims than previously.

In any case, future broadening of program eligibility and increases in benefit levels would clearly lead to further increases in costs, as they have in the past.

Incidence of Disability

The overall incidence of disability depends greatly on how stringent a definition is used in measurement. About 15 percent of the adult population under 65 report some amount of work disability,[5] about 5 percent report themselves unable to work at all, and the remaining 10 percent report lesser degrees of disability, such as disability-caused limitations in the kind or amount of work they can do (Special Tabulations from 1974 SSA Survey of the Disabled). Under the strictest definition of disability (used by DI and SSI) and a determination process that requires an individual to apply for the classification and be judged by an outside party (as opposed to self-reporting when asked), the incidence rate is about 3 percent (calculated from number of program beneficiaries and total population).

As shown in Table 7, incidence also depends heavily on age, largely reflecting an increase in physical problems with age. The increase in incidence with age is particularly great for the more severe degrees of disability.

TABLE 7

Percent Self-reported Disabled

Age	Any Degree of Disability	Unable to Work Regularly or at All
20-34	7.2	2.2
35-44	7.3	5.0
45-54	19.3	8.9
55-64	29.4	19.0

Source: SSA, 1972 Survey of the Disabled.

There are also strong links with education. As shown in Table 8, the less educated have higher incidences of disability:

TABLE 8

Percent Unable to Carry on Major Activity
By Education Level

Education	Age 17-44	45-64
Less Than 5 Years	12.0	17.0
5-8 Years	4.0	9.0
9-11 Years	1.0	6.0
12 Years	0.6	3.0
13-15 Years	0.5	4.0
16 Years and Over	0.3	1.5

Source: National Center for Health Statistics, 1974 Health Interview Survey.

The most obvious reasons for this relationship are the lesser dependency on physical abilities of the more educated, the wider range of employment opportunities available to them and their generally better health. Probably also important are the more pleasant nature of their jobs and greater income loss upon leaving the workforce, both of which make them less inclined to leave the workforce, other things being equal.

Similar occupation-specific differences in disability incidence are shown in Table 9. Lower status occupations have higher incidences of disability. Presumably, the causes are similar to those involved in the linkage of low education and disability. The pattern, moreover, is reinforced by higher rates of occupational injury and diseases among those in blue collar occupations.

TABLE 9

Disability Incidence by Occupation

Occupations	Percent Unable to Work at All	Percent with Some Degree of Work Disability
Professional, Technical, Administrative	2%	7%
Sales & Clerical	3	11
Craft & Operatives	6	16
Laborers (Non-Farm)	6	18
Service & Household Workers	9	22
All Occupations	5	13

Source: SSA 1972 Survey of the Disabled, includes proportional imputation of those who do not specify occupation.

As shown in Table 10, self-reported incidence has increased over time, particularly in the age group in which the incidence of disability is large.

TABLE 10

Percent Reporting Themselves Unable to Work
By Year and Age

Year	Males* Age 17-44	Males* Age 45-64
1969	1.5%	7.2%
1974	1.7	9.4
1978	1.6	10.1

*Question was only asked of those whose usual activity was work, retirement, or "other". The omission of housekeeping makes the data on females of limited use.

Source: National Center for Health Statistics, HEW.

Some 15 to 20 percent of the disabled report a job-related cause, with job-related diseases outnumbering job-related injuries by almost two to one. These figures need to be treated with some caution; there is much litigation over whether some job-related disabilities are in fact job-related. Other accidents, mostly outside the home, are reported to account for about another 10 percent of the disabled (Special Tabulations from 1972 and 1974 SSA Surveys of the Disabled).

Alternatively, cause can be looked at not in terms of a precipitating event, but in terms of a primary, underlying medical condition. From this standpoint, as shown in Table 11, the dominant causes are musculoskeletal disorders and cardiovascular disorders, which together account for a majority of all the disabled.

Among musculoskeletal disorders, arthritis/rheumatism is by far the most frequent single condition. Among cardiovascular disorders, heart conditions play a dominant role.

It should be noted that these data on medical condition are based on the non-institutional population. The importance of mental disorders is therefore understated, for persons in psychiatric institutions, institutional homes for the mentally retarded, etc., are omitted. However, it is unlikely that the inclusion of this omitted population would dispose musculoskeletal and cardiovascular disorders from their position as the two leading causes of disability.

TABLE 11

Diagnostic Group of Major Medical Condition Underlying Disability
(Percent)

	Both Sexes		Women		Men	
	Unable to Work Regularly or at All	All Degrees of Work Disability	Unable to Work Regularly or at All	All Degrees of Work Disability	Unable to Work Regularly or at All	All Degrees of Work Disability
Musculoskeletal Disorders	30.4%	35.9%	31.3%	34.2%	29.0%	38.0%
Cardiovascular Disorders	24.8	20.8	22.4	20.5	28.5	21.2
Respiratory & Related Disorders	7.8	9.1	7.3	7.6	8.6	10.9
Digestive System Disorders	3.9	4.9	4.3	4.4	3.4	5.4
Mental Disorders	11.3	7.7	12.0	8.7	10.2	6.5
Nervous System Disorders	3.9	2.7	3.4	2.4	4.9	3.1
Urogenital Conditions	2.0	2.0	2.8	3.3	.7	.4
Neoplasms	2.8	2.2	2.6	2.5	3.2	1.7
Endocrine Disorders	2.2	2.1	2.7	2.7	1.4	1.5
Other & Unspecified Conditions	6.9	7.6	6.7	7.7	7.1	7.5
Not Reported	4.0	5.0	4.6	6.1	3.0	3.8
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Source: SSA 1972 Survey of the Disabled.

Issues

Many issues concerning disability programs are related to similar issues in the pension system generally. Such issues include gaps and overlaps in entitlements and benefits, appropriate replacement ratios and the appropriate role of government, the private sector and individuals in providing for disability benefits. However, the disability features of these issues often have unique, distinguishing characteristics.

In addition, disability programs have their own important issues distinct from or substantially different from those common to the pension field generally. These include incentives and disincentives affecting program utilization, program malfunctioning, administrative issues and program-specific problems.

This section discusses these issues in the detail needed for proper consideration of options for change, which are presented in the next section.

Gaps, Overlaps, and Benefit Disparities

Findings in this section suggest that inadequate benefits and excessive benefits both are substantial problems for disability programs, with the former the more common problem. Wide disparities among programs are in large measure responsible.

REPLACEMENT RATIOS - The discussion of gaps, overlaps and benefit disparities should begin with a review of what benefits the disabled actually receive. Two concerns have been widely voiced. One is that many disabled persons receive inadequate or even no benefits. The other, a particular concern of the private insurance industry, is that many persons are the beneficiaries of excessive replacement ratios, mainly due to overlapping, multiple programs. The result is both excessive cost per beneficiary and excessive program utilization, especially excessive duration of claims (Health Insurance Association of America).

Data on actual benefits from the SSA's 1974 Survey of the Disabled suggest the problem of inadequate benefits and gaps is more serious than the problem of excessive benefits and overlaps. These data are the latest available, but some caution must be exercised in their use, given their age and the fact that they reflect a period when programs were generally smaller than now.

People in this survey reporting themselves unable to work at all had, on average, earnings of less than 10 percent of their non-disabled counterparts. This indicates that — at least in terms of their work behavior — this group is properly identified as totally disabled or very nearly so. Among this group, 27 percent received no benefits, 44 percent received benefits from one source, 25 percent received benefits from two sources and 4 percent received benefits from three or more sources. However, about half the cases of multiple benefits involved SSI, a welfare

program, indicating that total benefits from multiple sources were low in these cases of overlap.

Men reporting themselves unable to work at all[6] had, on average, only about one-third of their earnings losses[7] replaced by benefits. (All replacement ratios reported in this section are measured on a gross basis and after adjusting for the effects of inflation, unless otherwise specifically noted.) For members of this group who did receive benefits the situation was, of course, more favorable. Those with social security (two-thirds of the group) averaged about 40 percent of earnings losses replaced; those with veterans' benefits (one-fifth of the group) averaged about half of losses replaced; and, those with pensions (about one-fourth of the group) averaged about two-thirds of losses replaced. This variation by source partially reflects overlaps: 70 percent of pension recipients received social security, while only 20 percent of social security recipients also received pensions.

It is important to consider not only averages, but also the distribution of replacement ratios.

The following data on distribution are based (because of computational exigencies) on those who first became disabled in 1970 to 1972. (Again, the data are from special tabulations of the 1974 SSA Survey of the Disabled.) It should be noted that, for two reasons, this group was better off than the disabled population in general. First, some benefits are not permanent or are eroded in value by inflation. Those people disabled in 1970-72 were, as of the 1973-74 benefit data being examined, less affected by these problems than those people who were disabled earlier. Second, with new programs being created and existing ones broadened, persons recently disabled are more likely to be eligible for program benefits than persons whose disability occurred when available programs were less extensive. These two reasons underlie the statistic that among those unable to work at all who were first disabled in 1970 to 1972, only 19 percent were receiving no benefits, as compared with 27 percent of all persons this severely disabled. Thus, in appraising the following data, it should be kept in mind that they are drawn from a population with relatively high benefits.

Among those reporting themselves unable to work at all and first disabled in 1970 to 1972, only 5 percent reported earnings in excess of about one-sixth of predisability earnings, again confirming that this group is totally disabled or nearly so.

Table 12 shows the distribution of benefits received by the approximately 600,000 men reporting themselves unable to work at all and first disabled in 1970-72. This table shows that the problem of inadequate benefits and the problem of excessive benefits are both substantial. About two-thirds of the group had a replacement rate below 55 percent; about one-quarter of the group had a replacement rate above 70 percent.[8]

There is some pro-poor "tilt" within the replacement ratios shown in Table 12. Among men in this table whose pre-disability earnings were near average or above average, about three-fourths had a replacement rate

TABLE 12

Distribution of 1973 Disability Benefits of Men Unable to Work at All
(Only those disabled in 1970-1972 included)

	Category*				
	All Persons	Recipients of Social Security	Recipients of Veterans Benefits	Recipients of Private Pensions	Recipients of Government Pensions
% of Total Group in This Benefit Category	100%	77%	22%	24%	13%
% of the Persons in This Benefit Category with Replacement Ratio of:					
0-18%	19%	10%	11%	1%	17%
18% to 36%	20%	20%	5%	24%	
36% to 54%	25%	27%	41%	14%	35%
54% to 72%	12%	14%	12%	22%	
72% to 90%	10%	12%	5%	11%	20%
90% to 108%	6%	7%	20%	1%	25%
108% to 144%	7%	9%	2%	24%	5%
144%	1%	1%	2%	2%	

*About 7 percent of the total group was receiving workers' compensation; the number of cases in this category is too small for analysis. Replacement ratios have been combined for government pension recipients because of small numbers of respondents.

Source: SSA 1974 Survey of the Disabled.

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below 55 percent. Of those with predisability earnings of some 60 percent to 85 percent of average, about two-thirds had replacement rates this low, and of those with pre-disability earnings of about 30 percent to 60 percent of average earnings, only 45 percent had replacement rates this low. The pro-poor tilt of DI, the largest single disability program, may be significantly responsible for the similar tilt of overall disability replacement ratios. SSI and veterans pensions, both of which are income-tested programs whose benefits go only to relatively low-income individuals, may also be partially responsible for the overall pro-poor tilt.

In Table 12, replacement ratios substantially above one are found to be particularly common among recipients of private pensions. Because private pensions are very infrequently inflation indexed, ratios this high are likely to be temporary phenomena, rare except among those recently disabled (as all persons in Table 12 are).

People less seriously disabled than those included in Table 12 received much smaller benefits. The people involved range from those who reported no change required from their former occupation, but limits on the amount or kind of work they can do, to those who reported ability to work some, but not regularly. On average, men in this group reported a 20-25 percent reduction in earnings, and benefits equal to about 5 percent of earnings, or to one-fourth to one-fifth of the income loss. About two-thirds of persons with these lesser degrees of disability received no benefits, 26 percent received benefits from one source, 7 percent received benefits from two sources, and less than 1 percent received benefits from three or more sources. Overlapping benefits do not heavily involve SSI, probably because it is limited to the totally disabled. (Again, the data are from special tabulations of the 1974 SSA Survey of the Disabled.)

One source of the very substantial variation in the actual replacement ratios that disabled persons receive is wide variation in replacement ratios between programs and within individual programs.

The variation in replacement ratios that exists within individual programs is surprisingly large. For example, net replacement ratios in civil service disability retirement can range from 100 percent or slightly more (for high earning individuals with long years of service) down to perhaps 40 percent (for individuals with short periods of service, particularly those with low earnings). Net social security replacement ratios can vary from over 100 percent for low-earning individuals with dependents to under 40 percent for high-earning individuals without dependents. (For those whose earnings exceed the maximum wage base covered by social security, the ratio is even lower.)[9] These intra-program variations exist largely because of three practices followed in different combinations by different programs:

- Basing benefit amounts on duration of covered employment;
- Providing extra benefits for dependents; and
- Varying the replacement ratio by wage level, typically with a "tilt" in favor of the lower-paid.

In considering replacement ratios provided by individual programs, it is important to recall that federal civilian employee programs serve as both first-and second-tier programs. Thus, concern that high benefits in federal employee programs are out of line with provisions of other programs should be tempered by a recognition that private-sector employees who draw both DI and employer-provided, second-tier benefits can attain similar replacement ratios, without any single program showing a high ratio. Instead, as was noted in Table 12, the highest total replacement ratios are concentrated among recipients of private pensions.

Indeed, one of the more serious low-benefit problems in the entire disability system affects workers covered by federal civilian employee staff programs. The lowest civil service disability retirement ratio, about 40 percent, applies to all those with 22 or fewer years of service -- a large portion of the federal workforce. And, unlike the low ratios in social security, it is not supplemented by dependents' benefits or another tier of coverage.[10] Thus, it is one of the least adequate benefits.

Another low benefit problem of some concern exists in state workers' compensation programs. Most programs have a dollar ceiling on benefits equal to about two-thirds of the average wage in the state. For high earners this ceiling lowers the maximum replacement ratio. For example, the maximum gross ratio would be one-third for workers with earnings equal to twice the statewide average. This problem is, however, somewhat mitigated by the availability of DI benefits as an additional source of income to the workers in question if their disability is sufficiently severe and they have the work history required for DI coverage.

WIDE DIFFERENCES IN THE AVAILABILITY OF BENEFITS - There are vast differences among programs in how readily available benefits are. These differences are another source of gaps, overlaps, and benefit level disparities. Differences in availability arise primarily from differences in the definition and determination of disability and in the types of disability covered. Definitions range from inability to engage substantially in any kind of gainful work that exists in significant quantity in the national economy (DI, SSI) to inability to carry out any one of the essential tasks of the previous job (civil service disability retirement and, in its first two years of benefits, much private insurance). Some programs (DI, SSI) recognize only permanent and total disability; others (for example, workers' compensation) recognize temporary and/or partial disability. Some (DI, for example) terminate benefits upon either medical recovery or earnings resumption; others (for example, military permanent disability retirement) pay benefits permanently, regardless of changes in either of these factors.

As a result, a person covered by one program may not qualify for disability benefits that he would get if he were covered by a different program. To give some examples: One welfare program, SSI, adopted DI definitions of disability and the same determination system, because it was placed in the Social Security Administration which was already administering DI. Thus (among other consequences) it covers only total disability. The other welfare-like program, veterans' pensions, uses a disability rating system involving percentage ratings attached to what are really impairments, not disabilities. Thus, partial disabilities are covered.

Reasons can be given for some of the differences in ease of benefit availability. For example, DI and SSI cover only permanent and total disability because they are the basic publicly-provided income support system which -- one can argue -- appropriately deals with only the most serious problems in society. Workers' compensation covers partial and temporary disabilities, even of quite mild degrees, because it is a societal judgment that work-related injury is the fault, or at least the responsibility, of the employer and the worker deserves recompense for all degrees of disability that he suffers as a consequence of his job (formally speaking, workers' compensation is a no-fault system). To some extent, however, such explanations are after-the-fact rationalizations, for disability programs were not designed deliberately as a set with different roles and different provisions. The quirks of history and politics, rather than logic, are responsible for much of the difference in benefit availability.

VESTING PROBLEMS - There is a serious vesting problem peculiar to social security's disability component (DI) and absent from its retirement and survivors' programs (OASI). Upon moving out of DI-covered employment, the problem manifests itself as follows: DI requires 20 calendar quarters of coverage in the most recent 10 years, and so anyone moving from DI-covered work to other employment (for instance, a federal government job) loses DI coverage after five years. Unless the new employer's coverage vests in five years or less, the worker will be caught without coverage, even if there are absolutely no discontinuities in his work record. Shifting employment in the opposite direction can result in even more serious coverage lapses. For example, disability coverage for federal civilian workers is job-specific and lapses immediately upon leaving federal employment. Thus, a person moving out of federal employment into the general, DI-covered workforce will be without disability coverage for five years (again assuming complete continuity in employment). Similar gaps in coverage arise for persons shifting jobs between different employers not covered by DI (state and local governments and private, non-profit entities). Lapses of this kind do not occur in retirement and survivors' benefits coverage and could be eliminated by making DI universal. These gaps constitute a strong argument for universalizing DI, regardless of what is done about OASI.

WAITING PERIODS - Many disability programs pay no benefits for an initial period of disability, which is called a waiting period. Waiting periods can also be a source of both gaps and overlaps. In theory, waiting periods (1) leave individuals to bear relatively small losses while collective resources are expended on the large losses which individuals cannot afford; (2) greatly reduce administrative workload by eliminating claims for the shortest-term episodes of disability, which are by far the most frequent; and (3) discourage malingering by delaying financial support. In addition, programs which cover only permanent disability use the applicant's status during the waiting period as evidence of the permanence of his disability. The virtues of waiting periods are not merely theoretical. In 1974, the Federal Employee's Workers' Compensation Program (FECA) virtually eliminated waiting periods and made other changes, including paying benefits immediately rather than after claims were judged and resolved. In a very brief period, claims increased fourfold (Office of Workers' Compensation Programs Task Force, p. 101).

Given these merits, both theoretical and demonstrated, of waiting periods, it is important to note that in practice one form of program overlap, probably best labeled "front-end interlock," often frustrates them. To take one example, DI has a five-month waiting period, but SSI has none, and one-third to one-half of the new SSI disabled caseload consists of the "front-end" of cases eventually paid DI. Note, however, that SSI benefits are paid on the basis of need. Only the relatively poor receive them, and maintaining a waiting period for these people would raise serious problems from a relief-of-indigency standpoint. Private coverage for long-term disability offers another and clearer example of the problem. Typically, there is a six-month waiting period for long-term coverage. However, the employee concerned is very often covered by private short-term disability insurance and that short-term insurance usually covers precisely six months of disability in order to match with long-term coverage. Short-term insurance, in turn, sometimes has a waiting period of a few days, but the employer often provides sick leave which covers exactly that waiting period and no more. Thus, through three programs which deliberately interlock, an apparent six-month waiting period turns out to be no waiting period at all. In situations like these, the anti-malingering effect is lost; the administrative workload is, if anything, increased because a single episode of disability gives rise to multiple claims; and collective resources are used, in part, on small losses. The only function of the waiting period which remains unimpaired is its use in testing whether the disability is in fact long-term.

Incentives and Disincentives

Several important issues concerning disability programs involve features of the programs which discourage the disabled from continuing or returning to work or which encourage them to utilize disability programs in place of other more appropriate income sources such as retirement programs.

These features are of concern because of the substantial waste of human resources which may be characteristic of the current system. Because our society values people to a large extent on the basis of their work and earnings, the disabled are seen by others, and often by themselves, as less than full members of society. Moreover, to the extent they work less under the current system than they might, the total output available to society is diminished, and their support through benefit payments constitutes an unnecessary burden on others.

In addition, there are at least two reasons for which it is very difficult, perhaps impossible, to identify accurately the disabled without a proper structure of incentives. First, some important impairments, such as back problems, are extremely difficult to identify objectively, apart from what the claimant asserts. Second, as already pointed out, there are many intervening factors between impairment and disability. These include subjective factors such as personal attitude, ingenuity, perseverance, and skills in coping. Highly subjective intervening factors are virtually impossible to assess in a way that precludes being misled by the potential beneficiary. Moreover, some factors, such as personal and social attitude,

depend heavily on the structure of incentives and disincentives. Thus, to a large extent, actual work behavior under suitable incentives must be relied upon as an important indicator of disability.

Finally, there is concern about the rising costs of disability programs, which is caused in part by the growing number of beneficiaries. And there is a widespread belief that many beneficiaries could work and would work if incentives were appropriate. Indeed, it is widely believed that some are working for one employer while collecting benefits from another. Thus, appropriate incentives are again important.

REORIENTING DISABILITY PROGRAMS TOWARD CONTINUATION OF WORK - There has been much discussion of reorienting disability programs and their provisions to focus on continuation of work. Unlike the current system, which focuses on paying benefits, the reorientation would mean that programs would focus on finding jobs the disabled could perform; modifying jobs as necessary to fit their residual work capacity; and improving their work capacity through rehabilitation.

Potential advantages of the reorientation are possibly best illustrated by police and firemen's disability systems which have been the subject of much criticism. Disabled policemen or firemen have been determined to have impairments that keep them from being able to perform the full range of relatively arduous activities that are required by ordinary police or fire jobs. However, some of these individuals probably remain capable of a large range of work activities. If discharged with a disability pension, such pensioners are likely to work at another job, including one that may be considerably demanding physically and perhaps like their former work (for example, a disabled policeman may become a private security guard). A possible alternative is to retain the employees in question, switching them to a desk job or some other work (for instance, fire safety or investigations) that is less physically demanding. This alternative could have many advantages. The occupational skills of the individual would be used. Costs for disability income support payments would be eliminated. Malingering and abuse would be discouraged because a person could not pick up a "free-ride" pension and "double-dip" by also working.

Systematic evidence that disability programs frequently provide benefits to large numbers of "able bodied" persons is rarely available.[11] Two cases have, however, been documented in detail (Sunshine, pp. 80-85). One involves the military disability retirement system. The other involves the District of Columbia police and firemen's disability retirement system, which also covers some federal protective service employees in the Washington area. In both cases, administrative procedures were tightened in response to a perception that there was frequent award of benefits to able bodied individuals. In both, the result was that the percentage of all retirements which were made on grounds of disability was cut in half. There is, thus, a reasonable presumption that malfunctioning had been occurring frequently. Probably in both cases, however, the outcome was primarily that retirements were shifted from the "disabled" to the "regular" category rather than people being prevented from leaving employment and obtaining cash benefits.

The administrative principle adopted in the military disability retirement system might be usefully and widely applied. That principle is that if an employee has been performing his duties satisfactorily, and there has been no acute or grave illness or injury or deterioration of his condition in the immediate past, then he is not disabled, regardless of what a medical board may say about his impairment status and his hypothetical ability to perform the job he has, in fact, been performing satisfactorily.

The case involving police and firemen in Washington, D.C. is significant because popular concern about malfunctioning focuses on these occupations. Improper disability retirements are felt to be particularly common for police and firemen. For example, the Better Government Association estimates that more than $200 million annually is paid to disabled police and firemen, with at least 10 percent of that amount going to retirees who are not genuinely disabled. In surveying 86 programs nationwide, it found that at least one-fourth of police and firemen retire on disability and, as shown in Table 13, in some cases the percentage are much higher.

TABLE 13

Percent of Police and Firemen Retiring on Disability

Group	% Retiring on Disability
Baltimore Police and Firemen	60%
Seattle Police	62%
New York City Firemen	70%
Seattle Firemen	86%

Source: Better Government Association, Chicago

Three comments can be made:

- First, as the Better Government Association notes, the problem is not the product of retirees' wrong doing, but of vague and broad definitions of disability and "systems so poorly planned and badly administered that they not only allow these abuses to occur, but in fact encourage them;"

- Second, stopping malfunctions would often merely switch persons from the "disabled" to the "regular retiree" category rather than precluding them from receiving benefits. Therefore, the direct cost of malfunctions are probably far smaller than usual estimates. However, there may be a substantial indirect cost in income tax revenues lost because of the favored tax status of disability benefits, and often disability benefits are larger than regular retirement benefits would be even on a pre-tax basis; and

- Third, wide, city-to-city variation in disability retirement rates from jobs that are reasonably similar is itself strong circumstantial evidence of program problems.

The argument for reorienting the disability system toward continuation of work also rests upon the view that the "psychological incentives" of the current approach are wrong. Currently, to gain what a disability program has to offer, an applicant must generally demonstrate his or her inability to work. In doing so, he or she may undertake actions such as: seeking out a physician who will maximize the severity of the impairment, who will state that the claimant cannot work, and who will warn the claimant against attempting work; "proving" oneself disabled by not working during a required waiting period; generally limiting activity; and continuing to avoid working, while being certain not to succeed at attempts to work, and avoiding giving any indications that work is possible.

If successful, the outcome is a certification of inability to work. It is not surprising that the current system tends to create negative self-images about ability to work on the part of applicants and beneficiaries. The big problem is that personal and social attitudes are major factors in the ability of the impaired to work. The current system tends to undermine the willingness to work and attempts at work, and thereby, in a very real sense, undermines the ability to work. In contrast, an alternative system might focus upon ascertaining what work an individual could do, despite impairment; upon increasing the range of work of which he or she is capable by the use of vocational rehabilitation; upon finding -- or creating — jobs which he or she is "certified" capable of being able to perform; and upon placing the person in one of them. Positive labels such as "capable of certain types of work" and "suitable for rehabilitation" would replace the negative label of "permanently and totally disabled." In short, the psychological incentives would be positive and supportive.

Discussed below are other, more specific examples of disability program features that provide incentives and disincentives toward work and toward the use of disability programs rather than retirement programs. They include replacement ratios, earnings tests, and definitions of disability. In addition, current tax treatment of benefits provides incentives to qualify for disability benefits when possible.

REPLACEMENT RATIOS - Persons eligible for "regular" retirement often have financial incentives to seek disability benefits instead. Cash benefits are often higher under disability than under retirement. For example, persons retiring early under OASI (i.e., at ages 62 to 64) have benefits reduced by up to 20 percent, while there is no comparable reduction for those who go onto the DI rolls. Private pensions usually work similarly. "Early retirement" is permitted for persons younger than the "normal retirement" age, but benefits are reduced to reflect the longer expected payout period. On the other hand, disability provisions of private pension plans rarely reduce benefits because of age. Quite apart from these cases of age-related reductions, there are cases in which different formulas or different programs apply to disability as opposed to retirement, and the disability option is more remunerative.

There are, however, incentives to make the reverse choice. Disabled persons may choose early retirement benefits even though they are lower than disability benefits, in order to avoid waiting periods without benefits or the difficulties and uncertainties of the disability determination process.

The question of how large replacement ratios in disability programs should be, relative to those in retirement programs, is a difficult one to answer.

On the one hand, there are work incentive arguments for lower replacement ratios in disability than in retirement. Because it is difficult to determine administratively who is genuinely disabled, it is necessary to keep benefits relatively low to maintain work incentives, lest programs be severely overused by persons who should be working. Moreover, proper work incentives will generate positive attitudes toward work, thereby making the impaired more able to work.

On the other hand, there are three arguments that replacement ratios in disability programs should be higher than those in retirement programs. First, retirement is a foreseeable event, occurs for the vast majority of workers, and takes place after prime earning years. Thus, individuals are likely to be relatively prepared to meet its financial needs from their own resources -- at least as compared with their preparation for disability, which is unpredicatable in onset, infrequent in incidence, and sometimes occurs before prime earnings years. Second, the disabled, because they are younger, are more likely to have dependent children. Third, the disabled are often limited in their ability to perform even simple personal and household chores, and may have to pay someone to do these tasks.

Finally, there are arguments for the third possible view -- that the appropriate replacement ratio for disability programs are those used for "regular" retirement. One such argument is that such equality would remove incentives that distort the choices between disability and regular retirement. Another argument for this view is that equity requires equality.

EARNINGS TESTS - Currently, earnings tests vary greatly in strictness. At one extreme, DI cuts off benefits completely if earnings exceed the equivalent of approximately half-time work at minimum wages. At the other extreme, numerous programs -- including military disability retirement, much of workers' compensation, and some other public employee staff programs -- have no earnings tests at all. Among those programs which do have a test, civil service disability retirement is probably the most liberal. Earnings must exceed 80 percent of the current salary of the position from which the beneficiary was disabled for two consecutive years before the test is triggered and benefits cut off.

Whatever their level, current earnings tests tend to create work disincentives because of their structure. Generally, they are structured as "notches," with no effect on benefits unless the test amount is exceeded, at which point a complete cut-off of benefits results.

This "notch" form creates an incentive to earn less than the earnings test amount, unless the beneficiary can be sure of increasing his earnings by substantially more than his total benefits. The necessary increase must substantially exceed total benefits for two reasons. First, benefits are often tax exempt while earnings are subject to both social security and income taxes; earnings must therefore increase by much more than lost benefits in order to leave a person as well off on a net or "take-home" basis. Second, many persons will insist upon a substantial increase in net income to compensate for the time and expenses required by working. The consequence is that notch-type earnings tests create a formidable disincentive against work.

DISABILITY DEFINITIONS - Disability definitions also create work disincentives in some programs. For example, federal civil service disability retirement, as well as much private coverage, defines disability in job-specific terms, that is, as the inability to perform the employee's current job or (sometimes) other jobs in the same occupation. Under this definition, employees have a strong disincentive to accept reassignment to a different job. If they take the new assignment, their ability to perform becomes the basis for judging their disability. Thus, if they succeed, they lose a cash benefit they could obtain by staying with their old job. In addition, they could quite possibly suffer an income loss because in some cases the new job will pay less. And if they fail at their attempt to adapt and be reemployed, the wages of the new job, which may be lower, become the base for determining cash benefits. A system focused on maintaining workforce participation could eliminate these disincentives by recognizing in its structure that being at work is not a status incompatible with diminished earnings capacity. Through this recognition, the system could use the old job's normal pay as the referent for income determination.

TAX TREATMENT OF DISABILITY BENEFITS - The favorable tax treatment of disability benefits often provides a financial incentive for taking such benefits rather than retirement benefits, if possible. As with retirement programs, there is no taxation of benefits from social security, employee-financed sources, or welfare programs. However, disability benefits are the subject of several favorable tax provisions not applicable to retirement benefits: All benefits for work-related injury (primarily workers' compensation) are tax exempt. Most military disability retirement is tax exempt. All veterans' program benefits are tax exempt. And persons under 65 receiving benefits for permanent and total disability may exclude from taxable income $100 a week of otherwise taxable benefits. (This last exclusion phases out dollar-for-dollar as adjusted gross income exceeds $15,000.)

The importance of the tax incentive is especially great for those who work while collecting benefits. Because their income is higher, the tax bracket that would apply to benefits, if benefits were taxable, is higher than for those who do not work and have an income consisting primarily of disability benefits. This tax-related incentive frequently seems important in the case of police and firemen, whose disability is usually deemed to be work-caused or work-aggravated. Being work-related, their disability benefits are tax-free, while regular retirement benefits usually would be taxable at least in part and, if the retiree is working, subject to considerable tax.

It should be noted that the tax treatment of disability benefits was tightened in 1975, and the more stringent tax treatment could be responsible for much of the substantial reduction in federal civil service disability retirement that has been seen in recent years. The $100 a week exclusion is now available only to those totally disabled from work of any kind. Thus, civil service retirees disabled only from their previous job are not eligible for disability and have no tax advantage to gain from taking disability retirement rather than "regular" retirement. Hence, those with a choice probably are not applying for disability retirement with its more extensive and bothersome administrative procedures, in as great numbers as they used to when this exclusion was available.

Appropriate Government Roles

The appropriate role of government in providing for disability protection is an important issue. Much as is true in the pension field generally, people's views on this issue will depend heavily upon their basic views of the appropriate role of government in general and of the federal government in particular.

There is, however, an important argument for a relatively large government role in providing disability protection. It goes as follows: Disability is an infrequent and unpredictable event that will not touch most people. Therefore, people are less likely to prepare appropriately for it by themselves than they do for retirement, which is both predictable and a normal event for most workers. Because of this, it seems appropriate for the government to assume a larger responsibility in disability protection than it does in providing for normal retirement.

Under the current alignment of roles, the federal government operates general programs (DI, SSI) that cover only permanent and total disability and provide benefits that, except for workers with low wages, are below what would probably be deemed an adequate total income support package. States have important areas of responsibility (workers' compensation, short-term disability) and vary in the way they meet this responsibility. All have workers' compensation laws, while only a handful have general programs covering short-term disability. State programs unlike federal programs are not usually direct government operations but rather requirements for employers to provide a given coverage, which then is most often purchased from private insurers (or self-insured). Second-tier coverage and general coverage of lesser disability is left to employers and individuals.

The relatively small amount of benefits provided by non-governmental sources may be evidence supporting the thesis that leaving disability protection to voluntarism will result in limited protection. Thus, the fact is that total benefits under private sector, employment-based, long-term disability programs are not greater than those of public employee long-term programs, although private employees are much more numerous than public employees. And total benefits under individually-purchased arrangements are only about half those of private employment-based long-term programs. Alternatively, however, the relatively limited

extent of voluntary protection may reflect peoples' true values and free choices and represent a judgment that little additional private coverage is appropriate, given the substantial extent of public programs.

Administrative Issues

Many disability programs have serious administrative problems.

For one, correctness and consistency in the determination of disability are difficult to achieve, as has been noted in the discussion of work incentives. Evidence of the difficulty bears citing. DI has been a focus of concern in this context, and consequently a source of much data. DI determinations are made separately in each state according to criteria laid down in great detail by the Social Security Administration's (SSA) central office. One recent study (Gallicchio and Bye) chose at random some 500 DI cases that had been decided (some approved, some denied, none judged to need further information) by state offices. It submitted each case to two separate claims examiners in each of eight states for their decision, requiring either an approval or denial (i.e., "needs more information" was not a permitted decision). The study found a 15 percent probability that two randomly chosen states would disagree in their decision on a case. Two examiners within a single state disagreed slightly less often, about 12 percent of the time. SSA's central review office judged some of the cases to be inadequately documented even though the state office that had actually handled the case had judged the information in the file adequate for making a decision. For such cases, the probabilities of disagreement were 23 percent between states and 17 percent within a state. For cases judged by SSA's central review office to be adequately documented, the corresponding probabilities were 11 percent and 9 percent.

Another administrative problem, long processing time, acts much like a waiting period in forcing people to use other sources of financial support. The maximum speed consonant with reasonably accurate decisions should be sought. Current program experience suggests that one to two months is probably a feasible goal for the interval from claim to first payment on approved claims (Conley and Noble; Subcommittee on Social Security, pp. 110-114; General Accounting Office, pp. 5-7).

A third administrative problem is the poor verification of information about earnings that is prevalent in many programs with earnings tests. For instance, veterans' pensions and federal civil service disability retirement rely upon self-declaration using a postcard-like form to obtain information on earnings. Numerous private programs, in contrast, use a generally reliable verification procedure. As a condition of obtaining a benefit, they require a claimant to sign a consent form which permits the Social Security Administration to provide the program with information that the SSA receives on earnings. The SSA, as a matter of course, receives earnings information on about 90 percent of the workforce as a consequence of its task of compiling the earnings history of those in employment covered by social security. And it has set up an organizational unit and a standard procedure for providing such information (which is, of course, available

only with a consent form) to outside programs. Thus, there is available an established, inexpensive, and reasonably thorough source for verifying earnings information.

Federal programs which currently do not have good verification of earnings information might use this mechanism. (DI and SSI, because they are administered by SSA, already use the relevant information directly.) Alternatively, legislation might be enacted which permits them to receive information from SSA directly, without individual consent forms.

Hypothetically, earnings information might alternatively be obtained from the IRS, which covers the entire workforce, rather than from SSA, which omits about 10 percent of workers. However, IRS lacks accessible records for a substantial portion of the earnings information which reaches it; its focus is on tax information, not earnings records.

Problems of Workers' Compensation Programs

So far, this section has dealt with issues common to multiple programs. There is, however, one issue involving a single type of program that is important enough to merit discussion here. It is that workers' compensation programs typically have very deficient coverage of gradual diseases such as hearing loss or black lung. Causes of the problem include:

- Workers' compensation programs usually award payments for disability resulting from an "accident," an event identifiable in time and place. In contrast, gradual diseases result from a long, continuous process.

- Workers' compensation laws require that illness be work-related. In the absence of an identifiable "accident" it can be very difficult to prove that an illness is work-related.

- Medical knowledge of the consequences of workplace exposures is limited and recordkeeping with regard to workers' exposures is often very poor.

- Significant illness may not be recognizable until decades after the exposure which caused it. Thus, it may not be feasible to file claims within the time limits prescribed by state programs.

- Claims must be filed against a particular employer. If a worker has been employed by different firms, it may not be possible to prove that the illness, which only appears years later, was the result of employment by a particular firm. Indeed, the illness often is in fact the result of cumulative exposure to a hazard during employment, or it may be caused by an interaction of several hazards.

As a result of this problem, it appears that only a small percentage of occupational disease cases are compensated by workers' compensation (U.S. Dept. of Labor, p. 69; Interdepartmental Workers' Compensation Task Force, pp. 18 and 19; Kostrich).

The consequences of poor coverage include growing pressure upon the federal government to become more involved in an area that has long been a state responsibility, and pressure for the genesis of highly specific programs. The federal black lung program is a first response to these pressures. Pressures continue for similar special programs for other individual occupational diseases.

Another consequence of poor coverage is the failure to place financial responsibility upon the particular workplace that causes the disease. The economic argument for this linkage is that placing the costs of work-related illness on the firms where they occur improves overall efficiency because the price of products from each firm then reflects the real costs of producing them, including the cost of damage to human health. More simply, bearing the expenses of work-related illness may tend to make firms more careful about health and safety; if they do not take precautions, it costs them directly. However, as things stand, programs such as DI and SSI that are broadly financed pick up much of the burden of supporting those disabled by occupational illness, and the costs are spread broadly across society. Thus, work places which produce disease do not bear the cost.

There are courses of action that can help address the poor coverage problem. For example, legal presumptions could be established that certain patterns of diseases and work experience are proof the diseases are work-related. As to time limits, some states base their deadlines upon the time at which a claimant knows -- or should have known -- of the existence and potential compensability of the disease. Thus, the problem of delayed onset can be handled. As regards difficulties arising from question of which employer is at fault, various solutions seem possible although none is without drawbacks. One possibility is to use social security records to identify the employer in the relevant industry for whom the individual worked for the longest duration.

In part because of difficulties such as the foregoing, state workers' compensation has an additional problem of high overhead costs. Only about 50 cents of each premium dollar ultimately reaches workers as available income. The rest goes to such costs as administration, litigation, marketing, and profits (Interdepartmental Workers' Compensation Task Force, p. 27).

Options

The options for change presented in this chapter are designed to address the problems and issues identified in the previous chapter and are organized according to the same major subject headings. Explanatory information and an outline of considerations involved, both pro and con, are generally included in the the discussion of each option.

Gaps, Overlaps and Disparities

Present programs, as described above and in the Appendix for this chapter, have different definitions of disability, different earnings tests, different benefit levels, different recovery criteria, and cover different situations. The lack of uniformity increases the risks of both overlaps and gaps in protection under these programs. It makes the receipt of benefits and the level of benefits unreasonably dependent on luck. Options to deal with gaps, overlaps and disparities include the following:

EXTEND DI AND SSI TO COVER RELATIVELY SEVERE PARTIAL DISABILITY - This extension would follow the Western European pattern, where the threshold for corresponding programs is generally one-half or two-thirds loss of earnings capacity, not total disability. It would seem a logical step, given the fact that most unsuccessful applicants to DI and SSI -- i.e., those not quite meeting their disability definition --never resume sustained regular employment. Similarly, it seems appropriate given the data showing that most people with less than total disability do not receive any benefits. The Social Security Administration, which administers both DI and SSI, is ideally suited to apply earnings tests and already oversees a large disability determination system.

Arguments against this change are that program rolls and costs might approximately double, and the problem of determining disability would be compounded. There would be a greatly increased need to monitor medical condition and earnings potential. Given the difficulties DI and SSI appear to be having in administering coverage of total disability, it may be unwise to involve them in the even more difficult administrative problems of partial disability coverage. Moreover, if one's philosophy is that social insurance and public welfare programs should deal only with society's most serious problems, while leaving lesser concerns, then the restriction of these programs to permanent and total disability seems appropriate.

UNIVERSALIZE DI, WHATEVER IS DONE WITH OASI - This would solve the vesting problem peculiar to disability and is without some of the objections which generate opposition to universalizing OASI.

RAISE DI AND SSI-DISABILITY BENEFIT LEVELS - Raising the benefit would recognize the very large scope of the low-benefit problem for the severely disabled. However, it would increase costs, reduce work incentives, and tend to exacerbate the problem of excessive benefits. If not accompanied by a corresponding increase in retirement benefits, it would increase the incentives for inappropriate use of DI as a substitute for early retirement under OASI and would create similar problems in SSI.

REQUIRE EMPLOYMENT-BASED SUPPLEMENTS TO DI - This would achieve much the same result as the preceding option, but with a smaller federal role. Like the preceding option, it would address the low benefits problem. However, it would exacerbate work disincentives and the excessive benefits problem, and would increase

employers' costs in workplaces where private supplements do not currently exist. It would also magnify incentives to make use of malfunctioning disability programs as a substitute for early retirement programs, particularly if no corresponding increase in retirement program benefits were legislated.

MANDATE EMPLOYMENT-BASED COVERAGE OF MEDIUM-TERM DISABILITY, OF TWO TO 12 MONTHS DURATION - Under current law, DI and SSI are supposed to cover only disabilities of one year or greater duration. ("Permanent" is defined as one year or more.) Mandatory coverage of shorter-term disability would follow legislation currently in effect in a few, mostly large states (California, Hawaii, New York, New Jersey, Rhode Island) as well as Puerto Rico with about one-fourth of the U.S. workforce.

MANDATE EMPLOYMENT-BASED COVERAGE OF RELATIVELY SEVERE, PARTIAL DISABILITIES - This would achieve similar results to the first option, but with a smaller governmental role and one that confined direct government involvement to the most severe problem: total disability. It might be part of a package that included elimination of highly job-specific definitions of disability which now exist in most private coverage. However, given the difficulties of determining partial disability and its degree, the program would likely be the focus of considerable litigation and rancor.

ELIMINATE BENEFITS FOR SLIGHT DEGREES OF DISABILITY - This would reduce disparities between programs. It would primarily affect veterans' compensation.

USE MEDICAL RECOVERY AND EARNINGS RECOVERY AS CRITERIA IN TERMINATING OR REDUCING BENEFITS IN ALL PROGRAMS - Current disability programs include all the possible combinations, with some programs using neither criterion, some using one or the other, and some using both. Using both would produce not only more uniformity but also a tightening up of benefit administration.

MAKE EARNINGS TESTS MORE UNIFORM - Currently they range from less than half the minimum wage (DI) to 80 percent of indexed previous earnings (federal civil service disability).

Incentives and Disincentives

The importance of work incentives in disability programs has been discussed at length. Options to improve incentives include the following:

REORIENT DISABILITY PROGRAMS FROM AN EMPHASIS ON CASH BENEFITS TO AN EMPHASIS ON CONTINUATION IN THE LABOR FORCE THROUGH REEMPLOYMENT IN DIFFERENT JOBS, VOCATIONAL REHABILITATION, AND JOB MODIFICATION TO FIT THE RESIDUAL WORK CAPACITY OF THE DISABLED - Given that this option has not been tested and that means of obtaining employer support are not obvious, a demonstration project involving government employees might be a wise first step. Programs

involving police and firemen might be the appropriate starting point because, at least according to common perceptions, problems are most severe in this area and alternatives involving continued work seem clearest. Thus the payoff should be unusually large.

Another relatively simple early step would be to experience-rate employer contributions in DI, as is the usual practice in workers' compensation. This step would aim to encourage the desired reorientation in treatment of the disabled by increasing employers' financial incentives to retain disabled workers and place them in different or redesigned jobs. However, because DI covers only relatively severe disabilities, the potential payoff is likely to be small. Moreover, the workers' compensation analogy is of limited relevance. The primary objective of experience rating in workers' compensation is not to foster the retention of disabled workers, but rather to reduce disability by creating incentives in favor of a less hazardous workplace.

MODIFY EARNINGS TESTS - One possibility is to gradually reduce disability benefits as earnings increase, rather than having a sudden cut-off. Such an arrangement has been in effect for OASI's retirement test since 1973. Benefits decrease by one dollar for every two dollar increase in earnings above the retirement test amount. However, among disability programs a gradual reduction of benefits exists only in the two welfare-type programs (SSI and veterans' pensions). This arrangement reflects the welfare character of these programs rather than an unusual recognition of the problem of work disincentives for the disabled.[12]

Adoption of the gradual reduction solution would reduce the work disincentives caused by notches. However, it threatens one of two unpalatable results. On the one hand, if the reduction of benefits began at an earnings level equal to or above the current earnings test amount, there might be a large increase in costs. Many persons currently denied benefits because of the earnings test might become eligible for some, albeit reduced, benefits. Part of the cost of their benefits would be offset as some current beneficiaries worked more and thus reduced the amount of benefits to which they were entitled. However, net cost increases are likely. On the other hand, if the reduction in benefits began at an earnings level below the current earnings test amount (as might be done in an attempt to keep costs constant), persons currently receiving benefits and genuinely unable to work more than a small amount would suffer a decrease in their income.

Moreover, adoption of a gradual reduction approach tends to move programs toward dealing with partial disabilities, if not in the initial determination of disability then at least with respect to determination of benefit amounts and terminations from the rolls. And this is likely to engender additional administrative complexities.

Another possible solution to the disincentives caused by notch-type earnings tests is to dispense with earnings tests entirely.

However, this alternative ignores the important role earnings tests play in determining whether people are actually disabled. (Recall that ascertaining impairments is not enough because of intervening factors, including subjective ones, that make disability status different from impairment status.) Thus, disability status should be determined in part by work behavior under a suitable set of incentives.

ALTER REPLACEMENT RATIOS - Depending upon which arguments about appropriate replacement ratios are accepted, replacement ratios in individual programs could be modified accordingly. Recall, however, that there are arguments for replacement ratios greater than, equal to, or less than those in retirement programs.

A ceiling and a floor on replacement ratios based on total benefits from all sources would address both low replacement ratio problems and problems of excessive benefits, including those resulting from program overlaps, without necessitating major internal restructuring of programs. Moreover, by eliminating those excessive benefits specifically resulting from overlaps, it might create a greater willingness to broaden programs in order to cover those who now "fall through the cracks." Currently, broadening of programs is discouraged in part by concern about producing excessive benefits through newly created overlaps.

There would have to be an alternative floor at the low-income end based on some minimum income concept rather than a replacement ratio. And there would need to be indexing of both the floor and the ceiling for inflation. There may be constitutional limits on federal regulation of state and private benefits. Thus, it might be preferable, particularly until extensive experience is obtained, to apply the ceiling and floor only to the sum of all federal benefits. In any case, this approach requires coordination among numerous, disparate programs some of which are probably unaware of each others' existence. In particular, it would probably be necessary to decide which programs should be "first dollar" payers, thus being regarded as having the primary responsibility for benefits, and which would be permitted benefit cuts if the total would otherwise be too high. Administratively, the required coordination might be extraordinarily complex.

ELIMINATE JOB-SPECIFIC DEFINITIONS OF DISABILITY, REPLACING THEM WITH DEFINITIONS BASED ON EMPLOYABILITY IN BROAD CLASSES OF WORK - In addition to fostering uniformity, this would eliminate some current disincentives that work against reemployment in different jobs and would tend to eliminate some of the more egregious cases of benefits being paid to persons very able to work. Statutes and court rulings would present impediments to this change in some states.

ELIMINATE TAX TREATMENT MORE FAVORABLE THAN THAT ACCORDED RETIREMENT BENEFITS - As the tax system is progressive, with a substantial zero-bracket amount, the burden of this change would fall primarily on relatively well-off persons. It would eliminate one incentive to use disability programs

inappropriately as substitutes for retirement programs. However, this option implies modifying benefits for groups such as disabled veterans and workers' compensation beneficiaries, and may be challenged as taxing the handicapped. Moreover, it would run up against the claim that program benefit levels were based upon current tax rules and thus changing their tax status would produce unfair reductions.

Appropriate Government Roles

Many of the options discussed so far have involved expansions of current government roles. However, there is a growing view that government does too much. Proposals to reduce government roles are described below.

REDUCE OR ELIMINATE VETERANS' PROGRAMS - Arguably, the veterans' pensions program is duplicative of SSI and the veterans' compensation program is duplicative of military disability retirement. But veterans' programs are widely considered the moral obligation of a society to the people who fought for it. They are, therefore, particularly difficult to eliminate or reduce.

REDUCE DI BENEFITS TO 80 PERCENT OF THE "NORMAL" SOCIAL SECURITY AMOUNT - This would parallel the benefit reduction which exists for those who take early retirement under OASI, as most persons do, and would eliminate the financial incentive to prefer DI over early retirement under OASI. It would follow the direction of changes to DI made in 1980 legislation to enhance work incentives. These changes included the introduction of special benefit ceilings, not applicable to OASI, which in some cases lead to lower benefits.

Administration

One administrative problem has a relatively easy and obvious solution, as follows:

IMPROVE MONITORING OF EARNINGS IN PUBLIC PROGRAMS HAVING EARNINGS TESTS - Use social security earnings records as private programs do. Require the signing of a consent form permitting information release as a condition of receiving benefits.

Problems of Workers' Compensation Programs

REFORM WORKERS' COMPENSATION TO PROVIDE ADEQUATE COVERAGE OF GRADUAL DISEASE PROCESSES - The most obvious mechanism would be through a federal mandate of minimum standards on state workers' compensation programs. This idea has been canvassed widely in recent years, but would represent a departure from a policy established for more than a half century of leaving these programs almost entirely to state discretion.

Appendix

Capsule Descriptions of Disability Programs

Disability programs are unusually numerous and varied in their eligibility standards, benefits and financing. The major programs, categorized by sponsorship and type, are described in the following listing.* Many programs include not only cash benefits, which are the focus of this paper, but also medical care benefits. Some also provide vocational rehabilitation.

Publicly Sponsored: Direct-Operated, Insured

- Social Security Disability Insurance (DI) is the largest single program with over $13 billion paid to 2.9 million disabled workers plus dependents in 1979 (Social Security Bulletin). It covers the same 90 percent of the workforce as the rest of social security. However, DI coverage requires, in addition to OASI coverage rules, recent attachment to the labor force -- generally, covered earnings in at least 20 of the most recent 40 calendar quarters. Benefits are paid to the worker and dependents, as in OASI. The criterion for eligibility is permanent and total disability, defined as incapability of substantial gainful work at any job that exists to a substantial extent in the U.S. economy expected to last for at least one year. Benefits are payable after only five months of disability. Beneficiaries obtain Medicare coverage after two years on the DI rolls. A majority of new awards are to persons 55 and over. Beyond age 55, educational and vocational factors are taken into consideration, relaxing the severity of the medical impairment that is required before a person is considered disabled. Determinations of disability are made by federally-funded state government units according to criteria laid down by the federal government. Medical evidence is submitted by the claimant.

Publicly Sponsored: Direct-Operated, Means-Tested, and Welfare-Like

- Supplemental Security Income (SSI) for the disabled and blind, which paid about $4.5 billion to 2.3 million recipients in 1979, is the disability component of the welfare system (Social Security Bulletin). All persons in the U.S. are covered for permanent and total disability, defined and determined as in DI. Benefits are income-tested, going only to low-income persons, are not related to previous earnings. Unlike DI, there is no waiting period. In most states, SSI beneficiaries automatically obtain Medicaid coverage.

- The veterans' pension program paid $1 billion to one-half million beneficiaries in 1979 (Administrator of Veterans Affairs, pp. 157, 158; Sunshine, p. 30). The pensions are income-tested and available to veterans of wartime service who are 60 percent or more disabled (as determined by the VA), regardless of cause of the disability, with no waiting period.

*More extensive descriptions of these disability programs may be found in Sunshine, pp. 107-121.

Publicly Sponsored: Mandated (Mostly) Coverage of Work-Related Disability

- State workers' compensation programs paid almost $4 billion in benefits in 1977 (Social Security Bulletin Annual Statistical Supplement, Table 16; Sunshine, p. 30). They cover about 90 percent of the private sector workforce. Mandated private insurance is the dominant mode for providing these benefits, but there are also substantial state-administered funds and self-insurance. These programs are often based on the concept of an "accident" -- a short, identifiable event -- leading to disability, and so have poor coverage of gradual diseases.

- Special workers' compensation programs for government employees include the Federal Employee's Compensation Act (FECA) for federal civilian employees which paid $.75 billion in benefits in 1979 (Budget, pp. 652-3). These programs are generally more liberal than regular state programs. However, they often are not supplemented as regular workers' compensation often is by DI or additional employer-provided benefits.

- The black lung benefits program, which paid $0.6 billion to 0.3 million beneficiaries in 1977 (Social Security Bulletin Annual Statistical Supplement, Table 16), is a federal program covering a single occupational disease peculiar to a single industry (coal mining) and reflects a response to the poor coverage of gradual diseases by regular workers' compensation.

Employer-Sponsored: Public Sector

- Military disability retirement, which paid $1 billion to 150,000 beneficiaries in 1977 (Sunshine, p. 30), bases benefits on previous pay and degree of medically determined impairment.

- The veterans' service-connected disability compensation program, which paid $5.5 billion to 2.3 million beneficiaries in 1979 (Administrator of Veterans Affairs, p. 157), is an alternative to military disability retirement. It bases benefits on degree of medically determined impairment, but not on previous pay, and so is more attractive to persons in the lower ranks. Both programs are "second-tier" in the sense that military personnel are also covered by DI.

- The Federal civil service disability retirement program, which paid almost $2 billion to 0.3 million beneficiaries in 1977 (Social Security Bulletin Annual Statistical Supplement, Table 16), pays benefits based upon previous pay and length of service, but with stipulated minimums. The program is both first- and second-tier as these employees are not covered by DI.

- State and local government employee disability retirement programs, which paid $0.6 billion to about 150,000 beneficiaries in 1977 (Social Security Bulletin Annual Statistical Supplement, Table 16), are

mostly second-tier programs. However, for the approximately one-quarter of state and local government workers not covered by DI, they serve as both first- and second-tier programs.

- Sick leave for short-term illness covers about 90 percent of government workers and totaled $4.5 billion in 1977 (Price; Sunshine, p. 30). It often functions also as a front-end program that integrates with longer term programs.

Employer-Sponsored: Private Sector

- Disability provisions of private pension plans cover perhaps half the workforce. They paid roughly $2 billion to almost one million beneficiaries in 1977 (Berkowitz, p. 18; Sunshine, pp. 30-31). Benefits vary greatly -- from an amount above "normal" accrued retirement to nothing paid until age 65 is reached.

- Long-term disability insurance, which paid out $0.5 billion in 1977, is a rapidly spreading benefit which covered about one-sixth of the workforce in 1975 (Berkowitz, p. 18; Sunshine, p. 30), and may be twice as widespread now. It typically requires a six-month waiting period and usually is integrated with the previous program. Both this insurance and disability provisions of retirement plans (the previous item) form a second tier of coverage above and beyond the first tier provided by DI.

- Short-term disability coverage, including both insurance and formal sick leave, covers about 60 percent of private sector workers. Payments totaled about $5.3 billion in 1977. De facto coverage may be more widespread due to informal sick leave arrangements. Five states, which together encompass about one-quarter of the U.S. workforce, mandate that private employers provide short-term disability insurance. In other states, only about 45 percent of the private sector workforce is covered. Short-term disability insurance often has a three- or seven-day waiting period and pays 50-70 percent of wages. Sick leave usually pays full wages without a waiting period (Price).

Individually-Sponsored

- Individual disability insurance policies paid about $1 billion in 1978 and covered about 20 million persons (Health Insurance Institute, pp. 21, 24).

- Individual "self-insurance," or holding individual assets in part because of the possibility of disability, is of an unknown magnitude.

Glossary

DISABILITY -- A health-related inability or limitation in performing roles and tasks expected of an individual in a social environment. Not to be confused with "impairment" (see below). As used in this paper, "disability" is shorthand for "work disability," an inability or limitation in work roles and tasks.

EARNINGS LOSS -- Reduction in earnings due to disability.

EARNINGS TEST -- A feature of a benefit program under which benefits are reduced or eliminated based upon the presence and/or amount of the beneficiary's earnings.

IMPAIRMENT -- An anatomical, physiological, intellectual, or emotional abnormality or loss.

PENSION SYSTEM -- The entire set of programs making payments to retirees, survivors, the disabled, and their dependents. It includes public and private programs, individual arrangements, and both "insured" and means-tested programs.

REPLACEMENT RATIO -- The ratio of benefits to pre-benefit earnings or to what earnings would have been if the worker were not disabled. Numerous means of measuring the ratio can be used and distinctions among them should be observed: gross versus net earnings, total earnings versus earnings loss (the reduction in earnings), inflation-adjusted or not, recent or high-year(s) earnings versus longer-term average earnings, actual past earnings versus current or future earnings projected in the absence of disability, etc.

VESTING -- Obtaining a right to plan benefits even if an employee leaves an employer before the event (usually retirement or the onset of disability) which initiates payment of benefits.

WAITING PERIOD -- An initial period of disability with respect to which no benefits are payable.

Notes

1. For a definition of disability and of the related, but distinct, concept of impairment see pages 9-10 and the Glossary.

2. "Pension system," in this paper, refers to the set of programs making payments to retirees, survivors, and disabled. It includes public and private programs, individual arrangements, and "insured" and means-tested programs.

3. Individual insurance policies and individual private savings are omitted from tables 1, 2, and 3 because they lie outside the group and collective arrangement focus of the sources from which the data came. Payments under individually purchased insurance in 1978 totaled about $1 billion for disability and about $8 billion for retirement, survivors, and disability benefits combined.

4. Data from SSA 1972 Survey of the Disabled.

5. Measurement is usually confined to those under 65 because those 65 and over are not expected to be in the workforce.

6. Data on women are confounded by widespread non-participation in the workforce by those not disabled, and -- because benefits are identified on a family basis -- by retirement benefits going to slightly older spouses.

7. "Earnings loss" refers to the difference between pre-disability and post-disability earnings. For this group it is over 90 percent of pre-disability earnings.

8. Standards for "inadequate" and "excessive" benefits are necessarily somewhat judgmental. A rate of 55 percent approximates the lowest figures the President's Commission on Pension Policy suggests for retirement income goals in its Interim Report. The rate of 70 percent approximates or even exceeds the upper bound for disability benefits recommended by the private insurance industry in light of work incentive concerns. The President's Commission countenances a higher maximum rate -- around 80 percent to 85 percent -- for retirement benefits for relatively low-income persons.

9. This list of three causes ignores differences due to (1) paying different benefits for different degrees of disability and (2) differences in net replacement ratios for a constant gross ratio which result from the progressive character of income tax.

10. The lowest ratios in social security apply to workers with high earnings, who are the people most likely to have private second-tier supplemental coverage.

11. The question of who is "able bodied" and thus ought not to receive disability benefits depends in part on subjective judgments about what types of disabilities ought to be covered. However, evidence such as that presented in this section tends to lead to consensus views regarding the existence of malfunctions in at least some programs.

12. The reduction is based on income in general, not merely income from work. The latter basis is the logical one for a disability-related test; the former, for a welfare program.

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CHAPTER 41: DISABILITY PENSIONS: FOUR OPTIONS FOR CHANGE

Monroe Berkowitz, Jeffrey Rubin

In this paper, each of these issues is analyzed:

- The viability of a universal disability program for all people.
- The use of a ceiling on replacement ratios for all disability benefits as a work incentive.
- The use of rehabilitation, job redesign and so forth to encourage labor force participation.
- The development of an occupational disability program for older workers.

The four issues suggest important distinctions between using disability as the condition for pension eligibility in contrast to using age or years of service.

A Universal Disability Program

The Concept of a Universal Program

At its broadest, it is possible to conceive of a universal disability program as including everyone in the country and citizens abroad, regardless of age, duration of disability or cause of disability and to define disability in its broadest terms as an "inability to carry on normal daily activites" due to some physical or mental impairment. Persons could become eligible at birth and retain eligibility until death. The only requirement for benefits would be a demonstration of illness or injury and the inability to carry on normal daily activities. The activities would change over time from preschool activities, school, work, and eventually to the normal activites of daily living as a retired person. Restriction of activity could be measured in terms of periods of time as short as one day or less, and ability to carry on activities only in some partial fashion could trigger some partial benefits.

Carrying the notion of universality to such an extreme serves the useful purpose of exposing the restrictions we would want to place on a benefits program, even though it might still be broad enough to warrant the term universal. Obviously, the broadest program one could imagine would cause administrative nightmares and would promise financial insolvency, and yet each of the elements, when examined separately, is not obviously wrong or undesirable.

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The notion of a birth to death system (characterized as cradle to the grave, womb to the tomb, or sometimes in terms of events prior to birth and after death) is one made popular by Beveridge (Beveridge, 1942) and others. Our current system does provide certain children's benefits and old age retirement pensions. But the U.S., in common with all other nations, has seen fit to distinguish the risks accorded to broad age groups and the role and status of people in society.

Any effort to promote uniformity in the disability benefits system by covering all groups may well cause overlaps, and duplication with other aspects of the benefits system. It is true that disability always has some mental or physical impairment as one of its elements of eligibility, and that is not true of a retirement system, but that impairment must be accompanied by some period of "disability." The mental or physical impairment must result in an interruption of work or normal activities and the same kind of interruption is present in the case of those who leave the labor force due to voluntary retirement or for other reasons.

In much the same way, the element of very short-term coverage is present in some plans under collective bargaining agreements where absences as short as one hour may be covered. But it is difficult to think of the feasibility of administering benefits for such contingencies as part of a major public benefits program. Present day systems for even short-term disability, 26 weeks or less, place responsibility for such programs under different sponsorship than the long-term disability programs.

The concept of universality can be made less sweeping. It is possible to think of protection against the contingency of long-term disability only for those people who are, or who have recently been, in the labor force. The latter consideration eliminates children and retirees and also adults who are not, or who have not recently been, in the labor force. The glaring omissions under the restriction are students, new entrants to the labor force who have not yet established eligibility, and homemakers, i.e. women or men who attend the household chores as a partner in marriage and who are not paid wages subject to a social security or other tax.

The problem of the recent entrant is different in different programs. For veterans programs and workers' compensation programs, the new entrant has immediate "day one" coverage. The same is true for the means-tested Supplemental Security Income (SSI) program. The situation in the private programs varies. A new entrant may be immediately eligible for supplements to work injury programs if such are provided in the agreement with the employer but may have no, or at best minimal, coverage under long-term disability plans until after some period of service. Some plans may supplement the social security disability insurance (DI) program and the new employee who also is a new entrant into the labor force may not be eligible for coverage under social security.

The real problem for the new worker arises under the DI program, but here it is eased by the relaxation of the number of quarters of coverage required. Normally, 40 quarters of coverage are required before a worker is fully insured. But a worker disabled before age 24 need have only six quarters of coverage in the 12 quarters prior to becoming disabled.

The eligibility requirements for younger workers eases some of their problems but no such relief is accomplished in the case of the homemaker. None of the programs covers her or him, and except for the possibility of purchasing of a policy on the private market, they remain unprotected. If this is a problem, and we believe it may well be, it is one which the disability benefit program shares with retirement programs.

Various schemes have been proposed to ease the problem, ranging from splitting credits for contributions to devising new programs tailored to a world where family relationships are changing and divorce is becoming increasingly common. It is a problem that deserves careful thought and the attention now being devoted to it by the Social Security Administration. Although disability benefits share the problem of lack of protection for the unpaid half of the married couple who is not in the labor market, it has, as usual, an additional administrative problem.

Whatever the ambiguities in the retirement test, it is accompanied by the attainment of a certain age. Disability status has all of the ambiguities of a retirement test plus the inherent uncertainty of deciding on the severity of the physical and mental impairment. There would be no question that some afflictions would incapacitate a person for homemaking duties. But other ailments would have ambiguous consequences for several reasons.

Homemaking duties can be performed with some degree of flexibility insofar as the allocation of time is concerned. Also, in common with other self-employed people, the homemaker has no employer to set tasks and to judge accomplishments (although he or she may have many severe critics). All of this complicates adjudication of disabled status and argues for caution lest administrative pitfalls prove unmanageable. But the problem is too important to let slide, and once the tentative proposals are made to insure greater equity for homemakers in the retirement system, they probably will be attacked on the disability side soon thereafter.

A Universal Program and a Uniform Test of Disability

Even if we confine the concept of universality to labor force participants, past and present, and only to long-term disability, we are still left with problems if we seek the same program for all persons and all contingencies. Not the least of the problems lies in the area of the rather wide array of tests that have evolved to determine qualifications for benefits.

In many private sector plans, a person who is covered under the plan provided by the employer qualifies for benefits when that person's medically defined condition precludes him or her from performing the duties of his or her own job. Federal civil service rules are similar. Some private plans adhere to this "own job" test for a period of time, and then change it to inability to do any job for which the person is suited by training and which is reasonably available.

Work-connected injuries or illnesses operate with different tests of disability. There are some 54 different workers' compensation jurisdictions and each operates with its own rules. But it is possible to make some generalizations. All workers' compensation claims arise out of work-connected injuries or illnesses. If a covered worker sustains an injury which arises "out of and in the course of employment," the worker becomes entitled to medical care and cash benefits during the period of recovery while he or she is unable to work. Following that period, if the worker is left with conditions which are deemed to be permanent, he or she may be entitled to a permanent total, or permanent partial, cash benefit.

The entitlement test may be derived from a schedule which lists the number of weeks of benefits to be paid for the specific loss of an extremity, or for the loss of use of an extremity, loss of vision or hearing. If the case cannot be decided with reference to the schedule, then it is decided on a nonschedule basis with decision rules which vary according to the philosophy and practice in the state.

Some jurisdictions place primary reliance on evaluation of the physical or mental impairment. The person left with permanent consequences of the injury would be adjudged to be 10 percent, 50 percent or some other percentage impaired. The person's residual functioning is compared with a hypothetical "whole person" and the percentage fixed by an administrative tribunal based on medical and lay testimony.

Another group of states will pay less attention to the medical consequences and observe instead the actual wage loss sustained by the worker as a consequence of an injury. The difficulties of determining what portion of wage loss is due to the consequences of a work injury and what portion is due to other factors is obvious. Also, cases have to remain open for long periods of time to observe continuing possible wage loss. Although this appears to be administratively difficult, more states are turning to the wage loss measurements, possibly as a reaction to the frustrations over administering the other schemes.

The third group of states uses a "loss of wage-earning capacity" test. Administrators make judgments, based on the worker's age, education, training and medical and physical condition, as to the worker's future losses in the labor market. Operating with clouded crystal balls, the judgments turn on some conventional rules of thumb with rather gross disparities from state to state (Berkowitz, Burton and Vroman, 1979). It has to be emphasized that workers' compensation programs have the tremendously difficult task of making judgments as to partial disability as well as total disability, and in addition must distinguish injuries and illness with etiologies in the workplace from those which are not work-connected. It should come as no surprise to find this a litigious system which commissions and task forces seek to modify, (National Commission on State Workmen's Compensation Laws, 1972, and Interdepartmental Task Force, 1979).

In addition to workers' compensation programs which operate on a no-fault basis, benefits, if we may call them that, are paid in negligence cases arising from automobile accidents, medical malpractice, personal

negligence, etc. Unlike workers' compensation cases where benefits are restricted to some measure of wage loss and loss of earning capacity (physical impairment tests are proxies for one or the other), recoveries in negligence cases include, in addition to medical care and wage loss, payments for psychic losses as determined by a jury.

In addition to the private sector plans, work injury schemes and negligence suits, disability benefits may be paid because of veteran's status. Service-connected injuries result in permanent consequences which are adjudged according to a rating scale based on severity of the impairment. Unlike the situation in the case of nonservice-connected disability, there are no means tests and no labor market tests, although there may be a vocational bias in the medical ratings.

The means-tested or needs-tested civilian program, SSI, requires no waiting period for coverage. The applicant must demonstrate need and must pass the same disability determination test as for DI. In addition to the means test, the applicant is governed by the same substantial gainful activity test as in DI.

The needs test is a complicated one which examines earnings and assets with minimum exemptions and with some flexibility which is designed to encourage workers to test the labor market. Benefits are set at minimum income support levels and without reference to prior earnings.

The DI test is based on a theory of disability that is a blend of medical, demographic and labor market factors. The law does provide for benefits for covered workers who are unable to engage in substantial gainful activity (SGA) due to a physical or mental impairment. However, in practice, the test for most workers revolves around whether their condition matches or exceeds the so-called "medical listings." Most cases are decided on the purely medical basis although the applicants must minimize participation in the labor force. Earnings above the SGA level, $300 per month, will usually preclude continuing receipt of benefits. Older and less educated workers may be judged on vocational factors and then the question of whether jobs are reasonably available for a person with the characteristics and medical condition of the applicant becomes relevant.

Universality and the Many Disability Benefit Programs

Much of the discussion thus far points to the importance of recognizing the differences among existing disability benefit programs. They differ according to rationale, coverage, duration, types of risks, and benefit tests.

Rationale - The differing rationales for disability programs account for the most fundamental differences among the programs.

The rationale for private plans has to do with concepts of risk aversion as employers and workers seek to supplement public sector programs or to fill gaps in coverage.

The rationale for payments in negligence suits is presumably to curb undesirable conduct and to allocate the costs of the consequences of the incident to those at fault.

The rationale for work injury programs is found in the desire of legislators to encourage safety and to allocate costs of work injuries. There is also the notion that equity demands benefits be paid in the case of work injuries, regardless of fault.

The rationale for veterans' programs must be sought in the legislative judgment that those who served in the armed forces are entitled to special benefits because of that experience.

The rationale for SSI must be in the welfare judgment that those in need who are unable to work because of totally disabling impairments are entitled to a minimum level of benefits.

The rationale for DI rests on some social insurance justification. Without deciding whether this is valid or not, benefits are set at some percentage of prior income to maintain income during the period of disability.

Although these six rationales provide the justification for existing programs, it is possible to envision a society with other rationales for disability programs. Each of the existing programs has developed in response to perceived problems faced by the disabled. As these problems change and as society's views about the disabled are altered, new programs with new rationales will surely come on the scene.

The process by which old rationales are discarded and new ones added is not very well understood. Political, economic, and social conditions no doubt influence the structure of public programs. At present, we see no political support or economic rationale for a single disability program which would cover all persons for all impairments regardless of cause or the individual's status. If one accepts the current range of differing rationales and if universality is interpreted as uniformity, drastic adjustments would have to be made in these programs to make them fit the same Procrustean bed. In our view, a preferred approach is to alter existing programs incrementally where problems are identified. Some of the problems likely to arise if more complete reforms are pursued are emphasized as we look at differences in other aspects of disability programs.

Coverage - For those covered under private plans, the waiting period for eligibility for benefits depends on the provision of the insurance contract or the private plan. Coverage has another important aspect in the private plans. The Commission has explored the lack of coverage under private pension plans among workers in small companies and among workers who are frequent job changers. Since not all pensions cover long-term disability, and since few firms without pension plans would be expected to have separate long-term disability plans, it is likely that the coverage problem is exacerbated in the case of disability. If equity

considerations call for mandated pension coverage in the private sector, it would seem logical to include some disability provisions as well.

There are coverage issues in workers' compensation programs as well. Some states exempt small employers, more exempt agricultural and domestic workers, and all exempt the self-employed. Equally serious problems are posed by the exclusion of certain occupational illnesses and injuries for which it is not always possible to determine origin. These matters have been explored by the National Commission on State Workers' Compensation Laws which has made recommendations on desirable expansions in coverage (National Commission on State Workmen's Compensation Laws).

Other issues in workers' compensation have to do with the disparity in benefits in the state programs and those awarded in negligence cases. Remedies range from allowing workers the additional right to sue employers to extending the no-fault concept to all accidents regardless of cause.

Veterans programs are obviously restricted to ex-servicemen or women. Coverage in SSI is practically universal although restricted to those who can demonstrate need. DI coverage is restricted to those with the requisite quarters of coverage and who have demonstrated recent attachment to the labor force.

These requirements of coverage for DI are prompted by its philosophical and financial stake in the private insurance analogy. Problems are posed in the case of new entrants to the labor force and because coverage of DI is restricted to the private sector and to some government employees. Federal government employees are not covered by DI but by their own disability benefits plan. Workers who transfer from federal employment to private-sector jobs find themselves without protection until they attain the necessary quarters of coverage.

The importance of this problem can be exaggerated. Disability is a rare event and would not be expected to occur often among those who make the transfer from federal to private employment. If the problem is deemed important, and it surely is for the individuals affected, solutions short of a universal program are available. Special options could be created for the limited group of employees who transfer into private sector employment from noncovered employment. For example, rather than waiting until protection is earned, an employee could be given the option of purchasing coverage at an actuarially determined rate until his minimum quarters of coverage are attained.

A more radical solution, logically attractive and politically difficult, would be to extend DI coverage to federal employees. Current disability programs could be modified until they function as supplements to DI coverage as do countless other employer plans in the private sector. But to transfer DI coverage first, and to have retirement programs still separate, would surely be a case of the tail wagging the dog.

It is likely that such a radical change might be made first in the other plan. In any event, if the problem has to do with the transferring former federal employees, universality would seem to be the use of a major weapon to solve a relatively minor problem.

The issue of lack of coverage for homemakers is a more serious problem. Admittedly, those who never enter the labor force, perhaps because of a childhood disability, are also excluded from qualifying for DI on the basis of their own work experience. It is relatively easy to build a case for them on some equity basis because of their lack of opportunity to qualify. In addition, they may qualify on the basis of their parents' coverage. Obviously, these people can qualify for SSI if they are poor. Homemakers are also eligible for SSI, but the case for their inclusion in the social insurance programs rests on the notion that they provide important support functions, that they do work, but never have the opportunity to contribute or share in the proceeds of the contribution made by their partners. Of course, they would (might) receive dependent's benefits but not payments in the event of their illness and inability to carry on homemaker duties. (Under certain circumstances, they may be eligible for homemaker services. Our complex disability system obviously encompasses services as well as cash benefits but these are not discussed in this paper except for the rehabilitation services discussed below.)

In addition to the exclusion of recent entrants and homemakers, there are a number of people who become severely impaired and who receive no transfers. Estimates for the number of self-defined disabled receiving no transfer range as high as 32 percent (Wolfe, 1980). Of course, such estimates include recent entrants and homemakers and other nonparticipants. We do not know to what extent such lack of coverage is due to waiting periods, lack of knowledge of existing programs, income levels or wealth too great to qualify for needs-tested programs, or simply the failure to meet eligibility and coverage requirements of the programs. These gaps and the relatively low level of benefits in some cases result in about 20 percent of the disabled remaining in poverty status even after receipt of disability benefits (Wolfe, 1980; Rubin and Dolan, 1980).

Disturbing as these figures may be, they must be set against the real costs involved in trying to devise single coverage for all disability benefit programs. It would mean elimination of differential rules and benefits in the case of veterans, work injuries and negligence cases. It would, at one extreme, wipe out differences among programs based on a needs test (income support) and programs designed to replace a proportion of prior earnings (income maintenance). Admittedly, it would solve another and quite different problem. A single universal disability program would prevent a person from collecting benefits from more than one program. One person, under our present system, might receive benefits under workers' compensation, DI, SSI and private insurance. The resulting level of payments could provide adverse disincentive effects. We address the problem of replacement rates below.

Duration - Five states and Puerto Rico mandate short-term disability coverage. Many employers provide some sick leave programs for short-term disability in these and other states. Those outside the labor force and

those marginal workers are without coverage except for private insurance. Mandating universal coverage for short-term disabling conditions would have the possible advantage of alerting DI administrators about possible applicants and bringing rehabilitation programs into play at an early stage. But the shorter the term of coverage, the greater the number of cases and the greater the administrative problems.

Yet, we note that states have been reluctant to enter the short-term disability field. When Rhode Island, New York, New Jersey and California began programs after World War II, it was expected that other states would follow as part of the unemployment compensation plan as New Jersey did or as part of a workers' compensation scheme as New York did. That did not happen except in the case of Hawaii and Puerto Rico. Other jurisdictions did not act, possibly because of satisfaction with activities in the private sector in this area. Collectively-bargained plans providing for sick leave and short-term disability benefits (fewer than 26 weeks) were increasingly provided as part of general health and welfare programs. Possibly the increased number of these plans satisfied the union advocates who turned their attention to basic improvements in unemployment insurance and workers' compensation. Demand for short-term disability programs faded at the state level and never gained a serious place on the federal health legislation agenda.

Types of Risks - SSI and DI provide total but no partial disability benefits. This does not mean that a beneficiary must be incapable of any work to be eligible, but requires a demonstration by reason of medical condition or other means that the person is not capable of substantial gainful activity. However, the way the term "substantial" has been interpreted, in terms of dollar earnings figures or by actual participation, it has not extended to paying benefits to those only partially unable to work.

Workers' compensation, the veterans programs and the courts in negligence suits pay benefits for workers who are partially but permanently incapacitated.

There is no logical reason why all benefits programs should not pay partial as well as total benefits. There are very good financial and administrative reasons why SSI and DI have not intruded into this area. Depending on where the threshold for minimum benefits is set, the partial disability program can be expensive and administratively difficult. Most of the administrative attention in workers' compensation programs is in the permanent partial area and almost all of the litigation takes place in the area of these partial benefits. Should DI take on the responsibility for permanent partial disability benefits, it is unlikely that it would escape the litigation and disputes over individual awards that now characterize workers' compensation.

Benefit Test - True universality would require a single program with uniform coverage and uniform definitions and tests of disability. Theoretically, it is possible to devise such a test along the lines of some functional assessment of a person's residual capabilities. But even if it could be devised and administered in some efficient and equitable manner,

it would not serve all needs. Consideration of such a problem brings us inevitably back to the varying rationales for the different programs. Put crudely and simply, if the person has been hurt at work, in the army, or because someone was intoxicated and hit him or her with an automobile, we may want to pay that person a benefit based on the extent of injuries. The person has been harmed and we want to compensate him or her. But if we pay benefits because a person is poor or ill, then the question is, can that person work? If we pay because earning power has been interrupted due to an impairment, the test is can the person sustain a regimen entailed by substantial gainful activity? The questions are different and the answers will be different. A uniform, universal program will be forced to choose some uniform answer which will be unsatisfactory, at least for some purposes.

A Universal Program — A Conclusion

The foregoing arguments point to the difficulties of devising a universal program. At first glance the notion of a single program for all which would eliminate gaps in coverage, overlapping benefits and differences among diverse programs looks attractive. In our view, the difficulties with such a program would outweigh its advantages. For example, we have documented the problems that would arise because of differences in rationale, coverage, duration of benefits, types of risks, and tests of benefits. All of this is not to argue that we live in the best of all possible worlds where no changes are necessary. The scope for reform in each individual program is great and each is, and has been, subject to intense scrutiny by scholars, administrators, and government commissions.

The basic recommendations for reform of the workers' compensation system made by the National Commission on State Workmen's Compensation Laws have stimulated much state legislative action. However, as documented by the Interdepartmental Workers' Compensation Task Force, the states have a long way to go before they can be considered as being fully in compliance with the Commission's recommendations. Problem areas include inadequate benefit levels, gaps in coverage, insufficient survivors' benefits to spouses and children, and arbitrary restrictions on coverage for occupational illnesses.

As with workers' compensation, the deficiencies of other disability programs are well-documented (Berkowitz, 1980). Along with the problems, a number of solutions, far less extensive than a universal program, have been offered. Perhaps the single most important area for incremental reform of existing programs relates to the disincentives built into them. With the passage in 1980 of the Social Security Disability Insurance Amendments, changes (discussed later) will be instituted that should help to encourage more recipients to return to work.

We can expect that in our everchanging society, each of the programs will require periodic revision to meet changing conditions. But the need for such changes does not necessarily argue for the replacement of the current programs by a single universal program. As we have noted, there are gaps in coverage under our present system which places so much

emphasis on labor force attachment. These gaps occur especially for homemakers who may never enter the labor force and for recent entrants to the areas of covered employment. We believe that solutions to these and other problems posed by the differences in programs can be solved by solutions which stop short of a universal program.

Replacement Rates and Work Incentives

Because definitions of disability involve both medical and economic features and because of the subjective element in assessing disability, at the margin some people face a choice between applying for disability benefits and continuing to work. One of the factors influencing that decision will be the relative economic position of a person as a beneficiary and as a worker. With all else equal, higher disability income can be expected to increase the demand for disability benefits. Restricting available benefits by capping the ratio of benefits to predisability earnings is one method of discouraging some applications for disability benefits, but it is not without some deleterious consequences.

Replacement Rates Defined

Before we begin to analyze the role of replacement rates in the disability system, we must be cognizant of a number of definitional complexities. Simply defining the replacement rate as disability benefits divided by predisability earnings may not adequately portray the situation as seen by the claimant. Some of the variables that could make any numerical replacement rate a poor guide to understanding individual decisions include family situations, taxes, added costs associated with disability, and the length of time used to calculate predisability earnings.

Beginning with the last variable, we can explore the importance of accurate measurement of replacement rates. In deciding to apply for disability benefits, an individual will consider the "opportunity cost" of not working. Thus, in studies of the application decision, the denominator should be a measure of expected earnings if benefits are not awarded. An often used proxy, earnings prior to disability, may be biased for several reasons. If the individual's health is deteriorating, that person's earnings capability will be less in the future than in the period prior to seeking benefits. A bias in the opposite direction would be caused if the individual withdrew from the labor force or reduced hours worked, not for health reasons but to better document a disability claim.

The added costs of disability and the payment of taxes on earned income affect the replacement rate in the opposite direction. To measure opportunity cost accurately, the denominator ought to be predisability earnings net of taxes and work-related expenses. Disability status will reduce work expenses,[1] but it often brings other costs. Equipment and prosthetic devices, special transportation, housing modifications, and medical care are a few of the additional expenses some of the disabled (depending on the nature of the condition) might incur.

Medical costs represent an interesting case and require further elaboration. All of us, disabled or not, have medical bills, a portion of which are covered by insurance. What happens to insurance coverage and medical care utilization will determine the extent to which the unadjusted replacement rate is biased. If coverage is not lost, then the increased use of medical care may not require additional direct expenditure by the individual.[2] If fringe benefits are lost, then failure to take extra medical expenses into account could result in a serious underestimate of the opportunity cost. There is strong evidence (Berkowitz and Dean, 1980) that the disabled have the ordinary medical expenses plus additional expenses due to their condition.

An individual's family situation affects the role of opportunity cost in the decision to seek disability status through the determination of income needs. All else equal, having more family members is likely to mean that additional dollars of income are highly valued. For example, a net loss of 20 percent of a given income might have different effects on the application decision of a single man and a married man with children. In opposition to requiring additional dollars is the potential for other family members to go to work (or remain employed).[3]

There are also problems in choosing the appropriate numerator or benefit measure. The true opportunity cost depends on the net reduction in purchasing power. If an individual collects disability benefits from several programs and there are no (or only limited) efforts to integrate plans, then the opportunity cost will be reduced. Evidence from the private sector (Transactions, 1978, Table 1-5A) shows that for disability plans without an integration of benefits provision, actual claims are 4 percent above expected claims. (Expected claims are based on the average experience of all people covered under these plans.)

Not only is there the possibility of multiple disability benefits, but there are other benefits associated with achieving disability and/or low income status. Eligibility for food stamps would raise the real post-disability income of the family. Provisions in state and federal tax laws could result in reduced tax liability and possibly even a tax credit.

With a growing level of income allowable under the substantial gainful activity test in DI and with "own occupation" definitions of disability, there is another source of income for disability beneficiaries. Many disabled can earn some income while collecting benefits. Post-disability earnings can be substantial if an individual is capable of and can find part-time employment. For example, a DI recipient earning $250 per month and collecting a benefit of $400 per month would have an income of $7,800, most of which is free from taxes.

The difficulties in conceptualizing and measuring the replacement rate should not detract from the objective of disability insurance. Even though the replacement rate creates an "incentive" to apply for benefits, it also replaces lost income. If the primary objective of disability protection is to allow disabled persons to maintain their predisability standard of living, then the incentive effects of high replacement ratios should be viewed as a necessary but unfortunate by-product of providing adequate

benefits. The matter of an appropriate replacement rate cannot be answered without a decision (implicit or explicit) about what trade-offs one wishes to make. To us, the important research question is how much of an incentive to apply is acceptable. The choice is represented graphically in Figure 1. As the line suggests, applications rise slowly as the replacement rates approach one1. After point A, small increases in replacement rates bring forward large increases in applications. What is happening is that people with less severe conditions will find it worthwhile to apply for benefits even if the chances of getting benefits are low. There are no money costs in applying,[4] although the time and effort required to apply serve as a barrier.

Actual Replacement Rates and the Application for Benefits

Before examining the incentive effects of replacement rates on application, some available data on actual rates should be summarized. Muller and Lando have developed an extensive array of data on replacement rates for DI under three different definitions of predisability earnings. Rates are reported for individuals by age, race, and sex and cover the period from 1969 to 1975.

We will limit our review to those replacement rates that were calculated using average indexed monthly earnings over an individual's working lifetime. The median replacement rate in 1975 was 62.0, or more than 12 percentage points above the 1969 rate of 49.7.[5] In 1975, 11.8 percent of newly entitled workers had replacement rates below 40 percent while nearly 30 percent had a replacement rate above 80 percent.

Using data on white males only, Muller and Lando estimate median replacement rates for people of different ages and with different earnings histories. By the nature of the calculation, replacement rates should decline as earnings increase. This result is built into the computation of benefits to reflect the equity motives in social security. They define low earnings workers as persons with earnings less than two-thirds of the median earnings for all workers, and high earnings workers as persons with earnings more than four-thirds of the median earnings for all workers. In 1974, the earnings corresponding to these definitions were roughly $400 and $800 per month respectively.

Aggregating across all age groups, the median replacement rates for 1974 for low, medium, and high earners were 89.6 percent, 51.4 percent and 35.5 percent, respectively. For the groups under 50 years old, the replacement rate for high-earnings workers was above 60 percent, while for the older workers it varied between 32.5 percent and 39.2 percent. The higher rates were for low-earnings workers under 30 (a rate of 115.9 percent) and between 30-39 (a rate of 107.5). In all but the 60-64 age group, low earnings workers had replacement rates above 80 percent.

Along with earnings, another important factor affecting replacement rates is the number of dependents. Muller and Lando examined the data for four categories: worker only, worker with an aged spouse, worker with child, and worker with spouse and child. In 1974, median replacement rates

for these groups were 44.8 percent, 53.2 percent, 71.6 percent and 82.2 percent, respectively.

Data are also presented on the proportion of beneficiaries receiving high (greater than 80 percent) replacement rates. Across the same four categories, the percentages of recipients getting above an 80 percent rate were 11.4, 13.1, 38.3 and 53.6, respectively. In 1969, the corresponding percentages were 5.5, 5.0, 14.9 and 28.5. In 1969, 725,000 people applied for DI benefits and in 1974, 1,331,000 people applied. Certainly not all the increase in applications is a result of the increased replacement rates, but as we show below, replacement rates probably contributed greatly to the rise.

In addition to the DI experience, the patterns in group long-term disability insurance also suggest a positive relationship between benefits and salary (Transactions, Table 1-5A). The ratio of actual to expected claims for all experience units (large and small firms) is 71 percent when the replacement rate is less than 50 percent, 86 percent when the replacement rate equals 50 percent, and is 103 percent when the replacement rate is above 50 percent.[6]

In our view, the significance of the replacement rate is greatest in the decision to apply for benefits. We do not believe that once an individual begins to receive benefits his replacement rate affects his consideration to return to work. Instead, a new kind of replacement rate becomes relevant. We call this the "benefit replacement rate" (BRR) and define it as expected earnings divided by expected benefits.[7] Conceptually, the BRR maintains our opportunity cost view of individual decision-making. In this case, there is not an incentive to apply but rather a disincentive to work. Benefits are still important but as a measure of opportunity cost. There is also more uncertainty regarding expected earnings than there is regarding expected benefits prior to applying for DI. It is understandable that a worker facing an uncertain future may prefer to opt for disability benefits which for DI, SSI and other programs may keep up or even surpass the changes in the cost of living.[8]

Returning to the role of replacement rates in the decision to apply for benefits, a growing literature documenting the replacement rate-applications link is summarized below. In one of the first attempts to model the disability application process, Berkowitz, Johnson and Murphy used regression analysis to estimate the impact of replacement rates and a wide range of other variables on the probability of applying for DI benefits.[9] These authors found that the opportunity cost of becoming a beneficiary was negatively and significantly related to the probability of applying. "The elasticity of application with respect to opportunity cost is .17. For an individual capable of earning $400 a month in the labor market, an increase in the DI benefit from $100 to $200 per month will lead to an increase of 5 percent in the probability of application."[10]

In another study, Halpern has estimated another model of the application decision. She concludes that, "The evidence shows that increases in the replacement rates have been responsible, in part, for the large increase in the number of applications ... According to the regression

equations, a 10 percent increase in the replacement value of benefits increases applications by about 4 percent."[11] In viewing the trade-off between adequacy and incentives, Halpern concludes that emphasis should be placed on improving incentives to terminate rather than drastically restricting benefits under DI.

Halpern examines her estimates in light of the actual situation in the fourth quarter of 1977. Using her elasticity estimates, she finds that a $55 reduction (10 percent) in average benefits for a family of four would result in 11,000 (4 percent) fewer applications. It is difficult to know how many of these people would have been awarded benefits. The overall award rate, including reversals, could not be used because in all likelihood those choosing not to apply would be different from those who do apply.

Other studies by Lando and Hopkins and by Stephenson and Meyer (see bibliography) also confirm the impact of the replacement rates on applications. As data become available from the 1978 Survey of Disabled Adults, new estimates should be made; we expect little to have changed.

Conclusions

Limiting replacement rates to 80 percent will obviously affect only that proportion of the population which rates above 80 percent. The overall elasticity may not be applicable for this population if other characteristics such as age and absolute earnings are very different. In sum, while some reduction in applications can be expected, the number of people induced to continue working is uncertain. Also uncertain is the impact of the reduced benefits on income of the disabled. For the low earners, it will clearly involve a substantial hardship, but for others the effects will not be so severe. It may, therefore, be reasonable, in the interests of equity and adequacy, to limit the imposition of an 80 percent cap to those with high (however defined) preapplication earnings. While this suggestion would violate the insurance component of DI, it would affirm the distributional principles inherent in the current system used to calculate benefits.

In discussing the setting of a maximum benefit level, we should not ignore the related issue of a minimum benefit level. As noted above, the structure of benefits in DI is designed to replace a larger share of earnings of low-income workers. The same equity judgment provides support for incorporating a minimum benefit. Yet, a stronger inverse relationship between prior earnings and benefits will further weaken the social insurance concept on which DI is based. We feel the current structure in which SSI serves as an income-based backup to DI benefits is a fair and reasonable method to meet the equity objective.

Rehabilitation and Return to Work

Rehabilitation can be broadly defined as the restoration of a person to his fullest capabilities in light of his physical and mental conditions. In the context of disability programs, a narrower definition is appropriate.

The objective of rehabilitation is to return the individual to the labor market with the expectation of regular employment at a wage which will allow him to leave the benefit rolls.

Such a program may be operated under a private or public agency. It will often consist of physical restoration, the provision of aids and devices, educational and training programs, and the guidance and advice of a professional counselor.

A broad array of efforts are being made to encourage the reemployment of disabled workers. While public and private rehabilitation efforts are successful in returning some of the disabled to employment, there is a belief that many more people currently collecting benefits could be helped to return to work. Improvements in existing rehabilitation and other employment-related programs and new programs are offered as options. Legislation mandating affirmative action and nondiscrimination in employment, seen by some as needed to overcome the most significant roadblocks to reemployment of the disabled, is still being defined through litigation. Tax and subsidy policies to encourage job-redesign are getting closer examination for special groups of workers and may be applicable to the disabled. Finally, foreign experience with quotas offers some guidance on a more direct form of intervention in employer-personnel decisions.

In this section we will review what is known about recovery rates in public and private disability insurance and the considerable body of empirical evidence on factors contributing to successful rehabilitation. Other options have not been as well developed, either in the literature or in practice. These possibilities are examined in the context of a model of demand and supply of disabled workers. This chapter also summarizes what is known about the structure and function of private rehabilitation efforts, surveys recent changes in the DI program designed to reduce disincentives, and presents suggested reform options.

The Role of Rehabilitation in Disability Pension Policy

The disabling consequences of a health condition often can be avoided or overcome through the provision of medical, educational, vocational and other services. The success of these rehabilitation services will depend on a wide range of client characteristics "given" to the rehabilitation agency as well as the kind of job the agency does. From a purely financial perspective, rehabilitation can be attractive because of the potential savings of reemploying an individual currently receiving a disability transfer payment. But, in a similar view, there will be some recipients for whom rehabilitation would <u>not</u> be a financially-sound undertaking. Although there are exceptions, it is obvious that older workers who have nearly reached retirement age, and those individuals with severe health, educational, and skill deficiencies, would not be candidates for rehabilitation from a benefit-cost standpoint.[12]

In analyzing rehabilitation of disability beneficiaries, it is helpful to place the problem in a labor market perspective and examine the supply of and demand for rehabilitated employees. The level of earnings and the

quantity of impaired workers employed are determined by the willingness and ability of firms to hire these workers at different wage levels and the willingness and ability of these workers to work. In principle, from the firm's perspective, the most important determinant of demand is the worker's productivity and the associated revenue. Given two workers who will be paid the market wage, the profit-maximizing employer will select the more productive worker. Since, almost be definition, disabled workers have suffered some productivity loss, it can be expected that there will be less demand for their services at a given wage. To the extent that rehabilitation improves productivity (in the old or even a new profession) it will put the worker in a more competitive position and should result in more employment.

There are, of course, numerous qualifications one should make in such a simplified view of the disabled worker in the labor market. At both the theoretical and practical level, it is obvious that labor markets do not function as simply as described above. While we will mention a few of the necessary qualifications, we also strongly retain the view that worker productivity is the key element in the employment decision.

One problem with the productivity model of demand is that it contains an implicit assumption of nondiscrimination on the part of employers. Although the measurement of discrimination is extremely complex, one recent study (Horning, 1979) does provide support for the view that discrimination is present.

An alternative explanation for the wage and employment differentials (which persist even after adjustments are made for productivity variations) between impaired and non-impaired workers is that in the hiring decision employers lack information on the potential productivity of the disabled. Many judgments about employment are based on interviews during which a worker "signals" an employer regarding future effort and success. Employers may unwittingly misread the impact of physical and mental problems on productivity.

On the supply side of the labor market, we are concerned with an individual's willingness to work for a given wage. The traditional view of this decision is of an individual allocating time between work and leisure based on predetermined preferences for income and leisure.[13]

Income from nonlabor sources, such as disability transfer payments, will reduce the supply of labor. Higher income, in effect, allows the purchase of more leisure. At the same time, the impairment has reduced the potential wage that a worker can expect. A reduction in wage rates leads to a substitution and income effect. The substitution effect is the reduction in labor supply that comes about because the decline in wages makes leisure "less expensive." But, lower wages means lower income and a reduced "purchase" of leisure. The net effect is uncertain. To the extent the transfer payment minimizes the significance of the income effect, we can expect these payments to reduce labor supply. Moreover, the potential of losing transfer income acts as a disincentive to return to work, especially if the transfer is large relative to the wage the individual can earn after rehabilitation.

In the context of supply and demand, we can now consider the role of rehabilitation. Regardless of whether rehabilitation involves training for a new occupation or becoming capable of performing past skills, the general objective can be seen as increasing the worker's physical productivity. To the extent rehabilitation is successful in meeting this objective, it can be expected that the quantity of impaired workers demanded will increase.

It is important to recognize not only the increased ability to produce, but also the value of that output. Learning to produce a product not valued very highly on the market may not be very beneficial. Employers will be interested in the value of output which means physical units and their prices. Sometimes, as a result of a disabled person's health condition, it is not feasible to provide training for or anything other than a low skilled job. In fact, one of the bases for allowing sheltered workshops to pay less than the minimum wage is that otherwise there would be no employer willing to hire the workshop clients.

While increased productivity will affect demand, so too, will it have an impact on supply. By moving into a higher wage market, the choices facing the disabled worker are altered. Since potential earnings have increased, the opportunity cost of losing eligibility for transfers has been reduced. Thus, rehabilitation to jobs with higher wages will play an important role in reducing the disincentive to work.

Other efforts, besides rehabilitation, to increase the employment of the disabled can also be viewed in the framework of demand and supply. For example, job redesign may be seen as an indirect method of increasing employee productivity. Therefore, firms may find expenditures on redesign (for some kinds of workers in some kinds of jobs) a worthwhile investment, perhaps even better than putting these dollars into the training of a new employee with no experience. Because efforts by employers are not part of a single program, little is known about job redesign activities in the aggregate.

From the worker's point of view, reducing the opportunity cost of working will be an important element in the decision to return to work. Along with efforts to increase earnings, we can consider parallel efforts to decrease the loss of benefits as earnings rise, as is currently the case in SSI. Rules can be changed to prevent losses in nonmonetary benefits, such as medical care, after an individual returns to work. But once the costs to the worker are diminished, it adds to the costs of others. The added costs of paying for medical care for people going back to work should be balanced against the added savings from encouraging people to return to work.

These links between employment, benefits, and earnings suggest that efforts to improve rehabilitation success can be in two directions simultaneously. In the first instance, we can find ways to encourage better performance in the purely productivity-related aspects of rehabilitation. Secondly, we can look to changes in programs or the creation of new programs as a means of reducing disincentives to work facing disabled workers and increasing employer incentives to hire the disabled. After describing the structure and success of rehabilitation programs, we examine some policy options along the lines just suggested.

Public Rehabilitation Programs

Public provision of rehabilitation services has a long history in American social welfare policy. Over time, political, social, economic, and medical systems relating to disabled people have all changed. Rehabilitation has been a dynamic program in that its direction and focus has also changed to meet the changing needs of the disabled population. Yet philosophically, there is a difference of opinion as to whether the focus of rehabilitation should be simply to return to work or whether the primary objective is the termination of disability benefits. This difficulty is less significant in the private sector where the provision (or financing) of services by an employer is generally directed toward returning the employee to work.

The largest public program is the federal-state vocational rehabilitation (VR) program. In 1979, about $1 billion was spent and nearly 300,000 persons were rehabilitated. Because it is not directly linked to any disability benefit program, the VR program has not been oriented to rehabilitation as a way of reducing disability pensions. With growing emphasis on independent-living skills and a long-standing definition of rehabilitation that requires only a 60-day post-services employment period, it is clear that the VR program is not closely tied to the issue of cash benefits for the disabled.

In an attempt to resolve this dilemma, Congress has created two special vocational rehabilitation programs for DI (Beneficiary Rehabilitation Program, BRP) and SSI recipients. The programs are financed 100% from the DI trust fund and from general revenues, respectively. (The VR program is financed from general revenues with 80 percent from the federal government and 20 percent from the states.) These two special programs were established with the requirement that savings in reduced benefits be above costs of rehabilitation services. The programs are operated through the same system of state-level agencies as the more general VR program. In some cases, states have chosen to have specialist counselors for clients from these two programs while in other states no distinction is made.

In 1980, the BRP was budgeted at $113.3 million and the SSI rehabilitation program received $55 million. These programs grew rapidly in the 1970's, but dissatisfaction with performance led Congress to slow down their growth and even consider abandoning them altogether. We are certain that the BRP, which has had some success in the past (see Berkowitz, et. al., 1981 and U.S. General Accounting Office, 1976), can continue to be cost effective. Improvements are possible, although it is difficult to judge how large any such gain can be. For SSI, the picture is less clear. There are a number of possible explanations for its apparent inability to generate benefits greater than costs (U.S. General Accounting Office, 1979). For example, SSI clients receive less, on the average, than DI beneficiaries, making any return to work less valuable. Moreover, SSI clients have less employment experience than DI clients, making their rehabilitation more difficult and more costly.

The available data allow us to look much more closely at the recovery of disabled workers in the DI program. Although many of the same issues come up in an analysis of the SSI program, there are enough differences to require that separate consideration be given to the two special rehabilitation programs.

The termination of disability benefits can occur on the basis of either of two situations: medical recovery or employment with an income above a predetermined level of income, referred to as "substantial gainful activity" (SGA). It is not possible to separate recoveries caused by rehabilitation or by other factors. Nonetheless, since our concern is with the return to work and the termination of benefits, it is important to review total recovery rates. Below we look more closely at the impact of rehabilitation and earnings on the probability of termination.

In Table 1, we summarize some data on trends in recovery rates in the DI program. The 1970's witnessed two distinct periods: from 1970 (beginning, in fact, in 1967) to 1976 the recovery rate fell, after that the rate increased to near its 1970 level. Schobel cites several reasons for the observed pattern. In his view, the decrease in recovery rates was due to "increasingly high benefit levels ... and changes in the administration of the program" (Schobel, p. 10). With the advent of several new programs during the early 1970's, there were fewer resources available for review of state-level disability determinations, and hence fewer cases were identified as potential medical recoveries. As for the increase in recovery rates, Schobel offers the following opinion.

> Two important administrative changes may account for this increase in medical recoveries. First, in 1977, administrative policies were changed so that cases investigated for possible medical recovery are now decided according to whether the beneficiary would qualify as an initial claimant. Past policy required proof of actual improvement in medical condition in order to bring about termination. Second, and probably more important, for cases where State Agencies find that expected medical recovery has not occurred, central office review was increased from 10% to 100% in late 1976. This rate of review was reduced to 50% in July 1977.

More detail on the pattern of recoveries can be obtained from closer examination of recovery rates according to age, sex, and duration of disability. Evidence of the lower recovery rate for females, older workers, and among those who have been eligible for more than two years is presented in Table 2.

Schobel also examined some changes in mortality and recovery rates over time. A comparison of experience between 1975-1978 and 1973-1976 shows a slight rise in mortality rates among men below age 40 and among females below age 55. These results provide support for the hypothesis suggested earlier: tighter application of eligibility standards has led to a more severely disabled DI population. This change obviously makes rehabilitation more difficult and suggests a problem in looking at rehabilitation trends alone as a basis on which to judge the BRP. Yet,

TABLE 1

Beneficiaries and Recoveries in the DI Program

Year	Avg. No. of Beneficiaries (1000)	No. of Recoveries	Gross Recovery Rate per Thousand
1970	1,460	40,802	27.9
1971	1,586	42,981	27.1
1972	1,754	39,393	22.5
1973	1,937	36,696	18.9
1974	2,129	38,000 EST.	17.8
1975	2,391	39,000 EST.	16.3
1976	2,615	40,000 EST.	15.3
1977	2,781	60,000 EST.	21.6
1978	2,882	64,144	22.3
1979	2,893	72,325	25.0

Source: Bruce D. Schobel, "Experience of Disabled Worker Benefits Under OASDI, 1974-78," Actuarial Study No. 81, SSA Pub. No. 11-11528, USDHHS, April, 1980.

TABLE 2

Recovery Rates in the DI Program
(per 1000)

Age at Entitlement	Recovery Rate During: First Year of Entitlement	Second Year of Entitlement	Third Year of Entitlement	Fourth Year of Entitlement
21				
Males	50.9	146.0	109.9	66.4
Females	41.3	98.6	77.3	45.2
30				
Males	46.6	126.1	91.8	48.5
Females	27.9	80.1	63.8	31.8
40				
Males	34.1	91.7	61.6	28.2
Females	20.8	65.5	48.6	21.9
50				
Males	15.6	41.8	21.0	9.0
Females	11.6	34.5	20.1	7.5
60				
Males	2.9	8.1	2.7	1.0
Females	2.6	5.5	1.7	0.6

Source: The data are from 1975-1978 experience and are presented in Tables 6 and 7 in Schobel, 1980.

recovery rates have increased from the 1973-1976 period, again attributable to changes in the administrative review process.

Although the focus has been on all recoveries, there is good reason to know something of the importance of rehabilitation in recovery. Because of the wide array of services offered under rehabilitation, it is incorrect to assume that medical recoveries are nonrehabilitation-related and that earnings recoveries are. Rather than count potential medical recoveries as due to rehabilitation, one government agency (U.S. General Accounting Office, 1976) chose to invalidate all diaried (required reexamination) cases when it considered the benefits of the BRP. Even if the services were not the prime cause of recovery, it is possible that the services led to higher earnings than would otherwise have been earned. Another complication is that there can be a long delay between receipt of rehabilitation services and termination of benefits. Again, causation is difficult to establish with any certainty.

In an effort to better understand the link between rehabilitation and termination, a group of researchers at Rutgers (Berkowitz, Horning, McConnell, Rubin, and Worrall, 1981) undertook an investigation into the factors associated with termination for a group of clients who received rehabilitation services. Among the variables examined for their affect on termination were age, education, marital status, type (but not severity) of impairment, and duration of disability. Among clients who were declared rehabilitated by the state agency, 35 percent had their benefits terminated. The rate of termination decreased with age and increased with level of education. The lowest rates of termination were among those with mental retardation, speech, visual, and hearing impairments.[14] The highest termination rates were among those with orthopedic, genito-urinary, and respiratory conditions.

Males had a higher termination rate (38.7 percent) than females (23.2 percent), while whites had only a slightly higher termination rate (35.5 percent) than nonwhites (32.0 percent). Clients who were married had a higher termination rate (37.5 percent) than the nonmarried (31.5 percent). Finally, the termination rate rose with the wage the client was receiving at the time that the client's case was closed by the rehabilitation agency. More important than the absolute wage was the wage in relation to benefits. The relationship, which was as expected, is summarized in Table 3.

To separate the effects of the many different variables, a regression analysis was done with termination/nontermination as the dependent variable. The results are presented in Table 4. Earlier analyses suggested that the relationship between probability of termination and the wage/benefit was nonlinear. Therefore, two separate regressions were estimated to distinguish the different consequences of a wage/benefit ratio being above or below one.

The results show the importance of bringing the wage/benefit ratio nearer to one and the relative unimportance of comparable increases beyond one. The results suggest two directions to improve performance of the BRP: more careful selection, especially with regard to age and

TABLE 3

Wage/Benefit Ratio and the Rate of Termination

Wage/Benefit Ratio	Rate of Termination
0.00 - 0.25	4.4
0.26 - 0.50	13.9
0.51 - 0.75	22.2
0.76 - 1.00	40.5
1.01 - 1.25	50.7
1.26 - 1.50	53.6
1.51 - 1.75	61.8
1.76 - 2.00	64.7
greater than 2.00	69.6

Source: Berkowitz, Monroe, Martin Horning, Stephen McConnell, Jeffrey Rubin and John D. Worrall, "An Economic Evaluation of the Beneficiary Rehabilitation Program." In Jeffrey Rubin, ed., Alternatives in Rehabilitating The Handicapped: A Policy Analysis (New York: Human Sciences Press, 1981).

TABLE 4

Probability of Termination Regression Results
White Male Cohort of 1973 BRP Rehabilitants[1]

	Those With Wage/Benefit Ratios of Less Than One		Those With Wage/Benefit Ratios Equal To or Greater Than One	
Variable	B Coefficient (Stand. Error)	F-Value	B Coefficient (Stand. Error)	F-Value
Constant[2]	.0796911		.5213107	
Age 55-64	-.0876900 (.02063)	22.433	-.2204089 (.03731)	34.907
Age 45-54	-.0581019 (.01762)	10.868	-.0453020 (.02547)	3.162
Age 25-34	.0702263 (.01965)	12.773	.0388751 (.02471)	2.482
Age 14-24	.0575174 (.02864)	4.034	.1034945 (.02875)	12.959
College degree	.0876933 (.03849)	6.120	.0638810 (.05345)	1.429
1-3 years of college	-.0499096 (.02904)	2.499	.0736811 (.03801)	3.758
High school graduate	.0211751 (.02024)	1.094	.0956540 (.03106)	9.465
1-3 years of high school	-.0255230 (.02102)	1.474	.0445341 (.03255)	1.872
8 years of elementary	-.0086072 (.02359)	0.133	.0147545 (.03771)	0.153
Married	.0518518 (.01688)	9.431	.0831776 (.02081)	15.969
Visual impairment	-.0790213 (.02404)	10.805	-.0521420 (.03609)	2.092
Hearing impairment	-.0831094 (.04469)	1.827	-.0990160 (.06506)	2.354
Orthopedic impairment	.0204427 (.01965)	1.341	.0565990 (.02371)	5.696
Amputation	-.0057797 (.02909)	0.054	.0558036 (.04092)	2.566
Mental disorder	-.0458479 (.02907)	3.300	-.0985052 (.03433)	8.233
Mental retardation	-.0661832 (.04752)	1.940	-.1088044 (.08300)	1.718
Years from onset to closure	-.0031035 (.00046)	45.468	-.0097732 (.00089)	201.844
Months from referral to closure	-.0012636 (.00035)	12.827	.0026601 (.00046)	0.337
Wage/benefit ratio	.4333570 (.01993)	472.740	.0236662 (.00534)	19.677

[1]Terminations include only those 1973 BRP rehabilitants with both an MER and an R 300 record with appropriate entries for the variables used who left the DI beneficiary rolls because of recovery for any duration during the period July 1977 to January 1978

[2]The constant captures the combined effect of three nonspecified dummy variables in the probability of termination: These variables are age 35-44, 0-7 years of elementary school, and the disability classification for which the etiology is not known or not appropriate

Source: Berkowitz, Monroe, Martha Harning, Stephen McConnell, Jeffrey Ruben and John D. Worrall, "An Economic Evaluation of the Beneficiary Rehabilitation Program." In Jeffrey Ruben, ed., *Alternatives in Rehabilitating the Handicapped: A Policy Analysis*. New York, Human Sciences Press, 1980

CHART 1

Relation of Variables to Recovery by 1975 for Working-age Survivors with Disability Allowances in 1972

Variable	Recovery experience and characteristics of survivors [1]		Independent statistical effect on recovery found in logit analysis [2]
	Associated with difference in recovery rate		
	Higher Recovery Rate	Lower Recovery Rate	
Age	Younger. 23 percent under age 40 recovered.	Older. 4 percent or less of those aged 50 or over recovered.	Significant difference ($t = 17.37$).
Sex	Male. 10 percent of the men recovered.	Female. 6 percent of the women recovered.	Significant difference ($t = 4.20$).
Number of dependent children	With more dependents. 14 percent with 3 or more children recovered. (The recovered were younger workers, with no difference by marital status.)	With fewer dependents. 6 percent with no dependents recovered. (Many of the recovered were the oldest workers.)	Significant difference ($t = 3.62$).
Primary diagnosis	With injuries, infective diseases, and mental illness. Recovery rates: Fractures, 33 percent; disc displacement, 16 percent; tuberculosis, 34 percent; schizophrenia, 8 percent; statutory blindness, 10 percent.	With chronic diseases related to aging. Recovery rates: Heart disease or osteoarthritis, 3 percent; emphysema, less than 1 percent; neoplasms, 1 percent.	Significant difference ($t = 11.57$).
Education	With more schooling. 9 percent with more than high school recovered.	With less schooling. 4 percent with less than 9 years of school recovered.	Significant difference ($t = 4.86$).
Mobility	In treatment facility at time of application. 9 percent in a hospital or institution recovered.	With no limitation on ambulation. 5 percent recovered.	Significant difference ($t = 3.35$).
SSA region	In Western State. Recovery rates: San Francisco or Seattle region, 8 percent.	In Southern or Eastern State. Recovery rates: Atlanta, New York, and Philadelphia regions, 5 percent; Puerto Rico, 2 percent; Florida, Arkansas, Virginia, and West Virginia, 4 percent.	Significant difference ($t = 3.88$).
Predisability earnings	Higher earnings. 10 percent of those with annual earnings of $6,000 or more recovered.	Lower earnings. 6 percent of those with little earnings before onset of disability recovered.	Significant difference ($t = 7.36$).
Level of benefit	Higher amount. 10 percent with benefits of $300 or more recovered, but in logit analysis, with other variables controlled, higher benefits produced lower recovery rate.	Lower amount. 5 percent with benefits less than $250 recovered.	Significant difference ($t = 3.48$).
Earnings replacement	Higher replacement. 10 percent of those with replacement of 100 percent or more recovered, but in logit analysis, with other variables controlled, higher replacement produced lower recovery rate.	Lower replacement. 7 percent of those with 25–74 percent replacement recovered.	Significant difference ($t = 4.94$).
	Not associated with differences in recovery rates		
Marital status	Among married or single workers, 8 percent recovered.		No significant difference ($t = 0.10$).
Race	Among black or white workers, 8 percent recovered.		No significant difference ($t = 0.14$).
Occupation	In small group with white-collar positions (professional, technical, and managerial) 12 percent recovered; 6–9 percent of the blue-collar workers recovered. In logit analysis, little differences in recovery rates found among most occupational categories and no statistically significant differences by occupation.		No significant difference ($t = 1.09$).

[1] Based on recovery rates in cross tabulations in tables 3, 4, 6, and 7.

[2] According to t ratios (in parentheses). See discussion and table V in technical note for derivations of these measures.

Source: Ralph Treitel, "Recovery of Disabled Beneficiaries: A 1975 Followup Study of 1972 Allowances," Social Security Bulletin, Vol. 42, No. 4, April, 1979, p. 7.

education, and greater attention to the level of wages at closure. The existence of differences across states in regard to both factors is a strong indication that even with existing client disincentives, better performance is possible.

In another recent study, Treitel estimated the impact of different variables on recovery. His sample consisted of 413,000 beneficiaries in 1972. The characteristics of persons who recovered by 1975 were compared to those who were still collecting benefits. Of those in the sample, about 7 percent recovered, 42 percent were still collecting benefits and the rest had either attained age 65 or died.

The findings of Treitel's study are summarized in the following chart. The results are generally consistent with the research reported earlier. Among the more important findings, again, is that once other factors are controlled, the level of benefits is negatively related to recovery rates.

In summary, the evidence from the DI program suggests a limited potential for further efforts at rehabilitation. The characteristics associated with greater probability of disability (older age, lack of education, severity of impairment) all point to the basic difficulty in rehabilitation. Yet, some program features compound the problems. In an effort to improve the well-being of the disabled, the payment of larger benefits and the provision of medical insurance establish a disincentive to return to work. There appears to be room for reducing disincentives and increasing recovery rates through rehabilitation.

Before we discuss some recently-instituted changes and some other possible reforms, we shall take a short look at private sector rehabilitation. The basic issues are essentially the same as in the public sector. Yet, it has proven difficult to analyze the private disability and rehabilitation system. The most obvious reason for the difficulty is that there is not a single program but rather a collection of insurers and rehabilitation providers. For this reason, not very much data are collected as to private market experience. The data that are available do not provide separate information on terminations due to recovery and death. The data do show a decline in termination rates at higher ages and with longer duration of disability (Transactions, 1979). Comparing combined deaths and recovery rates suggests that the private sector experiences higher rates than the DI program, especially among younger workers with shorter durations of disability. While this is suggestive of more success in achieving recovery, we cannot even guess as to the relative contribution of rehabilitation services, benefit structures or the definition of disability. In fact, there is very little known on the size and structure of rehabilitation in the private sector. In the next section, a short review of different types of providers is offered.

Rehabilitation in the Private Sector*

The past five years have brought a virtual explosion of private rehabilitation services, stimulated in part by state legislative changes in workers' compensation that mandate rehabilitation services for injured workers. Many states have followed California's example of encouraging private rehabilitation services. In turn, the rise of the private sector has brought about an increasing awareness of rehabilitation by industry, and a new core of rehabilitation leaders and practitioners. Rehabilitation research has shown that to deal effectively with the rehabilitation of individuals within a compensation system, it is necessary to:

- Begin rehabilitation prior to, rather than after, the initiation of a claim;
- Accurately and efficiently evaluate the individual's residual capacity after injury;
- Develop specific intervention strategies for specific problems; and
- Reduce the time between injury and rehabilitation efforts.

The rehabilitation services within the private sector have evolved to meet these needs. They are conducted by several different types of organizations and are paid for by the employer, insurance carrier, or the benefit programs' sponsors. Although classification of providers is difficult, rehabilitation services in the private sector can be grouped into five categories of providers:

- Nonprofit or proprietary hospitals, rehabilitation centers or health care centers;
- Private insurance carriers;
- Private for profit rehabilitation businesses;
- Rehabilitation units within private corporations' personnel or labor relations programs; and
- Labor unions.

Each group has its own organizational structure, staffing pattern, goals, types of services, relationship with referral agencies, fee structure, and evaluation system. Variations are dependent on the size of the organization, the quality of the personnel involved, and the degree of sophistication and effectiveness in providing an appropriate service to the individual. The following review will present and analyze the characteristics of the private sector rehabilitation services. It must be acknowledged that there is a significant lack of hard data to evaluate

*This discussion of rehabilitation in the private sector was prepared specifically for inclusion in this paper by Dr. Kenneth Mitchell, Director, Division of Rehabilitation Counseling, University of North Carolina.

outcomes. Much of this analysis is based on review of the services provided, organizational structure of the programs, and the general linkage between industry and the disabled individual observed in the five areas of operation.

Nonprofit or Proprietary Hospitals, Rehabilitation Centers, and Health Care Centers - Rehabilitation services based within hospitals and rehabilitation centers have been providing rehabilitation services to people with chronic diseases and functional limitations for nearly 30 years. Traditionally, no particular emphasis was put on disincentive issues, complicating the rehabilitation of these disabled individuals who receive compensation benefits. There appeared to be a conscious effort to separate the treatment issues from problems of compensation benefits.

Currently, 930 rehabilitation centers or hospitals in the U.S. are accredited by the Commission on the Accreditation of Rehabilitation Facilities (CARF) as vendors of rehabilitation services. These services extend beyond the problems of preparing an individual for return to a job. They include inpatient and outpatient medical management, personal and vocational adjustment services, as well as work evaluation, job placement, and other ancillary services.

A growing number of these centers are developing links with industry and insurance carriers. Center management sees private industry and insurers as a source of income, which they are able to tap through their ability to meet the rehabilitation needs of disabled people. A program that is operationally linked to industry can serve as a preretirement and predisability insurance evaluation center. If such a program is an administrative unit of the hospital, fees for inpatient services can be incorporated into a per diem rate and covered by third party payers. Such units may also serve outpatients on a fee for service basis, using a wide range of prices. (For example, a work evaluation can total anywhere from $250 to $450, or $25 to $45 per hour, while counseling services range from $15 to $30 per hour.) The majority of private disability insurance programs will cover such costs.

Special evaluation or disability prevention centers have been developed in Ohio in conjunction with workers' compensation rehabilitation programs. A network of six rehabilitation centers in North Carolina offers a different blend of rehabilitation centers available for such a cooperative effort.

The lack of aggressive expansion of these centers into the disability/retirement process is unfortunate. Creative outreach programs could begin to develop a strong collaborative working relationship with industry or the insurance carriers. Industry would then be better able to become involved in the early stage of the disability and rehabilitation process.

Private Insurance Carriers - Private insurance carriers have led in the development of rehabilitation programs for their claimants. The major motivation for such activities is their desire to reduce claims costs by reducing the number of people receiving long-term disability benefits. No

single statement can adequately characterize these providers because their degree of involvement and expertise in rehabilitation varies considerably.

The Insurance Research Study Group (IRSG) reports that all insurance carriers who write no-fault auto insurance, workers' compensation, or long-term disability benefits have at least one person who oversees the rehabilitation issues involved in claims management (Welch, 1980). This person's activities include administration, evaluation, and monitoring of rehabilitation of recipients of benefits.

The process of rehabilitating claimants begins with a centralized rehabilitation administrative unit that oversees financial aid and claims decisions related to rehabilitation cases. The second level of operation includes regional and district rehabilitation staff, (predominantly individuals trained in nursing). The major mission of the regional rehabilitation personnel is to aid directly in the medical management of the patient. The rehabilitation skills of this group range from none to a very sophisticated level and usually are dependent upon the carrier's in-service training program. They have a wide geographical area to cover and have some degree of ongoing contact with the employers who are clients of the carrier. The rehabilitation nurse responds quickly to begin working with the individual after a claim is filed. Referrals are often made to local private providers, rehabilitation experts or evaluation centers for a one-time evaluation. The rehabilitation nurse plays an important role in vocational decision-making and could be viewed as a rehabilitation coordinator.

The IRSG also identifies several major insurance carriers in the country who handle the complete rehabilitation process. Not only do carriers have a centralized rehabilitation decision-making unit but also their own rehabilitation centers, evaluation units, and rehabilitation counseling staff. The rehabilitation professionals directly guide the rehabilitation process from initiation of claims to a final vocational decision. Once again, the rehabilitation staff usually works out of a regional or district office. Such a widespread area creates problems in developing an active plan. While these programs clearly are the most sophisticated, they must rely on local hospitals or rehabilitation centers for the delivery of many services.

One major source of abuse is the use of aggressive claims management techniques to prod or motivate the rehabilitation client to return to work. Most private and public carriers' rehabilitation clauses clearly indicate that if an individual does not participate in rehabilitative efforts, their benefits will be reduced or terminated. While benefits are seldom cut off by public agencies, private carriers can use this approach in lieu of a rehabilitation program that would offer the client a real opportunity to develop freely his capabilities.

Private for-Profit Rehabilitation Business - Approximately 850 private for-profit rehabilitation businesses are currently operating in the United States. These businesses range from the single person firm offering a single service to very highly organized multi-service programs with a national scope. Private for-profit rehabilitation businesses provide an

array of services including rehabilitation consultation, work and vocational evaluation, rehabilitation testimony in legal cases, vocational readiness programs, personal counseling and job placement services. The predominant service package is consultation, evaluation and placement. The consumers of these services include insurance carriers without an extensive rehabilitation component, firms that are self-insured and state workers' compensation agencies. As with any set of private firms, there is a great deal of variety in the quality of services.

The professional staff of the private for-profit group includes Ph.D. rehabilitation counselors, psychologists, and rehabilitation nurses as well as individuals without any special training. The salaries of the private rehabilitation professionals are anywhere from 20 percent to 30 percent greater than salaries in public rehabilitation programs. Over time, these differences may act to drain talent from the public sector as well as divert new counselors considering public service.

There is no current licensing process for private rehabilitation vendors. Their Certified Rehabilitation Counselor status appears to provide some guidelines as to skill but really does not maintain any level of quality control. A national organization, the National Association of Rehabilitation Professionals in the Private Sector (NARPPS), is addressing these issues, but they are having difficulty being accepted by the general rehabilitation community.

The amount of utilization of the private sector rehabilitation programs varies. The small companies of one or two people may have caseloads of 30 to 50 clients. One of the large, nationally based programs projects 25,000 clients annually with referrals coming from over 500 separate employers, insurance carriers, and other sources.

Organizationally, the rehabilitation businesses are incorporated as profit-making units. They have a board of directors, professional staff, and support staff. Their reimbursement or payments are on a fee for service basis. The prices are based on time required for the case as well as the complexity of services. Many of the rehabilitation businesses branch out into supportive or secondary areas offering services such as job placement to a wide variety of clients.

As in any competitive setting, many companies go out of business, some are joined by merger and others become bigger. The successful programs all have sophisticated marketing techniques. Currently, there are five to six major, national private for-profit companies. While there are variations across regions, most states have at least ten private companies with the number varying in response to the legislative makeup of the state workers' compensation system and no-fault auto insurance programs.

Rehabilitation Units Within Private Corporations - There are no current statistics identifying the number of rehabilitation programs housed within the corporations. They exist in several forms with multiple responsibilities. One form is well documented but usually not classified as a rehabilitation service. These are the employee assistance (EAP) or

troubled employee programs. Carr and Hellan (1980) indicated that in 1975 there were over 500 such employee assistance programs operating within the public and private work sector. The traditional focus of these programs has been to prevent work-related problems associated with alcoholism and emotional difficulties. The narrow focus has prevented rehabilitation principles from being used with the injured or chronically ill worker, but the EAP could easily be converted to include these potential recipients of disability benefits.

The organizational structure of EAP follows two patterns. One is an established program within the medical or industrial relations unit of the corporation. This program includes systematic referral of individuals suffering from alcoholism and mental health problems. After referral, evaluation and counseling are done. In most cases, direct treatment services are procured from a mental health agency or private counseling service. In a few cases, counseling is provided on site. The second pattern is for a company to procure all evaluation and treatment from an outside provider.

Studies have evaluated the Employee Assistance Programs (Witte and Cannon, 1979; Carr and Hellan, 1980). In one major corporation, an EAP resulted in an attendance improvement of 5.2 percent, weekly indemnity costs decreased by 74.6 percent, and hospital, medical and surgical costs decreased by 55.4 percent over one year.

A second form for rehabilitation is creation of rehabilitation programs within private corporations. These units have a director to oversee the corporate response to: (1) affirmative action and the disabled, (2) job modification for functional limitation in new employees or newly disabled employees, and (3) disability retirement. These units are usually housed within the medical, industrial relations, or personnel services of the corporation. There are a few corporations who make rehabilitation the responsibility of the safety director or workers' compensation program officer. Because rehabilitation is not their primary objective, it may suffer from neglect when housed in other areas.

Private corporations are certainly motivated to identify problems early and prevent an individual from applying for a disability pension. Typical preventive programs include health screenings, evaluation units within the firm, and counseling services to help an individual adapt to job changes necessitated by onset of a mental or physical condition. In most cases, these companies are self-insurers and actively engage in retraining or retooling the individual.

The professional staff in these programs is usually small in number, of a high professional quality, and based at the corporate level. It is important for these services to be available at the plant level, but it is probably necessary to have 2000 or more employees before a full-time, on-site rehabilitation counselor can be justified.

If the major thrust of the employer-based rehabilitation service is on management of the disability, such programs can identify employees at risk and respond quickly to the individual's needs. Such programs have the

capacity to develop and guide sound rehabilitation programs facilitating a return to work.

Labor Unions - Many of the large labor unions have identifiable rehabilitation services that aid the worker in return to work. Although services are traditionally excellent, unfortunately the rehabilitation expertise observed at a national level does not filter down to many of the local unions. At the local level, the general protocol for injured and disabled worker has been to protect them and seek legal aid to assure prompt receipt of benefits. In carrying out that legitimate endeavor, rehabilitation is often sacrificed.

Closing Comments - Rehabilitation services in the private sector offer the opportunity to develop a strong and effective rehabilitation program. The private sector offers a variety of responses that are required by the differences in disability benefits and definitions.

The most important issue is the need to develop a response that acknowledges the realities of becoming ill and injured, the psychological needs of the worker, and the fact that the appropriate rehabilitation technique can aid all involved. It is essential that pension and disability retirement policies actively search for ways to enhance the role and contribution of rehabilitation services in the private sector.

Disincentives and Reform Options

Anytime an increase in earned income could result in a reduction in a cash transfer or loss of other benefits, there is a potential disincentive. Rehabilitation counselors are aware of this, clients know it and policymakers try to find ways to avoid or minimize these disincentives. From the recipient's point of view, the loss in benefits is a cost of returning to work. Unless these costs are adequately balanced by earnings, the individual will likely prefer disability status. As we have seen, the presence of disincentives limits the effectiveness of rehabilitation and, more generally, any other effort to encourage reemployment. But it should be noted that given the amount of disincentives, other efforts will succeed for some clients.

The design of public and private disability programs often includes features to offset disincentives. For example, under SSI an individual's benefits are gradually reduced as income rises. In this way, the "tax" on earnings is reduced and employment encouraged. In some private sector programs, a similar gradation of benefits and earnings occurs. But in the largest single program, DI, benefits are all or nothing. If the individual shows evidence of being capable of earning above a predetermined level of income (or SGA) benefits can be completely terminated. The same SGA criterion also prevails in SSI where benefits and earnings tend to be lower.

The disincentive effect in any one program is compounded when an individual is eligible for receipt of benefits from multiple sources. Workers' compensation, veterans benefits, food stamps, Medicare and Medicaid are some of the other benefit sources for which a disabled person

may qualify (Johnson, 1979). Although some integration of cash benefits occurs, for example workers' compensation and DI have an 80 percent replacement rate limit, in many cases dual or triple eligibility can serve as a substantial barrier to termination.

There are currently several features of the DI program designed to counter the disincentives that naturally arise in such a program. For example, beneficiaries can use the so-called trial work period to test their earning capacity. During this period, workers can earn as much income as possible without any loss in benefits. The trial work period was recently extended from 12 to 24 months, with no benefits paid during the last 12 months but an automatic reinstatement if earnings should fall below SGA.

Another recent change in PL 96-265 (Social Security Disability Amendments of 1980) designed to encourage a return to work was the extension of Medicare benefits for two years following the cut-off of cash benefits. Also, the normal two-year waiting period for Medicare eligibility will be waived for a worker whose benefits have been terminated but who qualifies for DI within 60 months.

Another change was made to the method for calculating SGA levels. Extraordinary expenses associated with the disability can now be deducted from income before comparing earnings to the SGA level. While such a change will encourage more people to earn income, it may also mean some people who might previously have terminated will now earn less than the SGA limit.

The new legislation also placed limits on the DI replacement rate. To the extent benefits are thereby lowered, a rehabilitated worker will now be faced with a higher wage-benefit ratio. Thus, along with reducing the incentives to apply, the limit on replacement rates will indirectly affect rehabilitation performance.

Unlike the BRP, which has been subjected to some benefit-cost studies, the financial impact of these changes is not fully understood. For example, with longer trial work and higher SGA, some workers who would have terminated now will remain "disabled." Others who would not have terminated may now find they are capable of earning a sufficiently high level of income. It is too early to assess the net effect of these changes on benefits and costs to the trust fund.

One other recently instituted (and nearly costless reform) is a decision by the Rehabilitation Services Administration to allocate BRP dollars to the states on the basis of performance. Since termination data are not immediately available and are not always directly tied to efforts of rehabilitation counselors, the performance measure used is rehabilitations above the SGA level. By determining each state's share of total BRP funds on the basis of its share of SGA rehabilitations, states and counselors will, in principle, have an incentive to seek better "quality" rehabilitation. Given the research findings on the role of wage-benefit ratios, the result should be more terminations with no new costs.

Beside (or instead of) the changes already put into place, other options are worth considering and testing experimentally.[15] One alternative would be simply to award benefits in the principal beneficiary programs on the basis of a person's impairment or functional limitations, and not on the basis of lack of earnings in the labor market. Such an idea borrows from the indemnity schemes where a person may be compensated for the physical loss that occurs as a result of another's negligence, or in workers' compensation by reason of the employment relationship. In many state workers' compensation programs, it is the physical impairment or functional limitations per se for which compensation is awarded; although the limitation may be used as a proxy for future wage loss.

The virtue of adopting such a scheme nationally would be that the benefits would be due the person for an impairment or functional limitation. The benefits would be awarded as a matter of right, regardless of earnings or lack of earnings in the labor market. If earnings then fell below some minimal level, the worker would be entitled to available benefits, such as SSI, based upon need.

There is no well-developed philosophical basis for payment for impairments. Such payments could not be considered as indemnity payments unless somehow the impaired person's fate were considered the responsibility of society as a whole. Neither could they easily be justified on some basis of status. Veterans' programs do pay benefits on the basis of impairments or functional limitations. A veteran can receive a service-connected disability payment and still earn whatever he can in the labor market.

It is not easy to work out a comparable scheme for DI beneficiaries because receipt of benefits in that program is necessarily tied to levels of income from work. DI is an income maintenance program designed to provide people some proportion of their former work income in the event that they become impaired or functionally limited and unable to work. It is not easy to see how that could be transformed to a program in which beneficiaries would be paid for their impairments or functional limitations per se, and where receipt of that benefit would be allowed to continue, regardless of future earnings. However, the idea is at least worth investigating, even if the payments for impairments or functional limitations were considered as a proxy for lost income.

The reforms and disincentives issues discussed to this point have all been supply side based. That is, each of the changes was designed to make the disabled more willing to go back to work. At the same time more consideration can be given to efforts to encourage employers to increase their offers to disabled workers.

One obvious way to induce a greater demand for disabled workers would be to mandate employment quotas. To be of any value such quotas would have to be enforced with penalties for noncompliance. Furthermore, financial incentives, in line with existing tax credit policies, might be another cost-effective means to increase demand for disabled workers.

If one wished to avoid a quota system and all its inherent problems, there is still the potential for much greater use of tax credits as financial inducements to hire disabled workers. These options could be restricted to the DI program only or extended to other programs or even to all the disabled.

Limiting ourselves to DI where cost-effectiveness can be defined as the objective, further options could be proposed: First, maintain the current definition of disability with strict application of medical and vocational requirements. Then for every newly entitled beneficiary, calculate the present value of future payments with appropriate weight to given probability of recovery and death. This present value is then a measure of the potential savings of having an individual return to work. Make available to employers some of the savings attributable to reemployment. The form of the savings could be as a tax credit, a job redesign credit, a wage subsidy, or some other mechanism for increasing demand for disabled workers.

We have not estimated costs and benefits for these options. It is impossible to know with any certainty how firms and individuals will react to the different costs and benefits implied by each of these options. If society moves toward fuller integration of the disabled, we must find means to make the best possible use of their employment potential. Problems with past programs have created a gap between what is and what can be. We must continue to search for ways to get the greatest number of people back to work while guaranteeing an adequate level of benefits for those incapable of working. As our understanding of the relationships between disability pensions and employment of the impaired increases, we will be in a position to make substantial progress toward meeting these goals.

Occupational Disability and Older Workers

The older worker faces many disadvantages in the labor market. Discrimination may reinforce a general reluctance to take on an older worker in a new job. Fears of pension liability, doubts about health status, and the possibility that the older worker may lack needed skills and knowledge all combine to diminish his job chances. Once an older worker loses a job due to an impairment, rehabilitation programs are not as easy to develop and implement as they are for younger workers. The resulting lack of employment opportunities suggests that a definition of disability that uses the potential for employment in <u>any</u> occupation may not be equitable when applied to older workers. An alternative would be to define disability in terms of ability to perform the predisability occupation.

<u>Some Issues in An Occupational Definition of Disability</u>

In the disability insurance program, greater weight is placed on vocational as opposed to medical factors in evaluating disability claims of older workers. Yet, the test of disability relates to the ability to perform

substantial gainful activity in any job which is reasonably available. An exception exists for the blind over age 55. For these persons, the applicable test is whether they can engage in SGA in a job that requires skills comparable to those used in prior gainful activity.

In the private sector, programs sometimes use a more lenient "ability to perform one's own occupation" as a test of disability. The same is true of civil service, railroad, and other specialized programs. Concern over abuse of this definition has led private insurers to change the applicable definition to an "any occupation" test after two years (or longer for certain occupations) of benefit payments. The two-year period offers an incentive to obtain rehabilitation services directed toward becoming employed in an occupation reasonably suited to an individual's education, training, and experience. Without the potential loss in benefits, the individual may be more willing to accept rehabilitation services.

In light of the recognized need and potential for rehabilitation among workers meeting an "own occupation" definition, it is surprising to find so little encouragement and incentive built into the civil service programs. As Sunshine (1979, p. 62) has noted, "One may question the advisability of practices, such as those of the civil service disability retirement system, that involve no obligation to take other work, to undertake rehabilitation, or to redesign jobs." Even though limiting the "own occupation" definition just to older workers reduces the role of rehabilitation and reemployment; whatever potential exists for such programs needs to be exploited as a means to control costs.

The implementation of an occupational definition of disability would no doubt add to the administrative complexity and financial burden of disability programs. In recognition of the latter problem, it might be worthwhile to consider occupational disability as a form of partial disability and provide a lower payment than that received by someone meeting the "any occupation" test. The payment of partial benefits would be especially reasonable when an individual returns to work in a new occupation (Swager, 1974) or at less than full-time in the prior occupation at a lower wage than that person received prior to the onset of the disabling condition.

Another factor to consider when discussing an occupational definition of disability for older workers is the potential impact changes in retirement laws and benefits would have on disability claims. If efforts are made to reduce the financial incentive to retire at 62 or 65, then at the margin we should expect the demand for disability benefits to increase. Under a less strict disability definition, we could be faced with a major growth in costs in disability programs.

Disability Among Older Workers

Over 50 percent of new allowances in DI in 1975 were for people over 55 years old (Treitel, 1979a). Over time, 55 percent of males and 60 percent of females in the DI program have been over 55 years old. The older worker is also much more likely to have an initial claim allowed. In

1975, for those over age 60, 68 percent of initial decisions were favorable, while for all applicants the number was 50 percent.

Perhaps most important is the rate of disablement. For men age 60 to 64, the rate of entitlement per 1,000 persons in this age group was 26.0 percent in 1977, down from 31.6 percent in 1974 (Schobel, 1980). For females, the comparable numbers are 16.4 percent and 21.5 percent. As one might expect, the rate of recovery for older workers is very low. During the first and second years of entitlement, the recovery rate for males (age 60 at entitlement) was 11.0 per 1,000, and for females, 8.1 per 1,000 (Schobel, 1980). Comparable figures for males and females receiving benefits at age 40 are 125.8 and 86.3.

Mortality rates also provide some evidence about the condition of the disabled. Among the more recently eligible older workers, mortality rates actually are less than they are for slightly younger workers. For example, the mortality rate per 1,000 during the first year of entitlement for males age 55 was 100.8 in 1975-1978, and for males age 63 it was 93.3. Schobel attributes the result "to the progressively greater consideration given to vocational factors (as opposed to purely medical factors) in the disability determination process for older claimants. As a result, among newly-entitled beneficiaries, older workers are in relatively better physical condition than relatively younger ones" (Schobel, p. 12).

Other support for this contention comes from examining data on mobility of disabled-worker allowances in 1975. Older (age 55-64) disabled workers are less likely to be institutionalized or hospitalized than younger disability recipients. Also, 91 percent of older recipients are ambulatory outside the house, while for workers under age 50, the figure is 86.5 percent (Burdette and Mohr, 1979).

Some additional data are available for SSI-disabled recipients and for rates of disablement by age under private sector plans. In SSI, 25.7 percent of recipients are between age 50 and 59, and 11.7 percent are between age 60 and 64. There is an additional 16.1 percent of recipients over age 65 (Kahn and Rasberry, 1980).

Presently, the same definition used in the DI program is applied in the SSI disability determination. An alternative to the use of an occupational definition in the DI program would be to use this test of disability only in the SSI program. With lower benefits in SSI and with benefits contingent on earned income in any occupation, there would be less incentive to abuse the program, and benefits for occupational disability would effectively become payments for partial disability.

Rates of disablement per 1,000 lives exposed in the private sector are summarized in Table 5. Recall that there are few, if any, differences in definition of disability across age groups. Therefore, we cannot use these rates to measure the impact of an "own occupation" definition for older workers only. The policies on which these results are based generally had a two-year "own occupation" definition. The lower rates under the private plans reflect the selectivity possible in offering these plans. Under DI, no such selection is possible.

TABLE 5

Rates of Disablement (1972-1976)
(per 1000 lives exposed)

Age	Rates
40	0.91
40-44	2.06
45-49	3.57
50-54	6.22
55-59	10.65
60-64	14.15

Source: Transactions, 1978 Reports of Mortality and Morbidity Experience, Society of Actuaries, 1979.

As indicated in Table 5 the data are not adequate to inform us as to the exact consequences of an occupational definition of disability on DI. But experience with civil service and other programs along with the view of the DI application process cited earlier leads to the prediction that there would be a greatly increased demand for disability benefits. Also Allan (1978) has presented evidence showing that there were some 850,000 severely disabled persons age 60 to 64 not receiving DI benefits in 1971. When combined with the nonseverely disabled group that might become eligible under an occupational definition, the cost consequences of such an approach are apparent.

Occupational Disability, Retirement and Rehabilitation

A special problem in DI is that workers seeking early retirement would have an incentive to try the disability system first. Undoubtedly, many current early retirees would meet an occupational definition of disability. Unlike early retirement at age 62, disability benefits are not actuarially reduced to account for the longer period of receipt. Furthermore, a change in the retirement age rules to encourage later retirement would certainly increase the impact of an occupational definition on DI applications. As one representative of private insurers has noted, the trend toward earlier normal retirement "should cause greater concern about the propriety of the continued use of disability income policies noncancelable to age 65, than about the propriety of long 'his occupation' periods" (Von Waldmenich, 1979, p. 422).

Another problem with an occupational definition for older workers is that reliance on rehabilitation and job redesign are less valuable and less feasible as a worker nears the normal retirement age. Evidence from an earlier study (Berkowitz, et al., 1981) showed that the rate of terminations of benefits fell from 42.9 percent for workers age 25 to 34, to 38.0 percent for workers age 45 to 54, and to just 13.7 percent for workers age 55 to 64. Treitel (1979b) reports that for persons allowed benefits in 1972 who were receiving less than $300 in monthly benefits (the vast majority of recipients), 21.9 percent of survivors under age 40 recovered while for workers age 40 to 49, 11.5 percent recovered and for workers age 50 to 59 and age 60 to 61, the rate of recoveries was 3.9 percent and 1.8 percent, respectively. The data indicate that for many older recipients, disability benefits are used as a substitute for retirement benefits.

We believe it is correct to expect that the occupational definition would also encourage early retirement. If it is desirable to counter this effect for those workers who are unable to do their previous job, consideration should be given to incorporating a reduction in benefits and an earnings test as part of the program. For those meeting the current SGA-type definition, these adjustments would be unnecessary.

Notes

1. Note that this reduction is not as large for someone who works part-time after receiving benefits.

2. Health insurance from a working spouse is also a possibility.

3. Muller and Lando (p. 6) point out that as a matter of practicality, the calculation of replacements rates using Social Security data can be a problem because earnings above the maximum taxable limit are not recorded.

4. Physician expenses for a condition would normally occur regardless of whether one applies for benefits or not. It is possible that some visits will be made to reinforce the application.

5. Actually the median rate appears to have peaked in 1973 at 64.1 percent.

6. Experience for the cases where rates are above 70 percent is limited but the reported ratio of actual to expected is 161 percent.

7. We should restate the obvious: for the most severely disabled whose expected earnings are near zero it is meaningless to talk about disincentive effects.

8. The issue of disincentives to return to work will be reviewed more fully in the discussion of issue three.

9. Note that this study was based on the 1966 Survey of Disabled Adults.

10. Berkowitz, Johnson and Murphy, p. 124.

11. Halpern, p. 39.

12. Rejecting clients on grounds of the financial value of their rehabilitation does not mean there are not other bases for providing services. We emphasize the financial situation because this realistically portrays the decisions pension managers must make.

13. For the impaired person, there is the potential for a third factor to be considered: the time required to treat and deal with the problems caused by his condition. Just as a machine may either be in use, nonuse, or undergoing repair, so too can we visualize the individual as having a period of "downtime." See Lambrinos for further discussion of this concept.

14. Below, we discuss efforts to control for other variables to separate causality associated with impairment and age, education, and other variables.

15. This suggestion is taken from M. Berkowitz, Work Disincentives, Institute for Information Studies, 200 Little Falls Street, Suite 104, Falls Church, VA 22046.

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