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Reacting Quickly and Protecting Jobs

The Short-Term Impacts of the COVID-19 Lockdown on the Greek Labor Market

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Abstract

This paper uses administrative, survey, and online vacancy data to analyze the short-term labor market impacts of the COVID-19 lockdown in Greece. The analysis finds that flows into unemployment have not increased; instead, separations were lower than would have been expected given trends in recent years. At the same time, employment was about 12 percent lower at the end of June than it would have been without the pandemic. The interrupted time-series and difference-in-differences estimates indicate that this was due to a dramatic slowdown in hiring during months when job creation typically peaks in normal years, mostly in tourism. Although the reasons for these patterns are not formally tested, the analysis suggests that the measures introduced to mitigate the effects of the crisis in Greece played an important role. These measures prohibited layoffs in industries affected by the crisis and tied the major form of income support to the maintenance of employment relationships.

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Reacting Quickly and Protecting Jobs: The Short-Term Impacts of the COVID-19 Lockdown on the Greek Labor Market[1]

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1. Introduction

The COVID-19 pandemic has had dramatic consequences for economies and labor markets around the world. The pandemic has been unique in triggering both supply and demand shocks. To contain the spread of the virus, governments introduced various confinement and lockdown measures that shut down businesses and removed workers from their jobs. At the same time, there have been substantial declines in demand despite large government transfers to firms, workers, and households in many countries. According to the World Bank's June forecast, global GDP is expected to fall by 5% in 2020, with the decrease projected at 7% in the advanced economies (World Bank, 2020). The ILO estimates that the decrease in labor demand in the second quarter of 2020 compared to the last quarter of 2019 will be equivalent to the loss of about 400 million jobs worldwide (ILO, 2020c). The OECD expects that overall unemployment in member countries will be in double digits for the remainder of 2020, more than twice the 5.3% unemployment rate in the first quarter of the year (OECD, 2020).

While a dramatic reduction in labor demand has been a consequence of the pandemic everywhere, there has been considerable variation in how different labor markets have adjusted to the shock. Take the examples of two G-7 countries that have been hard-hit by the virus. In the United States, the unemployment rate more than tripled between February and May, with 14 million workers added to the unemployment rolls in this period. Italy, on the other hand, experienced a decline in unemployment, with almost 400,000 fewer unemployed workers in May compared to February. There, the adjustment to declining labor demand has occurred through labor force withdrawal. There are also important differences emerging between countries in terms of the types of jobs and workers most affected by the crisis.

In this paper, we analyze how the labor market in Greece has been affected during the early months of the pandemic and lockdown. Greece is a particularly interesting case, both because of its situation prior to the arrival of COVID-19 and because of how the pandemic has been handled. Greece entered the current crisis just as it seemed to be finally emerging from the protracted and deep recession the country had endured since the financial crisis began more than a decade earlier. After declining every year from 2008 to 2013, Greece's real GDP has experienced modest growth since 2014, with an annual increase of about 2% in 2018 and 2019. At the same time, labor market conditions, while still difficult, were improving. After peaking at over 27% in 2013, the unemployment rate had slowly but consistently declined to 14.3% in March of this year, the lowest monthly rate in a decade.

To this point, Greece has been quite successful in holding the pandemic in check. While many neighboring countries suffered rapid escalations in cases and deaths, and severe burdens on health care systems, for the most part Greece has been able to avoid difficulties of such magnitude. As of mid-July, Greece had fewer than 4,000 confirmed cases which, on a per capita basis, is roughly one-twentieth of the rate in Spain and one-tenth of Italy's rate. Fewer than 200 deaths have been attributed to the virus, about one-thirtieth of the rate in Italy and Spain. These numbers reflect the swift response of the government after the first case was confirmed on February 26. After that, and within a relatively narrow time window, closures shut down public events, schools, workplaces, travel, and public gatherings, and finally a general stay-at-home

order was implemented on March 23 (eventually lifted on May 4). The government was also very active in introducing a series of measures to help employers and workers weather the economic consequences of the lockdown. These included various forms of tax and rent relief for businesses, unemployment benefit extensions, financial support and social insurance coverage for employees whose contracts have been suspended, financial support for the self-employed, and prohibitions on dismissals for businesses shut down by state order.

Nonetheless, as elsewhere, the pandemic and lockdown are having major economic impacts in Greece. The Hellenic Statistical Authority (ELSTAT) reports that on a seasonally adjusted basis, GDP declined by 1.6% in the first quarter compared to the fourth quarter of 2019.[2] In its Summer Forecast, the European Commission predicts that economic activity will decrease by 9% in 2020.[3] In this situation, a significant deterioration in labor market conditions would be expected.

The main empirical contribution we make in this paper is to describe in some detail how the Greek labor market has evolved in the first few months of the pandemic. Relying on a range of sources including administrative data, survey data, and data from online job posting sites, we document the drop in employment following the imposition of the lockdown and the subsequent flat employment trend through the first months that followed. Two things are particularly noteworthy about the patterns we have observed. First, while Greece did not experience the major declines in employment that some other OECD countries did in March, April, and May, these are normally months when employment growth is substantial in the heavily seasonal Greek economy. Second, employment in these months in 2020 differed from the story in previous years not because the lockdown fueled large numbers of separations but rather it choked off new hiring in what should have been expansionary months. In fact, compared to recent years, separations were comparable or even lower. We attribute this largely to the regulations and wage subsidies introduced by the government that were designed to minimize job loss.

Indeed, one of the messages from our analysis is that policy choices help to explain how the labor market has responded differently to the pandemic shock in different OECD countries. A particularly relevant distinction is between countries, like Greece, that have primarily linked their support to the maintenance of the employment relationship through dismissal restrictions, wage subsidies, and short-term compensation and those countries that have largely let layoffs occur and supported workers through unemployment benefits and cash transfers. Highlighting this link between policy choices and labor market outcomes is a second contribution of this paper.

The remainder of the paper is organized into the following sections. In section 2, we review the early evidence on how the COVID-19 pandemic has affected labor markets in OECD countries. We note how a roughly similar shock has translated into different outcomes across countries and highlight the role of government mitigation policies in shaping those outcomes. Section 3 turns to the pandemic in Greece. It describes the measures introduced by the government to control the spread and to compensate

[2] The relevant ELSTAT press release can be found here.
[3] The Summer 2020 Interim forecast is here.

firms and workers, and it uses mobility data to document the evolution of the lockdown. In section 4, we describe the different data sources and methods used for our labor market analysis. That analysis is presented in section 5. It tracks employment and unemployment trends during the lockdown, with an emphasis on how the overall picture has been shaped by the dynamics of hirings and separations. Finally, in section 6, conclusions are presented as well as some key research questions moving forward to understand the impact of the pandemic on the Greek labor market.

2. Literature Review

2.1 Challenges related to data and measurement

The COVID-19 pandemic has affected entire economies and labor markets at a very fast pace, requiring policy makers to have access to up-to-date information to design suitable and timely policy responses. However, the disruptions caused by the pandemic and the speed with which the crisis has unfolded have shown that the methods and sources normally used to track labor market outcomes may have significant shortcomings in this context. For example, even gold standard surveys designed to provide up-to-date information, such as the Current Population Survey (CPS) in the United States, may not be sufficient to keep up with the fast spread of the virus and its disruptive impacts. Administrative data released with shorter time lags, as in the case of UI claims in the United States,[4] have also shown to have shortcomings that limit their effectiveness in timely and comprehensively informing policy responses during the pandemic (Cajner et al, 2020).

Furthermore, social distancing and other transmission prevention measures have affected several data-related activities around the world with potential impacts on data quality and reliability. ILO (2020b) shows that data collection, supervision, cleaning and analysis have been affected in several countries. Adjustments in survey instruments, data collection methods and weighting schemes have become necessary to address issues related to low response rates and non-random patterns in non-responses. Even with these adjustments, response rates have dropped in several cases. The United States Bureau of Labor Statistics documents that the response rate for the 2020 May Establishment Survey was 69%, compared to a 75% average between March 2019 and February 2020. The corresponding figure for the household survey in May 2020 was 67%, compared to the 82% average over the 12 months ending in February 2020 (BLS, 2020). Furthermore, focusing on the nature on non-responses in the March and April 2020 rounds of the CPS, Montenovo et al. (2020) show that the drops in responses in these two months were not random.

The specific disruptions emerging from the crisis have also implied that standard labor market definitions may not be sufficient to fully capture labor market dynamics under the pandemic. For example, given the different forms of mobility restrictions and social distancing measures currently in place, variations in unemployment may be misleading. In fact, in the COVID-19 era, slow increases in unemployment may co-exist with significant job losses. This is because non-employed people, despite being interested in working, might not be actively looking for a job as a result of restrictions on economic activities or the perceived risk of contracting the disease at work. As such, going beyond the analysis of employment, unemployment and labor force

[4] Official estimates on UI claims are released 12 days after the end of the week they refer to.

participation trends becomes important to fully understand labor market dynamics during the crisis (ILO, 2020b; Abraham, 2020; Hamermesh, 2020).

Several efforts have been made over the last months to address these challenges. Some researchers have complemented administrative and survey data with online vacancy data that record information in real-time and are available with short time lags (Kahn et al, 2020; Campello et al., 2020; Hensvick et al.; 2020). Kong and Prinz (2020) and Goldsmith-Pinkham and Sojourner (2020) use Google search data to predict UI claims in the United States with the objective to reduce the time lag with which this information becomes available. Other authors have leveraged private sector data, specifically payroll data (Cajner et al., 2020), data from a time and scheduling software (Kurman et al., 2020) or data from daily purchases (Coibion et al., 2020). By combining these data with information from traditional data sources or augmenting these data with newly collected COVID-related information, they have been able to provide timely and detailed insights on the labor market impacts of the crisis.

Several other researchers have used newly collected data based on surveys specifically implemented to better understand the impacts of the crisis. In the United States, Bick and Blandin (2020) fielded a survey that follows a similar structure to the CPS but that generates more timely estimates. Brynjolfsson et al. (2020) used Google Consumer Surveys to collect two waves of survey data in April and May 2020. Bartik et al. (2020) focused on firms and collected data from approximately 5,800 businesses using an online survey. Online surveys were also used in the United Kingdom (Gardiner and Slaughter, 2020) and in Belgium (Baert at al. 2020) to collect data from workers, and in Denmark (Bennedsen et al., 2020) to collect data from firms. Finally, some researchers implemented multi-country online surveys. Adams-Prassl et al. (2020) covered Germany, the United States and the United Kingdom, while Belot et al. focused on China, Japan, the Republic of Korea, the United States, the United Kingdom, and Italy.

2.2 Evidence on employment impacts and the role of policies

Combining data from surveys, administrative and real-time sources, the ILO estimates large drops in employment due to the pandemic. To address the data and methodological challenges emerging from the crisis, the ILO developed what they refer to as a "nowcasting" model, which provides real-time statistical prediction based on a multiplicity of traditional and non-traditional data sources (ILOa, 2020). Based on this model, the ILO estimates that between April and June 2020, Europe alone experienced a decline in hours worked equivalent to 37 million full-time jobs compared to the last quarter of 2019. Projections for the second half of 2020 show that even in the most optimistic scenario, hours worked would still be far from pre-COVID levels. The OECD projects unemployment in OECD countries to be at 11.5% in mid-2020, twice the level at the end of 2019. The projections for the rest of the year still show unemployment rates well above the pre-outbreak levels, with the most optimistic scenario suggesting levels comparable those recorded during the peak of the Global Financial Crisis (OECD, 2020).

These significant drops in hours worked are the result of different labor market adjustments in various countries. ILO (2020c) shows that working hour losses were not due to significant job losses in the United Kingdom and in Korea, as the vast majority of workers were still able to keep their jobs even if working fewer or no hours.

As a result of this, unemployment was not greatly affected in these countries. The implications of reductions in hours worked were significantly different in Canada and the United States. In Canada, almost half of the reduction in hours worked was due to people losing their jobs. In the United States, two-thirds of the decline in hours worked was due to people losing their jobs. Among those who lost their jobs, relatively more people became inactive in Canada, while the majority became unemployed in the United States. Furthermore, these disruptions did not equally affect all workers and segments of the economy. Estimates suggest that women, migrants, young people, informal workers, and specific vulnerable sectors and occupations were particularly hit by the crisis (ILOa, 2020; OECD, 2020).

The policies introduced to attenuate the disruptions caused by the pandemic have likely played a role in the way labor markets have responded in different countries. Gentilini et al. (2020) show that since the beginning of the outbreak, 200 countries implemented more than 1,000 social protection and employment measures to address the impacts of the crisis. While most of these interventions were cash transfer programs, several countries also introduced policies specifically focused on attenuating the labor market impacts of the crisis: 64 countries provided unemployment benefits, 53 social security subsidies, 69 wage subsidies, 24 labor market regulation adjustments and 10 shorter work time benefits.

Some clear patterns have emerged after these initial months of policies' implementation. A first group of countries has focused on policies and programs aimed at preserving existing employment relationships, often implemented through the provision of subsidies to reduce labor and other costs for employers and/or the introduction of measures to limit dismissals. New Zealand, Germany, Denmark, France, and Switzerland are all countries in which take-up rates in job retention schemes have been high. A second group of countries has focused on mitigating the impacts of the crisis on workers by expanding unemployment insurance systems. In the United States, Israel, Norway, Canada and Ireland, the unemployment insurance system has played an important role in response to the crisis. While projections, administrative data and surveys suggest that increases in unemployment have been minimal for the first group of countries, unemployment has increased significantly for the second group (Rothwell, 2020; OECD, 2020).

A large body of research in the last months has focused on better understanding the impacts of COVID on labor markets in specific countries, with particular attention to identifying groups severely affected by the crisis and jobs at risk. An increasing number of papers has also focused on the impacts of the pandemic on small firms, on the role of policies in shaping labor market dynamics, and on potential shock-induced changes in labor market behaviors such as job search.

Studies focused on the United States suggest that significant job losses were recorded in March and April, with some initial signs of recovery in May, which however seem to have slowed down by the end of June. Evidence from both standard surveys (Béland et al., 2020a; Cowan, 2020) and private sector data (Coibion et al., 2020; Cajner et al. 2020) points to unprecedented drops in employment, increases in unemployment and declines in labor force participation. Between February and April 2020, it was estimated that at least 20 million people lost their jobs (Coibion et al., 2020; Cajner et al. 2020). These patterns have been accompanied by significant declines in job vacancies posted by firms (Kahn et al., 2020; Campello et al., 2020). Estimates based

on real-time population surveys document strong increases in employment and declines in unemployment during May and most of June. However, the current figures are still well below their pre-COVID levels (Bick and Blanding, 2020).

These findings are confirmed by studies focused on small businesses. Kurman et al. (2020) find that until mid-April employment in small businesses in the services sector dropped by 60%, equivalent to the loss of 18.2 million jobs. However, from mid-April to June more than half of the closed businesses reopened, resulting in 9.1 million additional jobs, mainly taken by previously furloughed workers. Bartik et. al (2020) find similar patterns and point to significant heterogeneity across sectors, with retail, arts and entertainment, personal services, food services, and hospitality reporting the largest declines. Using CPS data, Fairlie (2020) confirms that economic activities by small businesses significantly declined in April and only partially recovered in May.

Overall, the research so far seems to unanimously show that the workers hit the hardest by the crisis are women, young, low-educated (Béland et al., 2020a; Bick and Blanding, 2020; Cho and Winters, 2020; Cowan, 2020; Montenovo et al., 2020) or with an ethnic minority or migration background (Béland et al., 2020a; Borjas and Cassidy, 2020; Cho and Winters, 2020; Cowan, 2020; Fairlie et al., 2020; Montenovo et al., 2020). Nevertheless, some evidence suggests that during the initial stages of the crisis men might have been disproportionately affected (Béland et al., 2020a) and that some older workers might have chosen to go on early retirement (Coibion et al., 2020; Cowan, 2020).

These studies also explore whether social distancing measures have disproportionally impacted specific categories of workers. Findings from this research show that jobs that cannot be performed from home are at higher risk, while, jobs in workplaces classified as essential face lower risks (Béland et al., 2020a; Cajner et al., 2020; Montenovo et al., 2020). As an estimated 93% of workers around the world live in countries with some forms of workplace restrictions (ILOa, 2020), a large body of research across the world has focused on identifying vulnerable occupations, with a particular focus on jobs that cannot be performed from home and in sectors that have been severely affected by the shutdown (Diengel and Neiman, 2020; Garrote-Sanchez et al., 2020; Hatayama et al., 2020; Hicks et al., 2020; Mongey et al. 2020; Pouliakas and Branka, 2020; Saltiel, 2020). ILO (2020a) shows that while only 7.9% of workers around the world worked from home before the crisis, almost 18% are in jobs or have access to the infrastructure that could allow them to work from home in the future. This research also shows that working from home is more feasible in high-income countries (23%) than in low-income countries (13%). Focusing on Greece, Pouliakas (2020) shows that more than one-third of jobs in the Greek labor market could be performed from home.

A number of studies have tried to identify the channels driving the observed employment impacts. Using data from the United States' Current Employment Statistics (CES), Brinca et al. (2020) try to disentangle the aggregate COVID shock in its demand and supply components. They observe that in April 2020 employment in the private sector was significantly lower than its historical average and estimated that more than 65% of this impact was due to labor supply shocks, i.e. inability of workers to perform their jobs. Kong and Prinz (2020) conclude that restaurant and bar limitations and non-essential business closures were the only transmission prevention measures that in the United States led to an increase in UI claims. Barrero et al. (2020)

using forward-looking firm level data, find that the COVID-19 induced shocks lead to 3 new hires for every 10 layoffs. They also project that the total number of entire working days performed from home will triple after the end of the pandemic and that between 32% and 42% of all layoffs will be permanent.

Findings of research focused on the Canadian labor market are in line with the results in the United States. Using the Canadian Labor Force Survey up to April 2020, Béland et al. (2020b) document substantial increases in unemployment (approximately 5 percentage points) and drops in labor force participation (3.7 percentage points), hours worked (1.5 percentage points) and wages (0.4 percentage points). These impacts were less severe for essential workers or workers who can work remotely, while they were more pronounced for younger and less educated workers. Differently from the results for the United States, they do not find evidence of differential effects by gender or of disproportionate impacts of the crisis on labor market outcomes for migrants.

Adams-Prassl et al. (2020) compare the impacts of COVID-19 on jobs, earnings and hour worked in three countries that have introduced different policies in response to the pandemic, i.e. the United Kingdom, United States and Germany. They find substantial differences across and within countries. Job losses in the United States and the United Kingdom were substantially higher (18% and 15%) than in Germany (5%), a country with a well-established short-time work scheme. They point out that the United Kingdom also introduced a similar scheme, which however does not allow furloughed workers to do any work for their employers, thereby potentially discouraging firms from applying. Not surprisingly, the study also finds that furloughing was more prevalent in the United Kingdom (43%) than in the United States (31%), a country that strongly relied on the expansion of unemployment benefits to respond to the crisis. The study also finds that in all countries, people who can work from home are less likely to lose their jobs. This is also the case for people with permanent contracts, fixed hours and in salaried jobs. In the United States and the United Kingdom, less educated workers and women were found to be more likely to lose their jobs during the pandemic. This is not the case in Germany. Based on a survey covering China, Japan, Korea, the United States, the United Kingdom, and Italy, Belot et al (2020) also find that young people are severely affected by the crisis in these countries.

Focusing on Denmark, another country that introduced significant measures to encourage job retention, Bennedsen et al. (2020) provide additional evidence on the strong impact of these policies in helping firms keep their workers. Estimates presented in this study suggest that the policies introduced by the Danish government contributed to a reduction in layoffs by 81,000 jobs and increase in furloughs by 285,000. Employment subsidies seem to have a stronger correlation with job retention, while the correlation is weaker for cost subsidies and the evidence for tax subsidies is mixed. The authors conclude that labor subsidies meet their objective of preserving employer-employee relationships, while the impact of the other policies is less clear.

Sweden is another example of a country that has leveraged on strong job retention interventions to respond to the crisis. Hensvick et al. (2020) study the impact of the COVID-19 crisis on job search using real-time data from the job board of the Swedish Public Employment Service. They find that between March and May employers posted

40% fewer vacancies. The drops were significant in sectors such as hotels and restaurants, and entertainment, as well as in occupations that are more difficult to perform from home. They also find that users reduced job-search intensity and seemed to have re-directed their searches to occupations that are more likely to be performed from home and more resilient to the crisis.

Alstadsæter et al. (2020) study the impacts of COVID-19 on layoffs in Norway, a country that has strongly relied on unemployment insurance benefits to mitigate the impacts of the crisis. Their analysis based on UI claims data shows that almost all layoffs up to April 19 were temporary. Even if accounting for only 10% of the total number of layoffs, permanent layoffs generated a 1.5 percentage point increase in unemployment, a significant month-to-month variation for Norway. They also show that layoffs affect populations that are already financially vulnerable (low-income, low-educated, immigrants) and are more common in jobs that require physical proximity, especially in the initial phases of the crisis. Similarly, they find that in the early stages of the crisis, the impacts were mostly felt by women and young workers, but as time passed men and older workers were also significantly impacted.

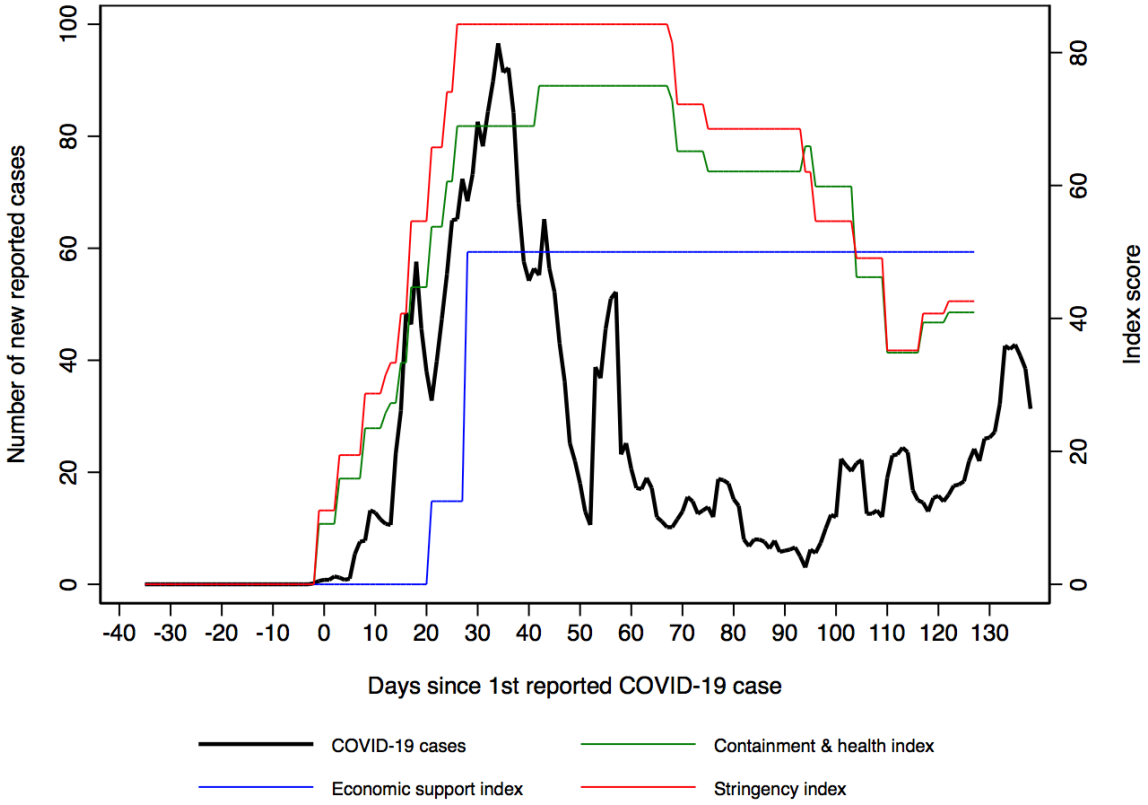
The Korean experience also provides interesting insights as the government mainly relied on testing and tracing and less on lockdowns to contain the spread of the virus. Aum et al. (2020) find that a one per thousand increase in infections leads to an almost 3% decrease in local employment. They compare these effects to those in the United Kingdom and the United States, where lockdowns were introduced, and note that employment losses were almost double in these countries. Shedding light on the channels driving these results, the authors find that employment losses were mainly due to a slowdown in hiring by firms and to transition of workers out of the labor market rather than to unemployment. The authors note that at the time of publication, the Korean government had not implemented any public furlough scheme. The paper also shows that employment losses were mainly experienced in small businesses (less than 30 employees), and that the workers with the highest probability to lose their jobs were less educated, young, employed in low-wage occupations, with temporary contracts, or self-employed. Men were also more affected than women. With the exception of the gender results, these results are similar to those found by other studies for the United States and the United Kingdom.

3. COVID-19 in Greece: Evolution and measures taken

3.1 The spread of the virus and the lockdown measures

The first case of COVID-19 in Greece was confirmed on February 26. Figure 1 shows the trend in new cases from that date. Compared to many other countries in Europe, where cases and fatalities exploded quickly, the pandemic progressed slowly in Greece. The government has been credited with reacting quickly to the pandemic, introducing various restrictions even when cases and fatalities were quite low. For example, on March 10, before most of Europe, schools and universities nationwide were ordered closed, when there were just 89 confirmed cases and no deaths. The first virus-related death in Greece was recorded on March 12. The outbreak peaked in early April when new cases were approaching 100 per day. By April 21, there were 2,401 confirmed cases; 150 new cases, all asymptomatic, were related to one refugee facility located in Northern Greece. As of early July, Greece had around 3,500 confirmed cases and slightly fewer than 200 deaths from the virus.

Figure 1. COVID-19 cases and public policy mitigation measures



Source: Johns Hopkins University; University of Oxford, Blavatnik School of Government.
Notes: Indices range from 0 to 100. The Containment & health index combines lockdown restrictions and closures with measures such as testing policy, contact tracing, short-term healthcare investment in healthcare, and investments in vaccine. The Economic support index records measures such income support and debt relief. The Stringency index records the strictness of lockdown-style policies that primarily restrict behavior and activities. The first confirmed COVID-19 case in Greece was reported on February 26, 2020.

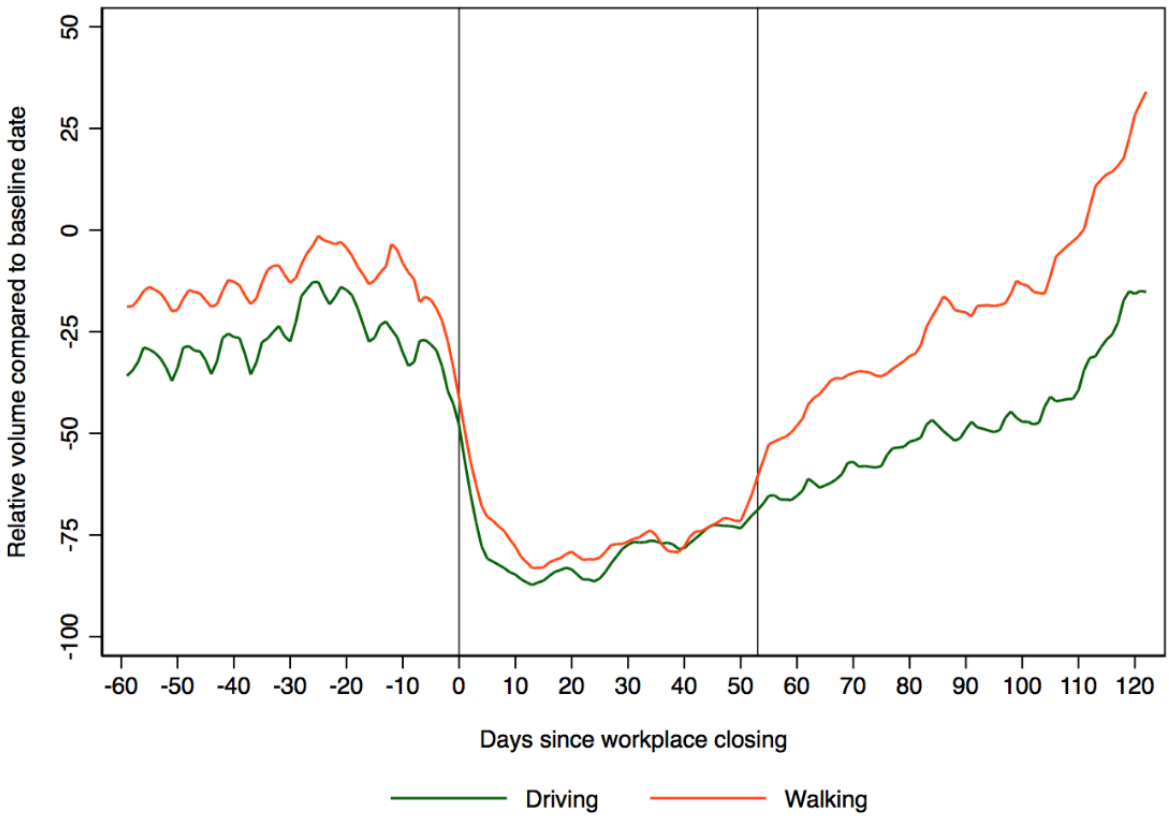
Even though the actual spread of the virus has been much lower than in most European countries, the impact on society and the economy has been substantial because of the strict lockdown measures. Figure 1 shows the rapid imposition of the lockdown, as shown by the steep rise in the Oxford/Blavatnik Stringency and Containment and Health Indices within the first three weeks after the initial recorded case.

Some of the key measures put in place to slow the spread of the pandemic included cancellation of all carnival events (February 27), school closings (February 27 at a regional level and closed down nationally on March 10), closing of all non-essential workplaces (March 12-18), suspension of all public religious services (March 16), ban on gatherings of more than 10 people (March 19), internal and external travel restrictions (March 18-22), and finally, a general stay-at-home order (March 23), intensified by permanent roadblocks and checks of vehicles (April 8). The government lifted the stay-at-home order on May 4, followed by the opening of schools,

commercial activities, and workplaces (progressively from May 11, essentially completed by June 1).

These measures affected all aspects of everyday life. This effect can be visualized through mobility data provided by Apple and Google, which is sent from users' devices to these companies' maps services.[5] Using February 15 as the pre-pandemic baseline, Figure 2 presents Apple Maps data to illustrate how driving and walking in Greece started to decline after the first cases but then fell sharply as soon as the lockdown and workplace closing measures were implemented. For much of the period between March 12 (workplace closings initiated) and May 4 (end of the lockdown), driving and walking activity was well below 70% of February 15 levels. Towards the end of the lockdown period, mobility started to slowly pick up and this continued through May and June and approached pre-pandemic levels, at least in the case of walking.

Figure 2. Daily driving and walking activity



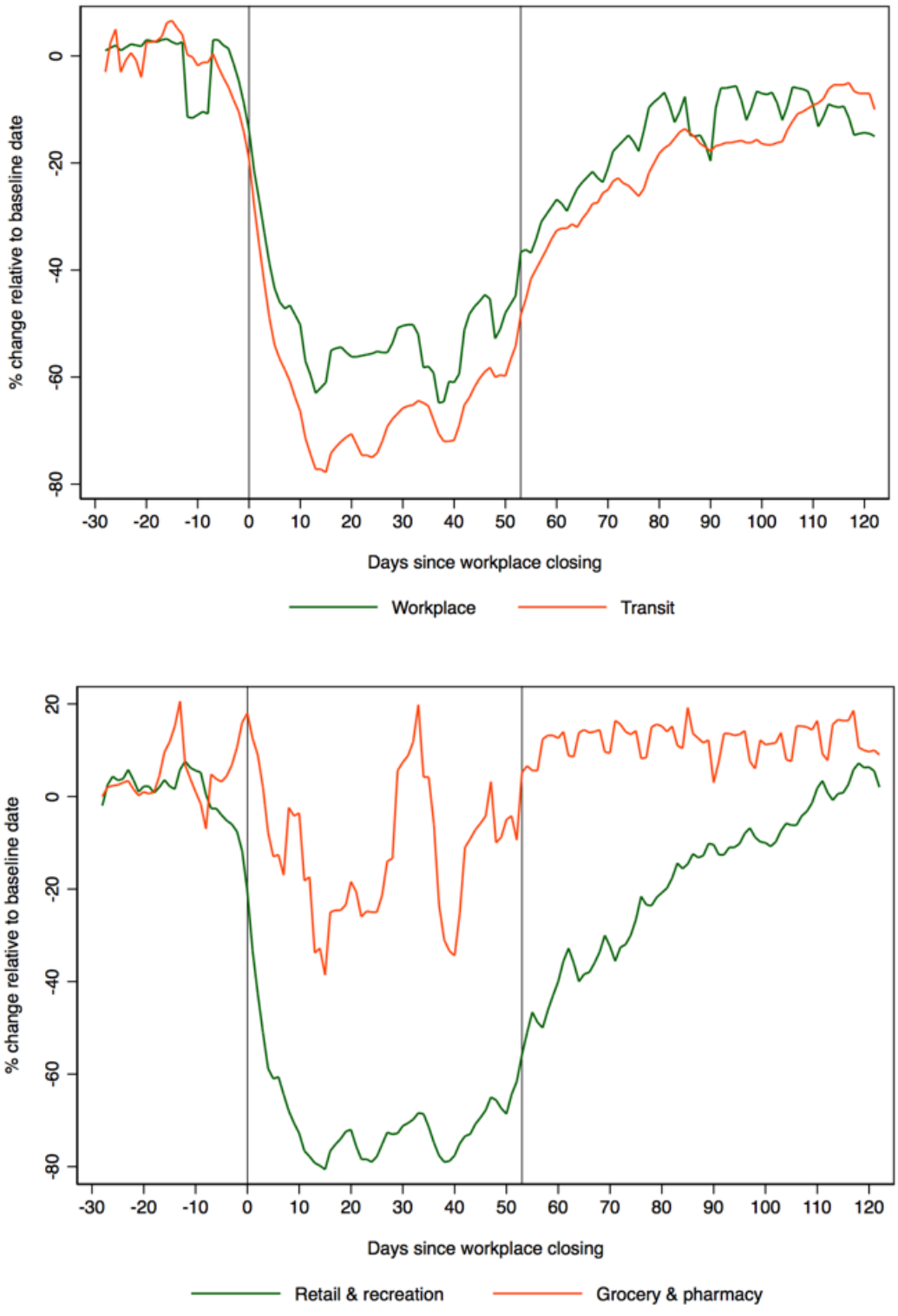
Source: Apple.
Notes: Vertical lines are set at workplace closing (March 12) and at the end of the lockdown (May 4). The baseline date is February 15.

The lockdown effects are also reflected in market-related activities. Google mobility reports provide data on trends in visits to various types of places, which can be compared to the pre-pandemic baseline (February 15). Figure 3 (top panel) shows that visits to workplaces and use of public transit declined by 50%-80% during the lockdown compared to pre-pandemic levels. The data again show the return (albeit

[5] Apple data: www.apple.com/COVID19/mobility; Google data: www.google.com/COVID19/mobility/.

partial) towards the pre-pandemic baseline after the lockdown was lifted. A similar pattern is observed for non-essential shops (using retail and recreation as an example), while essential retail (grocery stores and pharmacies) were not nearly affected to the same extent (Figure 3, bottom panel).

Figure 3. Daily activity for selected indicators



Source: Google Community Mobility Reports.

Notes: Charts begin on 15 February 2020 (baseline date) after which Google data became available. Vertical lines are set at workplace closing (March 12) and at the end of the lockdown (May 4).

3.2 Economic impact and mitigation measures

As expected, restrictions imposed by the government as well as the demand shock that affected most sectors resulted in a major economic slowdown with significant consequences for businesses and workers. GDP for the 1st quarter of 2020 decreased by 1.6% in comparison with the 4th quarter of 2019, while in comparison with the 1st quarter of 2019, the decline was 0.9%.[6] Various projections from national and international agencies estimate that GDP will shrink between 5.7% and 10% in 2020. A key factor will be declining exports, and especially tourism and shipping.[7]

To keep the economy afloat during the pandemic, the Greek government introduced a range of measures to support affected businesses and their employees. The government mobilized an immediate aid package amounting to 6.8 billion euros (or 3.5% of GDP) for March and April and legislated an additional package of 24 billion euros in May in order to stimulate the restart of the economy in the aftermath of the crisis.

The first legislative act to support businesses (March 11) was intended to provide firms with liquidity through the extension of tax and social contribution compliance deadlines, discounts on certified tax liabilities in case they were paid in due time, and suspension of debt payments. About 800,000 firms that had been financially affected in terms of a decline in their turnover or had ceased operation by state order were eligible for these and other benefits described below, on the condition of no layoffs.[8]

On March 18, the Ministries of Finance and Labor announced and then legislated a new package of measures. The key component was the provision of an 800-euro stipend (covering the period from March 15 to April 30, eventually extended through May) to workers whose contracts had been suspended because of the suspension of operations of their enterprise. In addition, for these workers, the government covered all social insurance contributions and all tax payments were suspended for a period of four months. The same measure was applied to freelancers, self-employed, and individual business owners with up to 20 employees.[10] Enterprises whose operations had been mandatorily suspended and affected employees were asked to pay just 60% of their rents for March to May.

Overall, by early May, approximately 1.2 million employees and 550,000 self-employed and freelancers had benefited from this scheme. A one-off stipend of 600 euros in the form of a special training program was provided to specific professionals (economists/accountants, engineers, lawyers, doctors, teachers, and researchers) in April.[9] These occupations became eligible for the €800 financial support as of May. The budget allocation for the stipends for employees, freelancers/self-

[6] See Table 2 here.
[7] See the relevant Centre of Planning and Economic Research report here.
[8] The list of eligible businesses was defined by virtue of Ministerial Decision by the Ministry of Finance (MoF), included business activities (sectors) per Code of Business Activity and was updated regularly during the health crisis. The most recent version of the list is provided on the MoF website.
[9] The eligibility criteria for the freelancers, self-employed and individual business owners who were entitled to such financial support were explained in Ministerial Decision 39162 ΕΞ 2020/ GG B' 1457/16.04.2020.

employed/individual businesses, and professionals is €2.36 billion, with an additional €1.36 billion for the social insurance payments.[10]

Additional funds were allocated to benefits for unemployed workers. On March 20, a measure was introduced to extend payments of the regular unemployment benefit, the long-term unemployment benefit, and the unemployment allowance for the self-employed by 2 months for those whose entitlement ended on March 31. The measure was then extended to cover those whose entitlement ended at the end of April and at the end of May. In addition, a lump sum stipend of €400 was introduced for 155,000 long-term unemployed individuals, registered with the public employment agency (Hellenic Manpower Employment Organization (OAED)) from April 1, 2019 who were maintaining their status until April 16, 2020 and were not receiving any other benefit from the state. The budget allocation for these measures related to unemployment benefits is about €300 million.

In terms of numbers affected and financial commitment, the government's mitigation measures have emphasized the preservation of employment in enterprises where operations were suspended. A key condition of the benefits provided to affected businesses was that they were obliged to maintain the same headcount. In fact, layoffs in designated industries were temporarily prohibited from March 18 until the restriction was lifted on June 16.

4. Data and methods

This section briefly presents the data sources, relevant indicators, and the methods that are used to assess labor market adjustments in Greece due to the COVID-19 pandemic and the relevant mitigation policies.

4.1. Labor market indicators

We report monthly estimates from the Labor Force Survey (from ELSTAT) on the labor force participation rate, employment to population ratio, and unemployment rate for the periods January-April 2019 and January-April 2020 to see differences in trends before and during the lockdown.[11]

We also use the LFS data to identify how other aspects of the Greek labor market have been affected by the COVID-19 crisis. In addition, to assess the degree of labor market slackness, we calculate the extended labor force indicator which is simply the active labor force plus the "potential additional labor force" (PALF), which takes into account persons seeking work but not immediately available and persons available for work but not seeking work.

[10] Information regarding fiscal responses to the economic fallout from the coronavirus was provided by the Bruegel data sets; see here.

[11] It should be noted that the pandemic and mitigation measures affected the LFS data collection process, to some extent. From mid-March 2020 onwards, the LFS data collection switched from a blended style of personal and telephone interviews to solely telephone interviews. This decreased the response rate compared to previous months, especially in urban areas. The relevant ELSTAT press release is here.

4.2. Unemployment claims

As an indicator of the evolution of unemployment, we present data from OAED, the public employment agency, on the number of unemployment benefit recipients and the new claims for benefits covering the period from January 2017 to May 2020.

4.3. Labor market flows

Administered by the Ministry of Labor and Social Affairs (MoLSA), ERGANI is the national employment registry in Greece and covers all registered employers who contribute to the Social Security System. The ERGANI monthly reports provide daily information on labor market flows in the private sector, and we use the reports from January 2018 through June 2020. More specifically, the data we analyze covers new hires, overall and by type (full-time, part-time and shift work), and separations (lay-offs, quits and contract terminations). On a monthly frequency, labor market flows are disaggregated by gender, age and region. In addition, we disaggregate these flows by occupation (2-digit) and sector of economic activity (2-digit) for the periods January-April 2019, and January-April 2020.[12]

Using ERGANI daily data, the change in daily flows since the onset of the pandemic and the government restriction on layoffs can be analyzed through a simple regression framework. More specifically, we adopt a single group interrupted time series analysis, in order to compare how outcomes change between the pre-pandemic period and two post-pandemic sub-periods, i.e., one since the onset of the pandemic and one since the government intervention to protect jobs:

$$y_t = a + b_1(c_t \times S_t) + b_2(c_t \times R_t) + W_t^d + c_t + u_t \quad (1)$$

where y is the daily number of hires (or separations), S is dummy for the period after the onset of the pandemic (26 February 2020), R is a dummy switched on after the implementation of layoff restrictions (18 March 2020), c a linear daily time trend, and W is a vector of day-of-week fixed effects (i.e. d=1,…,7); u is an error term. Model (1) is estimated with negative binomial regressions and for two different sample sizes: (a) one for 2020 only, and (b) one covering the total period (2018-2020) for which ERGANI daily data are available. In the latter case, models additionally control for month and year fixed effects. Under the assumption that pre-pandemic labor market flows would have prevailed in the absence of the pandemic and the government responses to it, this method offer an approach for identifying COVID-19-related impacts on daily labor market activity.

However, changing trends before and after the pandemic onset and the related government interventions could be driven by unobserved factors. To account for such unobservables, we follow Powdthavee et al. (2019) and Metcalfe et al. (2011) in constructing a "control group" of observations based on trends from earlier years unaffected by COVID-19. More specifically, we compare the size of weekly labor market flows during weeks after Greece was exposed to the virus ("treated" group) with weekly flows for previous years ("control") group.[13] The exposure period for hires

[12] Due to data limitations in the ERGANI monthly reports, we extracted information on monthly labor market flows (January-April 2019 and January-April 2020) disaggregated by occupation (2-digit) and sector of economic activity (2-digit) from the National Institute of Labor and Human Resources (NILHR) website.

[13] Averaging over weeks for years before 2020 also smooths out any seasonal effects.

begins after week 9 in 2020, corresponding to the first COVID-19 case, while, for separations, the exposure period is after week 12 when layoffs were restricted by the government.

We use a difference-in-differences (DiD) approach, with the identifying assumption being that control and treated weeks move on parallel trends before the exposure period. This is tested visually as well as by including leads of the treatment for a sufficient number of weeks before (Autor, 2003; Cookson and Laliotis, 2017). The model is the following:

$$m_{it} = \alpha_0 + \alpha_1 Treat_i + \alpha_2 Post_t + \alpha_3 Treat_i \times Post_t + e_{it} \quad (2)$$

where m is the number of hires (or separations) in week t (t=1,…,21) for group i (i=0,1), Treat is a binary indicator equal to 1 if the week is observed in 2020 and 0 if observed before (average of weeks 2018-2019), Post is a dummy switched on during the exposure period for both groups (week 9 or 12) and e is an error term. In this quasi-experimental setup, the coefficient of interest is the one associated with the interaction of treatment and exposure period indicators, i.e., α_3. As the lockdown was lifted on May 4, we restrict this analysis for weeks 1-21 so our DiD estimates are not affected by increased labor market activity due to relaxing restrictions. Under the pre-exposure parallel trends assumption, the estimated DiD coefficients will indicate the short-term labor market impacts of COVID-19. As in (1), the model is estimated using negative binomial regressions.

4.4. Online vacancies

Daily data on the number of vacancies posted online are extracted from the two most popular job search portals in Greece. In order to achieve a wide coverage of the market, we use Alexa's ranking, which is web traffic data-based metric.[14] An automated data acquisition mechanism was set up to scrape and store daily information on job postings from all selected portals. Extracted data were pre-processed (e.g., string cleaning, language detection, avoid multiple entries per job ad and harmonization of company name and sectoral affiliation) before being used for the analysis. Advanced machine learning techniques were employed for deduplication. After deduplication, a total of 17,812 job vacancies were collected. Most job vacancies cover occupations such as sales and purchasing agents and brokers, administrative and specialized secretaries, administration professionals, transport and storage laborers, and information and communications technology professionals. A combination of Natural Language Processing and Name Entity Extraction/Recognition methods was adopted to extract the core information from the job postings. Examples of job posting fields extracted through this process include job title, job description, job category, location, job type, contract type, experience, qualification, employer, employer type, firm location, firm size. The extracted data cover the period from January 2020 through June 2020.

[14] The the two highest-ranked job portals according to Alexa (www.alexa.com) are kariera.gr and jobfind.gr. Alexa's traffic data take into account websites' unique visitors and page views. A recent assessment conducted by Cedefop also lists kariera.gr and jobfind.gr among the top private job portals in Greece based on different sources, including a study conducted by ELSTAT in 2017 and based on number of advertisements, number of monthly visitors and Alexa ranking (Cedefop, 2018).

4.5. Job search and finding employment

One additional question we investigate is whether the lockdown and economic slowdown may have reduced job search activity. To answer this question, we use individual-level data from the quarterly LFS to estimate the probability that those not working in a specific quarter were actively searching for a job during that quarter. The estimation sample consists of jobless individuals observed in the first quarters of 2017-2020 who lost their jobs over the previous two years. We estimate the following:

$$Prob(U_i=1) = a + Y^{2020} \times [b^q Q^q_i + \gamma X_i] + \varepsilon_i \quad (3)$$

where U indicates the i-th non-employed jobseeker, Y^{2020} is a dummy indicator which takes the value of 1 for the first quarter of 2020 and 0 for first quarters of earlier years, Q is a vector of quarter dummies (q=1,…,8) and X is a vector of observable individual characteristics, i.e. gender, age, country of birth, education, region and sector of economic activity in the individual's last job, as well as indicators for the reason they stopped working (i.e. laid-off, contract termination, and other reasons).

In addition, we estimate the probability of finding employment during the first quarter in each of 2017, 2018, 2019, and 2020 for those were out of employment prior to that quarter.

$$Prob(E_i=1) = \alpha + Y^{2020} \times [\beta^t T^t_i + \delta Z_i] + \eta_i \quad (4)$$

where E indicates the i-th individual entered into employment, Y^{2020} is a dummy indicator which takes the value of 1 for the first quarter of 2020 and 0 for first quarters of earlier years, T is a vector of year dummies (t=2018, 2019, 2020) and X is a vector of individual characteristics, i.e. gender, age, country of birth, education, and region. Both models in (3) and (4) use a probit link function.

5. Analysis of impacts on the labor market

5.1. Labor market indicators

Table 1 shows non-seasonally-adjusted monthly estimates of the main labor market indicators from the LFS since the onset of the pandemic. The February figures show the improvement in the Greek labor market during the period prior to the pandemic.[15] Most notably, the number of workers unemployed in February 2020 was 16.9% lower than in 2019, corresponding to a nearly three percentage point drop in the unemployment rate (from 19.8% to 17%). On the eve of the pandemic, unemployment had been falling compared to the previous year and there had been a modest increase in employment.

The data for March and April present the evolution of labor market conditions while the lockdown was in place. Normally these are months when seasonal factors lead to job creation and an improvement in labor indicators in Greece. In 2020, employment numbers rose very slightly in March and April, less than they had in 2019. The unemployment figures are interesting. Between February and March 2020, the number of unemployed actually decreased by 13.8%, larger than the decrease in 2019.

[15] Disaggregated trends in the main labor market indicators for 2018Q1, 2019Q1, and 2020Q1 are in Appendix Table A.1.

However, as the lockdown continued in April, unemployment numbers rose by 9.8%. Yet unemployment in April 2020 was still 14.3% lower than it had been a year earlier.

Table 1. Main labor market indicators, February, March, and April 2019 and 2020

	February	March	April	% change (monthly)	
	[1]	[2]	[3]	[2] vs [1]	[3] vs [2]
		2019			
[4] Employed	3758.9	3846.3	3884.3	2.3	1.0
[5] Unemployed	928.0	844.0	852.6	-9.1	1.0
[6] Inactive	3261.8	3254.4	3203.9	-0.2	-1.6
		2020			
[7] Employed	3779.2	3813.0	3839.3	0.9	0.7
[8] Unemployed	771.6	665.4	730.3	-13.8	9.8
[9] Inactive	3353.1	3423.1	3329.4	2.1	-2.7
		% change (annual)			
[7] vs [4]	0.5	-0.9	-1.2		
[8] vs [5]	-16.9	-21.2	-14.3		
[9] vs [6]	2.8	5.2	3.9		

Source: Labor Force Survey (EL.STAT.)
Notes: Seasonally unadjusted estimates for persons 15-74 years old.

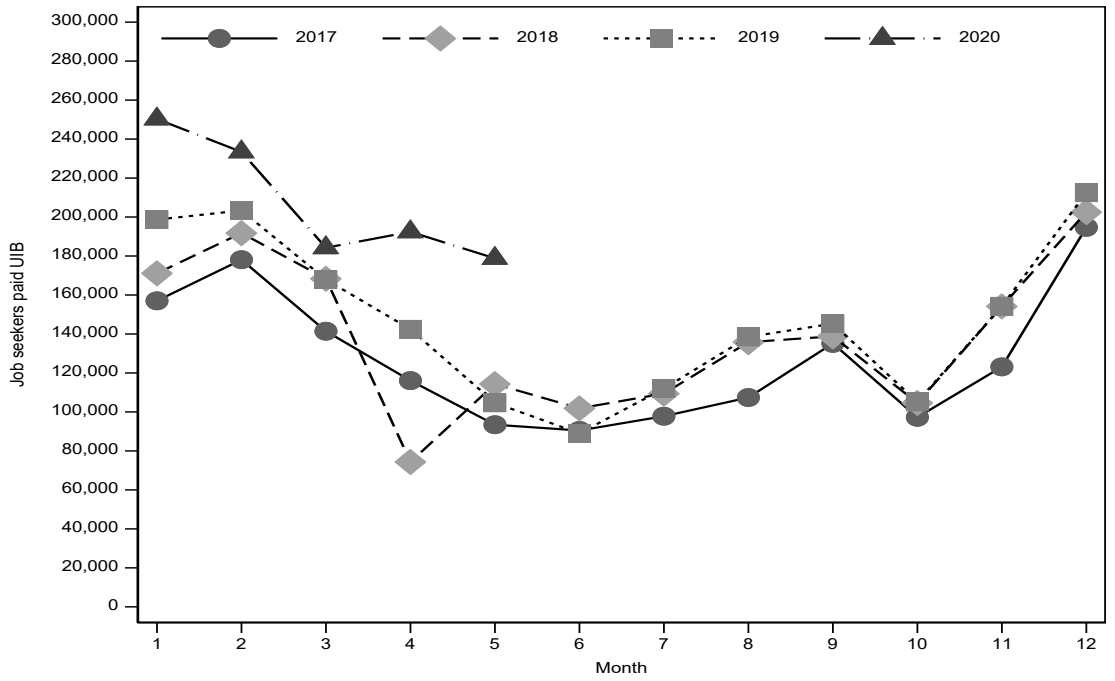
In part, the falling unemployment rates reflect higher inactivity, as jobless workers were less likely to search for work. Table 1 confirms that more workers were inactive in February 2020 than one year earlier. The pandemic accentuated this trend: in March inactivity increased by 2.1%. However, labor force participation statistics need to be carefully interpreted while the lockdown is in place since some people who are counted as inactive might still have some attachment to the labor force. This is evident when we consider the "potential additional labor force" (PALF), which includes those "seeking work but who are not immediately available" and those "available for work and wanting to work but not currently seeking work" (Hornstein et al., 2014). According to LFS data, the size of the PALF increased by 40% in 2020Q1 compared to 2019Q1, and by 72% compared to 2019Q4.[16] This suggests that lockdown measures increased the underutilization of labor, with growing numbers awaiting recall, unable to look for jobs because of the lockdown, or discouraged by the lack of new job openings. As economic activity resumes, these marginally attached workers may be more likely to (re)join the labor force.

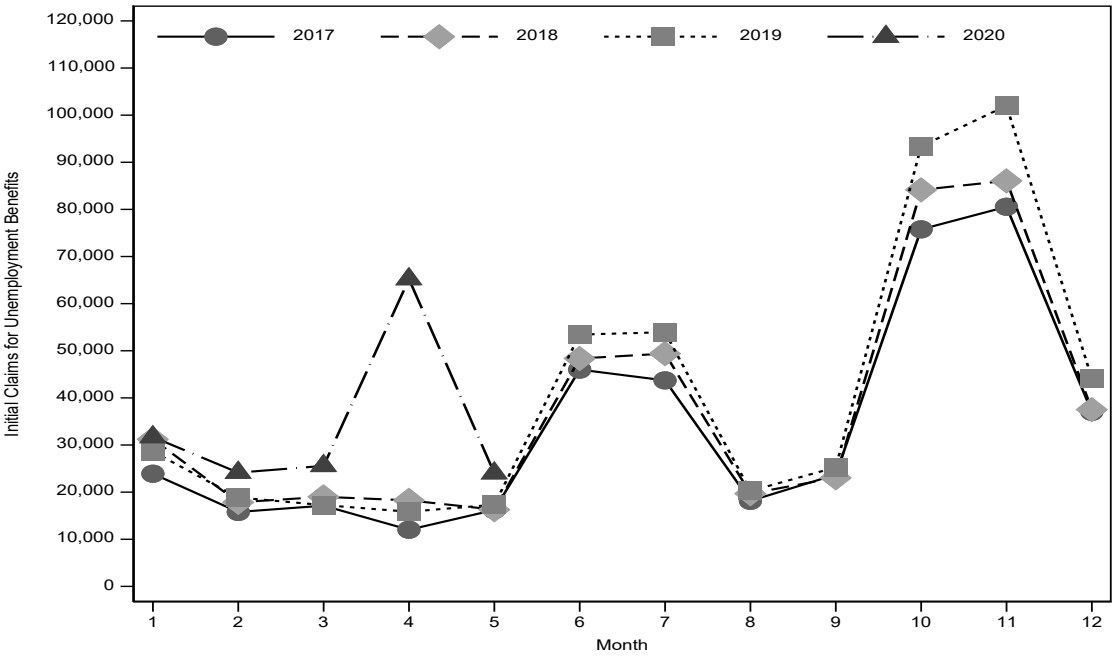
5.2 Unemployment claims

Figure 4 shows the monthly number of recipients of unemployment insurance benefits. The top panel shows overall beneficiaries, demonstrating a pattern which reflects the seasonal character of the Greek economy. The bottom panel shows that new claims for unemployment insurance benefits increased slightly in February and March 2020, and then tripled in April 2020. However, in May, initial claims moved back to a level and trend similar to that of earlier years.

[16] See ELSTAT Table 10 here.

Figure 4. Unemployment insurance benefit recipients and new monthly claimants





Source: OAED Monthly Reports. Authors' calculations.

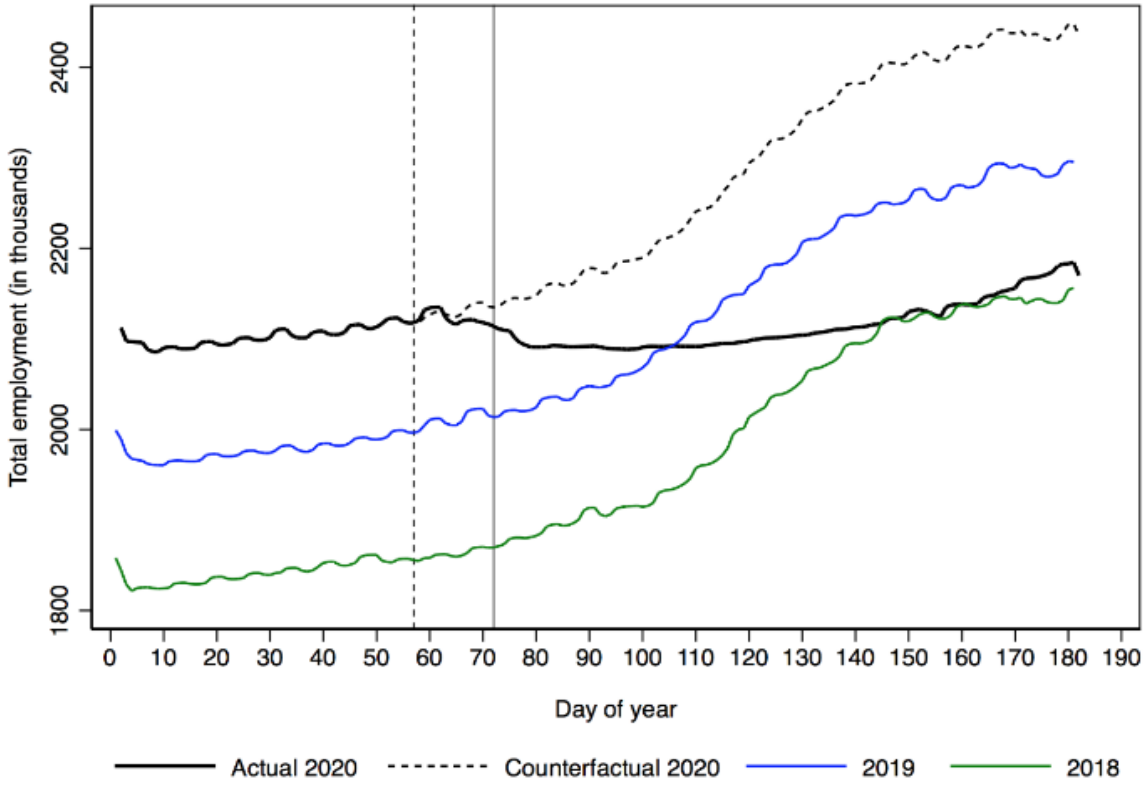
5.3 Labor market flows

The employment registry, ERGANI, provides a unique data source since employment levels and flows in and out of employment can be tracked on a daily basis. Figure 5 presents the day-by-day employment for 2020, from the start of the year to the end of June. The first COVID case and the introduction of the workplace restrictions are marked with vertical lines on the chart so that the employment trend can be observed with reference to these key dates. In order to provide perspective on the 2020 numbers, a counterfactual trend line is included which estimates what the 2020

employment levels would have been if the daily 2018 and 2019 patterns had prevailed in 2020. The chart also shows the actual numbers for 2018 and 2019.

Figure 5 shows that employment started decreasing after COVID-19 appeared in Greece and this continued for a few days (about ten) during the lockdown period. At that point, employment levelled off and then gradually started increasing in May, when restrictions started to be relaxed. However, the employment impact is more striking when actual trends are compared with our best estimate of what the employment trajectory would have been in the absence of the pandemic and lockdown (i.e., based on 2018 and 2019 trends in daily changes).[17] This modest increase in employment corresponds to a period when job growth tends to be strong in Greece, because of seasonal factors primarily associated with the gearing up of the tourism industry. Comparing the actual employment to the counterfactual employment level results to a job deficit of 265,000 by end of June. This corresponds to a loss of 11.9% in total employment relative to a no-pandemic scenario.

Figure 5. Observed and counterfactual daily employment levels for 2020 and employment levels for 2018 and 2019



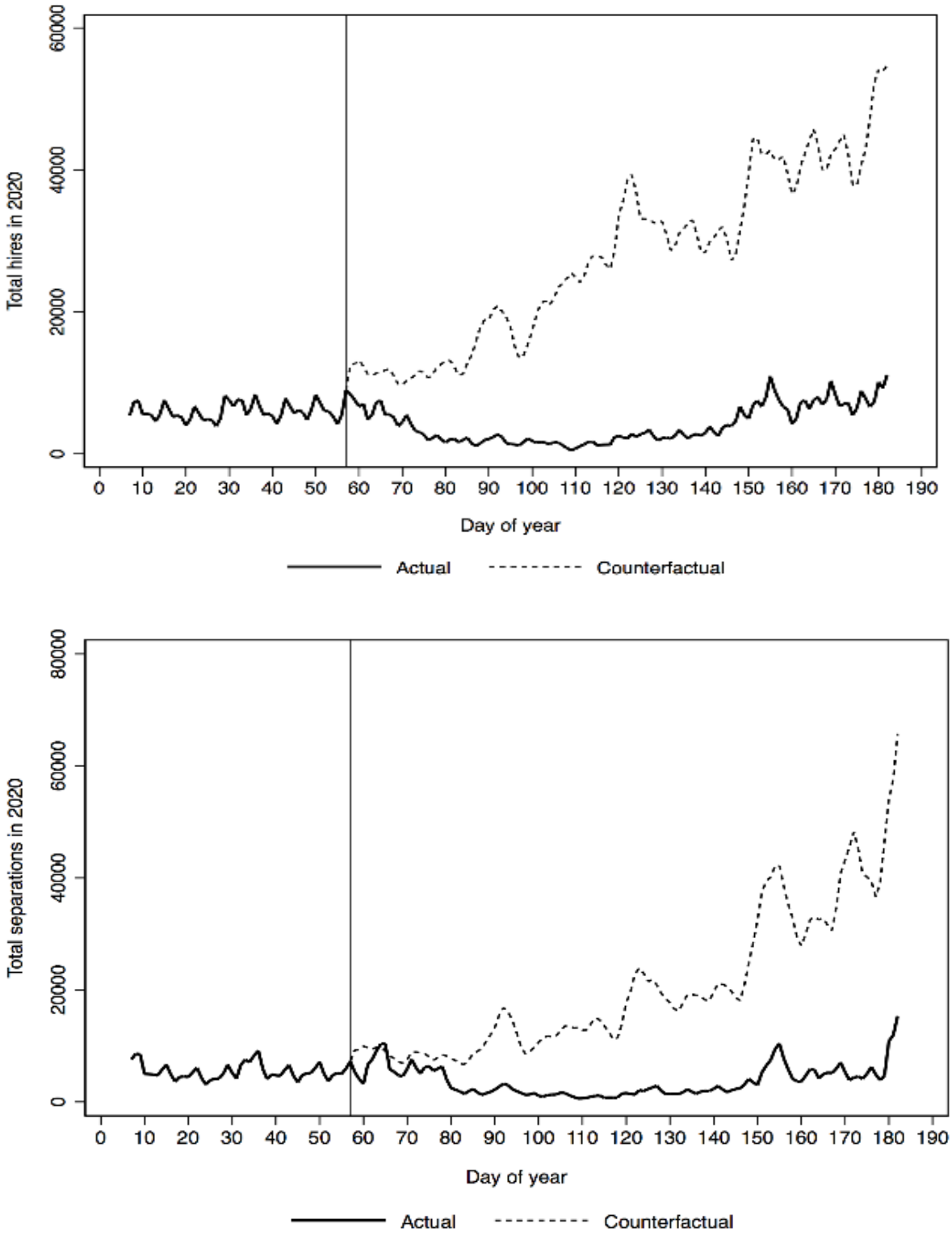
Source: ERGANI.
Notes: Vertical lines are set in the days when the first COVID-19 case was identified (26 February 2020) and when workplace restrictions were implemented (12 March 2020).

Changes in employment levels are explained by trends in hires and separations. The impact on jobs we have observed in Greece is completely due to the effect of the pandemic on new hires. Figure 6 shows the daily progression in total new hires (top panel) and separations (bottom panel) and compares the actual to the counterfactual

[17] This is our identifying assumption of our interrupted time series analysis, i.e. Equation (1).

trends, calculated as before. The decline in new hires, compared to the counterfactual scenario, is apparent. This occurs for all types of hires, i.e., full-time, part-time and shift work (see Appendix Figure A.2).

Figure 6. Total daily hires and separations before and after the pandemic onset, with comparison to counterfactual scenario



Source: ERGANI. Authors' calculations.
Notes: Vertical line is set at the pandemic onset (February 26, 2020).

On the other hand, as the bottom panel of Figure 6 shows, there is no evidence that separations have increased because of the pandemic and lockdown. In fact, the actual number of separations is below what would have been expected if the 2018-19 trends had continued in 2020. This is true for layoffs, quits, and contract terminations (Appendix Figure A.1). Certainly, in the case of layoffs, this can be explained by the government measures to protect jobs by prohibiting layoffs in affected industries and by tying income support to the maintenance of employment relationships. The reduction in quits is not surprising since one would expect fewer workers to leave their jobs in a deteriorating labor market. It should be noticed that there is initial evidence of a small uptick in the number of separations at the end of the period, which may reflect the easing of the layoff restrictions.

Using monthly data on net labor market flows, we observe that the crisis has affected sectors and occupations differently. Table 2 presents the difference between 2020 and 2019 in the size of net flows (new hires minus separations) for January, February, March, and April by sector of economic activity. The results suggest that the accommodation and food sector was particularly affected by the crisis. The negative impacts were especially severe in March and April, the months in which tourism would normally be gearing up for the summer season. In March, accommodation and food services accounted for 52% of the 2020 net job decreases, relative to 2019, while by April, this share was 84%.

Table 2. Comparison of net job flows between 2019 and 2020 by sector

	Difference: Month 2020 – Month 2019			
NACE Rev. 2 sector of economic activity:	January	February	March	April
Agriculture, forestry etc.	402	8	-413	-127
Mining and quarrying	22	-75	-164	-58
Manufacturing	1151	83	-5014	-482
Electricity, gas, steam etc.	-419	829	-42	-248
Water supply; sewerage etc.	-187	-188	-53	-18
Construction	548	-383	-1472	292
Wholesale and retail trade	1009	592	-7310	-8119
Transportation and storage	500	371	-6556	-3572
Accommodation and food service	3865	3415	-43120	-84491
Information and communication	-80	-665	-1965	447
Financial and insurance activities	-485	-188	-415	126
Real estate activities	-17	-34	-405	-769
Professional, scientific and technical	-634	-1303	-3000	-389
Administrative and support service	-688	-515	-4896	-3435
Public administration, defense etc.	-941	-2612	235	-260
Education	299	-350	-1798	214
Human health and social work	179	-846	-943	2038
Arts, entertainment and recreation	573	-728	-4684	309
Other service, households and extra	-119	-295	-1623	-2114
Total additional jobs	4978	-2884	-83638	-100656

Source: ERGANI and National Institute of Labor and Human Resources (NILHR). Authors' calculations.

Table 3 presents a similar analysis by occupation. During March and April, the most affected group was workers employed in services and shop and market sales workers.

This group accounted for two-thirds of the total drop in net job flows in April. A large number of workers in this occupation in Greece are employed in the tourism sector.

We now turn to our more formal analysis of the impact of the pandemic on labor market flows, first using interrupted time series and then difference-in-difference estimates. Regarding the former, we regress the log of total new hires (or separations) on a day-of-week, month, year fixed effects and a linear time trend, and then plot the mean residual by week and year. The results are shown in Figure 7; vertical lines are set at the weeks when the pandemic started and when restrictions on layoffs were implemented. The results confirm what we observed through the descriptive data analysis. There is a pronounced decline in new hires after the pandemic appeared and this decline started in those weeks during which new hires peaked in the pre-pandemic years. At the same time, separations were lower compared to the respective weeks of pre-pandemic "normal" years.

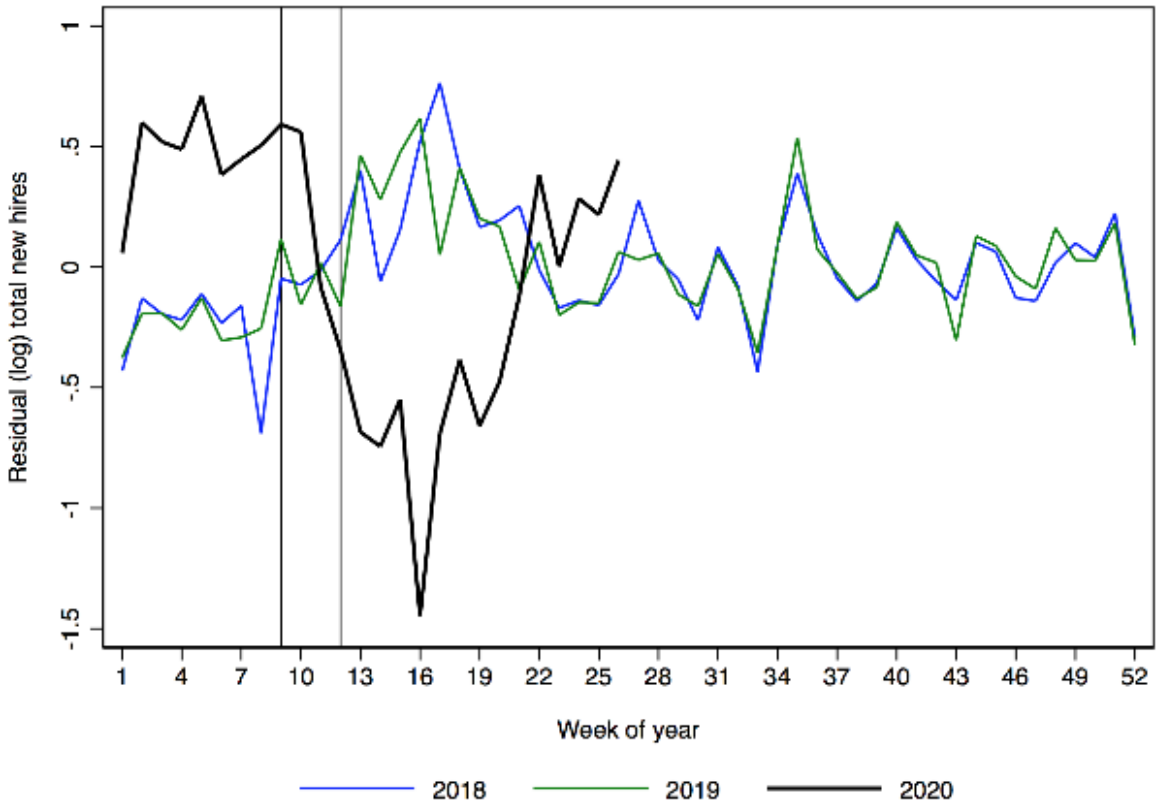
Table 3. Comparison of net job flows between 2019 and 2020 by occupation

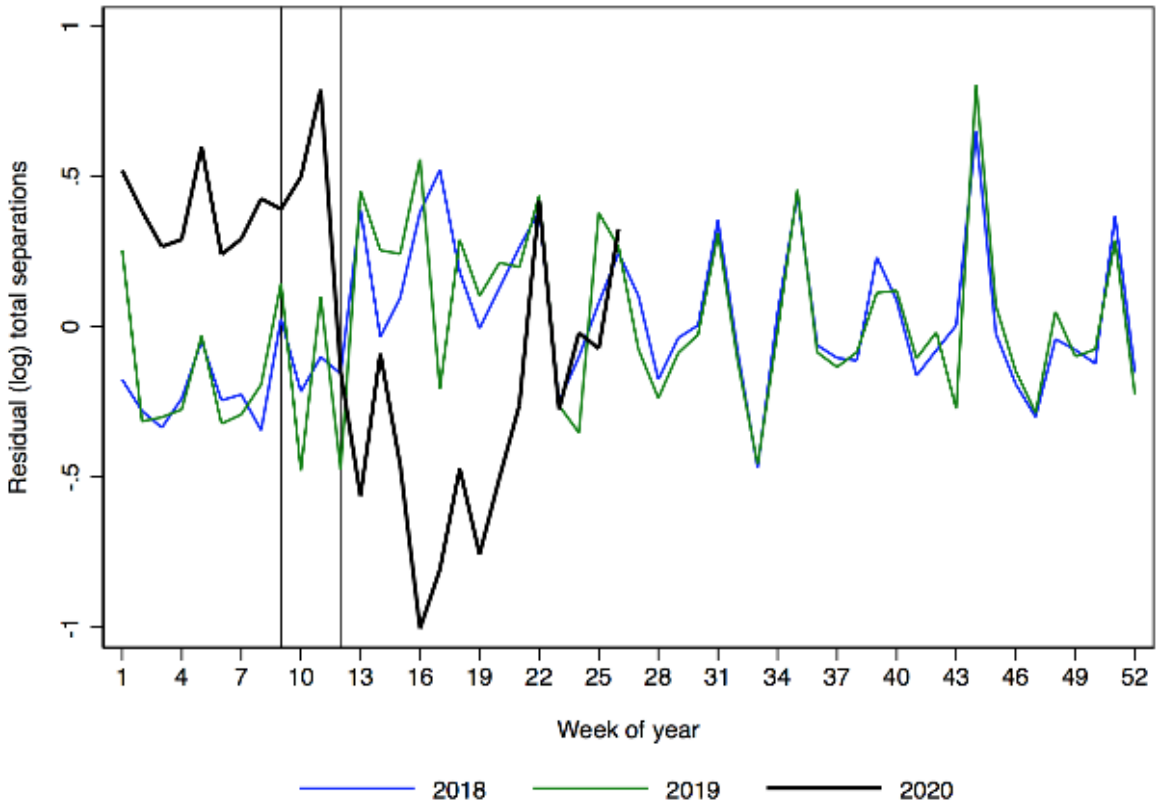
	Difference: Month 2020 – Month 2019			
NACE Rev. 2 sector of economic activity:	January	February	March	April
Legislators, senior officials and managers	-10	43	-641	-498
Professionals	418	-2890	-3951	990
Technicians and associate professionals	1970	-2018	-8894	-1362
Clerks	-951	-2508	-11418	-14781
Service workers and shop and market sales workers	1333	3456	-35567	-66066
Skilled agricultural and fishery workers	43	-89	-417	-388
Craft and related trades workers	-156	491	-3285	-1452
Plant and machine operators and assemblers	511	-11	-7577	-3452
Elementary occupations	1860	552	-13527	-16683
Total additional jobs	5018	-2974	-85277	-103692

Source: ERGANI and National Institute of Labor and Human Resources (NILHR). Authors' calculations.

As the data show signs of over-dispersion, Equation (1) is also estimated using negative binomial regression. Under this specification, b_1 indicates the mean daily change on each outcome after the onset of the pandemic and b_2 denotes the effect of layoff restrictions. Estimation results are summarized in Table 4. The interrupted time series regression estimates confirm the graphical evidence. In 2020, new hires decrease by a significant 1.12%, on average, each day during the pandemic crisis. The effect is more sizeable for part-timers (1.38%) and those in shift work (2.09%), although full-timers are the biggest group in the labor market. Moreover, it seems that the labor market responded with a slight delay, in terms of full-time hires, after the onset of the pandemic, although coefficient estimates are everywhere negative. On the other hand, separations are significantly decreased relative to pre-pandemic days. This is true especially for firings which, as already noted, were restricted during the crisis.

Figure 7. Residual hires and separations by week and year





Source: ERGANI. Authors' calculations.

Table 4. Pandemic onset and layoff restriction effects on hires and separations: Interrupted time series estimates.

	Days since pandemic	Days since layoff restrictions	Days since pandemic	Days since layoff restrictions
Dependent variable:	[1]	[2]	[3]	[4]
Total new hires	-.0112***	-.0058**	.0002	-.0047**
	(.0029)	(.0023)	(.0020)	(.0019)
Full-time new hires	-.0071***	-.0055***	.0011	-.0049***
	(.0027)	(.0020)	(.0019)	(.0019)
Part-time new hires	-.0138***	-.0056**	-.0007	-.0044**
	(.0031)	(.0025)	(.0021)	(.0021)
Shift-work new hires	-.0209***	-.0079***	-.0011	-.0049*
	(.0038)	(.0031)	(.0028)	(.0028)
Total separations	-.0001	-.0070***	.0050***	-.0099***
	(.0030)	(.0022)	(.0017)	(.0016)
Quits	.0020	-.0087***	.0060***	-.0103***
	(.0028)	(.0020)	(.0016)	(.0015)
Firings	.0041	-.0120***	.0075***	-.0137***
	(.0031)	(.0020)	(.0016)	(.0014)
Contract terminations	-.0031	-.0028	.0024	-.0077***
	(.0037)	(.0031)	(.0028)	(.0025)
Day of week fixed effects	Yes	Yes	Yes	Yes
Month fixed effects	No	No	Yes	Yes
Year fixed effects	No	No	Yes	Yes
Daily time trend	Yes	Yes	Yes	Yes
Period covered	01 Jan 2020 – 30 Jun 2020	01 Jan 2020 – 30 Jun 2020	01 Jan 2018 – 30 Jun 2020	01 Jan 2018 – 30 Jun 2020
Observations	182	182	912	912

Source: ERGANI. Authors' calculations.
Notes: Negative binomial regression estimates. Robust standard errors in parentheses.
*** at 1%, ** at 5% and * at 1%.

Turning to the DiD estimates, this approach requires an identifying assumption that control and treated weeks move on parallel trends before the exposure period. To assess this, we have graphed weekly trends for total employment, hires, and separations for both time periods (see Appendix Figure A.2). In each case, the figures show that the trends move in parallel before the outbreak.

Table 5 presents the DiD results for cumulative employment, total new hires and total separations. Results for the last two variables are also presented by type of hire and separation. In all cases, the estimated DiD parameters are sizeable and highly significant confirming that the labor market impact of the pandemic has been quite severe, at least in the short-run. Cumulative employment and new hires (overall and by job type) in 2020 fell substantially after week 9, relative to the control group. For separations, the exposure period is set at week 12 when the government intervened to restrict layoffs. The associated DiD coefficients, overall and by separation type, are also sizeable and significant.

In addition to the graphical evidence confirming that employment, hires, and separations trended similarly before the pandemic onset and the layoff restrictions (Appendix Figure A.2), we also report results of an additional test. In this test outcomes are regressed on the set of controls already controlled for in Table 5, plus leads of the interaction term (Equation (2)) that range from one to five weeks before

the actual treatment takes place. The size and significance of those estimates will indicate how the series trended before the treatment period (Table 6).

Table 5. Pandemic and layoff restriction effects on labor market: Difference-in-differences results.

	DiD coefficient	Treatment group coefficient	Treatment period coefficient[1]
Dependent variable:	[1]	[2]	[3]
Cumulative employment	-.0602*** (.0092)	.0964*** (.0034)	.0127 (.0128)
Total new hires	-1.196*** (.1718)	.1138* (.0624)	.5483** (.2312)
Full-time hires	-1.097*** (.1594)	.1171 (.0724)	.6174*** (.2218)
Part-time hires	-1.264*** (.2009)	.1326** (.0651)	.4919* (.2524)
Shift work hires	-1.558*** (.2978)	.0432 (.1037)	.5835 (.3558)
Total separations	-1.330*** (.1650)	.1539 (.1113)	.1702 (.1590)
Firings	-1.407*** (.2076)	.1711 (.1101)	.1748 (.2052)
Quits	-1.236*** (.1576)	.1507* (.0812)	.1066 (.1462)
Contract terminations	-1.423*** (.2167)	.1481 (.1702)	.2550 (.2176)

Source: ERGANI. Authors' calculations.
Notes: Negative binomial regression estimates. Robust standard errors in parentheses. All models include a constant and a weekly linear trend. Sample size covers weeks 1-21 (lockdown lifting) and the effective observations are 42 in all models (21 weeks; 2 groups). [1] Treatment period for cumulative employment and hires is week 9 onwards (pandemic onset). Treatment period for separations runs from week 12 onwards (layoff restrictions).
*** at 1%, ** at 5% and * at 1%.

Table 6. Testing for parallel trends before the treatment period.

	-5 weeks lead	-4 weeks lead	-3 weeks lead	-2 weeks lead	-1 weeks lead	0 weeks lead
Dependent variable:	[1]	[2]	[3]	[4]	[5]	[6]
Cumulative employment	-.008*	-.002	-.005***	-.002	-.001	-.051***
	(.004)	(.001)	(.001)	(.001)	(.001)	(.008)
Total new hires	-.050	.372***	-.222***	.076***	-.001	-1.28***
	(.076)	(.021)	(.021)	(.021)	(.021)	(.157)
Full-time hires	-.120**	.486***	-.345***	.065***	-.086***	-1.05***
	(.052)	(.018)	(.018)	(.018)	(.018)	(.149)
Part-time hires	-.039	.289***	-.128***	.075***	.060**	-1.421***
	(.106)	(.023)	(.023)	(.023)	(.024)	(.192)
Shift work hires	.199*	.232***	-.048	.131***	.082**	-1.878***
	(.110)	(.034)	(.033)	(.034)	(.033)	(.288)
Total separations	-.148	.020	.197***	.025	.015	-1.437***
	(.126)	(.017)	(.017)	(.017)	(.017)	(.149)
Firings	-.141	-.010	.324***	.162***	.411***	-2.050***
	(.108)	(.020)	(.020)	(.020)	(.020)	(.179)
Quits	-.244***	-.032**	.215***	.190***	.094***	-1.472***
	(.090)	(.015)	(.015)	(.015)	(.015)	(.154)
Contract terminations	-.050	.075***	.143***	-.209***	-.422***	-.983***
	(.196)	(.023)	(.023)	(.023)	(.023)	(.174)

Source: ERGANI. Authors' calculations.
Notes: Negative binomial regression estimates. Robust standard errors in parentheses. All models include a constant and a weekly linear trend. Sample size covers weeks 1-21 (lockdown lifting) and the effective observations are 42 in all models (21 weeks; 2 groups). [1] Treatment period for cumulative employment and hires is week 9 onwards (pandemic onset). Treatment period for separations runs from week 12 onwards (layoff restrictions).
*** at 1%, ** at 5% and * at 1%.

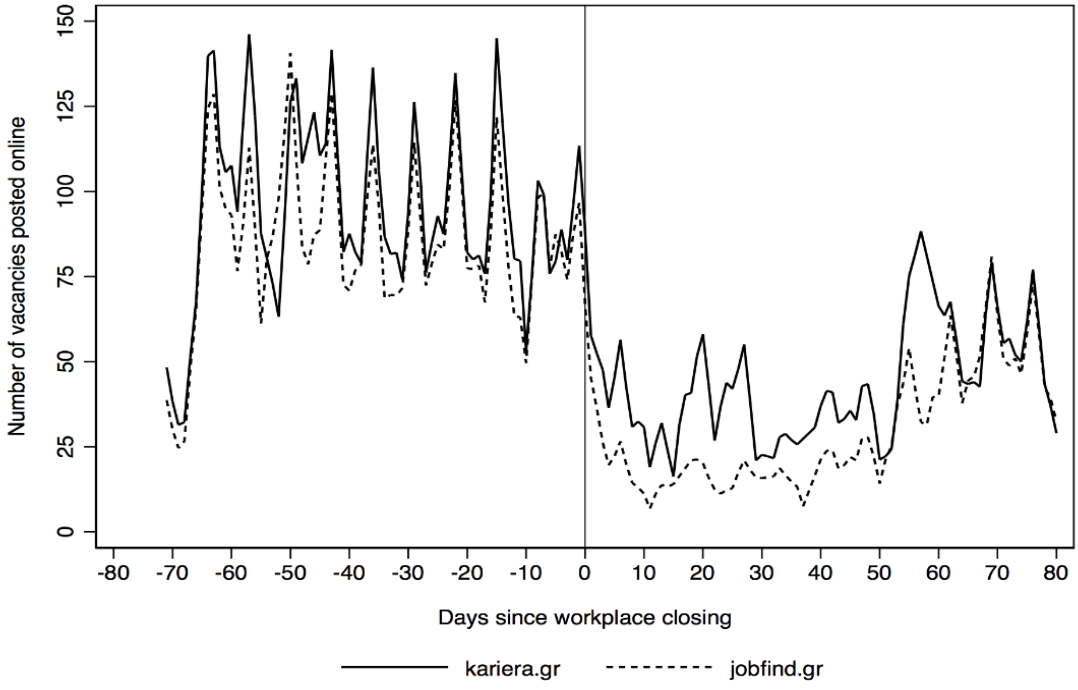
For cumulative employment, the results confirm the parallel trend hypothesis for treated and control groups before the pandemic. The estimated coefficients are not significant and remarkably low; the effect comes when specifying a zero weeks lead

and it is comparable to the respective DiD estimate from Table 5. No clear patterns emerge when considering hires-related outcomes, the effects on the zero weeks lead coefficient are in line with the reported DiD estimates. When considering separations, there are some sizeable and positive effects taking place even three weeks before the actual treatment takes place. This is also in line with the graphical evidence (Figure 8), indicating that there might have been some anticipation of the pandemic in terms of labor market activity that induced the government to step in and restrict layoffs. Hence despite an upward tendency in separations, these were drastically reduced from week 12 onwards. Again, the coefficients when specifying a zero-week lead are comparable with the DiD estimates shown before.

5.4 Online vacancies

To further understand hiring dynamics during the crisis, we use daily data from two popular online job portals in Greece (www.kariera.gr and www.jobfind.gr). Following Hensvik et al. (2020), we measure the changes in labor demand by the average daily inflows of new vacancies. Although we do not have evidence to assess the representativeness or coverage of these data, the number of vacancies posted on them is consistent with the sharp decline in new hires reported in ERGANI. The results, summarized in Figure 8, show a steep decrease in new vacancies posted on both sites corresponding to the implementation of the workplace restrictions in March. There seems to be a slight but fluctuating increase in job postings in May as the restrictions were lifted but the number of new postings was still far below pre-pandemic levels.

Figure 8. Job vacancy postings, kariera.gr and jobfind.gr, January-May 2020



Source: kariera.gr and jobfind.gr

5.5 Job search and finding employment

We also look at the impact of the pandemic on job search behaviors and on the likelihood of finding employment. First, we use the LFS micro data set to estimate

Equation (2) and to assess the probability that those not employed are actively seeking work. The associated marginal effects are shown in Table 7.

Table 7. Job seeking during the COVID-19 pandemic

	2019-2020		2017-2020	
	[1]	[2]	[3]	[4]
Reasons for stop working				
Laid-off	-.128***	-.112***	-.156***	-.139***
	(.034)	(.035)	(.031)	(.031)
Contract termination	-.143***	-.144***	-.163***	-.158***
	(.023)	(.023)	(.022)	(.022)
Other	-.047	-.046	.018	.022
	(.045)	(.045)	(.043)	(.043)
Quarters since stop working				
0 (current quarter)	-	-.383***	-	-.467***
		(.079)		(.069)
1	-	-.135***	-	-.130***
		(.031)		(.031)
2	-	-.022	-	-.065*
		(.043)		(.039)
3	-	-.222***	-	-.210***
		(.062)		(.060)
4	-	-.070	-	-.134**
		(.065)		(.056)
5	-	-.148***	-	-.164***
		(.056)		(.054)
6	-	-.049	-	-.027
		(.057)		(.056)
7	-	-.054	-	.028
		(.056)		(.055)
Observations	3416		7637	

Source: EL.STAT, Quarterly Labor Force Survey-LFS (2017 – 2020, 1st quarter).
Notes: Reported estimates are average marginal effects drawn from a probit model (interaction effects model) and correspond to the post 2020Q1 period (additive effect). Based on the ILO definition of unemployment, the dependent variable takes the value of 1 if the individual is considered to be unemployed and 0 otherwise. Sample includes all individuals (aged 25-54) who have stopped working during the last 8 quarters (2 years). All models include controls for gender, age, country of birth, education, region and sector of economic activity of the last job. In parentheses, white heteroskedasticity corrected standard errors are reported. All estimates are weighted using the sampling weights provided by the EL.STAT. *** at 1%, ** at 5% and * at 1%.

We observe (column 2) that, for those who had been laid-off, the probability of searching for work during the first quarter of 2020 was 11.2 percentage points lower than in the first quarter of 2019. For those who were not working because their last employment contract had been terminated, the drop in the probability of searching employment was even stronger, i.e. 14.4 percentage points lower. The largest drop was experienced by those who had lost their job within the current quarter (38.3 percentage points). This suggests that the slackness of the labor market in the first quarter of 2020 mostly affected the newly jobless individuals. These results are confirmed even when additional years of first quarters are added in the model (column 4).

We now turn to the estimation results of the probability of finding employment during the 1st quarter of 2020. Table 8 presents the estimated marginal effects of the probit model described in equation (3). We observe (column 2) that the probability of finding employment in the first quarter of 2020 was 4.6 percentage points lower than during the first quarter of 2019. When additional years are added (columns 3 and 4), we

observe that the estimated marginal effect for the first quarter of 2020 compared to the corresponding quarter of 2017 is negative although only marginally significant. These results suggest that the slackness of the labor market in the first quarter of 2020 may well have contributed to slowing down the employment prospects of jobless individuals.

Table 8. Employment entry during the onset of COVID pandemic

		2019-2020		2017-2020	
Year start work		[1]	[2]	[3]	[4]
	2020	-.045***	-.046***	-.017*	-.016
		(.010)	(.010)	(.009)	(.009)
	2019	-	-	.028***	.029***
				(.010)	(.010)
	2018	-	-	.001	.001
				(.009)	(.009)
Fixed effects		-	Yes	-	Yes
Observations		3802		7942	

Source: Hellenic Statistical Authority (EL.STAT.), Quarterly Labor Force Survey-LFS (2017 – 2020, 1st quarter).

Notes: Reported estimates are average marginal effects drawn from a probit model (the first year serves as the reference category, i.e., 2019 and 2017 in columns 1-2 and 3-4, respectively). Based on the ILO definition of employment, the dependent variable takes the value of 1 if the individual has start working in the current employer during the last 3 months and 0 otherwise. Sample includes all individuals (aged 15-54) who have start working any month during the last 8 quarters (2 years). In all models fixed effects include controls for gender, age, country of birth, education, region. In parentheses, white heteroskedasticity corrected standard errors are reported. All estimates are weighted using the sampling weights provided by the EL.STAT. *** at 1%, ** at 5% and * at 1%.

6. Conclusions

In many respects, Greece has been an interesting case for studying the COVID-19 pandemic and its impacts on employment. The virus itself has been controlled well when compared to other countries in Europe and elsewhere in the OECD. To a significant degree, this was due to a stringent lockdown quickly imposed by the government after the first cases were confirmed in late February. Even without widespread contagion, though, the pandemic has had an important economic impact, with GDP expected to decrease as much as 10% in 2020.

The timing of the pandemic and lockdown is also an important part of the Greek story, in two ways. First, COVID-19 arrived at a point when the economy seemed to be finally on a sustainable growth path after the economic crisis that had persisted for the past decade. Second, the lockdown covered a period when the heavily seasonal Greek economy, quite reliant on tourism, would normally be gearing up and creating large numbers of jobs – something that could not happen in the spring of 2020. This is important to keep in mind in order to fully understand how the labor market has been affected by the COVID-19 crisis. A final characteristic of the Greek experience was the government's decision to mitigate the economic consequences of the crisis by introducing regulatory and income support measures to maintain employment relationships. This has had an important effect on how the lockdown and the reduced labor demand have played out in the labor market.

We use administrative, survey, and online vacancy data to analyze how employment in Greece was affected during the first few months of the COVID-19 pandemic and

lockdown. Our main findings are the following: First, in the early months of the lockdown, labor force participation and unemployment fell, while there was very little change in employment levels. Second, job search activity declined, both because of continued attachment to employers who had suspended operations and because of almost no hiring activity. Third, by the end of June, we estimate that (registered) employment was 11.9% less than it should have been, based on trends from the previous two years. Fourth, this lost employment was entirely due to the sharp decline in hiring activity in the first few months of the crisis. This is evident from both the administrative and online vacancy data. As noted above, the early months spanned a period when seasonal activities, especially related to tourism, would normally be expanding and this needs to be taken into consideration in assessing the impact of the crisis. Most of the "missing" jobs thus far in 2020 have been in accommodation and food, which reflects the pandemic's effect on tourism. Fifth, and somewhat unexpectedly, separations to the end of May were *lower* than would be predicted based on the trends from recent years. This almost certainly was due to the government's measures to protect existing employment relationships. This was done through a prohibition of layoffs in industries affected by the crisis and by tying the major form of income support to the maintenance of jobs.

To sum up, the analysis points to the important role that policy has played in determining how the Greek labor market has adjusted to the pandemic and lockdown. The measures put in place by the government to mitigate the effects of the crisis on employers and workers emphasized job protection. The decreased labor demand, then, translated into a downturn in hiring rather than increases in separations that would lead to higher unemployment. In this respect, Greece has been similar to some other European countries that have adopted measures to avoid layoffs. This stands in contrast to some other countries, like the United States and Canada, where unemployment rose quickly as policies emphasized income support more than job protection. Of course, it is still far too early to assess the efficacy of the different approaches. However, at least in the short run, the policy stance adopted by Greece and others to maintain employment relationships where possible seems to have had positive attributes.

We are still, of course, in the early days when it comes to understanding how COVID-19 is affecting labor markets in Greece and elsewhere. The analysis in this paper largely covers just the lockdown period and does not include analysis of what is happening to employment as Greece emerges from the lockdown and implements a "new normal," which may or may not include further lockdowns. So, there is an important research agenda going forward.

In the next stage of our research, we plan to assess three topics. First, an in-depth examination of how the impacts of the pandemic and lockdown were distributed across different types of workers, different occupations and industries, and different parts of the country. Second, an updated analysis of the labor market and employment relations adjustments as Greece emerges from the lockdown and as the mitigation measures are phased out. Third, the medium-term impacts of the mitigation strategies based on maintaining employment relationships rather than income support for workers who have lost their jobs. This last issue is particularly relevant for the ongoing debate in labor market policy about protecting jobs vs. protecting workers.

References

Abraham, K. (2020),"What is happening to unemployment in the post-Covid-19 labor market?", IZA World of Labor, available at: https://wol.iza.org/opinions/what-is-happening-to-unemployment-in-the-post-covid-19-labor-market

Adams-Prassl, A. Boneva, T., Golin, M., and Rauh, C. (2020), "Inequality in the Impact of the Coronavirus Shock: Evidence from Real Time Surveys," IZA Discussion Papers 13183, Institute of Labor Economics (IZA).

Alstadsæter, A., Bratsberg, B., Eielsen, G., Kopczuk, W., Markussen, S., Raaum, O., and Røed, K (2020), "The First Weeks of the Coronavirus Crisis: Who Got Hit, When and Why? Evidence from Norway", NBER Working Paper No. 27131, DOI: 10.3386/w27131.

Aum, S., Lee, S. Y. (Tim), and Shin, Y. (2020a), "COVID-19 Doesn't Need Lockdowns to Destroy Jobs: The Effect of Local Outbreaks in Korea", NBER Working Paper No. 27264, DOI: 10.3386/w27264.

Autor, D.H. (2003), Outsourcing at will: The contribution of unjust dismissal doctrine to the growth of employment outsourcing, Journal of Labor Economics, 21(1): pp. 1-42.

Baert, S., Lippens, L., Moens, E., Sterkens, P. and Weytjens, J., (2020), "How Do We Think the COVID-19 Crisis Will Affect Our Careers (If Any Remain)?", IZA Discussion Paper No 13164.

Barrero, J. M., Bloom, N., and Davis, S. J. (2020), "COVID-19 Is Also a Reallocation Shock"
NBER Working Paper No. 27137, DOI: 10.3386/w27137.

Bartik, A. W., Bertrand, M., Cullen, Z. B., Glaeser, E. L., Luca, M., and Stanton, C. T. (2020), "How Are Small Businesses Adjusting to COVID-19? Early Evidence from a Survey" NBER Working Paper No. 26989, DOI: 10.3386/w26989.

Béland, L. P., Brodeur, A., and Wright, T. (2020), "The Short-Term Economic Consequences of Covid-19: Exposure to Disease, Remote Work and Government Response", IZA discussion paper No 13159.

Béland, L. P., Brodeur, A., Mikola, D., and Wright, T. (2020), "The Short-Term Economic Consequences of Covid-19: Occupation Tasks and Mental Health in Canada", IZA Discussion Paper No 13254.

Belot, M., Choi, S.Tripodi, E. van den Broek-Altenburg, E.; Jamison, J.C. and Papageorge, N. W. (2020), "Unequal Consequences of COVID-19 across Age and Income: Representative Evidence from Six Countries", IZA Discussion Paper No 13366.

Bennedsen, M, Larsen, B.,Schmutte, I.and Scur, D. (2020), “Preserving job matches during the COVID-19 pandemic: Firm-level evidence on the role of government aid", Covid Economics: Vetted and real-time papers No. 27.

Bick, A. and Blandin, A. (2020), “Real Time Labor Market Estimates During the 2020 Coronavirus Outbreak”, Working Paper, available at: https://drive.google.com/file/d/1uQrlBJ_w4b2Fps6Zp9qgc-9pMnbC-mjq/view.

Bureau of Labor Statistics, U.S. Department of Labor (2020), ”Frequently asked questions: The impact of the coronavirus (COVID-19) pandemic on The Employment Situation for May 2020”, available at: https://www.bls.gov/cps/employment-situation-covid19-faq-may-2020.pdf

Borjas, G. J., and Cassidy, H. (2020), “The Adverse Effect of the COVID-19 Labor Market Shock on Immigrant Employment”, NBER Working Paper No. 27243, DOI: 10.3386/w27243.

Brinca, P., Duarte J., Faria-e-Castro, M. (2020) "Measuring Sectoral Supply and Demand Shocks during COVID-19," Federal Reserve Bank of St. Louis Working Papers 2020-011 D, DOI: 10.20955/wp.2020.011.

Brynjolfsson, E. and Horton, J., Ozimek, A., Rock D., Sharma, G., and TuYe, H.Y., (2020), "COVID-19 and Remote Work: An Early Look at US Data" NBER Working Papers No 27344.

Cajner, T., Dod Crane, L., Decker, R., Hamins-Puertolas, A., and Kurz, C. J. (2020), “Tracking Labor Market Developments during the COVID-19 Pandemic: A Preliminary Assessment”, FEDS Working Paper No. 2020-030, DOI: 10.17016/FEDS.2020.030.

Campello, M., Kankanhalli, G., and Muthukrishnan, P. (2020), “Tracking labor market developments during the covid-19 pandemic: A preliminary assessment”, Technical report, NBER Working Paper No 27208.

Cedefop (2018), “Mapping the landscape of online job vacancies. Background country report: Greece”, available at: https://www.cedefop.europa.eu/files/rlmi_-_mapping_online_vacancies_greece.pdf.

Cho, S.J., Winters, J. V. (2020), “The Distributional Impacts of Early Employment Losses from COVID-19”, IZA Discussion Paper No 13266.

Coibion, O., and Gorodnichenko, Y. and Weber, M. (2020), "Labor Markets During the COVID-19 Crisis: A Preliminary View" NBER Working Papers No 27017.

Cookson G. and Laliotis I. (2017), Promoting normal birth and reducing caesarean section rates: An evaluation of the Rapid Improvement Programme, Health Economics, 27(4): 675-679.

Cowan, B. W. (2020), “Short-run effects of COVID-19 on U.S. worker transitions” NBER Working Paper No 27315.

Dingel, J. I., and Neiman, B. (2020), "How Many Jobs Can be Done at Home?", NBER Working Paper No. 26948, DOI: 10.3386/w26948.

Fairlie, R. W., Couch, K., and Xu, H. (2020), "The Impacts of COVID-19 on Minority Unemployment: First Evidence from April 2020 CPS Microdata", NBER Working Paper No. 27246, DOI: 10.3386/w27246.

Fairlie, R.W. (2020), "The Impact of COVID-19 on Small Business Owners: Continued Losses and the Partial Rebound in May 2020", NBER Working Paper No 27462.

Gardiner, L., Slaughter, H. (2020), "The effects of the coronavirus crisis on workers: Flash findings from the Resolution Foundation's coronavirus survey", Resolution Foundation, available at: https://www.resolutionfoundation.org/app/uploads/2020/05/The-effect-of-the-coronavirus-crisis-on-workers.pdf.

Garrote Sanchez, D., Gomez Parra, N., Ozden, C., Rijkers, B. (2020), "Which Jobs Are Most Vulnerable to COVID-19? What an Analysis of the European Union Reveals", Research and Policy Brief No. 34, World Bank, Washington, DC, available at: https://openknowledge.worldbank.org/handle/10986/33737.

Gentilini,U., Almenfi, M., Dale, P., Lopez, A. V., Mujica, I.V., Quintana. R., and Zafar, U. (2020), "Social Protection and Jobs Responses to COVID-19: A Real-Time Review of Country Measures (July 10, 2020)", COVID-19 Living Paper Washington, D.C. : World Bank Group, available at: http://documents1.worldbank.org/curated/en/454671594649637530/pdf/Social-Protection-and-Jobs-Responses-to-COID-19-A-Real-Time-Review-of-Country-Measures.pdf

Goldsmith-Pinkham, P., Sojourner, A. (2020), "Predicting Initial Unemployment Insurance Claims Using Google Trends", available at: https://paulgp.github.io/GoogleTrendsUINowcast/google_trends_UI.html.

Hamermesh, D. (2020), "Measuring employment and unemployment – Primer and predictions", IZA World of Labor, available at: https://wol.iza.org/opinions/measuring-employment-and-unemployment-primer-and-predictions

Hatayama, M., Viollaz, M. and Winkler, H. (2020a), "Work from home: which jobs?", Covid Economics: Vetted and Real-Time Papers, No. 19.

Hensvik L., Le Barbanchon T. and Rathelot, R. (2020) "Job Search During the COVID-19 Crisis", IZA Discussion Paper No. 13237.

Hicks, M.J., Faulk, D., and Devaraj, S. (2020), "Occupational Exposure to Social Distancing: A Preliminary Analysis using O*NET Data", Center for Business and Economic Research, Ball University, Working Paper, available at: https://projects.cberdata.org/reports/SocialDistanceEffects-20200313.pdf.

Hornstein A., Kudlyak M. and Lange F. (2014), Measuring resource utilization in the labor market, Economic Quarterly, 100(1): pp. 1-21

ILO (2020a), ”Working from home: estimating the worldwide potential”, ILO Policy Brief, available at: https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---travail/documents/briefingnote/wcms_743447.pdf.

ILO (2020b), “COVID-19 impact on the collection of labour market statistics”, ILOSTAT, available at: https://ilostat.ilo.org/topics/covid-19/covid-19-impact-on-labour-market-statistics/.

ILO (2020c), “ILO monitor: Covid-19 and the world of work”,5th edition, available at: https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/briefingnote/wcms_749399.pdf

Kahn, L., Lange, F., and Wiczer, D. (2020), “Labor Demand in the Time of COVID-19: Evidence from Vacancy Postings and UI Claims”, NBER Working Paper No. 27061.

Kong, D., Prinz, D. (2020), “The impact of shutdown policies on unemployment during a pandemic”, Covid Economics: Vetted and Real-Time Papers, No. 17.

Kurman, A.; Lale, E.; Ta, L. (2020). The Impact of COVID-19 on Small Business Employment and Hours: Real-Time Estimates With Homebase Data. Working Paper. http://www.andrekurmann.com/hb_covid

Metcalfe R., Powdthavee N. and Dolan P. (2011), Destruction and distress: Using a quasi-experiment to show the effects of September 11 attacks on mental well-being in the United Kingdom, Economic Journal, 121(550): pp. F81-F103.

Mongey, S., Pilossoph, L., and Weingberg, A. (2020), “Which workers bear the burden of social distancing measures?” NBER Working Paper No 27085.

Montenovo, L, Jiang, X., Rojas, F. L., Schmutte, I. M., Simon, K. I., Weinberg B. A. and Wing, C. (2020), “Determinants of disparities in covid-19 job losses”, NBER Working Paper No 27132.

OECD (2020), “OECD Economic Outlook”, Volume 2020 Issue 1, OECD Publishing, Paris, available at: https://doi.org/10.1787/0d1d1e2e-en.

Pouliakas, K. (2020), “Working at Home in Greece: Unexplored Potential at Times of Social Distancing?”, IZA Discussion Paper No 13408.

Pouliakas, K., Branka, J. (2020), “EU jobs at highest risk of Covid-19 social distancing: Is the pandemic exacerbating the labour market divide?”, Luxembourg: Publications Office of the European Union, Cedefop Working Paper No 1.

Powdthavee N., Plangol A., Frijters A.C. and Clark A.E. (2019), Who got the Brexit blues? The effect of Brexit on subjective wellbeing in the UK, Economica, 86(343): pp. 471-494.

Rothwell, J. (2020), “The effects of COVID-19 on international labor markets: An update”, Brookings, available at: https://www.brookings.edu/research/the-effects-of-covid-19-on-international-labor-markets-an-update/.

Saltiel, F. (2020), “Home working in developing countries”, Covid Economics: Vetted and Real-Time Papers, No. 6.

World Bank (2020), “Global economic prospects”, World Bank Group Flagship Report, June 2020.

Appendix

Table A.1: Labor market indicators, Greece, Q1 for 2018-2020

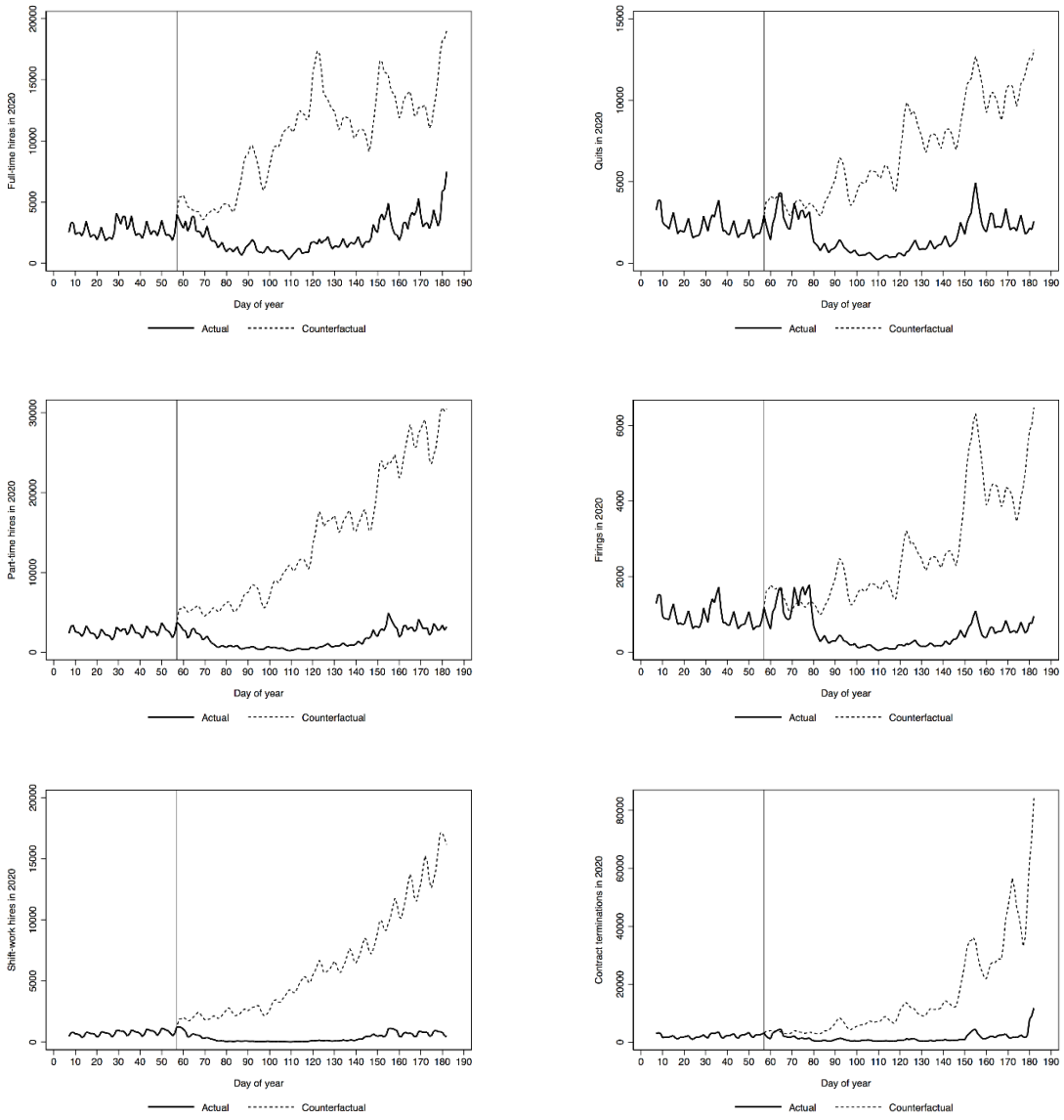
	Labor force participation (%)			Employment to population (%)			Unemployment (%)		
	2018Q1	2019Q1	2020Q1	2018Q1	2019Q1	2020Q1	2018Q1	2019Q1	2020Q1
Age 15 and over									
Total	51.62	51.78	50.61	40.68	41.83	42.21	21.19	19.21	16.21
Men	59.79	59.70	58.80	49.48	50.52	50.72	17.24	15.37	13.73
Women	44.01	44.42	43.01	32.48	33.75	34.69	26.18	24.02	19.35
Age group									
15-19	5.15	4.87	3.83	2.31	2.42	2.52	55.22	50.21	34.22
20-24	43.76	41.80	39.46	24.95	25.21	25.86	42.97	39.69	34.47
25-29	81.66	84.15	80.44	56.23	60.36	59.49	31.13	28.27	26.05
30-34	86.89	86.97	85.87	67.49	66.68	70.55	22.32	23.33	17.84
35-39	88.03	87.67	85.57	69.69	71.21	72.18	20.84	18.77	15.65
40-44	88.21	87.84	85.90	71.87	73.91	74.20	18.53	15.85	13.62
45-49	84.39	85.86	85.57	68.50	71.06	73.82	18.83	17.24	13.74
50-54	77.17	78.72	78.47	65.03	67.87	68.24	15.72	13.78	13.03
55-59	60.97	62.40	61.48	50.65	53.22	53.86	16.93	14.70	12.39
60-64	33.69	36.67	37.40	28.31	31.60	32.78	15.98	13.82	12.37
65-74	6.82	7.38	7.93	6.08	6.50	7.25	10.88	11.89	8.66
Country of birth (15 and over)									
Greece	50.50	50.51	49.53	40.31	41.51	42.08	20.18	17.82	15.03
Foreign	67.52	68.77	66.01	45.98	46.13	47.05	31.90	32.93	28.72
Region									
Eastern Macedonia & Thrace	49.21	50.62	48.95	41.13	42.12	40.79	16.43	16.79	16.66
Central Macedonia	50.70	50.68	49.25	39.58	40.40	39.76	21.94	20.28	19.25
Western Macedonia	50.24	50.24	45.87	36.14	36.63	36.98	28.06	27.08	19.39
Epirus	47.58	46.35	45.85	36.72	38.63	37.82	22.82	16.64	17.53
Thessaly	50.41	50.46	48.82	41.29	41.10	40.90	18.09	18.55	16.22
Ionian Islands	51.37	48.54	45.56	38.07	38.78	39.37	25.89	20.09	13.59
Western Greece	50.74	50.89	48.55	37.81	37.86	38.64	25.47	25.61	20.41
Central Greece	50.06	48.77	49.38	40.10	39.78	39.83	19.89	18.43	19.34
Attica	52.60	53.33	53.14	41.43	43.54	45.57	21.24	18.35	14.25
Peloponnese	52.80	51.38	51.84	44.39	44.48	46.26	15.92	13.44	10.76
Northern Aegean	54.24	54.99	53.66	40.96	43.86	44.93	24.48	20.24	16.27
Southern Aegean	55.51	55.93	46.10	42.14	40.91	39.63	24.08	26.85	14.02
Crete	53.40	53.82	52.97	42.76	44.92	43.94	19.92	16.54	17.05

Source: LFS, ELSTAT

Figure A.1. Daily observed and counterfactual hires and separations by type before and after the pandemic onset

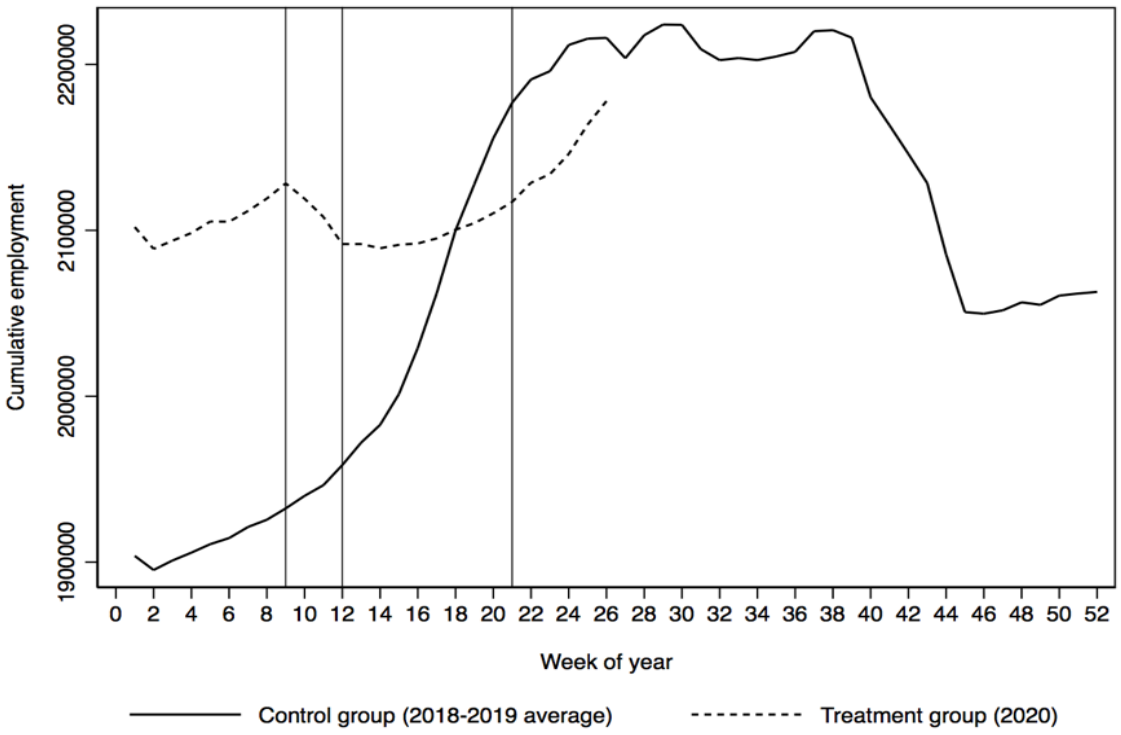
Number of new hires by type

Number of separations by type

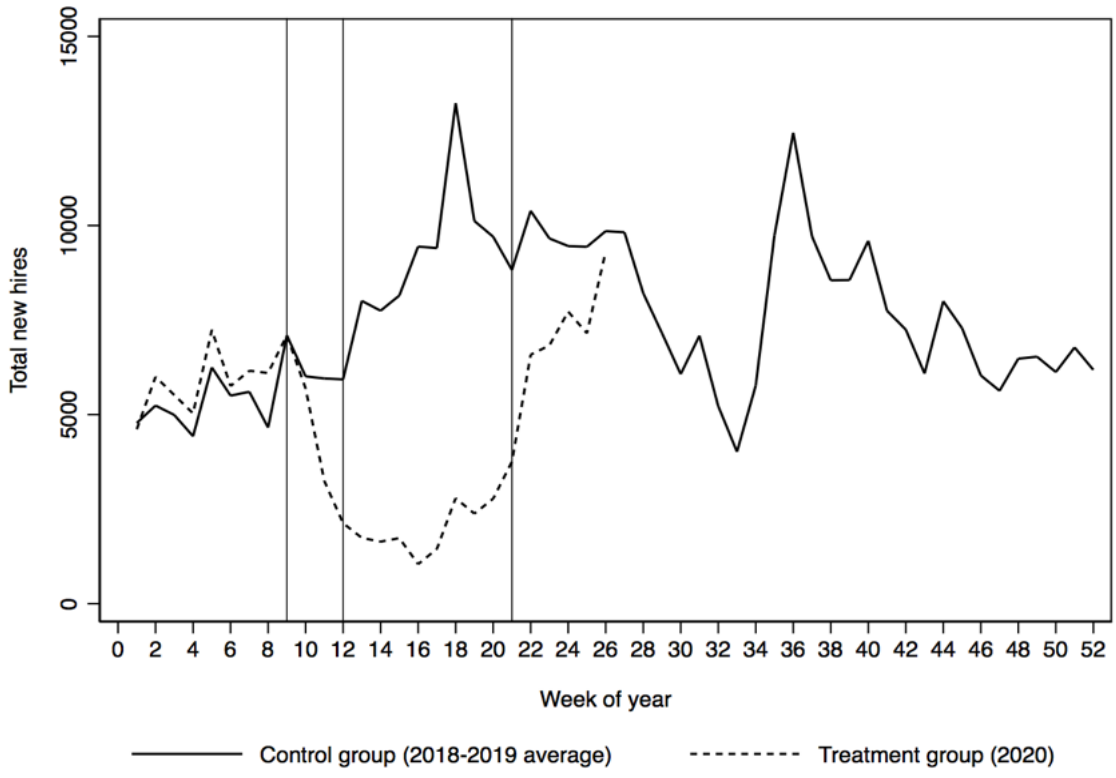


Source: ERGANI.
Notes: Vertical line is set at the pandemic onset (February 26, 2020).

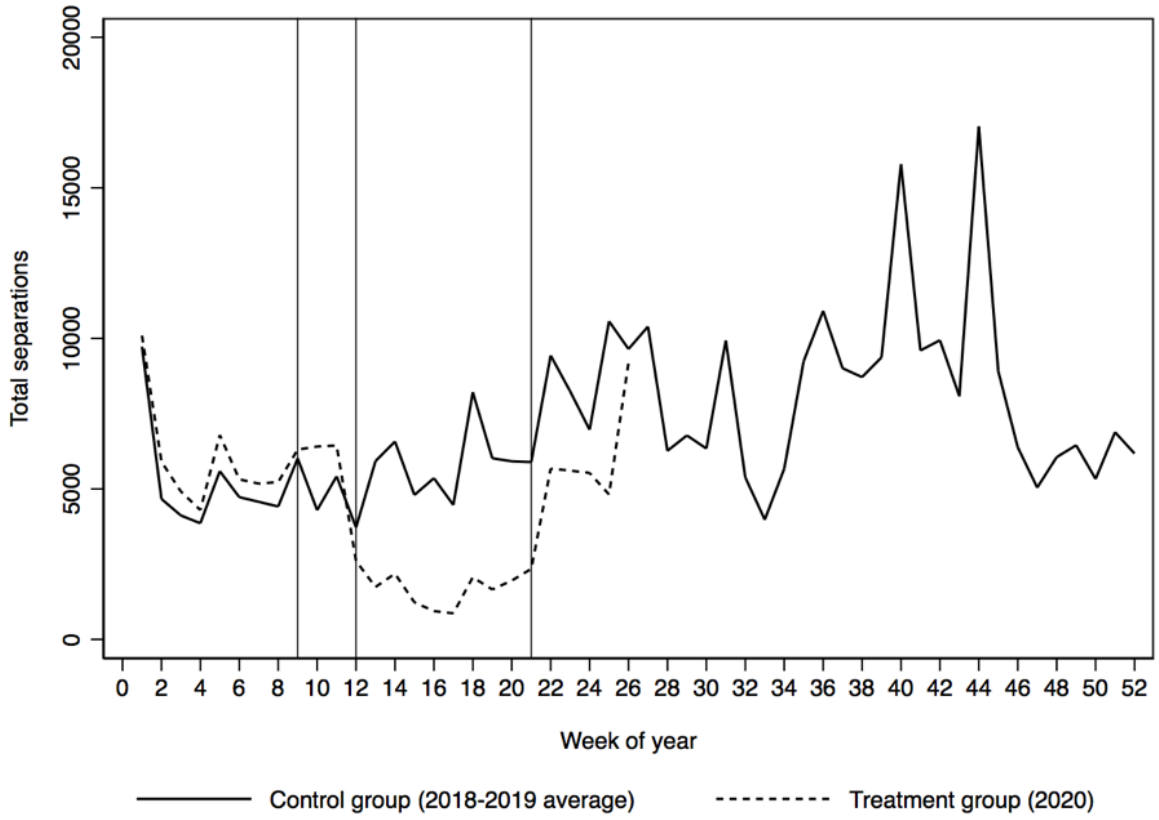
Figure A.2. Trends in labor market flows for treatment and control groups.



Panel A. Cumulative employment by week



Panel B. Total new hires



Panel C. Total separations

Source: ERGANI. Authors' calculations.
Notes: Vertical lines are set in weeks 9, 12 and 21 to indicate the pandemic onset, the layoffs restrictions and the end of our estimation sample (lockdown lifting), respectively.

For employment and new hires, there is a common trend up to week 9, and then there is a visible break in the trend for the treatment group (2020). For total separations, the trend for both groups is common up to week 11. Total weekly separations in 2020 are on a slightly higher level, compared to the control group, in weeks 9-11; however there is a sharp reduction after week 12 when the government restricted layoffs to protect the number of jobs. These observations hold even when looking within total new hires and total separations.