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The impact of collective bargaining on employment and wage inequality: Evidence from a new taxonomy of bargaining systems

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Abstract

To study the link between different types of collective bargaining systems and employment, unemployment and wage inequality, I use a novel taxonomy of bargaining systems in 36 OECD countries between 1980 and 2015. The results show that coordinated bargaining systems are associated with higher employment, better integration of vulnerable groups and lower wage inequality than fully decentralized systems. Uncoordinated centralized systems perform similarly in terms of unemployment to fully decentralized systems but are associated with higher employment and lower wage inequalities. These results suggest that the link between decentralization and good labour market outcomes is more nuanced than previously suggested.

Keywords

Collective bargaining, employment, OECD countries, unemployment, wage inequality

Introduction

There is now a broad consensus that unions and collective bargaining contribute to a broad sharing of productivity gains, but the impact of collective bargaining on employment and unemployment remains the subject of a largely open debate. The influential hump-shape hypothesis of Calmfors and Driffill (1988) suggested that centralized and decentralized systems perform better than intermediate ones. However, empirical evidence has not provided much backing for this hypothesis. Moreover, analyses based only on the level of bargaining have proved unable to reflect finer differences, in particular with respect to the

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possibility to deviate from the provisions established in sector-level agreements or the presence and relevance of wage coordination. Countries may share the same level of bargaining but differ significantly in the degree of flexibility left to companies or in the degree of coordination between sectors when negotiating wage growth targets.

In light of the debate on the reforms undertaken by several European countries during the global financial crisis, up-to-date and more fine-grained evidence is necessary. I therefore develop a new taxonomy of collective bargaining systems in OECD countries based on three main criteria: first, the *level of bargaining* at which collective agreements are negotiated: company, sector or cross-sectoral level; second, the role of *wage coordination* between sectoral (or company) agreements, such as the setting of common wage targets to take account of macroeconomic conditions; third, the *degree of flexibility* for firms to modify the terms set by higher level agreements.

I show that coordinated bargaining systems are linked to higher employment and lower unemployment (also for young people, women and low-skilled workers) than fully decentralized systems. Rather centralized systems with no coordination are in between. Moreover, collective bargaining is also linked to lower wage dispersion, with greater dispersion in systems with no collective bargaining or where firms set wages independently. The main results have been presented in a non-technical manner in the OECD report, *Negotiating Our Way Up* (OECD, 2019) and in the *Employment Outlook 2018* (OECD, 2018). This article provides the complete set of results and robustness tests as well as a more thorough discussion for an academic audience.

The next section discusses the literature on the role of collective bargaining on labour market performance. I then describe in detail the taxonomy of collective bargaining systems, before presenting the empirical approach and the data used. The last sections present the main results and a series of robustness tests and provide some concluding remarks.

A review of the literature

Since the 1980s, many studies have tried to identify the impact of unions and collective bargaining on labour market outcomes. While there is a remarkable consensus on the role of unions and collective agreements in reducing wage dispersion,[1] the impact on employment and unemployment has been the subject of a long-standing and intense debate.

Some studies focus on the presence of a union or the share of workers covered by a collective agreement rather than the functioning of the collective bargaining as such: for example, analyses of countries with predominantly firm-level bargaining, such as the UK or the USA. Freeman (1988) found no effect of unionization on unemployment, while Nickell (1997) and Nickell and Layard (1999) found a positive correlation. Scarpetta (1996) suggested that high unionization tends to reinforce the persistence of unemployment. Others have addressed policy reforms in particular countries to study the relationship of unionization with employment: Blanchflower and Freeman (1993) found no effect of the Thatcher reforms in the UK on unemployment and the probability of leaving unemployment. Maloney (1997), by contrast, found that the reform in New Zealand that led to a sharp reduction in unionization caused a significant increase in employment.

Union membership is a reasonable proxy of collective bargaining coverage in countries with predominantly firm-level bargaining, but it is not sufficient for measuring the scope of collective bargaining where sectoral bargaining predominates, particularly where *erga omnes* clauses and extension mechanisms apply (OECD, 2017). Bargaining coverage is therefore a more appropriate proxy for the relevance of collective bargaining. Nickell and Layard (1999), for instance, find a positive effect of coverage on unemployment and a negative one on employment, while Baker et al. (2005) find insignificant effects. At the OECD level, de Serres and Murtin (2014) find that bargaining coverage, especially if larger than union coverage, can lead to rigid adjustments in wages and may be detrimental to employment. Several studies have also used the difference between bargaining coverage and trade union density, the so-called 'excess bargaining coverage', to study the effect of *erga omnes* clauses and administrative extensions. For example, Murtin et al. (2014) study the interaction of extensions and the tax wedge and find a negative effect of the tax wedge on unemployment in countries with higher 'excess coverage'.

Even collective bargaining coverage is a partial proxy. For instance, Australia and Germany have comparable coverage but very different systems (the former based on firm-level bargaining, the second on sectoral bargaining with considerable margins of flexibility). Similarly, Italy and Sweden have a similar level of coverage, but despite being both based on sectoral bargaining, their systems work in a very different manner. As Aidt and Tzannatos (2008) conclude, in their review of trade unions, collective bargaining and macroeconomic performance, more than trade union density or coverage, what matters most is the functioning of the 'entire package'.

Much attention, especially in the early literature, has been directed to the role of centralization – the predominant level of bargaining. In the early 1980s, the corporatist view suggested that by guaranteeing that wage-setters recognize broader interests, centralization can deliver superior outcomes in terms of macroeconomic and labour market performance (Cameron, 1984). However, opponents argued that wage increases would be restrained or resource allocation would be more effective if market forces were allowed to play a larger role.

To reconcile these opposing views, Calmfors and Driffill (1988) proposed the influential 'hump-shape' hypothesis, which suggested that both centralization and decentralization perform well in terms of employment while the worst outcomes may be found in systems with an intermediate degree of centralization (sectoral bargaining). In this intermediate case, organized interests are 'strong enough to cause major disruptions, but not sufficiently encompassing to bear any significant fraction of the costs for society of their actions in their own interests' (Calmfors and Driffill, 1988). Their study had the merit to suggest that the relationship between the degree of centralization and performance does not need to be monotonic. However, later empirical studies (Aidt and Tzannatos, 2002; Bassanini and Duval, 2006; OECD, 1997; Traxler et al., 2001) did not provide much backing for this hypothesis.

Another key feature of collective bargaining systems is the degree of wage coordination across bargaining units. Soskice (1990) suggested that coordinated systems of sectoral bargaining may be as effective as national bargaining systems in adapting to aggregate economic conditions. Subsequent studies found that coordination plays a key

role in improving the performance of sectoral bargaining: see the review in Aidt and Tzannatos (2002) as well as the evidence in Bassanini and Duval (2006), Elmeskov et al. (1998), OECD (2004, 2012), Traxler and Brandl (2012) and Traxler et al. (2001),

More recently, Boeri (2014) revived the debate by suggesting that 'two-tier' bargaining systems (where firm-level bargaining can only improve on sectoral agreements) are worse than fully centralized and fully decentralized systems, as they cannot respond appropriately to microeconomic or macroeconomic shocks. However, it is not clear whether the result is driven by the 'two-tier' structure or the lack of wage coordination in those countries that have such a structure.

Few studies have tried to capture the role of the collective bargaining system as a whole. Traxler et al. (2001) were among the first to do so by collecting data for 20 OECD countries between 1970 and 1998 and exploiting cross-country variation to study the link between wage centralization and coordination as well as interest group organization and participation in public policy-making and macroeconomic performance. They find that collective bargaining institutions are not detrimental to macroeconomic performance and that wage coordination, in particular in the form of pattern bargaining or peak-level wage bargaining, plays a much more significant role than centralization. More recently, Braakmann and Brandl (2016) have studied the effect of different collective bargaining systems on firm-level performance by building a taxonomy based on the level of bargaining, the degree of horizontal coordination and the degree of vertical governability of bargaining.[2] Using cross-sectional data for the 28 EU member states from the 2013 European Company Survey, they find that companies covered by coordinated sectoral bargaining and governed multi-level bargaining systems perform better than companies covered by company and national bargaining. Bechter et al. (2019) use the same source to study the link between bargaining systems and performance-related pay, and again show that the type of system matters more than the level of bargaining: variable pay systems thrive under company and multi-level collective bargaining, whereas their implementation is limited under national collective wage bargaining.

I build on this last strand of literature by going beyond single features of collective bargaining systems and analysing the role of collective bargaining systems as a whole for employment, unemployment and wage dispersion in OECD countries. This contributes to the literature in two important respects. First, I provide a thorough reassessment of the role of collective bargaining systems in the context of a much-changed international economy, by proposing a novel characterization of bargaining systems which accounts for the level of bargaining, the degree of flexibility and the degree of coordination for 36 countries over 35 years. Second, I consider a wider set of labour market outcomes than previous studies, by looking into employment, unemployment (including for vulnerable groups) and wage inequality to identify possible trade-offs between equity and efficiency.

A novel taxonomy of collective bargaining systems

Building on the considerable corpus of research on collective bargaining institutions (including Marginson and Welz, 2014; Traxler et al., 2001; Visser, 2016), I use three main aspects to group countries:

- *Level of bargaining*: company, sector or cross-sectoral. Higher level agreements can be expected to reduce wage inequality relative to decentralized systems, by lowering wage differentials not only between workers in the same firm, but also between workers in different firms and, in the case of peak-level bargaining, in different sectors. Company agreements, by contrast, allow more attention to firm-specific conditions, potentially raising productivity.
- *Degree of flexibility*: higher level agreements differ substantially in the degree of flexibility they provide to firms. For example, the possibility of opt-outs or leaving the application of the favourability principle to social partners can increase flexibility and allow for a stronger link between wages and firm performance, enabling higher employment and productivity but also causing higher wage inequality.
- *Wage coordination*: coordination between agreements helps negotiators internalize the macroeconomic effects of the terms set in collective agreements. This is typically achieved by keeping wage increases in the non-tradable sector in line with what can be afforded by the tradable sector or by strengthening the ability of the system to adjust wages or working time in the face of a macroeconomic downturn. Coordination can therefore serve as an instrument for wage moderation and earnings flexibility over the business cycle, with potential benefits for employment and resilience.

Table 1 provides a dashboard of collective bargaining systems in the 36 OECD countries, using the information on the actual functioning of national bargaining systems in OECD (2017) and the ICTWSS database (Visser, 2019). The first variable is the predominant level of bargaining (a particular level is dominant if it accounts for at least two-thirds of bargaining in terms of employees covered). The second is the degree of flexibility which is defined as 'limited' in countries where the favourability principle is strictly applied (either because it is defined by law as in Spain or Portugal or because social partners enforce it as in France), where extensions, or functional equivalents, are largely used (as in Belgium, France, Italy, Spain, Portugal) or where firms have limited margins for derogation from higher level agreements as there are no opening clauses and national/sectoral agreements are fairly prescriptive and detailed (as in Belgium and Finland until 2015, and France, Italy, Portugal and Slovenia). In countries such as the Nordics, Germany or the Netherlands, the degree of flexibility is 'significant', as sectoral agreements leave large space to firm-level bargaining to renegotiate the terms or because firms can use opening clauses to exit the agreement (or part of it) under specific conditions. Finally, the third variable is the degree of coordination, which is practically absent (or limited to very specific sectors) in countries where bargaining takes place essentially at firm level (with the notable exception of Japan and the *Shunto* system), limited in a large number of Western European countries and relatively strong only in the Nordic countries, Germany and the Netherlands.

Grouping countries necessarily requires simplification.[3] However, by combining the predominant level of bargaining with the degree of flexibility and the degree of coordination, it is possible to identify five main groups of countries:

Table 1. Dashboard of collective bargaining systems, 2015.

Group	Country	Flexibility	Coordination	TUD (%)	EOD (%)	CBC (%)
FD	TUR	–	No	Under 5	20–30	5–10
	EST	–	No	Under 5	20–30	10–20
	MEX	–	No	5–10	–	10–20
	USA	–	No	5–10	–	10–20
	KOR	–	No	5–10	10–20	10–20
	POL	–	No	5–10	20–30	10–20
	LVA	–	No	5–10	40–50	10–20
	HUN	–	No	5–10	40–50	20–30
	CHL	–	No	10–20	–	10–20
	NZL	–	No	10–20	–	10–20
	CAN	–	No	10–20	–	20–30
	GBR	–	No	10–20	30–40	20–30
	CZE	–	No	10–20	60–70	40–50
	IRL	–	No	20–30	50–60	40–50
LD	JPN	–	High	10–20	–	10–20
	ISR	Almost full	No	10–20	–	20–30
	SVK	Almost full	No	10–20	30–40	20–30
	GRC	Almost full	No	10–20	40–50	40–50
	AUS[a]	Almost full	No	10–20	–	50–60
	LUX	Almost full	No	20–30	80–90	50–60
ODC	DEU	Significant	High	10–20	50–60	50-60
	NLD	Significant	High	10–20	80–90	80–90
	AUT	Significant	High	20–30	90 or more	90 or more
	NOR	Significant	High	30–40	60–70	60–70
	DNK	Significant	High	60–70	60–70	80–90
	SWE	Significant	High	60–70	80–90	90 or more
RCW	ESP	Medium	Low	10–20	70–80	70–80
	CHE	Medium	Medium	10–20	–	40–50
	SVN	Limited	Low	10–20	60–70	60–70
	FRA	Limited	Low	5–10	70–80	90 or more
	PRT	Limited	Low	10–20	30–40	60–70
	ITA	Limited	Low	20–30	50–60	80–90
PCC	FIN	Limited	High	50–60	70–80	80–90
	BEL	Limited	High	50–60	80–90	90 or more

Source: OECD (2017).
TUD: trade union density (private sector); EOD: employer organization density; CBC: collective bargaining coverage; FD: fully decentralized; LD: largely decentralized; ODC: organized decentralized and coordinated; RCW: rather centralized and weakly coordinated; PCC: predominantly centralized and coordinated.
[a]In Australia, proper sectoral bargaining does not exist, but the 'Modern Awards' are industry-wide regulations providing a minimum safety net.

- *Rather centralized and weakly coordinated collective bargaining systems.* Sectoral agreements play a strong role, extensions are relatively widely used, derogations

from higher level agreements are possible but usually limited or not often used, and wage coordination is largely absent. In 2015, France, Iceland, Italy, Portugal, Slovenia, Spain and Switzerland fell in this group.[4]

- *Predominantly centralized and coordinated collective bargaining systems.* As in the previous category, sectoral (or cross-sectoral) agreements play a strong role and the room for lower level agreements to derogate is quite limited. However, wage coordination is strong across sectors. In 2015, Belgium and Finland were a part of this group.[5]
- *Organized decentralized and coordinated collective bargaining systems.* Sectoral agreements play an important role, but they also leave significant room for lower level agreements to set standards, either by limiting the role of extensions (rare and never automatic or quasi-automatic), leaving the design of the hierarchy of agreements to bargaining parties or allowing opt-outs. Coordination across sectors and bargaining units tends to be strong. In 2015, Austria, Denmark, Germany,[6] the Netherlands, Norway and Sweden were in this group.
- *Largely decentralized collective bargaining systems.* Firm-level bargaining is the dominant form, but sectoral bargaining (or a functional equivalent) or wage coordination also plays a role. Extensions are very rare. Australia with its 'Modern Awards' and Japan with its unique form of coordination (*Shunto*) were in this group in 2015, as well as Greece, Luxembourg and the Slovak Republic.
- *Fully decentralized collective bargaining systems.* Bargaining is essentially confined to the firm or establishment level, with no coordination and no (or very limited) influence by the government. In 2015, Canada, Chile, the Czech Republic, Estonia, Hungary, Ireland, Korea, Latvia, Lithuania, Mexico, New Zealand, Poland, Turkey, the UK and the USA were a part of this group.

The country classification in 2015 is extended backwards to 1980 using information in the ICTWSS database complemented with information on policy reforms and major agreements using information from LABREF,[7] Eurofound[8] and the available literature.

Figure A1 in the online Appendix shows the taxonomy for all OECD countries between 1980 and 2015 (Central and Eastern European countries only available after 1990). The time variation in the resulting taxonomy of collective bargaining systems for OECD countries over the period 1980–2015 is considerable.[9] It reflects, in large part, the strong trend towards decentralized collective bargaining, but it also captures many country-specific changes in collective bargaining laws and practices.

Empirical approach and data

The variation of collective bargaining systems over time and countries is used in the analysis to estimate the relationship between systems of collective bargaining and indicators of employment outcomes and wage distribution, using the following regression

$$Outcome_{c,t} = \alpha + \beta CBCov_{c,t} + \gamma CBSystem_{c,t} + \delta LMI_{c,t} + \theta X_{c,t} + \rho_c + \tau_t + \varepsilon_{c,t} \qquad (1)$$

Table 2. Descriptive statistics, 1980–2015.

	Mean	SD	Minimum	Maximum
Dependent variables				
Employment rate (%)	70.7	7.1	49.3	87.3
Unemployment rate (%)	6.4	3.5	1.0	25.5
Temporary employment (%)	9.0	5.8	1.4	29.8
Part-time employment (%)	15.2	8.4	1.8	43.1
Involuntary part-time (%)	2.9	1.9	0.1	11.4
Youth unemployment (%)	16.4	8.9	2.6	58.3
Female unemployment (%)	7.0	4.1	0.6	29.2
Low-skilled unemployment (%)	10.8	7.0	0.9	49.2
Earnings inequality: D5/D1	1.7	0.2	1.2	2.5
Earnings inequality: D9/D1	3.3	0.9	1.9	6.3
Earnings inequality: D9/D5	1.9	0.4	1.4	3.6
Coverage and additional controls				
Bargaining coverage (%)	58.7	29.0	5.4	100.0
Output gap	0.8	7.3	−14.7	46.7
PMR in seven sectors	3.6	1.4	0.8	6.0
Tax wedge	37.6	10.6	6.1	57.8
EPL of permanent workers	2.2	0.9	0.3	5.0
EPL of temporary workers	1.9	1.4	0.3	5.3
Gross UB replacement rate	26.9	13.5	−0.3	65.0
Minimum-to-median wage	0.5	0.1	0.2	0.7
Female employment share	42.8	4.9	25.5	52.7
Log of average years of education	2.4	0.2	1.6	2.6

where *outcome* on the left-hand side is the labour market outcome (employment rate, unemployment rate, wage distribution, etc.) in country *c* and year *t*, while on the right-hand side *CBCov* is collective bargaining coverage, *CBSystem* is a dummy variable for each group identified in the taxonomy described above (with fully decentralized systems as the reference group), *LMI* includes controls for other policy reforms that occurred at the same time, in the areas of labour taxation, product market regulation, job dismissal regulation, minimum wages and unemployment benefits, *X* includes other controls for the characteristics of the workforce (average years of education and female employment share). Country fixed-effects ρ_c allow controlling for persistent country-specific features while year fixed-effects τ_t allow controlling for the business cycle.

All 36 OECD countries are included in the analysis. Precise definitions and sources of all variables used are detailed in the online Appendix, while Table 2 provides a series of descriptive statistics on the variables used in the analysis.

To avoid a reduction in the sample size when using the variables in Table 2 in the regressions, missing values among control variables have been redefined at zero and dummies for missing observations have been included among the controls.

Although the empirical estimations that follow rely only on changes in the type of bargaining systems and therefore net out time-persistent country specificities, and the

Table 3. Collective bargaining systems and the employment/unemployment rate: OLS regressions.

	Employment rate		Unemployment rate	
	[1]	[2]	[1]	[2]
Bargaining coverage	−0.074***		0.010	
	(0.016)		(0.016)	
RCW[a]	3.373***	1.719***	−0.225	0.008
	(0.630)	(0.650)	(0.568)	(0.512)
PCC[a]	4.598***	2.630***	−2.187***	−1.911***
	(0.691)	(0.682)	(0.643)	(0.556)
ODC[a]	4.618***	2.734***	−1.105*	−0.841
	(0.715)	(0.704)	(0.657)	(0.577)
LD[a]	1.948***	1.546**	0.841	0.897
	(0.658)	(0.650)	(0.673)	(0.631)
Observations	931	931	931	931
R-squared	0.944	0.942	0.816	0.815

Robust standard errors in parentheses.
OLS regressions including country and time dummies, institutional variables (tax wedges, PMR in seven sectors, EPL (both temporary and permanent), minimum wage/median wage and gross replacement rate) log of average years of education and female employment share.
[a]See Table 1.
***, **, *: statistically significant at the 1, 5 and 10% levels, respectively.

large series of controls help controlling for other potential confounding factors, the estimations may still be influenced by the state of the labour market over and above the business cycle or other potentially important factors not controlled for; hence, care should be taken not to give the results a strict causal interpretation.

Results

I start my analysis by examining the link between collective bargaining systems and employment and unemployment rates. Table 3 shows the results using the taxonomy developed above.

Employment rates are significantly higher in systems which are not fully decentralized. When comparing the magnitude of the estimates, the correlation appears to be stronger for coordinated bargaining systems and for systems that are rather centralized and weakly coordinated. The results for unemployment, however, are somewhat smaller and less robust. Only coordinated systems appear to be associated with lower unemployment than fully decentralized systems. And in the case of organized decentralized and coordinated systems, the significance of the correlation is also not very strong (10 percent). The difference between the employment and unemployment results suggests that rather centralized and weakly coordinated systems are linked to higher employment and labour force participation. Finally, on average across all regimes, higher bargaining coverage is associated with lower employment rates. Given that bargaining coverage is in

itself also a result of different bargaining systems, Table 3 also shows the same regression excluding bargaining coverage and the results remain qualitatively the same.

Moreover, the results obtained using the novel taxonomy developed above are more qualitatively robust than the more traditional collective bargaining indicators for centralization and coordination from the ICTWSS database (see Tables A.1 and A.2 in the online Appendix).[10]

No specific country is driving the results (see Table A.4 in the online Appendix). However, when excluding multiple countries, it appears that, empirically, the relative underperformance of fully decentralized systems is identified from variation in three countries (Ireland, New Zealand and the UK), which all undertook very significant collective bargaining reforms. Nevertheless, the finding does not appear to be specific to these three countries, as it remains unchanged when country fixed effects are omitted from the regression.

It has been argued that collective bargaining may deliver good labour market outcomes for 'insiders' (notably prime-age male full-time workers with a permanent contract) at the expense of jobs for 'outsiders', such as youth, women and low skilled (Bertola, 1999; Saint-Paul, 1996). Moreover, by pushing the interests of 'insiders', unions may accept or even contribute to the proliferation of non-standard forms of employment as a buffer for their members, thereby reducing the inclusiveness of the labour market. In particular, unions may make temporary contracts indirectly more attractive for firms, by increasing the labour cost of 'insiders', for instance, through bargaining over severance pay or assisting workers faced with the risk of dismissal.

The results in Table 4, however, suggest that, in most cases, coordinated systems (either centralized or organized decentralized) are associated with better labour market outcomes for vulnerable groups as well.

The unemployment rates of youth, women and low-skilled workers appear to be lower (or at least not significantly higher) in coordinated systems than in decentralized ones. Coordinated and organized decentralized systems are also associated with a lower share of involuntary part-time workers. Although the share of temporary employment does not vary across different bargaining systems, it is higher in countries with a higher bargaining coverage. This result, while different from previous evidence on agency work in the USA by Gramm and Schnell (2001) and Autor (2003), is in line with the findings of Salvatori (2009) who shows, looking at 21 European countries, that unionized workplaces are more likely to use temporary employment.

Moreover, the results in Table 5 show that collective bargaining systems that are not fully decentralized are also significantly and strongly correlated with lower wage inequality for full-time employees, as measured by the D9/D1-ratio, that is, the ratio of the wage at the ninth decile of the distribution to that at the first. This association is present both in the lower and upper halves of the wage distribution.[11]

Again, similar results are obtained when replacing the taxonomy indicators with indicators for centralization and coordination using the ICTWSS database (see Table A.3 in the online Appendix).

Strengthening the bargaining power of low-wage workers is one of the core missions of collective bargaining, so it is not surprising that collective bargaining is empirically associated with lower levels of inequality. Detailed pay scales, where they are defined,

Table 4. Collective bargaining systems and labour market outcomes for vulnerable groups: OLS regressions.

	Temporary		Part-time		Involuntary part-time		Youth unemployment		Female unemployment		Low-skilled unemployment	
	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
Bargaining coverage	0.037*		0.063***		−0.034***		0.041		0.006		0.003	
	(0.022)		(0.014)		(0.009)		(0.031)		(0.019)		(0.023)	
RCW	0.984	1.568**	1.120**	2.621***	−0.470	−1.244***	−3.982***	−3.054***	0.337	0.462	−1.025	−0.957
	(0.685)	(0.628)	(0.487)	(0.431)	(0.443)	(0.358)	(1.142)	(1.040)	(0.560)	(0.485)	(0.833)	(0.680)
PCC	0.886	1.590**	−0.180	1.570***	−0.788	−1.692***	−5.868***	−4.764***	−2.481***	−2.331***	−3.286***	−3.209***
	(0.782)	(0.642)	(0.538)	(0.475)	(0.495)	(0.402)	(1.363)	(1.149)	(0.683)	(0.547)	(0.949)	(0.780)
ODC	0.659	1.343**	−0.798	0.900	−1.337***	−2.210***	−5.459***	−4.403***	−0.661	−0.518	−2.486**	−2.414***
	(0.727)	(0.628)	(0.711)	(0.631)	(0.484)	(0.444)	(1.370)	(1.207)	(0.657)	(0.560)	(1.054)	(0.908)
LD	−0.304	−0.305	0.637	0.974*	−1.464***	−1.688***	−2.271*	−2.046*	1.415**	1.445**	0.537	0.544
	(0.705)	(0.782)	(0.501)	(0.537)	(0.384)	(0.340)	(1.195)	(1.132)	(0.710)	(0.659)	(1.243)	(1.222)
Observations	702	702	858	858	746	746	931	931	931	931	746	746
R-squared	0.912	0.911	0.953	0.952	0.797	0.791	0.848	0.847	0.820	0.820	0.893	0.893

Robust standard errors in parentheses.
OLS regressions including country and time dummies, institutional variables (tax wedges, PMR in seven sectors, EPL (both temporary and permanent), minimum wage/median wage and gross replacement rate) log of average years of education and female employment share.
***, **, *: statistically significant at the 1, 5 and 10% levels, respectively.

Table 5. Collective bargaining systems and earnings inequality: OLS regressions.

	Earnings inequality: D9/D1		Earnings inequality: D9/D5		Earnings inequality: D5/D1	
	[1]	[2]	[1]	[2]	[1]	[2]
Bargaining coverage	−0.002		−0.001		0.000	
	(0.002)		(0.001)		(0.001)	
RCW	−0.223***	−0.280***	−0.079***	−0.103***	−0.057**	−0.048***
	(0.068)	(0.051)	(0.023)	(0.018)	(0.024)	(0.017)
PCC	−0.232***	−0.299***	−0.084***	−0.112***	−0.050*	−0.040*
	(0.077)	(0.058)	(0.026)	(0.020)	(0.030)	(0.021)
ODC	−0.273***	−0.342***	−0.090***	−0.118***	−0.065**	−0.054***
	(0.073)	(0.052)	(0.024)	(0.018)	(0.027)	(0.019)
LD	−0.193***	−0.211***	−0.043*	−0.051**	−0.062***	−0.059***
	(0.065)	(0.062)	(0.023)	(0.022)	(0.020)	(0.019)
Observations	747	747	747	747	747	747
R-squared	0.957	0.957	0.970	0.970	0.940	0.940

Robust standard errors in parentheses.
OLS regressions including country and time dummies, institutional variables (tax wedges, PMR in seven sectors, EPL (both temporary and permanent), minimum wage/median wage and gross replacement rate) log of average years of education and female employment share.
***, **, *: statistically significant at the 1, 5 and 10% levels, respectively.

can compress wages in the middle and top of the distribution to compensate for higher wages at the bottom; Leonardi et al. (2019) provide evidence of wage compression within Italian firms. These mechanisms are particularly relevant when bargaining covers a substantial share of the working population. Indeed, the inequality results in this article complement previous findings that point in the same direction (ILO, 2015; Jaumotte and Buitron, 2015; OECD, 2011, 2018).

Discussion and conclusion

My analysis reassesses the impact of collective bargaining systems on employment, unemployment and wage dispersion, presenting the full set of results and robustness tests behind the analysis discussed in a non-technical manner in the OECD report, *Negotiating Our Way Up* (OECD, 2019) and the *Employment Outlook 2018* (OECD, 2018).

In particular, I go beyond existing cross-country analyses of trade union density, bargaining coverage or single features of the bargaining system, to examine the functioning of the 'entire package', building on the seminal analysis by Traxler et al. (2001). In order to do so, the analysis relies on a novel taxonomy of collective bargaining systems, grouping countries according to their predominant level of bargaining, the degree of flexibility for firms to modify the terms set by higher level agreements and the role of wage coordination.

The results show that coordinated bargaining systems are associated with higher employment, a better integration of vulnerable groups and lower wage inequality than

fully decentralized systems. Previous evidence also showed that coordinated systems help strengthen the resilience of the economy against business-cycle downturns. Uncoordinated centralized systems hold an intermediate position, performing similarly in terms of unemployment to fully decentralized systems, but sharing many of the positive effects on other outcomes with coordinated systems. The difference between the employment and unemployment results suggests that rather centralized and uncoordinated systems, such as Italy or France, are linked to higher employment and labour force participation.

Compared to analyses, in particular in the field of economics, that only consider the share of workers who are members of a union or are covered by a collective agreement, my approach shows that the functioning of the bargaining system itself is what matters. Systems that have the same degree of trade union density (for instance, France and the USA) or bargaining coverage (Australia and Germany) are associated with very different outcomes. Moreover, when looking at the different models of bargaining, in line with the recent literature, I show the key role that wage coordination plays in good labour market performance. Strong coordination of wage targets, such as can be found in the Nordic countries, Germany or Belgium, is associated with better employment outcomes and lower wage inequalities. By ensuring that collective agreements take into account their macroeconomic effects, wage coordination safeguards the external competitiveness of the country, allows adaptation to the state of the business cycle and ensures similar wage increases across the whole economy. Not surprisingly, wage coordination, where present and strong, tends to be strongly supported by both employer associations and unions.

The findings also show the importance of accounting for the precise role of firm-level bargaining in systems where sectoral bargaining is dominant. While this is well established in the industrial relations literature since Traxler (1995) coined the concept of 'organized decentralization', there are not many empirical analyses that have operationalized this concept and put it to an empirical test. With the considerable limitations of an analysis based on country-level data, I show that systems where sectoral bargaining plays a significant role are not those which perform worse, contrary to the consensus of the early 1990s, but rather those that perform best if firm-level bargaining is widespread and if the margins to tailor the conditions in the sectoral agreement are significant (the 'organized decentralized' systems). Micro-level evidence goes in the same direction: for instance, Carlsson et al. (2019) show that in Sweden, where collective bargaining is 'organized decentralized', aggregate wage dispersion has remained constant but wages vary significantly according to local labour market conditions. In conclusion, two-tier bargaining systems, as defined in Boeri (2014), may raise concerns only insofar as firm-level bargaining is *de jure* or *de facto* marginal or wage coordination is absent or limited. Otherwise, they appear to be rather inclusive and flexible.

While care should be taken not to give the findings a strict causal interpretation, the conclusions have important implications for policy. While many OECD countries have taken steps towards decentralization in the past two decades, the evidence shown in this article tends to suggest that the link between decentralization and labour market outcomes is more nuanced than previous analyses based only on the level of bargaining suggested. Decentralization typically occurred in two ways: either directly through

a replacement of national/sectoral agreements by enterprise agreements ('disorganized decentralization' in the words of Traxler), or through a process of articulated devolution within the national/sectoral agreements ('organized decentralization') allowing firm-level agreements to negotiate wage and working conditions within a general framework negotiated at higher level. I show that simply replacing sectoral with firm-level bargaining appears to be associated with poorer employment and unemployment outcomes as well as with higher wage inequality. While further research is needed to establish the causal link between different bargaining systems and labour market outcomes, these findings suggest that a more fine-grained approach is needed when analysing (and even more, reforming) the functioning of collective bargaining systems. 'Organized decentralization' takes two main forms in European countries (Ibsen and Keune, 2018). In the first, national or sectoral agreements define the broad framework but leave large scope for bargaining at the company or establishment level[12] (notably in the Scandinavian countries or the Netherlands). In the second form, cross-sectoral or sectoral agreements allow and define the conditions for deviations at lower levels via opening or opt-out clauses (Germany is probably the most notable example). In this article, I have pooled these two models of organized decentralization into a single one, but future work should assess whether the effects on labour outcomes are effectively the same or not.

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Supplemental material

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Notes

1. From earlier studies by Blanchflower and Freeman (1993), Blau and Kahn (1999), Card et al. (2004) and DiNardo and Lee (2004) to more recent ones including OECD (2011), ILO (2015), Jaumotte and Buitron (2015) and OECD (2018).
2. Vertical governability is the ability of higher level bargaining units, usually peak-level employers' organizations and trade unions, to impose restrictions and rules on the outcomes and topics of lower level bargaining.

3. A major limitation of a taxonomy at country level is that collective bargaining systems also display significant variation across sectors within the same country, as Bechter et al. (2012) have shown. I follow OECD (2017) and use the manufacturing sector as a reference when differences across sectors cannot be easily reconciled. See, for instance, endnote 6 on Germany.
4. Spain and Switzerland could be classified to an intermediate group between the rather centralized and organized decentralized countries. However, the number of observations between 1980 and 2015 for such an intermediate group is too small to be used for econometric purposes. In Italy and France, formal regulatory changes in the bargaining structure have not resulted in a real shift of power to the firm level: social partners still make sure that sectoral agreements dominate over firm-level bargaining, which in practice only improves wage standards (Boeri, 2014; D'Amuri and Nizzi, 2018; OECD, 2017). In Italy, in particular, company bargaining remains limited to large firms while the bulk of the economy consists of small and medium enterprises. In 2016–2017 the government took a series of initiatives to promote company bargaining, notably by providing tax incentives for wage increases defined at firm level, but without really changing the structure of collective bargaining. The Italian system is increasingly fragmented but still far from any form of 'organized decentralization'.
5. After 2015, Finland moved to a system of sectoral pattern bargaining very much in line with Denmark, Norway and, in particular, Sweden.
6. In Germany, the bargaining system is organized decentralized and coordinated in manufacturing but more and more decentralized and uncoordinated in private services, as for instance, retail trade (Schulten and Bispinck, 2018).
7. http://ec.europa.eu/social/main.jsp?catId=1143&intPageId=3193.
8. https://www.eurofound.europa.eu/observatories/european-observatory-of-working-life-eurwork/database-of-wages-working-time-and-collective-disputes
9. The level of bargaining and the degree of actual centralization show no variation in France, Italy and Portugal. However, wage bargaining in these countries remained quite centralized between 1980 and 2015 despite several piecemeal reforms. In France the favourability principle was inverted and other reforms promoted firm-level bargaining, but decentralization only covered non-wage working conditions (Ray, 2017). In Italy, the scope for firm-level bargaining was also widened but there remains a tension between the rules set by social partners autonomously, which define a hierarchical relationship between bargaining levels, and jurisprudence, according to which a company agreement can always depart from sectoral agreements (D'Amuri and Nizzi, 2018). However, wage bargaining has remained quite centralized over the period of observation. Finally, the recent reforms in Portugal have changed considerably the functioning of the bargaining systems, but have been partly rolled back (OECD, 2017). At this stage, wage bargaining remains rather centralized.
10. Moreover, controlling separately for the degrees of centralization and coordination delivers qualitatively similar results: centralization is associated with lower employment rates (although the relationship is not monotonic as it becomes weaker for extreme forms of centralization) and is not related to the unemployment rate. Wage coordination is linked to higher employment rates and lower unemployment rates.
11. While decreasing wage inequality among full-time workers, collective bargaining may increase earnings inequality between full-time employees and other workers, in the spirit of an insider–outsider model. Since the data in this analysis are based on hourly wages of full-time workers, they cannot be used to study the effects on the overall earnings inequality among all workers.
12. In this first group of organized decentralized countries, sectors can either set *minimum* or *standard* terms of employment, which employers can complement or deviate from at firm level, or allow workers and employers to choose *à la carte* and trade-off, if they want, wages against working conditions.

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