Employment shifts in Europe from 1997 to 2021:
from job upgrading to polarisation

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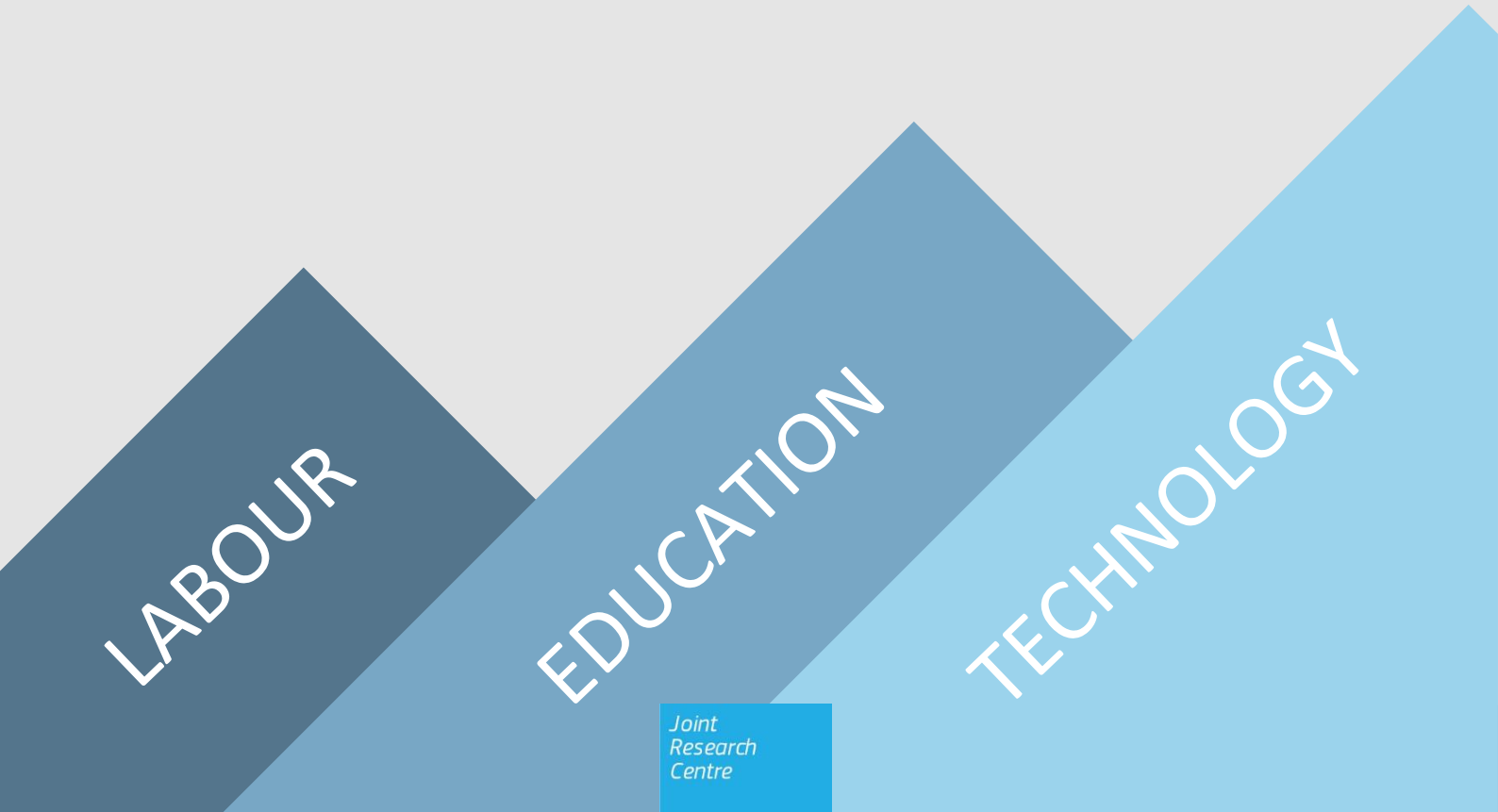

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Employment shifts in Europe from 1997 to 2021
from job upgrading to polarisation

Sergio Torrejón Pérez (Joint Research Centre), John Hurley (Eurofound), Enrique Fernández-Macías (Joint Research Centre) and Elisa Staffa (The Economic and Social Research Institute)

Abstract

This article analyses shifts in employment structures in a selection of eight EU countries (the Czech Republic, Germany, Spain, France, Ireland, Italy, Romania and Sweden), as well as employment dynamics at the aggregate EU level. This is done for four periods, separated by the financial crisis and the outbreak of the COVID-19 crisis: 1997-2007, 2008-2010, 2011-2019 and 2019Q4-2021Q4. Results show that there is a wide diversity of patterns of structural change across periods and countries in Europe. During the expansive phase of the business cycle (1997-2007), the pattern that was more widespread was job upgrading, with the number of workers increasing more in mid-high and high-paid jobs (especially in private and public services). Some important deviations are identified, i.e., the case of Germany and France experiencing job polarisation, and Romania being the only country of our sample that experienced net employment losses from 1997 to 2007. During the financial crisis (2008-2010) and the following period (2011-2019), the patterns of structural change were much more diverse. Workers that were hardest hit by the financial crisis were more likely to be located in the middle of the wage structure, generating in some cases (such as in Ireland, Spain and France, apart from the EU8) job polarization. The global financial crisis impacted hardest on male workers and workers that were employed in construction and manufacturing, while the number of workers in public services continued increasing. From 2011 to 2019, net employment growth was mainly driven by the increase in the size of service jobs, with employment in private services growing in a polarised way and public services promoting upgrading. In the EU8, as well as in Germany, Romania and Sweden we identify patterns of job upgrading or close variants (mid-upgrading), while in the Czech Republic, France, Italy, Ireland and Spain the shape of the pattern of employment change was more similar to one of job polarization. Finally, the COVID-19 crisis had an asymmetric impact, impacting mainly employment in low-paid in-person service activities and agriculture. Although women in low-paid jobs were initially more affected by men, it's also true that later the resilience of better paid jobs benefited more female workers than male workers.

Keywords: job polarisation; economic restructuring; structural change; employment growth.

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Contents

Executive summary

- In 1997-2021 in Europe, employment has grown relatively faster in well-paid jobs. This was the case during the employment expansions preceding both the global financial crisis and the sharp downturn at the outset of the COVID-19 outbreak in 2020. It was also the case during the crises, with sharp declines in overall employment occurring but being concentrated in mid-paying jobs (2008-10) or in low-paying jobs (2019-2021), while well-paid, top quintile jobs alone continued to experience employment growth.

- This has resulted in mainly upgrading pattern in the long run in the EU-8 as a whole. However, while the first and the third sub-periods (1997-2007 and 2011-2019) were characterised by a clear process of job upgrading supported by a strong net employment creation, during the global financial crisis (2008-2010) Europe experienced some degree of asymmetric job polarisation (biased towards best paid jobs).

- The COVID downturn and associated job loss in the EU (2019Q4-2021Q4) was not polarising. Employment declined more or less monotonically with well-paid jobs least affected and low-paid jobs most affected. This was a consequence of the disproportionate impact of the pandemic on employment in social and personal service sectors such as retail, accommodation, travels and transport and food and beverages.

- Two thirds of net new employment in the EU since the late 1990s has been female. For that reason, gender gaps in employment rates are closing. In addition, women have accounted for a greater share of top quintile employment growth in the EU and employment shifts for women have been more obviously upgrading while those for men have been more polarising, especially during and after the global financial crisis. This is partly a consequence of the growth of professional employment in predominantly female employing jobs, especially in the state-supported sectors of education and health but also of the concomitant decline in traditionally male-employing sectors such as agriculture, manufacturing and construction. Still, since women departed from a much worse scenario few decades ago, both in terms of employment rates and wages, such progress in closing the gender gaps has only made a mild dent in these structural gender imbalances in the last decades. In fact, women are still over-represented in the low-paid, bottom quintile jobs, and under-represented in all of the four higher quintiles.

- There is a variety of employment shift patterns across Europe. This is the result of different drivers (labour market regulation, the socio-demographic composition of the workforce, etc) modelling the impact of technological change, changes in international trade and other global trends in different ways in different places. Job upgrading and polarisation are the most readily observed patterns, but there is no pervasive pattern of employment change occurring everywhere (but a variety of patterns across countries and periods instead).

- The rate of employment growth has tended to decrease over the last two decades. This is mainly because of broader demographic shifts, such as the ageing and retirement of the 'boomer' generation and the resulting contraction of the working age population in the EU after 2010. Population growth has been an indispensable component of overall economic growth in the EU in recent generations. But what was a tailwind has now become a headwind. Employment growth henceforward in the EU (whether polarising or upgrading) will be harder won.

1 Introduction

Shifts in job structures are key to understand processes of economic restructuring, but also changes in job quality and its implications. It is a central topic for socioeconomic research, given the broad implications it has for economic growth and productivity, for inequality and in terms of job polarisation, to understand job quality trends and know more about the working conditions of the labour force, etc. These are some of the reasons why it is a topic that has been addressed and discussed by many social researchers with different profiles, creating a fertile area of work where economists and sociologists (mainly, but not only) can discuss and cross-fertilise.

Given its broad and relevant implications, this topic has received attention not only from academia, but also from the policy arena. Has a given country experienced job polarisation, with employment creation at either end of the job-wage distribution, and thus socio-economic gaps between workers getting more and more marked? Has job growth been biased towards high-quality jobs, creating more 'room at the top' and thus benefiting an important share of the labour force? Has job growth been concentrated in low-paid jobs, fostering labour market transitions towards lower-quality jobs? What are the drivers promoting these trends? What can be done to promote job upgrading and mitigate job polarisation and downgrading? These are the type of questions some stakeholders may want answers for at the time of designing policies aimed at promoting a more balanced and fairer employment growth.

Although the relevance of the topic is broad and global, so far, most studies have been focused on employment dynamics in the United States (U.S.), Europe and some other developed countries. In contrast, this paper is part of a broader project, aimed to produce comparative evidence on employment shifts at the global level. This way we aim to compare what is happening in Europe, and more precisely in a sample of eight countries of the European Union -EU- (the Czech Republic, Germany, Spain, France, Ireland, Italy, Romania and Sweden) with the experiences of other developed and developing countries.[1]

The basic idea is to replicate the work that has been done for years in the context of the European Jobs Monitor[2] -see, for instance, Fernández-Macías et al. (2017)-, which has been tracking shifts in EU employment structures on a regular basis, but comparing the patterns observed in the EU with those of other global economies. In this context, the aim of this paper is twofold:

1. We update the evidence on shifts in employment structures in Europe, by covering the period 1997-2019. We study what has happened in three subperiods: during the expansive phase of the business cycle (1997-2007), during the financial crisis (2008-2010) and after it (2011-2019).
2. We cover separately the impact on employment of the spreading, from March 2020, of SARS-CoV-2 (from now on, referred as "the COVID crisis" or "COVID-19").

By doing this we produce evidence directly comparable with the findings that are being produced in the context of a broader project for other non-EU countries (see footnote 1). To ensure this is possible, we apply a common approach and similar methods. This way the reader can also benefit from benchmarking Europe with other global economies.

With these two objectives in mind, the rest of the article is organized as follows. After the introduction, in section 2 we discuss and extract some key lessons from the literature. In section 3, we talk about the methods used to produce our findings, as well as about the data sources and the variables. Section

[1] The other countries covered by the project are Canada, U.S., Mexico, Brazil, Chile, Argentina, Russia, India and South Korea. More info on: https://www.ilo.org/employment/Whatwedo/Projects/building-partnerships-on-the-future-of-work/lang--en/index.htm

[2] https://www.eurofound.europa.eu/data/european-jobs-monitor

4 displays the main results and then we conclude in section 5, summarizing the most important findings and reflecting on their implications.

2 A lasting debate on changes in employment structures

Over the past thirty years, there has been an intense debate on the evolution of developed economies' employment structures, involving mainly (labour) economists and sociologists, often using similar approaches. This debate originated in the U.S. (CEA, 1996; Wright and Dwyer, 2003) and was later engaged in other countries, such as the EU member states.

This debate has mainly revolved around two observed patterns of change: upgrading and job polarisation. Upgrading shifts lead to an improvement in the employment structure, with the greatest employment growth taking place in high-paid jobs and the weakest growth taking place in low-paid jobs, with middling growth in the middle. Regarding job polarisation, the main difference with upgrading is that the relative positions of the middle and bottom of the job distribution are swapped: employment growth is weakest in the middle and relatively stronger at both ends of the job-wage distribution, leading to a 'shrinking' or 'hollowed middle'.[3]

While for the U.S. and the United Kingdom (U.K.) the recent literature has tended to identify job polarisation (Matias, 2016; Autor and Dorn, 2013; Autor,2015; Salvatori, 2015; Goos and Manning, 2007; Autor, Katz and Kearney, 2006; Autor, 2011; Wright and Dwyer, 2003),[4] as regards the EU countries such a diagnosis has been more contested. Goos et al. (2009; 2014) suggest, by using EU-LFS data, that there was a pervasive pattern of job polarisation in 16 European countries over 1993-2010. However, using the same data, countries and period, and by applying similar methods, Fernández-Macías (2012) finds different results: not a pervasive polarisation but a plurality of patterns of structural change in EU labour markets. The differences result from small but consequential differences in the methodology. Fernández-Macías (2012) uses jobs instead of occupations as the unit of analysis, with jobs understood as a given occupation in a given sector, and thus obtaining categories that are more precise and detailed. Another important difference is that while Goos et al. use U.K.'s median hourly wages (2009) or mean European wages (2014) to rank the job distribution in all European countries (effectively making the simplifying assumption that the job-wage structure is the same everywhere), Fernández-Macías (2012) uses country-specific wage levels and finds three main patterns of change: job polarisation in Continental Europe; upgrading in Nordic countries and Luxembourg; and mixed upgrading and polarisation (job polarisation biased towards better paid jobs) in Southern Europe. Also, Goos et al. (2009) use uneven groups of occupations to analyse patterns of change, whereas Fernández-Macías (2012) uses quintiles following the tradition of Wright and Dwyer (2003). Since then, many other papers and reports have found a variety of patterns of structural change across EU countries, both at the national (Fernández-Macías and Hurley, 2017; Oesch and Menés, 2011; Oesch and Piccitto, 2019; Fernández-Macías et al., 2017; Oesch, 2015) and the regional level (Vera-Toscano et al. 2022; Hurley et al., 2019).

In line with the previous studies, Oesch and Piccitto (2019) critisize the existence of a 'polarisation myth' in Europe: even if the idea has become widely accepted by economists, they show that the polarisation thesis does not hold empirically, and the scenario of pervasive polarisation is not in line

[3] The opposite pattern of job quality downgrading appears when the employment growth is more intense in the lowest-wage jobs. It could also be the case that employment grows relatively evenly across quintiles, indicating a pattern of structural job quality stability.

[4] However, there are a few exceptions. Hunt and Nunn (2022) contest the previous finding of job polarisation as a pervasive pattern of structural change affecting the U.S. in the last decades. In their view, this is a statistical artefact of occupational code redefinitions. Mishel (2014) also claims that no employment polarisation has been found in the U.S. from 1999 to 2012, because of a decelerated growth in high-skilled, high-wage occupations in top quintiles. The reason behind this may be the over-supply in the labour market of highly educated workers who have chosen jobs in which they are over-educated. For the U.K., and according to Cominetti et al. (2022), from 2001 to 2019 the country experienced occupational upgrading.

with structural trends of EU labour markets. To reach that conclusion, they analyse data on occupational change in Sweden, Germany, Spain and the U.K. between 1992 and 2015, using several indicators of job quality: earnings, education, prestige and job satisfaction. They find clear-cut occupational upgrading for Germany, Spain, and Sweden and mixed evidence (depending on the indicator used) for the U.K. Others that do not find support for the polarisation thesis and the idea of 'the middle-class squeeze' are Albertini et al. (2020) and Oesch (2022), that identify instead a pattern of upgrading more consistent with the skilled-biased technological change (SBTC) hypothesis.

However, and although findings are very sensitive to the methods and the type of data used, determining the shape and nature of changes in employment structures has proven easier than determining their root causes. Among the main drivers, researchers have identified labour demand-side and supply-side factors, as well as other institutional and contextual factors.

The observed diversity in the patterns of structural change (which is not only about polarisation and upgrading, but also downgrading and other possible variants) comes about because common factors such as technology and globalisation interact with institutional features and policies, socio-demographic trends and other factors that have different configurations in different countries -for more information on the variety of patterns and drivers across countries, see Fernández Macías et al. (2017: 12-17)-. These can influence and mediate the impact of mega-drivers such as technological change and globalization in many different ways. In the following paragraphs we describe some of the main hypotheses on how relevant factors are expected to impact labour markets and employment structures.

Labour demand drivers

On the demand-side, the main driver affecting employment levels and wages according to the literature is technological change. In the last three decades, the main technologies that have been deployed at a large scale in workplaces are automation technologies and robotization (Fernández-Macías et al. 2021), Information and Communication Technologies (ICT) and digital platforms (Urzì Brancati et al. 2020; Fernández-Macías et al, forthcoming). Artificial Intelligence is also expected to alter the way we work, but it is a type of technology that has not been yet deployed at a large scale in work contexts.

To be used, digital tools often require high-level professional skills, and can be complementary to and productivity-enhancing in particular for high-skilled workers, increasing relative demand for their services. On the other hand, automation technologies may be more likely to displace less skilled workers, whose jobs are more easily replaceable by machines. In line with these predictions, the SBTC approach predicts that the demand for skilled jobs is high relative to the demand for less skilled jobs, and supports the narrative of upgrading employment structures in developed economies (Violante, 2008; Beckman et al. 1998).

For a long time, the specialised literature has focused on the notion of skills, as the capacities workers acquire through education, training and experience. Then Autor, Levy and Murnane (2003) laid the foundations for a new theoretical approach (referred to as the 'Routine-Biased Technological Change' -RBTC- hypothesis), by introducing the concept of tasks, to be understood as "the smallest unit of work involved in an economic process" (Rodrigues at al., 2021, 1). These authors distinguish between routine and non-routine tasks, both manual and cognitive. Routine tasks can be fully codified and automated, and tend to be prevalent in occupations located in the middle of the employment structure (i.e., clerical and manufacturing jobs). Non-routine manual tasks and non-routine cognitive tasks are more common, respectively, in occupations at the bottom (i.e., cleaners, restaurant workers) and at the top of the employment distribution (i.e., professional, and managerial occupations). According to these authors, technology more readily displaces occupations intensive in routine tasks and leads to declining employment in these mid-paid jobs, while it promotes the relative growth of high-quality and low-quality jobs (Autor, 2015).

Another driving force behind changes in job structures is the influence of globalisation and international trade. Over decades there has been a process of offshore outsourcing: the transfer of some stages of the production process, mainly the production of intermediate inputs, from developed to developing countries, such as China and India (Goos at al., 2010). Routine jobs are more standardised, subject to codified procedures, and they often do not necessarily have to be carried out in person or in a specific place. Such jobs are accordingly more offshorable (Blinder, 2006; Levy and Murnane, 2004) as well as more amenable to automation or technological substitution. In this way, globalisation and international trade may be expected to incentivize the hollowing out of mainly mid-skilled, mid-paid routine-task performing employment in developed economies, a pre-requisite for job polarisation to occur.

Supply-side drivers

Employers use different production techniques and create different types of jobs depending on the availability and characteristics of the workforce. In developed economies, female labour market participation has increased substantially over the latest decades. Women are more likely to work in low-paid service and care-related occupations and the demand for these jobs has increased over time. By boosting low-paid employment, care work has contributed to job polarisation (Dwyer, 2013). At the same time, relatively faster increases in women's tertiary education participation and attainment may result in an increasing participation of women in top quintile occupations (Murphy and Oesch, 2018; Hurley et al, 2021).

More generally speaking, over the past 50 years the educational attainment of the people in western countries has risen substantially for each successive cohort. Hardy et al. (2018) claim that this has had a central role in promoting changes in the task content of jobs: the higher the education level of the workforce, the higher the intensity and prevalence of non-routine cognitive tasks and the lower the intensity and prevalence of manual tasks. Since companies choose their production techniques and create jobs not only considering available technology but also the skillsets of the workforce, investments in education and training are likely to promote upgrading, with more high skilled workers being hired and more high-quality jobs being created (Oesch and Piccitto, 2019) to take full advantage of the possibilities opened up by technological progress.[5]

On the other hand, immigration can be one factor behind the employment expansion in the bottom tiers of the employment structure: the availability of migrant supply tends to contribute to employment demand in the bottom quintiles. This was the case in the U.S., where the overall polarisation of employment expansion in the 1990s has been related to Hispanic immigration, because almost two thirds of the jobs created were held by immigrants (Wright and Dwyer, 2003). Something similar happened in Spain -where migrants occupied most jobs created in the bottom quintiles during the expansive phase of the business cycle (Torrejón, 2019)- and Ireland (Murphy and Oesch, 2018), while other countries, such as Switzerland, were more likely to attract high skilled migrant workers boosting employment in the top quintiles of the job-wage distribution (Ibid.). Apart from contributing to filling given employment niches (usually low-paid jobs), migrations can also have an indirect effect and contribute to rearrange the employment structure by pushing natives to be reallocated to better paid jobs (Edo, 2018).

The role of institutions

Focusing on labour-demand and labour-supply drivers is not enough: institutions and regulation manage and channel in very different ways employment trends and dynamics.

Minimum wage legislation and employment protection legislation (EPL) are likely to affect the demand for low-paid jobs. This is key considering that most differences across countries take place at the

[5] However, the labour market is not always capable of keeping up with the educational upgrading and overqualification occurs.

bottom of the employment structure. Consequently, regulation and EPL may be key to understanding why different countries display different patterns of employment change.

For instance, if the minimum wage is relatively high the economy may be less capable of creating low-paid manual jobs, and thus the pattern of job polarisation is more likely to be asymmetric and/or more biased towards high-paid jobs (it may also happen this results in job upgrading, in extreme cases in which job creation in the bottom of the wage structure is only marginal). On the contrary, if the minimum wage is low, the capacity of the economy to create low-paid jobs may be higher, and thus a symmetric form of job polarisation is more likely to happen. For this reason, we can conclude that the higher the minimum wage, the lower the probability of symmetric polarisation to happen, especially in economies in which the share of informal work is low or marginal (Maarek and Moiteaux, 2018; Lordan and Neumark 2018).

From the point of view of EPL and regulation, some European countries (such as Germany, a prominent case of job polarisation in this period according to many studies) experienced a process of de-standardisation of employment regulation in the late 1990s and early 2000s which may have contributed to an expansion in non-standard jobs, mainly in the lowest-paid quintile, thus contributing to job polarisation (Hurley et al., 2013; Fernández-Macías, 2012).

Another important policy dimension relates to the State's role as an employer. In most EU Member States, the State accounts directly or indirectly for between 15% and 35% of total employment. In sectors such as health, education and public administration, policy decisions (whether to reduce or expand public expenditure on such services services) have a very direct bearing on the shape of overall employment shifts, especially as labour demand in these sectors tends to be biased towards higher paid jobs (Fernández-Macías et al. 2017). Clear examples are Nordic countries, where public investment in services such as health, education and care are high in comparative terms, and where these sectors are an important source of mid and well-paid jobs contributing to upgrading employment shifts.

The institutional settings of different regimes of welfare states also manage in very different ways the impact of technological change and globalization. According to Esping-Andersen's (1993) three welfare state taxonomy (1993), in liberal regimes governments privilege markets and stimulate growth in low-paid occupations, generating polarising effects; in social-democratic regimes, governments are more capable of creating public employment in the middle and upper end of the distribution, promoting job upgrading; while in conservative regimes, some key services are provided in households instead of by the market and/ or public employment (Oesch, 2015).

Finally, other relevant labour market institutions are trade unions and collective representation. The presence of strong wage-setting institutions makes wage structures more compressed (Farber et al., 2018; Brennan, 2016) and lead wage flexibility to decrease. In such systems, low-paid jobs are comparatively expensive and, in many cases, may simply not be created, mitigating the polarising effects of technological change and globalization. In a similar fashion, collective representation may also tend to shift production towards higher value-added activities, a dynamic that is consistent with upgrading patterns. Sweden is a paradigmatic example of a country with high levels of collective representation, high levels of productivity and employment shifts that have been predominantly upgrading over many decades (Fernández-Macías et al., 2017; cf. Figure 1 below).

Consumption spillovers

Many low-skilled workers are occupied in services such as food preparation, cleaning, repairing or personal services. On the other hand, there is also a growing share of high-skilled/ time-poor workers, that are net buyers of these types of service. The demand for these services depends on the consumption choices of higher paid workers generating additional demand for low-skilled employment (Fernández-Macías et al. 2017). This is one of the reasons why the regions that are more innovative and have a higher share of high-paid jobs, tend to be also those that have experienced job polarisation,

with sharper rises in well-paid employment being accompanied by similar increases in low-wage employment (Hurley et al., 2019). Mazzolari and Ragusa (2013) estimate that this consumption spillover effect is not negligible, arguing that that "this channel may explain one-third of the growth of US employment of non-college workers in low-skill services in the 1990s". With these low-paid services being still considered essential and key for production and the functioning of the society, but also difficult to automate, and the emergence and consolidation of platform work as another source of low-paid jobs (Urzì Brancati et al., 2020; Fernández-Macías et al., forthcoming), such mechanisms are likely to continue contributing to employment polarisation.

Apart from this, other macro-economic dynamics (economic growth, the business cycle, etc) and factors, such as organizational change (Caroli and Van Reenen, 2001), are also able to alter the rhythm and direction of employment flows. All the above-mentioned drivers, among others, interact and produce different outcomes in different places. That is why, if we want to gain a deep understanding of trends, patterns and drivers explaining occupational change, we first need to analyze the different cases in depth, by focusing separately on single countries and/or regions. In addition, it is also convenient to consider in our framework and analyses as many variables and explanatory factors as possible, to ensure that important mechanisms and drivers are not ignored. Bearing all this in mind, in section 4 we present evidence for eight EU countries, covering in all these cases the period from 1997 to 2021. But first it is important to say something on the approach, data and methods used.

3 Data and methods

3.1 The jobs approach

In order to study how employment structures have evolved over time in our sample of eight EU countries, we apply the 'jobs-based approach' (U.S. Council of Economic Advisors, 1996; Wright and Dwyer, 2003; Fernández-Macías and Hurley, 2008; Goos et al., 2009; Hurley and Fernández-Macías, 2015; Fernández-Macías et al., 2017). This methodology uses jobs as the unit of analysis, defined as specific occupations within specific sectors. The concepts of occupations (referring to the vertical hierarchy of roles and skills within organisations or firms) and sectors (referring to the horizontal distribution of economic activities and the market position of the firm/ institution within a country or territory) correspond to two fundamental dimensions of the division of labour within and across organisations. Thus, we adopt an approach that is conceptually coherent, and that also benefits from the existence of internationally comparable classifications such as ISCO (for occupations) and the Statistical Classification of Economic Activities in the European Community (NACE, for sectors). In addition, jobs are precise and intuitive categories corresponding to what a lay reader might understand by the term. Examples of a job are office clerks within the construction sector, teaching professionals in education; sales workers in retail, etc.

This study covers four sub-periods (1997-2007, 2008-2010, 2011-2019 and 2019-2021), and the following procedure is applied in all of them separately. Once all jobs are defined, their quality is proxied by using information on mean hourly wages, so that they can be ranked.[6] Then jobs are grouped into a number of job quality tiers (we use five categories with a roughly equal amount of

[6] There are a few exceptions. For the ranking used in Romania for the first period under study (1997-2007), we use the educational attainment to proxy job quality. This is because of the comparatively lower quality of the data on wages in that precise case. In other cases, when there are some job cells (or 'jobs') that are empty in terms of employment (and therefore we cannot extract information about the wages or the educational attainment of workers occupied in those jobs), we create rankings using information coming from the aggregate EU8 data (referring to the same jobs). Apart from wages, other proxies of job quality are often used in the specialised literature: mainly one based on the average educational attainment of job-holders, but also other that is a composite index of non-pecuniary job quality attributes. For a detailed discussion on the differences between them, see Hurley et al. (2013). However, wages are considered the gold standard: this is because wages tend to correlate positively with other elements of job quality, but also because the information we obtain from a continuous variable tend to be richer than the information other type of variables provide.

employment in the first year of each sub-period).[7] The core of the approach consists of ranking and grouping the jobs according to their quality and then studying the change across time in the number of workers across the different tiers of job quality. We present these results in figures reporting the pattern of net employment change by quintiles of job quality.[8] The bars on the left of each diagram show net employment change for low-paid jobs, and the bars on the right show net employment change for highest-paid jobs.

In addition, we perform the same analysis by subgroups, so to qualify patterns of structural change. We use as breakdowns: the sex of workers; the broad economic sector (1. Primary, manufacturing and construction; 2. Public Services -including Public Administration, Health and Education- and 3. Mainly private services); the type of contract (permanent or temporary); and the working time arrangement (full-time or part-time). This way we see who has benefited more from job growth or has been hardest hit during crises, shedding light on the drivers explaining the different patterns of job transformations and their socio-economic consequences.

3.2 Data and main variables

We combine data from the EU-LFS for 1997-2021[9] and aggregated data from the Structure of Earnings Survey (SES) for 2002, 2010 and 2018. These sources allow for the creation of country job-wage rankings for the 8 Member States covered in this study.

Due to its large sample size, we extract the employment weights (from 2005 for the period that goes from 1997 to 2007, 2009 for 2008-2010, and 2014 for 2011-2019) and labour market information from the EU-LFS. But this database does not contain detailed information on wages in all cases. That is why we also rely on the SES, a database that also contains information on ISCO and NACE codes, so we can assign a wage-based measure of job quality to the same unit of analysis (the job, i.e., occupation -ISCO at 2-digit level- x sector -NACE at 1-digit level- cell), and then merge all the information.

For the period that goes from 1997 to 2019 we cover eight EU countries: the Czech Republic, Germany, Spain, France, Ireland, Italy, Romania and Sweden. In addition, we also include an analysis at the EU-8 level by aggregating the information from these eight countries which accounted for just over two-thirds of EU27 employment in 2019. The purpose is to include not only country-specific evidence, but also information on employment dynamics at the aggregate EU level, so the latter can be used to compare employment trends in Europe and outside Europe. The countries in our sample have been selected by taking into account three main criteria: their size in terms of employment, so we can account for an important share of all EU employment;[10] data quality[11] and comparability.[12] When analysing the impact of COVID-19 on employment, we perform the same type of analysis but at the

[7] In some cases, there are jobs that are very large in terms of employment. This is for instance the case of some agricultural jobs in Romania. Something similar happens in Brazil (Rodrigues-Silveira, 2023). When these large jobs are close to the boundary between two quintiles, if we assign those jobs (based on their average/ median wages) to one single quintile, this may result in quintiles having a very different initial employment size. To overcome this limitation and ensure we can operate with quintiles of a similar initial size (accounting for around 20% of employment each), we split in two those large jobs falling between quintiles and assign the two split "sub-jobs" to the relevant quintile to ensure equal initial employment.

[8] We represent annual change in all figures, calculated by simply dividing the total employment change by the number of years in each period. This does not alter the pattern of change across quintiles in each period, but makes the analysis comparable across periods which have different lengths.

[9] From 1997 to 2019 we use annual data files and from 2019(Q4) to 2021(Q4) quarterly data.

[10] According to Eurostat, in 2021 Ireland accounted for 1.2% of total EU-27 employment, while Sweden accounted for 2.5%, the Czech Republic for 2.6%, Romania for 4%, Spain for 10.1%, Italy for 11.3%, France for 14.1% and Germany for 20.8%.

[11] The Netherlands is excluded because there are many missing observations on sectors, and Poland because the information required to perform this type of analysis is only available from 2000.

[12] We replace the Netherlands by Ireland, so that we also include a country considered as 'liberal' in the European context. Belgium and Sweden have a similar size in terms of employment, so we decide to include the latter because we consider it's important to include a 'Nordic' country in our sample.

EU27 level. This is due to restrictions imposed by Eurostat on access to LFS quarterly data via ad hoc request. This quarterly data does nonetheless have the advantage of being able to allow us to track developments up until 2021 Q4.

We therefore cover the following periods: 1) 1997-2007, that in most places coincide with the expansive phase of the business cycle; 2) 2008-2010, that is the first and most significant employment impacts of the global financial crisis; 3) 2011-2019, that combines residual impacts of the financial crisis / sovereign debt crisis (in some countries) with a new phase of employment and economic recovery after 2013; and 4) 2019Q4-2021Q4, capturing the impact of COVID. The first three sub-periods are also separated because some breaks were introduced in the EU-LFS for the core sector and occupation variables. There were changes in classification from NACE Rev1.1. to NACE Rev2. in 2008, and from ISCO88 to ISCO08 in 2011 in the EU-LFS. Fortunately, in our case these breaks coincide with two peaks of the business cycle, so it also makes sense from a theoretical point of view to study separately these three periods, to better capture how the different phases of the business cycle contribute to shape job structures. Finally, we also wanted to include a separate analysis on how the COVID crisis (the first and most aggressive impact occurring during 2020) has affected employment structures.

4 Results

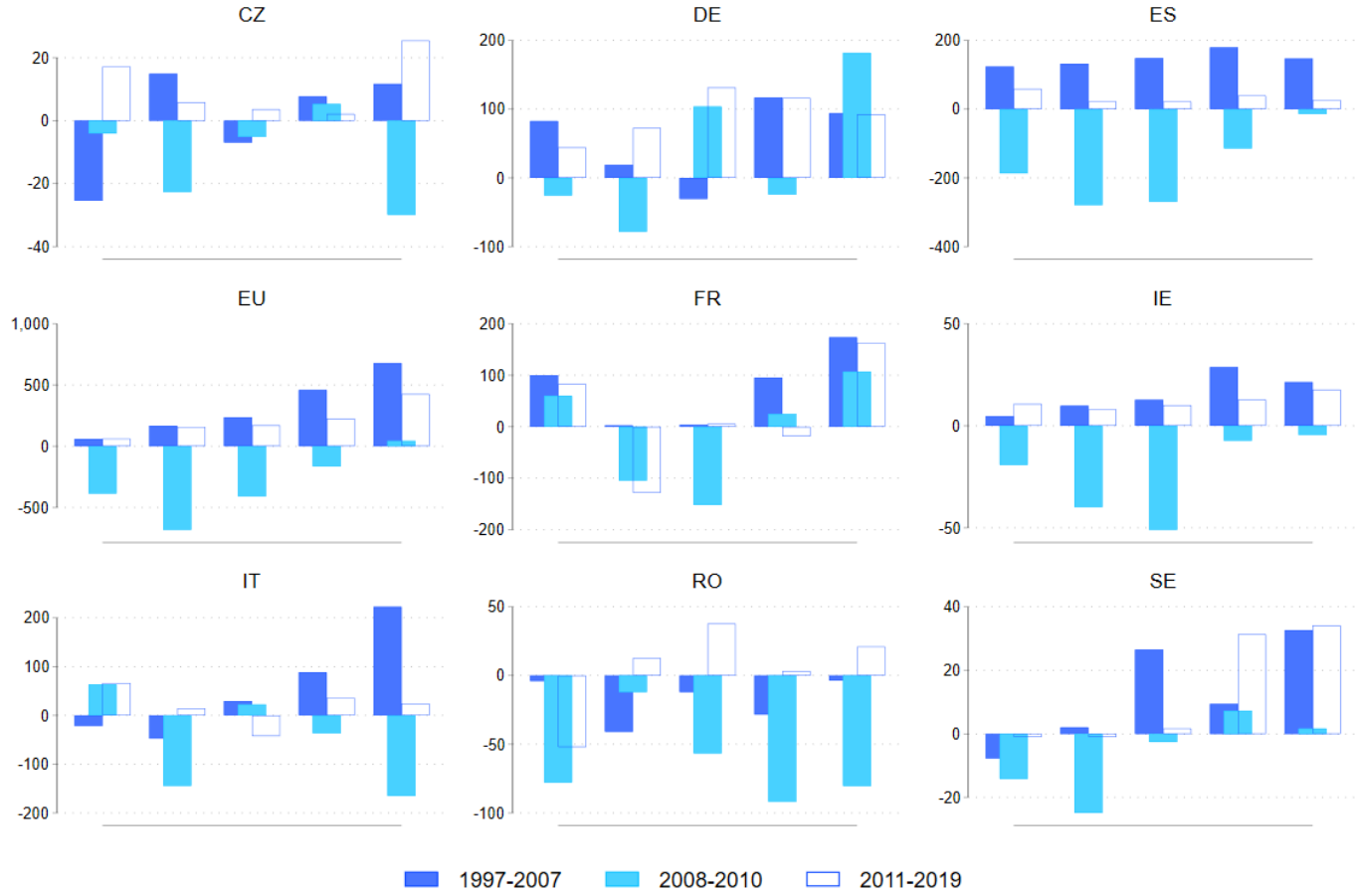
4.1 Employment shifts in the long run: 1997-2019

4.1.1 1997-2019: job upgrading, downgrading or polarisation

According to Fig. 1, during the expansive phase of the business cycle, there was job upgrading at the EU8 aggregate level. Employment grew in all quintiles, but employment growth was faster in high-paid jobs. A similar pattern was visible in Sweden and Italy, although in these cases the number of workers decreased in low-paid jobs. In the Czech Republic job upgrading was milder, with important employment losses in the lowest and the middle quintile and employment gains in the top of the employment structure and the second quintile. In Spain and Ireland, job creation was widespread across all quintiles, but more biased towards mid-high and high-quality jobs, drawing a pattern that is closer to one of mid-upgrading. By contrast, Germany and France were the only countries that experienced job polarisation during the first period analysed. Job polarisation in these two cases was asymmetric, with employment creation being more biased towards mid-high and high-paid jobs. Romania is a special case because it was the only country experiencing net employment losses from 1997 to 2007. These contractions in the number of employees were widespread but concentrated in quintiles 2, 3 and 4. This related in large part to depopulation as negative employment growth mirrored declining population in this period.

As the financial crisis hit Europe, from 2008 to 2010 employment declined in all types of jobs except in the top quintile. These employment losses concentrated in low and especially mid-paid jobs, in a process of job polarisation (with an upgrading skew). Patterns of change by country in this period are more diverse than in the previous one. Similar results to the aggregated EU8 trend are found in Ireland and Spain. This reflects the concentration of job losses during the financial crisis in manufacturing and construction, two sectors with a disproportionate share of employment in mid-paid (and mainly male) jobs. There also was job polarisation in France, although one key difference in relation to the previous countries is that in this country both well-paid jobs and low-paid jobs continued increasing during the global financial crisis. On the other hand, Germany and Sweden experienced upgrading, being the reason that in these two cases employment losses were biased towards the bottom of the employment structure. Germany is, together with France, one of the countries in which best paid jobs grew the most during the financial crisis. In Italy and the Czech Republic, the crisis hit hardest those in quintiles two and five. In Romania the crisis affected negatively workers across the whole job-wage distribution.

Figure 1. Employment change (annual, in thousands) by job-wage quintile, 97-19



Source: EU-LFS, SES (authors' elaboration)

In the period following the financial crisis (2011-2019), in the EU8 there was again job upgrading. However, patterns of employment change vary a lot across countries. Germany and Romania (clear cut mid-upgrading cases) and especially Sweden upgraded their job structures from 2011 to 2019. By contrast, job polarisation with an upgrading skew was visible in the Czech Republic, France and Ireland. In Italy and Spain there was job polarisation, but in these cases the patterns of asymmetric polarization were more biased towards low-paid jobs (that is, job polarization with a downgrading skew).

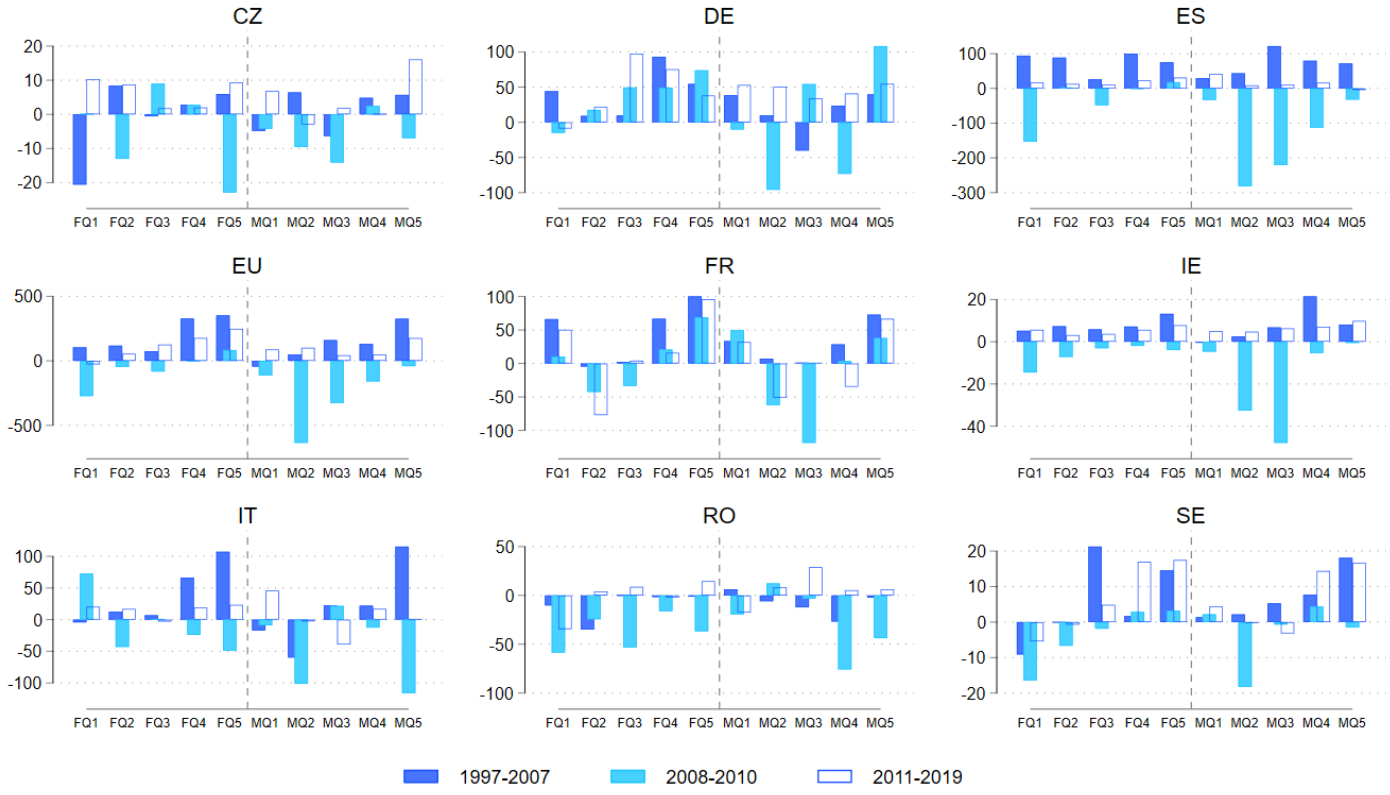
4.1.2 1997-2019: employment shifts by sex

Fig. 2 shows that both men and women (except male workers in low-paid jobs) benefited from employment creation during the expansive phase of the business cycle in the EU8 aggregate. The main difference by sex is that while women experienced a clear-cut process of job upgrading, in the case of men employment growth was also prominent in middle paid jobs.

In that period in the Czech Republic only female workers with low-wages experienced substantial employment losses, while job losses for male workers were less intense and concentrated not only in low-paid jobs, but also mid-paid jobs. In Germany and France, employment developments among both men and women contributed to polarise the employment structure. In these two countries, women benefited more from employment creation in high and low-paid jobs. In Spain the main difference by sex is that only men contributed to expand employment in the middle of the distribution, a phenomenon associated to the key role that the construction sector, as a male dominated sector, played during those years (more information on this in section 4.1.3). Due to this, the growth of male employment was not polarizing, as it was the case for females. Something similar happened in Ireland.

In Italy employment growth was clearly biased towards high-paid jobs in both cases. Employment growth in the two top quintiles was slightly higher for women, who did not experience net employment losses in any quintile. In Sweden male workers benefited from a process of linear upgrading, while employment growth for women was greater in the middle and the top of the distribution (mid-upgrading). Only Swedish female workers in low-paid jobs experienced employment losses during the expansive phase of the business cycle. As indicated above, while in the rest of the countries there was net employment creation in this period, in Romania there were net employment losses. This employment contraction affected females in low and mid-low paid jobs and males in mid-paid jobs.

Figure 2. Employment change (annual, in thousands) by quintile and sex, 97-19



Source: EU-LFS, SES (authors' elaboration). Note: 'F' stands for Female and 'M' for Male

From 2008 to 2010 in the EU8, the financial crisis hit hardest men than women. Male workers in mid-paid jobs were those more affected by employment reductions, while in the case of women there were female workers with low-wages the ones suffering a greater shock. This partly explains why male employment developments contributed more to polarize the employment structure during this short period, while female employment developments continued promoting job upgrading.

The decline in the number of mid-paid male workers was notably intense in Spain, Ireland, Germany France and the Czech Republic. More generally speaking, and considering all types of jobs, the financial crisis hit hardest male workers, as the previous cases (but also Italy) demonstrate. Exceptions were Sweden (with women in low-paid jobs suffering the main impacts of the crisis), the Czech Republic (with women in high-paid jobs and in quintile 2 suffering the main impacts of the crisis) and Romania (with the number of female workers decreasing in all quintiles). In Germany, women did not see their employment levels decreasing during those two years (only a little in low-paid jobs). The number of female workers continued increasing in the middle and the top of the employment distribution, while in France the same happened, but only for women in best paid jobs and, to a much lesser extent, low-paid jobs.

From 2011 to 2019, in the EU8 there was again net employment creation. The structure of male jobs got polarised, given that job growth was more salient in both ends of the employment distribution. In the meantime, women experienced job upgrading. However, the different countries contributed in very different ways to shape aggregate patterns, as figure 2 reveals.

In summary, it is more likely to observe upgrading patterns when analysing female employment dynamics. At the aggregate level, this trend is consistent and visible through the whole period analysed in this section. Male employment has, on the other hand, produced job polarization in some specific periods (this was the case from 2008 to 2019). At aggregate EU level (as proxied by the EU8 countries covered), to the extent that employment polarisation occurred, it was strongly evident for male employment during the sharp recession of the global financial crisis, and in milder form in the subsequent recovery of male employment post-2011. For women, net employment growth has been consistently higher than for men and has had a consistently upgrading pattern. This however is against a background of a strongly skewed starting distribution of employment by gender with women over-represented in particular in low-paid jobs and under-represented in higher paid jobs in all countries covered. In other words, the changes at the margin noted in this analysis have gone only a small way to narrowing this gender employment quality gap (Hurley et al., 2021).

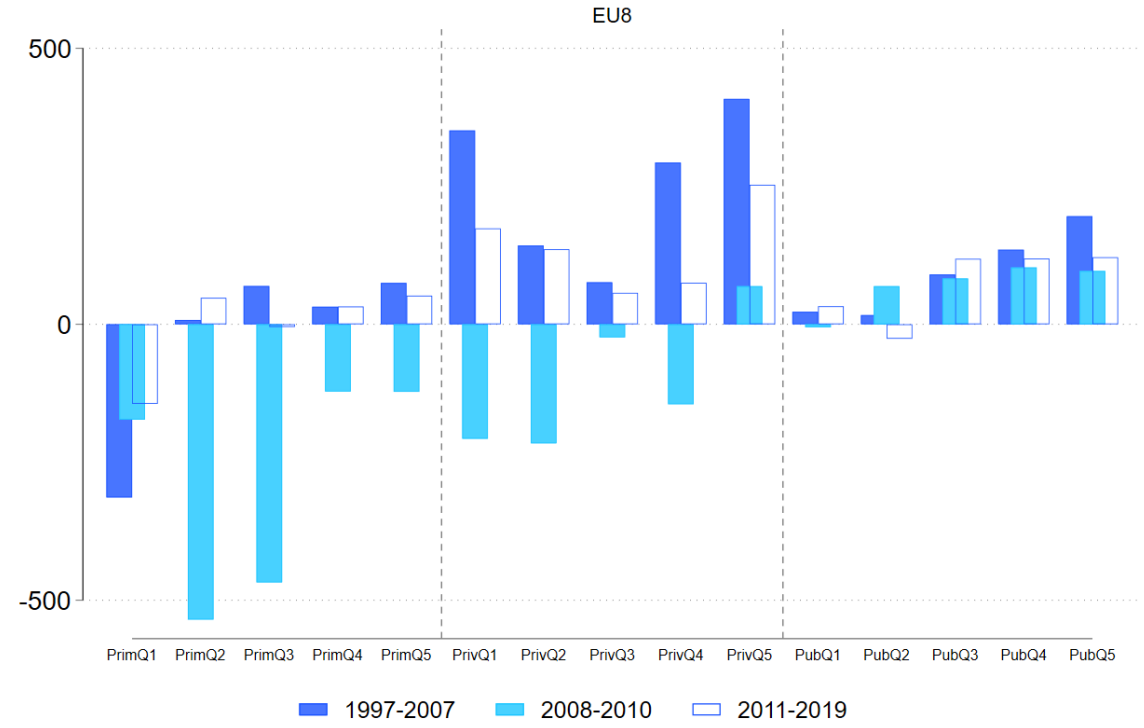
4.1.3 1997-2019: employment shifts by broad sector[13]

Employment growth during the latest decades in the EU8 has been mainly driven by job creation in the private service sector (Fig. 3). When there was consistent economic growth (that is, from 1997 to 2007 and from 2011 to 2019), employment in private services increased substantially and in a polarised way. Only during the financial crisis, they did decrease (with the already noted exception of employment in better paid jobs). On the other hand, employment in public services increased considerably from 1997 to 2019.[14] In all sub-periods considered, employment growth in public services was faster in mid and high-paid jobs. This is not unexpected, considering that public services employment tends to be above the average in terms of job qualifications and pay. Finally, employment in the sector containing primary activities, manufacturing, utilities and construction (from now on, the primary sector) has been shrinking in the last decades, and especially from 1997 to 2010. These employment losses were mainly driven by a reduction of the size of low-paid jobs from 1997 to 2007, and by a reduction of the size of mid-low and mid-paid jobs from 2008 to 2010. The narrowing of the primary sector is other of the factors (apart from the dynamic of public services) that promoted a process of job upgrading in the first period and job polarisation during the financial crisis.

[13] 1. 'Primary, manufacturing and construction' ('Prim' in the figures below) includes Agriculture, Forestry and Fishing; Mining and Quarrying; Manufacturing; Electricity, Gas and Water supply and Construction. This category corresponds with sections from A to F in NACE Rev.1.1. and NACE Rev.2. 2. 'Public Services' -Public administration, Health and Education- ('Pub' in the figures below) includes Public Administration and Defence, Compulsory Social Security; Education; Health and Social Work Activities and Activities of Extra-territorial Organizations and Bodies. That is, categories L, M, N and Q in NACE Rev.1.1. and categories O, P, Q and U in NACE Rev.2. All remaining service sectors are categorized as 3. 'Mainly private services.' ('Priv' in the figures below).

[14] Some measurement error may exist in our public sector measure. Although education, health and social work are largely provided by the public sector, the private sector also intervenes here to some extent, with its relevance varying across countries (while care activities are more institutionalized in central-north Europe, the private sector is larger in southern Europe) and may affect the comparison of the results.

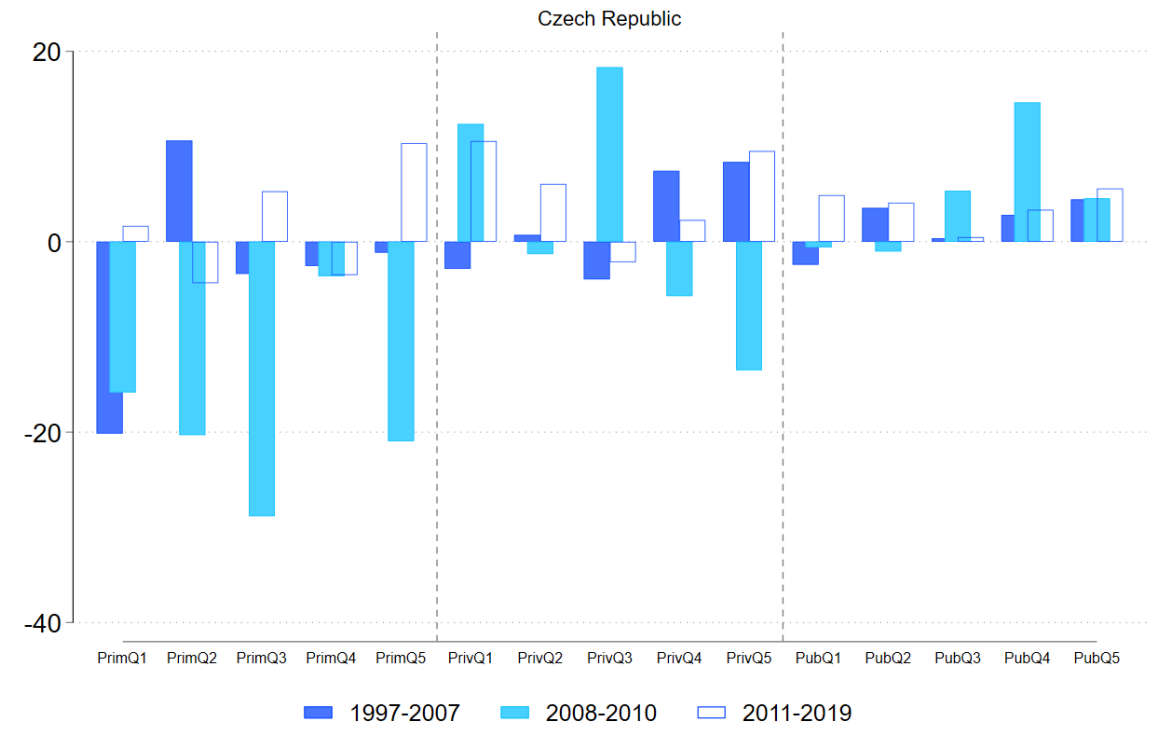
Figure 3. Employment change (annual, in thousands) by quintile and sector, 97-19 (EU)



Source: EU-LFS, SES (authors' elaboration). Note: 'Prim' = Primary, manufacturing and construction; 'Priv' = Private services & 'Pub' = Public Services

The service sector overall has been also driving employment growth during the last decades in the Czech Republic (Fig. 4). Main employment losses were experienced during the financial crisis in the primary sector. While in other countries private services decreased substantially during the financial crisis, in the Czech Republic there was net employment creation also in this sector (concentrated in low-paid and mid-paid jobs). Another important difference in relation to other countries is that the role of private services as a polarising force is not pervasive in the Czech Republic, but only visible for 2011-2019. Finally, while in other countries public services have tended to promote job upgrading, in the Czech Republic employment in public services grew in a polarised way (at least in periods of economic growth).

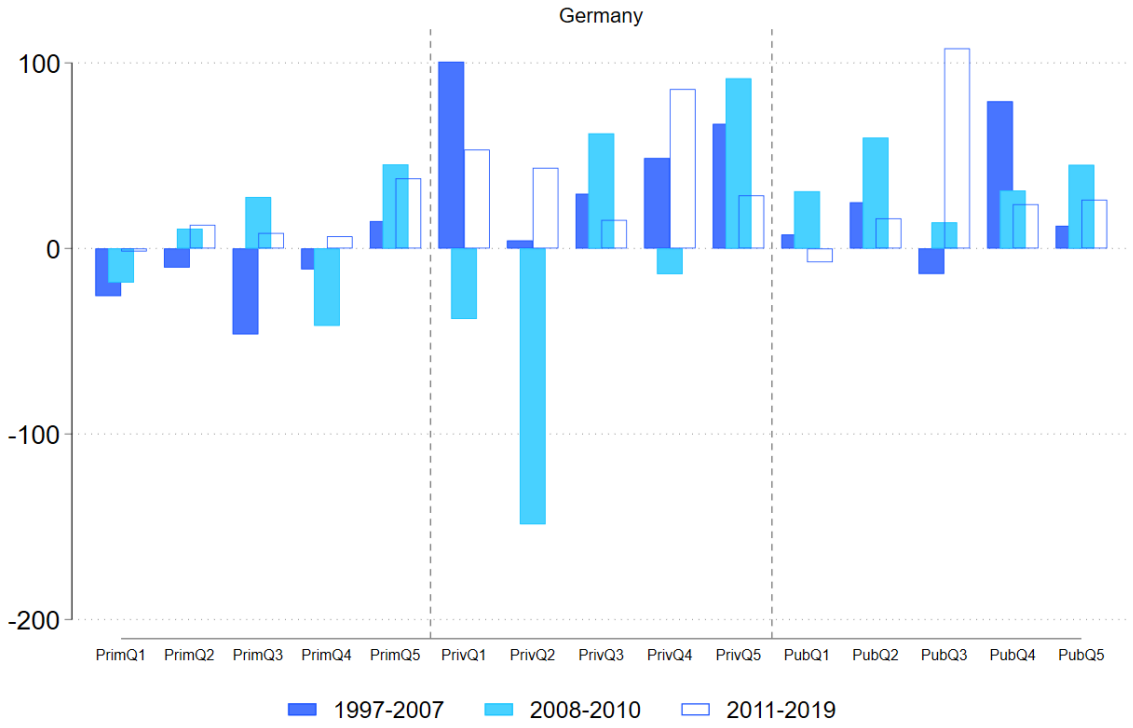
Figure 4. Employment change (annual, in thousands) by quintile and sector, 97-19 (CZ)



Source: EU-LFS, SES (authors' elaboration). Note: 'Prim' = Primary, manufacturing and construction; 'Priv' = Private services & 'Pub' = Public Services

In Germany (Fig. 5), private services grew in a polarised way from 1997 to 2007 and from 2011 to 2019. Low and mid-low paid workers occupied in the private service sector were those hardest hit by the financial crisis. Public services in this country have steadily contributed to generate employment in all sub-periods. It is worth mentioning that most new jobs in the public sector created from 2011 were mid-paid jobs. The primary sector shrank from 1997 to 2007 (except in quintile 5) and then experienced job gains from 2008 to 2019, having the capacity to create many mid and high-paid jobs during that decade.

Figure 5. Employment change (annual, in thousands) by quintile and sector, 97-19 (DE)

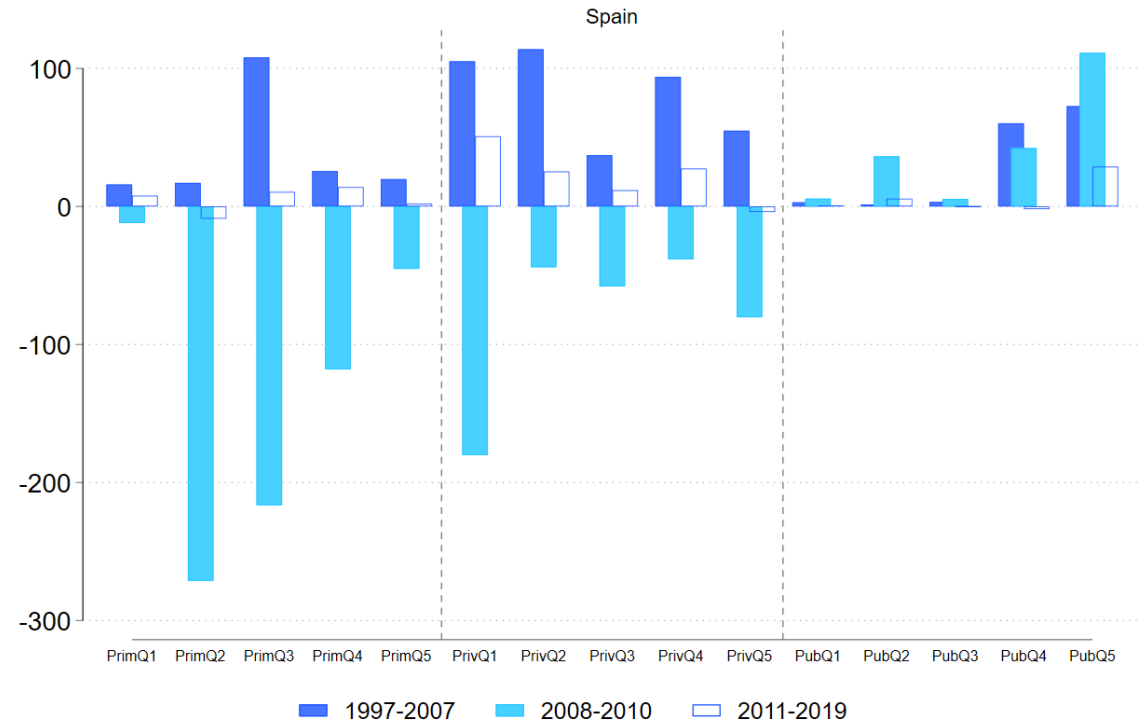


Source: EU-LFS, SES (authors' elaboration). Note: 'Prim' = Primary, manufacturing and construction; 'Priv' = Private services & 'Pub' = Public Services

In Spain (Fig. 6), the private service sector drove employment growth in 1997-2007 and 2011-2019, contributing as in many other countries to generate job polarisation in both periods. This sector shrunk from 2008 to 2010, when many low-paid private service jobs were destroyed. Employment creation in public services has been biased towards best-paid jobs in Spain, although job creation in this sector has been scarce in the latest period analysed. Nevertheless, during the global financial crisis, public employment growth in top quintiles and in quintile 2 compensated the sharp employment declines that occurred in the other sectors. This is because in Spain employment in education, public administration and social security and health and social services continued increasing (while private employment was declining) until 2011 (Montesinos et al. 2014), when the impact of austerity measures started to be visible. From that year, public services also suffered important cuts in their employment levels for some years. That's the reason explaining why public employment growth has only been mild from 2011 to 2019.

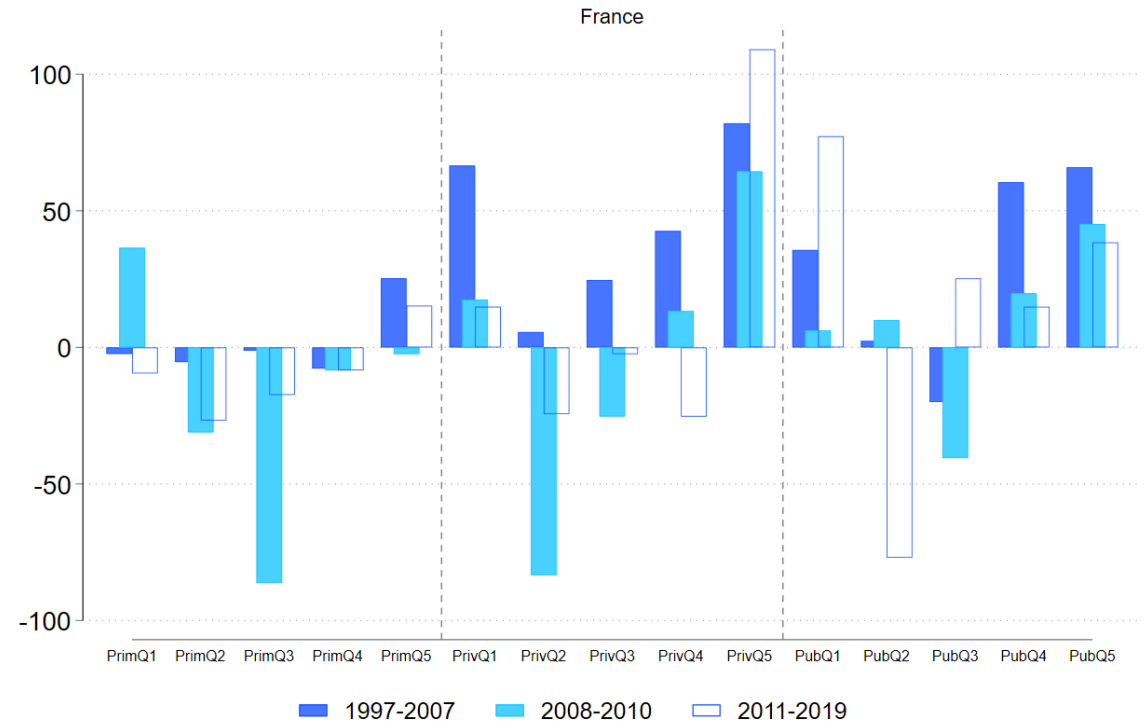
Finally, it is also important to highlight that an important share of all job losses and gains in the primary sector are located in the middle of the wage distribution. This has to do with the key role the construction played in Spain during the expansive phase of the business cycle, but also later during the financial crisis (with construction and other related jobs being hardest hit).

Figure 6. Employment change (annual, in thousands) by quintile and sector, 97-19 (ES)



Source: EU-LFS, SES (authors' elaboration). Note: 'Prim' = Primary, manufacturing and construction; 'Priv' = Private services & 'Pub' = Public Services

Figure 7. Employment change (annual, in thousands) by quintile and sector, 97-19 (FR)

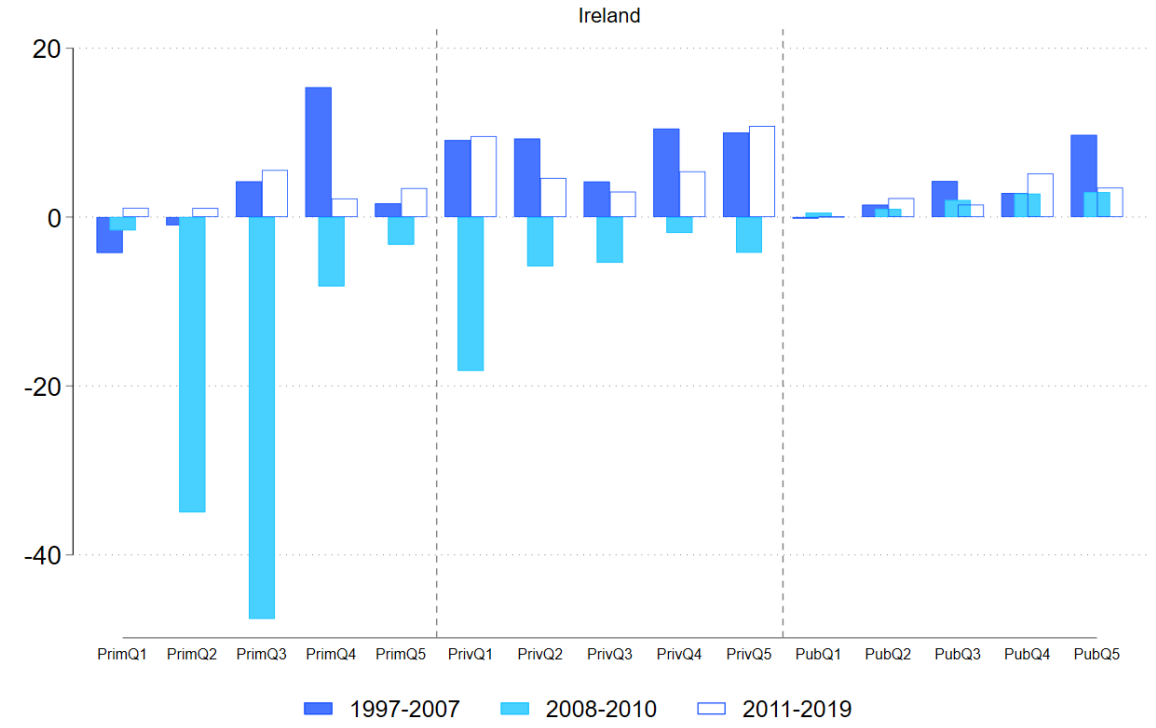


Source: EU-LFS, SES (authors' elaboration). Note: 'Prim' = Primary, manufacturing and construction; 'Priv' = Private services & 'Pub' = Public Services

In France (Fig. 7), the main contrasts with EU trends are four. First, private services have grown in a polarised way in all periods, and not only during the expansive phases of the business cycle, as tended to be the case in most countries. Second, although employment growth in public services has been skewed towards higher quintile jobs, this sector also created significant employment levels in low-paid jobs from 1997 to 2007 and from 2011 to 2019, generating some additional polarising effects. Third, public services have suffered employment losses in different periods (in quintile 2 and 3), while in the EU8 public services have been much more resilient. Fourth, in France the primary sector continued experiencing net employment gains from 1997 to 2007, when it was still capable of generating important quantities of high-quality employment. Then employment in the primary sector was very much reduced from 2008.

Employment dynamics in Ireland (Fig. 8) almost mimic those observed for the EU8, with the main difference being that in Ireland employment in the primary sector continued notably increasing until 2007 (especially in quintile 4).

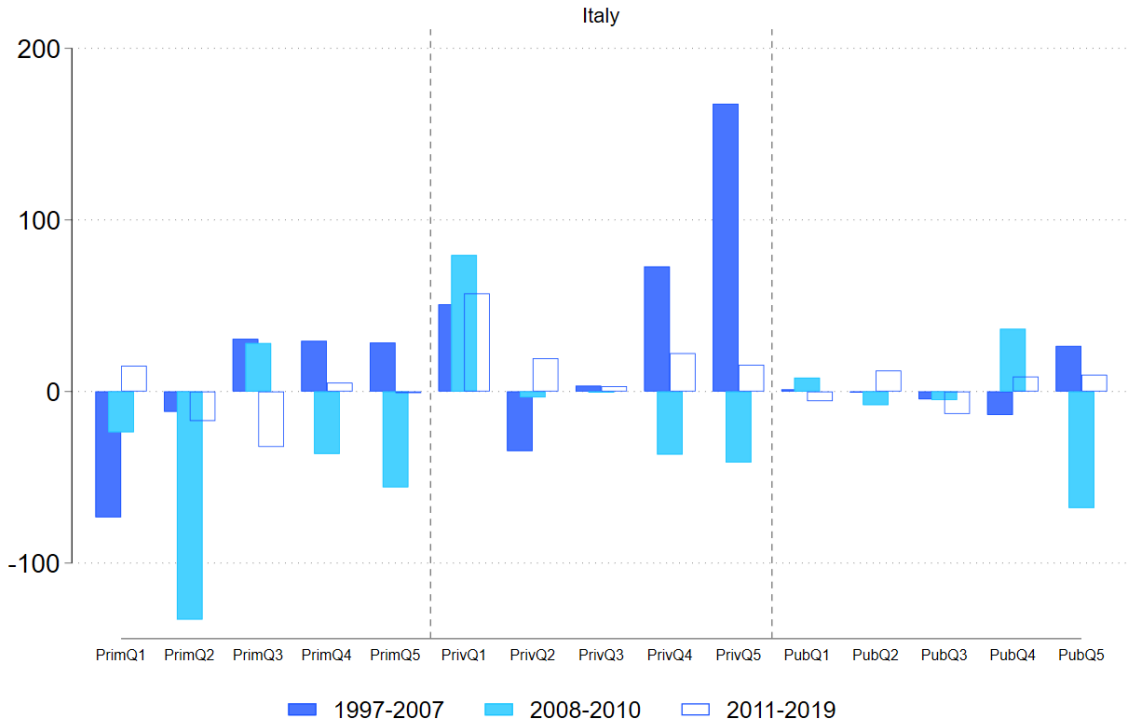
Figure 8. Employment change (annual, in thousands) by quintile and sector, 97-19 (IE)



Source: EU-LFS, SES (authors' elaboration). Note: 'Prim' = Primary, manufacturing and construction; 'Priv' = Private services & 'Pub' = Public Services

Italy is other of the countries in which private services have tended to grown in a polarised way during economic expansions (see Fig. 9). Something remarkable about the labour market of this country is that it was capable of creating many high-paid private service jobs in the period preceding the global financial crisis. After that, from 2008 to 2010, low-paid private service jobs continued increasing, while high-paid jobs in the same sector decreased. By contrast, job creation in public services has been relatively modest in Italy during the latest decades, compared to other countries.

Figure 9. Employment change (annual, in thousands) by quintile and sector, 97-19 (IT)

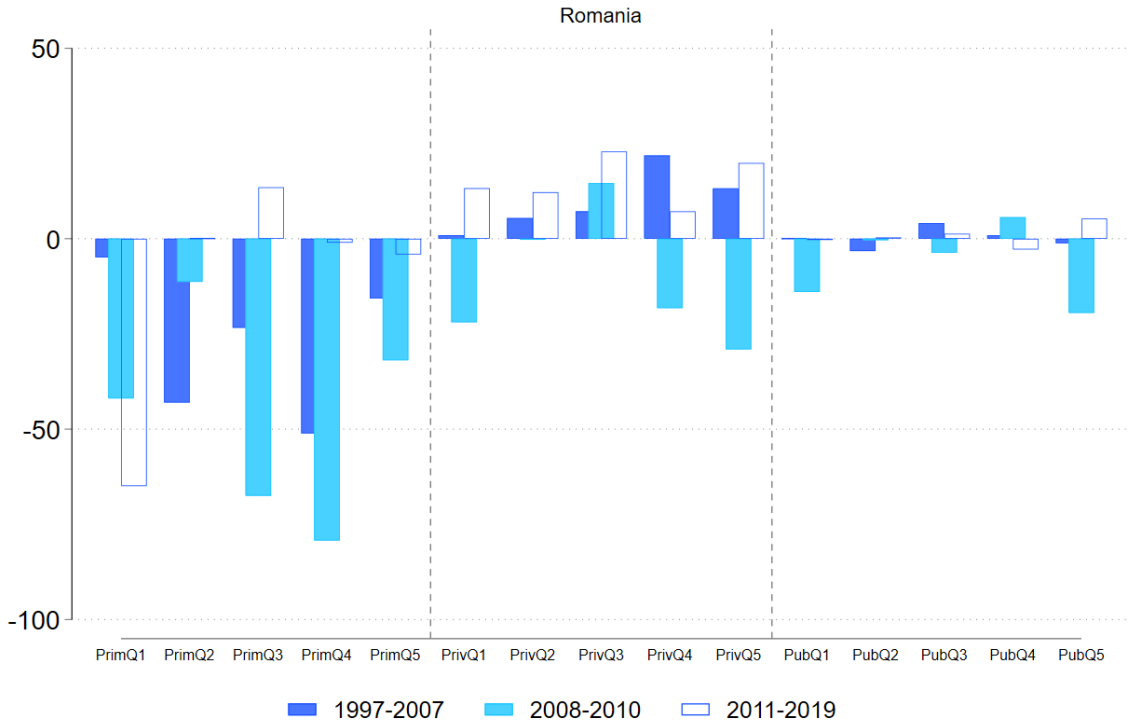


Source: EU-LFS, SES (authors' elaboration). Note: 'Prim' = Primary, manufacturing and construction; 'Priv' = Private services & 'Pub' = Public Services

Romania is the country that has experienced greatest employment losses in the primary sector during the latest decades. This is because the processes of deagrarianization that were largely played out in other western European countries arrived later to this country and were still active in the periods covered. The share of Romanian employment in the agriculture sector declined from 35% in 1997 to less than 20% in 2019 (compared to around 4% in the EU27 in 2019). As figure 10 demonstrates, these jobs were not only low and mid-paid jobs, but were more evenly distributed across the whole wage distribution.

Private services have been driving employment creation in Romania, but this is the only country in which they have not contributed in any sub-period to promote job polarisation. Instead, employment creation in this sector has been more salient in intermediate quintiles. Public services have contributed very little to promote employment growth in Romania during the latest decades.

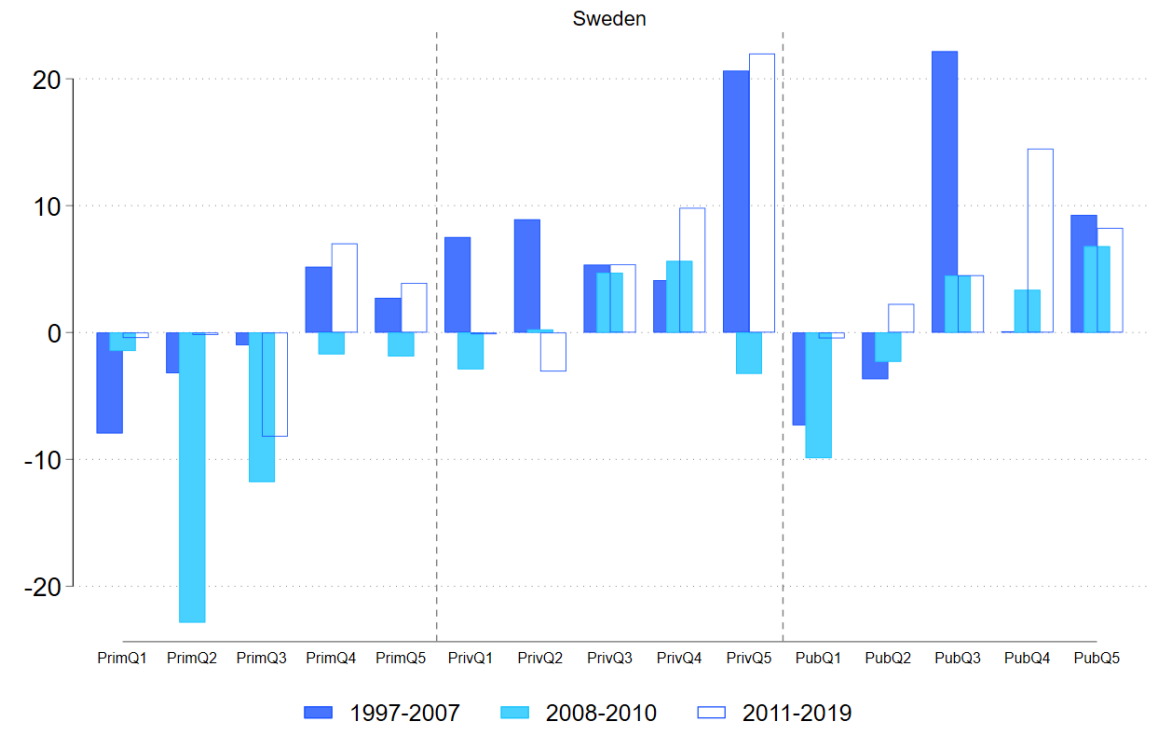
Figure 10. Employment change (annual, in thousands) by quintile and sector, 97-19 (RO)



Source: EU-LFS, SES (authors' elaboration). Note: 'Prim' = Primary, manufacturing and construction; 'Priv' = Private services & 'Pub' = Public Services

In Sweden (Fig. 11), private services grew in a polarised way from 1997 to 2007 and promoted job upgrading from 2011 onwards, when employment growth in the sector was clearly biased towards high-quality jobs. Another difference in relation to the EU average is that many of the newly created public service jobs were located in the middle of the employment distribution, and not only in the top (especially during the first sub-period). Only those public service sector jobs that were low-paid decreased until 2010, while mid and high-paid jobs of public services never stopped increasing. The primary sector has been able to create some high-quality jobs in the last decades in Sweden.

Figure 11. Employment change (annual, in thousands) by quintile and sector, 97-19 (SE)



Source: EU-LFS, SES (authors' elaboration). Note: 'Prim' = Primary, manufacturing and construction; 'Priv' = Private services & 'Pub' = Public Services

In summary, private services have been driving employment creation in most EU8 countries, followed by employment increase in public services. The main difference between both types of services is that private service jobs have tended to be created in both ends of the employment distribution (this having a polarising effect), while public services tend to be better paid and thus are more likely to promote job upgrading. Regarding the primary (goods producing) sector, the size of these jobs has been reduced in most countries, with primary sector jobs declining mainly in mid and low-paid jobs.

4.1.4 1997-2019: employment shifts by type of contract

Economic growth from 1997 to 2007 in Europe was accompanied by an increase in the share of temporary employment in all types of jobs. The increase of that share during those years was more intense in Sweden, Italy, France and Germany. Spain, Romania and Ireland are the only countries of our sample in which the share of temporary employment declined. Spain is a very special case because at the beginning of the period the share of temporary employment (33.6% of the total number of employees) more than doubled the EU average rate, according to Eurostat data. For this reason, although its reduction was intense in this first period, the share of temporary employment in 2007 (and in following years) continued being much higher than in other EU countries.

Table 1. Change in the temporary rate[15] by quintile, from 1997 to 2019 (in pp)

a) 1997-2007	Q1	Q2	Q3	Q4	Q5	Total
CZ	1.5	2.0	0.7	0.4	0.3	1.0
DE	4.5	3.4	3.5	2.2	-0.5	2.6
ES	-7.0	-9.7	-3.9	2.8	3.3	-2.9
EU	3.7	2.9	4.3	3.2	1.2	3.1
FR	3.9	3.6	3.3	2.6	0.4	2.8
IE	-1.7	0.4	-1.7	-0.6	-0.3	-0.8
IT	7.2	7.1	5.2	2.5	5.4	5.5
RO	-8.4	-3.0	-1.6	-1.8	-0.4	-3.0
SE	8.6	10.0	6.1	3.0	2.1	6.0

b) 2008-2010	Q1	Q2	Q3	Q4	Q5	Total
CZ	1.3	1.9	1.4	0.5	-0.6	0.9
DE	2.2	0.9	-0.8	-1.9	-0.4	0.0
ES	-2.9	-6.6	-4.6	-3.5	-2.5	-4.0
EU	0.2	-1.2	-1.0	-0.6	-0.7	-0.6
FR	0.4	-0.3	0.1	1.0	0.2	0.3
IE	2.0	1.1	2.4	-0.2	0.3	1.1
IT	0.2	-0.5	-1.2	-0.5	-1.3	-0.7
RO	-0.2	2.0	-0.2	-0.2	-0.4	0.2
SE	0.1	1.5	0.9	0.5	-0.5	0.5

c) 2011-2019	Q1	Q2	Q3	Q4	Q5	Total
CZ	0.4	-0.1	-0.4	-0.3	0.3	0.0
DE	-3.5	-1.9	-2.9	-0.9	-2.7	-2.4
ES	1.5	0.0	0.5	0.7	2.7	1.1
EU	0.5	0.2	0.4	0.8	-0.9	0.2
FR	0.9	2.4	4.3	0.4	0.6	1.7
IE	1.1	-0.4	-1.3	0.2	-1.3	-0.3
IT	4.0	6.1	3.7	1.3	2.3	3.5
RO	0.3	-0.2	-0.2	-0.4	-0.2	-0.1
SE	5.0	-0.6	0.0	-0.8	-1.2	0.5

Source: EU-LFS, SES (author's elaboration)

Table 1 also indicates that increases in the share of temporary employment were more pronounced in low-paid jobs (especially in Italy and Sweden), while reductions in the share of temporary employment in Spain and Romania were more pronounced in the bottom of the employment structure.

As a general lesson, we observe that the economic boom that started in the mid-nineties in the EU was supported by an expansion of fixed-term contracts. Even in countries such as Spain, where the share of temporary employment decreased, thousands of new jobs were formalized through fixed-term contracts in this period, as can be seen in figure 16 (Annex). However, in general most employment creation was formalised through permanent jobs (except in Romania).

The financial crisis impacted disproportionately on workers with fixed-term contracts in Spain and to a lesser extent in Italy. In economic downturns the categories most immediately vulnerable to job loss are those on temporary contracts. Non-renewal of such contracts is a path of least resistance for employers confronted with declines in demand and/ or the need to reduce headcount. For this reason, the share of temporary employment was very much reduced (in Spain and Italy) in a short period of time, as table 1 shows. In the rest of the countries of our sample the opposite happened, and the share of temporary employment continued increasing (especially in low and mid-paid jobs). This is the result

[15] Temporary employees as percentage of the total number of (salaried) employees.

of the opposite trend, with the financial crisis affecting more to stable workers, as it happened in Ireland, France, the Czech Republic, Romania and Sweden (see fig. 16 in the Annex).

Finally, from 2011 to 2019 most countries (but Germany, Ireland and Romania) continued experiencing an increase in the share of temporary employment. In Germany, Ireland and Romania there were no increases of temporary employment, but employment only grew in permanent jobs (see figure 16 in the Annex). Where the share of temporary employment continued increasing, this increase tended to be more pronounced in low and mid-paid jobs than in high-paid jobs.

4.1.5 1997-2019: employment shifts by working time arrangement

The share of part-time employment has increased in most European countries during the last decades. These increases were more pronounced from the mid-nineties until the financial crisis, and in countries such as Germany, Italy, Ireland and Spain. In general, these increases in the share of part-time employment have tended to be more pronounced in low and mid-low-quality jobs. During the first sub-period, the share of part-timers declined only in Romania and the Czech Republic.

Table 2. Change in the part-time rate[16] by quintile, 1997-2019 (in pp)

a) 1997-2007	Q1	Q2	Q3	Q4	Q5	Total
CZ	-3.0	-1.7	-0.5	0.1	0.6	-0.9
DE	13.1	6.7	6.5	8.2	6.1	8.1
ES	6.3	6.6	1.7	4.1	0.9	3.9
EU	5.8	5.0	2.5	4.5	3.0	4.2
FR	0.9	-1.1	-0.3	1.0	1.5	0.4
IE	12.9	10.0	6.6	2.0	4.9	7.3
IT	8.1	11.5	6.3	7.5	3.2	7.3
RO	1.7	-16.3	-1.2	-0.2	-1.0	-3.4
SE	-2.0	3.1	3.2	-1.6	3.7	1.3

b) 2008-2010	Q1	Q2	Q3	Q4	Q5	Total
CZ	1.0	0.5	1.1	1.2	1.2	0.8
DE	1.4	0.2	-0.1	1.3	0.1	0.3
ES	0.9	3.3	1.5	0.8	0.4	1.2
EU	1.7	1.3	0.7	0.8	0.3	0.8
FR	-0.4	1.1	1.0	0.7	0.5	0.5
IE	6.6	4.6	7.2	1.2	0.9	3.9
IT	2.1	0.4	-0.1	-0.1	-0.1	0.5
RO	4.7	-0.1	0.2	0.1	-0.5	0.9
SE	-0.1	1.7	1.0	0.7	-0.5	0.4

c) 2011-2019	Q1	Q2	Q3	Q4	Q5	Total
CZ	3.6	1.6	0.9	1.0	1.5	1.7
DE	1.2	1.3	4.0	2.6	1.0	2.0
ES	-1.2	-0.1	0.8	0.2	2.1	0.4
EU	0.8	1.2	2.1	2.4	0.3	1.4
FR	0.0	-1.0	1.3	0.7	0.3	0.3
IE	0.6	-5.9	-4.8	-2.3	-1.8	-2.8
IT	4.7	6.2	2.6	1.2	1.8	3.3
RO	-11.9	1.2	-1.8	-0.5	-0.4	-2.7
SE	-2.6	0.1	1.0	-2.2	-2.0	-1.1

Source: EU-LFS, SES (author's elaboration)

[16] Part-time employment as percentage of total employment.

During the financial crisis the share of part-time employment increased in all countries. This is, as figure 17 (Annex) indicates, because although at a slow pace in most cases, part-time employment continued increasing while job losses were concentrated amongst those in full-time employment.

From 2011 to 2019, the share of part-time employment continued increasing in all countries but Ireland and Sweden (where it had increased in previous years) and Romania. These recent increases were again more prominent in low and mid-low paid jobs in the cases of Italy and the Czech Republic, while in the rest of the countries the increase in the share of part-time employment was more evenly distributed than in the first period analysed.

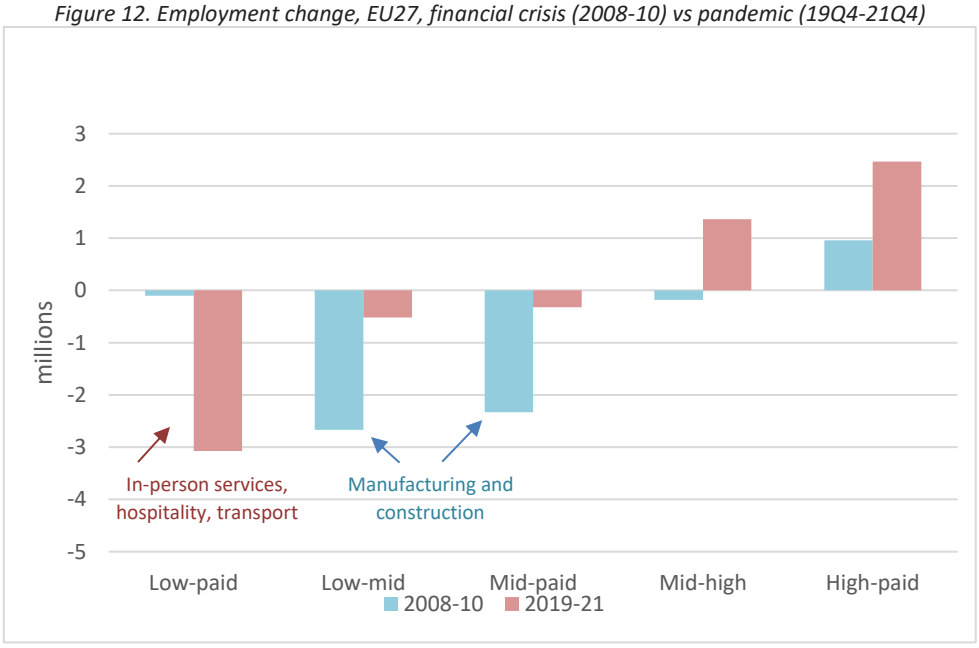
4.2 Employment shifts during COVID-19 (2019-2021)

This section applies the same approach to analyse employment shifts across the job-wage distribution during the first two years of the COVID-19 crisis (from 2019Q4 to 2021Q4). However, due data access limitations, in this case the analysis is performed at the EU27 level.

In earlier analysis (Weber et al., 2021; Fana et al. 2020a; Fana et al. 2020b) a comparison of the initial impacts of COVID-19 (up to 2020Q2) with those of the global financial crisis a decade earlier showed that headcount loss was concentrated in the lowest job-wage quintile and especially amongst low-paid female workers. By contrast, the global financial crisis (2008-10) induced sharpest losses in the middle of the job-wage distribution with much more severe impacts on male employment. As already indicated, these differences relate to the specific sectors most impacted during either crisis (construction and manufacturing in the aftermath of the financial crisis; accommodation, transport, food/beverages etc. during the pandemic). The former has a high share of male employment while employment in the latter is either mixed by gender or predominantly female.

Extending the data series to the final quarter of 2021 does not alter this overall assessment. Indeed, in some ways it sharpens the comparison (see Fig. 12). The main employment shifts took place at the margins of the wage distribution during the pandemic (with low-paid workers being hardest hit by the COVID crisis, while those at the top of the wage distribution have seen their numbers increasing), in contrast to the financial crisis where they took place more in the middle.

Figure 12. Employment change, EU27, financial crisis (2008-10) vs pandemic (19Q4-21Q4)



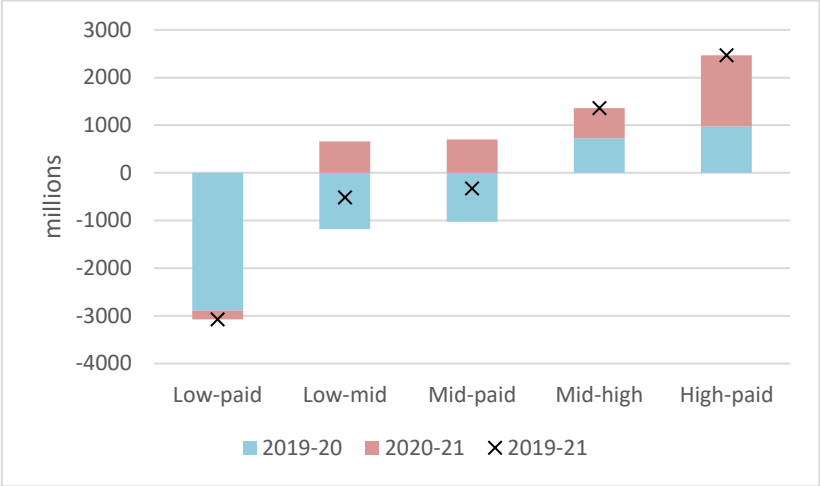
Source: EU-LFS, SES (author's elaboration)

A second contrast with the global financial crisis has been the very rapid recovery in employment following the initial sharp decline. Employment levels in the EU took eight years to recover following

the global financial crisis but had largely made good the pandemic shortfall in two years. At the peak of the pandemic in 2020Q2 (in terms of employment impacts) there were six million fewer people at work compared to 2019Q4. Employment growth however resumed with the abatement of the first wave of COVID in summer 2020 and by the end of the year (2020Q4), net employment losses year-on-year had reduced to 3.4 million. This improvement strengthened during 2021 so that by the end of 2021 net employment losses were less than 0.3m (around 0.15% of total employment) over the two-year period, i.e., nearly fully recovered.

Figure 13 decomposes the net employment shifts from 2019Q4-2021Q4 into its separate yearly components (2019Q4-2020Q4, broadly the peak COVID period and partial recovery thereafter) and (2020Q4-2021Q4, the recovery proper).

Figure 13. Employment change, EU27, 2019Q4-2021Q4, by year



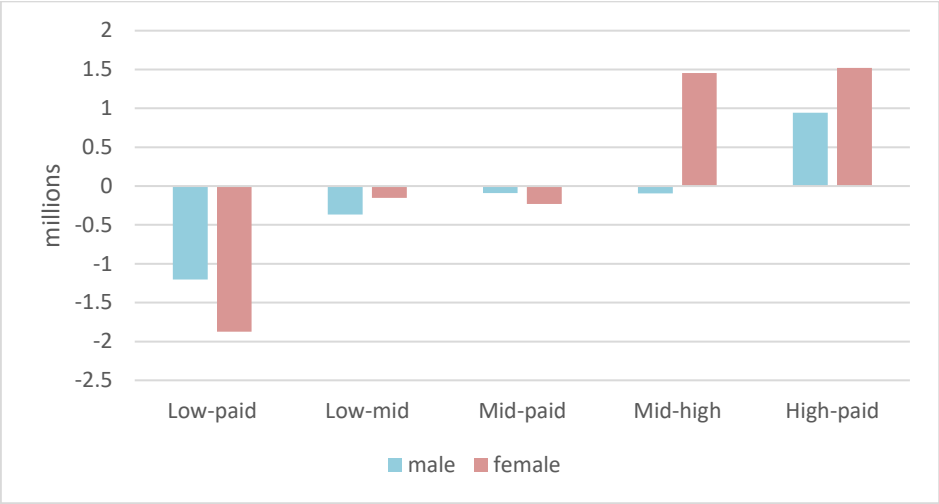
Source: EU-LFS, SES (author's elaboration)

Net employment losses during the first year of the crisis were sharpest in bottom quintile jobs and occurred only in the bottom three quintiles. Employment grew in the top two quintiles again with a skew to the best-paid, top quintile jobs.

During the second year, 2020Q4-2021Q4, there was a more broadly distributed recovery with employment in jobs in the top four quintiles (accounting for the top 80% of employment by pay) each experiencing growth. Again, employment growth was especially strong in the top quintile with nearly 1.5m net new jobs created in 2021 following the 1 million already added in the first year of the crisis. In contrast to the relative buoyancy of well-paid employment, there was no recovery in low-paid employment. Net employment declines in the bottom quintile persisted during 2021, bringing overall job losses in this category to over 3 million jobs during the two-year period 2019q4-2021q4. It was here that employment losses were sharpest at the outset of the pandemic but also where they failed to recover thereafter.

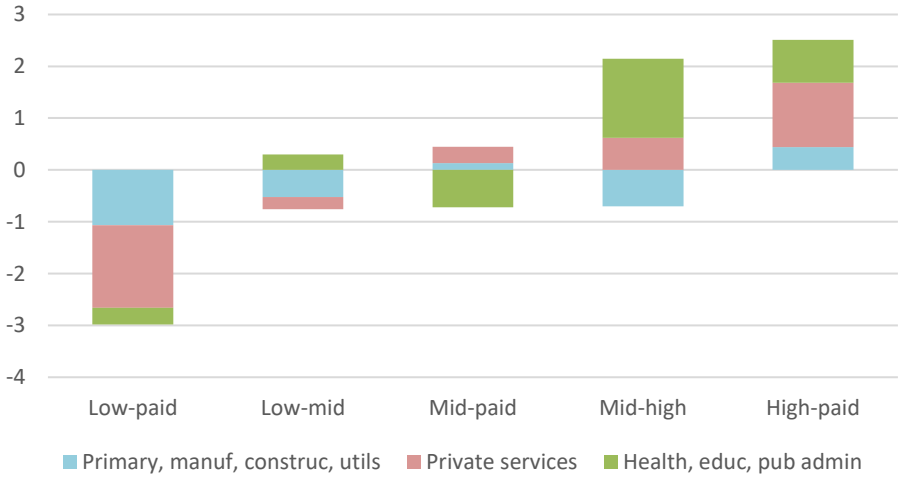
Females accounted for a somewhat smaller share of job loss in the initial phase of the pandemic (2019Q4- 2020Q4, -1.5 million versus -1.9 million) and the employment recovery has been stronger amongst women in 2020Q4-2021Q4 (+2.2 million versus +1 million for men). At the end of 2021, there were over 600,000 more women in employment in the EU than pre-crisis but nearly a million fewer men. In terms of aggregate job quality, both male and female employment has been sharply 'upgrading', as figure 14 indicates. Employment losses in low paid jobs have been compensated by gains in well-paid jobs. The difference has been in the sharpness of the contrast in these two developments with women in particular dominating employment growth in the top two quintiles but also enduring a larger share of the losses in low-paid jobs.

Figure 14. Employment change, EU27, 2019Q4-2021Q4, by gender



Source: EU-LFS, SES (author's elaboration)

Figure 15. Employment change, by broad sector, EU27, 2019Q4-2021Q4



Source: EU-LFS, SES (author's elaboration)

In each decade since the 1990s, aggregate employment growth in the EU during both recessions and periods of expansion alike has been relatively strongest in well-paid jobs (Hurley et al., 2019). This structural growth in well-paid employment may have weakened in absolute terms during the crisis (due to curtailed economic activity more generally) but appears to have strengthened in relative terms when compared to the rest of the employment structure.

Service sectors account for nearly all of this net employment growth at the top, as Fig. 15 indicates. Private service sectors (all services except health, education and public administration) were responsible for most new top quintile jobs, while predominantly state paid service sectors (health, education and public administration) were responsible for most growth in the fourth quintile. But services, in particular in the private sector, were also the locus of job loss at the bottom of the wage distribution. The initial assessment of the pandemic as a 'tale of two service sectors' (Hurley, 2021) continued to be relevant until the end of 2021. Employment recovered fast in 2021 in well paid services but stagnated in low-paid services.

The contributions of the other non-service sectors were in aggregate negative (c.-1.4 million jobs) with main declines recorded in low-paid jobs. Construction and manufacturing contributed only modestly to these declines (around half a million jobs combined); the main locus of job loss was instead in agriculture (nearly one million jobs lost) continuing its long secular decline in employment share.

Table 3. Top three jobs with biggest employment gains and losses, EU27, 2019Q4-2021Q4

Occupation	Sector	Wage quintile	Employment change (,000s)
Job gains			2019q4-2021q4
ICT professionals	J-Information and communication	5	407
Teaching professionals / legal etc assoc professionals *	P-Education	5	379
Protective services workers	O-Public administration and defence; compulsory s	4	257
Job losses			
Sales workers	G-Wholesale and retail trade; repair of motor vehi	2	-848
Personal service workers / sales workers *	I-Accommodation and food service activities	1	-649
Market-oriented skilled agricultural workers	A-Agriculture, forestry and fishing	2	-514

Note: omits occupations with clear jumps in employment due to reclassification. * are combinations of two occupational categories. Source: EU-LFS (author's elaboration), EU-SES for wage quintiles.

The single job affected most by the pandemic has been that of retail salespersons (the largest employing job in the EU27 accounting for more than one in 20 workers). Around two in three job losses were amongst female workers in this predominantly female job. The combined category of personal service workers/ sales workers in the accommodation/food services worker shed 649,000 jobs. This is a low-paid, bottom quintile job typically with limited entry requirements in terms of qualifications. Given high levels of social contact in both the above jobs, activity was severely curtailed for jobholders during the pandemic, and this was likely an important factor in the observed job losses.

By contrast the jobs experiencing greatest employment gains were nearer the top of the job-wage distribution (in quintiles four and five). Demand for ICT professionals in information/ communication was presumably boosted by accelerated digitalisation of work processes as organisations moved work online. This was the fastest growing category, adding just over 400,000 new jobs.

In summary, employment losses over the pandemic have been very concentrated in jobs in the bottom wage quintile. And the mid and mid-low wage quintiles, where most of the impact was felt during 2008-10, remained relatively unaffected in terms of net employment shift.

The resilience of employment in well-paid jobs has been a structural feature of the EU labour market over the last two decades (Hurley et al., 2019). In periods of growth as well as recession, employment growth has been relatively greatest in well-paid jobs. This has been again observed during the pandemic. As employment recovered during 2021, most of this recovery has occurred in jobs in quintile four and five. Employment levels then were nearly restored to pre-pandemic levels by 2021Q4 but the distribution of that employment across the job-wage spectrum had transformed markedly with a strong upgrading bent.

Another prior trend that resumed during the 2021 recovery was that of stronger employment growth for women than for men and with a more pronounced female skew towards higher-paid jobs (Hurley et al., 2019). Speculations at the outset that the pandemic would be a 'she-cession' in contrast to the 'man-cession' of the global financial crisis have proven wide of the mark (Social Europe, 2022; Financial Times, 2020). There are more women in employment in the EU27 post-crisis than pre-crisis, which is not the case for men. That said, women also have accounted for the majority of job losses in low-paid jobs.

The non-recovery of employment in low-paid jobs during 2021 is the one obvious novel development noted in this analysis. It connects with more anecdotal narratives such as that of the 'great resignation' - the hypothesis that workers who lost low paid, irregular hours services jobs (or were furloughed) have decided not to return to those jobs after lockdowns eased. This could have occurred because of disenchantment with the job quality of such jobs. Alternatively, tight labour markets may have offered alternative possibilities in better quality jobs. Many of these low-paid services jobs are ones where

employers are increasingly struggling to fill vacancies. Whether or not these mismatches persist or are just lags in adjustment involving those sectors most disrupted by the crisis (accommodation, food / beverages, etc.) will become more evident during 2022-2023.

5 Conclusions

This paper uses the "jobs approach" to analyse recent employment shifts in a sample of eight EU countries. This approach has been applied in developed economies for over two decades (starting with the USA and followed by the EU) and is increasingly applied in other developed and developing countries. It has provided the main empirical support to the debate over whether and to what extent employment is polarising or upgrading in developed economies, providing evidence on whether employment growth is relatively stronger in well-paid, mid-paid or low-paid jobs.

The main answer to this simple question for the EU as a whole[17] during 1997-2021 is that employment has grown relatively fastest in well-paid jobs. This was the case during the employment expansions preceding both of the main economic crises of the period, the global financial crisis and the sharp downturn at the outset of the COVID-19 outbreak in 2020. It was also the case during the crises themselves. Sharp declines in overall employment occurred but these were concentrated in mid-paying jobs (2008-10) or in low-paying jobs (2019-2021). Well-paid, top quintile jobs alone continued to experience employment growth.

In terms of patterns of employment growth, this has resulted in a mainly upgrading pattern for the EU over the whole period, though with some evidence of polarisation as employment has tended to be relatively stronger in low-paid rather than mid-paid jobs in the bottom half of the job wage distribution in a specific period. This was the case during the 2008-10 interval which was clearly polarising, arising from the strong concentration of job losses in mid-paid (mainly male) jobs in construction and manufacturing. While this is in line with the findings for the USA that employment polarisation tends to concentrate in periods of recession (Jaimovich and Siu, 2012), it is worth noting that the COVID downturn and associated job loss in the EU was not polarising: employment declined more or less monotonically across the job quality spectrum, with well-paid jobs least affected and low-paid jobs most affected. This was a consequence of the disproportionate impact of the pandemic on employment in social and personal service sectors such as retail, accommodation, travel/ transport and food/ beverages.

A second important finding is that at the country level and in the different periods, a variety of employment shift patterns is observed. Of these, upgrading and polarisation may be the most readily observed, often with some shading of the two, but there are also episodes of downgrading (e.g., Italy from 2008 to 2019 and Spain from 2011 to 2019) and growth-in-the-middle (Spain and Ireland from 1997 to 2007, and Germany and Romania from 2011 to 2019), as well as other less easy-to-identify patterns.

This variety should come as no surprise given the institutional diversity and different levels of development of the national labour markets covered (from a highly developed industrial export-oriented economy such as Germany to Romania, where the main structural employment shift continues to be the shift away from work on the land). Patterns of employment shift also reflect differences in how countries navigated the challenges of a global recession, for example, with Spain and Ireland particularly hard hit by collapsing property bubbles during 2008-10, a fate largely avoided by Germany. To these specificities, we can add many of the broader variables influencing employment

[17] The sample includes the more populous member states accounting for over two thirds of the EU workforce. The aggregated charts for the EU8 are therefore reasonably representative of developments across the EU as a whole, as reflected in the similar patterns of change observed in similar analysis using data from all EU member states (Hurley et al. 2019).

shifts described earlier (migration/ mobility, labour market policy and collective bargaining structures, skills supply, etc) which also vary widely across EU member states.

A third important finding relates to the closing gender employment gap. Two thirds of net new employment in the EU since the late 1990s has been female (Hurley et al., 2021). The gap in employment rates of adult men and women was just over 10 ppts in 2021 compared to 16 ppts twenty years earlier. So quantitatively, in terms of headcount, gender gaps are closing. But qualitative gaps are also closing. Women have accounted for a greater share of top quintile employment growth in the EU and employment shifts for women have been more obviously upgrading while those for men have been more polarising, especially during and after the global financial crisis. This is partly a consequence of the growth of professional employment in predominantly female employing jobs, especially in the state-supported sectors of education and health, but also of the concomitant decline in traditionally male-employing sectors such as agriculture, manufacturing and construction.

There are however important methodological and substantive caveats to this positive characterization of female progress in European labour markets. In the first instance, the jobs approach emphasizes marginal change, i.e., shifts in employment, but this focus abstracts from the starting distributions which have notable gender skews. Women in particular are (very) over-represented compared to men in the low-paid, bottom quintile jobs, and under-represented in all of the four higher quintiles. The observed progress in closing the gender employment gap has only made a mild dent in these structural gender imbalances in the two decades plus period covered in this analysis. In the second instance, the jobs approach relies on ranking jobs by average or median hourly wage but is blind (in our application at least) to the gender pay gaps at job level which tend to be much greater in top quintile jobs (Hurley et al., 2021). In other words, the employment growth for women has occurred in jobs where they are likely to be at a larger disadvantage compared to men.

Finally, it is important to note that the rate of employment growth has tended to decrease over the last two decades, as evident when looking at the charts by period in this article. This arises mainly because of broader demographic shifts, the ageing and retirement of the 'boomer' generation and the resulting contraction of the working age population in the EU after 2010 (exacerbated in a country such as Romania by large net emigration). This justifies the emphasis of EU labour market policy over the last generation on increasing the share of adults in employment, in part to compensate for these emerging demographic deficits.[18] Population growth has been an indispensable component of overall economic growth in the EU in recent generations. But what was a tailwind has now become a headwind. Employment growth henceforward in the EU (whether polarising or upgrading) will be harder won.

[18] One strategic EU target is to achieve a 78% employment rate amongst 20–64-year-olds by 2030, some 6 ppts higher than in 2021.

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List of abbreviations and definitions

CZ	Czech Republic
DE	Germany
ES	Spain
EU	EU-8
FR	France
IE	Ireland
IT	Italy
RO	Romania
SE	Sweden

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Appendices

A.1. Distribution of employment by quintile and selected variables

Table 4. Distribution of employment by quintile and selected variables, EU-8, 1997

	Males	Females	Primary sector	Public Serv	Private Serv	Temporary	Permanent	Full-Time	Part-Time
Q1	48.6	51.4	58.7	5.7	35.6	19.7	80.3	75.8	24.2
Q2	57.4	42.6	39.1	6.6	54.3	14.2	85.8	85.4	14.6
Q3	69.9	30.1	60.8	16.1	23.1	12.7	87.3	90.5	9.5
Q4	54.2	45.8	23.8	38.2	38.1	9.2	90.8	88.4	11.6
Q5	62.1	37.9	17.9	44.1	38.0	11.2	88.8	91.0	9.0
Total	58.4	41.6	40.1	22.1	37.8	13.0	87.0	86.2	13.8

Source: EU-LFS, SES (authors' elaboration)

Table 5. Distribution of employment by quintile and selected variables, EU-8, 2008

	Males	Females	Primary sector	Public Serv	Private Serv	Temporary	Permanent	Full-Time	Part-Time
Q1	36.9	63.1	18.9	8.5	72.6	21.5	78.5	64.1	35.9
Q2	66.1	33.9	51.2	20.4	28.4	20.5	79.5	84.7	15.3
Q3	60.6	39.4	55.5	9.8	34.7	13.3	86.7	86.7	13.3
Q4	52.1	47.9	14.8	35.5	49.7	12.7	87.3	84.9	15.1
Q5	62.7	37.3	22.9	40.9	36.2	10.7	89.3	90.2	9.8
Total	55.7	44.3	32.6	23.0	44.4	15.7	84.3	82.1	17.9

Source: EU-LFS, SES (authors' elaboration)

Table 6. Table 6. Distribution of employment by quintile and selected variables, EU-8, 2011

	Males	Females	Primary sector	Public Serv	Private Serv	Temporary	Permanent	Full-Time	Part-Time
Q1	43.8	56.2	31.5	14.2	54.3	23.3	76.7	65.5	34.5
Q2	57.7	42.3	24.6	14.5	60.8	16.6	83.4	80.3	19.7
Q3	59.5	40.5	52.6	20.9	26.5	14.0	86.0	85.7	14.3
Q4	55.9	44.1	25.5	35.6	38.8	11.9	88.1	85.1	14.9
Q5	57.0	43.0	18.1	37.4	44.5	10.9	89.1	87.6	12.4
Total	54.8	45.2	30.5	24.5	45.0	15.2	84.8	80.9	19.1

Source: EU-LFS, SES (authors' elaboration)

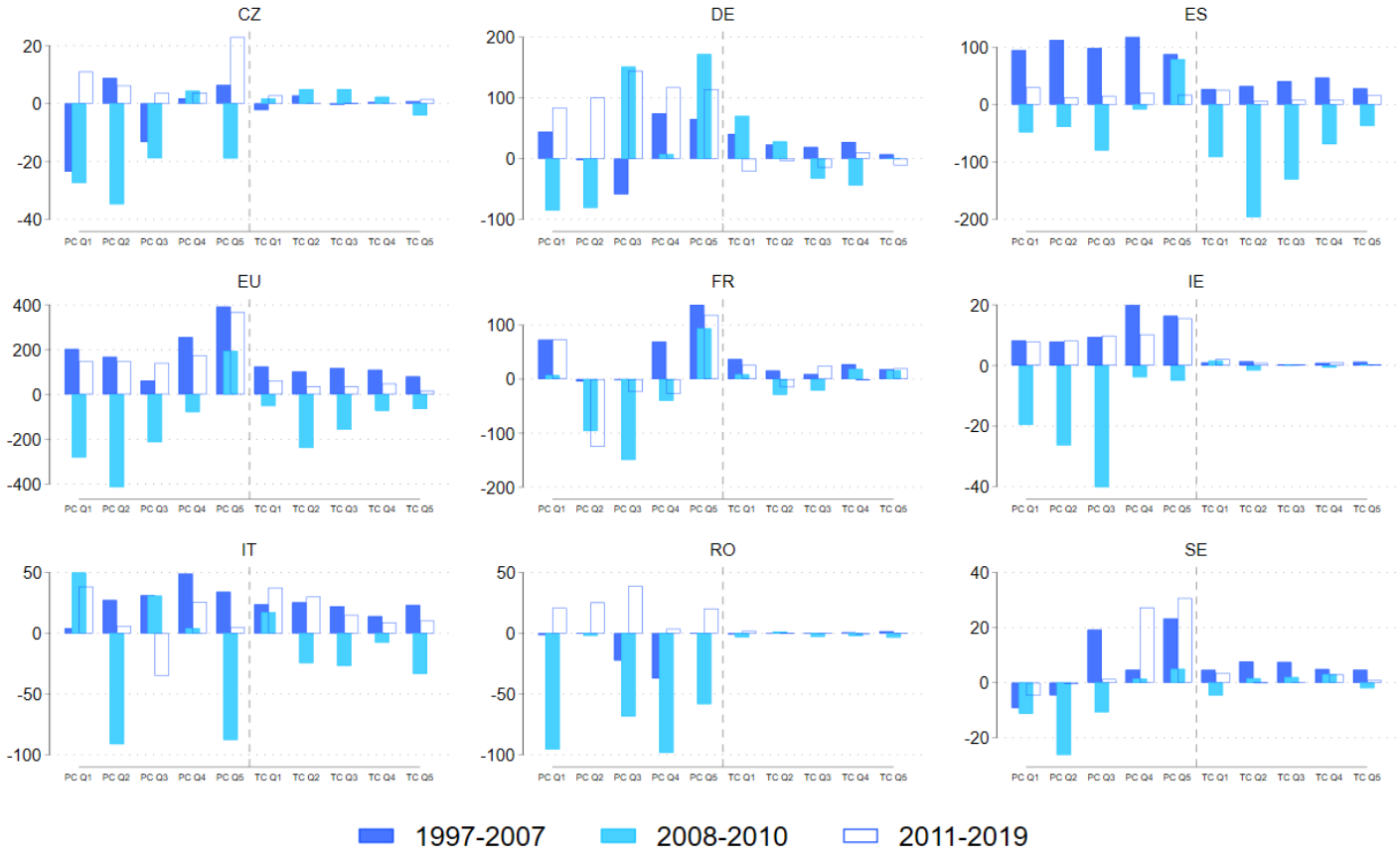
Table 7. Distribution of employment by quintile and selected variables, EU-8, 2019

	Males	Females	Primary sector	Public Serv	Private Serv	Temporary	Permanent	Full-Time	Part-Time
Q1	45.7	54.3	26.3	14.9	58.7	23.8	76.2	64.7	35.3
Q2	58.1	41.9	24.9	13.0	62.0	16.8	83.2	79.1	20.9
Q3	57.6	42.4	49.6	23.4	27.0	14.3	85.7	83.5	16.5
Q4	53.8	46.2	24.8	36.8	38.4	12.6	87.4	82.8	17.2
Q5	55.2	44.8	17.5	36.2	46.4	10.0	90.0	87.4	12.6
Total	54.1	45.9	28.4	25.1	46.4	15.3	84.7	79.7	20.3

Source: EU-LFS, SES (authors' elaboration)

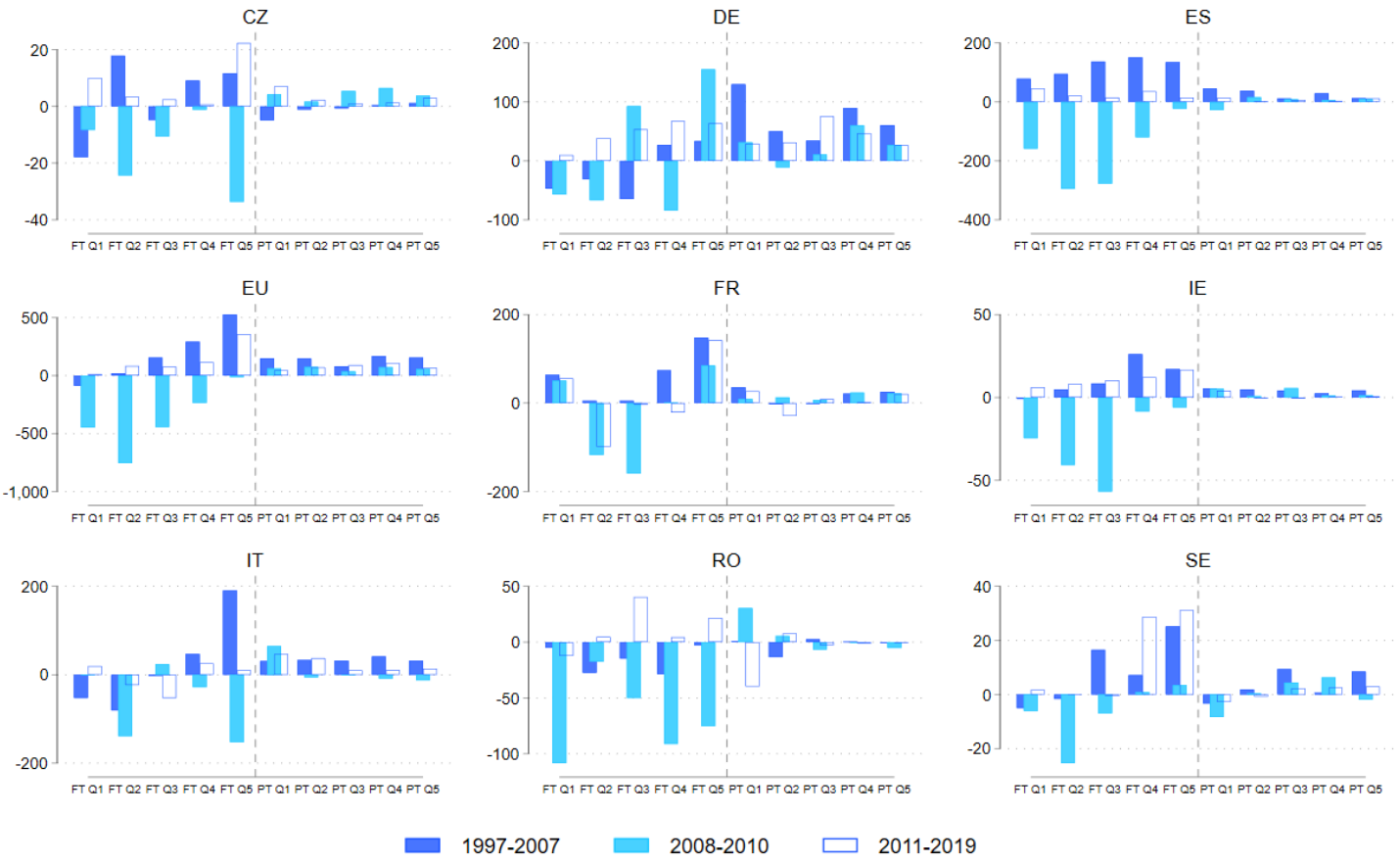
A.2. Employment shifts by type of contract and working time arrangement

Figure 16. Employment change (annual, in thousands) by quintile and contract, 97-19



Source: EU-LFS, SES (authors' elaboration). Note: 'PC' = Permanent contract and 'TC' = Temporary contract

Figure 17. Employment change (annual, in thousands) by quintile and working time, 97-19



Source: EU-LFS, SES (authors' elaboration). Note: 'FT' = Full-Time and 'PT' = Part-Time

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