



# Feminization, ageing and occupational change in Europe in the last 25 years

JRC Working Papers Series on  
Labour, education and Technology  
2023/04

LABOUR

EDUCATION

TECHNOLOGY

This publication is part of a working paper series on Labour, Education and Technology by the Joint Research Centre (JRC). The JRC is the European Commission's science and knowledge service. It aims to provide evidence-based scientific support to the European policymaking process. The contents of this publication do not necessarily reflect the position or opinion of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication. For information on the methodology and quality underlying the data used in this publication for which the source is neither Eurostat nor other Commission services, users should contact the referenced source. The designations employed and the presentation of material on the maps do not imply the expression of any opinion whatsoever on the part of the European Union concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

#### Contact information

Name: Amaia Palencia Esteban

Address: Joint Research Centre, European Commission (Seville, Spain)

Email: Amaia.PALENCIA-ESTEBAN@ec.europa.eu

#### EU Science Hub

<https://joint-research-centre.ec.europa.eu>

JRC132328

Seville: European Commission, 2023

© European Union, 2023



The reuse policy of the European Commission is implemented by the Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39). Except otherwise noted, the reuse of this document is authorised under the Creative Commons Attribution 4.0 International (CC BY 4.0) licence (<https://creativecommons.org/licenses/by/4.0/>). This means that reuse is allowed provided appropriate credit is given and any changes are indicated. For any use or reproduction of photos or other material that is not owned by the EU, permission must be sought directly from the copyright holders.

All content © European Union 2023

**How to cite this report:** Mariscal-de-Gante, A., Palencia-Esteban, A., Grubanov-Boskovic, S., Fernández-Macias, E., *Feminization, ageing and occupational change in Europe in the last 25 years*, JRC Working Papers on Labour, Education and Technology 2023/04, European Commission, Seville, 2023, JRC132328.

# Feminization, ageing and occupational change in Europe in the last 25 years

Álvaro Mariscal-de-Gante (Institute for Advanced Social Studies, Spanish Research Council)

Amaia Palencia-Esteban (Joint Research Centre-European Commission, Seville)

Sara Grubanov-Boskovic (OECD, Istanbul Centre)

Enrique Fernández-Macías (Joint Research Centre-European Commission, Seville)

## Abstract

This paper presents new evidence on the interaction between demographic and occupational change in Europe over the last 25 years. We use data from the European Union Labour Force Survey covering six European countries. The analysis is based on a cross-sectional comparison between the population and employment distributions in 1995 and 2019. This strategy allows us to study the changing demographic dynamics, which have brought a more feminised, aged and educated working population, in a context of structural employment change, where higher job polarisation or occupational upgrading are the main patterns. The results indicate that the increasing female participation has been accompanied by job polarisation, driven especially by the expansion of low-paid jobs among women. Although educational upgrading was particularly relevant for females, a multinomial logistic regression shows that occupational returns to education have declined more for women than men. Finally, despite the fact that the share of young (old) workers has decreased (increased), the occupational profile has changed similarly for both groups and the gender-based differences remain regardless of their age.

**Keywords:** demographic change, labour markets, European Union, gender gap

**Joint Research Centre reference number:** JRC132328

## Related publications and reports:

Hurley, J., Grubanov-Boskovic, S., Bisello, M., Vacas-Soriano, C., Fana, M., & Fernández Macías, E. (2021). *European Jobs Monitor 2021: Gender gaps and the employment structure*, Eurofound and European Commission Joint Research Centre, Dublin.

Fana M., Villani D. & Bisello M. (2021). "Mind the task: evidence on persistent gender gaps at the workplace," JRC Working Papers on Labour, Education and Technology 2021-03, Joint Research Centre (Seville site).

**Acknowledgements:** The authors are grateful for very useful comments and suggestions from John Hurley, Martina Bisello, Marta Fana, Carlos Vacas, Leire Salazar, Guillermo Orfao and Alberto del Rey Poveda.

**Disclaimer:** Sara Grubanov-Boskovic completed this research project during her period of work at the European Commission, Joint Research Centre. The opinions expressed and arguments employed are solely those of the authors and should not be reported as representing the official position or opinion of the OECD nor its Member countries. OECD nor any person acting on behalf of the OECD is responsible for the use that might be made of this publication.

## Contents

Executive summary .....	1
1 Introduction .....	2
2 Literature review .....	3
2.1 Demographic changes and the labour market .....	3
2.2 Occupational change in developed market economies since the 1990s .....	4
3 Data and methodology .....	5
4 Results .....	7
4.1 Has increased female participation narrowed or enlarged the gender occupational gap? .....	7
4.2 Has educational upgrading benefitted the labour market position of women? .....	13
4.3 How has the occupational profile of old and young workers changed in the last 25 years? .....	15
5 Discussion and conclusions .....	17
References .....	19
List of abbreviations and definitions .....	22
List of figures .....	23

## **Executive summary**

This paper presents new empirical evidence on the interaction between demographic and occupational change over 1995-2019 in Europe. We focus on six European countries, namely, Germany, France, Italy, Spain, Sweden and Czech Republic. Using data from the European Union Labour Force Survey, and based on a jobs approach (occupation-sector combinations). We explore how the occupational and demographic structures have changed and evolved, but more importantly, we study the link between both structures, which are important drivers of change for each other. In particular, this paper is articulated around the following three major questions.

First, focusing on the increasing female employment, we study if the feminization of the labour market narrowed or enlarged the gap between the jobs held by men and women. Our results show that the growth of female employment was higher in low-paid jobs and, to a lesser extent, in high-paid jobs. Therefore, the increasing share of female workers has been associated to a certain polarisation, or even “degradation”. This implies that, although progress has been achieved, the gender gap remains an important aspect of European labour markets.

Second, since Europe has undergone a process of educational upgrading, especially among women, we explore whether this process has favoured the labour market position of European workers, and whether women benefitted more than men. Using a multinomial logistic regression, we show that the occupational structure could not keep with the increasing levels of education, so occupational returns to education have been eroded over time. This trend affected more female workers, which is especially significant given their higher educational achievements. Moreover, our results suggest that despite occupational and educational upgrading tended to go together, the latter may have driven the former.

Finally, we look at the aging of the working age population. We compare how the occupational prospects of the increasing/decreasing number of old/young workers have changed over the last 25 years. Despite this demographic divergence, which could lead to different labour market trajectories, the occupational profile of both groups has changed similarly within each country. Interestingly, differences between male and female workers remain regardless of their age. Besides highlighting the importance of gender differences, this result suggests that other factors beyond the size of the cohorts, especially at a national level, can play an important role.

Overall, we find that female employment is getting increasingly polarised and, based on our results, the occupational outcomes of education is one of the main drivers behind this trend. However, important differences between countries emerge when we look at the gender occupational gap: Sweden and France are the most advanced countries in terms of gender parity, significant progress has been made in Italy and, especially, Spain. Germany shows no great improvements in the last 25 years and the Czech Republic is an outlier in this respect. Therefore, further research is needed to better understand the cross-country difference in the link between occupational and demographic change, starting from the role that labour market institutions might have had in mediating this link.

## **1 Introduction**

In the last couple of decades, there has been abundant literature in social sciences discussing the main patterns of occupational change and their underlying drivers, particularly in developed economies. A vibrant debate around the empirical observation of patterns such as job polarisation or occupational upgrading has emerged, with different hypotheses around what factors may explain them (Autor, Levy and Murnane 2003; Goos, Manning and Salomons 2009; Acemoglu and Autor, 2011; Fernández-Macías, 2012; Fernández-Macías and Hurley 2017). Some of these hypotheses relate to demographic factors which, via changes in labour supply and in patterns of economic demand, can affect the evolution of the occupational structure (Oesch and Rodríguez-Menés 2011; Oesch, 2013; Dwyer, 2013; Murphy and Oesch, 2018). In this paper, we discuss empirically the interaction between occupational and demographic change using population and labour market data from 6 European countries over a period of two and a half decades (1995 to 2019).

The occupational and demographic structures are continuously changing and evolving for different reasons. In the literature, the main factors considered to be behind the change in the occupational structure are technical and organisational change, trade, the changing structure of demand, institutional change and changes in the structure of labour supply (Autor and Dorn, 2013; Oesch, 2013). Conversely, improvements in health, social and cultural changes in norms surrounding gender roles and family formation and education policies are altering the demographic structure (Goldin, 2006; Juhn and McCue, 2017; Lesthaeghe, 2020). But what is most important for our purposes is that the occupational and demographic structures are strongly interlinked, and they are important drivers of change for each other. The demographic structure provides the supply of labour that fills up the positions of the occupational structure. At the same time, the occupational structure is a key determinant of the life chances available to the different demographic groups, thus acting as a barrier or an enabler of individuals' life choices and affecting in turn fertility rates, life expectancy and/or migration trends.

For instance, the increasing female labour market participation, which resulted from large-scale changes in gender roles in recent decades, has most likely contributed to the expansion of care and household services occupations (Dwyer, 2013). However, while such growing presence led to their greater economic independence and freedom of choice in the domain of family formation, it has likely contributed to declining fertility rates and, thus, an ageing population (Goldin, 2006; Lesthaeghe, 2020). Moreover, such demographic trends can additionally affect the labour market by reducing the size of the entering cohorts. Indeed, the *cohort-crowding hypothesis* argues that the larger the labour market entry cohorts, the bigger the competition for jobs (Korenman and Neumark, 2000; Biagi and Lucifora, 2008; Moffat and Roth, 2016; Graaff et al., 2018).

Focusing on six European countries, this study presents some new empirical evidence on the interaction between demographic and occupational change over 1995-2019. Offering a comparative perspective is particularly relevant in the European context, where different welfare state regimes and diverse realities and policy needs coexist (Esping-Andersen, 1990). In this line, this paper provides a comprehensive understanding of the abovementioned phenomena, allowing us to gain new insight and contribute to the existing literature. Although previous literature has considered the impact of labour supply factors on occupational change, or occupational chances as a driver of demographic trends, to our knowledge no previous study has integrated the demographic and occupational perspectives as we do in this paper.

Following a jobs approach (using a combination of occupations and sectors as unit of analysis), we rely on descriptive and inferential statistical techniques, including the adaptation of population pyramids to the study of the labour market, to answer the following main questions. First, has the increasing female employment participation narrowed or enlarged the gap between the jobs held

by men and women? Second, Europe has undergone a process of education upgrading, especially among women, but has it benefited the labour market position of women more than that of men? Third, given the growing share of old age workers and the decreasing number of young workers, have their occupational chances differently evolved over time? Do they face worse or better occupational prospects today than 25 years ago?

Our results show that the growth of female employment was higher in low-paid jobs and, to a lesser extent, in high-paid jobs, thus being associated to a certain polarisation or even “degradation” in occupational terms. In fact, despite the progress made, we confirm that the gender gap remains an important aspect of European labour markets. A multinomial logistic regression also reveals that the occupational structure could not keep with the increasing levels of education, so occupational returns to education have been eroded over time, particularly for female workers. Interestingly, despite presenting a diverging demographic pattern, the occupational profile of both young and old workers has changed similarly within each country and the gender-based differences remain regardless of their age.

The paper unfolds as follows. Section 2 reviews the literature regarding how occupational and demographic change interact. Section 3 describes the methodology and data. Section 4 presents the main results, which are structured along the above-mentioned key questions. Section 5 concludes.

## **2 Literature review**

This section presents some stylised facts about demographic and occupational change in Europe in the last 25 years. On the socio-demographic side, the key trends have been the ageing of the working age population, an increasing participation of women in the labour market and a (still) significant educational upgrading. On the occupational side, in a context of growing employment rates there have been two dominant patterns: polarisation and upgrading, namely, a more or less pervasive expansion of high-paid jobs simultaneous with varying trends in mid and low-paid jobs. The following subsections delve deeper into these processes and their interrelation, but first we must define the basic concepts.

The *demographic (or population) structure* refers to the distribution of the general population by age and gender at a given point in time, which is determined by the rates of birth, death, immigration and emigration. Those, in turn, are driven by socioeconomic factors such as economic development, health, education, social and cultural norms surrounding family formation, etc.

The *occupational structure* refers to the distribution of the working population across different occupations and sectors at a given point in time (Fernández-Macías, 2011; Oesch, 2013). The main mechanism determining this structure is the division of labour, which is in advanced market economies coordinated mostly by two institutions: markets and firms. Markets coordinate exchanges between firms (or productive organisations) in a decentralised way, and firms coordinate collaborative production and distribution processes in a hierarchical way. Sectors are a way of classifying productive organisations relying on their product and the markets on which they operate, while occupations express roles or positions within productive organisations based on their specialisation and hierarchical position. The employment distribution by sector and occupation is, therefore, a picture of the division of labour in a society at a given point in time.

### **2.1 Demographic changes and the labour market**

The transformation of Europe’s population structure from a ‘young’ to an ‘old’ one is a long-term trend. The demographic transition started around 1800 when mortality rates started to decline in northwest Europe and was followed a century later (1890-1920) by a generalized decrease in fertility rates (Lee, 2003). Consequently, although population growth first accelerated, it slowed

down as the population moved towards low fertility and long life expectancy. Since then, continuing socio-demographic change has had profound implications on the structure of the European labour force. It has made the overall labour supply older and the labour market participation more gender balanced.

The continuous decline in the fertility rates have been rooted in the changes in attitudes and norms that European society was undergoing at that time. In demographic terms, this cultural transformation - 'the second demographic transition' (Lesthaeghe and van de Kaa, 1986) - was reflected in a decline of marriages, rising ages at first marriage, increasing cohabitation, fertility postponement and increasing mean ages at parenthood, all of which contributed to the structural sub-replacement fertility and population decline (Lesthaeghe, 2020). The process, however, did not occur homogeneously across Europe. Fertility rates were below replacement level by 1960 in Sweden, Germany and the Czech Republic, by 1975 in France and Italy and only in 1981 in Spain.<sup>1</sup>

The expansion of education has been considered one of the main driving factors of the 'second demographic transition', as it has contributed to the decline of traditional religious beliefs and to the increasing focus on personal self-fulfillment from work (Zaidi and Morgan, 2017). In this context, the *gender revolution* started to gain momentum and, ultimately, enhanced the 'second demographic transition' (Goldin, 2006). Women gained greater freedom and ability to prevent unwanted pregnancies, postpone marriage and parenthood, participate in the labour market and achieve economic independence.

In this light, the second half of the 20<sup>th</sup> century marked the decline of the traditional 'male breadwinner - female care provider' model (Britt-Inger, 2016), which has given way to the affirmation of the 'dual earner-carer' model, now being at the centre of the current EU's welfare state approach (Hobson, 2004; Olivetti and Petrongolo, 2017). Nevertheless, gender gaps in the labour market persist even today. Despite the increasing female labour market participation, European women are still less active on the labour market, receive lower wages, face occupational segregation and carry most of care burden of dependent household members (Klasen, 2019; Kleven et al., 2019; Grubanov-Boskovic et al., 2020). Among the barriers, we can mention the *motherhood penalty* (Boeckmann et al., 2015; Juhn and McCue, 2017; Kleven et al., 2019), the *hiring discrimination* (Neumark, 2018), the *bargaining effect* (Dittrich et al., 2014; Card et al., 2016) and the *discriminating promotion opportunities* for women (Hospido et al., 2019).

The changes in the fertility rates have also affected the age structure of the working population. With decreasing fertility, the size of the cohorts entering the labour market also shrinks. In this regard, Easterlin (1961), Perry (1970) and Flaim (1979) advanced the so-called *cohort-crowding hypothesis*, according to which the workers belonging to large labour market entry cohorts face bigger within-cohort competition for jobs. The literature has largely confirmed the negative effect of the cohort size of youth on the employment rate and a positive effect on the unemployment rate (Korenman and Neumark, 2000; Biagi and Lucifora, 2008; Graaff et al., 2018).<sup>2</sup> In this paper, we exploit the aging of the working population and explore how the occupational prospects have changed over time for old and young workers, whose demographic share has increased and decreased, respectively.

## **2.2 Occupational change in developed market economies since the 1990s**

At the turn of the millennium, the debate on occupational change was largely focused on the pervasive and polarising effect of digital technologies on labour markets (Autor, Levy and Murnane, 2003; Goos, Manning and Salomons, 2009; Acemoglu and Autor, 2011). However, subsequent

---

<sup>1</sup> Eurostat [demo\_find] database, extracted on 05.04.2021.

<sup>2</sup> On other hand, Shimer (2001) results do not confirm the cohort crowding hypothesis. This discrepancy stems mainly from different methodological approaches.



studies found varying patterns across different developed economies, with occupational upgrading being at least as important (or even more) as job polarisation (Oesch and Rodríguez-Menés, 2011; Fernández-Macías, 2012). In fact, besides computerisation, flexibilizing changes in the regulation of labour in the 1990s and early 2000s have probably contributed to some observed patterns of job polarisation, whereas the continuing expansion of public sector services (e.g., education and health) contributed to the expansion of high-skilled jobs (Fernández-Macías and Hurley, 2017).

Another important driver of occupational change in this recent literature refers to supply-side factors (Dwyer, 2013). Recently, Daniel Oesch has argued that the availability of some types of labour supply can at least facilitate or hinder the expansion of some types of jobs (Oesch and Rodríguez-Menés 2011; Oesch, 2013; Murphy and Oesch, 2018). Oesch refers to two specific factors. On the one hand, the massive process of educational upgrading in advanced economies since WWII, which accelerated since the 1970s especially for women, can be plausibly linked to the simultaneous and more or less pervasive expansion of highly qualified occupations (Oesch, 2013).<sup>3</sup> On the other hand, the surges of migration in some developed economies seemed to facilitate an expansion of low-paid jobs that would not fit the educational upgrading hypothesis (Spain and UK were among the countries that saw a bigger migration surge, which may explain their exception).<sup>4</sup>

In this line, Dwyer (2013) focused on the change in gender relations that resulted in an expanding participation of women in the US labour market since the 1990s. This affects the occupational structure in at least two important ways. First, the increasing female participation in paid employment contributed to a growing demand for reproductive and care paid labour services (previously provided by domestic labour). Second, it increased the supply of labour for (paid) care and reproductive labour occupations. Both trends contribute to job polarisation, because the occupations involved tend to be either low-paid reproductive work (e.g., domestic or care activities) or mid-high paid professional care work (e.g., health and education professionals and associates). This is an example of the feedback loop that exists between socio-demographic and occupational change, which motivates the need to comprehensively study their interrelation, which is the main purpose of the paper.

Linked to the questions stated in the introduction, the following hypotheses (H) were derived from previous evidence in the literature. First, we expect that the increasing participation of women has enlarged the occupational gender gap in Europe (H1), as argued by Dwyer (2013). Second, given the barriers that female workers face when entering the labour market (Blau and Kahn, 2017), we also expect that educational upgrading has benefited more the occupational position of men (H2). Finally, since the share of old and young works has been increasing and decreasing, respectively, and the cohort size influences labour outcomes (Garloff, Pohl and Schanne, 2013; Moffat and Roth, 2016), we hypothesize that the labour markets prospects and occupational patterns have differently evolved over time for both groups (H3).

### **3 Data and methodology**

The main data source used in this paper is the European Union Labour Force Survey (LFS). We use a sub-sample of six countries: Germany, France, Italy, Spain, Sweden and Czech Republic. These

---

<sup>3</sup> There may be a chicken and egg issue here, yet educational upgrading is plausibly predominant because it is a longer term process that requires significant investments and planning, and its effects are slow to materialize. However, it is also reasonable to assume that both trends tend to reinforce each other in the long run.

<sup>4</sup> Overall, the literature has found immigrants to be complements of local workers. As immigrants specialise in manual intensive tasks (Peri and Sparber, 2009; Murphy and Oesch, 2018), they push local low-skilled workers towards non-manual jobs and high-skilled ones to better wages (Ottaviano et al., 2013; Foged and Peri 2016). Consequently, researchers found no or little impact of migrants on overall wages (Card, 2009; Manacorda et al., 2012) and, when present, it positively/negatively affects wages at the top/bottom of the wage distribution (Dustmann et al., 2013; Dustmann et al., 2016).

countries have been selected according to size (they represent more than half of the working age population of the EU), data quality (samples are large and include the variables necessary for our analysis) and representativity of the different EU institutional families (covering different EU regions: Continental, Southern, Northern and Eastern Europe, see Esping-Andersen, 1990). Note that during 1995-2019, the Czech Republic underwent a profound economic transformation following the demise of the state-socialist regime in 1989 and joined the EU in 2004, thus gaining access to the EU single market.

Our sample concerns the working age population (15-64), and the main analysis is based on the (cross-sectional) comparison between the population and employment distributions in 1995 and 2019.<sup>5</sup> In order to study this link, we have created different categories. Demographically, the working age population is classified in six major groups: young (age 15-29), prime (age 30-49) and old (age 50-64) male and female. Moreover, education is added when necessary. Occupationally, we define five main groups: inactive, unemployed, and employed in low-, mid- and high-paid jobs.<sup>6</sup>

Since the EU LFS data does not include wages for the necessary level of detail and period, to classify occupation-sector combinations as low-paid, mid-paid or high-paid, we linked external data from the 2014 European Structure of Earnings Survey (SES) for 2019 and from the European Jobs Monitor database for 1995 (see Hurley et al. 2021). The variables used for combining occupation and sector are defined at the two-digit level of International Standard Classification of Occupations (ISCO) in the case of occupation and at the one-digit level of the statistical classification of economic activities (NACE) in the case of sector.

The terciles approach corresponds to the jobs methodology that has been followed for many years in the European Jobs Monitor (see Hurley et al. 2021), but with an important difference. In this paper, *the classification of jobs (occupation-sector combinations) into terciles is carried out separately in the beginning and end of the period*, and the analysis focuses on how the socio-demographic composition of the terciles (plus the two non-employment categories) changes across the two periods. This approach has several important benefits for our analysis. First, it shifts the focus from occupational change to the demographic composition of the occupational structure, which fits better our research objectives. Second, it simplifies the analysis considerably, which is necessary given the complexity imposed by adding socio-demographic change into the picture. Third, it solves the problems of comparability between the underlying classifications over the 25-year period analysed, since the analysis is constructed separately for each year (both ISCO and NACE are different and incompatible between 1995 and 2019).

---

<sup>5</sup> Because of data availability, the initial year of analysis is 1997 in Sweden and 1998 in the Czech Republic.

<sup>6</sup> The last three categories correspond to individuals who are in paid employment in jobs (occupation-sector combinations) whose average pay puts them at the lower, middle and upper tercile of the employment structure, respectively.

---

## **4 Results**

Once we have reviewed some key stylised facts about demographic and occupational change in Europe (Section 2), and after describing the main data and methods used to analyse their interrelation (Section 3), we are ready to answer our three main questions.

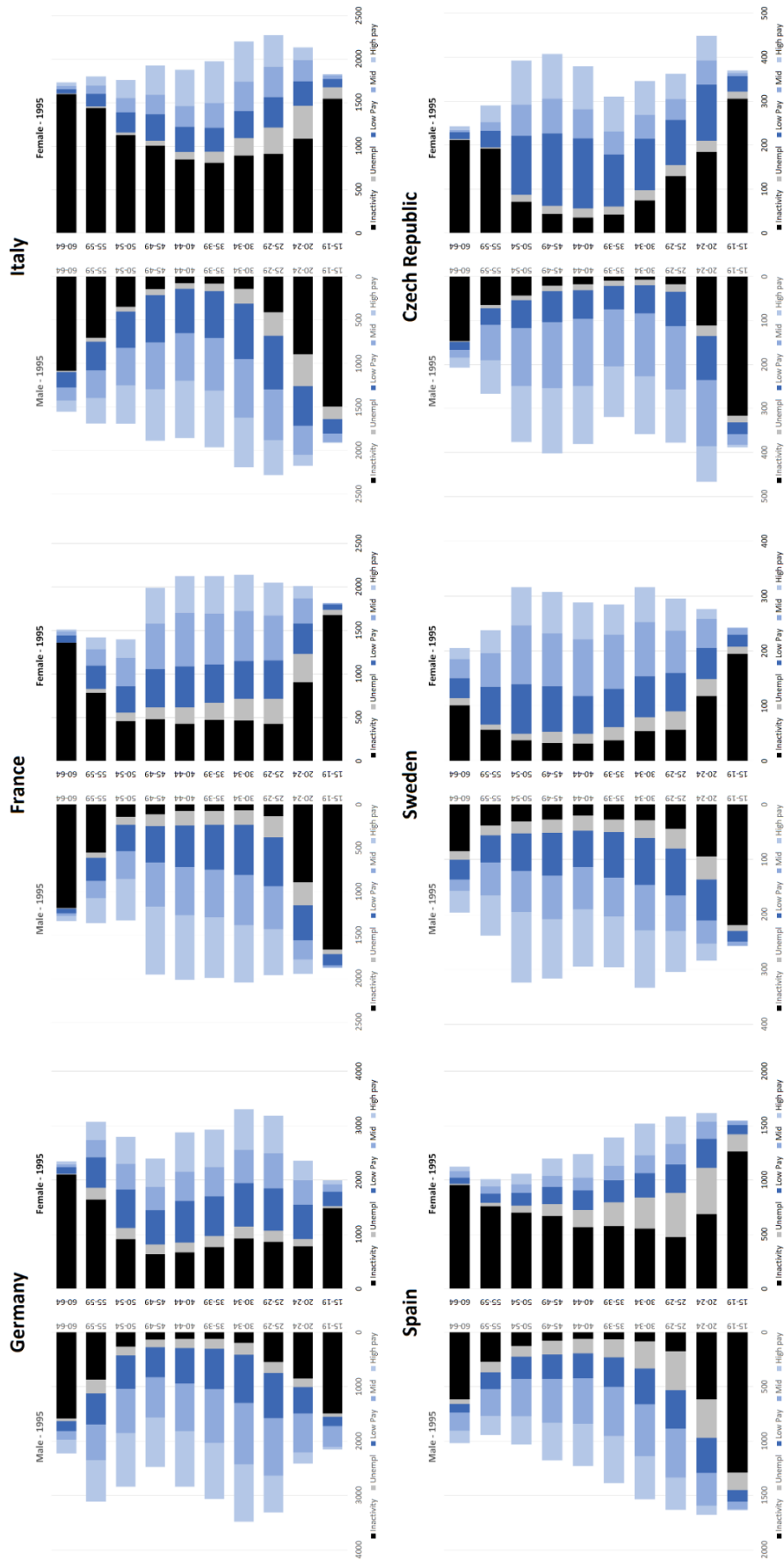
### **4.1 Has increased female participation narrowed or enlarged the gender occupational gap?**

To approach the demographic and occupational structures of the 6 European countries 25 years ago, we have built an *occupation-population pyramid* for the initial year of analysis (1995) (Figure 1). Compared to a standard population pyramid, each of the bars representing the gender-age groups (male 15-19, male 20-24 and so on) have been split into five categories representing their employment and occupational status. The black segment represents inactivity, the grey segment represents unemployment, and the blue segments represent low-paid, mid-paid and high-paid occupations (the lighter the blue, the higher the wage level).

It is noteworthy that 25 years ago there were two main types of pyramid shape in the six countries analysed. While Germany, Sweden and, to a lesser extent, France showed a narrowing of the base that reflects an earlier drop in fertility rates and incipient demographic ageing, Spain, Italy and the Czech Republic displayed an actual pyramidal shape (although youngest groups were already in decline). We can also see how inactivity rates were much higher for young and old (the black segments have a hourglass shape) and for women, especially in Italy and Spain. In contrast, Sweden was already very close to gender parity, as the 'second demographic transition' started there much earlier.

Moreover, in 1995 unemployment (grey segments) was particularly concentrated in the younger age groups, especially in Spain, Italy and, to a lesser extent, France. We can also observe some diverging patterns when looking at the blue segments: low-paid jobs were relatively more frequent for younger people and women across all countries in 1995; mid-paid jobs tended to be more frequent for mid-aged men, except in Sweden and France (where mid-aged women also had a significant share); and well-paid jobs were more frequent for mid-aged and old men.

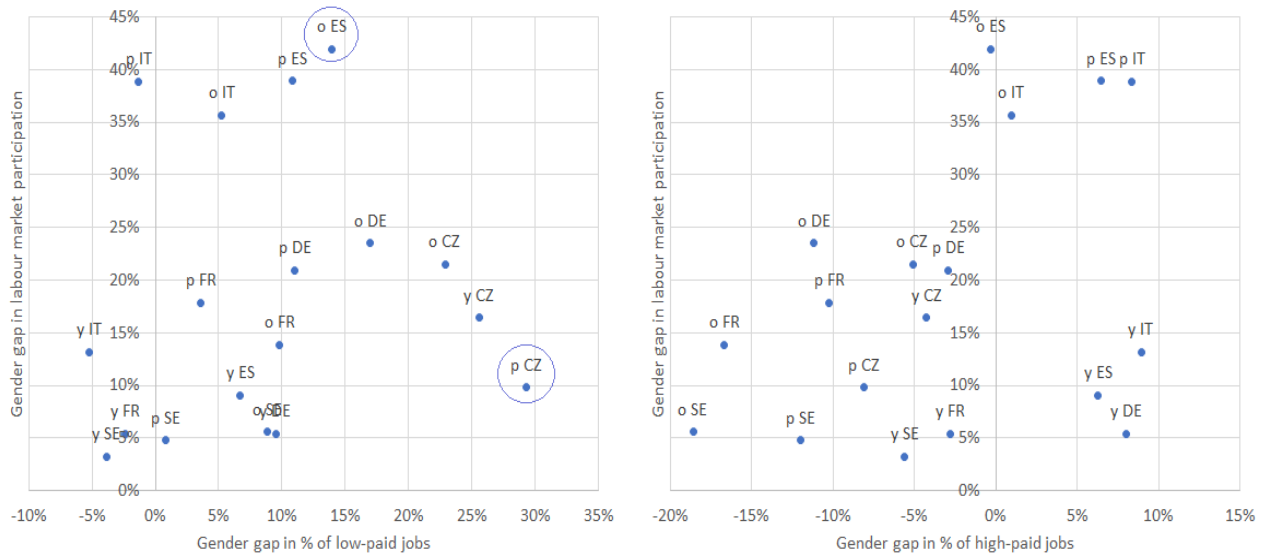
Figure 1: Population-occupation pyramids for 6 European countries, 1995.



Source: Author's calculations based on EU-LFS.1995 and SES 2014.

Gender gaps in both labour market participation and occupational position were a common feature of the labour market in 1995. As Figure 2 reflects, besides having lower participation rates than men, women were also more present in low-paid jobs. Interestingly, the right-hand side panel unveils a remarkable association. Where the gender gap in participation was bigger, the gap in high-paid jobs is smaller, in some cases even benefitting women (e.g., prime-aged and old women in Spain and Italy).

Figure 2: Gender gaps in labour market participation, low-paid and high-paid jobs, 1995.

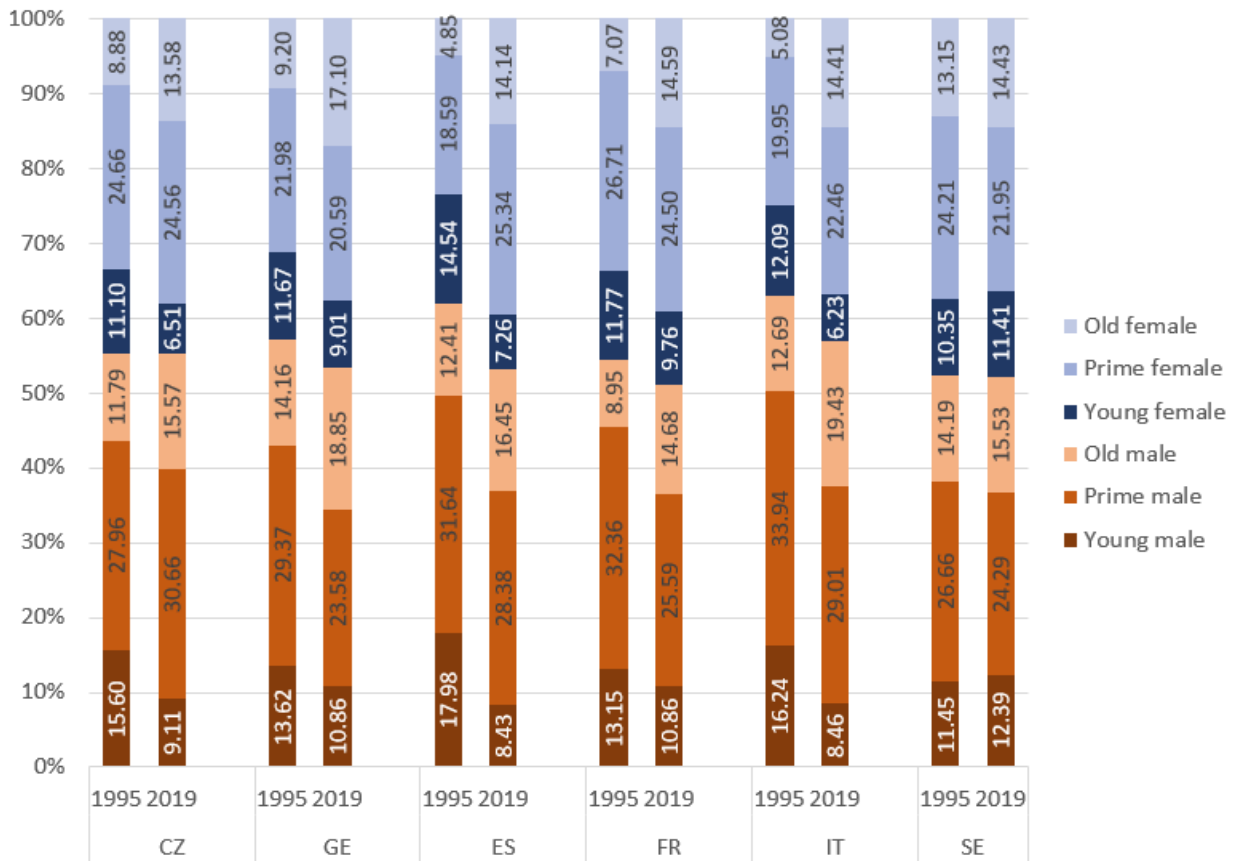


Source: Author's calculations based on EU-LFS 1995 and SES 2014. Note: The dots in these figures represent young (y, 15-29), prime (p, 30-49) and old (o, 50-64) age groups by gender (m, male; f, female) for each country (with acronyms).

This result points towards a filtering effect. Where female participation is low, the few who participate tend to be from higher social extractions and, thus, hold relatively high-paid jobs. Conversely, where labour market participation is more gender-balanced, women of all social extractions fill all employment niches, indeed with a bias towards low-paid occupations (for the Spanish case, see Salazar 2020). Therefore, the increasing participation of women over the following 25 years should have reverted this filtering bias in those countries where gender equality was less advanced in 1995, namely Spain and Italy.

Now that we have an overall picture of the situation in 1995, we can discuss how it subsequently changed. Firstly, as we will show at the end of the section, inactivity dropped for most gender-age groups and countries, particularly for old and female workers. But most remarkably, Figure 3 shows the main changes experienced by the active population, which largely captures the big patterns reviewed in Section 2: the ageing and feminisation of employment. On the one hand, the labour markets (including employed and unemployed persons) were significantly feminised in 2019 compared to 1995, with an especially large relative increase in the share of old and prime-aged women (from 31% to 38% on average). On the other hand, while the older segments were overall expanded, young people experienced a sharp drop. For instance, the share young males falls from 16-18% to 8% in Spain and Italy. Sweden represents the only exception, its distribution being stable over the last 25 years. But how did these socio-demographic changes translate into the occupational structure?

Figure 3: Change in the gender-age composition of the active population, 1995-2019.

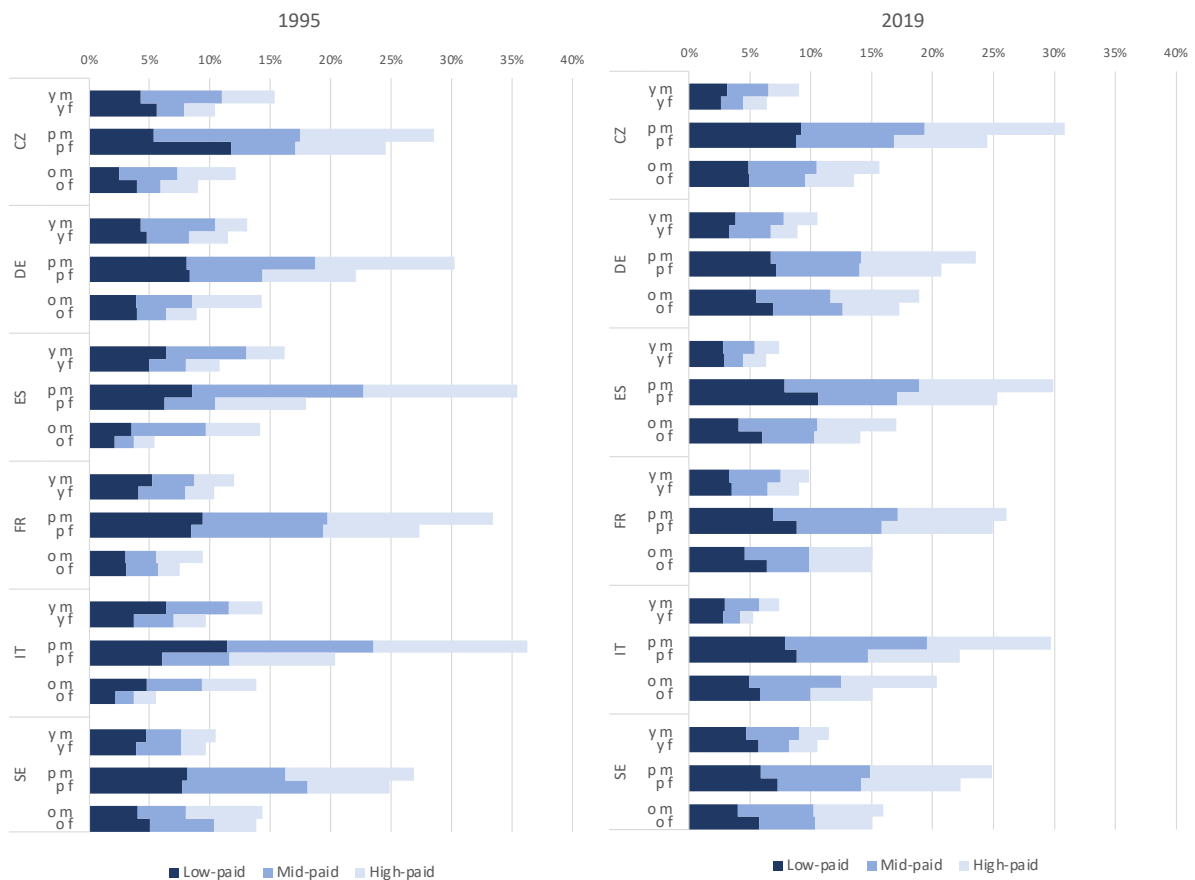


Source: Author's calculations based on EU-LFS 1995 and 2019.

Focusing on the employed population, Figure 4 displays the decline in overall employment gaps by gender. We can indeed see that the size of the bars for men and women was much more unequal in 1995 than in 2019, except for Sweden (which remained quite equal) and the Czech Republic (which increased the size of the employment gap for prime aged women). However, Figure 4 also helps identify the change in the composition of the occupational categories by age and gender in the last 25 years. The two panels show the distribution of the six demographic groups across low, medium and high-paid jobs in 1995 and 2019, respectively. Given its structure, we can easily identify gender gaps by comparing the size of the (dark, mid and light blue) bars between genders.

Overall, the growing female employment translated into an increase of low-paid jobs. With the only exceptions of Germany and the Czech Republic, the gender gap reversed and was expanded against women in such occupations (as illustrated by the greater length of dark blue bars for females in 2019). At the same time, the occupational gap between men and women in Europe was particularly reduced in high-paid jobs over the last 25 years (as indicated by light blue bars being more even in 2019), especially in France and Sweden, whereas it had varying developments in mid-paid jobs. Therefore, as argued by Dwyer (2013) and others, the expansion of female employment was associated with job polarisation because female jobs tended to grow in high- and low-paid occupations.

Figure 4: Change in the demographic composition of occupational terciles, 1995-2019

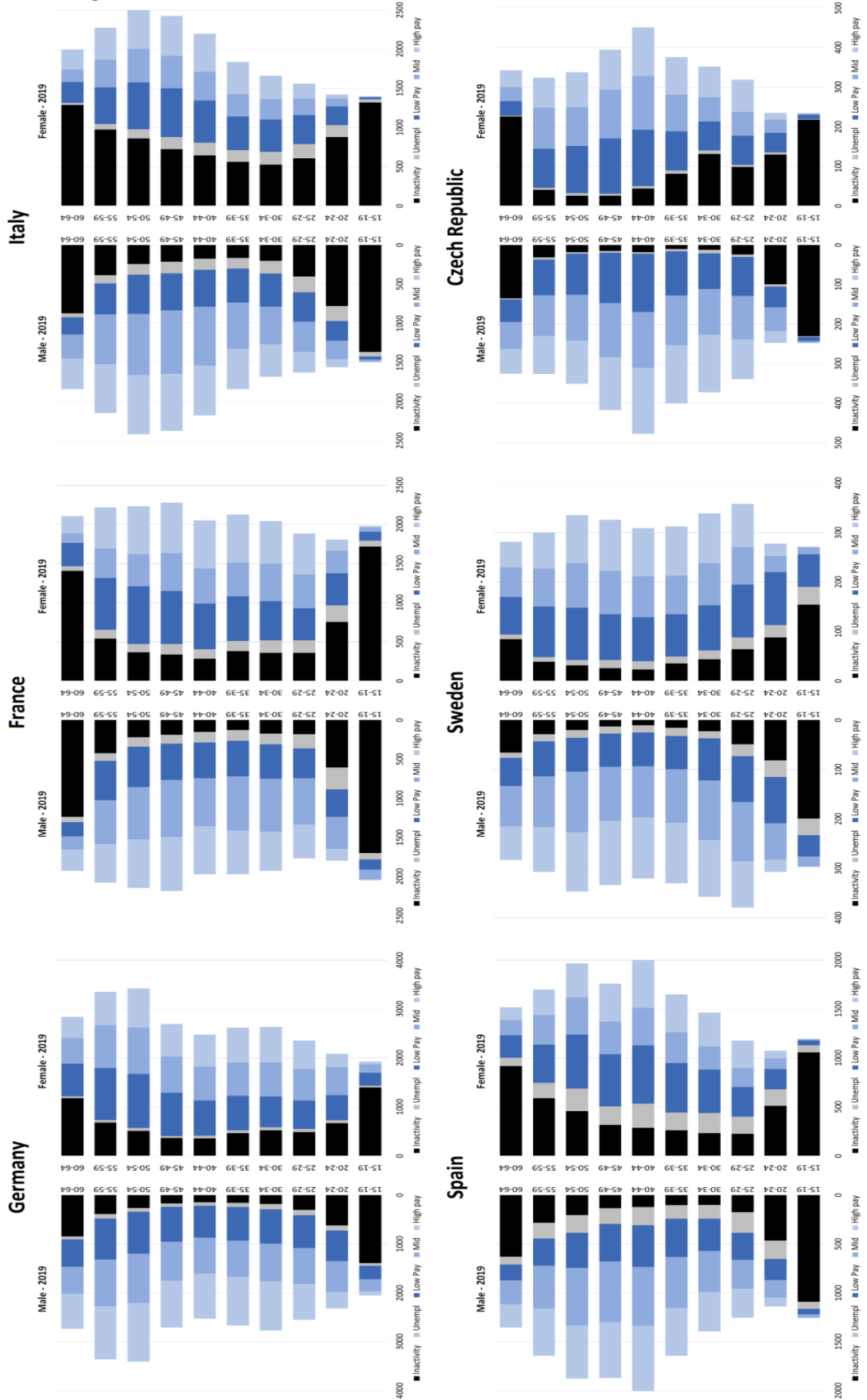


Source: Author's calculations based on EU-LFS 1995 and 2019 and SES 2014. Note: young (y, 15-29), prime (p, 30-49) and old (o, 50-64) age groups by gender (m, male; f, female).

We close this section as we started, discussing the population-occupational pyramid, but now for the year 2019 (Figure 5). The first striking observation is that there is no pyramid anymore. Firstly, barrel-shaped is now the dominant pattern, although with some variations. Germany and Italy look in fact quite close to inverted pyramids. Sweden and France are relatively flat in their age distributions, suggesting a stable population structure. The remaining countries show an imbalanced structure with an increasingly old working age population. Secondly, we can see much less inactivity (black) in the figure than 25 years ago, especially for the old (50-64) age groups and women. Italy and the Czech Republic are the exceptions with still a big imbalance in the inactivity rates of men and women across most age groups and an increase in inactivity rates for mid-aged women, respectively.

Finally, as previously discussed, the blue segments representing employment look much more symmetrical between genders in 2019 than 25 years ago, with the partial exceptions of Italy and the Czech Republic. Nevertheless, as previously discussed, there is still a bias in female employment towards low-paid jobs in most countries, as well as a bias in female employment against high-paid and especially mid-paid jobs, suggesting a certain degree of polarisation in female employment trends. In short, the occupational gender gap has been closing over time, but it remains an important feature of the European labour markets. Indeed, this progress was not registered for the segment of low-paid jobs where the occupational gender gap has actually expanded.

Figure 5: Population-occupation pyramids for 6 European countries, 2019



Source: Author's calculations based on EU-LFS 2019 and SES 2014.

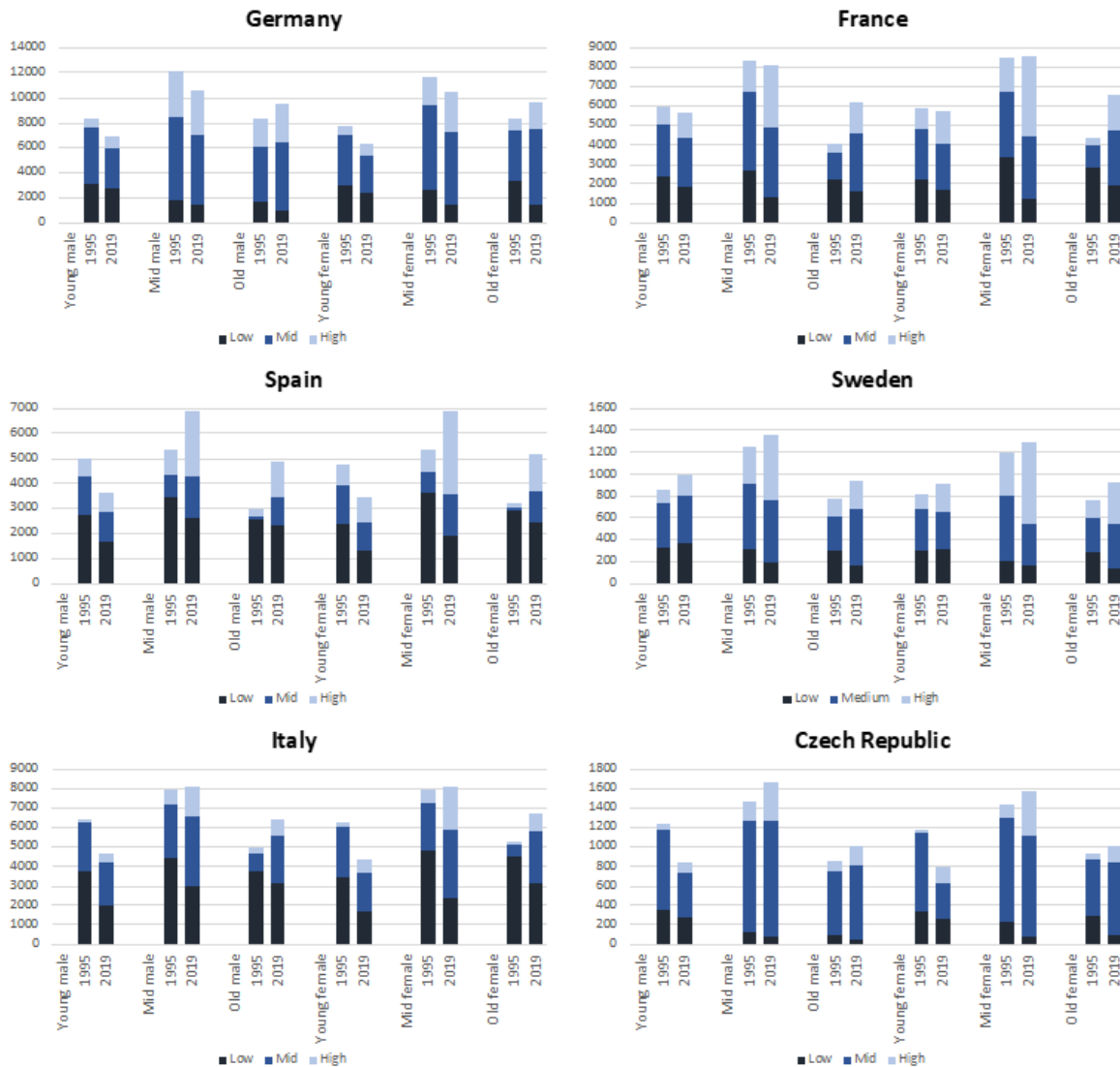


## 4.2 Has educational upgrading benefitted the labour market position of women?

As pointed out in Section 2, education has been one of the key drivers of the increasing female labour market participation and has probably contributed to the observed patterns of occupational upgrading, as discussed in the literature review section. Moreover, there may be systematic differences in the educational profiles of different age groups that might make them imperfect substitutes. Therefore, it is important to also consider how changes in the educational attainment in the last 25 years may have affected the labour market position of both genders, to address hypothesis H2.

Overall, the period 1995-2019 was marked by a rapid expansion of tertiary education coupled with a decline in the share of the population with primary education, particularly among women, as illustrated by Figure 6. This effect is most evident among the old (50-64) and prime age (30-49) working population, so the biggest educational upgrading affected the cohorts born between 1955-1969 and 1970-1989. Most remarkably, the expansion of tertiary education was stronger among women. Except for Germany, this greater effect is visible in all countries considered, especially for prime age female workers. For instance, in Spain the number of prime age male workers with tertiary education in 2019 was 1.6 times that of 1995, whilst female workers with such qualification level in 2019 were 2.6 times that of 1995.

Figure 6: Working age population by completed level of education in 1995 and 2019

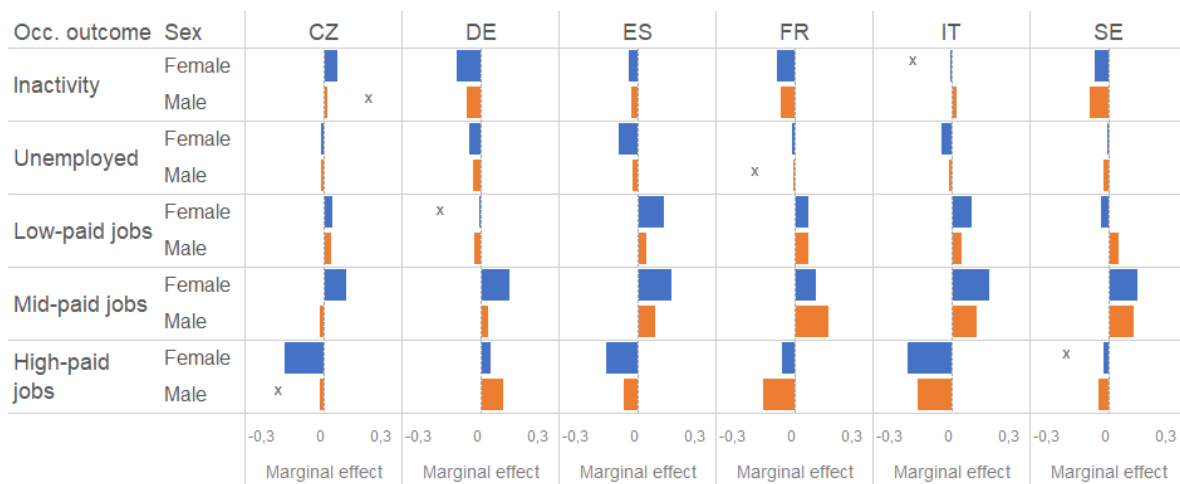


Source: Author's calculations based on EU-LFS 1995 and 2019 and SES 2014.

In short, the educational composition of the population has upgraded quite significantly since 1995 in Europe, especially among women. But has the link between education and occupational level changed as well?

In order to answer this question, we focus on the working age population with tertiary education and run a multinomial logistic regression.<sup>7</sup> This approach can show us how the occupational structure has changed over time for highly educated women and men after controlling for certain individual characteristics. Figure 7 displays the main results. The bars in the Figure express how the change of year (2019 vs. 1995) affects the chance of having a certain labour market outcome separately by gender. Negative values indicate that the chance of having a certain labour market outcome decreased between 1995 and 2019, while positive values indicate that it increased. Values close or equal to zero imply that college-educated workers have the same chance of having a certain outcome in 2019 as in 1995.<sup>8</sup>

Figure 7: Correlation between tertiary education and occupational outcomes. Multinomial logit marginal effects (2019 vs. 1995)



Source: Author's calculations based on EU-LFS 1995 and SES 2014. Note: X indicates that the coefficient is not statistically significant.

We start by looking at those out of the labour market. The relative risk of being inactive for highly qualified workers decreased between 1995 and 2019, Italy and the Czech Republic being the only exceptions. Even though such decline is higher for female workers in Germany, France and, to a lesser extent, Spain, it is less strong that could be expected considering the big decline in inactivity for women during this period. This is probably explained by the above-mentioned filtering effect: the reduced number of women with tertiary education in 1995 had relatively high levels of activity. Additionally, college-educated workers have also become less likely to be unemployed over the years, which is probably the result of better economic conditions. The marginal effects are close to zero in most countries, yet a substantive drop is mainly attributable to female workers in Spain, Italy, and Germany.

<sup>7</sup> The dependent variable captures the five labour market outcomes. The main independent variables are a dummy variable for year (2019=1), for gender (male=1) and their interaction. We also control for age and country of birth, and run separate models by country.

<sup>8</sup> We have checked the robustness of the results by estimating three alternative models. The first one is a multinomial logit with three outcome variables: inactive, unemployed and employed. The second and third models are a multinomial and ordered logit with the three employment options (low, middle and high paid jobs) as the dependent variable. The overall results remain and are available upon request.

Despite such increasing chances of finding employment, the type of job that qualified workers could expect in 2019 is markedly different from that in 1995. The chances of having a low-paid job increased in all countries except Germany and Sweden, thus suggesting declining returns to education. This applies especially to female workers in Italy and Spain, where their increasing chance of having a low-paid job is 2.3 and 3.2 times that of men, respectively. The picture is even clearer regarding mid-paid jobs: the relative chance that highly qualified workers have a mid-paid occupation grew in all countries. This result also points to declining returns to education, as the maximum level of qualification does not correspond to an equivalent level of occupational wages. Except in France, this decreasing returns effect is stronger for female workers in all countries considered (as shown by the greater length of blue bars), especially in the Czech Republic (6.4 times the coefficient of men), Germany (4.5 times) and Spain (2 times).

Moreover, highly educated workers were overall less likely to hold a high-paid job in 2019 than in 1995. The marginal effect is indeed only positive in Germany. Yet, the size of the effect is smaller for German women, indicating that even in this case labour market prospects are better for men. This gender-biased difference is also present in the Czech Republic, Spain, and Italy: despite the greater educational upgrading of women, their chance of having a high-paid job decreased more than that of men. Finally, while France presents the opposite situation (highly-skilled men become less likely than women to be in the third tercile over time), the results do not appear to be biased by gender in Sweden.

Overall, our results indicate that occupational returns to education decreased over the last 25 years.<sup>9</sup> The possibility that workers with tertiary education hold a high-paid job has narrowed considerably (excluding Germany), whereas their chance of having a mid-paid job (in the Czech Republic, Germany, and Sweden), or even a low and a mid-paid job (in Spain, France, and Italy), has increased. With the only exception of France, and perhaps Sweden, female workers have suffered the most from this effect: the occupational outcomes of highly qualified workers have declined relatively more for women in a period in which their educational profile has increased more than that of men.

### **4.3 How has the occupational profile of old and young workers changed in the last 25 years?**

We have previously seen that the supply of labour has overall been characterized by increasing ageing and feminization over the last 25 years. Given these major demographic shifts, this section analyses how the occupational profile of the additional number of old workers and the shrinking number of young workers has changed for both genders. As hypothesized in H3, we expect that the labour markets prospects and occupational patterns have differently evolved over time for both age groups (H3).

In order to address this hypothesis, Figure 8 displays some figures on the changing occupational structure of older workers in Europe. First, we notice that inactivity and unemployment were reduced almost everywhere, Spain and Italy being the only ones with rising unemployment. However, the occupational distribution has changed very differently among genders and across countries. In France and Sweden, the reduction of the gender gap<sup>10</sup> stems from older male workers expanding their share of employment in mid-paid jobs and older females becoming more polarised.

---

<sup>9</sup> We have checked that the situation of the other educational groups complement our main outcome. The middle-educated have become less likely to be inactive and unemployed, but they have been filling low- and middle-paid occupations. For the low-educated, the chances of being in high-paid jobs has decreased everywhere, whereas being in the lowest tercile has become more frequent. Moreover, inactivity has increased among men in several countries.

<sup>10</sup> Job-wage tercile index: the simple employment-weighted average of the occupational level (1 to 3) of men and women.

Conversely, while old men have been upgrading in Italy and Spain, old women have been downgrading, thus increasing the gender gap. Both trends are coherent with our previous results, as the occupational outcomes of education are more unequal against women in the latter two countries and more even in France and Sweden. Additionally, the expansion of low-paid occupations might be attributable to the reversion of the above-mentioned filtering effect.

Figure 8: Changing occupational structure of old workers (50-64), 1995 and 2019

	CZ		DE		ES		FR		IT		SE	
	1995	2019	1995	2019	1995	2019	1995	2019	1995	2019	1995	2019
<b>Male</b>												
<i>Inactive</i>	29.9%	18.2%	33.2%	15.8%	33.8%	22.9%	46.6%	30.6%	43.1%	23.4%	20.2%	12.2%
<i>Unemployed</i>	2.3%	1.3%	5.7%	2.4%	8.0%	8.7%	4.0%	4.6%	2.3%	4.6%	7.5%	4.3%
<i>Low-paid jobs</i>	14.1%	25.1%	16.7%	23.8%	14.5%	16.3%	15.6%	19.6%	18.8%	17.5%	20.2%	21.0%
<i>Mid-paid</i>	26.9%	28.7%	19.9%	26.4%	25.3%	26.2%	13.3%	22.7%	18.1%	26.7%	20.3%	32.8%
<i>High-paid</i>	26.8%	26.7%	24.5%	31.7%	18.5%	25.9%	20.4%	22.5%	17.6%	27.8%	31.7%	29.7%
<b>Female</b>												
<i>Inactive</i>	51.4%	29.0%	56.7%	24.6%	75.6%	37.9%	60.1%	35.4%	78.6%	46.2%	25.6%	16.8%
<i>Unemployed</i>	2.3%	1.4%	5.4%	1.7%	3.4%	9.1%	3.3%	4.2%	1.0%	3.2%	4.7%	3.4%
<i>Low-paid jobs</i>	20.3%	25.3%	17.0%	29.5%	8.1%	22.6%	15.0%	25.8%	8.0%	19.6%	25.5%	30.9%
<i>Mid-paid</i>	10.2%	23.7%	10.2%	24.4%	6.3%	16.1%	12.8%	13.9%	5.6%	14.0%	26.8%	24.6%
<i>High-paid</i>	15.9%	20.6%	10.9%	19.9%	6.5%	14.3%	8.7%	20.7%	6.7%	17.0%	17.4%	24.3%
<b>Job-wage tercile index (1-3)</b>												
Male	2.19	2.02	2.13	2.10	2.07	2.14	2.10	2.05	1.98	2.14	2.16	2.10
Female	1.91	1.93	1.84	1.87	1.92	1.84	1.83	1.92	1.93	1.95	1.88	1.92
<b>Gap (male - fem)</b>	<b>0.28</b>	<b>0.09</b>	<b>0.29</b>	<b>0.23</b>	<b>0.14</b>	<b>0.30</b>	<b>0.27</b>	<b>0.13</b>	<b>0.04</b>	<b>0.19</b>	<b>0.28</b>	<b>0.19</b>

Source: Author's calculations based on EU-LFS 1995 and SES 2014.

The occupational composition of old men and women in Germany in 2019 did not change much from 1995, so the gender gap decreased just slightly (from 0.29 to 0.23) due to a small expansion of mid-paid jobs for old women. This result might also be linked to education, as we have previously seen that highly qualified German female workers have a substantively higher propensity to hold mid-paid occupations. Yet it is surprising that 30 years after the German unification and the subsequent profound economic reforms the occupational structure largely resembles that of 1995. Finally, the Czech Republic remains as an outsider, registering an occupational downgrading for old men and middling of old women, thus reducing the gender gap among old workers (0.9, the lowest value registered).

In the case of young workers, whose share in the working age population has decreased since 1995, we find remarkable differences regarding labour participation. While unemployment was reduced everywhere, inactivity rose in Czech Republic, Spain and Italy, but decreased in Germany, France and Sweden. Regardless of this difference, and against hypothesis H3, the changes in the occupational structure of young workers strongly resemble those of old workers in the same country, except for Germany (Figure 9). Indeed, while young German men have been polarising, young women have registered more occupational middling. This difference could be, at least partially, explained in the light of substantial economic and labour market policies (e.g., early retirement, job creation schemes, etc) adopted following the German reunification.<sup>11</sup>

<sup>11</sup> For example, Ketzmerick (2016) discusses unequal impact of labour market policies in East Germany on different age groups. He argues that, as a result of these policies, individuals who completed their education in the mid-90s (i.e., the young workers) entered a 'de-facto blocked' labour market in East Germany.

Figure 9: Changing occupational structure of young workers (15-29), 1995 and 2019

	CZ		DE		ES		FR		IT		SE	
	1995	2019	1995	2019	1995	2019	1995	2019	1995	2019	1995	2019
<b>Male</b>												
<i>Inactive</i>	36.1%	42.5%	36.7%	33.4%	42.0%	47.3%	46.6%	44.3%	43.9%	54.4%	42.3%	33.5%
<i>Unemployed</i>	4.7%	1.7%	5.2%	3.8%	17.7%	13.0%	9.6%	9.5%	12.2%	9.7%	10.4%	9.2%
Low-paid jobs	16.6%	19.3%	18.9%	22.6%	15.8%	14.9%	19.0%	15.5%	19.5%	14.2%	21.2%	23.5%
Mid-paid	25.8%	20.9%	27.3%	23.3%	16.5%	14.0%	12.7%	20.0%	15.9%	13.8%	13.3%	21.5%
High-paid	16.9%	15.6%	11.9%	16.8%	7.9%	10.8%	12.0%	10.7%	8.5%	8.0%	12.7%	12.3%
<b>Female</b>												
<i>Inactive</i>	52.5%	56.5%	41.4%	40.1%	51.0%	52.0%	51.1%	49.9%	56.8%	64.1%	45.3%	33.8%
<i>Unemployed</i>	5.7%	1.6%	5.1%	2.5%	21.0%	12.1%	11.6%	7.9%	13.0%	8.6%	9.4%	9.3%
Low-paid jobs	22.4%	17.0%	22.1%	21.2%	12.8%	16.2%	14.6%	16.4%	11.6%	14.5%	18.3%	30.8%
Mid-paid	9.3%	12.2%	16.3%	21.9%	8.0%	9.0%	14.0%	13.7%	10.2%	7.2%	17.4%	13.5%
High-paid	10.1%	12.6%	15.0%	14.2%	7.3%	10.5%	8.7%	12.1%	8.4%	5.7%	9.5%	12.6%
<b>Job-wage tercile index (1-3)</b>												
Male	2.01	1.93	1.88	1.91	1.80	1.90	1.84	1.90	1.75	1.83	1.82	1.81
Female	1.71	1.89	1.87	1.88	1.80	1.84	1.84	1.90	1.90	1.68	1.80	1.68
<b>Gap (male - fem)</b>	<b>0.30</b>	<b>0.04</b>	<b>0.01</b>	<b>0.03</b>	<b>0.00</b>	<b>0.06</b>	<b>0.00</b>	<b>0.00</b>	<b>-0.15</b>	<b>0.15</b>	<b>0.02</b>	<b>0.12</b>

Source: Author's calculations based on EU-LFS 1995 and SES 2014.

It is also noteworthy that gender-based differences remain regardless of age, which ultimately highlights the barriers that women face at different points of the professional carrier. Since the diverging demographic size of old and young workers does neither affect their labour market prospects nor differences by gender, other factors beyond the size of the cohort seem to determine how the occupational chances of both age groups have evolved over time. The different trends observed suggest that the idiosyncrasy of each country, with its own institutions, labour market regulation, trade unions, welfare state, educational system, and tools to respond to shocks like the Great Recession, predominates over any common trend in terms of ageing or feminisation.

## 5 Discussion and conclusions

Over the years, policies at both the EU and Member States level have systematically acknowledged that population ageing has had profound economic and societal implications. The related policy initiatives have been mainly directed toward adapting education and skills systems, developing a 'flexicurity' approach in labour market policies, promoting longer working lives and reforming social protection and pension systems. In 2020, addressing the challenges of population ageing has also become a political priority at the EU level: the Green Paper on ageing (COM(2021) 50 final) seeks to develop new labour policy approaches in this regard, jointly with the twin green and digital transitions.

In this context, this paper aimed to contribute to a better understanding of the link between demographic and occupational change in Europe over the past 25 years. We have started by looking at the increasing female labour market participation that took place since the second half of the 20th century, when the traditional 'male breadwinner' model started losing weight in favour of the 'dual earner-carer' model. In fact, we observe a significant reduction of inactivity rates for most gender-age groups in the period 1995-2019 in six selected countries (Czech Republic, Germany, France, Italy, Spain and Sweden).

Although the gender gap in terms of labour participation was reduced due to the increasing presence of female workers, women's distribution across occupations was far from homogeneous: the growth of female employment was a higher in the lower tercile and, to a lesser extent, in the higher one. In this line, and answering Hypothesis H1, our analysis shows that while there has been an expansion of the gender gap against women in low-paid jobs, the gap in high-paid jobs tended to decline, although it has still remained a prominent feature. Thus, the increase in the female labour market participation over the past 25 years has been associated with a certain polarisation

or even "degradation" in occupational terms. Despite the progress made, the occupational gender gap remains an important aspect of European labour markets.

The period 1995-2019 also saw a significant expansion of tertiary education together with a decline of primary education. Consequently, there has been a change not only in the size of the cohorts participating in the labour market, but also in their educational composition. Thus, we wonder whether the occupational returns to education have also changed and, since educational upgrading was particularly relevant for women, whether this trend has benefitted more females' labour market position. Our results show that occupational and educational upgrading tended to go together, but in line with Oesch (2013), it seems that the latter may have driven, at least partly, the former. Our results also suggest that the occupational structure could not keep up with the increasing levels of education, so the occupational returns to education have been consistently eroded over time. As expected in hypothesis H2, this trend affected more women than men, which ultimately confirms that the greater availability of female labour is related to the expansion of low-paid jobs, as argued by Dwyer (2013). Besides the barriers women face during their professional career (Neumark, 2018; Kleven et al., 2019; Hospido et al., 2019), decreasing occupational returns to education are more pervasive among women and also seems to be behind the occupational gender gap.

Finally, focusing on the shifts in the age structure, our analysis has tried to address the question of how occupational profiles have changed for the growing number of old workers and shrinking number of young workers. Despite this demographic divergence, and going against hypothesis H3, the occupational profile has changed similarly for both groups within a country, and the gender-based differences remain regardless of their age. In general, the occupational profile of young and old male workers has been stable or slightly declining over the last 25 years, while that of young and old women has become increasingly polarised. These results suggest that other factors beyond the size of the cohort (for instance, the economic conditions or country specific labour policies and regulations) can determine the labour market prospects of the working populations.

Indeed, our analysis reveals diverging trends between countries. Sweden stands out as the most advanced country in terms of gender parity and appears to keep improving. France is a similar case, though the occupational gender gap has been reduced to a lesser extent. Interestingly, Germany is less egalitarian than we could expect given its level of economic development and no great improvements were observed in the last 25 years. Italy and Spain started to reduce the gender occupational gap more recently, but progress was comparatively stronger in Spain. Finally, the Czech Republic is an outlier: we found growing inactivity for prime aged-women and an expansion of female mid-paid jobs, which in other countries tended to be more associated with men.

These varying patterns are pointing out the important role that country specific factors play in shaping the relationship between demographic and occupational change. As highlighted in the beginning of this section, countries have been adopting a series of measures to alleviate the potentially negative effect of demographic ageing on labour markets, which cannot be disregarded. In this context, further research is needed to better understand the cross-country differences in the link between occupational and demographic change, starting from the role that labour market institutions might have had in mediating this link.

In this paper, we have found that the increasing feminization of employment has not produced equal occupational outcomes for men and women, despite women's impressive educational upgrading. This is probably linked to well-known processes of occupational segregation by which women often end up in less well-paid jobs, because of a variety of reasons that go from different choices in early education to uneven household workload or even outright discrimination. For occupational outcomes to be more equal across genders, and to correspond more fairly to educational achievement, policies aimed at removing those factors of occupational segregation should be reinforced.

## References

- Acemoglu, D., and Autor, D. H. (2011). Skills, tasks and technologies: implications for employment and earnings. In O. Ashenfelter & D. E. Card (Eds.), *Handbook of labor economics* (Vol. 4B, pp. 1043–1171). Elsevier.
- Autor, D. H., and Dorn, D. (2013). The growth of low-skill service jobs and the polarization of the US labor market. *American economic review*, 103(5), 1553–97.
- Autor, D. H., Levy, F., and Murnane, R. J. (2003). The skill content of recent technological change: An empirical exploration. *The Quarterly journal of economics*, 118(4), 1279–1333.
- Biagi, F., and Lucifora C. (2008). Demographic and education effects on unemployment in Europe. *Labour Economics*, 15(5), 1076–1101.
- Blau, F. D., and Kahn, L.M. (2017). The Gender Wage Gap: Extent, Trends, and Explanations. *Journal of Economic Literature*, 55(3), 789–865.
- Boeckmann, I., Misra, J., and Budig, M. J. (2015). Cultural and Institutional Factors Shaping Mothers' Employment and Working Hours in Postindustrial Countries. *Social Forces*, 93(4), 1301–33.
- Britt-Inger, K. (2016). Earner-Carer Model. In *The Wiley Blackwell Encyclopedia of Gender and Sexuality Studies*, edited by Angela Wong, Maithree Wickramasinghe, renee hoogland, and Nancy A Naples, 1–3. Singapore: John Wiley & Sons, Ltd.
- Card, D. (2009). Immigration and Inequality. *American Economic Review: Papers & Proceedings*, 99(2), 1–21.
- Card, D., Cardoso, A. R., and Kline P. (2016). Bargaining, sorting, and the gender wage gap. Quantifying the impact of firms on the relative pay of women. *The Quarterly Journal of Economics*, 131(2), 633–686.
- Dittrich, M., Knabe, A., and Leipold K. (2014). Gender differences in experimental wage negotiations. *Economic Inquiry*, 52(2), 862–873.
- Dustmann, C., Frattini, T., and Preston, I.P. (2013) The Effect of Immigration along the Distribution of Wages. *The Review of Economic Studies*, 80(1), 145–173.
- Dustmann, C., Schönberg, U., and Stuhler, J. (2016). The Impact of Immigration: Why Do Studies Reach Such Different Results? *Journal of Economic Perspectives*, 30(4), 31–56.
- Dwyer, R. E. (2013). The care economy? Gender, economic restructuring, and job polarization in the US labor market. *American Sociological Review*, 78(3), 390–416.
- Easterlin, R. (1961). The American baby boom in historical perspective. *American Economic Review*, 51, 869–911.
- Esping-Andersen, Gøsta. 1990. *The Three Worlds of Welfare Capitalism*. Cambridge: Polity Press.
- Fernández-Macías, E. (2012). Job polarization in Europe? Changes in the employment structure and job quality, 1995–2007. *Work and Occupations*, 39(2), 157–182.

Fernández-Macías, E., and Hurley, J. (2017). Routine-biased technical change and job polarization in Europe. *Socio-Economic Review*, 15(3), 563-585.

Flaim, P. (1979). The effect of demographic changes on the nation's unemployment rate. *Monthly Labor Review*, 102, 13-23.

Foged, M., and Peri, G. (2016). Immigrants' Effect on Native Workers: New Analysis on Longitudinal Data. *American Economic Journal: Applied Economics*, 8(2), 1-34.

Garloff, A., Pohl, C., and Schanne, N. (2013). Do small labour market entry cohorts reduce unemployment? *Demographic Research*, 29, 379-406.

Goldin, C. (2006). The quiet revolution that transformed women's employment, education, and family. *American Economic Review*, 96(2), 1-21.

Goos, M., Manning, A., and Salomons, A. (2009). Job polarization in Europe. *American economic review*, 99(2), 58-63.

Graaff, T., Ozgen, C., and Roth, D. (2018). Varying Youth Cohort Effects on Regional Labour Market Outcomes in Germany. *IZA Discussion Paper*, IZA DP No. 11932.

Grubanov-Boskovic, S., Tintori, G., and Biagi, F. (2020) Gaps in the EU Labour Market Participation Rates: an intersectional assessment of the role of gender and migrant status, EUR 30406 EN, Publications Office of the European Union, Luxembourg.

Hobson, B. (2004). The Individualised Worker, the Gender Participatory and the Gender Equity Models in Sweden. *Social Policy and Society*, 3(1), 75-83.

Hospido, L., Laeven, L., and Lamo, A. (2019). The gender promotion gap: evidence from central banking. *European Central Bank Working Series* No 2265.

Hurley, J., Grubanov-Boskovic, S., Bisello, M., Vacas-Soriano, C., Fana, M. and Fernández-Macías, E. (2021). *European Jobs Monitor 2021: Gender gaps and the employment structure*. Eurofound and European Commission Joint Research Centre.

Juhn, C., and McCue, K. (2017). Specialization Then and Now: Marriage, Children, and the Gender Earnings Gap across Cohorts. *Journal of Economic Perspectives*, 31(1), 183-204.

Ketzmerick, T. (2016). The Transformation of the East German Labour Market: From short-term Responses to long-term Consequences. *Historical Social Research / Historische Sozialforschung*, 41(3), 229-255.

Klasen, S. (2019). What Explains Uneven Female Labor Force Participation Levels and Trends in Developing Countries? *The World Bank Research Observer*, 34(2), 161- 97.

Kleven, H., Landais, C., and Egholt Sogaard, J. (2019). Children and Gender Inequality: Evidence from Denmark. *American Economic Journal: Applied Economics*, 11(4), 181-209.

Korenman, S., and Neumark, D. (2000). *Cohort Crowding and Youth Labor Markets: A Cross-National Analysis*. In *Youth Employment and Joblessness in Advanced Countries*, Ed. by D. G. Blanchflower and R. B. Freeman. January. University of Chicago Pres, 57-106

Lee, R. (2003). The Demographic Transition: Three Centuries of Fundamental Change. *Journal of Economic Perspectives*, 17(4), 167-190.



- Lesthaege, R. (2020). The second demographic transition, 1986-2020: sub-replacement fertility and rising cohabitation - a global update. *The Genus*, 76(10), 1-38.
- Lesthaeghe, R., and van de Kaa, D. J. (1986). Twee Demografische Transitie's? (Two Demographic transitions?). Pp. 9-24. In D. J. van de Kaa and R. Lesthaeghe (eds.), *Bevolking: Groei en Krimp (Population: Growth and Decline)*, Deventer, Van Loghum Slaterus.
- Manacorda, M., Manning, A., and Wadsworth, J. (2012). The Impact of Immigration on the Structure of Wages: Theory and Evidence from Britain. *Journal of the European Economic Association*, 10(1), 120-151.
- Moffat, J., and Roth, D. (2016). The Cohort Size-Wage Relationship in Europe. *Labour*, 30(4), 415-432.
- Murphy, E. C., and Oesch, D. (2018). Is employment polarisation inevitable? Occupational change in Ireland and Switzerland, 1970-2010. *Work, employment and society*, 32(6), 1099-1117.
- Neumark, D. (2018). Experimental research on labor market discrimination. *Journal of Economic Literature*, 56(3), 799-866.
- Oesch, D. (2013). *Occupational change in Europe: how technology and education transform the job structure*. Oxford University Press.
- Oesch, D., and Rodríguez Menés, J. (2011). Upgrading or polarization? occupational change in Britain, Germany, Spain and Switzerland, 1990-2008. *Socio-Economic Review*, 9(3), 503-531.
- Olivetti, C., and Petrongolo, B. (2017). The Economic Consequences of Family Policies: Lessons from a Century of Legislation in High-Income Countries. *Journal of Economic Perspectives* 31(1), 205-30.
- Ottaviano, G., Peri, G., and Wright, G.C. (2013). Immigration, Offshoring, and American Jobs. *American Economic Review*, 103(5), 1925-59.
- Peri, G., and Sparber, C. (2009). Task Specialization, Immigration, and Wages. *American Economic Journal: Applied Economics*, 1(3), 135-69.
- Perry, G. (1970). Changing labor markets and inflation. *Brooking Papers on Economic Review*, 51, 869-911.
- Salazar, L. (2020) Social Inequalities. In *The Oxford Handbook of Spanish Politics*, Oxford University Press.
- Shimer, R., (2001). The impact of young workers on the aggregate labor market. *Quarterly Journal of Economics*, 116 (3), 969-1007.
- Zaidi, B., and Morgan, S. P. (2017). The second demographic transition theory: A review and appraisal. *Annual review of sociology*, 43, 473.

**List of abbreviations and definitions**

LFS	Labour Force Survey
SES	Structure of Earnings Survey
EU	European Union
US	United States
CZ	Czech Republic
DE	Germany
ES	Spain
FR	France
IT	Italy
SE	Sweden
ISCO	International Standard Classification of Occupations
NACE	Statistical classification of economic activities

## List of figures

<i>Figure 1: Population-occupation pyramids for 6 European countries, 1995.</i> .....	8
<i>Figure 2: Gender gaps in labour market participation, low-paid and high-paid jobs, 1995.</i> .....	9
<i>Figure 3: Change in the gender-age composition of the active population, 1995-2019.</i> .....	10
<i>Figure 4: Change in the demographic composition of occupational terciles, 1995-2019.</i> .....	11
<i>Figure 5: Population-occupation pyramids for 6 European countries, 2019</i> .....	12
<i>Figure 6: Working age population by completed level of education in 1995 and 2019.</i> .....	13
<i>Figure 7: Correlation between tertiary education and occupational outcomes. Multinomial logit marginal effects (2019 vs. 1995)</i> .....	14
<i>Figure 8: Changing occupational structure of old workers (50-64), 1995 and 2019.</i> .....	16
<i>Figure 9: Changing occupational structure of young workers (15-29), 1995 and 2019</i> .....	17

## **GETTING IN TOUCH WITH THE EU**

### **In person**

All over the European Union there are hundreds of Europe Direct centres. You can find the address of the centre nearest you online ([european-union.europa.eu/contact-eu/meet-us\\_en](https://european-union.europa.eu/contact-eu/meet-us_en)).

### **On the phone or in writing**

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696,
- via the following form: [european-union.europa.eu/contact-eu/write-us\\_en](https://european-union.europa.eu/contact-eu/write-us_en).

## **FINDING INFORMATION ABOUT THE EU**

### **Online**

Information about the European Union in all the official languages of the EU is available on the Europa website ([european-union.europa.eu](https://european-union.europa.eu)).

### **EU publications**

You can view or order EU publications at [op.europa.eu/en/publications](https://op.europa.eu/en/publications). Multiple copies of free publications can be obtained by contacting Europe Direct or your local documentation centre ([european-union.europa.eu/contact-eu/meet-us\\_en](https://european-union.europa.eu/contact-eu/meet-us_en)).

### **EU law and related documents**

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex ([eur-lex.europa.eu](https://eur-lex.europa.eu)).

### **Open data from the EU**

The portal [data.europa.eu](https://data.europa.eu) provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

## The European Commission's science and knowledge service

Joint Research Centre

### JRC Mission

As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.



**EU Science Hub**  
[joint-research-centre.ec.europa.eu](https://joint-research-centre.ec.europa.eu)

 @EU\_ScienceHub

 EU Science Hub - Joint Research Centre

 EU Science, Research and Innovation

 EU Science Hub

 EU Science