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Covid-19 and regional employment in Europe

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Key takeaways

- We construct employment risk indices for European regions that reflect the share of jobs under threat from Covid-19. The risk index is based on local employment in sectors that are more exposed to the pandemic and on the regional incidence of small firms.
- Employment in regions in southern Europe and France is shown to have high risk indices, while regions in northern Europe have lower risk indices. Eastern and central European regions have intermediate risk indices.
- Regions with a higher risk index have a bigger jump in Google searches for unemployment-related terms.

1. Introduction

The outbreak of Covid-19 and the ensuing measures to contain the pandemic have brought Europe into a deep downturn. GDP is expected to drop by around 8% in the euro area this year (ECB (2020)), a significantly steeper decline than forecasted for the United States or Asia (IMF (2020)). One of the major reasons why the European economy is expected to be so hard-hit is its high share of small firms, especially in southern and eastern European countries. Small firms are financially more constrained and bank-dependent than larger firms. They also sell goods predominantly in local markets and with less diversified sources of revenue.¹

This Bulletin investigates which European regions face higher risks to employment from Covid-19. We first use data on local industry-level employment before the outbreak and construct a measure of local employment exposure to Covid-19, using the methodology developed in Doerr and Gambacorta (2020) for the US. We then extend the analysis by taking into account the share of employment among small firms in different regions. Specifically, we calculate an employment risk index based on the interaction of sectoral exposure and the share of small business employment. Our results show that while several European regions employ a high share of people in sectors particularly exposed to the economic consequences of the pandemic, the high share of small firms in southern Europe puts employment in those regions particularly at risk. We show that regions with a higher employment risk index, ie those with higher sectoral exposure and a higher share of small businesses, also exhibit a stronger increase in Google searches for unemployment, providing a cross-check of our measure of local employment risk.

¹ Eurostat provides regional data on employment for firms with zero employees, one to nine employees, and 10 or more employees. Based on the available data, this Bulletin considers firms with fewer than 10 employees as "small". In the Eurostat classification, these firms are categorised as "micro" firms. According to data supplied by the Organisation for Economic Co-operation and Development (OECD), the employment share of firms with fewer than 10 employees averages over 33% in Europe, but less than 10% in other advanced economies. See also FSB (2019), Doerr (2019) and EIB (2020a).

2. Identifying regional exposure to Covid-19

The widespread adoption of lockdown measures has led to a strong decline in mobility in Europe, with repercussions on consumption and production. Concerns about job losses, however, have not risen everywhere to the same extent. Graph 1 (left-hand panel) shows average mobility in Europe (red line), measured by Apple Covid-19 Mobility Trends Reports. In mid-March, when the severity of the Covid-19 outbreak became evident, mobility dropped by around 70%, relative to its February trend. Mobility declined in each individual country (grey lines), reflecting the widespread adoption of lockdown measures.



The left-hand panel shows the evolution of Apple Covid-19 Mobility Trends Reports from 1 February to 21 April 2020 for individual European countries (grey lines) and the European average (red line). The index is averaged across all subcategories. The Mobility Trends index reflects requests for directions in Apple Maps and is standardised to 100 on 13 January 2020. The right-hand panel shows the relative frequency of Google searches for the topic "unemployment" from 1 February to 21 April 2020 for individual European countries (grey lines) and the European average (red line). For illustration, country-specific lines are Hodrick Prescott-filtered trend components with a smoothing parameter of 500.

Sources: Apple Covid-19 Mobility Trends Reports; Google Trends; authors' calculations.

Graph 1 (right-hand panel) shows that Google searches related to the topic "unemployment" soared in tandem with the decline in mobility. Topic indices reflect keywords and search queries within a region, based on the local language (Wolski and Wruuck (2020)). The index almost tripled around 15 March and has remained elevated since, suggesting that employees worry about their job security.² Unlike the relatively uniform decline in mobility, internet searches for unemployment increased to a different degree across countries. For example, while the mobility index declined by around 90 points in Austria, Greece and France in mid- March, the unemployment index increased by 5, 12 and 21 points, respectively. This discrepancy suggests that the Covid-19 shock affects local labour markets over and above the lockdown measures.

² The Google Trends code for the topic index "unemployment" is "/m/07s_c" and subsumes multiple search queries related to unemployment in the respective country and local language. In other words, local indices in France incorporate "chômage" and other unemployment-related queries in French, while indices in Germany contain eg "Arbeitslosigkeit". Google Trends standardises search intensity to lie between zero and 100 in each geographical unit. Higher values denote higher search intensity, where a value of 100 represents the date on which the popularity of a term peaked during the chosen period of interest. Google reports a value of zero if there are not enough search queries for a topic on a given date. If, for example, the city of Aschaffenburg (Germany) sees an increase in the value from 25 to 75, a topic moves from being one quarter to being three quarters as popular as its peak value for Aschaffenburg.

Exposure to Covid-19, share of small-firm employment and risk index by region

In per cent



The top panel shows the share of employment in industries that are likely to be the most affected by the Covid-19 shock at the NUTS 2 level. The middle panel shows the share of employment among small firms out of total employment at the NUTS 2 level. The bottom panel shows the employment risk index for each region, is sectoral exposure interacted with the share of employment among small firms out of total employment at the NUTS 2 level. Darker colours denote higher exposure, a higher share of employment among small firms or a higher risk index.

Sources: Eurostat; OECD; authors' calculations.

The pandemic has affected some sectors more than others. For instance, transportation, retail trade, leisure and hospitality, and travel agencies are particularly hard-hit and also directly affected by containment measures such as social distancing, travel bans or lockdowns. To construct regional exposure to Covid-19, we use data on employment by industry group in each NUTS 2 region.³ Sectoral Covid-19 employment exposure ("sectoral exposure") measures the share of regional jobs in sectors that are severely affected by the unfolding crisis. Graph 2 (top panel) shows a map of NUTS 2 regions and their sectoral Covid-19 employment exposure (the darker the colour, the higher the exposure). Sectoral exposure ranges from a low of 15% to a high of 57%; in the average region, 29% of all jobs are at risk. Regional exposure varies significantly across Europe: regions with high sectoral exposure are predominately to be found in Italy, Greece and Spain, but also in northwestern Germany, the Baltic states and the United Kingdom.

The economic consequences of the pandemic are likely to be particularly severe for smaller enterprises. Small firms usually depend heavily on local demand and are financially constrained. The middle panel of Graph 2 shows a map of regions and their share of employment in firms with fewer than 10 employees ("small firms").⁴ On average, the share of small-firm employment equals 35%; it ranges from a low of 16% to a high of 97% across regions. Regions with the highest share of small-firm employment are mostly located in France, as well as in southern and eastern Europe.

3. European regions at risk and Google searches for unemployment

Labour markets in regions characterised by high sectoral exposure to the Covid-19 shock and a high employment share of small firms are likely to be particularly at risk. To further illustrate the relationship, we compute each region's employment risk index as the product of sectoral exposure and the employment share of small firms. Regions with high sectoral exposure and a high share of employment among small firms receive a higher risk index, ie have a larger share of employment among small firms in exposed industries. In the map depicted in the bottom panel of Graph 2, darker colours indicate regions where employment is particularly at risk. Southern European countries and France have a significant share of regions with a high employment risk index. Several regions in central and eastern Europe have intermediate risk indices, while northern Europe has generally lower risk indices.

Do our measures of regional risk correlate with changes in local unemployment? While no official unemployment statistics are available at the regional level as yet, daily data on internet searches allow for a preliminary assessment. We collect daily data from Google Trends on search queries related to the topic "unemployment" at the regional level.⁵ We then split the sample period into the time before the decline in mobility (from 1 February to 10 March 2020) and after (from 11 March to 21 April 2020) and compute the change in average search intensity for unemployment across periods in each region.

⁵ We collect data for each day from 1 February to 21 April 2020 for each region. Since Google does not categorise regions by the NUTS 2 standard but by the ISO 3166-1 standard, we hand-match NUTS 2 regions to the regional identifiers provided by Google, which results in a sample of 195 NUTS 2-matched regions.

³ Eurostat provides data at the Nomenclature of Territorial Units for Statistics (NUTS) 2 level for European Union (EU) member states, candidate countries, European Free Trade Association (EFTA) countries and the United Kingdom. There are no data for Belarus, Moldova, Russia or Ukraine. NUTS 2 refers to basic regions for the application of regional policies with usually an average population of between 800,000 and 3 million. We categorise industries with NACE Rev 2 codes G-I and R-U as Covid-19-affected and then compute sectoral exposure as the sum of total employment in these industries over total employment in all industries in each region; see Doerr and Gambacorta (2020), Muro et al (2020) and Zandi (2020). We do not include mining industries, as Eurostat provides no separate breakdown of employment in the sector. Our sample contains 35 countries and 325 NUTS 2 regions.

⁴ Data on firms with fewer than 10 employees are provided by Eurostat as of 2017. If Eurostat provides no regional information, we collect the most recent data provided by local authorities. Whenever regional information is not available, we use data at the country level from the OECD. Eurostat and local authorities provide information on employment among firms with fewer than 10 employees for 149 regions (17 countries). For another 170 regions (15 countries), we use OECD data. We were unable to locate information on small-firm employment for Montenegro, North Macedonia or Serbia.

Graph 3 shows that regions with higher sectoral exposure, a higher share of employment among small firms and higher risk indices see a significantly stronger increase in search intensity for "unemployment". The left-hand panel shows a positive relationship between the change in search intensity on the vertical axis and sectoral exposure on the horizontal axis for each region (the black line denotes the linear fit). Regions with higher exposure also report a larger increase in searches for unemployment. Likewise, the centre panel shows that regions with a higher share of employment among small firms see an increase in Google searches, albeit to a smaller extent. Finally, the right-hand panel shows that regions with a higher risk index see a larger increase in unemployment-related searches.⁶ A 10 percentage point (ppt) increase in the risk index – which corresponds to 10 ppt higher local employment among small firms in exposed industries – implies an 8 ppt stronger increase in the unemployment search index. The fact that people in more affected areas are also more concerned about unemployment suggests that indicators based on local employment in hard-hit industries, paired with information on small-firm employment, may identify regions where employment is threatened by the economic fallout from the pandemic.



The three panels provide binscatter plots with a linear fit of the change in the Google search index for the topic "unemployment" on the vertical axis against sectoral exposure and the employment risk index, respectively, on the horizontal axis. Binscatter plots group the explanatory variable into equally spaced bins and then provide a scatter plot of the relationship between the average value of the dependent and independent variable in each bin. The country (c)-region (r) regression $\Delta search index_{c,r} = \beta X_{c,r} + \gamma \Delta Covid cases_c + \varepsilon_{c,r}$ yields a coefficient of $\beta = 0.65$ (0.28, 0.79) and t-value of 4.58 (6.09, 6.60) for sectoral exposure (share of small-firm employment, employment risk index) as independent variable. The R² is 0.17 (0.23, 0.25). Changes in search intensity are the difference in means for the periods 1 February to 10 March 2020 and 11 March to 21 April 2020 for Google Trends index on searches for the topic "unemployment". The change in Covid-19 cases per country is in log differences. Data are provided by the European Centre for Disease Prevention and Control (ECDC). Regressions are weighted by NUTS 2 total employment.

Sources: Eurostat; OECD; ECDC; Google Trends; authors' calculations.

4. Conclusion

The recession caused by Covid-19 will affect some European regions more than others. To target immediate and effective support, it is essential to identify regions that are the most vulnerable. Granular information on the virus's impact on local labour markets is not available in a timely fashion. One viable option to inform interventions is to examine regional structural economic factors. European authorities

⁶ Results are conditional on the change in Covid-19 cases in each country, so that the positive correlations are not explained by the severity of the local Covid-19 outbreak. Nor are they explained by the change in the stringency index that measures the extent of national containment measures (Hale et al (2020)). Note that the goodness of fit (measured by R²) equals 0.17 in the left-hand and 0.25 in the right-hand panel. In other words, while exposure explains close to one fifth of the variation in the change in searches for unemployment across regions, the risk index explains one quarter of total variation.

have put several new policy measures in place to combat the economic consequences of the pandemic.⁷ In addition, national authorities have established their own support schemes, with a focus on SMEs. Often, the allocation of funds to support small firms is done at the regional level. Examples are tax reductions, wage subsidies and financial guarantees.

This Bulletin provides an analysis on the impact of Covid-19 on regional employment in Europe and could inform policy responses. Our findings suggest that, to protect employment, special emphasis should be placed on measures that reflect spatial differences in Europe's local economic fabric. Targeted measures should not only consider sectors at risk from the Covid-19 shock, but should also take the regional importance of small firms into account. Swift and coordinated action could prove essential not only to avoid economic divergences across countries but also to prevent negative medium- and long-term spillovers through supply chains to industries and regions that are not directly affected by the pandemic.

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For example, the European Investment Fund aims to incentivise banks to provide liquidity to small firms with the help of a €1 billion guarantee out of the EU budget, and the European Commission proposes to free cash in the European Structural and Investment Funds to support small and medium-sized enterprises (SMEs) (Euronews (2020)). The European Investment Bank (EIB) is backing the creation of a €25 billion European Covid-19 guarantee fund (EIB (2020b)), and the ECB's pandemic emergency purchase programme is aimed at maintaining illiquidity and reducing volatility in euro area financial markets (Schnabel (2020)). See http://www.eurada.org/covid-19/ for a regularly updated overview over measures implemented by national governments.

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