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Questa pubblicazione raccoglie i risultati di un progetto a cui hanno contribuito ricercatori del Dipartimento Economia e statistica e della rete territoriale della Banca d'Italia.

Women, labour markets and economic growth[*]

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Abstract

This report summarises the findings of a research project that has been carried out by the Bank of Italy over the past three years. The report provides an overview of the gender divides in the Italian labour market and a comparison with the other main EU economies. It then traces the origins of such gaps by considering: (i) the education choices and the school-to-work transition, (ii) motherhood and within-family interactions and, (iii) career progressions. The report frames the contributions of the underlying research in the most recent economic literature and discusses some avenues for effective policy action.

Contents

1   Introduction and motivation

Despite significant progress in recent decades, gender inequality in access to economic op-
portunities is still present in all countries worldwide.[1] The integration of women into the
labour market goes far beyond considerations of equity and fairness, as there is a strong
and undeniable link between women's participation in the labour market and economic
development. Indeed, the literature has established that not only is economic develop-
ment a prerequisite for improving women's living conditions but women's participation
is also an important driver of economic growth (see for example Goldin, 1995 and Duflo,
2012 among many others).

Figure 1: Female labour force participation rate and per capita GDP in OECD countries
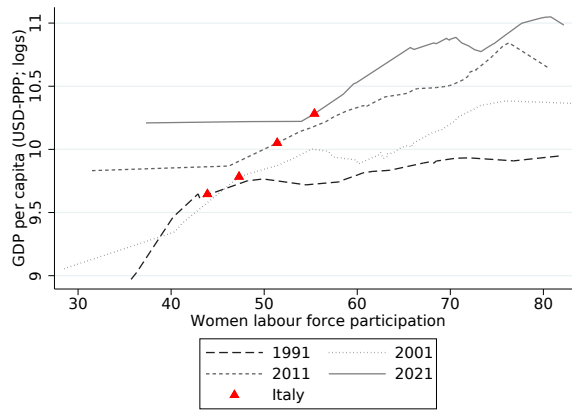
Notes: Estimates of the relationship between GDP per capita (in logs) and female activity rate. Population aged 15-64.
Source: Our calculations based on OECD data.

Figure 1 shows that the estimated relationship between GDP per capita and female
activity rates in the OECD countries in several selected years (1991, 2001, 2011 and 2021)
is positive.[2] Moreover, Figure 1 indicates that Italy (represented by the red triangles)
lags behind many other OECD countries in terms of both participation and GDP per
capita. If we focus only on the European Union, the picture is even worse. In 2022
the average participation rate of women in the 15-64 age group was 69.5 per cent in the
EU and just 56.4 per cent in Italy, the lowest level recorded among EU countries. In
quantitative terms, if the female participation rate in Italy was at the same level as the

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[1]Buono et al. (2022) provide a survey of the most relevant challenges women face in several selected
countries of the Bank of Italy foreign network.

[2]More specifically, the relationship between female labour force participation and GDP per capita is
U-shaped, both when looking at the evolution within a single country from a historical perspective and
when looking at a cross-section of countries at different stages of development. Goldin (1995), among
others, points out that in the early stages of development women work on family farms and in domestic
production. As the economy develops and work is transferred to firms, it becomes more difficult for
women to combine household production with participation in the labour market. Instead, the rise of
the service economy (e.g., Ngai and Petrongolo, 2017) makes it easier for women to participate (and this
determines the rising part of the U-shaped curve). For a recent discussion of the U-Shaped hypothesis,
see also Buono and Polselli (2022).

EU average, there would be about 2.4 million additional individuals (+10 per cent) in the Italian labour force.

The need to enhance women's labour market participation emerges even more clearly in light of the population drop predicted for future decades. According to the latest Istat projections, the total population aged 15-64 will number around 6 million fewer individuals in 2040 compared with 2022. Such a demographic change would imply a significant decline in the total labour force in the next 20 years. An increase in the female participation rate could mitigate these adverse demographic trends. For example, if the female participation rate were to converge towards the current EU average in ten years' time, the expected decline in the Italian labour force in 2040 would be halved.

An increase in female participation would have a positive impact on GDP. Estimates based on the model developed in Bulligan et al. (2017) suggest that, other things being equal, an increase of 10 per cent in the labour force — due to the convergence of the Italian female activity rate to the EU level — would raise GDP by roughly the same amount in the long run. However, these figures do not take into account the potential extra gains deriving from the consequent reallocation of talents in the economy; according to Hsieh et al. (2019) such mechanisms accounted for a large part of the economic growth observed in the US since the 1960s.[3]

For all these reasons, 11 years ago the Bank of Italy carried out several studies aimed at analysing the determinants of the gender gaps in the Italian economy (see Bianco et al., 2013). Despite some progress since then, the overall picture has not changed much. Hence, starting in 2020, a new wave of research projects has been carried out by Bank of Italy economists (20 papers — marked with red title in the References). This report summarises their main findings, highlighting how they contribute to the evidence provided in the most recent international literature on the topic and indicates the most promising avenues for effective policy action.

The report is divided into six chapters. Chapter 2 provides an overview of the gender gaps in the Italian labour market, also highlighting the relative position of Italy in the European context. Besides showing that Italy is the country in the EU with the lowest female participation rate and the second lowest female employment rate, it documents that women, when employed, work fewer hours, are more likely to involuntarily work part-time and are paid less than men.

Chapter 3 investigates the differences in education between boys and girls and discusses how they affect gender gaps at entry into the labour market. It shows that girls tend to outperform boys at school and at university in terms of both educational attainment and achievement. However, girls tend to systematically self-select into fields of study that are associated with worse labour market prospects One year after having

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[3]Ostry et al., 2018 also highlight that a non-negligible part of the effect of increasing female labour supply on GDP is driven by the gains in productivity that derive from a higher diversity in the workplace.

completed their studies, there is already a large gap between men and women in terms of both employment probability and wages, which is largely related to the choice of high school track and — especially — university major. This result points out that, to tackle gender gaps, it is important to act in the very early stages too, when women are at school and choose their field of study.

Chapter 4 discusses the relationship between female employment and fertility decisions. The traditional role of women as the main providers of childcare and domestic work has undoubtedly been one of the main obstacles to the integration of women in the formal labour market. Despite the enormous progress observed in the last decades, motherhood is still a critical point for women's employment and careers. Family-friendly policies — like parental leaves and subsidised childcare — may play a significant role in boosting female labour supply and reducing gender gaps. Based on the vast literature on the topic and on the characteristics of the policies currently in place in Italy, we outline the main areas of policy interventions.

Chapter 5 highlights the role of partners' interactions in shaping female and household labour supply and the impact of the tax-transfer system on these joint decisions. The labour supply of married women, as secondary earners in the household, may be discouraged by joint taxation or transfers sharply decreasing with family income. We provide an overall assessment of how the Italian tax-transfer system affects monetary incentives to work by gender, given the current distribution of employment among Italian households. We also look in detail at specific policy interventions that have been implemented in the most recent years.

In Chapter 6 we document the extent and determinants of women's vertical segregation in the labour market and their under-representation in top earnings classes and jobs. We show that this *glass ceiling* is determined not only by the initial unfavourable sorting across fields of study (Chapter 3) or by the child penalty (Chapter 4) but also by differences across employers and in career progressions within firms, where women tend to be assigned less remunerative tasks and hold lower paid positions. We discuss some of the interventions that may be more useful in counteracting such disparities. In particular, we point at the importance of stimulating corporate managerial practices that favour a work-life balance and of promoting, including through affirmative action interventions, the presence of women in medium-ranked management as well.

Finally, Chapter 7 discusses some possible policy measures that could help alleviate the existing gender gaps, also in light of the recent actions taken within the scope of the National Recovery and Resilience Plan (NRRP).

2 An overview of gender gaps

This chapter describes gender gaps in the Italian labour market, focusing on female labour supply and employment relative to that of men, as well as on the gaps in wages and work intensity among employed individuals. Finally, we discuss the contribution of these gender gaps to labour income inequality and in-work poverty.

In Italy the female employment rate in the 15-64 age group was 51.1 per cent in 2022, a value which is high if compared with the past three decades, but is still almost 14 percentage points lower than the EU average (see panel (a) of Figure 2). The difference between the employment rate of men and women was 18.1 percentage points in Italy, the second largest in the European Union and appears to be mostly driven by the lower participation of women in the labour market: Italy indeed shows the lowest female activity rate in the EU (56.4 and 69.5 per cent, respectively in 2022; panel (b) of Figure 2), while gender differences in unemployment rates — although larger than the European average — are more limited (2.3 percentage points, compared with 0.6 points in the EU).

Figure 2: Female employment and participation rates

(a) Evolution of the female employment rate, percentage points

(b) Female participation rate (2022), percentage points
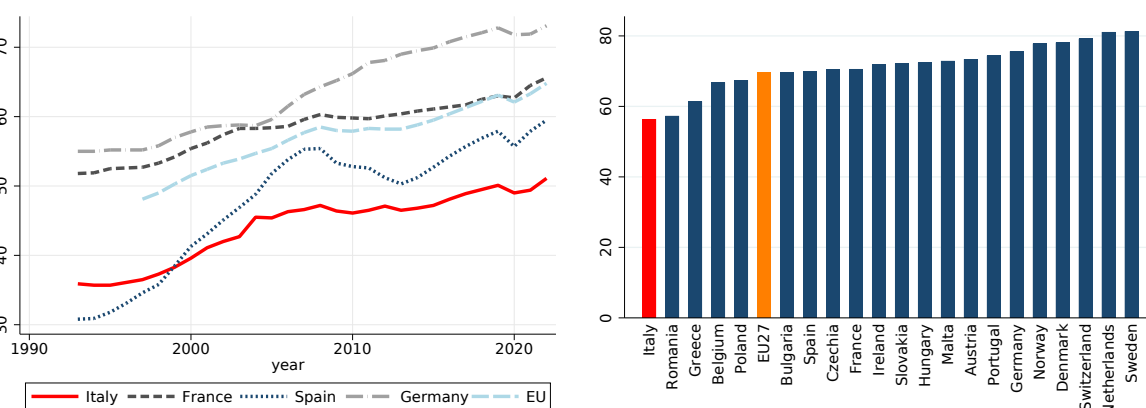
Notes: The data refer to individuals aged 15-64. The series shows a discontinuity in 2021, following the updates established by regulation EU/2019/1700 which specifically provides new criteria for identifying employed individuals. **Source**: Eurostat, European Labour Force Survey.

De Philippis and Lo Bello (2023) use quarterly panel data from the Italian Labour Force Survey to estimate transition probabilities across labour market states (employment, unemployment and inactivity) by gender and use them to decompose the dynamics observed in the male and female employment rates in the past 40 years. They document that flows into and out of inactivity were the key driver of the convergence of the employment rate across genders (the gap has shrunk by approximately 18 p.p. since 1985). In particular, the convergence operated mainly through a reduction in the labour market exit rate of women and a decrease in the entry rate of men; differences in flows between employment and unemployment among active individuals instead played a much smaller

role. Moreover, the authors point out that nowadays the gender employment gap is also largely due to women's lower rate of entry into the labour market and to higher exit rates, especially after the birth of their first child, while the role of flows between employment and unemployment status is limited.

The significant growth in education levels among women has contributed to the marked increase in the female employment rate observed in the past few decades: in 1990, less than 7 per cent of women aged 25-34 had a university degree, while in 2022 this share had increased to more than 35 per cent (from 7 to 23 per cent among men). Indeed, the growth in women's employment rate did not take place much within but mostly between education levels (De Philippis, 2017), as highly educated individuals tend to be more attached to the labour market, especially women.[4] Italy, however, is still s one of the countries in Europe with the lowest diffusion of tertiary educated individuals, including among women (in 2022 the share of women aged 25-34 with a university education in the EU was 12 p.p. higher than in Italy); this may be contributing to the low participation of Italian women in the labour market.

The growth of female employment observed in the last few decades has also been favoured by the diffusion of part-time contracts, which in principle allow for a better reconciliation between family and work. While just over 10 per cent of female workers were employed part-time in Italy at the beginning of the 1990s, the share rose to 31.7 per cent in 2022 (from 2.4 to 7.7 per cent for men). This is partly associated with some structural transformations, like the rise of the service economy, where part-time contracts are more widespread and women's employment is concentrated (in 2022, approximately 84 per cent of employed women against less than 60 per cent of employed men worked in the service sector, especially in education, health, social and domestic services). Indeed, some papers document that the expansion of the service economy has created jobs with characteristics that better match female preferences and household roles, and, at the same time, increased the relative demand for female work as long as women have a comparative advantage in the production of services rather than in manufacturing (see Olivetti and Petrongolo, 2016a and Buono and Polselli, 2022).

Overall, however, the incidence of part-time contracts among Italian female workers is particularly high in comparison with other EU countries with similar female employment rates (panel (a) of Figure 3). This is in part due to the very high share of involuntary part-time work in Italy. Indeed, Italy is the EU country with the highest proportion of women for whom the choice of part-time work is determined by the lack of full-time job opportunities (more than one in two women employed part-time compared with less than one in five women in the European Union on average in 2022; panel (b) of Figure

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[4]In 2021 almost 80 per cent of women aged 15-64 with a tertiary degree and approximately 30 per cent of women without secondary education were employed; similar values were observed in 1990.

3).[5] Therefore, besides supply-driven factors relating to work-life balance considerations, demand-side aspects are also relevant why part-time work is so common among Italian women.

Figure 3: Part-time contracts, involuntary part-time and female employment

(a) Female employment rate and share of part-time work, percentage points
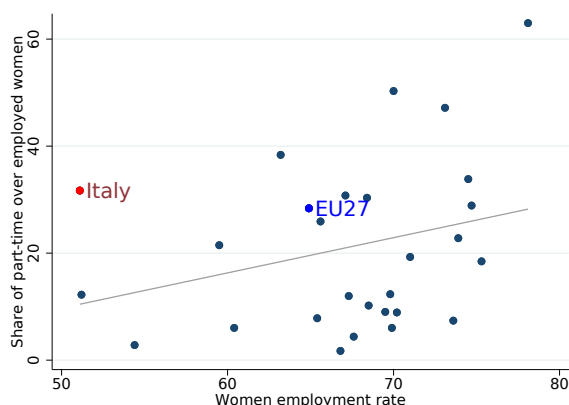
(b) Share of involuntary part-time work among women employed part-time, percentage points

Notes: The data refer to individuals aged 15-64. **Source**: Eurostat, European Labour Force Survey.

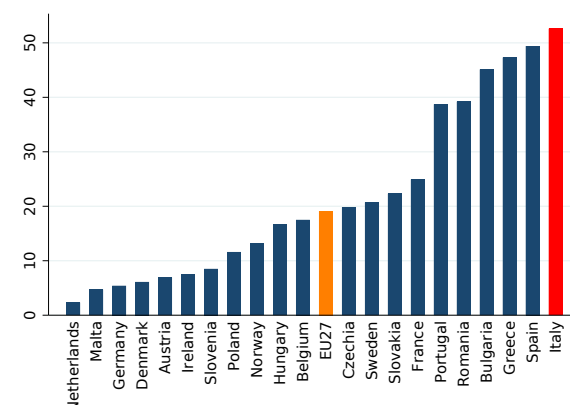The particularly marked expansion of part-time work, together with the strong diffusion of fixed-term contracts (among employees, 18 per cent of women were employed on a temporary basis against 16 per cent of men in 2022), translated into a decline in the average number of hours worked per year among employees that is sharper for women than for men. Looking at employees in the non-agricultural private sector, the gender gap in annual full-time equivalent work units has widened, from 7 per cent in the early 1990s to almost 15 per cent in 2021.

The gaps in hours worked in the labour market are also associated with important differences in time use between men and women (Figure 4). Italy is the country with the largest gap between the time spent by women and by men on domestic work and care-giving activities, compared with the countries included in the latest European-wide Harmonised Time Use Survey (approximately 4 hours and 40 minutes per day for women and 1 hour and 50 minutes for men). This large gap is still observed when focusing on working individuals and on younger cohorts. However, if we consider the time spent on total paid and unpaid work, as defined by Eurostat (which includes time spent on paid work, domestic work, care activities and travelling to and from work), Italian women work more than men, and this gap is relatively large with respect to the European average. Indeed, total working time is higher for women than for men in almost all the countries

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[5]Other studies link the proliferation of part-time work to undeclared work, i.e. the growing tendency to reduce the number of completely undeclared workers, but to compensate for this by increasing the number of undeclared hours in regular employment, in order to avoid some of the social security contributions to be paid (see Tirozzi, 2018).

Figure 4: Time use, domestic and total (paid and unpaid) work by gender
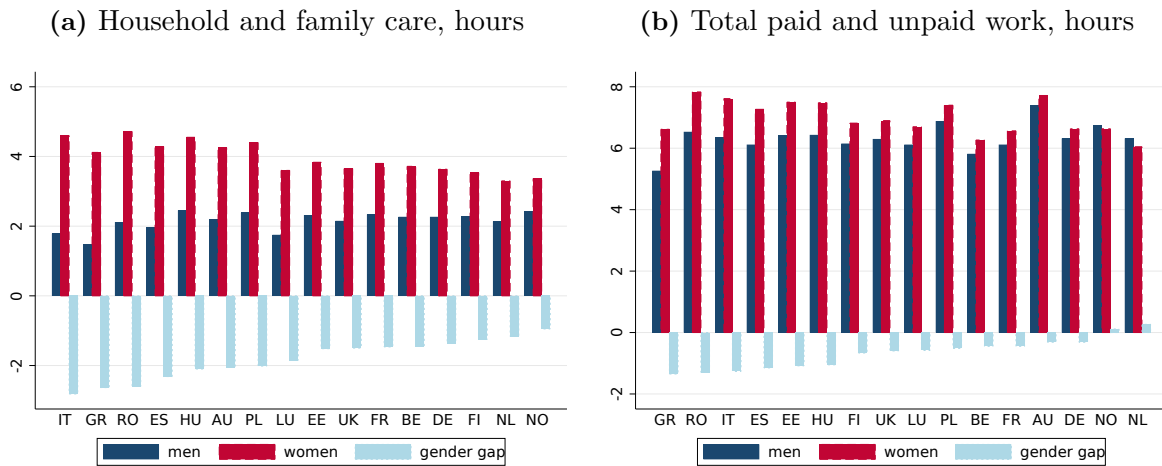
(a) Household and family care, hours

(b) Total paid and unpaid work, hours

considered: in Italy, women work about 1 hour and 15 minutes per day more than men (in line with Spain, but more than in France and Germany, where the difference is lower than half an hour).

Figure 5: Net hiring, cumulated values from January 2018 (December 2019=1))
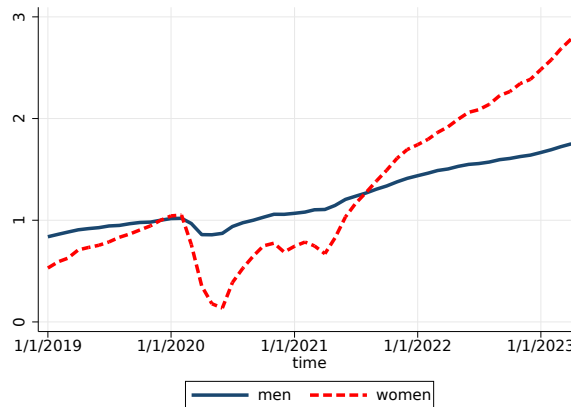
The employment and unemployment rates of men and women also differ in terms of their cyclical behaviour (Buono and Polselli, 2022; Albanesi, 2019). In particular, the female employment rate tends to vary less along the business cycle, both because women usually work in sectors and occupations less affected by recessions and economic booms (like the public sector) and because of the so-called added worker effect, which reduces the procyclicality of female employment. Indeed, it is found that women who are married or cohabiting, increase their own labour supply in response to a job (and therefore income) loss for their partner (Lundberg, 1985 and Chapter 5). Unlike standard recessions, the Covid-19 pandemic instead hit female-dominated in-person services heavily. As a consequence, net hirings for women dropped more markedly than for men at the outbreak

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of the pandemic; overall in Italy women lost more than 70,000 jobs in 2020, while male employment increased by more than 60,000 units (Figure 5). However, starting from the second half of 2021, net hiring increased rapidly among the female population, reaching historically high levels. In the last year and a half, women have accounted for nearly 40 per cent of jobs created, a value 2.5 percentage points higher than in the two-year period 2018-19.

As in other European economies, women's hourly wages are on average lower than men's in Italy (Leythienne and Ronkowsk, 2018): the gap between private sector employees — although it has gradually decreased over the last three decades — was around 11 per cent in 2021 (panel (a) of Figure 6).[6] The decline in the gender wage gap was mostly driven by a reduction in the gap in the top percentiles of the wage distribution (panel (b) of Figure 6), possibly also because of the marked increase in women's average education levels observed in the same period. Nevertheless, in 2021, the gender wage gap in unitary wages — present along the entire wage distribution — was larger among top earners: the percentage difference between the 9th deciles of the wage distributions of men and women was twice as large than that between the 1st deciles of the gender-specific distribution (see also Chapter 6).

Figure 6: Gender gaps in Full-Time Equivalent (FTE) wages

(a) FTE wages and work units, percentage points

(b) Percentiles and mean of FTE wages, percentage points
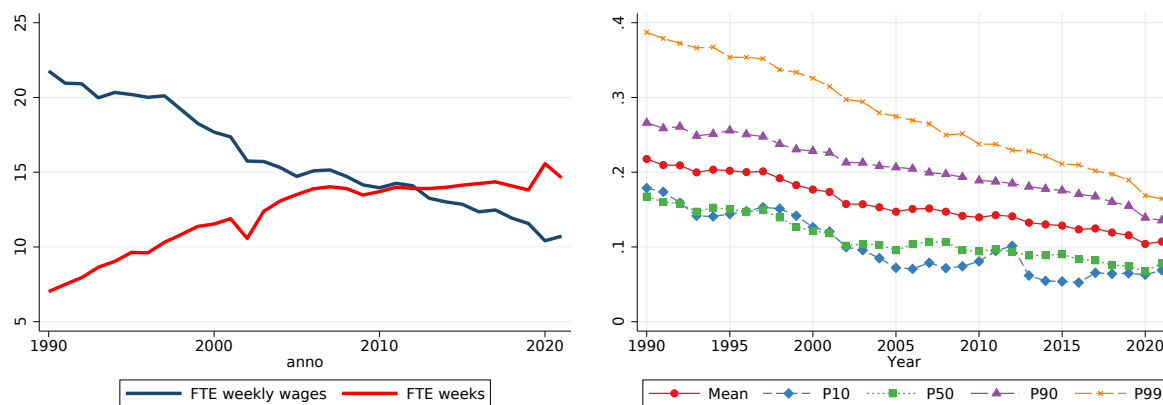
Notes: Differences between the annual averages of Full-Time Equivalent (FTE) wages or work units of men and women, as a percentage of the level observed among men. Non-farm private sector employees aged 15-64; a FTE wage is the weekly wage adjusted for full-time equivalent work units; the full-time equivalent work units are determined by dividing the total number of hours worked by the full-time contractual hours. Panel (b): percentiles are computed along the distributions of women and men respectively. **Source**: Calculations on INPS data.

Furthermore, since women earn less than men at the bottom of the wage distribution as well, they are more likely to receive a *unitary* wage that stands below 60 per cent of the median, a threshold that usually defines low-wage workers. According to Depalo and

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[6]According to INPS data, also considering public sector employees (about 20 per cent of employees in the total economy), the average pay gap in daily wages would be slightly lower; indeed, in the public sector — where the wage distribution is more compressed — the gender gap is almost 14 per cent lower than that observed among private employees.

Lattanzio (2023) 7.1 per cent of women are considered working poor according to this definition against 4.6 per cent of men. If we take into account that employed women also work fewer hours per year, and therefore look at the probability that *annual* earnings fall below 60% of the median, the gender gap is even larger (39 per cent of women against 25 per cent of men have a yearly wage below this threshold).

According to data from the Eurostat Structure of Earnings Survey for 2018 (the latest available year), the average pay gap between men and women in Italy is lower than that observed in the other main European countries, but this only depends on compositional effects. Since the participation of less qualified women is particularly low, female Italian workers tend to be relatively more educated than the European average and therefore to receive higher wages: net of this heterogeneity, the gender hourly wage gap in Italy is in line with the European figure.

The low female employment rate, together with the limited number of hours worked if employed, affects the economic conditions of women and their families. Indeed, the incidence of couples in which the woman is not employed or only works a few hours in Italy is particularly high in the European context — especially among the less well-off households. According to data from the EU-Survey on Income and Living Conditions referring to 2018, in 35 per cent of households in Italy with at least two adult members there is only one labour income recipient (in about 80 per cent of cases, it is a man); this share is much lower in the other main EU countries (28 per cent in Spain, 24 per cent in France and 23 per cent in Germany). This boosts labour income inequality at household level (which is higher in Italy compared with other EU countries such as France and Germany) and explains a significant part of the difference with respect to the other main EU countries. For example, if Italian women worked the same number of hours per year as German women, the Gini index on equivalised labour income would drop by almost 3 p.p., closing about 80 per cent of the gap with Germany (Bovini et al., 2023).

3 Education and school-to-work transition

This chapter first documents the existence of gender gaps in educational achievements and attainments, indicating that on average girls tend to outperform boys both at school and at university. However, women tend to sort and graduate into less remunerative fields of study, which imply worse career prospects in the labour market, both at secondary school and at university. The chapter then reviews the existing literature that analyses the determinants of gender gaps in field of study choices, indicating that they mainly originate from gender-specific preferences that are largely shaped by cultural norms and stereotypes. The second part of the chapter describes and explores the determinants of wage and employment gaps between boys and girls that emerges only one year after having completed their studies and confirms that differences in fields of study play a major role, especially among university graduates. Finally, it discusses some policy measures that could be effective in partly reducing these gaps, for instance, the exposure of girls to women employed in male-dominated occupations, who act as positive role models, or interventions aimed at revealing teachers' or parents' implicit biases.

3.1 Descriptive evidence on gender gaps in education

In all advanced economies, girls reach higher levels of educational attainment than boys. Across OECD countries, boys are more likely than girls to lack an upper-secondary qualification. When selecting an educational trajectory, boys are usually over-represented in vocational paths and less likely to enter into and graduate from tertiary education (OECD, 2022). Italy is no exception: while the share of tertiary graduates is in general very low by international standards, both for boys and for girls, the percentage of girls among university graduates aged 25-34 is above 60 per cent, a value substantially higher than the European average (Figure 7).

In all developed countries, girls also outperform boys in terms of educational achievements: on average across OECD countries with data available, boys are more likely to repeat a grade than girls and represent 61 per cent of repeaters in lower secondary education and 57 per cent in upper secondary education (OECD, 2022). Bovini et al. (2023) rely on administrative data on the universe of Italian graduates from upper secondary school and university between 2011 and 2018 to assess gender gaps in educational performance. They show that girls actually obtain higher final grades than boys at all educational levels: this also holds true within all high-school tracks and most university majors (Figure 8).

On examining the origin of this girls' advantage in education, Bovini et al. (2023) find that it appears larger at the bottom of the ability distribution. Girls' final university grades are above those of boys, especially among students who obtained relatively lower grades at the end of secondary school. Similarly, the gender gap in university enrolment

Figure 7: Educational attainment by gender

(a) Share of girls among tertiary graduates aged 25-34

(b) Education attainment, individuals aged 25-34
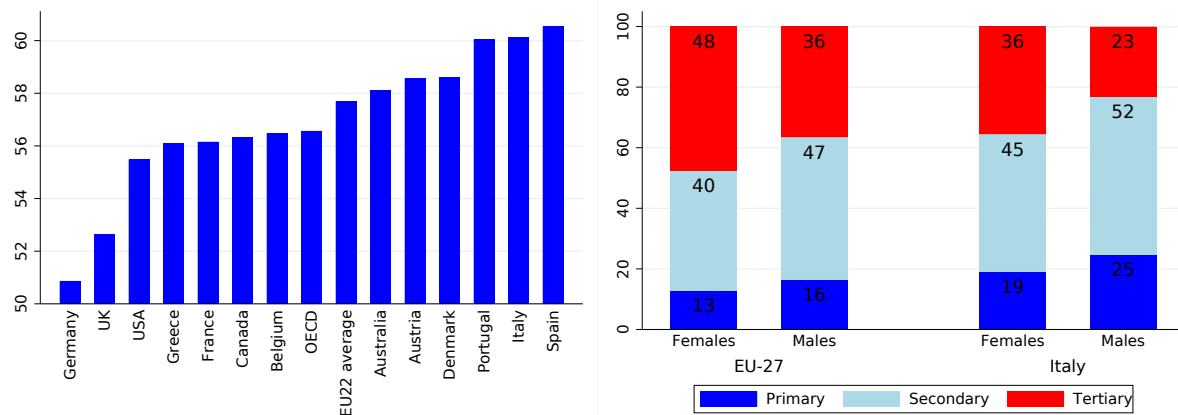
Notes: The data refer to the last available year (2021 for panel a, 2022 for panel b). **Source**: panel a, OECD Education at a Glance, 2022; panel b, Eurostat.

Figure 8: Final grades

(a) in secondary school, by high school track

(b) at university, by major
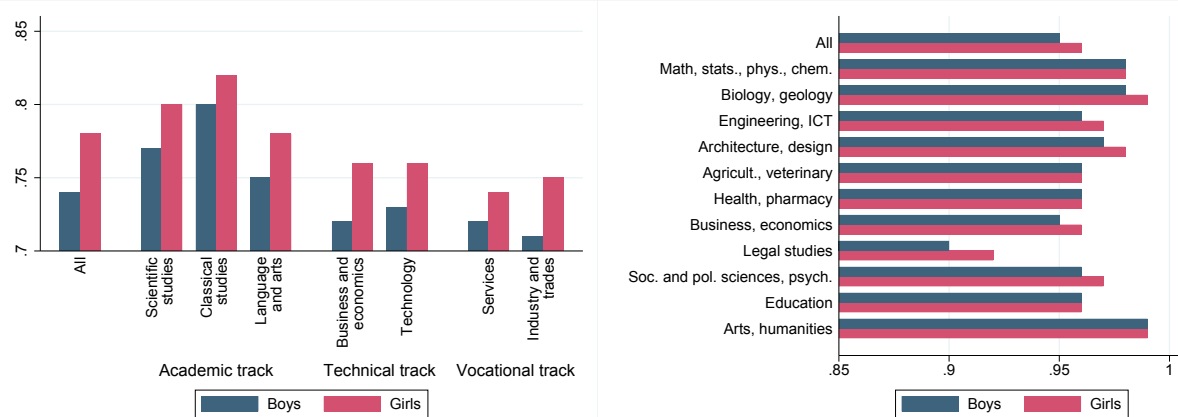
Notes: Cohorts who graduated from upper secondary school or from university (2nd level degree or a combined bachelor and master's degree) in the period 2011-2018. Final grades are re-scaled to range from 0.6 (minimum) to 1.01 (maximum, corresponding to 100 *cum Laude*). **Source**: Bovini et al. (2023).

is larger among students from less advantaged socio-economic backgrounds, with lower final secondary school grades (panel (a) of Figure 9) and who graduated from technical and vocational tracks (as opposed to the academic track; panel (b) of Figure 9).[7]

However, in all advanced countries there are substantial differences in the fields of study chosen by boys and girls, leading to very different career paths (OECD, 2021). Bovini et al. (2023) explore gender differences in secondary school tracks and university major choices among Italian students. In secondary school, girls make up a larger proportion of graduates in all non-STEM fields, such as humanities, languages, services

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[7]This is in line with some existing literature showing that boys are particularly affected by poorer home and school environments (see for instance Bertrand and Pan, 2013 or Chetty et al., 2016, even if they look at different outcomes).

Figure 9: Probability of enrolling in tertiary education

(a) by secondary school final grade   **(b)** by secondary school track

Notes: Cohorts who graduated from upper secondary school in the period 2011-2018. Secondary school graduates are assumed to have enrolled in tertiary education if they are registered as students in the administrative data for the year after graduation. Final grades range between 60 and 100 and are rescaled to take values between 0.6 and 1. Full marks with honours (100 cum Laude) are rescaled to take value 1. In panels (b) and (c), the lines capture quadratic fits to the data. **Source**: Bovini et al. (2023).

and social sciences (Panel (a) of Figure 10). At university too, girls tend to enrol in non-STEM majors.[8] Panel (b) of Figure 10 indicates that girls represent 94 per cent of those graduating in education, more than 80 per cent of those graduating in foreign languages and psychology and over 70 per cent of those graduating in humanities and social sciences. Instead only 40 per cent of graduates in the STEM majors are girls (27 per cent of students in engineering and ICT and 46 per cent in maths, chemistry and physics).[9]

Moreover, girls tend to enrol at lower-quality universities. First, they are less likely to move away from home (to a different region) to study; the gap is particularly large for those born in the South of Italy, a macro area where universities are on average of lower quality (Mariani and Torrini, 2022) and out-migration rates are large. Approximately 48 per cent of boys against 43 per cent of girls born in the South of Italy attend university in a different region.[10] Second, Bovini et al. (2023) indicate that, also because girls are less likely to change region to study, they tend to graduate from universities that are less likely to be ranked among the top 50 departments, according to the 2022 QS Italian ranking, and which receive a lower grade from the Italian Institute of university evaluation

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[8]This considers a narrow definition of STEM fields (that only includes Maths, Natural Sciences, Engineering and ICT).

[9]Similar gaps are observed on average in all OECD countries: in 2020, the latest available data show that girls represented approximately 80 per cent of graduates in Education and 70 per cent of graduates in the fields of Arts and Humanities or Social Sciences. The share of girls among graduates in Business or Law was smaller, approximately 57 per cent. Finally, girls represented about half of those graduating from the fields of Natural Sciences and Mathematics and only 27 per cent and 22 per cent of those graduating in Engineering and ICT, respectively. Overall the share of girls graduating in a STEM field in Italy seems to be in line with the average for OECD countries.

[10]This pattern is in line with the existing literature, for instance Rizzica (2013), De Angelis et al. (2016) and De Angelis et al. (2017).

Figure 10: Girls' fields of study

(a) share of girls across secondary school tracks

(b) share of girls across university majors

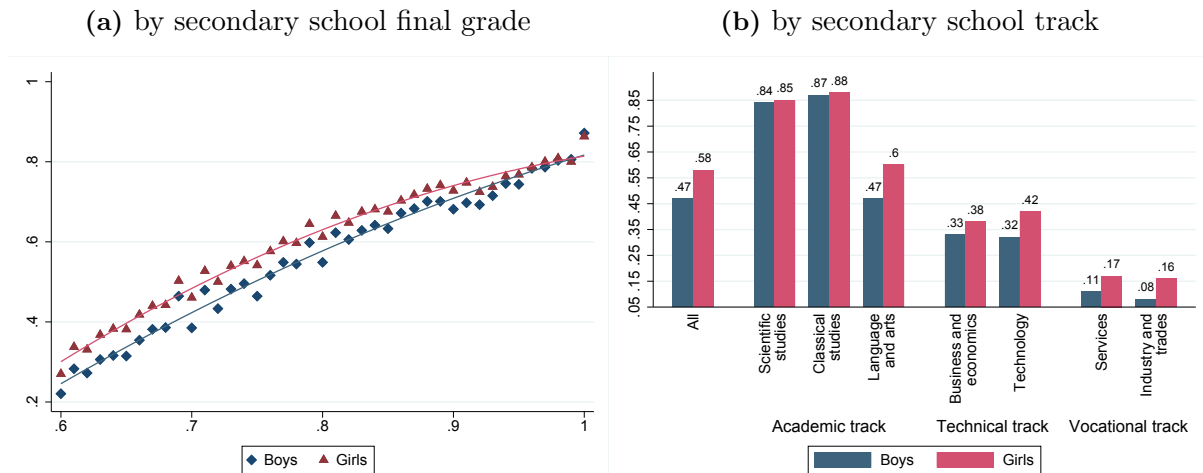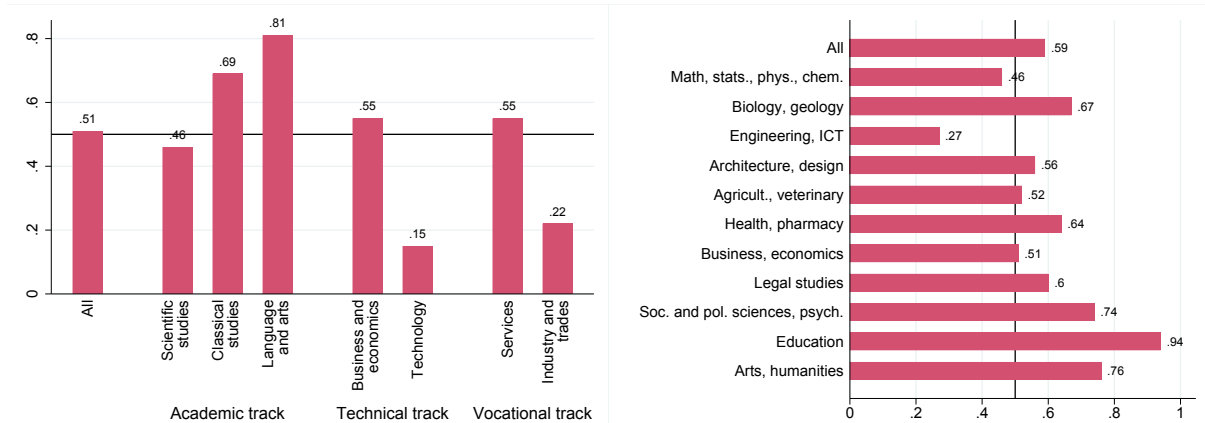**Notes:** Cohorts who graduated from upper secondary school or from university (2nd level degree or a combined bachelor and master's degree) in 2011-2018. Panel (a) shows the share of girls among secondary school graduates and within each sub-track; panel (b) reports the share of girls among university graduates and within each major (excluding majors in Defence and Strategic Studies and in Performing Arts). **Source**: Bovini et al. (2023).

(Evaluation of Research Quality, VQR score, ANVUR 2016).[11]

Overall, Bovini et al. (2023) show that these differences in field of study imply that girls tend to self-select into secondary school tracks and university degrees that will guarantee them lower-paying jobs.

Figure 11 refers to students who enrol in non-academic secondary school tracks (and who are therefore more likely to stop studying after secondary school). It defines secondary school tracks' potential career prospects depending on: *i)* the median annual earnings (panel a) and *ii)* the average employment probability (panel b) 5 years after the graduation of male non-immigrant graduates who did not continue to study. The results indicate that there is significant heterogeneity in high school tracks' average potential labour market outcomes: the average yearly earnings (employment probability) 5 years after graduation varies from about 20,000 euro (87 per cent) euro for graduates in Mechanics to approximately 13,000 euro (70 per cent) for graduates in Tourism studies. Importantly, girls are more likely to graduate from tracks with worse average labour market prospects in terms of both average earnings and employment probability.

Even at university women make educational choices that translate into lower expected labour market earnings. Figure 12 plots the average labour market returns (measured as the median yearly earnings 5 years after the graduation of male non-immigrant students) of each combination of universities and majors (referred to as a degree).[12] It indicates

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[11]The VQR exercises provide an up-to-date assessment of the state of research in the various scientific fields, in order to allocate the performance-based share of the Ordinary Financing Fund for the Italian University system. This ranking refers to the latest data available, those of the VQR exercise that covers the years between 2011 and 2014 and took place in 2015.

[12]We do not perform the same analysis also looking at differences in employment probability across majors, because — as will be shown later — gender differences in the employment rate among university graduates are negligible.

Figure 11: Types of secondary school track attended by girls

(a) Higher paying tracks

(b) Tracks with higher employment probabilities
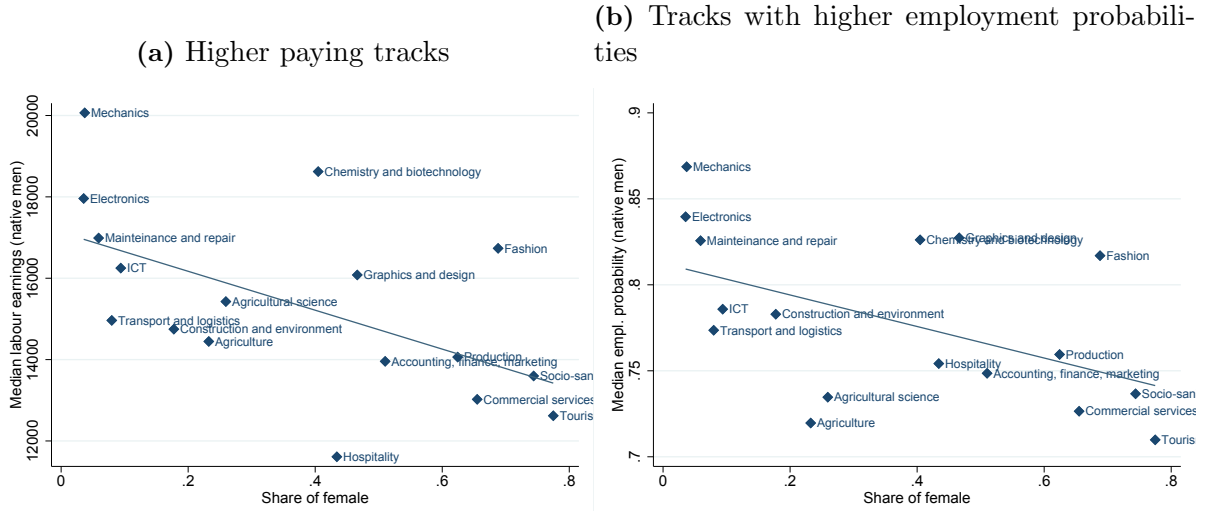
Source: **Notes**: Cohorts who graduated from non-academic (i.e., technical and vocational) tracks of upper secondary school in 2011-2018. On the $x-$ axis the share of girls among graduates is shown by track; on the y-axis the median annual income (panel a) or employment rate (panel b) 5 years after graduation by track in shown, computed on the population of native male students who stop studying after secondary school. The blue line captures the linear fit to the data. Bovini et al. (2023).

that girls select lower-paying degrees along the entire ability distribution (panel a): female students graduate in degrees that imply yearly earnings that are approximately 3,000 euro lower on average than those selected by male students. Moreover, this gap is larger for higher-ability students (it is about 2,000 euro at the bottom and 4,000 euro at the top of the ability distribution). This largely reflects the low share of girls, especially among high-achievers, who pursue STEM majors that are typically associated with high-paying careers. Indeed, when decomposing this by major (panel b), it appears that most of the differences come from students' choice of major: within a major (when the difference in degree quality only depends on the institution of enrolment) the gap is almost null (the blue and the red lines are very close to each other).

3.2 Understanding gender gaps in education

From the previous section, it emerges that there are large gender gaps in education. On the one hand, boys are disadvantaged in terms of educational attainment and achievements: they are less likely to finish secondary school and to graduate from university, and they tend to perform worse at school, especially those at the bottom of the income and ability distribution. This is a very important dimension that deserves further investigation (see for instance Goldin et al., 2006) but it is not our focus, since the aim of this report is to assess the origin of women's disadvantages in the labour market. On the other hand, women make education choices that translate into lower future labour market returns, and therefore lower attachment to the labour market. Understanding what drives these differences is thus crucial and we will focus our attention on this.

Figure 12: Degree quality by students' gender and ability

(a) Higher paying degrees

(b) Higher paying degrees, by major
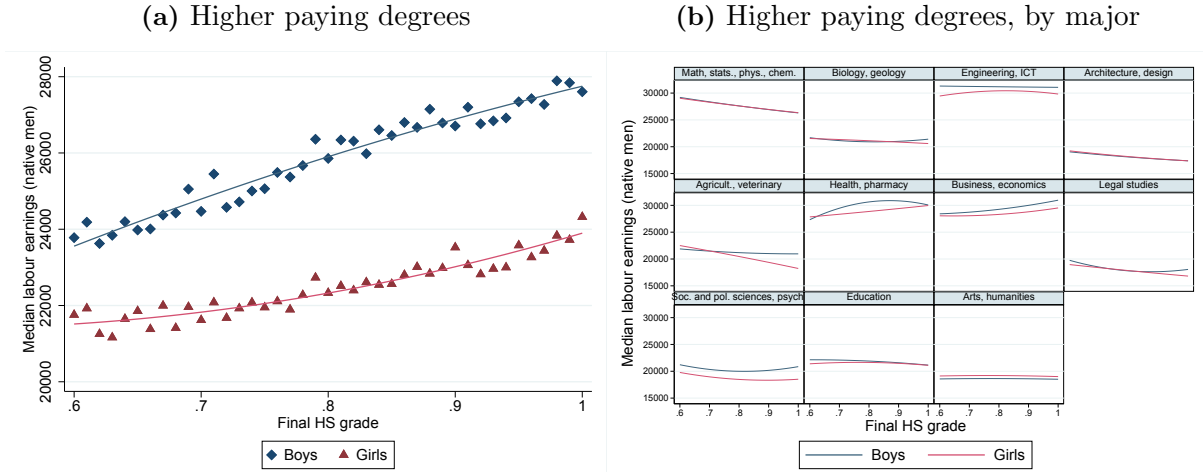
Notes: The sample consists of students who belong to the 2016-2018 cohorts of university graduates (2nd level degree or a combined bachelor and master's degree) and for whom the final high-school grade is also recorded. A degree is a university×major combination. The quality of a degree is measured by the median labour earnings of its native male students 5 years after graduation. **Source:** Bovini et al. (2023).

3.2.1 The role of skills

Different choices might reflect differences in skills. For example, girls may perform worse than boys in maths and sciences, and hence have a comparative disadvantage in these subjects, which are mostly needed to succeed in high-paying majors.

We can explore the importance of this explanation by looking at boys' and girls' scores in the standardised tests administered by INVALSI.[13] Panel (a) of Figure 13 shows the difference between the average scores of male and female students in the Language and Mathematics tests taken at different stages of the education cycle. From the beginning of primary school (grade 2) to the end of upper secondary school (grade 13), girls on average outperform boys in the language test, but they score lower in maths. Moreover, the gender gap in mathematics is negative along the entire distribution of grades (panel (b) of Figure 13). Notably, the gap widens with the age of the students and is larger for older students at the top of the grade distribution than at the bottom, so that it is particularly sizeable for high-achievers.

This pattern is not specific to Italy. In all countries that participate in the Programme for International Student Assessment (PISA) standardised testing of skills, 15 years old females have higher reading skills on average than males; on the other hand, in 31 out of 37 countries, they have lower mathematics skills (OECD, 2019; Appendix Figure A.1). In Italy, the positive gender gap in reading scores is slightly larger than the OECD average; worryingly, the negative gender gap in mathematics is much larger than the

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[13]INVALSI (*Istituto nazionale per la valutazione del sistema di istruzione e formazione*) is the Italian agency that administers standardised tests each year to all pupils at the start and at the end of primary school (grades 2 and 5), at the end of lower secondary school (grade 8), and at the start and at the end of upper secondary school (grades 10 and 13).

Figure 13: Gender gap in scores in standardised INVALSI tests

(a) By grade and subject (girls-boys)   **(b)** In maths, over the grade distribution
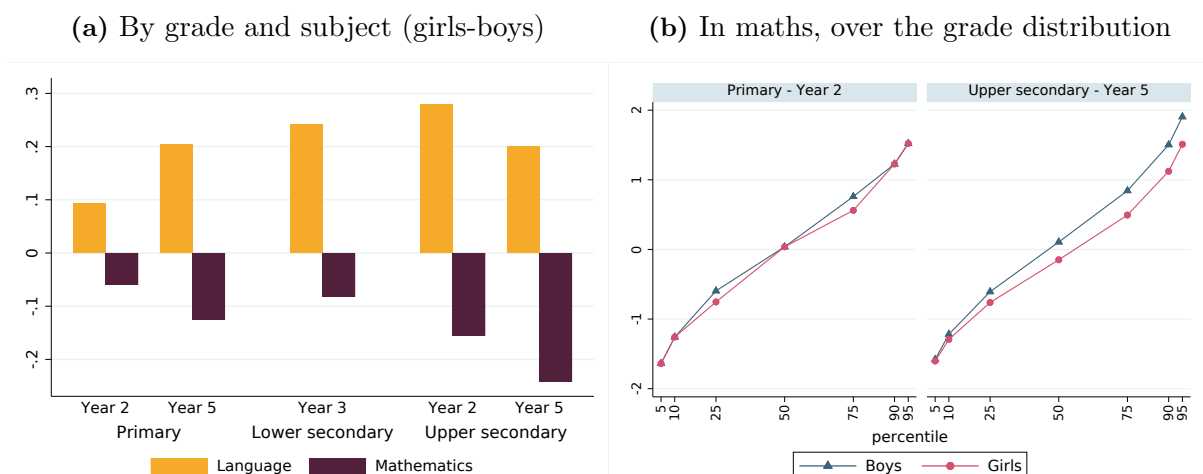
Notes: The data refer to the academic year 2018-19. Scores are standardised to have a mean equal to 0 and a standard deviation equal to 1 across all test takers. **Source**: INVALSI.

OECD average and is the largest in Europe.[14]

Comparative advantage is likely to be an important driver of a student's choice of high-school track and university major. Table 1 confirms that the share of girls with a comparative advantage in mathematics over language is smaller than that of boys in grade 8, when Italian students decide which high-school track to enrol in:[15] 31 per cent of male students have a maths score that belongs to a fourth higher than that of their language score (i.e., they have a comparative advantage in maths); this figure drops to 17 per cent for female pupils. The gender gap in comparative advantage persists up to grade 13, when students need to decide whether to pursue tertiary education and if so, which major to enrol in.

The evidence discussed so far shows that differences in skills and comparative advantages are significant. Breda et al. (2018) indeed document that girls' comparative advantage in reading over maths is a key determinant of the gender gap in enrolment in STEM majors across OECD countries. However, it does not appear to be the only driver of gender differences in education paths, at least in Italy.

Figure 14 analyses the choice of high-school track. It shows the average number of weekly maths teaching hours at grade 10 (a measure of how maths-intensive a high-school track is) by high-school track, gender and, notably, by individuals' comparative advantage measured at grade 8 (the last year of middle school).[16] Focusing on the academic

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[14]Moreover, the literature shows that, not only in Italy but also in other countries, the male advantage is not present (or is very small) at school entry and tends to emerge when students get older, during the first four years of school (Hyde et al., 2008; Penner and Paret, 2008; Fryer and Levitt, 2010).

[15]In the Italian school system there are three main high-school tracks: academic, technical and vocational. Within the academic track, the *liceo scientifico* (scientific studies) features the most maths-heavy curriculum, while the *liceo classico* (classical studies) and the other sub-tracks typically devote less instruction time to mathematics. Within the technical tracks, *istituti tecnologici* (technology sub-track) have the most maths-intensive curricula.

[16]In INVALSI microdata we cannot distinguish the various sub-tracks within the three principal

Table 1: Comparative advantage at grade 8

Language fourth	a. Boys				b. Girls			
	Mathematics fourth				Mathematics fourth			
	1	2	3	4	1	2	3	4
1	0.17	0.08	0.03	0.01	0.15	0.05	0.01	0.00
2	0.06	0.10	0.08	0.03	0.08	0.10	0.05	0.01
3	0.01	0.05	0.09	0.08	0.03	0.08	0.10	0.05
4	0.00	0.01	0.05	0.15	0.01	0.03	0.09	0.16

Notes: Each cell (i, j) of the table contains the share of boys (panel a) and girls (panel b) with a language score belonging to the *i-th* fourth of the distribution and a mathematics score belonging to the *j-th* fourth of the distribution. In the main diagonal (orange cells) students are equally skilled in language as in mathematics; in the lower triangle (yellow) they have a comparative advantage in language; in the upper triangle (blue) they have a comparative advantage in mathematics. **Source:** INVALSI, academic year 2018-19.

Figure 14: Comparative advantage at grade 8 and maths content in high-school curriculum at grade 10
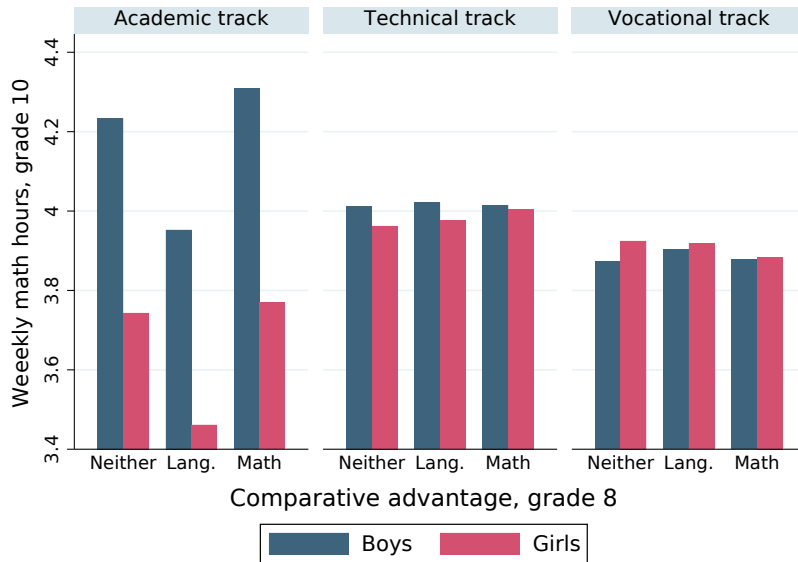
Notes: Comparative advantage at grade 8 and weekly mathematics teaching hours at grade 10 are computed for the cohort who attended grade 8 in the academic year 2014-15 and grade 10 in the academic year 2016-17. An individual has a comparative advantage in language (maths) if their language (maths) score belongs to a fourth of the grade distribution that is higher than that of the maths (language) score; an individual has no comparative advantage if the fourth of the grade distribution of her language score is the same as that of the maths score. **Source**: INVALSI.

track, having a comparative advantage in maths at the end of lower secondary school is associated with choosing more maths-heavy curricula in upper secondary school for both genders. However, even among students with a maths comparative advantage, girls are

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tracks (academic, technical, vocational). We, therefore, retrieve the information on weekly mathematics teaching hours (that vary across sub-tracks) from the questions asked by INVALSI to a representative sample of grade 10 maths teachers about their weekly teaching schedule in the class surveyed. This information, which we can link to students' data through a unique anonymised class ID, is therefore only available for a sample of pupils. We focus on the cohort that attended grade 8 in the academic year 2014-15 and grade 10 in the academic year 2016-17, as it is the one for which we have all the data available needed.

much less likely to choose a math-intensive track than boys.[17] Gender differences are more muted in technical and vocational tracks, also likely due to the smaller variation in mathematics teaching time across sub-tracks.

Concerning the choice of major, Bovini et al. (2023) show that, among university graduates, females are less likely than males to graduate from a narrow STEM major and, importantly, this gender gap is also sizeable among those who attended a maths-intensive upper secondary school track, who presumably have a comparative advantage in maths and science.[18] This finding is in line with the existing literature. Delaney and Devereux (2019) show that in Ireland, even for students with identical preparation at the end of secondary school in terms of both subjects studied and grades, there remains a 9 p.p. gender gap in the propensity to enrol in STEM courses at the tertiary level.

3.2.2 The role of preferences and stereotypes

Boys and girls may also make different choices because of differences in preferences. For instance, it is common for girls to state they dislike STEM subjects. The existing literature tends to agree that preferences are the main driver of gender differences in fields of study choices. For instance, a survey by Zafar (2013) documents that the largest determinant of college major choices for both genders is whether they enjoyed the coursework. Wiswall and Zafar (2017) find that job attributes, and especially non-pecuniary job attributes (like work flexibility), have a sizeable impact on choices of university majors for women. Ceci et al. (2014) also stress the importance of preferences towards job characteristics. They show that girls, differently from boys, prefer people-oriented rather than thing-oriented jobs and that this dichotomy explains a large part of gender differences in secondary school track and university major choices. Finally, Wiswall and Zafar (2014) randomly provide some students with information about the earnings and employment of people who chose a certain major; they still find that preferences — rather than expected earnings — are the dominant factor in the choice of university major and that they explain a large part of different choices by gender.

It therefore becomes important to assess what generates differences in preferences. If preferences are innate, then there may be no need for corrective actions, as choice differences would depend on intrinsic parameters. However, if preferences also depend on the context and vary over time, they may be a reflection of gender norms and stereotypes, and policy action may be needed (Bertrand, 2020). Some descriptive evidence shows that, at least in Italy, the gender gap in preferences appears quite small at early ages and it expands as children get older. According to a survey administered by INVALSI to 5-

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[17]This likely reflects the fact that even girls with a comparative advantage in mathematics are less likely to attend a *liceo scientifico*.

[18]See Appendix Figure A.2. Notice that Bovini et al. (2023) cannot use the same definition of comparative advantage used for the choice of secondary school tracks, since there is no information about subject-specific grades in their data.

th grade Italian pupils on their feelings about maths, girls are slightly less likely than boys to report having good or very good feelings about learning Mathematics at age 11 (approximately a 2 p.p. difference). Instead, PISA data show that at age 15, when asked about their work expectations, even girls who are top performers in STEM subjects are much less likely to state they expect to work in STEM jobs.[19]

The existing literature points out that, by affecting individuals' stereotypes and cultural values, the family and school environment impacts girls' performance and willingness to enrol in male-dominated subjects and majors (like STEM degrees). At country level, many studies have indicated how the average maths performance among girls is strongly correlated with gender attitudes in a country (Guiso et al., 2008; Pope and Sydnor, 2010; Nollenberger et al., 2016). Besides cross-country evidence, Brenøe (2022) uses a quasi-experimental variation to show that girls born in a family with opposite-sex siblings acquire less traditional gender norms, and are more likely to graduate in a STEM degree and to work in less female-dominated occupations than girls with a same-sex sibling. Dossi et al. (2021) identify families with a preference for boys by using fertility-stopping rules and show that girls raised in boy-biased families have more traditional gender attitudes and that this translates into lower performance in maths. Teachers are also an important determinant of stereotypes and gender norms, as will be discussed in detail in Section 3.2.3. Finally, Di Addario et al. (2023) indicate that women's probability of graduating in a STEM major at university and of becoming an inventor crucially depends on cultural factors regarding the role of women in society, which are very persistent over time. In particular, the authors show that a higher participation of women in medieval guilds — which according to some historians were a tool that gave women decision-making and economic power — at municipal level is associated with a higher incidence of female inventors nowadays, and a higher number of patent submissions by women.

3.2.3 The role of the school environment: curricula, peers and teachers

The school environment can also be an important determinant of gender gaps in the choices of the field of study and in the performance in scientific subjects (see for instance Kahn and Ginther, 2018; McNally, 2020); some evidence suggests that schools are very heterogeneous in their ability to develop talents in STEM, especially among girls, and that this heterogeneity mostly depends on unobservable factors (see Ellison and Swanson, 2010).

Peer composition at school could be important. The existing literature tends to show that attending classes with many same-sex peers does not affect girls' field of study choices nor does it improve their performance at school both in the short and the long run (while

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[19]See Appendix Figure A.3. In particular, in panel (b) it appears that in Italy the gender difference in the share of top performers who expect to work in STEM jobs is approximately 14 p.p. (26 per cent of boys against 12 per cent of girls); it is slightly smaller in the OECD (12 p.p.).

it generally has a positive effect on boys, at least in the short term; see Anelli and Peri, 2019; Park et al., 2018; Doris et al., 2013). Instead, it appears that attending classes with very high-ability same-sex peers has positive effects on educational outcomes for both girls and boys. Modena et al. (2022) exploit individual-level administrative data on the population of Italian university students to analyse the effects of high-performing male and female peers on individual academic performance. They find that higher shares of high-performing peers improve both the extensive margin of student performance (in terms of the number of exams taken) and its intensive margin (in terms of grades). Two findings clearly emerge. First, the strongest effect comes from same-gender peers. This result can be rationalised within the role model framework: observing similar-gender students doing particularly well affects students' own perception of themselves and their study effort positively. Second, high-performing female peers have beneficial effects on males too while high-performing male peers do not affect female students; when they do so, their impact can even become negative. This is consistent with the results of the literature according to which men increase their self-confidence in competitive environments with other men, while women tend to become less confident under competitive pressure with men (Niederle and Vesterlund, 2007).

The structure of curricula is another determinant of school choice and performance. For instance, more exposure to maths or science early in the educational path may lead more girls into STEM subjects. Several studies have analysed the effect of curricula reforms, which generally increase the teaching hours in maths or science, on gender gaps in educational outcomes. These studies suggest that the type of curriculum reforms and of students who are affected (for instance whether higher-ability or lower-ability students) are important to understand the effect of such policies. In general, more scientific subjects in secondary school increase overall enrolment in STEM subjects at tertiary level, but — even if the evidence is mixed — the increase appears to be concentrated mostly among boys (Joensen and Nielsen, 2016; Görlitz and Gravert, 2018; De Philippis, 2023). These reforms, therefore, tend to widen the gender gap in STEM enrolment at university.

Finally, teachers are a key input in the production of student achievement (Rockoff, 2004 and Rivkin et al., 2005); some recent papers have pointed out that their impact persists through adulthood (Chetty et al., 2014). In general, the existing literature points out that teachers can reduce gender gaps in education. First, they can act as a role model. While the effect of having a female teacher for female students appears to be small (and even slightly negative) in primary school (Antecol et al., 2015), studies looking at secondary school and university teachers usually find that having a female teacher has a positive effect on female students' achievements and on the probability of selecting and graduating in male-dominated degrees (e.g., Nixon and Robinson, 1999; Bettinger and Long, 2005; Dee, 2007; Hoffmann and Oreopoulos, 2009). Carrell et al. (2010) for instance, using the random allocation of students to teachers, find that, although a professor's

gender has little impact on male students, the highest-ability girls are more likely to graduate in a STEM major and achieve better grades in maths and sciences if assigned to a female STEM instructor at university. Bottia et al. (2015) also show that exposure to female maths and science teachers in high school increases the probability that female students are willing to major in STEM subjects in college, especially for girls with high maths ability. These results confirm that stereotypes and cultural factors seem to play an important role in girls' field of study choices.

Second, teachers also affect students' performance in maths and science through their possible bias in favour of or against female students, with long-term consequences on subject choices. Carlana (2019) studies teachers' stereotypes in Italy. She finds that teachers are strongly and implicitly gender-stereotyped and tend to believe that girls are worse than men in scientific fields. This has a negative and significant effect on girls' performance and self-confidence in maths and induces girls to self-select into less demanding high schools, following their teachers' (biased) track recommendations. Moreover, Lavy and Sand (2018) measure bias using class-gender differences in scores between school exams graded by (randomly assigned) teachers and national exams graded blindly by external examiners. They show that in maths girls outscore boys in the blind exam and boys outscore girls in the non-blind exam, suggesting there is significant gender bias among teachers. Furthermore, they show that a negative bias has long-term negative effects both on achievements and on the probability of enrolling in advanced-level maths courses during middle and high school. Terrier (2020) also uses a combination of blind and non-blind test scores to show that in France girls tend to benefit from positive gender bias on the part of middle school maths teachers and that this makes them more likely to select a science track in secondary school.[20]

3.3 School-to-work transition: descriptive evidence on early career gender earning gaps

This section focuses on the gender pay gap in the first few years after labour market entry; this is an important object of study since it tends to persist over the life-cycle, to widen after childbirth, and to become especially large at the top of the distribution (see Chapters 4 and 6). Arellano-Bover et al. (2023) show that the decrease in the overall gender hourly wage gap observed in the last forty years in Italy (Chapter 2), as well as in other countries, was mainly due to a reduction in the gender gap in entry wages across cohorts rather than to within-cohorts dynamics (see Figure 15). This is important to understand the sources of the observed gender convergence, as it suggests that it was mainly driven by factors taking place during the initial sorting of workers to firms or

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[20]Jansson and Tyrefors (2020) also find the same bias in exam correction in favour of boys at university, especially among male graders.

by compositional changes in the characteristics of men and women entering the labour market (like the more marked increase in women's educational attainments relatively to men's). The paper actually shows some evidence of a gradual change in the initial allocation of young men and women across firms.

Figure 15: Gender gap in weekly wages between and within cohorts
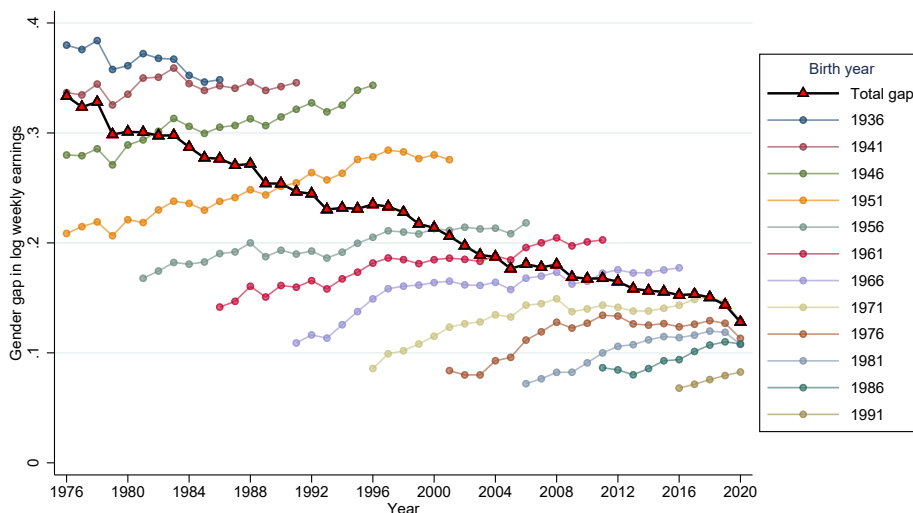
Notes: In each year, the data pools information about all workers who were between 25 and 64 years old, worked in the private sector for at least 27 weeks year, earned strictly positive wages, and did not retire. Weekly wages are expressed in full-time equivalent units. **Source**: Arellano-Bover et al. (2023).

Bovini et al. (2023) assess what determines gender gaps in entry wages using a unique dataset assembled from multiple administrative registers. For the universe of students graduating in Italy from upper secondary school or from university over the period 2011-2018, the dataset matches information on their educational career paths with data about their earnings and their jobs' characteristics in the first years since graduation (up to 7 for the oldest cohort).[21] The remainder of this chapter summarises the main findings of this study.

First, the authors show that girls' labour market outcomes are already worse than boys' at the start of their careers. Strikingly, this disadvantage materialises only 1 year after graduation and holds at any level of education. Figure 16 confirms that, as shown in the previous section, girls graduating from secondary school are more likely than boys to enrol in further education. However, among those who do not continue studying, girls are less likely to be employed: 1 year after secondary school graduation there is already a 10 p.p. gender gap in employment probabilities, which remains stable for up to 5 years. Instead, the gender employment gap is very small among university graduates (3 p.p.)

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[21]Taken from: the Italian Ministry of Education and Merit (MIM); the Ministry of University and Research (MUR), the tax records collected by the Ministry of Finance (MEF); mandatory reporting data on job contracts collected by the Ministry of Labour and Social Policies (MLPS) and firms registers and matched employer-employee data, maintained and collected by INPS.

Figure 16: Boys' and girls' condition 1 year after graduation
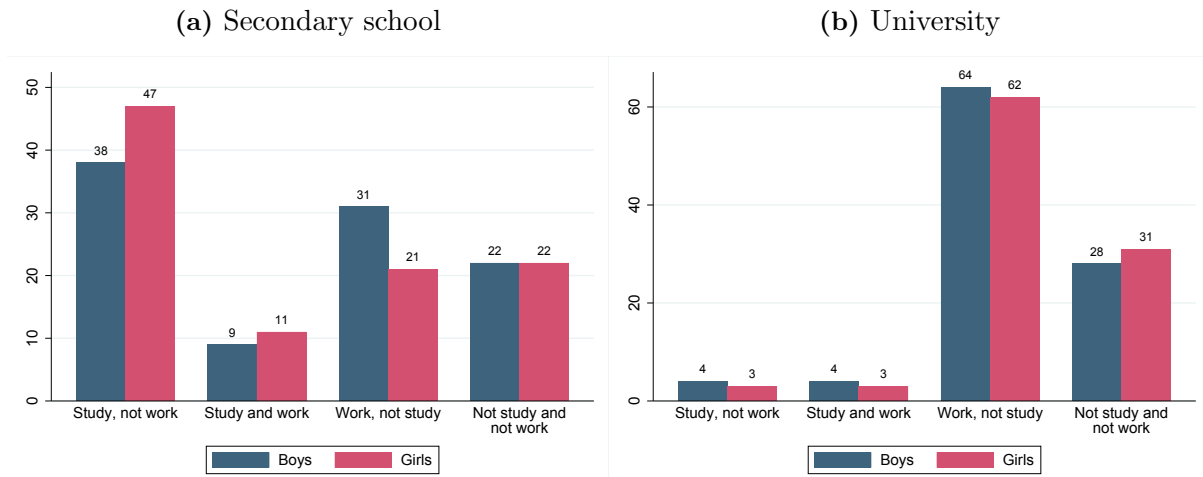
(a) Secondary school

(b) University

Notes: Cohorts who graduated from upper secondary school or university (2nd level or a combined bachelor and master's degree) in the period 2011-2018. An individual is classified as studying if he/she is enrolled in a course 1 year after graduating from upper secondary school (panel a) or from university (panel b). An individual is classified as working if he/she has a non-zero annual labour income. **Source**: Bovini et al. (2023).

and it vanishes after 5 years.

Figure 17 displays the percentage gap in earnings at the mean, focusing on graduates who work and have completed their studies. At 1 year after graduation, there is a significant gender gap in annual labour earnings (32 per cent among high-school-educated workers and 26 per cent among the university-educated). The gap in daily wages is smaller at every education level indicating that part of the annual earnings gap stems from days worked, especially among secondary school graduates.[22] Focusing on full-time workers — hence only considering differences in pay rates and not in work intensity —, the gap in daily wages further declines (16 per cent among high-school-educated and 13 per cent among university-educated workers), due to a higher prevalence of part-time work among female employees. Five years after graduation, the differences remain large.[23,24]

Finally, Figure 18 shows that the gap is approximately constant in all the deciles of the wage distribution.[25] This is an important finding: the existing literature tends to find that the aggregate gender wage gap widens at the top of the distribution (Arulampalam

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[22]Since days worked are only recorded for employees, the gap in daily wages is only computed for workers whose main employment in a given year is salaried; the gap in daily wage for full-time workers is only computed for the subset of employees whose type of contract is recorded (approximately 80 per cent). The magnitude of the gaps, however, is very similar even if the sample is kept fixed.

[23]It is interesting to notice that the gap in annual earnings among secondary school graduates shrinks, due to a narrower gap in days worked, whereas that in daily wages remains roughly constant. For university graduates, on the other hand, the gap in annual wages does not change while that in daily wages increases, suggesting growing disparities in pay rates.

[24]These earning gaps may seem large if compared with the figures for the overall population (see for instance Chapter 2), but are broadly in line with similar evidence for the early career gender gaps in the population of university graduates in Italy emerging from survey data (AlmaLaurea, 2022). Similar figures have also been found for Germany (Francesconi and Parey, 2018).

[25]The figure only considers full-time employees, as gender differences in hours and days worked would otherwise confound the comparison.

Figure 17: Gender pay gap at the mean 1, 3 and 5 years after graduation
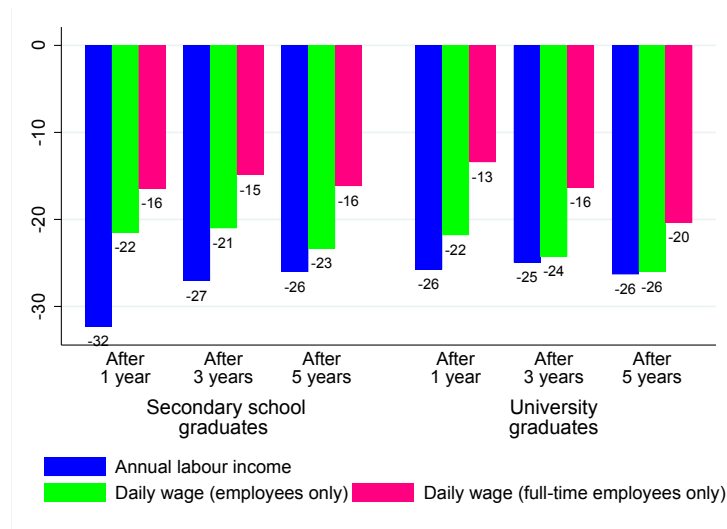
Notes: Values represent the differences between women and men wages, relative to men's wages. Gaps 1 year after graduation are computed on cohorts who graduated from upper secondary school or university (2nd level or a combined bachelor and master's degree) in 2011-2018; gaps 3 and 5 years after graduation are computed on cohorts who graduated in 2011-2016 and 2011-2014, respectively. Only graduates who work and no longer study are considered. Annual labour income is calculated for all workers; the daily wage is only computed for employees (i.e., those whose prevalent source of labour income is from private employment); the daily wage for full-time workers is computed for the subset of employees for whom the information on their schedule is available (81 per cent of employees 1 year after graduation and 86 per cent of employees 5 years after graduation. **Source**: Bovini et al. (2023).

et al., 2007; Casarico and Lattanzio, 2023b). Bovini et al. (2023) show that this is not the case for young workers.

Figure 18: Daily wage distribution of full-time employees, 1 year after graduation by gender and educational level.
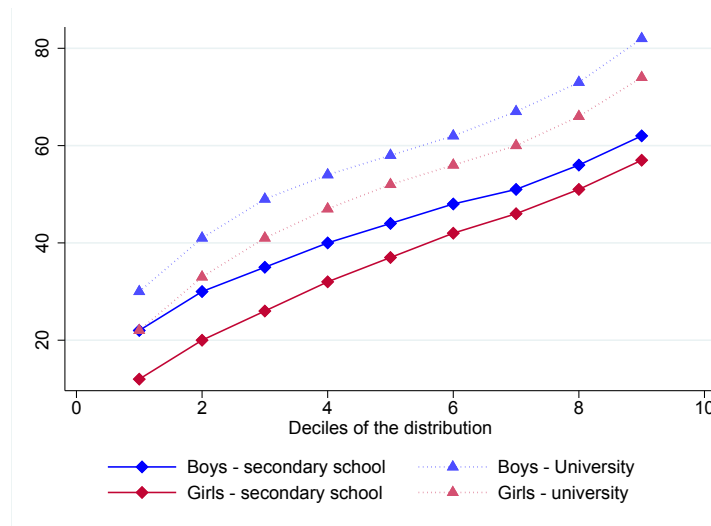
Notes: cohorts who graduated from upper secondary school or university (2nd level or a combined bachelor and master's degree) in 2011-2018. Only graduates who work and no longer study are considered. Annual labour income is calculated for all workers; the daily wage for full-time workers is oncomputed for the subset of employees for whom the information on the work schedule is available (81 per cent of employees). The figure plots the deciles of the wage distribution, by gender and final education level. **Source**: Bovini et al. (2023).

3.4 Understanding the early career gender earning gaps: a two-step analysis

Understanding the determinants of these sizeable early career gender pay gaps is important to design policies that can tackle them. Bovini et al. (2023) model their emergence as a two-step process. First, boys and girls choose which high-school track or university major to pursue. Second, after graduation, they decide whether to become employees or self-employed; if they decide to become employees, they match with an employer.

In their empirical analysis, the authors assess to what extent gender differences in educational choices can explain *aggregate* gender gaps. They document that the sorting of girls into less remunerative fields explains a large share of gender pay differences after graduation, especially among university graduates.

Nevertheless, they show that within-field gender gaps are also substantial. This motivates the second step of the analysis, which explores within-field gender differences in jobs' and employers' characteristics and assesses to what extent they account for residual *within-field-of-study* gender pay disparities. The authors show that, from the beginning of their careers, girls sort into less productive firms.

### 3.4.1 Step 1: The role of education choices

Figure 19 shows the result of the Oaxaca-Blinder decomposition that explores the role of educational choices.

For secondary school graduates, differences in high-school tracks explain 30 per cent of the gender gap in average (log) daily wage 1 year after graduation. The figure is slightly larger when looking at differences at the bottom (i.e., the probability of being in the bottom 10 per cent of the wage distribution) and slightly smaller when focusing on gaps at the top (i.e., the probability of being in the top 10 per cent of the wage distribution). Gender differences in academic achievements (final grade and age at graduation) play a very limited role and, if anything, they narrow the pay gap, as girls on average outperform boys; also demographic differences appear to give a very small contribution. Overall, around 70 per cent of the gap in daily wages remains unexplained by education and demographic factors for this group of individuals.[26]

Different educational choices are more important for university graduates, likely because of the higher degree of specialisation of university majors with respect to high school tracks. One year after graduation, majors account for almost 60 per cent of the average

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[26]The main sample for this analysis consists of all individuals who *(i)* graduated from secondary school or university between 2011 and 2018 and *(ii)* 1 year after graduating were employed as private sector employees and no longer studied. Moreover, most of the decomposition focuses on private sector employees because detailed information on the job characteristics and employers is only available for this group. For the self-employed the only information available is their sector of activity; for public sector employees, detailed information on employer attributes (i.e., size, wage bill, workforce education) is not available.

Figure 19: Oaxaca decomposition of gaps in daily wages 1 year after graduation, educational controls only

(a) Secondary school graduates   **(b)** University graduates
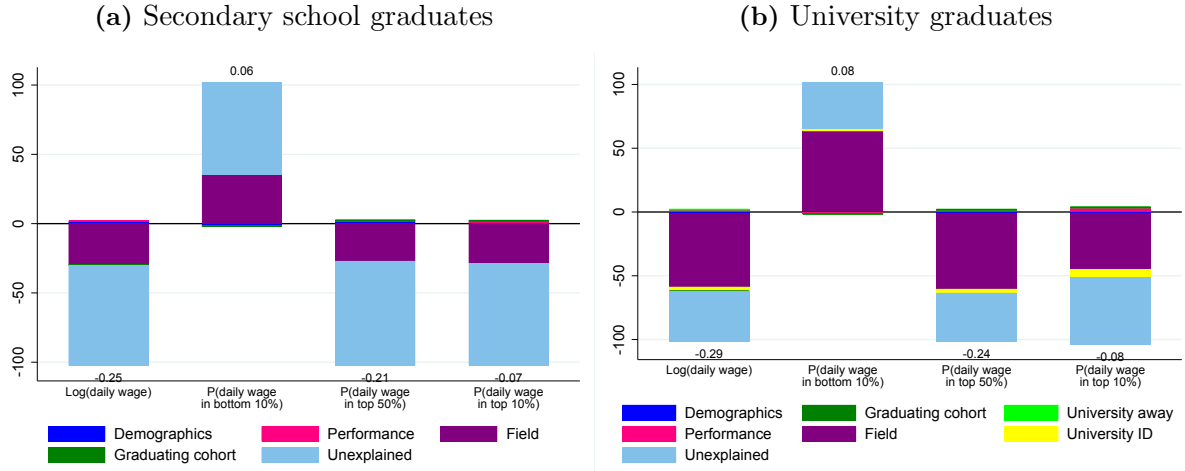
Notes: Cohorts who graduated from non-academic upper secondary school tracks or university (2nd level or a combined bachelor and master's degree) in 2011-2018. Only graduates who work and no longer study are considered. P(daily wage) is the probability that the daily wage falls within the bottom tenth, is below the median or exceeds the top tenth of the wage distribution. "Demographics" includes region of birth fixed effects, marital status, and socio-economic background as captured by ventiles of parents' total income. "Performance" includes age and final grade at graduation, as well as their squares. "Field" contains high-school track (panel a) or major (panel b) fixed effects. "Graduating cohorts" includes year-of-graduation fixed effects (2011-2018). In panel b the Oaxaca decomposition also includes fixed effects for each university as well as a dummy for whether the worker graduated from a university located in a region different from the birth one. The decomposition is performed on the sample of private sector employees for whom these controls, as well as – for the sake of comparability – those that will be included in later Oaxaca-decomposition (see Figures 21 and 22), are observed. Bars sum to 100. The number at the top of each bar reports the value of the overall gender gap in each dimension. **Source**: Bovini et al. (2023).

gender wage gap. Interestingly, their role is more important at the bottom than at the top of the wage distribution. Differences in the choice of which university to attend (yellow bars) play a very small role, which is however more visible among the top earners.[27] All in all, 40 per cent of the wage gap is not explained by education and socio-demographic characteristics on average; this share increases along the wage distribution.

3.4.2 Step 2: The role of firms and job characteristics for given fields of study

Nonetheless, young women earn less than men even within each field of study. At the median, gaps in annual labour income among workers are ubiquitous and in some fields as large as 30-40 per cent 5 years after graduation.

Table 2 shows how graduates — who are employed and have terminated their studies — are distributed among types of employment one year after graduation. The table displays the average incidence among boys (column 1), the aggregate female-male gap (column 2), as well as the 25*th*, 50*th* and 75*th* percentile of the distribution of the within-field female-male gap in each considered dimension (columns 3, 4, and 5). Virtually all

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[27]As found for secondary graduates, disparities in academic performance would imply a smaller gap than that observed (especially at the top), due to girls' advantage in this dimension. Socio-demographic controls have a very limited impact.

Table 2: Gender gap (girls-boys) in type of employment, 1 year after graduation

	All		Within fields		
	M	F-M		F-M	
			p25	p50	p75
A. Secondary-school graduates					
Private sector employees (%)	94.4	1.5	-0.6	1.0	2.6
Public sector employees (%)	0.5	0.5	0.2	0.4	1.2
Self-employed (%)	4.9	-1.9	-3.3	-2.0	-0.6
B. University graduates					
Private sector employees (%)	74.6	-2.4	0.4	1.5	4.2
Public sector employees (%)	6.5	7.4	0.1	0.8	2.2
Self-employed (%)	19.0	-5.0	-5.1	-3.5	-0.9

Notes: Cohorts who graduated from non-academic upper secondary school or university (2nd level or one-cycle degrees) degrees in 2011-2018. Only graduates who work and no longer study are considered. Column (1) displays the value among males; column (2) reports the gender gap (female-male); columns (3), (4) and (5) show the 25*th*, 50*th* and 75*th* percentiles of the distribution of the within-field-of-study gap. **Source**: Bovini et al. (2023).

those with a secondary education who are in employment work as private employees, and gender differences in the type of employment are modest. Among those with tertiary education, both the share of employees and of self-employed are higher. Moreover, girls are much more likely than boys to be public employees (by 7.4 p.p.) and less likely to be either self-employed (by 5.5 p.p.) or private employees (by 2.4 p.p.). These differences mainly stem from the field of study rather than from within-field gender gaps (indeed, the aggregate gender gap — which encompasses both within and between field of study differences — tend to be very different from within-major gender differences). Appendix Figure A.4 shows that gender pay gaps are very different by type of employment (they are much smaller among public employees for instance, see also Chapter 6); the different allocation of workers by type of employment therefore matters for the aggregate gender wage gap.

Tables 3 and 4 look at other job characteristics for secondary school and university graduates, respectively.[28] One year after leaving secondary school, women are already more likely than men to have a part-time contract and less likely to have a permanent contract. Employees with a high-school diploma are mostly found in medium-skill occupations, especially so for girls (who are mainly employed as sales assistants or restaurant staff). Interestingly, young women work closer to their birthplace (-7 kilometres compared with the male average of 93). The characteristics of the employer are also different between genders. Firms employing females who just graduated from secondary school are on average younger, smaller (22 employees; 31 for boys), and have a much higher proportion of female employees. Notably, they pay roughly 9 per cent lower wages on average and have 18 per cent lower value added (VA) per worker (used as a proxy for

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[28]The results are presented for employees only, as information on the type of self-employment is far scarcer. Given the very small share of public employees with just a high school attainment (less than 1 per cent), Table 3 focuses on private sector employees.

Table 3: Gender gap (girls-boys) in job and employer characteristics, 1 year after graduation from secondary school

	Private employees				
	All		Within fields		
	M	F-M	F-M		
			p25	p50	p75
Part-time contract (%)	29	20.8	13.0	19.7	22.9
Permanent contract (%)	23	-2.4	-2.7	-1.9	0.5
High-skill occ. (%)	10	-2.8	-3.9	-1.5	0.3
Medium-skill occ. (%)	60	20.0	15.0	17.8	21.6
Low-skill occ. (%)	30	-17.3	-17.7	-15.0	-13.3
Firm distance from birth muni.	93	-6.9	-16.9	-3.2	4.4
Firm average age	17	-2.4	-3.6	-2.0	-1.3
Firm size	31	-9.2	-13.7	-9.4	-1.4
Co-workers' average educ.	12	0.3	0.2	0.2	0.3
Female co-workers (%)	33	28.6	22.3	25.1	28.4
Firm VA per worker	38	-6.8	-10.0	-5.9	-3.1
Firm av. wage	1937	-175	-229.8	-143.6	-82.6

Notes: Cohorts who graduated from non-academic upper secondary school in 2011-2018. Only graduates who work and no longer study are considered. Column (1) displays the value among males; column (2) reports the gender gap (female-male); columns (3), (4) and (5) show the 25*th*, 50*th* and 75*th* percentiles of the distribution of the within-field-of-study gap. Employer characteristics are computed as averages over the period 2014-2018. **Source**: Bovini et al. (2023).

firm productivity). Median within-field gaps are in most cases of similar magnitude to aggregate ones. In line with what has been documented so far, this suggests that sorting into different high-school tracks only explains a fraction of early career gender gaps and that, from the very start, female graduates hold different, lower-quality, jobs than same-track male graduates.

Table 4 looks at university graduates. Compared with recent secondary school graduates, they have more stable jobs[29], are employed in higher-skill occupations and work in firms that are farther away from their birthplace, older, larger, higher-paying, and more productive. Gender gaps in job characteristics are marked for this population as well. They go in the same direction as those documented for high-school graduates. Importantly, however, for university graduates median within-major gaps are substantially smaller than the aggregate ones along all the considered dimensions, confirming the importance of gender differences in the choice of majors, as documented in the previous section.

Moreover, Figure 20 shows that these initial allocative gender differences in the firms where people are first employed do not fade away over time. Five years after graduation men and women are equally likely to have remained in the firm of their first employment (grey bars); among those who changed employer, however, boys are more (less) likely than girls to have moved into a more (less or equally) productive firm than the starting one.

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[29]The share of temporary workers appears nonetheless very high; this is because in Italy firms typically hire workers on a temporary basis, and then they convert their contract to a permanent one (see for instance, Sestito and Viviano, 2018). Five years after graduation, the share of employees with a permanent contract is equal to 75 per cent on average (and is larger for boys).

Table 4: Gender gap (girls-boys) in job and employer characteristics, 1 year after graduation from university

| | Private employees | | | | | Public employees | | | | |
| | All | | Within fields | | | All | | Within fields | | |
| | M | F-M | F-M | | | M | F-M | F-M | | |
			p25	p50	p75			p25	p50	p75
Part-time contract (%)	14	17.6	2.6	6.1	9.6	18	2.5	-1.3	1.6	5.1
Permanent contract (%)	38	-7.2	-6.3	-3.5	-2.6	30	-6.9	-10.8	-3.1	-0.9
High-skill occ. (%)	66	-12.0	-5.9	-2.9	-1.2	84	7.1	0.0	1.1	3.5
Medium skill occ. (%)	30	13.1	2.7	6.5	8.2	14	-7.0	-6.2	-1.6	-0.1
Low skill occ. (%)	4	-1.2	-3.9	-2.3	-0.5	2	0.1	0.0	0.2	1.0
Firm distance from birth muni.	246	-46.4	-24.5	-9.8	9.1	283	-21.4	-84.4	-12.8	22.7
Firm average age	22	-2.6	-2.1	-1.5	-0.8					
Firm size	189	-89.7	-20.4	-6.2	4.6					
Co-workers' average educ.	14	-0.2	-0.1	0.0	0.1					
Female co-workers (%)	37	19.9	8.4	11.5	14.8					
Firm VA per worker	61	-12.6	-5.9	-3.8	-2.2					
Firm av. wage	2983	-522.4	-276.6	-144.6	-53.7					

Notes: cohorts who graduated from university (2nd-cycle and single degrees) in 2011-2018. Only graduates who work and no longer study are considered. Column (1) displays the value among males; column (2) reports the gender gap (female-male); columns (3), (4) and (5) show the 25th, 50th and 75th percentiles of the distribution of the within-field-of-study gap. Employer characteristics are computed as averages over the period 2014-2018. **Source**: Bovini et al. (2023).

Figure 20: Gender gaps in employer productivity (value added per employee)

(a) Allocation 1 year after graduation *(shares)*
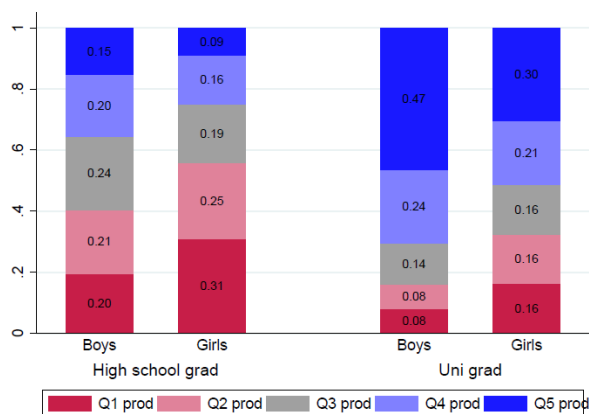
(b) Movements along the productivity ladder between 1 and 5 years after graduation *(shares)*
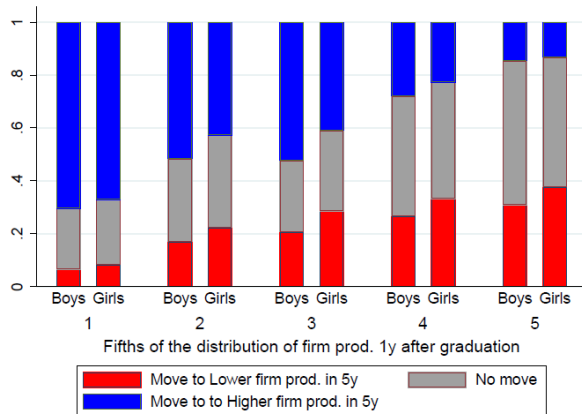
Notes: cohorts who graduated from upper secondary school or university (2nd level or a combined bachelor and master's degree) in the period 2011-2018 (panel a) and 2011-2014 (panel b). Only graduates who work and no longer study are considered. Panel (a): boys' and girls' allocation into fifths of the distribution of employer productivity (value added per worker) 1 year after graduation. Panel (b): the red (blue) bars capture the probability of falling down (climbing up) the productivity ladder, i.e. moving to a firm with lower or equal (higher) productivity than that of the original firm; the grey bars represent the probability of remaining in the same firm. Private sector employees only, as the information on productivity is not available for public sector employees. **Source**: Bovini et al. (2023).

It is then important to understand how much differences in job characteristics, such as those in Tables 3 and 4, explain earnings' within field gender gaps. Figures 21 and 22 present the results of the Oaxaca-Blinder decomposition of the average daily wage gap for private-sector employees for whom there is no missing information on job and employer attributes (i.e., the same sample as in Figure 19). The Oaxaca decomposition is run

separately for each high-school track/university major. To summarise the results of this set of Oaxaca-decompositions, Figures 21 and 22 plot the 25th, 50th and 75th percentiles of the distribution of the gender gap fraction within each field that is explained by each job attribute.[30] The control variables included in the Oaxaca decomposition are reported in detail in the footnote to the table.

Figure 21 shows that a higher prevalence of part-time contracts and of lower-paying occupations plays the largest role in explaining the within-field wage gender gaps for secondary school graduates. Focusing on employer attributes, the sorting of female graduates into smaller, younger and less productive firms than male graduates matters the most. It is also interesting to notice the non-trivial role of sorting of women into firms with a higher share of female co-workers: this evidence could signal non-wage amenities that are particularly valued by young women. Nevertheless, despite the availability of this rich set of controls, the unexplained within-field component of the gender early career gap is around 25 per cent at the median (40 per cent at the 75th percentile of the distribution).
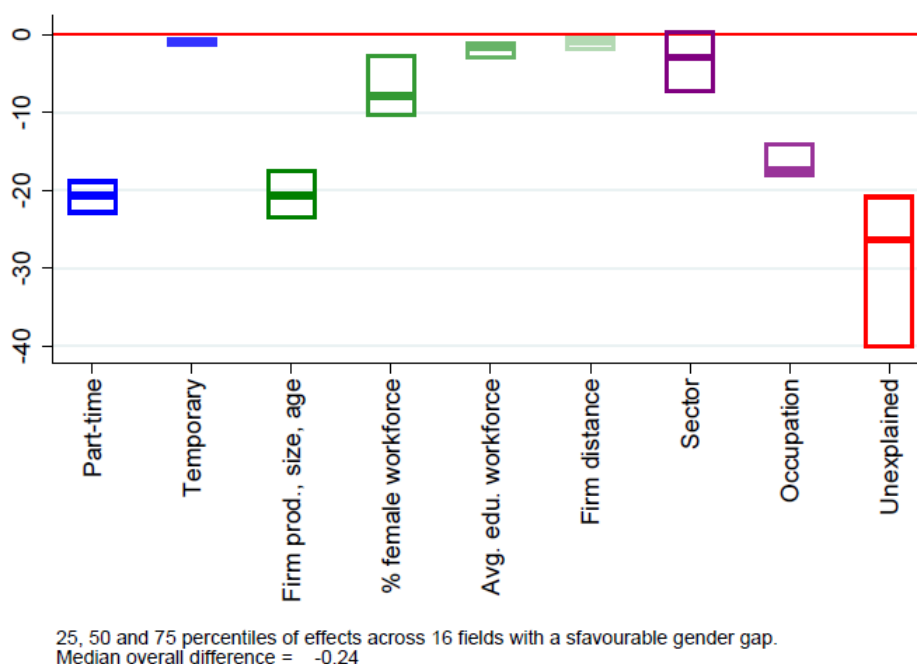
Figure 22 displays the results for university-educated private sector employees. As for high-school-educated employees, the job attribute that matters the most is whether the contract is part-time; the most important employer attributes are size, age and productivity. However, the residual (i.e. the unexplained) portion of the within-field gender gap is far larger than for secondary school graduates: 40 per cent at the median and around 55 per cent at the 75th percentile of the distribution. This suggests that, while the choice of majors is a very important determinant of the gender pay gap among university graduates, within-major differences in firm and job characteristics play a relatively little role; the residual gender gap is probably related to factors that cannot be observed even in the very granular data available to Bovini et al. (2023) (for instance, negotiation skills or availability to work very long hours, see Chapter 6).

3.4.3   Summing up the evidence on early career gender wage gaps

Bovini et al. (2023) then summarise the extent to which differences in educational choices, academic achievement and job characteristics, explain the early career gender gap. This is done by estimating regressions that progressively add controls at a higher level of granularity than is possible in the Oaxaca-Blinder decomposition. They find that, after controlling for all the variables that capture education choices and academic achievement, the raw (unconditional) gap in daily wages one year after graduation shrinks by almost 30 per cent for high-school-educated workers and by almost 60 per cent for college-

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[30]More formally, let J be the number of fields of study and I the number of job attributes; e_i^j is the fraction of the gender gap within field j explained by each job attribute i and u^j is the part of the gender gap within track j that remains unexplained after controlling for all job attributes i. The Figures then plot the 25th, 50th and 75th percentiles of the distribution of $(e_i^1, e_i^2, .., e_i^{J-1}, e_i^J)_{i=1}^{i=I}$ and of $(u^1, u^2, .., u^{J-1}, u^J)$.

Figure 21: Within field of study gap: Oaxaca-Blinder decomposition of average (log) daily wage 1 year after graduation, secondary school graduates *(percent)*
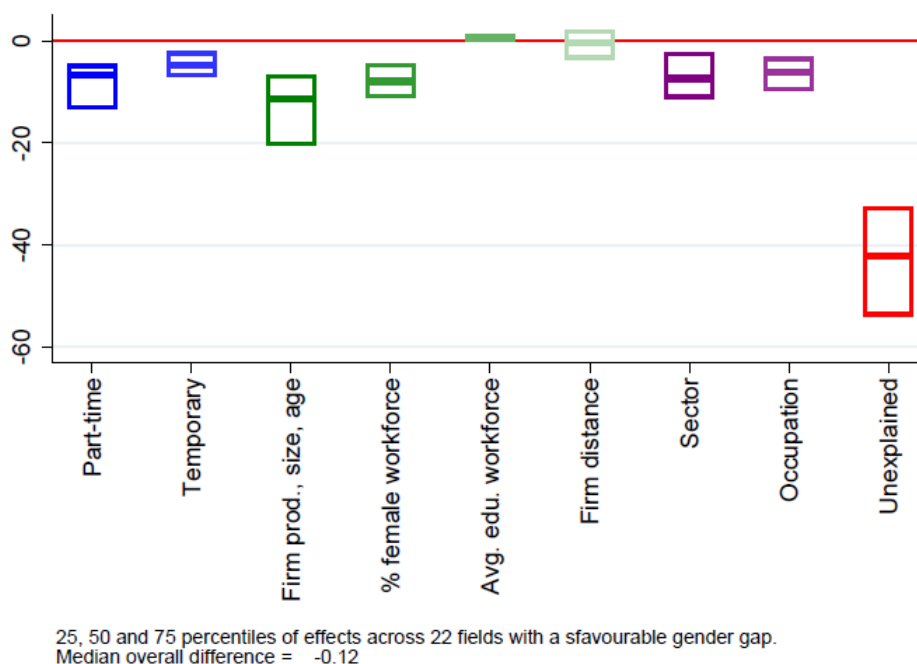

25, 50 and 75 percentiles of effects across 16 fields with a sfavourable gender gap.
Median overall difference =   -0.24

Notes: cohorts who graduated from upper secondary school in the period 2011-2018. Only graduates who work and no longer study are considered. "Part-time" and "Temporary" include dummies for whether the contract is part-time or temporary, respectively. "Firm prod., size, age" contains the following information on the employer: age, size, productivity (i.e. value added per worker), and their squares; " per cent female workforce" includes the share of the workforce in the firm who are female, and its square; " per cent edu. workforce" consists of the average education (in years) of the workforce in the firm, and its square; "Firm distance" captures the distance between the birth municipality and the work municipality, aggregated in 10 bins; and "Sector" and "Occupation" are 2-digit occupation and sector fixed effects, respectively. Finally, "Unexplained" captures the fraction of the gap not explained by the aforementioned factors. The decomposition is performed on the sample of private sector employees for whom these controls, as well as - for the sake of comparability - those that have been included in later Oaxaca decomposition (see Figure 19), are observed. **Source**: Bovini et al. (2023).

educated ones and that differences in fields of study play by far the largest role. The larger contribution of educational choices for university students compared with secondary school students probably depends on the higher degree of specialisation of university majors with respect to secondary school tracks.

Moreover, they find that all controls that capture differences in job attributes and employer characteristics, net of education effects, account for about 45 per cent of the raw gap for secondary school graduates and 20 per cent for university graduates.

Finally, even with the very detailed set of available controls included in the regressions, approximately 25 per cent of the early career gender wage gap remains unexplained among secondary school graduates (20 per cent among university graduates); this share is higher at the top of the wage distribution. This unexplained component is probably due to differences in characteristics that are difficult to measure and observe, like negotiation skills or non-cognitive traits.

Figure 22: Within field of study gap: Oaxaca-Blinder decomposition of average (log) daily wage 1 year after graduation, university graduates *(percent)*

25, 50 and 75 percentiles of effects across 22 fields with a sfavourable gender gap.
Median overall difference =   -0.12

Notes: cohorts who graduated from upper secondary school in the period 2011-2018. Only graduates who work and no longer study are considered. "Part-time" and "Temporary" include dummies for whether the contract is part-time or temporary, respectively. "Firm prod., size, age" contains the following information on the employer: age, size, productivity (i.e. value added per worker), and their squares; " per cent female workforce" includes the share of the workforce in the firm who are female, and its square; " per cent edu. workforce" consists of the average education (in years) of the workforce in the firm, and its square; "Firm distance" captures the distance between the birth municipality and the work municipality, aggregated in 10 bins; and "Sector" and "Occupation" are 2-digit occupation and sector fixed effects, respectively. Finally, "Unexplained" captures the fraction of the gap not explained by the aforementioned factors. The decomposition is performed on the sample of private sector employees for whom these controls, as well as - for the sake of comparability - those that have been included in later Oaxaca-decomposition (see Figure 19), are observed. **Source**: Bovini et al. (2023).

3.5   Policy implications

This chapter documents four important facts. First, girls on average achieve higher educational levels and outperform boys in education. Second, girls select very different university majors and high school tracks from boys, and specifically they choose subjects that involve considerably worse labour market prospects. Bovini et al. (2023) find that the choice of the field of study explains about 60 per cent of the wage gap 1 year after graduation among university graduates. Among secondary school graduates high school track choices still matter substantially (they explain 30 per cent of the gap) but the largest contribution comes from differences in jobs characteristics: even among men and women who graduate from the same high school track, women are employed under lower-paying contracts (part-time) and in lower-paying and less productive firms. Finally, approximately 20 to 25 per cent of the gender gap remains unexplained by the very detailed set of available controls included in the regressions.

Overall, from these results it emerges how actions should also be taken when boys and girls choose their high school track and, especially, their university major. As discussed in

this chapter, the literature agrees that differences in the choice of the field of study mostly depend on preferences, which are largely shaped not by innate and immutable factors, but rather by the school and home environment, and by cultural norms and stereotypes. It is therefore possible for policymakers to act in order to partially overcome some of these cultural barriers, for example through interventions at school that expose students to positive role models (women working in STEM jobs or occupying high-level positions) or that raise awareness of parents' and teachers' stereotypes (including implicit ones).

The existing evidence indicates that role models can be very effective in reducing some of these cultural barriers. As mentioned before, female students' performance and enrolment in STEM and other male-dominated subjects are positively affected by the presence of a female maths teacher and by interaction with high-performing female peers. Moreover, some papers indicate that even very small interventions — that briefly expose female students to women working in male-dominated occupations — can have sizeable and long-lasting effects.[31]

Finally, policies aimed at reducing teachers' or parents' biases can induce students to modify their behaviours (see also Chapter 6). For instance, schools and universities may favour exam formats that limit possible biased behaviours (like written, blind graded tests). Moreover, Alesina et al. (2018) show that revealing teachers' implicit biases improves the school performances of discriminated students. Importantly, the effect only emerges if teachers are given information about their own biases: generic debiasing messages informing them of the presence of false beliefs toward certain demographic groups are not sufficient.

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[31]Breda et al. (2018) show that in France a brief exposure to female role models working in scientific fields greatly affected high school students' perceptions and induced them to enrol in selective and male-dominated STEM programs in college, especially among high-achieving girls. Porter and Serra (2020) also show that female students exposed in introductory classes to successful women who majored in economics at the same university are more likely to enrol in further economics classes and to complete their economics degrees.

4   Maternity and labour market outcomes

This chapter extensively investigates the evidence on the relationship between female employment and fertility decisions. Section 4.1 first discusses how, at aggregate level, the correlation between these two variables has changed across OECD countries over time, turning from negative in the 1980s to positive in the 2000s. Second, it shows that child penalties — the negative effects of parenthood on the careers of mothers — are large and observed everywhere. In Italy, a sizeable share of women still exits employment at childbirth, even if less so than in past decades. Among those who remain employed, women tend to work less after childbirth and this translates into lower earnings in the long run. Indeed, the asymmetrical impact of parenthood on men and women is still considered the main driver of the remaining gender gaps in many developed countries (Angelov et al., 2016; Kleven et al., 2019).

Family-friendly policies — like parental leave and subsidised childcare — may play a significant role in boosting female labour supply and reducing gender gaps. Informed by the vast literature on the topic and given the system of family-friendly policies currently in place in Italy, Section 4.2 outlines the main areas of policy interventions, focussing in particular on expanding childcare facilities and providing more generous paternity leaves to increase fathers' involvement in household responsibilities.

The last part of this chapter returns to the relationship between employment and fertility, looking in particular at the causal impact of employment on fertility. This issue is particularly important in a country like Italy, which has both very low female employment and fertility rates. The literature shows that this relationship varies according to the sample of women analysed (Section 4.3). If we focus on women who, for exogenous reasons, lose their job, the effect of employment on fertility is positive; but if we look at other contexts, where women are on the margins of the participation decision, the sign may change. In general, working time flexibility and job stability positively affect fertility.

## 4.1   The 'cost' of motherhood in the labour market

Female employment and fertility are two highly interrelated and jointly determined decisions, also affected by common factors, including culture and social norms.

The macro literature has shown that the relationship between female employment and fertility rates has evolved and reversed over time. Doepke et al. (2022) show that the negative relationship between fertility and female employment rates observed in the 1980s has turned out to be positive since 2000 in high-income countries that currently feature ultra-low fertility rates. According to the authors the compatibility of women's career and family goals is now a key driver of fertility decisions in high-income countries. New-generation fertility models refer to a shift in women's aspirations to explain the change in

the relationship between employment and fertility. While in the past women believed that work and family were incompatible, they now aspire to have both — likewise men. Thus, in countries where it is easy to combine career and family, women have both; in countries where the two are in conflict, women are forced to choose between the two, leading to both fewer children being born and fewer women working. In this sense, family-friendly policies which aim to help parents — especially women — to combine work and family responsibilities seem to play a crucial role.

This evidence is consistent with the results of Barbiellini Amedei et al. (2023) that provide a long-run estimation of the relationship between fertility dynamics and female labour force participation in Italy after WWII. The authors show that the unconditional correlation across all Italian regions by year is strongly negative up to the mid-1990s, turning positive in the early 2000s (see Figure 23). A more formal econometric analysis — based on panel cointegration techniques — confirms that the negative correlation holds until 1995, then it weakens and becomes not significant afterwards.

Figure 23: Cross-correlation: female participation rates (FPRs) and total fertility rates (TFRs), Italy (1951-2019)
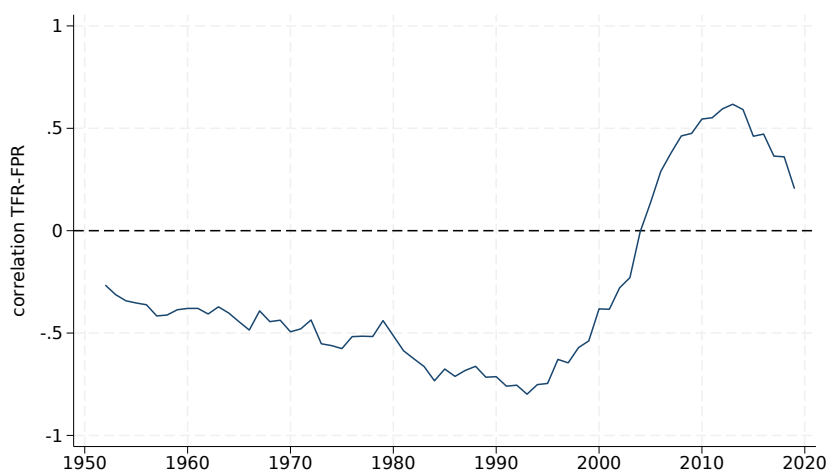

Notes: The figure plots the unconditional correlation between fertility and female employment rates across Italian regions by year. **Source:** Barbiellini Amedei et al. (2023).

Moving to micro data, simple descriptive evidence based on the European Labour Force Survey (EULFS; Figure 24) shows that marriage and parenthood correlate differently with employment across genders. In the main European economies, married women experience lower employment rates than unmarried women, especially during their (most) fertile years, while the opposite is observed for men (Figure A.5). In Italy, and to a lesser extent in Spain, this gap persists over time; in France and in Germany, instead, the gap observed at childbearing age cancels out at older ages.

Some studies aimed at estimating the causal impact of fertility on maternal labour outcomes use preferences for a mixed sibling-sex composition (Angrist and Evans, 1998) or success with IVF (in vitro fertilisation) treatments (Lundborg et al., 2017) as instruments

Figure 24: Female employment rates along the life cycle, by country and marital status
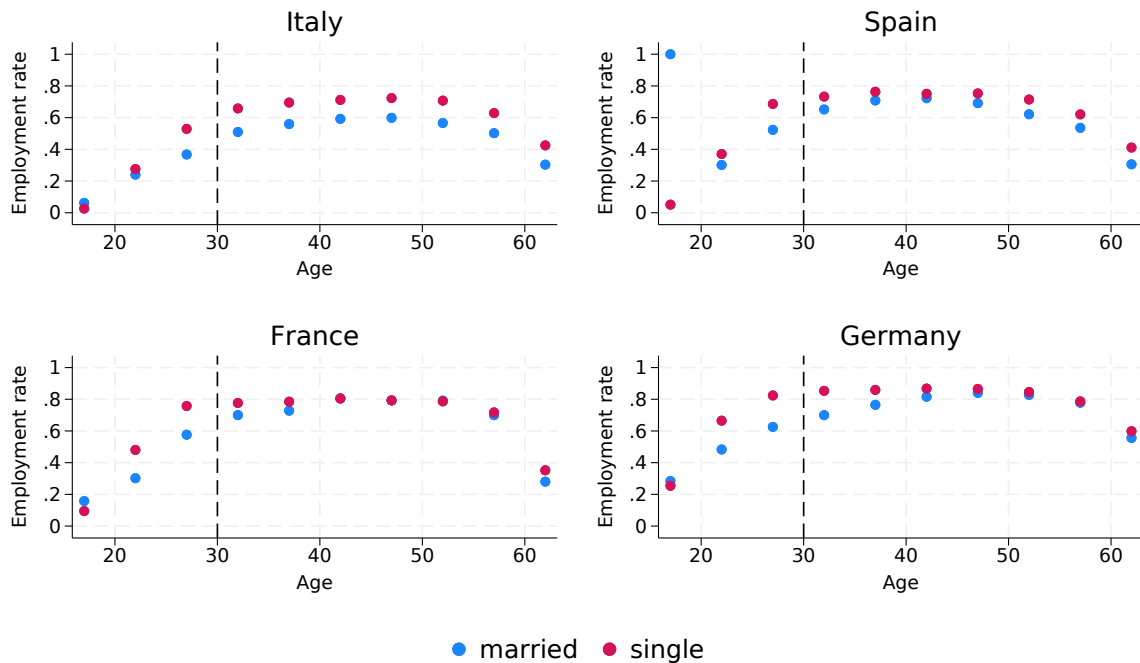
Notes: 30 is the mean age of women at the birth of their first child across the selected countries in 2019. **Source:** European Labour Force Survey, 2019.

for childbearing. However, the generalisation and external validity of their results is rather limited since estimates are based on small samples and refer to very particular treatment effects (i.e., having at least a third child) and samples (i.e., large families or those who access IVF treatments).

Other studies have analysed the trajectories of earnings of men and women, and how they diverge during childbirth, for highly-educated professionals. Bertrand et al. (2010) document that female, but not male, MBA graduates employed in the financial sector experience a significant loss in earnings after childbirth. Azmat and Ferrer (2017a) observe the same evidence among lawyers.

Thanks to the growing access to large-scale administrative data, a rich literature that estimates the *child penalty* in the overall population has recently flourished (Angelov et al. 2016; Kleven and Landais 2017 are seminal works). The child penalty is, broadly speaking, the negative effects that childbirth — typically the first — has on the labour outcomes of mothers compared with fathers (or similar women without children). Under certain given identifying assumptions, this provides evidence of the causal impact of fertility choices on maternal labour outcomes.[32]

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[32]The main approach is based on event study analyses around the birth of the first child. This relies on the idea that, while fertility choices are not exogenous, the event of having a child generates sharp changes in labour market outcomes that are arguably not correlated to other unobserved determinants, which should evolve smoothly over time. The identification of the child penalty in the short run relies on the assumption that in the absence of maternity, the outcome would be evolve smoothly. The identification

Child penalties are significant, long-lasting (up to 20 years) and widespread in all countries, even in those considered as the benchmark for gender equality, such as the Nordic countries (Angelov et al. 2016 for Sweden; Kleven et al. 2019 for Denmark; Sieppi and Pehkonen 2019 for Finland; Andresen and Nix 2022 for Norway).[33] Goldin et al. (2022) show that in the US the motherhood penalty (with respect to non-mothers) lowers over time when children grow up and women increase their working hours; however, fathers expand their relative premium — with respect to non-fathers observed after childbirth —, particularly among those with a college degree.[34]

De Philippis and Lo Bello (2023) and Casarico and Lattanzio (2023a) contribute to this literature by investigating the child penalty in Italy on different maternal labour supply outcomes, employing social security administrative data provided by the Italian National Social Security Institute (INPS) and data from the Italian Labour Force Survey (ILFS). The former looks at the effect of childbirth on the employment gap between mothers and non-mothers. The latter assesses the earnings gap relative to non-mothers by looking at mothers who continue to work after childbirth, thus focusing on differences along the intensive margin of labour supply.

De Philippis and Lo Bello (2023) first show that the main driver of the reduction in the gender employment gap observed between 1984 and 2019 was the significant decline in women's flows out of the labour market that is typically observed around the age of fertility. Figure 25 highlights a considerable rise in the employment rates of married women at fertility and at subsequent ages across different generations.

The authors then turn to social security administrative data to assess the child penalty in the flows into and out of employment and how this has evolved over time. By comparing the employment trajectories before and after childbirth of mothers and non-mothers, they find that childbirth almost doubles the probability of quitting employment (panel a of Figure 26).[35] Despite being smaller, this increase is still observed 15 years later. At the same time, the probability of entry into employment is lower around childbirth and goes back to the original level approximately 5 years after maternity (panel b of Figure 26). Overall, the change in employment is largely negative after childbirth. However, the authors also find that child penalties in employment probabilities have strongly decreased

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of the long-run penalty relies on parallel trends between men and women, conditional on controls for time and lifecycle trends. While event studies cannot formally address the endogeneity of fertility, Kleven et al. (2019) prove that the event study estimates of the effect of a third birth are close to the IV-based estimates that use twins or sex composition as an IV for a third birth.

[33]Kleven et al. 2019 provide estimates of the child penalty in earnings for six developed economies (Denmark, Sweden, the US, the UK, Austria and Germany); de Quinto et al., 2021 provide evidence for Spain; Cortés and Pan, 2023 for the US; Martino, 2022 for Italy.

[34]The authors show that the parental gender gap in earnings in the US is lower for highly educated with respect to low-educated mothers but is still substantial.

[35]De Philippis and Lo Bello (2023) and Casarico and Lattanzio (2023a) follow Kleven et al. (2019) in assigning placebo births to non-mothers; they do so by assigning a random draw from the distribution of age at birth of mothers to non-mothers.

Figure 25: Employment probability along the life cycle and across generations in Italy

(a) Women

(b) Men
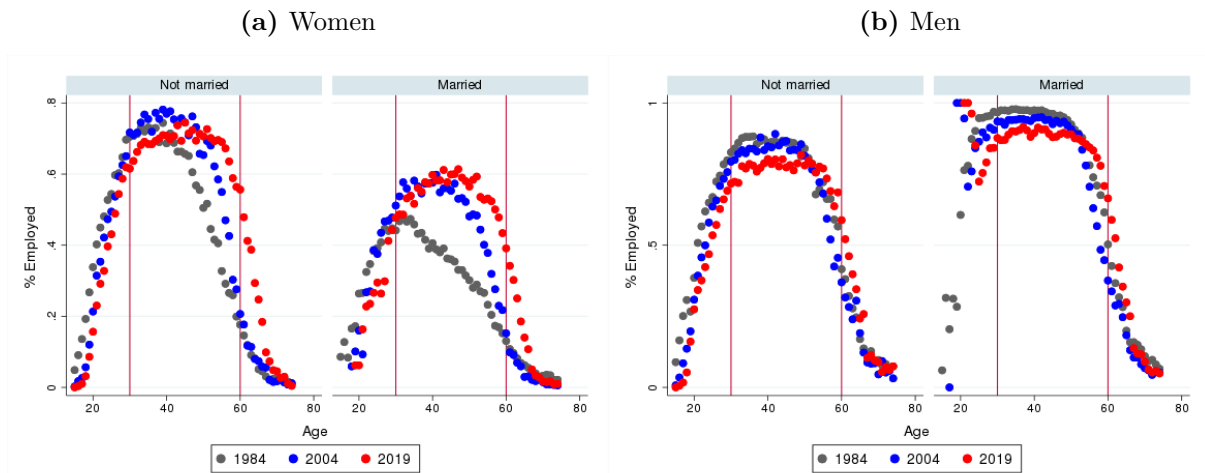
Notes: Share of employed individuals over age (15-74), by marital status. The authors use married individuals to proxy for individuals with children, since this information is not available in the ILFS before 2004. The definition of married individuals includes all cohabiting couples. **Source:** De Philippis and Lo Bello (2023).

over time: the effect of childbirth on the probability of exiting and entering employment has almost halved for younger cohorts with respect to older generations.

Figure 26: Child employment penalties

(a) Employment-to-non-employment flows

**(b)** Non-employment-to-employment flows
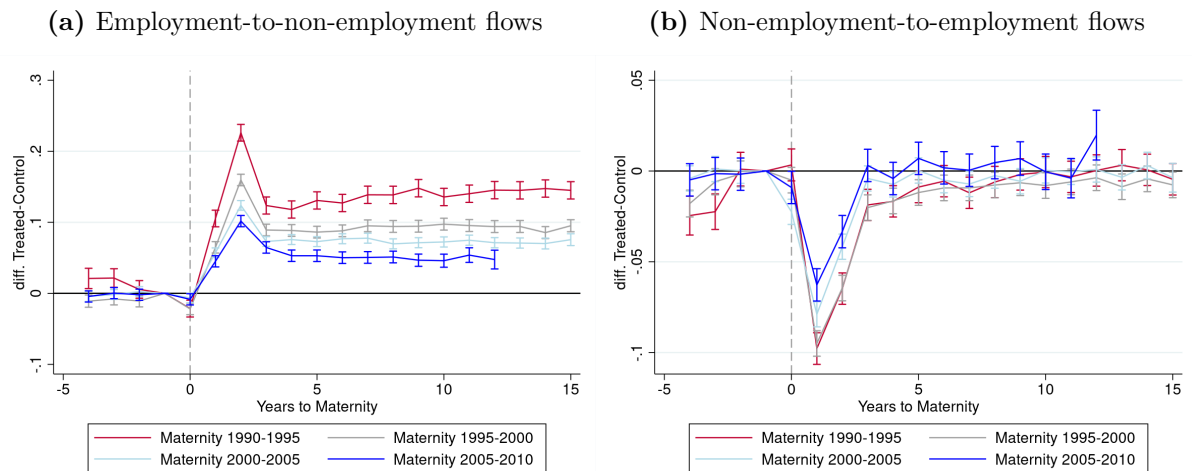
Notes: The figure shows the evolution of the probability of exiting employment (Panel a) and entry into employment (Panel b) relative to the year before the birth of the first child for women with children compared with those who never have children (assigning placebo births based on the observed distribution of age at first child among those who have children; see De Philippis and Lo Bello, 2023 for details). In the figure, the authors control for year/region, age and year of first contribution fixed effects. The vertical bars indicate the 95 per cent confidence intervals based on robust standard errors. Individuals are considered employed if they worked at least one month in year t. **Source:** De Philippis and Lo Bello (2023).

Finally, De Philippis and Lo Bello (2023) combine the information on fertility trends with the estimated evolution of the employment child penalty to decompose how much of the increase in the female employment rate observed between 1984 and 2019 reflects these determinants. Overall, declining fertility rates and reductions in the child employment penalty explain approximately 70 per cent of the observed growth; the reduction of the child employment penalty alone accounts for 60 per cent of the change. One of the main

drivers of this reduction has been the increase in women's educational attainment, since highly educated women have a stronger attachment to the labour market and lower exit rates. Moreover, the authors show that eliminating the existing child penalty among new mothers would increase the female employment rate by 6.5 p.p. by 2040 (covering 38 per cent of the current gender employment gap). Removing the child penalties for both new and existing mothers would rise female employment by 14 p.p. already by 2030, thus closing 85 per cent of the existing gender gap.

Casarico and Lattanzio (2023a) find that the birth of the first child leads to a sizeable and long-lasting reduction in mothers' annual earnings with respect to non-mothers, even if the focuses is only on women who remain in the labour market after childbirth. Fifteen years after childbirth, this penalty equals 52 per cent compared with the year before maternity. Most of the child penalty observed for mothers is due to a reduction in weeks worked (approximately 70 per cent; Figure 27). These are rather large long-run estimates if compared with the evidence provided in Kleven et al. (2019),[36] especially if we consider that focusing on mothers who remain in the labour market likely leads to underestimating the total penalty in annual earnings.

Figure 27: Child penalty in earnings
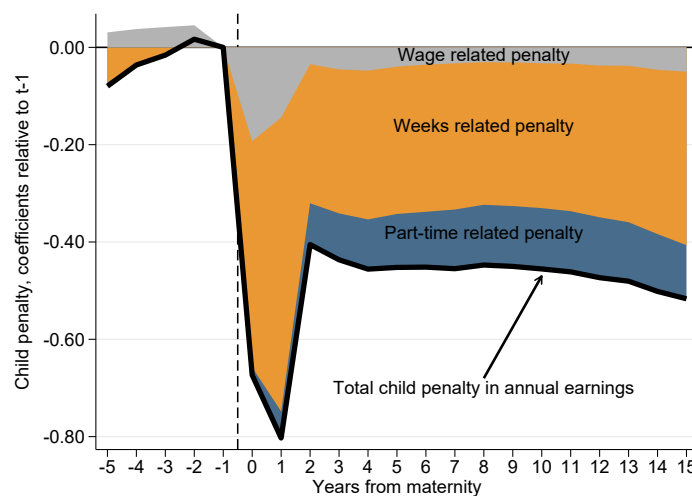
Notes: The figure reports the child penalty in log annual earnings, and its decomposition into the contribution of the reduction in weekly wages, the reduction in weeks worked and the switch to part-time. **Source:** Casarico and Lattanzio (2023a).

Using the same social security administrative data as described before, De Paola and Lattanzio (2023) provide evidence that the child penalty expanded during the economic crisis due to the COVID-19 pandemic. Figure 28 shows that working mothers experienced a larger penalty in terms of reduced labour market earnings compared with working

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[36]Kleven et al. (2019) provide estimates of the child penalty for Denmark, Sweden, the US, the UK, Austria and Germany. The long-run child penalty, measured ten years after childbirth and as the difference in earnings between mothers and fathers, is 21-26 per cent in the Scandinavian countries, 31-44 per cent in the English-speaking countries, and 51-61 per cent in the German-speaking countries.

fathers throughout the period March 2020-May 2021, and that this was mainly driven by a substantial fall in the number of days worked. The penalty is larger for mothers of younger children, for those working in non-essential activities[37] and for those in couples where the pre-pandemic mother-father pay gap was larger, suggesting that second earners with lower bargaining power suffered a higher penalty. This means that both demand and supply factors played a role in explaining the gendered impact of the economic crisis triggered by COVID-19.

Figure 28: Impact of the COVID-19 crisis on the earnings of fathers and mothers
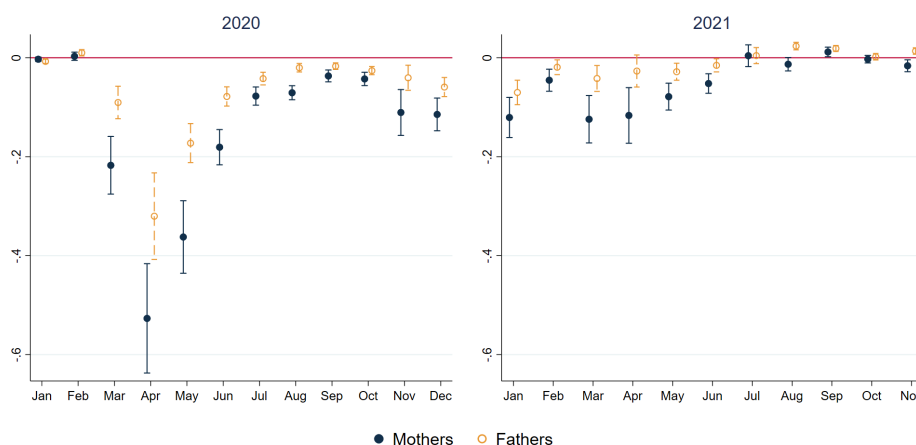
Notes: The figure reports the estimated difference in log annual earnings for workers in 2020 and 2021 relative to 2019 in each month using February as a reference. Control variables include: labour market experience, age, a dummy for white-collar workers, the number of children, dummies for workers taking parental leave and COVID-19 leave, a dummy for workers in short-time work compensation schemes and region dummies. **Source:** De Paola and Lattanzio (2023).

The debate on the determinants of the child penalty is still ongoing (see Cortés and Pan (2023) for an extensive review). First, there is evidence that after childbirth, mothers work in less productive firms (Casarico and Lattanzio, 2023a) preferring other amenities (like shorter commuting times Le Barbanchon et al., 2021 or job flexibility Bang, 2021; De Philippis and Lo Bello, 2023) to higher wages. Second, there is a great deal of evidence showing that conservative gender norms play a significant role in determining the child penalty as they attribute the full burden of childbearing to women (Kleven et al., 2019; Kleven, 2022; Andresen and Nix, 2022; De Philippis and Lo Bello, 2023 provide evidence for Italy). Finally, public policy can also influence the child penalty by providing a better work-life balance or by changing gender norms. Here the evidence is mixed, as is more extensively illustrated in the next subsection.

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[37]Prime Ministerial Decree 64/2020 established the nationwide March lockdown and specified the activities that were deemed as essential and could continue to operate, and those that were classified as non-essential and were forced to shut down (the Prime Ministerial Decrees 76/2020 and 79/2020 further clarified the definition of essential and non-essential activities). The former mainly include agriculture, some manufacturing, energy and water supply, transport and logistics, ICT, banking and insurance, professional and scientific activities, public administration, education, healthcare and some service activities. Sectors that were shutdown include most manufacturing activities, wholesale and retail trade, hotels, restaurants and bars, entertainment and sport activities.

4.2 The role of family policies

Parental leave and childcare policies are the two main family-friendly programmes adopted in developed countries to help parents, especially mothers, to reconcile work and family responsibilities.

Parental leaves is job-protected leave for working parents. Across OECD countries there are three types of leave. Maternity leave is specifically reserved for mothers and is granted around the time of childbirth; parental leave is shareable entitlement among parents but usually taken by mothers, as we will explore further in Subsection 4.2.4. The last type of leave entitlement is specifically reserved for fathers. Paternity leave should increase fathers' involvement in caring activities, thereby rebalancing domestic work among partners with positive effects on maternal labour supply. Finally, subsidised childcare is intended to provide families with an accessible market care alternative to the maternal one, thus freeing up mothers' time for market work.

Because extending parental leave or providing highly subsidised childcare entail large costs for public budgets, understanding their causal impact on female labour supply is crucial. Despite the positive cross-country correlation between the duration of leave (or publicly provided childcare) and female participation and employment rates,[38] empirical works aimed at estimating the causal effect of similar policies on female labour supply have found mixed and non-conclusive results. More in general, these policies are highly debated, not only because of their cost. Some scholars (see Rossin-Slater, 2017; Carta, 2019; Canaan et al., 2023 for a review) argue that long periods of leave may reduce mothers' labour market attachment and depreciate their human capital; they could increase employers' expected labour costs at the time of hiring women of childbearing age; formal childcare may be detrimental for children's development, especially if it replaces high-quality maternal care. In the next subsection we discuss the empirical literature on these relevant topics.

4.2.1 Maternity and parental leave policies

The impact of leave-taking on female employment is theoretically ambiguous since it may involve two different groups of women: i) those who would have otherwise remained employed and in their jobs and ii) those who would otherwise have quit their jobs. For women in the first group, the leave policy does not have any impact on short-run employment since they would have remained employed anyway. If anything, the policy increases time away from work with negative consequences for their careers and wages,

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[38]Ruhm (1998); Olivetti and Petrongolo (2017) find a non-monotonic relationship between the duration of parental leave and female outcomes: short or intermediate-length leave is associated with higher female employment rates and no wage effects, while longer entitlements lead to negligible effects on employment, but negative ones on wages. According to Olivetti and Petrongolo (2017), childcare expenditure is more positively correlated with smaller gender gaps since, by allowing mothers to go back to work earlier, subsidised childcare avoids losses of human capital or of working experience.

thus feeding the child penalty. For women in the second group, the policy may increase short-run employment by providing a period of leave instead of quitting their jobs, which contributes to reducing non-employment spells and the child penalty. We only focus on labour supply, but there may also be labour demand effects: longer parental leave, especially if mostly used by women, may raise the costs of hiring and promoting women of childbearing age, in anticipation of their future leave-taking behaviour, fostering what is labelled as *statistical discrimination*.

In general, the impact of leave policies on maternal labour supply mainly depends on the characteristics of the programme: the length of the leave, the replacement rate paid and the degree of job protection. Most of the empirical works that assess the causal impact of paid leave exploit changes in its duration. The evidence is mixed.

Lalive and Zweimüller (2009) find that leave duration negatively affects maternal earnings in the short run (during the first three years after birth) since mothers delay returning to work even after the benefits are exhausted; however, the effects are small in the long run. Similar employment effects are also detected by Schönberg and Ludsteck (2014); they also highlight the role of job protection in determining job attachment and positive employment effects (see Zurla 2022 for evidence on Italy). According to Kluve and Tamm (2013); Bergemann and Riphahn (2010), shortening long parental leave duration (from 24 to 12 months) in combination with an increase in the replacement rate generated positive employment effects in Germany in the medium and long term. In Norway, Dahl et al. (2016) find no significant impacts of a variety of extensions in paid maternity leave from 4 to 8 months on either earnings or labour force participation among mothers. Employment effects are instead positive and stronger when the parental leave extensions are shorter to begin with (Baker and Milligan, 2008; Baum and Ruhm, 2016). Overall, the literature has established the existence of a concave relationship between the length of parental leave and maternal labour market outcomes. Short parental leave (up to approximately 6 months) improves maternal labour market outcomes. Up to 1 year, these programmes seem to have a limited effect, while leave entitlements longer than 1 year seem to have adverse effects on mothers' wages and employment.

Carta et al. (2023) study a policy that increased the duration of the unemployment benefit from 8 months to up to 24 months. The unemployment benefit can be seen as a job leave right with no job protection paid at a higher replacement rate relative to the parental leave (75 and 30 per cent, respectively).[39] The authors show that the higher economic convenience of taking leave without job protection significantly increased mothers' probability of quitting at childbirth, resulting in a higher non-employment probability up to at least 18 months after childbirth (see Figure 29). In response to the higher turnover of new mothers, firms tend to hire more male workers with respect to women. This

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[39]This is only true for new mothers, within the first year of having a child; they can access unemployment benefits even if they voluntarily resign from their job rather than being laid off.

would imply that the reform has deterred hiring childbearing age women, thus limiting their employment and career opportunities. These results are informative on the role of job protection in determining mothers' labour market attachment and how policies can backfire and contribute to statistical discrimination against women.

Figure 29: Quitting and non-employment probability of new mothers — response to an increase in the duration of the unemployment benefit
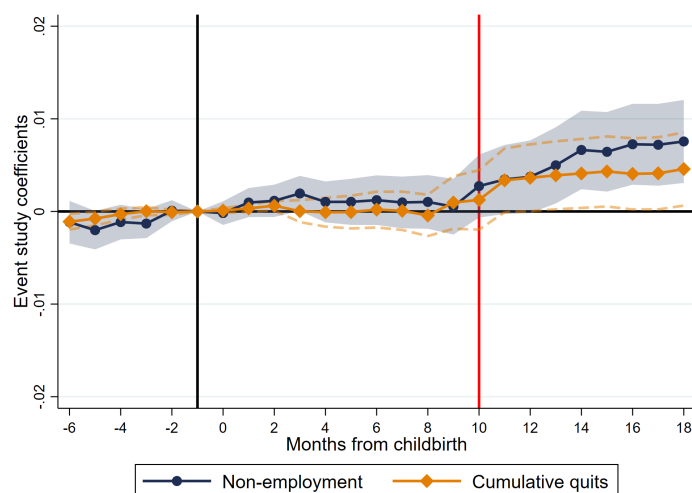
Notes: Each dot represents the change in the quitting/non-employment probability of new mothers having their child after the UB reform relative to the period before and exposed to a 100 days' increase in their potential UB duration, between the 6 months before until 18 months after childbirth. The confidence intervals are obtained from cluster-robust standard errors at individual level. Other controls are included. **Source:** Carta et al. (2023).

On top of understanding the effects of maternity and parental leave on maternal employment, it is also crucial to study the determinants of leave-taking behaviour so as to create a more women (parent)-friendly environment. As we will discuss further in Section 4.2.4, the take-up of voluntary parental leave is rather heterogeneous across countries, and is especially low in Italy. Rossin-Slater (2017) survey the main literature on the determinants of leave-taking behaviour. On the one hand, lack of awareness of the existing policies, low (or lack of) pay and the absence of job protection may prevent workers from taking up leave. On the other hand, the literature has shown that cultural norms play a crucial role: peer effects and role models may reduce stigma and foster leave-taking behaviour (Dahl et al., 2014).

Dottori et al. (2023) estimate the importance of peer effects in leave-taking behaviour for Italian mothers. The peer effect might be important along two main channels. First, colleagues who previously took parental leave can provide useful information on their use; second, by looking at their experience, mothers can understand possible earnings reductions or penalties associated with their use. The paper exploits a reform, implemented in Italy in 2015, that extended the child's age up to which parents can take advantage of paid parental leave from 0-3 to 0-6. They study whether post-reform mothers are more likely to use the paid parental leave when a greater share of their peers previously used

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it. The latter is instrumented with the share of peer-mothers with children aged 4-6 who were exposed to the reform. The authors first show that the reform increased the leave-taking rate by 12.4 per cent for mothers with 4-6-year-old children.[40] They then find that peer effects increase both the probability of using parental leave and the number of weeks of leave taken by mothers. Moreover, the peer effects determine a reduction in the probability of working part-time, suggesting that part-time and parental leave may be substitutes. The latter is more flexible and prevents changes in the contractual relationship that might result in long-term earnings losses. The effects are concentrated among mothers with low tenure in the firm, suggesting that the channel through which the peer effect operates is that of providing information to employees about the employer's reaction to the use of parental leave by female employees.

4.2.2 Paternity leave

Paternity leave is reserved for fathers, i.e. it is not transferable to mothers. Paternity leave should increase fathers' involvement in caring activities, thereby rebalancing domestic work among partners with positive effects on maternal labour supply. OECD countries have only recently introduced paternity leave, in addition to maternity and shareable parental leave. Thus, the available empirical evidence on their effects on maternal labour supply and the allocation of household chores is more limited. Cools et al. (2015) show that a specific paternal quota of parental leave of 4 weeks introduced in Norway in 1993 did not affect maternal labour supply and slightly reduced fathers' earnings in the short run. Rege and Solli (2013), by adopting a different empirical strategy, find a penalty on fathers' earnings associated with the same policy in the medium and long run, but again no effects on maternal employment, resulting into an overall increase in home production. The introduction in 2007 of 2 weeks of voluntary paternity leave in Spain increased home production by fathers (González and Zoabi, 2021), fostered maternal labour supply (Farré and González, 2019) and changed gender norms across generations: children raised in couples where fathers took paternity leave tend to have more progressive and egalitarian gender views (Farré et al., 2022). Overall, the evidence from the Nordic countries — the first to introduce paternity leave — show zero or modest effects on paternal and maternal labour supply, while the effects estimated in countries with low female employment rates (like Spain or Germany) seem to go in the expected direction of a lower specialisation in domestic chores within the household. In countries with lower female participation, there should therefore be more room for such adjustments.

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[40]The reform did not change the economic convenience of taking parental leave for 0-3 year-old children.

4.2.3 Subsidised childcare

Even more debate surrounds the estimated effects of childcare services on female labour supply (see Olivetti and Petrongolo 2017 for a review of the literature). The literature looking at the causal effect of subsidised childcare on maternal labour supply is vast and has reached different results, varying not only across countries but also across individuals within the same country. The heterogeneity of the estimates depends on maternal employment rate before the policy intervention, the existing formal alternatives to childcare, and the age of the targeted children.

According to most US studies, the availability of public kindergartens for 4-year-old (Fitzpatrick, 2010; Wikle and Wilson, 2022) and 5-year-old kids (Cascio, 2009; Barua, 2014; Fitzpatrick, 2012) only generates small increases in maternal employment (typically limited to single or less educated mothers), mainly because publicly provided care replaces market care.[41] Similar negligible or small results are found for European countries such as Norway (Havnes and Mogstad, 2011) and France (Goux and Maurin, 2010) where, unlike the US, services for families are generally provided publicly. These papers look at episodes of expansion in subsidised childcare that took place in a context of already large public provision and high female labour supply. Labour demand and general economic conditions are also crucial for the effects of subsidised childcare on maternal labour supply to be sizeable. Nollenberger and Rodriguez-Planas (2015) show that in Spain, despite the low public childcare provision, very few private alternatives and low female labour supply, an expansion in public full-time childcare for 3 year-old children determined a modest increase in maternal labour supply due to a context of extremely low labour demand and depressed wages. Finally, Kleven et al. (2020) show that increases in the provision of public childcare provision failed to increase maternal labour supply in either the short or long run in Austria, mainly due to the availability of free childcare with relatives and strong preferences for maternal care (i.e., gender norms).

On the other hand, the introduction of highly subsidised childcare for younger children (generally 0-3 year-olds) did prove successful in boosting female labour supply in Canada (Baker et al., 2008), Germany (Bauernschuster and Schlotter, 2015; Müller and Wrohlich, 2020) and Argentina (Berlinski and Galiani, 2007). Carta and Rizzica (2018) also find that early access to kindergarten, a much cheaper option than nurseries for 2-year-old children implemented in Italy, significantly increased maternal participation and employment. Positive sizeable effects are concentrated in the Northern regions, where labour market conditions are more favourable and less traditional gender norms prevail.

In Italy, providing care for older children also seems to boost the maternal labour

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[41]Exceptions are Gelbach (2002), who finds significant — albeit smaller — effects on married mothers too when looking at a reform that took place in 1974, and Herbst (2017), who nevertheless focuses on a very peculiar setting, i.e. the provision of childcare during World War II. In both cases, the baseline maternal employment rate was low.

supply. On this point, Bovini et al. (2023) study the short- and medium-term effect of increasing the length of the school day in primary education on parental labour supply. They find that attending a long school day (full-time) in primary school has a positive effect on maternal labour force participation and employment (approximately 2 p.p. concentrated among less educated mothers). Moreover, the effect persists in the medium term, even when students are no longer in a long-day schedule. No effect is found on fathers' employment.

Overall, the take-home message of this literature is that providing childcare services to younger children has positive effects on maternal employment when the latter is at very low levels, there are few alternatives (both formal and informal) to maternal care, and the overall culture is favourable to childcare use and maternal labour supply. Finally, these kinds of reform should be implemented when economic/labour demand conditions are good enough to produce positive employment effects.

4.2.4   Parental leave and childcare policies in Italy

The Italian parental leave system envisages three different parental leave entitlements for employed parents (see Carta, 2019 for a more detailed review).

First, mothers have access to 5 months of compulsory maternity leave paid at 80 per cent of their earnings around the time of childbirth.[42] Almost all collective agreements establish that employers provide the remaining 20 per cent. In order to compare the length of leave periods across OECD countries,[43] we consider the Full Rate Equivalent (FRE) number of weeks, which is the length of the paid leave in weeks if it were paid at 100 per cent of previous earnings — a figure provided by the Family OECD Database (OECD, 2023) that is given by the product of the number of weeks of leave and the replacement rate. According to this measure, Italy provides a rather generous maternity leave: in 2022, the FRE number of weeks in Italy was 17.4 (the figure only considers the leave paid by the government and not the top-up provided by employers), vis-à-vis 16.0 weeks in Spain, 14.6 in France and 14 in Germany.[44]

Second, Italian working parents — both mothers and fathers — are eligible for parental leave. Differently from maternity leave, this is taken on a voluntary basis. The parental leave for each parent — working as an employee — is up to 26 weeks (six months); the sum of the two periods cannot exceed ten months (eleven if the father enjoys the leave for at least three months) and the leave expires on the child's 12th birthday. The total leave is paid at 30 per cent of average earnings for the first nine months, while the rest

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[42]Mothers can choose how to use the leave: either 2 months before childbirth and 3 afterwards, or 1 month before and 4 after, or using all the leave after childbirth.

[43]Following the ILO recommendations (International Labour Organization, 2012), at present almost all the OECD countries — with the exception of the US — have paid maternity leave rights in place.

[44]Not all of maternity leave needs to be compulsory. Maternity leave usually envisages a compulsory period very close to childbirth (as in Spain and in France).

of the leave is unpaid. Each parent has a quota of three months of paid leave while the last three months can be shared.[45] The availability and generosity of paid parental leave vary considerably across countries. The average entitlement available to mothers (or fathers, excluding periods specifically reserved to them) among OECD countries is just over 37 weeks, with most of the countries that offer at least one week providing somewhere between 26 and 52 weeks (see panel a of Figure 30).[46] Most countries provide benefits that replace around 30 to 60 per cent of previous earnings. The lowest payment rates tend to be found in countries with the longest entitlements. According to OECD (2023) data, the use of parental leave in Italy is rather low with respect to the OECD average[47] and the recipients are mainly women (approximately 80 per cent). On top of the role of social norms and preferences, the large use of parental leave by mothers may also be due to the fact that the household, when choosing which income to give up to take the leave, opts for the lower income, which is typically the one earned by the wife. Interestingly, in the Nordic countries, where there is a more equal distribution of household chores and a higher female labour supply, the replacement rate of voluntary leave for fathers is significantly higher than the one envisaged for mothers.[48] While the different replacement rates paid to mothers and fathers may appear to be a source of inequity, a higher replacement rate for leave-taking fathers may induce the family to choose fathers to take the leave, giving up a lower share of income with respect to the case in which the mother takes the leave.

Finally, in Italy, fathers working as employees are entitled to a compulsory paternity leave of 10 days, which can be taken from two months before childbirth up to five months after childbirth.[49] The leave is paid at 100 per cent of earnings. Indeed, as periods of paternity leave are usually much shorter than periods of maternity leave, they are usually fully paid. Panel b of Figure 30 shows that Italy offers rather short overall leave earmarked for fathers in comparison with other OECD countries (it is the sum of FRE weeks of paternity leave and the father's quota of paid parental leave). According to INPS (2022), in 2021, only approximately one out of three Italian fathers took the leave,

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[45]Law 234/2021 — in accordance with EU Directive 2019/1158 that established two months of paid leave for each parent not transferable to the other — increased the length of the paid parental leave from six to nine months and established that three months are reserved for each parent. The total length (the sum of paid and unpaid leave) did not change, meaning that the reform simply increased the replacement rate from 0 to 30 per cent for three months of leave.

[46]Twelve of the OECD countries offer no entitlement to paid parental leave at all.

[47]The figure refers to the number of users of parental leave entitlements out of 100 births, so the low use rate may partly reflect lower employment and a larger share of self-employment in Italy.

[48]For fathers, the replacement rate is 100 per cent in Norway, 77.6 per cent in Sweden and 62.8 per cent in Finland. For mothers they are respectively 34.0, 57.2 and 18.7 per cent (OECD, 2023).

[49]Italian legislation introduced paternity leave in 2012 on an experimental basis, initially for three years; the leave was mainly symbolic since it only envisaged one day of compulsory leave and two days of voluntary leave. Compulsory leave has gradually been increased over time, reaching ten days in 2021 (Law 234/2021), in accordance with EU Directive 2019/1158 that imposed a minimum paternity leave entitlement of 10 days on member states. The voluntary paternity leave has been reduced to just one day. Paternity leave has been a permanent policy since January 2022 and does not need yearly financing.

despite it being compulsory for employees that represent 75 per cent of the overall number of employed individuals.

The whole Italian parental leave system is significantly less generous relative to those in place in the Nordic countries, while it is similar to systems implemented in the other main European economies (panel a of Figure 30). With respect to the latter, however, the Italian programme is relatively less generous for fathers, for whom only 20.5 per cent of the FRE leave is reserved (panel b of Figure 30).[50]

Figure 30: Maternity, parental and paternity leave entitlements in selected OECD countries, 2022

(a) Duration of earmarked and shareable paid parental leaves
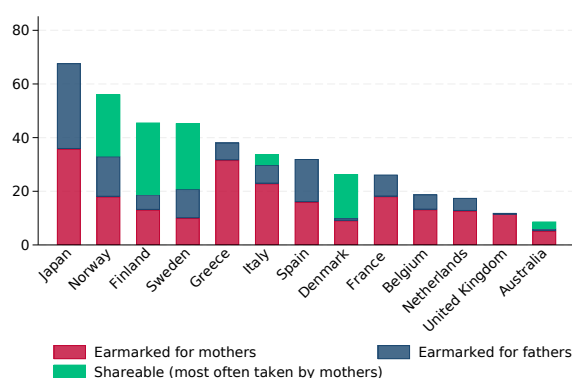
(b) Share of leave reserved to fathers over the total leave entitlements
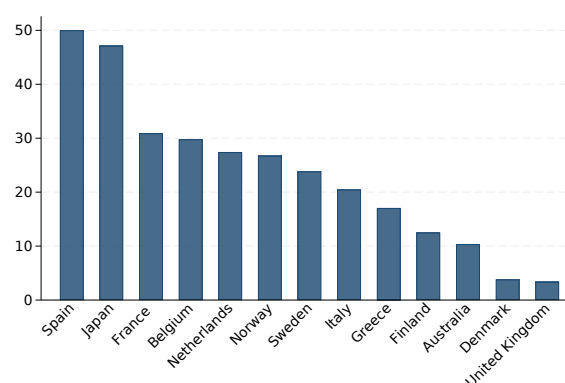
Notes: Duration is measured by the Full Rate Equivalent (FRE) number of weeks, which is the length of the paid leave in weeks if it were paid at 100 per cent of previous earnings. Figures refer to the laws in place in April 2022. The figure for Italy has been updated to April 2023. **Source:** OECD (2023).

Other than parental leave, governments can help families with children financially. The government's interventions in early childhood consist mainly of childcare provision and cash transfers. According to OECD (2023), in 2019 (the latest available year), public expenditure per child, converted into USD PPP, in Italy for young children in Italy (0-5) was slightly below the OECD average, 28.5 and 38.1 per cent lower than in France and Germany, respectively. Looking at younger children (0-2), public expenditure in Italy was relatively even lower, meaning that the distribution of resources across younger (0-2) and older (3-5) children was more uneven than what was observed in the OECD on average (or in France or Germany, for example).

More than in other OECD countries, in Italy there is a marked difference in the share of resources devoted to childcare and to cash transfers across the different age groups. Looking at expenditure for 0-2 year-olds, only 22.8 per cent is spent on childcare (29.5 per cent in the OECD average, 55.4 in Germany and 66.8 in France), while the rest is spent on cash transfers. For children aged 3-5, the figure is completely reversed: the share of resources spent on childcare provision is 75.4 per cent, higher than what is observed in the OECD average or in the main European economies. A comparison of the enrolment

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[50]Shareable parental leave is mainly taken by mothers, according to OECD (2023).

rates in childcare for the two age groups across countries reflects these disparities in public interventions across children's ages.[51] Figure 31 shows that the enrolment rate in childcare services for children aged 0-2 in Italy is lower (26.4 per cent) than the OECD and the EU averages (36.0 and 32.6 per cent respectively), ranking Italy as one of the countries recording the lowest rates among the selected ones. Enrolment rates among 3-5-year-olds are much less heterogeneous across countries. In Italy, it stood at 94.6 per cent in 2020, above the OECD and the EU averages (87.1 and 89.5 per cent respectively), so Italy is among the countries recording the highest rates.

Figure 31: Enrolment in childcare services in selected OECD countries, 0-2 year-olds
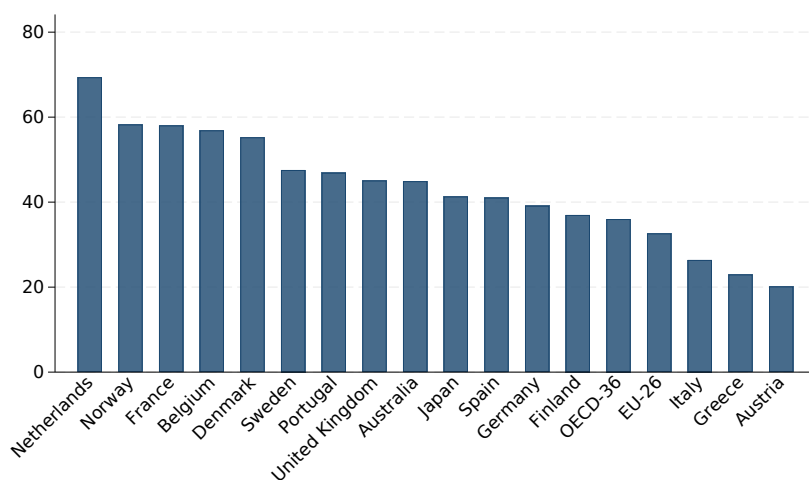

Notes: Data for European countries are OECD estimates for 2020 based on information from EU-SILC. Data refer to children using center-based services (e.g. nurseries or day care centers and pre-schools, both public and private), organized family day care, and care services provided by (paid) professional childminders, regardless of whether or not the service is registered or ISCED-recognised. **Source:** OECD (2023).

According to Istat (2022), there is great geographical heterogeneity in the supply of childcare services: the coverage rate — the number of childcare places for 100 0-2 year-olds — in Northern and Central regions is more than double that recorded in the Southern regions (panel a of Figure 32). The average coverage rate is 27.2 per cent, ranging from the highest value (40.8 per cent) recorded in Emilia-Romagna to the lowest in Campania (11.0 per cent). Panel b of Figure 32 shows that in the Italian provinces recording a higher coverage rate, the labour force participation rate of mothers with 0-2-year-old children is also higher. This is a correlation similar to the one observed across countries (Olivetti and Petrongolo, 2017).

The cost of formal childcare for Italian families is high. As reported by some recent estimates, in Italy, an average family composed of two working adults and one child aged less than 3 pays €303 per month for a full-time place in a public nursery (Cittadinan-zattiva, 2019); the cost in private nurseries is higher, on average approximately €500 per

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[51]A measure of coverage rather than the use of childcare services is not available for international comparisons.

Figure 32: Childcare coverage rates across Italian regions and provinces in 2020

(a) Coverage rate

(b) Correlation between coverage rates and maternal labour supply
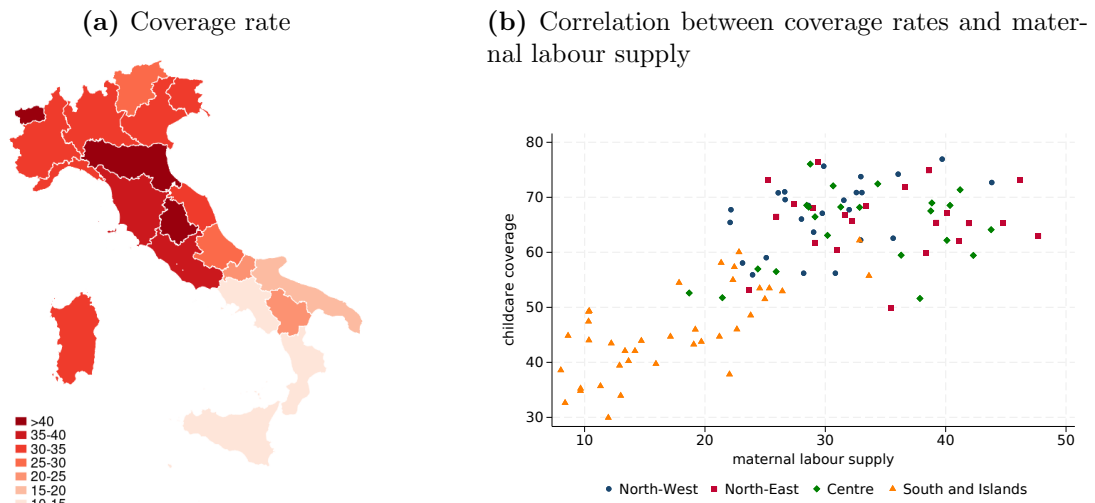
Notes: The coverage rate is the number of childcare places for 100 children aged 0-2. Both private and public childcare services are considered (private services represent approximately half of the total number of places). Childcare facilities are represented by approximately 90 per cent for nurseries, and only around 10 per cent for complementary daycare services, which are more flexible than nurseries — for example, they can be organised by families in private houses. The coverage rate also considers the number of places in *Sezioni Primavera*, which are classes for children in kindergartens agd 2-3 (typically for 3-5-year-olds). The number of places in *Early Kindergarten* — children who turn 3 years old by April 30 of the school year can directly access kindergarten — is instead not included. In panel b, we consider the participation rate of mothers aged 25-49 with children younger than 3 years old (average of 2017-2019 data). **Source:** Istat (2022) and Bank of Italy (2022).

month. Kindergartens, being considered the first level of the school system, are instead almost free (there is only a meal fee, on average €80 per month for full-time attendance).

Recently, several policies have been adopted in Italy in order to support families financially in the use of childcare services. First, in 2012, a voucher for childcare services or baby-sitting was introduced for the period 2013-2015 for employed mothers (*bonus infanzia*, Law 92/2012).[52] More precisely, the mother was entitled to replace her parental leave after the maternity period (within 11 months after the end of the compulsory entitlement) with a voucher of up to €600 per month for a maximum of six months (€300 for self-employed). Martino (2022) finds that this childcare subsidy, associated with a shorter leave period, increased maternal earnings in the very short run and significantly reduced mothers' probability of leaving the labour market. Second, in 2016, a yearly bonus (named *bonus nido*, Law 232/2016) of €1,000 was introduced for children aged 0-2 conditional on attendance of childcare services. The generosity of the subsidy increased over time, especially for low-income households. This instrument is also discussed in detail in Chapter 5.

4.2.5 Policy implications

Overall, the empirical works considered here and the international evidence suggest that the extension of affordable and good-quality early childcare provision could be a good

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[52]The voucher was re-financed in the following years and abolished at the end of 2018.

policy tool for boosting female labour supply in countries that currently have low coverage and low female labour supply, like Italy. Particular effort should be made in the Southern regions where the coverage rate is extremely low.[53] At the same time interventions to foster labour demand in the Southern regions are also needed to boost female employment. The bonus envisaged to pay for childcare services might still not be sufficient to afford the prices of private nurseries, which represent almost half of the supply of childcare services. However, it represents significant help for low-income households who usually have priority in accessing public nurseries. Instead, unconditional child-related cash transfers, by raising family non-labour income, are not the right policy response to boost female employment. Transfers conditional on the use of care services (either formally in childcare facilities or domestically) or on both parents' employment instead go in the right direction, since they are specifically addressed to women who need to reconcile family and work responsibilities (see also Chapter 5).

On the other hand, it is rather unlikely that expanding the parental leave system for mothers, which is already quite generous in Italy, could significantly increase maternal employment rates. What is likely more important is to take action to better balance the distribution of household chores between parents. One possibility is to push more fathers to take the parental leave. Paying a higher replacement rate when fathers take the leave — as envisaged in the Nordic countries — could create such an incentive. A second option is to increase the duration of compulsory paternity leave. We have seen that it is still lower than those in place in several European economies. The actual leave is likely too short and inadequate to re-balance the domestic workload among genders; improvements in this direction may help eradicate gender stereotypes and free the time that women can dedicate to work.

4.3   The effect of maternal employment on fertility

As already stated at the beginning of this chapter, one of the biggest concerns relating to female employment is the possible adverse effect on fertility. If that were the case, fostering female labour supply would be particularly problematic in Italy, where the fertility rate is on a declining trend and has one of the lowest values among EU countries (1.25 against the EU average of 1.53).

From a theoretical point of view, the causal impact of female employment on fertility is ambiguous. Female employment affects fertility through three main channels. First, women's employment brings additional income to the family, which facilitates having children and guarantees financial stability for raising children (income effect). Second, children require time and attention which might be not compatible with a full-time job.

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[53]This could also be due to conservative gender norms, such that women prefer to provide childcare directly themselves; this would translate into a low demand for childcare services. However, a larger public provision might trigger a change in the way early childcare is conceived.

Alternatively, in the absence of free childcare, children need to be looked after in childcare facilities or by nannies, which may represent a significant cost for families. Thus, having a job increases the opportunity cost of having children (price effect). Third, working outside the household and earning one's own income empowers women. If women have lower-fertility preferences than men, women's empowerment within the family will reduce fertility rates (empowerment effect).

Fertility and employment decisions are often taken simultaneously, and unobserved heterogeneity and reverse causality makes identification of the relationship difficult. In the review of the literature, we only focus on studies relying on (quasi-)experimental evidence (see Bhalotra et al., 2022 for a more extensive review).

The literature on developing countries finds that female employment unambiguously reduces fertility (Jensen, 2012; Van den Broeck and Maertens, 2015). Studies that look at developed countries instead find milder and more mixed results. These studies mainly employ reforms to the tax-transfer system for instrumenting variation in female employment. Francesconi and van der Klaauw (2007) find that a tax credit for low-income families in the UK — also involving a generous childcare tax credit differently from the earned income tax credit described in Chapter 5 — increased single mothers' employment and childcare use, while it slightly reduced (at a non-significant level) their subsequent fertility. Brewer et al. (2012) find a positive effect of the same policy on the re-parenting behaviour of married women for whom positive employment effects were smaller. Azmat and González (2010) study a reform that introduced a tax credit for working mothers with children under the age of three, while also increasing child deductions for all households with children. They find that the combined reforms significantly increased both fertility and the employment rate of mothers with children under three.

Differences across the available estimates are largely due to the samples of women considered. Focusing on employed women — that may have different labour market attachment and preferences over work and fertility with respect to non-employed women — who experience job losses, the literature finds that these episodes significantly reduce fertility rates (Del Bono et al., 2012; Huttunen and Kellokumpu, 2016). Huttunen and Kellokumpu (2016) look at both male and female job displacements to isolate the income effect. They find that only female job displacement significantly affects couples' fertility behaviour. This suggests that the income channel is not driving the result, since a male job loss results in a higher income loss for the family with a hypothetically larger effect on fertility. The authors suggest that the most likely mechanism is the response to a career disruption itself. Women, especially highly educated ones, tend to reduce childbearing after job displacement since they either fear having trouble finding new employment after a job loss or they want to secure their careers in new jobs before taking maternity leave. This suggests that the underlying mechanisms driving the causal impact of female employment on fertility may go well beyond a simple income and substitution effect.

The different effects found in the literature may also depend on the generosity of family policies between less and more developed countries, which may have contributed to the change in the cross-country correlation over time.[54] The characteristics of the available jobs, such as part-time opportunities and the level of job protection, are also important (Del Boca, 2002; De Paola et al., 2021; Clark and Lepinteur, 2022). Billari et al. (2023) study whether (and why) self-employed individuals have more children than employees do. The relationship between self-employment and fertility is *a priori* ambiguous. Self-employment is typically associated with income uncertainty and instability, and might be negatively related to fertility. However, self-employment also implies workplace flexibility and higher potential income and might positively affect fertility. These mechanisms may be different for men and women. Using the Bank of Italy's Survey on Household Income and Wealth (SHIW) for 1995-2014, the authors focus on three types of self-employed workers, i.e., labourer (solo) self-employed, entrepreneurs, and self-employed professionals. They show that all self-employed men and most self-employed women have higher fertility rates than employees. Using a control function approach (endogenous treatment effect regression), they show that self-employment causes higher fertility on average — however, heterogeneity in self-employment matters. They provide significant evidence that male and female entrepreneurs have more children because they would like to 'pass the crown' (and rely on the family labour supply). On the other hand, they do not find evidence that Italian women see a labourer type of self-employment as a flexible form of employment for achieving a work-life balance.

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[54]There is a general consensus that improving the possibilities for women to reconcile employment and family responsibilities is key to raising fertility rates in high-income countries (Doepke et al., 2022).

5 Family interactions and the role of the tax-transfer system

The role of the household dimension in shaping female labour supply goes beyond parenthood, as partners share economic resources and enjoy spending time together, features that may strongly affect female labour supply. This chapter discusses the role of partners' interactions in shaping female and household labour supply (Section 5.1) highlighting that earnings, wages and the non-labour income of one spouse impact other family members' labour supply decisions. The effects are stronger on female outcomes. Leisure complementarities between partners have also proven to be particularly relevant in partners' labour supply decision-making.

The tax-transfer system itself can also foster partners' interactions: monetary incentives to work may depend on marital status and partners' income. The labour supply of married women, as second earners in the household, may be discouraged by the household'sjoint taxation or by the provision of transfers sharply decreasing with higher family income. In Section 5.2 we provide an overall evaluation of how the Italian tax-transfer system affects monetary incentives to work by gender. We show that, given the current distribution of employment among Italian households, women have lower incentives to work than men at the bottom of the income distribution. Then, we look in detail at specific family or children-related policy interventions that have been implemented in the most recent years and we outline how to revise their design to take into account the distortions currently affecting women's incentives to work. Tax credits or more generous transfers for dual-earner families — who need to outsource household production to combine work and family duties — could be useful tools in this direction.

5.1 Household labour supply and partners' interactions

A growing body of evidence points to the key role of family interactions in explaining the economic behaviour of individuals and in revealing the wider effects of economic policies.

A very large strand of the literature on family labour supply develops models according to which the household, even if it consists of different individuals, acts as a single decision-making unit (i.e., there is a single household utility function reflecting the preferences of all its members) and the partners agree on the optimal allocation of resources (the 'unitary' model; for a comprehensive review see Chiappori and Mazzocco, 2017; Chiappori et al., 2022). Income from different sources is pooled ('the income pooling hypothesis'), regardless of who receives it, as only the total amount affects the household's decisions.

However, within the unitary model, it is impossible to introduce heterogeneity in the response of men and women within the same family. Crucial issues relating to, for example, intra-household resource allocation, household welfare, couple formation and

dissolution, cannot really be analysed in this framework. Moreover, the income pooling hypothesis has been repeatedly rejected by the data (see Cesarini et al., 2017 among many others).[55]

To overcome these limitations, economists have developed other approaches that allow household members to have their own preferences and therefore sometimes disagree about the optimal decision. One of the most adopted approaches, named as 'collective model', recognises that a household is made up of many individuals with different preferences and welfare weights (interpreted as the bargaining power of household members), but it does not assume any particular protocol for how decisions are made.[56]

Collective models can therefore be used to study the impact of policies that change intra-household bargaining power and have generated an extensive empirical literature, which has reached a number of conclusions. One of the main findings is that the earnings, wages and non-labour income of one spouse impact other members' labour supply decisions and that these cross-effects are different by gender and very significant (e.g., Chiuri, 2000 studies the impact in Italy of changes in the husband's wage on the wife's hours worked).

The applied micro literature investigates the response of individual labour supply to shocks (for example, fiscal and pension reforms, job losses) to the spouse's income and/or job characteristics (hours of work, wage or commuting time). Several studies prove the existence of important positive spillovers in the spouse's labour supply and complementarities in leisure time. Goux et al. (2014) study the extent of leisure complementarities (net of income effects) across partners' hours worked, exploiting a reform that took place in France and reduced working hours, leaving workers' earnings unchanged. They find that men react to their wives' workweek reduction, while the contrary does not hold. Similar results are obtained by Gelber (2014) who examines how own earnings respond to changes in the marginal tax rate of the spouse. He shows that as spousal earnings rise, own earnings rise too, suggesting strong complementarities in labour supply/leisure instead of substitutability through income effects. Other papers document joint retirement decisions of spouses over and above what would be predicted by correlation in age and incentives in the retirement system (Hospido and Zamarro, 2014; Lalive and Parrotta, 2017; Bloemen et al., 2019). Along the same lines, Carta and De Philippis (2021) study how middle-aged individuals and their partners respond to increases in the full retirement age in Italy. The authors take advantage of the Fornero pension reform (Law 214/2011)

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[55]For example, Duflo (2003) shows that the gender of the income transfer recipient is not neutral with respect to how the transfer is then spent. In particular, grandmothers show a higher propensity to spend it on the welfare of their granddaughters; no similar effect is found for pensions received by men. In the same vein, Dunbar et al. (2013) find evidence that male household heads tend not to allocate additional resources to children, while female household heads do.

[56]This approach simply assumes that allocations are Pareto efficient, i.e., that the chosen consumption bundles and leisure are such that one individual's welfare cannot be increased without decreasing the welfare of the other household members (see Chiappori et al., 2022 for details).

enacted in 2011, which heterogeneously increased the number of years to retirement. The authors detect a sizeable rise in the participation rate of middle-aged women, consistent with the fact that women experienced very large increases in the full retirement age relative to men as a result of the 2011 reform. The positive labour supply response is concentrated among married women. The authors then find that this response spills over into the labour supply of their husbands, who choose to postpone their retirement. These interactions, due to both wealth effects and leisure complementarities, are sizeable and substantially amplify the observed individual impact on wives' own labour supply by approximately 70 per cent.

On the contrary, studies on the added worker effect (the increase in the labour supply of one of the spouses when the other loses his/her job) establishe mild substitutability in partners' labour supply; for instance, married women, following husbands' job loss, tend to increase their working hours only marginally (Cullen and Gruber, 2000; Juhn and Potter, 2007). In line with these results, Carta and De Philippis (2018) study how the husband's commuting time — which represents a negative income shock to time spent on productive activities — affects family time allocation and the wife's employment. They find that an increase in the husband's commuting distance (a proxy for commuting time)[57] decreases the wife's employment probability slightly and induces him to supply slightly more hours of work. Reductions in the wives' employment are mainly observed in couples with children.

5.2 The tax-transfer system and the labour supply of married women

The tax-transfer system generates significant partner interactions in their monetary incentives to work, with important effects on the labour supply of married women as second earners in the family (see Eissa and Hoynes, 2004; Guner et al., 2012; Blundell et al., 2016; Bick and Fuchs-Schündeln, 2017; Borella et al., 2023 among many others; Aaberge et al., 2004; Colonna and Marcassa, 2015; Marino et al., 2016 for Italy). The literature typically assumes sequential family labour supply decisions, with the husband as the primary mover, acting as if he were single and independent from his wife; the wife is instead the secondary mover, taking her partner's employment as given. We refer to the first earner as the working spouse in a one-earner household, while the secondary earner as the additional employed spouse in a two-earner household.

Multiple factors in the tax-transfer schedule may generate partner interactions. First of all, the unit of taxation, which can be the individual or the household. In a system in which the tax unit is the individual, each spouse's marginal tax rate only increases in the

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[57]To avoid endogeneity issues, the authors only consider employer-induced changes in commuting distances, not given by residential relocation or a change in the employer.

own income. In systems where the tax unit is the family (joint taxation), one spouse's marginal tax rate increases not only in the own income, but also in the *spouse*'s income. Under progressive and joint taxation, secondary earners face a higher marginal tax rate than under separate taxation.

Even under separate taxation, jointnesses can arise if the provision of transfers or tax credits depends on the overall family or on the other spouse's income. This is the case for Italy and many other countries, where income taxation is based on personal income, but most of the benefits are means-tested on the basis of overall household income or there are tax allowances for dependent spouses (Rastrigina and Verashchagina, 2015; European Commission, 2018). The specific design of the transfers (and the withdrawal rate as earnings rise) determines the incidence of taxation on first and second earners.

Taking into account the whole household dimension in the design of the tax-transfer system responds to the principle of horizontal equity. In our discussion, we do not question the optimality of joint taxation or the design of family transfers, but we want to point out how to better frame, for efficiency reasons, the incentives to supply labour for second earners who seem to be particularly sensitive to taxes (Alesina et al., 2011).

Policy solutions such as in-work benefits (such as the earned income tax credit, EITC) are usually considered as a way to improve the monetary incentives to work for the poor who typically benefit from family and income support transfers. In EITC-type schemes, which are based on family income, the tax credit is a given percentage of earnings up to a maximum and then declines. Both the credit rate and the maximum credit vary by family size, with larger credits available to families with more children.

While the literature has established that EITC schemes provide incentives to work to single mothers (Eissa and Hoynes, 2006; Bastian and Jones, 2021), this is not necessarily true for married women (Eissa and Hoynes, 2004). For couples, the EITC subsidises the first-earner entry into employment while taxing second-earner entry (Immervoll et al., 2011). Two-earner tax credits or a premium on second earners would go in the right direction towards correcting the disincentives for married women.

In the following section, we explore the characteristics of some of the main transfers in Italy and how their design affects the labour supply of married women.

5.2.1 The effective participation tax rate in Italy

Before analysing the single policy measures, we provide an overall picture of how the Italian tax-transfer system affects the monetary incentives to work for men and women differentially. We quantify the disincentives to work embedded in the tax-transfer system by computing the effective participation tax rate (EPTR), which measures the share of earnings that is taxed away when a person accepts a job due to the increase in taxes or to benefits withdrawal. Using the Bank of Italy's microsimulation model (BIMic), we com-

pute the EPTR for non-employed individuals, given their current household composition and income (see also Curci and Savegnago, 2021).

Despite the Italian tax-transfer system being neutral with respect to genders (i.e., there are no gender differences in terms of marginal tax rates or in the eligibility of specific transfers), we observe that women face a higher EPTR on average than men (Figure 33). This is especially true when comparing the EPTRs of men and women at the bottom of the equivalised disposable income distribution, where it is more likely that households benefit from income and family-related transfers.

The higher incidence of effective taxation for women is due to the characteristics of the households in which non-employed individuals live. Indeed, non-employed women are more likely than non-employed men to live with employed partners; thus, they are more likely to be second earners. This evidence suggests that the Italian tax-transfer system penalises second earners.

Figure 33: The effective participation tax rate in Italy by gender over the equivalised disposable income distribution, by quintile
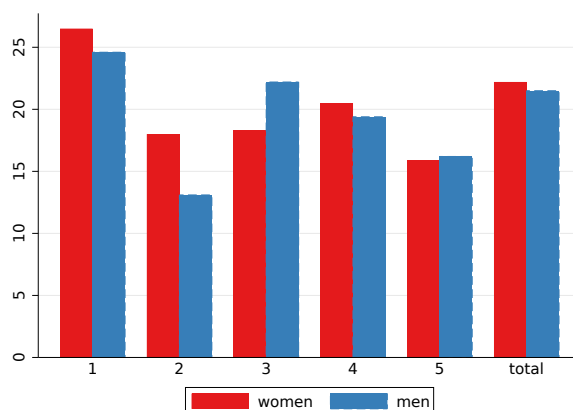
Notes: We consider non-employed individuals — without earnings or pension benefits — who may get earnings equal to half of the average gross labour income observed in Italy in 2021 (approximately €18,000) if they agree to work. **Source:** Calculations based on the Bank of Italy microsimulation model (BIMic).

In the following sections, we move on to investigate how some policy measures for the Italian tax-transfer system play a role in determining the above result.

5.2.2   The spouse tax credit (or *detrazione per coniuge a carico*)

In Italy , poor and middle-income households have been receiving a sizeable tax deduction since 1986 if one of the two spouses has a personal annual income below €2,800 (*detrazione per coniuge a carico*).

The amount of the deduction depends on the sum of spouses' income.[58] This scheme

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[58]It amounts to €800 euro for total income below €15.000, varies non-monotonically (from €690 to €720) for total income between €15,000 and €80,000 and then goes to zero for incomes above €80,000. The size of the transfer is not negligible for poor households. For instance, if the annual income of the household is below €15,000 per year, the tax credit amounts to roughly 40 per cent of the overall tax

creates a strong disincentive to work for the second earner in the family — the dependent spouse — since, by accepting a job and earning more than €2,800, the family would lose the tax credit. The non-employment (or low labour supply) of the dependent spouse lowers the marginal tax rates on the working spouse, such that, for some levels of earnings, having an additional income in the household might not be convenient. Marino et al. (2016) and Colonna and Marcassa (2015) demonstrate this point. Colonna and Marcassa (2015), in particular, show that by moving from such a tax system to a revenue-neutral working tax credit, women's participation would increase.

This scheme is clearly based on the idea that poor households, typically made up of a working man and a woman involved in home production, need to be helped because there are no opportunities in the labour market for low-skilled women. However, the Italian safety net system has been redesigned in the last 20 years and now includes instruments to support poor households who cannot work.

5.2.3 Means testing

Access to income-support transfers in Italy is, in most cases, means-tested on the basis of an index called the *Indicatore della Situazione Economica Equivalente* (ISEE). Having an ISEE below a given threshold is the condition for accessing many transfers and services such as some direct income support instruments (e.g., the guaranteed minimum income or *reddito di cittadinanza*, the utility bonus) and parenting support bonuses (e.g., bonuses for newborn children, for childcare services and for education expenses, such as books and university fees). The ISEE is a function of all the income sources and assets of all household members, adjusted using an equivalence scale that varies according to the size and the characteristics of the household to take into account the existence of economies of scale within the family. More in detail, the ISEE is composed of two sub-indices. One measures the contribution of total household income and is typically referred to as the ISR (*Indicatore Situazione Reddituale*); ISP (*Indicatore Situazione Patrimoniale*) is instead the sub-index for assets. To get the ISEE parameter for a given family, 20 per cent of the ISP is then added to the ISR and their sum is divided by the equivalence scale. There is also a system of deductions and allowances that reduces the extent to which certain types of income or assets contribute to forming the various components of the index. Concerning labour income, a deduction of 20 percent of earned income is currently recognised, up to a maximum of €3,000 per year. It is important to highlight that the maximum amount of the deduction is fixed and is not related to the number of earners in the household.

In practice, the ISEE increases linearly with the ISR, as shown in panel a of Figure 34, which reports the average values of ISRs and ISPs by ISEE fifths (among all households

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burden. This measure is rather expensive: according to some estimates, based on the microsimulation model of the Bank of Italy (BIMic), it costs around €3 billion each year.

that have declared their ISEE to the Italian Social Security Institute to access some benefits).

In general, since access to transfers in Italy is subject to the means-tested income defined by the ISEE and this increases almost proportionally with overall household labour income, all transfers that decrease with the ISEE reduce the monetary incentives to accept a job for non-employed individuals. Since the deduction for labour income does not depend on the number of earners in the family, it follows that the labour income of the wife — most probably the second earner — is less likely to benefit from the deduction than the income of the husband (or of a single person). Consequently, the income of the second earner has a relatively higher weight in the calculation of the ISEE.[59] This design discourages female labour supply and may be one of the reasons why female non-participation decreases dramatically by ISEE fifths (panel b of Figure 34) — on top of the characteristics of family-related transfers.

Figure 34: ISEE composition and women's non-participation

(a) Composition of ISEE, by ISEE fifths   **(b)** Non-participation of women, by ISEE fifths
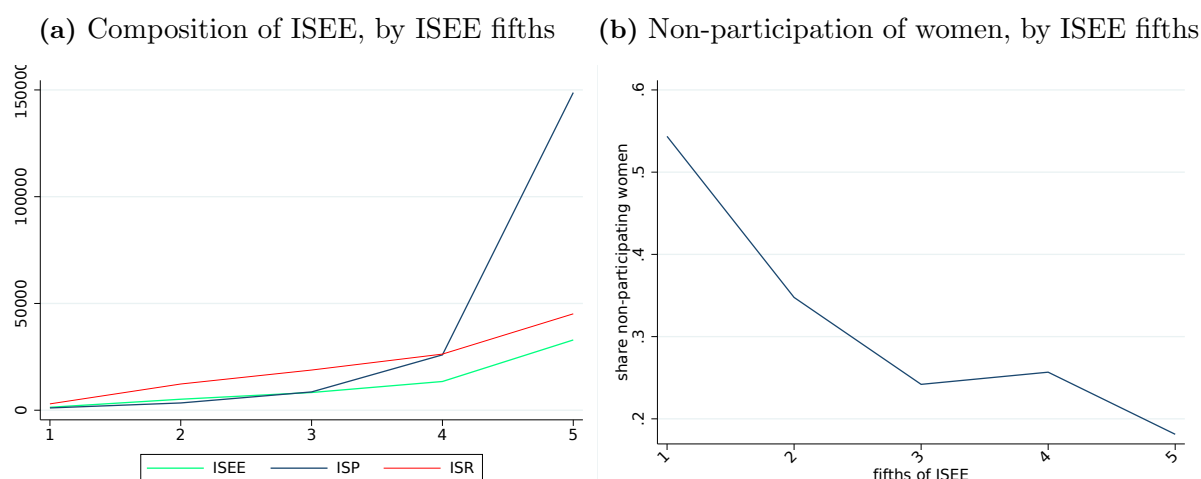
Notes: In panel a we only consider households declaring an ISEE in 2019; in panel b, only households with positive labour income or unemployment benefits. **Source**: Authors' calculations based on INPS data (panel a); Bank of Italy microsimulation model (BIMic) (panel b).

5.2.4 Conditional cash transfers: *bonus nido*

The *bonus nido*, already mentioned in Chapter 4, is a conditional cash transfer to households with children under the age of 3 aimed at compensating households for part of the cost of childcare. The aim of the transfer is to encourage the use of childcare services, especially by children living in poorer households who benefit the most from these services (see for instance the numerous contributions based on the Perry Preschool Project in the US, Garcıa et al. (2020) among many others), and to allow mothers to work.

The transfer is universal and very generous, especially for low-income households:

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[59]The fixed deduction also discourages the quantity of labour supplied because it is not adjusted to take into account the number of days worked in the reference year.

it can potentially cover the full cost of public childcare services for children from poor households, who are generally also entitled to reduced rates.

Households with ISEE lower than €25,000 receive €3,000 each year; households with ISEE between €25,000 and €40,000 get €2,500; those with ISEE higher than €40,000 obtain €1,500. According to INPS data, the transfer reached over 400,000 children in 2021 (around 1 out of 3 of those aged 0-2 and almost all of those attending childcare services).

The design of the *bonus nido* may discourage second earners from working because the amount of the subsidy falls sharply and non-linearly with the ISEE parameter. Indeed, the disincentive is probably higher at the second threshold (i.e., when the value of an ISEE is around €40,000), where middle-income households in Italy are more often concentrated.[60] Such a threshold is high for an average one-earner family, thus it is more likely to affect second earners in married couples, thus mothers.

5.2.5 Family cash transfers: the design of *assegno unico universale*

Unconditional family cash transfers increase family non-wage income and may discourage labour supply. This effect is even stronger when the benefit decreases linearly with labour income. The *assegno unico universale* (AUU) is a cash transfer that has been in place in Italy since March 1, 2022 (Legislative Decree 230). It is paid to households with children below 18, or children who have not yet reached the age of 21 if they are students or unemployed, and disabled children with no age limit. The benefit has been modified by the Budget Law for 2023, and now it is more generous for poorer households and for households with disabled children, children aged less than 1 and young mothers (aged no more than 21). The take-up is very high, close to 90 per cent.

The AUU pursues the objective of rationalising and simplifying the welfare system for families with children that was in place before 2022. Indeed, it has replaced multiple measures like tax credits for dependent children or the *assegno per il nucleo familiare* (ANF).[61] All families with children are now covered, including those who previously did not benefit from any tax credit because their income was too low, and those with very high incomes.[62]

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[60]For instance, consider a household composed of a father with gross earnings of around €40,000 per year. Assume that there is one child in the family aged 0-2 and that the mother does not work. Assume also that the household owns the house where they live (i.e., they have an ISP of around €160,000). According to INPS data, the ISEE is around €34,000 for this household. If the female partner decides to work full time for around €16,000 gross earnings per year (the average earnings of women entering full-time employment in 2019), then their ISEE hits the threshold and the *bonus nido* drops by €1,000 (-40 per cent of the previous transfer), which amounts to slightly less than one net monthly wage of the mother.

[61]It also replaces more limited instruments with respect to the category of beneficiaries (such as the allowance for families with 3 or more children with low incomes) or duration (such as the birth allowance in the first year of life and the *bonus nascita*).

[62]The previous system was particularly fragmented also by type of employment. For instance, the

The transfer varies according to the economic condition of the household, as represented by its ISEE. There is a basic amount equal to €50 per child per month for households with an ISEE above €40,000, whereas it is more generous for poorer households (up to €175 per month for families with an ISEE below €15,000).

One of the key features of the AUU is that its design takes into account work disincentives and pays a supplement in the event of a second earner in the family. In fact, the transfer is more generous for relatively poor households where both parents work, as they receive an additional €30 per child (decreasing up to an ISEE of €40,000). In designing this instrument, the legislator has thus tried to compensate, at least partially, for the negative impact that the subsidy could have on the labour supply of the second earner. In this respect, the AUU is unique in the Italian tax and transfer system, even if it is certainly true that the transfer in the case of work could be more generous and parameterised to actual hours worked (in order to stimulate the intensive margin of employment as well). According to the Bank of Italy's microsimulation model (BIMic), this additional transfer in the case of work is small but not negligible for households composed of the working-poor (Bank of Italy, Annual Report, 2022; see also Curci and Savegnago (2021) for a discussion and alternative proposals).

5.2.6 Guaranteed minimum income: the case of *reddito di cittadinanza*

Carta and Colonna (2023) study a form of jointness in the tax-transfer function of Italian households recently introduced by *reddito di cittadinanza* (RdC), a guaranteed minimum income (GMI) programme implemented in April 2019.

In general, GMIs are income programmes that supplement family income up to a given reference threshold. The unit eligible for the transfer is the household. Carta and Colonna (2023) theoretically study how a GMI differentially affects the incentives to work of partners. For singles, where there are no partners' interactions, the GMI acts like an individual-based subsidy and discourages the labour supply of workers facing lower wage offers, typically women. In couples, on the other hand, the GMI introduces strategic complementarities that are not present in traditional individual-based schemes. When one partner is non-employed or their wage is low enough to qualify the family for the subsidy, the other partner might find it convenient to stay non-employed in order not to lose the benefit. Such a disincentive to work disappears for partners of high-wage workers, whose income is already high enough to exclude them from the programme. Thus, a GMI is expected to produce larger labour supply effects in economies where a lower employment rate of married women compresses the share of two-earner households.

The authors test the model implications by quantifying the labour supply effects associated with the RdC in Italy,[63] a country with low participation and employment

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ANF was only for employees, leaving out the self-employed.

[63]The programme is in the spirit of other European GMI schemes (Carta et al., 2022), which are

rates for married women, resulting in a relatively high share of single earner households.[64] The authors find that among singles, where there are no household interactions, the RdC reduces employment more among women than men (by 1.8 and 1.0 percentage points, respectively; Table 5), since the former typically have lower wages. As for couples, there are no significant effects on married women, but married men are largely more likely to be unemployed after the introduction of the RdC. As predicted by the model, declines in male employment mainly affect single earner households in the pre-RdC scenario: with the RdC the share of couples where neither partner works rises by 2.1 p.p (Table 6)., mostly fuelled by a reduction in the share of households where only the husband works (-1.8 p.p.); on the contrary, the share of households in which both partners work stays substantially unaltered. Overall, with the introduction of the RdC, the employment rate of married men reduces by 2.1 p.p. (-2.3 p.p. for those with children) and the share of unemployed rises by 1.6 p.p. (1.8 p.p.). The authors then simulate the effects of an 'equivalent' individual-based transfer, which individually considers partners' income.[65] This scheme would reduce female labour supply, increasing the share of single earner households while decreasing that of double earners (Table 6). Compared with an individual-based transfer, the RdC therefore has a much lower impact on the labour supply of married women who, in Italy, already display particularly low participation rates. On the other hand, it encourages low-wage partners to be non-employed, increasing the share of households in which both partners do not work and are dependent on income support programmes, maybe boosting the risk of poverty traps and undermining their social inclusion in the long run.

The RdC therefore illustrates how a transfer can encourage both partners to stay out of the labour market. More in general, the design of GMIs is crucially different from the other family transfers previously studied. For example, as shown in Colonna and Marcassa (2015), with the spouse tax credit, the non-employment (or low-paid job) of the second earner (wife) reduces the taxation of the husband, thereby lowering the implicit marginal tax rates. This encourages specialisation within the household and reduces the labour supply of wives. Instead, under a GMI scheme like the RdC, the non-employment (or low-wage employment) of the second earner means very large implicit marginal tax rates on the low-wage husband. Low-wage partners may both prefer not to

means-tested but not targeted to specific demographic subgroups of the population (as is the case instead in the US or in the UK).

[64] According to European Labour Force Survey data, the difference in employment rates between single and married women is the largest in Italy: approximately 30.0 p.p.; 20.7 in Spain, 14.4 in Germany and 11.3 in France. This implies that in Italy, the share of adults living in single-earner households or in families with no-labour income is higher (74.3 per cent; 70.4 per cent in Spain, 61.8 per cent in France and 50.7 per cent in Germany), meaning that the share of the population potentially affected by a GMI is larger.

[65] The relevant income threshold for the computation of individual benefit is half of the RdC threshold for the family considered. When family and individual labour incomes are zero, the two schemes are equally generous.

Table 5: Model results — Impact of the RdC on participation and employment rates

| | Total | | | Single | | Couples | | | |
| | | | | | | no children | | with children | |
	Total	Men	Women	Men	Women	Men	Women	Men	Women
Employment rate									
Model	79.5	89.9	69.4	83.9	84.3	94.0	73.1	92.8	58.6
impact of RdC	-1.2	-1.4	-0.9	-1.0	-1.8	-1.4	-0.3	-2.3	-0.3
Participation rate									
Model	87.5	97.2	78.1	94.6	92.9	97.9	85.4	98.7	66.7
impact of RdC	-0.7	-0.7	-0.7	-0.7	-1.5	-0.7	-0.1	-0.5	-0.1

Source: Carta and Colonna (2023).

Table 6: Model results — Changes in the distribution of couples across different working status (%)

| | Men | |
Women	**Non-Employed**	**Employed**
Non-Employed		
Model	3.8	35.0
impact of RdC	2.1	-1.8
impact of IB	1.6	1.1
Employed		
Model	3.0	58.2
impact of RdC	0.0	-0.3
impact of IB	0.1	-2.8

Notes: IB stands for the scenario in which a scheme that considers individual rather than family income is implemented. For family and individual labour incomes equal to zero, IB and RdC provide the same resources to the family. **Source:** Carta and Colonna (2023).

work. Women, as second earners, only face a high RdC implicit tax on earnings if the family is still eligible for the subsidy, given the husband's employment decision and his wage.

6 Career progressions

As shown in Chapter 3, women already face a large wage gap at entry in the labour market. However, this gap widens up as workers progress in their careers with women being underrepresented in top earnings (Olivetti and Petrongolo, 2016b) and top income classes (Atkinson et al., 2018). This evidence suggests that there is a *glass ceiling* in the career progressions of women, which is holding them back in comparison to their male peers.

This chapter documents the extent of vertical segregation in Italy (i.e., the extent to which women are relegated to lower-ranked jobs); then investigates its origins, pointing in particular to women's sorting into firms with worse pay and career prospects; and finally reviews the policy interventions that may be adopted to break the ceiling, arguing that corporate managerial practices that favour work-life balance — for instance a more flexible organisation of work in terms of schedule and workplace — and a higher inclusion of women in middle management too — even through affirmative action interventions — can be particularly effective tools, especially if coupled with increased pay and diversity transparency.

6.1 Descriptive evidence

### 6.1.1 Evidence on earnings profiles

In Figure 35 we use data from the European Labour Force Survey (2020) to compare the gender gap in the distribution of labour income in three countries: Italy, France and Denmark.[66] In particular, each point corresponds to the difference in the probability of being in a given decile between men and women ('gender gap'). In each plot, the two lines correspond to two different specifications: one with no controls ('raw') and one that includes a large set of individual characteristics as control variables ('with controls').[67]

First, the raw specification (blue line) provides us with some descriptive evidence of the differences in the distribution of men's and women's labour earnings over their working life. Some stylised facts emerge: female presence decreases over income deciles in all countries and age groups, i.e., consistently with the previous literature (Olivetti and Petrongolo, 2016b), women are everywhere more likely to fall into lower labour income deciles and less likely to fall into higher income deciles compared with men. However, this pattern changes across countries and evolves with age. In particular, the differences at the top of the earnings distribution appear at the later stages of the career in all three

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[66]Data on monthly pay of employees are only available for a small subset of countries and are grouped into deciles.

[67]These are: age brackets dummies, a dummy for being married, a dummy for having children aged below 10 (only available for Italy and France), educational attainment fixed effects, weekly hours worked and a dummy for full-time contracts, experience and its square, tenure and its square, occupation and sector fixed effects.

Figure 35: Monthly (take home) pay from the main job. Gender difference in the probability of falling within each decile of the distribution. Selected countries, employees only
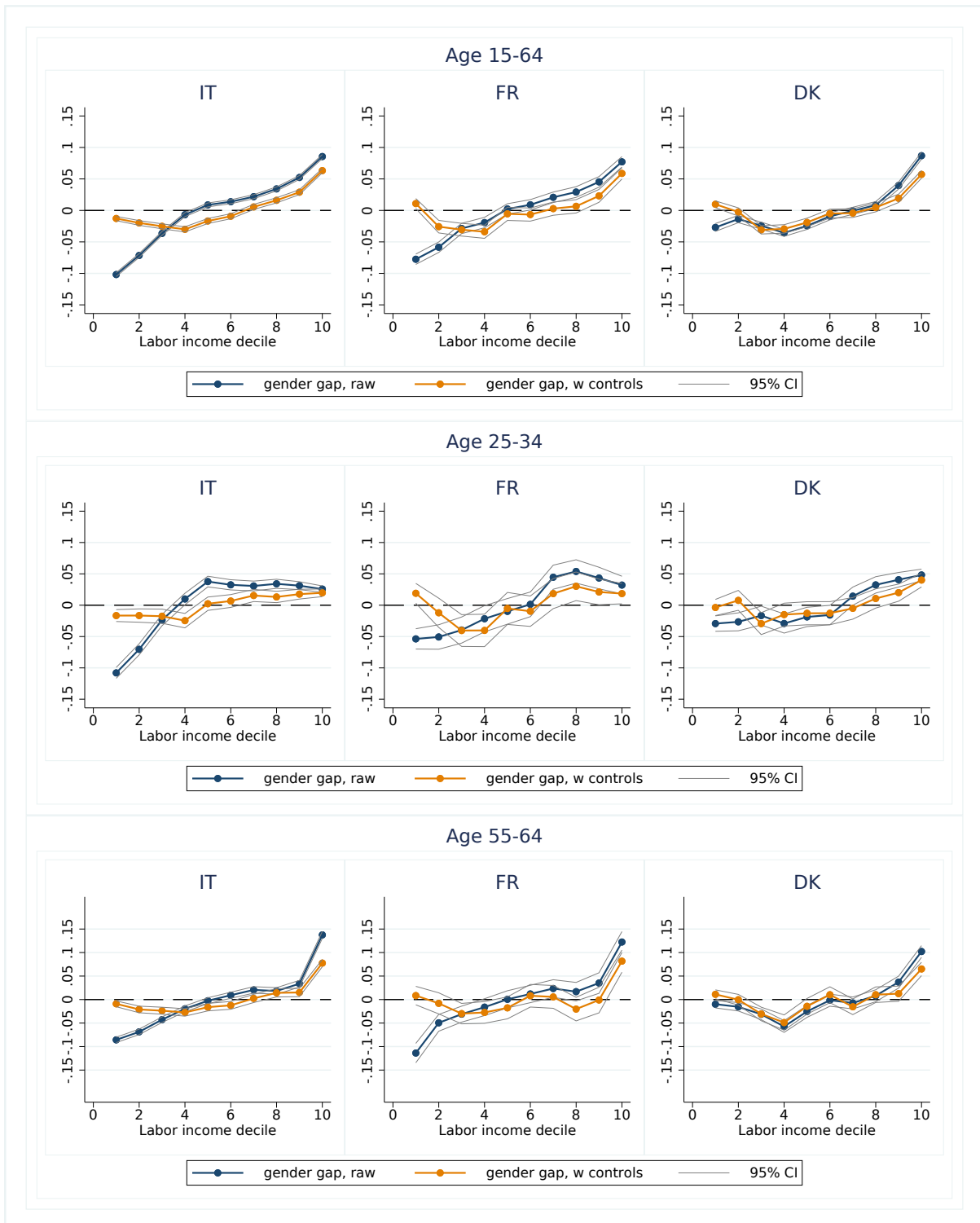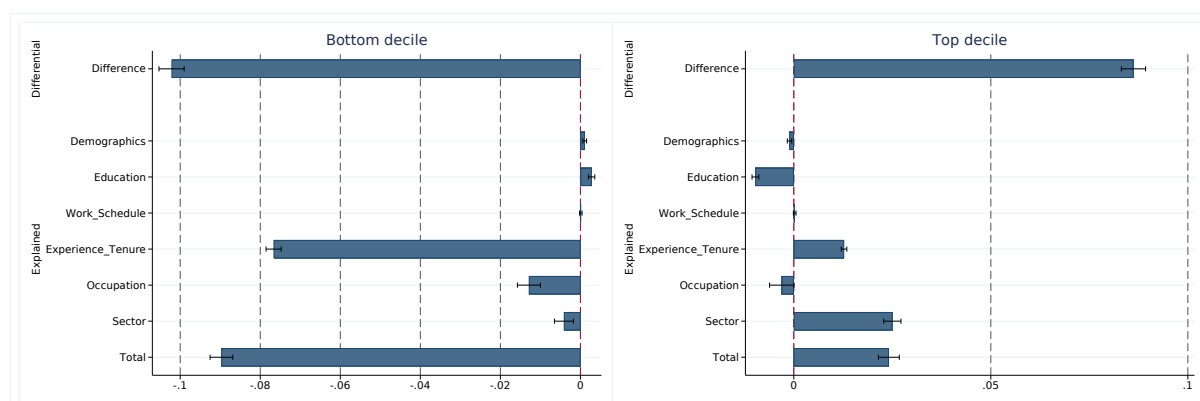

Notes: The figures plot the coefficients of a male dummy (gender gap) in a linear regression where the outcome variable is the probability of falling into a given labour income decile. The two lines correspond to two different specifications: a raw difference that comes from a linear regression with no controls, and one that includes a large set of individual controls, namely: age brackets dummies, a dummy for being married, a dummy for having children aged below 10 (available only for Italy and France), educational attainment fixed effects, weekly hours worked and a dummy for full-time contracts, experience and its square, tenure and its square, occupation and sector fixed effects. **Source:** Calculations based on the Labour Force Survey, 2020.

countries, suggesting that women progress less in their careers compared with men (in line with the findings of Chapter 3). As for cross-country differences, Italian women are more concentrated in the bottom deciles, especially at the beginning of their careers. The difference is particularly stark in comparison with Denmark.

Second, Figure 35 also allows us to draw some interesting insights from the analysis of the conditional differences (orange line), i.e., those which account for individual and job characteristics. When controls are added to the regression, all gender differences are significantly attenuated, i.e., the line becomes flatter and closer to zero in all countries. In particular, job and individual characteristics explain most of the (large) earnings gap at the bottom of the distribution, while the gap at the top of the distribution among older workers remains largely unexplained. Coherently with the evidence presented in Chapter 2, when individual characteristics are taken into account the wage gap in Italy becomes similar to that in other countries.

Looking at the underlying regression analysis for Italy (Oaxaca-Blinder decomposition, Figure 36) we find that at the bottom of the distribution, where individual characteristics explain almost all of the gap, the variables that matter the most are those capturing working experience and job tenure (since men can count on more continuous careers, Chapter 4), while differences in occupations and sectors of employment explain the rest of the observed gap. At the top of the distribution, on the other hand, it is the sector of employment that has the highest explanatory value. However, note that in this part of the distribution individual characteristics only explain a small fraction of the gap (about 28 per cent).

Figure 36: Decomposition of the gender (male-female) difference in the probability of falling into the bottom and top income deciles in Italy


Notes: The figure plots the coefficients of the Oaxaca-Blinder decomposition of the gender gap in the probability of falling within the bottom and top income decile in Italy. The first coefficient plotted is the estimated differential between men and women. The other coefficients are the estimated differential explained by each of the groups of variables. The last one is the Total differential explained by the variables included. Demographics include age brackets dummies, a dummy for being married, a dummy for having children aged below 10; Education includes educational attainment fixed effects; Work Schedule includes weekly hours worked and a dummy for full-time contracts; Experience and Tenure includes: experience and its square, tenure and its square; Occupation includes Isco 3 digit fixed effects; and Sector includes Nace 1 digit fixed effects. **Source:** Calculations based on EU Labour Force Survey Database, 2020.

Data from the EULFS further allow us to analyse the career patterns of employees in

the private and public sectors separately. The latter is particularly interesting because it is typically a more regulated sector, where hirings and promotions are mainly decided through open vacancies and compensations are linked to job positions and not subject to individual bargaining. Such a comparison reveals that the observed differences in the distribution of labour earnings over the working life stem mainly from employees in the private sector, with the (conditional) distribution of earnings of public sector employees being equal across genders up to the 80th percentile, with a smaller, though still considerable, gap in the two top deciles. The same patterns appear in France and Denmark (Appendix Figure A.6).[68]

In turn, the comparative analysis of the distribution of labour earnings across countries reveals that, even when controlling for individual observable characteristics, differences in earnings widen at older ages and at higher levels of income, thus signalling the existence of a glass ceiling in all countries.

Figure 37: Gender pay gaps over the life cycle
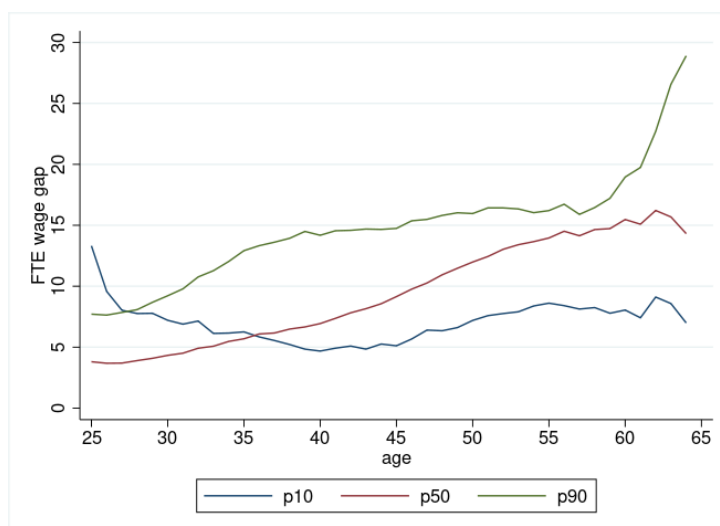
Notes: Data refer to private sector employees excluding agriculture. The gaps are computed as the difference between men and women in FTE wages as a percentage of men's wages. FTE wage is the yearly salary corrected by the number of full-time equivalent units of labour, which is the average number of days worked per year multiplied by the share of part-time. P10, P50 and P90 indicate, respectively, the 10th percentile, the median and the 90th percentile of the distribution by gender and age of the FTE wages. **Source:** Calculations based on INPS data, average 2011-2021.

For Italy, more detailed information can be derived from the INPS administrative archives. Figure 37 refers to the universe of employees in the non-agricultural private sector. It plots the percentage gender difference between median, top and bottom deciles of full-time equivalent (FTE) wages by worker's age. There appears a clear pattern of the median gap widening at older ages. This is not concentrated in the years of motherhood but progressively expands throughout working life.[69] The gap evolves very differently

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[68]With similar reasoning, Mocetti et al. (2021) show that the gender gap is also lower among employees in regulated occupations, where entry requirements impose a selection of workers and where conduct, including prices and tariffs charged for services, is often subject to regulation.

[69]Note that these estimates show the difference in the path of progression conditional on employment, and therefore do not account, for example, for women exiting the labour market upon maternity.

at the top and bottom of the male and female wage distribution: in the bottom decile it remains broadly constant at around 7 per cent over the whole working life, whereas among top earners it becomes consistently larger over the whole life cycle and explodes towards the end of the career reaching a 30 per cent gap.[70]

Figure 38: Cumulative distribution of self-employed workers by yearly declared taxable income and gender
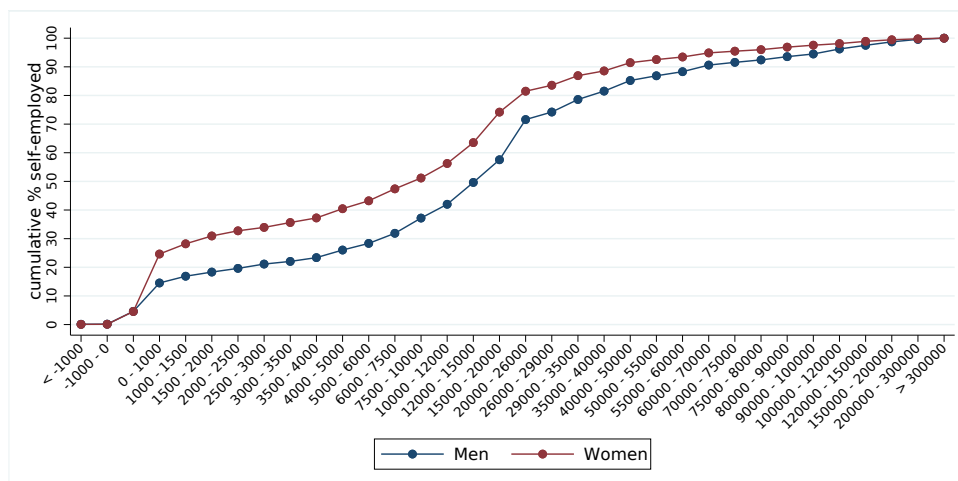
Notes: The figure shows the cumulative distribution of self-employed workers' declared taxable income in 2021. Self-employed workers include both non-employees and entrepreneurs. Specifically, all individuals who declared: *redditi da lavoro autonomo, altri redditi da lavoro autonomo provvigioni e redditi diversi da Mod 770, redditi di spettanza dell'imprenditore in contabilita' ordinaria, redditi di spettanza dell'imprenditore in contabilita' semplificata, redditi da partecipazione, altri redditi da lavoro autonomo e redditi da recupero start up e persone fisiche titolari di partita IVA che usufruiscono di regimi fiscali agevolati (c.d. minimi)*. Numbers are weighted by the share of individuals for whom the reported type of income is the main source of income. **Source:** Calculations based on data from the Ministry of Economy and Finance, Dati e statistiche fiscali, Dichiarazioni fiscali.

Finally, very few data are available on the self-employed (for instance, professionals, traders, artisans, freelancers, and entrepreneurs), who represent a sizeable share of Italian workers, about 22 per cent (Italian Labour Force Survey, 2021). However, information on their earnings is not collected in the Labour Force Survey data and is barely available from administrative sources. In Chapter 3, we showed that self-employed women and men quickly face different career patterns, with girls earning about 18 per cent less than boys just one year after entry into the labour market. In Figure 38 we employ aggregate data published by the Italian Tax Authority and plot the cumulative distribution of earnings of all self-employed workers by gender as of 2021.[71] The graph shows that women are concentrated in lower earnings brackets, with the median declared taxable income being below €10,000 for women and about €15,000 for men. About 80 per cent of self-employed workers who declared more than €200,000 euro were men. If we compare Figure 38 with

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[70]Differences in the very last age brackets may also be influenced by retirement decisions. Given that women's minimum retirement age is generally lower than men's, we may expect the pool of female workers aged between 60 and 64 to be more selected than that of male workers. Under the assumption that workers with higher wages are more willing to stay longer in the labour market, the resulting observed pay gap at the end of the working life may even be underestimated.

[71]Note that, as data on earnings are top-coded, we cannot tell how 'long' the right tails are for men and women respectively.

the corresponding figure for employees (Appendix Figure A.7), we observe that the gender gap among the self-employed is more pronounced.

6.1.2 Women in top positions

The evidence from workers' earnings goes hand in hand with that of the representation of women in top executive positions within firms. Ballacci et al. (2021) show that as of 2019, the share of women among board members in Italian non-listed companies and banks was about 24 per cent and 17 per cent respectively, with very little improvement over the past decade. On the contrary, listed companies and banks have seen a massive increase in female representation due to the implementation of the quota system introduced in 2011. In listed companies, in particular, the share of women passed from 7.4 per cent in 2011 to 41 per cent in 2021. However, even in these cases, women are typically relegated to secondary roles within the board, with less than 1 per cent of them holding a CEO position in listed firms and 1.7 per cent in listed banks.

Similar evidence comes from the public sector. In Figure 39 we use administrative aggregate data from the Ministry of Finance, and show that the share of women among directors is systematically lower than among all employees. Overall women are 49 per cent of directors vis-à-vis 59 per cent of employees; interestingly, the share of women among directors is lower than that among all employees even in sectors where women represent the vast majority of employees, like education and health. Among top directors, the share of women is even lower.

**Figure 39:** Share of women among public employees and directors, by sector
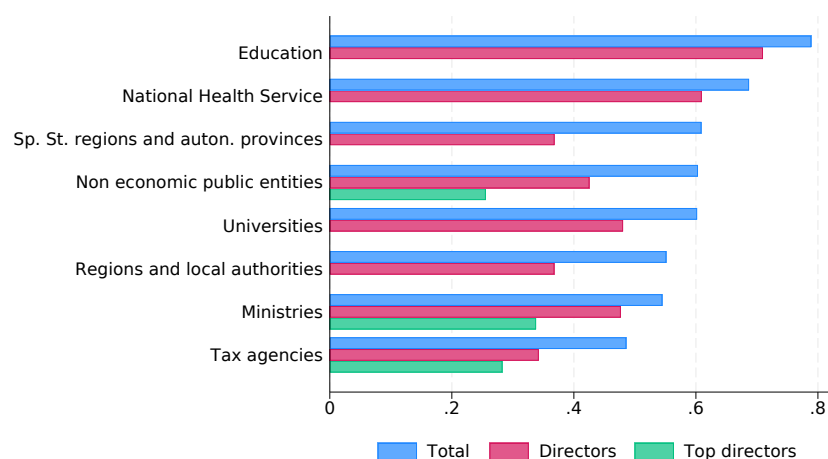
Finally, a particularly interesting case is that of female entrepreneurs. Data on the ownership structure of Italian companies in 2021 show that among those who own some

or all of the shares in a firm (excluding firms with zero employees), less than one third are women.[72] Moreover, women typically hold smaller shares of the firm, on average each female shareholder holds 33 per cent of the firm's shares, vis-à-vis 39 per cent of men. If we define 'female firms' as those in which women own at least 50 per cent of the firm, we find that these currently represent 27 per cent of the total. This share has remained stable over the past ten years. In Figure 40 we show that female firms are generally smaller, representing less than one fifth of firms with more than 50 employees and are concentrated in certain service sectors, in particular health and education, and accommodation and food services, which have lower levels of productivity (revenues per worker).[73]

Figure 40: Share of female firms
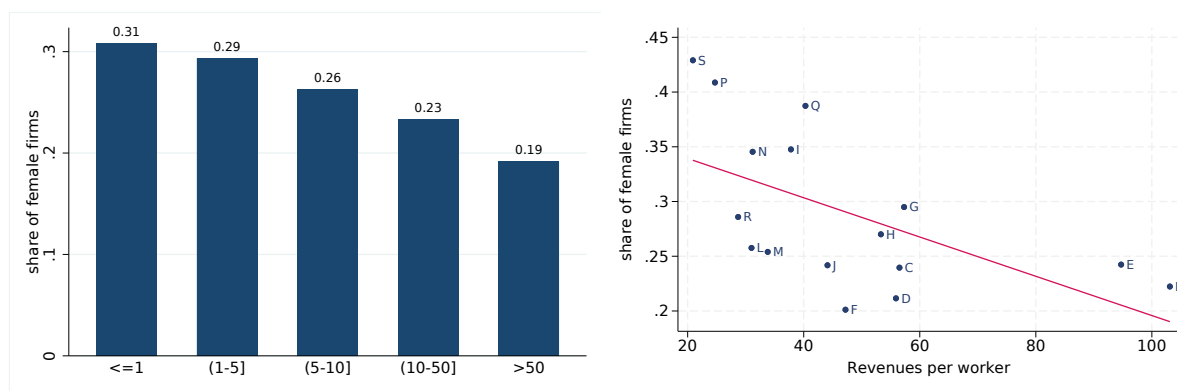
Notes: Share of female firms by firm size class in terms of the number of workers (left panel) and by sector in 2021 (right panel). Female firms are those in which women hold 50 per cent or more shares. Sectors includes: A = Agriculture, forestry and fishing; B = Mining and quarrying; C = Manufacturing; D = Electricity, gas, etc.; E = water, waste, etc.; F = Construction; G = Wholesale and retail trade; H = Transportation and storage; I = Accommodation and food service activities; J = Information and communication; K = Finance and insurance; L = Real estate; M = Professional business services; N = Administrative and support activities; P = Education; Q = Health and social work; R = Arts, entertainment and recreation; S = Other service activities; T = Activities of households as employers. Revenues per worker, median value, thousand euro. **Source:** Calculations based on Infocamere data, 2021 and Istat data, 2019 (*Risultati economici delle imprese: Principali indicatori di performance*).

All in all, the available evidence, both for employees and for the self-employed, returns a picture of lower career progressions for women, with a strong under-representation of women among the highest level positions and income brackets.

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[72]Our sample includes all corporate companies (*societa di capitali*), it does not include partnerships and individual firms (*societa di persone, ditte individuali*). In this sample, the number of entrepreneurs amounts to about 950 thousand individuals. Using Italian labour Force Survey data, Baltrunaite et al. (2022) estimate that the number of entrepreneurs in Italy is about 1.24 million, i.e. 5 per cent of the employed, one quarter of the self-employed. Of these, 25 per cent are women. In their work entrepreneurs are defined as those who either define their main working activity as that of an entrepreneur or those who define themselves as self-employed and have employees working in their firm.

[73]Indeed, in Appendix Figure A.8 we resort again to the data from the Italian Tax Authority and show that the earnings of women entrepreneurs are generally lower than those of men.

6.2 The origins of the glass ceiling

In Chapter 3 we showed that a large gap in labour earnings is already observable at the very beginning of careers and is mainly due to differences in the fields of study and specialisation; in Chapter 4 we further showed that maternity plays a crucial role in widening the gap; while we have provided evidence that, up to a point, differences in observable characteristics – mainly experience, tenure and occupation and industry of employment – explain a significant part of the observed raw gap, in what follows we will analyse other important factors that contribute to the vertical segregation of women in the labour market.

6.2.1 Sorting across industries and firms

A growing body of literature shows that, at least for workers in the private sector, employer heterogeneity, even within sector, explains a significant share of the observed differences in both levels and dynamics of wages (Barth et al., 2021; Bruns, 2019; Card et al., 2015; Coudin et al., 2018).

A recent OECD report (OECD, 2021), for example, based on administrative matched employer-employee data referring to 16 OECD countries (including Italy), shows that about one quarter of the average gender wage gap observed between similarly skilled women and men could be explained by differences *between* firms.[74] This is due to the concentration of women both in low-pay industries and in low-wage firms within industries. The remaining three quarters of the gap is instead explained by gaps in pay *within* firms, mainly reflecting differences in tasks and responsibilities, but also, to a minor extent, differences in pay that may be attributable to implicit discrimination phenomena (Section 6.2.2).

In Italy, the distribution of female employment across industries is very heterogeneous. Calculations based on Labour Force Survey data from 2021 show that over 25 per cent of employed women work in education and health-related services and 14 per cent in wholesale and retail trade. Comparing the share of women among workers in each sector with the average productivity of the industry (which is also a strong predictor of average wages), we can see that women tend to work mosre often in less productive industries (Figure 41, left-hand panel). This evidence is indeed in line with that presented in Chapter 3. Interestingly, the public sector is the most important employer of women in Italy with almost two million women versus 1.3 million men according to the Ministry of Economics and Finance. However, even within the public sector, where the distribution of wages is generally more compressed and thus gender differences are milder, women are mostly concentrated in lower-pay sectors: half of them work in schools, and one quarter in the National Health Service. In the right-hand panel of Figure 41, we plot the share

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[74]The data refer to the first decade of the 2000s.

of women among workers in each public sector compartment versus the average annual pay in it, which highlights how women are concentrated in lower-paid activities.

**Figure 41:** Distribution of women across sectors
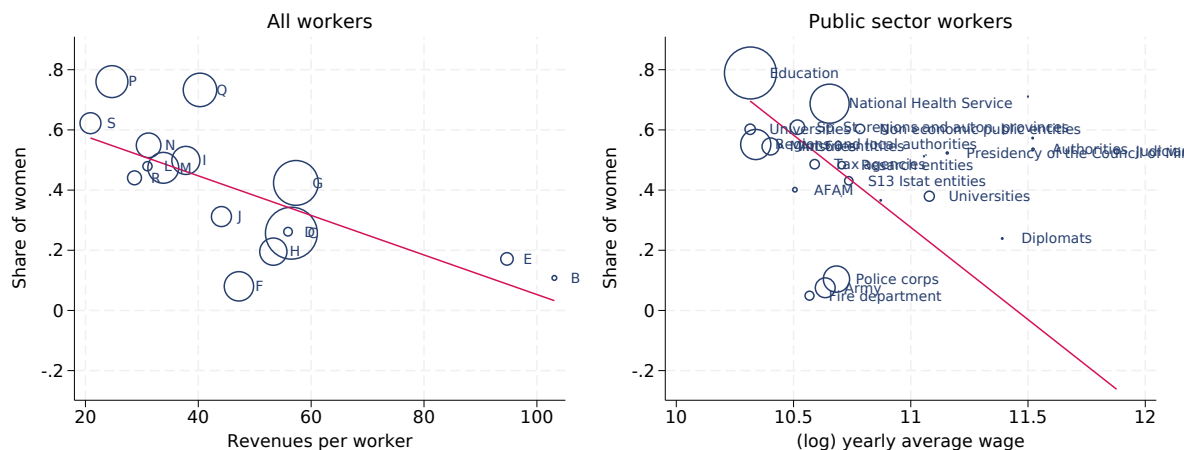
Notes: Share of women among workers in each sector. Area of symbol proportional to the number of workers employed in the sector. Left panel: all workers; sectors include: B = Mining and quarrying; C = Manufacturing; D = Electricity, gas, etc.; E = water, waste, etc.; F = Construction; G = Wholesale and retail trade; H = Transportation and storage; I = Accommodation and food service activities; J = Information and communication; K = Finance and insurance; L = Real estate; M = Professional business services; N = Administrative and support activities; P = Education; Q = Health and social work; R = Arts, entertainment and recreation; S = Other service activities. Revenues per worker, median value, thousand euro. Right panel: public sector workers. Linear fit is computed excluding Police corps, Army and Fire department. **Source:** Calculations based on Italian Labour Force Survey 2021 and Istat data, 2019 (*Risultati economici delle imprese: Principali indicatori di performance*, left panel); Calculations based on Ministry of Economics and Finance data 2021 (right panel).

The unfavourable distribution of female employment across sectors also implied that women suffered more than men during the Covid-19 pandemic (Ministry of Labour and Social Policies, Bank of Italy and ANPAL, 2023). However, while male employment experienced a significant sectoral reallocation after Covid, largely due to the boom in the construction sector, female employment remained concentrated in retail and tourism (Figure 42). Such distribution also implies that women are still over-represented in temporary work positions.

Differences across employers not only contribute to determining the average wage gap but also its evolution over time. Indeed, women tend to sort into industries and firms with lower and also flatter wage profiles, i.e., with fewer career opportunities.

The paper by Casarico and Lattanzio (2023b) provides detailed and novel evidence for Italian workers. Following the literature started by Card et al. (2013), the authors employ a two-way fixed effects estimation model to decompose the gender wage gap into a between and a within-firm component for private sector employees. Moreover, they do so along the distribution of earnings, which allows them to shed light on the impact of employer heterogeneity on career progression gaps. Figure 43 provides a graphical representation of their core results. The unconditional gender wage gap, on average about 20 per cent , grows from 10 to 60 per cent when moving from the bottom decile to
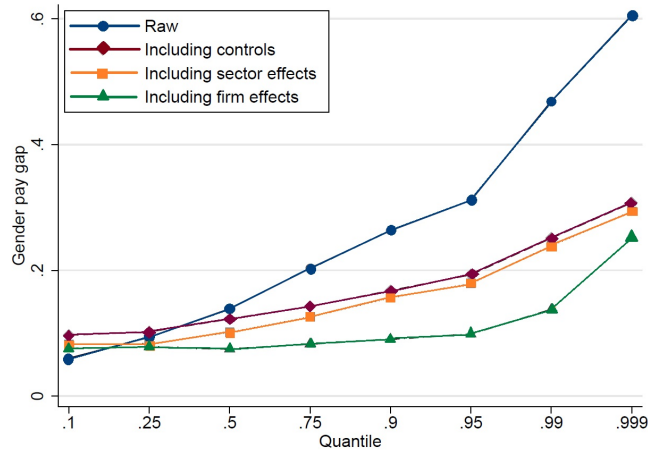
Figure 42: Sectoral distribution of male and female net hirings before and after Covid-19
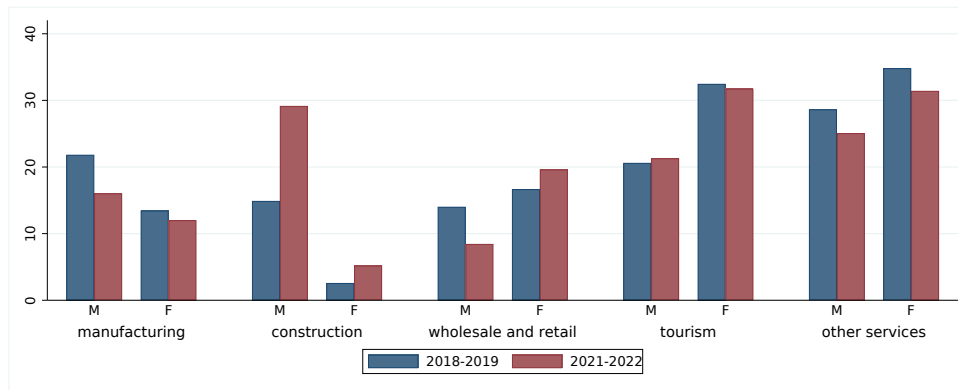
the top 0.1 per cent of the distribution. However, the share of the gap that is explained by individual characteristics, industry and firm fixed effects decreases over the distribution, leaving a constant 10 per cent gap unexplained. For top earners the unexplained gap is twice as large, i.e., all the observable characteristics, and in particular differences between firms, explain much lower shares of the raw gender gap. The authors argue that at the top decile within-firm differences become the only factor that explains part – though only about 10 per cent – of the gender gap (Appendix Figure A.9).

Figure 43: Decomposition of the gender pay gap along the distribution of earnings

Casarico and Lattanzio (2023b) also explore the role of job-to-job mobility in determining wage and career gaps (Bowlus, 1997; Del Bono and Vuri, 2011; Caldwell and

Danieli, 2023). They estimate the likelihood of (i) moving to a firm with a more favourable pay policy (i.e. higher firm effect) and (ii) moving to a firm with a higher gender wage gap (as a proxy for within-firm differences in pay). Their results reveal that women are generally less prone to changing jobs and, most importantly, when they do so, they move to worse firms (both in terms of between and within-firm differences), i.e., they move to firms that pay lower wages on average and that make more differences between men and women. This is particularly true when job moves are involuntary, i.e., in the case of firm closure. This evidence, which is in line with some recent work by Caldwell and Danieli (2023), confirms the primary role of sorting across firms in determining the wage and career gaps, highlighting how this effect tends to reinforce over time, with women being not just disadvantaged in their first placement, but also moving to worse jobs throughout their working life.

The analysis in Di Addario et al. (2023) further explores this aspect. The authors propose an econometric model allowing the effect of the firm of origin to be disentangled from that of the firm of destination. In other words, they empirically evaluate the relative importance of a worker's current employer (firm of destination) and of the employer from which a worker was hired (firm of origin) for the determination of wages and thus, of the gender wage gap. The model is tested empirically on Italian matched employer-employee data covering a sample of relatively large firms surveyed by the Bank of Italy (INVIND) and the working histories of their employees taken from social security records.

The model developed by Di Addario et al. (2023) turns out to be a very powerful tool to predict hiring wage variability, achieving an R^2 of 72.5 per cent . However, only 0.7 per cent of the variance is explained by the effects of the firm of origin, vis-à-vis about 24 per cent of the firm of destination (and almost 30 per cent by worker's effects, which take into account all obesrevable and unobservable time invariant individual characteristics). When applying the model to the analysis of the evolution of the gender gap in hiring wages, the authors find that destination effects explain almost the entire gap at entry into the labour market, but that they remain constant as workers age, even though the gap tends to widen. Hence, while sorting across firms explains a great deal of the observed gender gap in hiring wages over the whole working life, the expansion of the gap that is observed as workers age should be attributed to reasons different from flatter job ladders (Figure 44).[75]

These findings are in line with a rich vein of literature from the US (Bayard et al., 2003; Ludsteck, 2014; Cardoso et al., 2016; Morchio and Moser, 2021) showing that even when having the same characteristics as men, women sort into lower-paying firms. As to why this is the case, the existing evidence generally rejects the hypothesis that it is due to demand-side factors, i.e., employers explicitly discriminating against women

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[75]Di Addario et al. (2023) also provide evidence that the gap and, correspondingly, the unexplained part, are higher for more educated individuals.

Figure 44: Gender wage gap and origin and destination effects
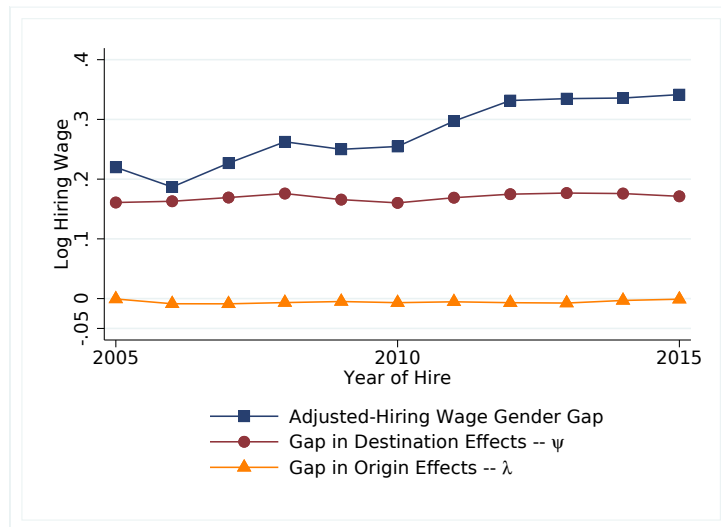
at hiring (Bertrand and Mullainathan, 2004; Booth and Leigh, 2010; Carlsson, 2011). However, these studies typically focus on low-skilled jobs with lower returns, and thus their validity is hard to extend to higher-paying positions.[76] On the other hand, the literature has highlighted how the sorting of women into lower-paying firms mainly stems from supply-side choices, in particular the fact that women may value other aspects of their job (Cortés and Pan, 2018), namely the flexibility of the working schedule and a better work-life balance (Bøler et al., 2018; Hotz et al., 2017a; Goldin, 2021; Wiswall and Zafar, 2017; Sorkin, 2017), or a shorter commuting time (Le Barbanchon et al., 2021; Caldwell and Danieli, 2023). These differences in preferences effectively restrict the choice set of employers for women, giving these selected employers high monopsony power that may result in lower pay (Caldwell and Oehlsen, 2022; Sharma, 2023). On top of this, recent studies have shown that women have different search behaviours which may result in a disadvantaged sorting across employers: not only do they face higher search costs for instance because of their childbearing responsibilities (Carta and Rizzica, 2018), but are also more risk averse and less optimistic than their male peers, which induces them to accept job offers more quickly than men, thus missing out on potentiallly better offers (Cortés et al., 2023).

6.2.2 Careers within the firm

The finding that differences across employers are less important at higher levels of the career ladder in explaining the observed gaps, urges us to investigate other aspects in-

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[76]These papers are based on experiments consisting in sending fake CVs for real (low-skill) job postings. They generally find no difference in callbacks between male and female candidates, with an advantage for women in highly female-dominated occupations.

cluding the organisation of the firms, how employers set wages for both new hires and incumbents and how they decide on promotions (i.e., the within-firm variation).

Recent work by Bronson (2018) shows that most of the gender gap in wage growth is due to differences in the incidence of large, within-firm promotions, proxied by outsize pay hikes relative to similar co-workers. While they show that this difference is primarily due to the missed opportunities after childbirth (Angelov et al., 2016; Kleven et al., 2019) and to the anticipation of the related labour supply contractions by employers (i.e., statistical discrimination), a significant part of the gap remains unexplained.[77] So why are women promoted less often?

Starting from the seminal work by Babcock and Laschevar (2003), a growing body of evidence has shown that women have a lower propensity to engage in wage negotiations and to bargain for better employment conditions than men (Bowles et al., 2007; Gonzalez-Rozada and Yeyati, 2018). Similarly, the paper by Babcock et al. (2017) shows that within the organisation women are more likely to accept being assigned to tasks with low promotability.[78] This mechanism may sustain vertical gender segregation in labour markets. Interestingly, these phenomena are not entirely supply driven, on the contrary women's behaviour appears to be largely driven by the anticipated reactions on the part of the employer. Indeed, studies of women's propensity to negotiate show that evaluators react very differently when women initiate negotiations for higher compensation than when men do (Bowles et al., 2007). As for the allocation of non-remunerative tasks, on the other hand, the analysis by Babcock et al. (2017) highlights that women are more likely to be asked to volunteer for such tasks. Hence, employer-driven differences in compensation bargaining and task allocation may contribute to female vertical segregation within organisations.

One explanation that has often been put forward in explaining women's under- representation in high-pay and highly competitive jobs is that they would 'shy away from competition' (Niederle and Vesterlund, 2007). However, experimental studies have provided mixed evidence on differences in gender attitudes towards competition, which calls into question the relevance of such a mechanism (Gneezy et al., 2003; Niederle and Vesterlund, 2007; Paserman, 2010; Shurchkov, 2012; De Paola et al., 2015). Instead, differences in other non-cognitive traits seem to play a role. Azmat and Ferrer (2017b) have shown that in a highly competitive and highly remunerative environment like the legal profession in top firms, women have lower career aspirations and this negatively influences their performance. Moreover, recent evidence from the world of economics reveals that men are more self-confident than women: Sarsons and Xu (2021) survey male and female economists from top departments and show that men are systematically more likely than

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[77]Evidence on similar mechanisms is also provided by Fernández-Kranz and Rodríguez-Planas (2021).

[78]Similar evidence, drawing from academic organisations, is provided by Misra et al. (2012); Mitchell and Hesli (2013); Porter (2007).

women to provide strong personal judgments even when asked questions on the economy that are further away from their field of expertise.

All these differences in attitudes and non-cognitive traits are unlikely innate according to the psychology literature (Hyde, 2005, 2014). Rather they tend to result from compliance to gender identity norms (Akerlof and Kranton, 2000). The extent to which such norms are explicitly manifested is unclear. Several recent studies have indeed focused on what can be labelled as 'implicit discrimination' (Bertrand et al., 2005) or 'implicit stereotypes' (Carlana, 2019) thus referring to the case in which such discriminatory or stereotypical attitudes are somehow unintentional and outside of the discriminator's awareness.

The paper by Baltrunaite et al. (2022) provides novel and interesting insights into stereotypical attitudes in the labour market drawing from the economics profession. The authors collected information from the junior economics academic job market to build a large dataset covering ten cohorts of applicants to two top institutions in Italy. By leveraging the most recent techniques of Natural Language Processing (NLP),[79] they analyse the text of the reference letters that job market candidates receive from their sponsors. These texts turn out to reveal significant implicit gender stereotypes on the part of letter writers, i.e. senior individuals in the profession. In particular, female candidates are consistently described more in terms of being diligent and hardworking rather than outstanding or brilliant, these differences being driven by letters written by male sponsors. The authors further show that such differences in candidates' descriptions affect early career outcomes, both in terms of placement and position and, through these, in terms of subsequent publication records.

Several important implications follow from these findings. First, because 'one intriguing feature of implicit attitudes is their potential manipulability' (Bertrand et al., 2005), raising awareness about implicitly held gender stereotypes on the part of senior professionals can improve women's chances of progressing along the career ladder. Indeed, experimental studies have shown that when discriminators have their biases revealed to them, they tend to counteract them (Carlana, 2019). Second, the finding that the referral process may be intrinsically non-gender neutral raises concerns about its widespread use in the labour market. Performance reviews are key tools in organisations to evaluate an employee's performance and, while they have the advantage of setting goals and designing career trajectories, they may be influenced by implicit stereotypes that may eventually harm a specific minority group, like women. A similar phenomenon is generally referred to as 'institutional discrimination' – i.e., when the rules, practices, or non-conscious un-

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[79]Natural Language Processing (NLP) is a subfield of linguistics, computer science, and artificial intelligence that aims at using machine learning algorithms to process and analyse large amounts of natural language (text) data. By transforming language into mathematical objects, NLP allows the computer to understand and analyse the content of documents. Hovy (2021) provides a primer for the use of these tools in social sciences.

derstandings of appropriate conduct systematically advantage or disadvantage members of particular groups (Haney-Lopez, 2000).

The paper by Pereda-Fernández (2023) contributes to the analysis of such mechanisms within organisations, focusing in particular on the selection process of employees at the Bank of Italy. The author analyses the various stages of the competitive exam to assess its effectiveness in hiring the best candidates, and understand whether it unintentionally generates discrimination on the basis of gender. Combining detailed information on the answers given to each specific question in the test with indicators of subsequent individual labour productivity, he shows that the exam design does a good job of discarding less able candidates and does not produce discriminatory outcomes.

6.3   Policies

In recent years, there has been a strong emphasis on diversity in the corporate world. Advocates of increasing diversity in the workplace point out that it can improve a firm's performance for a number of reasons: better diversity management can lower the costs for firms by reducing the turnover of minority workers and attracting more talented individuals; a more diverse team can provide a broader perspective and thus a better response to the challenges that firms face; it can enhance creativity and thus foster innovation; there would also be a strong case for improving the reputation of the firm and thus its commercial value. In response to such arguments, action has often been taken in terms of the organisation of the firm, the type of managerial practices adopted and the composition of the workforce and managers. All of these factors can indeed affect women's career trajectories within the firm.

6.3.1   Firm organisation and diversity management

Azmat and Boring (2021) use data on about 4,000 large publicly traded companies across 28 OECD countries to analyse whether and what policies in favour of gender diversity they have implemented and what the share of women is on boards, C-suite and managerial positions. It turns out that a large majority of firms have a gender diversity policy or statement in place. In Italy this share is as high as 95 per cent . However, when it comes to disclosing how gender diversity is effectively pursued and what policies are applied firm-wise, the share of compliant firms drops to 62 per cent ; it shrinks even more when they look at how many firms have posed quantitative targets in their diversity agendas (less than 10 per cent).[80] Hence, the strong push for diversity in the corporate world is not always effectively backed up by clear and strong actions within the corporate

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[80]On average across countries 79 per cent of firms have a diversity policy or statement in place, 54 per cent report information on their diversity actions in them and 14 per cent have clear quantitative targets.

organisation. Below we discuss some of the actions that companies can undertake.

First of all, there is a strong case for setting up a more family-friendly organisation in the workplace. Hotz et al. (2017b) show that women with children value such attributes more than men with children when moving from one job to another. Similarly, Azmat et al. (2022) analyse within couple interactions and job attributes and find that upon arrival of the first child, women tend to move away from jobs and firms where presenteeism is more important. In particular, childbearing would decrease the likelihood of women holding 'unique' jobs, i.e., those that are more difficult to be substituted within the firm. The authors show that these positions are also those paid the most. Hence an organisation of work that relies less on workers' physical presence in the office can be an effective policy for retaining women in high-paying jobs and on more rewarding career paths.

Recent research also focuses on some particular management practices that entail more discretion in decisions, finding that while on average these schemes increase the average wage level within the firm, they also tend to widen the gender wage gap (Datta Gupta and Eriksson, 2012; Davies et al., 2015).[81] When adopted in non-gender-neutral contexts, perhaps in the presence of implicit biases, such discretionary mechanisms may exacerbate the existing gender gaps.

A growing number of firms have put diversity training in place for managers to improve firm culture and reduce biases and implicit stereotypes. The scarce available evidence on whether such interventions are truly effective is quite negative (Dobbin et al., 2015). This would partly be due to the fact that managers feel pressure and constraints on their own managerial choices such as hiring and promotion decisions, and thus oppose such indications. However, the findings in Carlana (2019), as well as those similar in Boring and Philippe (2021) point to the possibility that evaluators' attitudes and behaviours may change when their own biases are revealed to them. This provides an interesting and useful suggestion on what the content of a successful diversity training could be.

Another highly advocated initiative to foster women's careers is the introduction of within-gender mentoring for junior employees. Mentoring programs are believed to reduce information costs for junior workers who want to climb the hierarchy. Because women and men tend to build and have different professional networks – men's networks being larger (more connections) but loser (weaker ties) than women' (Lindenlaub and Prummer, 2020) – and because larger networks have been proved to be more valuable in job searching and career, there would be a strong case for sustaining the formation of professional networks for junior female workers. However, Azmat and Boring (2021) argue that within-gender networks may not be the best solution. Although they may provide

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[81]The practices that are analysed, generally referred to as 'Human Resources Management' or more specifically as 'High-Performance Work System', prescribe a higher involvement of the employee in the decision-making process and a more decentralised and discretionary determination of the allocation of tasks and promotions, including individual performance-related pay.

successful role models to junior women, the fact that there are still only a few women in top positions and they are often less senior than men may limit the effectiveness of this policy and overburden senior female professionals. Whether within- or across-gender networks should be promoted is thus still an open question.

Finally, an increasing number of countries are introducing pay transparency regulations. A recent EU Directive (2023/970) lays down minimum requirements to strengthen the application of the principle of equal pay for equal work or work of equal value between men and women through pay transparency and reinforced enforcement mechanisms. The Directive rules that by 2031 all employers with 100 or more workers shall provide detailed information on the level and composition of work pay across genders. Such information should be provided to workers, job applicants and workers' representatives upon request. The argument at the heart of these policies is that gender inequality may persist in part because it is hidden: on the one hand, employers rarely keep systematic track of employees' pay and career progression by gender, thus this exercise may raise their awareness about possible unequal treatments within the firm; on the other hand, workers also rarely engage in conversations with their colleagues about pay, a better knowledge of their own condition relative to others may improve their bargaining power. Pay transparency regulations may be especially effective when employers are mandated to disclose the information publicly, as this may increase public pressure for firms' actions in this domain. Duchini et al. (2022) show that the introduction in 2018 of mandatory publication of gender equality indicators by UK firms with more than 250 employees reduced the gender gap in these firms by almost one fifth. Gender equality transparency regulation has also been used in more nuanced ways, mandating (large) firms to generally report on their diversity policies. However, as shown in Azmat and Boring (2021), such statements may not be very informative about the actual action taken and the corresponding outcomes.

6.3.2 Female leadership and the impact of affirmative action policies

A growing strand of literature in organisational economics has studied the interplay between managers' gender and the gender wage gap within the firm. The underlying idea is that a higher representation of women in top layers of management may favour the adoption of managerial practices that better take into account women's attitudes and needs, challenging implicit (or explicit) discrimination mechanisms that may be in place and allowing women to compete on a level playing field. For instance, female managers may be more sensitive to flexible work schedule instances, or they may implement a more balanced distribution of tasks, especially with regard to those with lower individual returns, or their presence may facilitate the negotiation of higher compensations by female employees, or they may have better knowledge about the actual productivity of female employees in a context where the latter suffer statistical discrimination (Flabbi et al.,

2019).

The empirical evidence has indeed generally found positive effects of increasing female representation at senior levels on women's wages and careers within the firm (Theodoropoulos et al., 2022; Kunze and Miller, 2017; Tate and Yang, 2015; Hensvik, 2014; Cardoso and Winter-Ebmer, 2010). Similarly, a recent paper, Corradini et al. (2022) shows that a higher representation of women in collective bargaining organisms improves women's career outcomes by increasing female-centric amenities in the firm.

The evidence on the effects of introducing quotas for women at the very top of the firm's hierarchy, i.e. in corporate boards, is instead more mixed. This type of affirmative action policy was implemented first in Norway in 2003, and numerous countries have followed suit. In some countries, including Italy (Ballacci et al., 2021), these quotas have been mandated for firms by governments through legislative actions. In other countries, governments have introduced a softer approach of non-binding board quotas. However, even when quotas are not mandatory, there may be strong pressure from institutional investors to increase diversity in the boards (Gormley et al., 2022). The rationale for introducing gender quotas in boards is both that of facilitating female careers within the firm and that of generally enhancing diversity in the society through the promotion of female leader role models. Moreover, several studies have highlighted that more diversity in decision teams may enhance firm performance and raise productivity (Azmat and Boring, 2021).

Whether raising female representation on the boards of large (typically listed) companies may effectively improve and facilitate women's career progressions within the firm is unclear. Bertrand et al. (2018), in particular, study the effects of the Norwegian reform both with regard to gender equality within the firm and also to the promotion of female role models in the business sector. While the gender gap in earnings across board members was reduced, the authors find no evidence of any improvement in other female employees' careers within the firm. In addition, their findings on the very early career outcomes of young women with graduate business degrees are not robust enough to conclude that, about seven years after its full implementation, the reform had any effect on girls' professional choices and outcomes. The evaluation of the Italian reform carried out by Maida and Weber (2022) comes to similar conclusions about the negligible impact on the representation of women in top executive or top earnings positions within the firm on the careers of other women within the firm four years after the introduction of the board quotas.

At the same time, some papers have found that the imposition of gender quotas in corporate boards negatively affects firm performance (Ahern and Dittmar, 2012; Greene et al., 2020), whereas some more recent evidence has come to opposite conclusions (Ferreira et al., 2020; Ferrari et al., 2022). Interestingly, Matsa and Miller (2013) report that firms in which quotas were imposed adopted different corporate strategies, in particular,

they undertook fewer corporate workforce reductions.

The papers by Del Prete et al. (2022) and Baltrunaite et al. (2023) contribute to this last strand of literature by analysing some peculiar types of firms which have been previously neglected, namely banks and State Owned Enterprises (SOEs), respectively. Indeed, the Italian law on gender quotas, which was passed in 2011, mandated that listed companies and banks as well as SOEs included at least one third of the least represented gender in their boards.[82] The implementation was gradual, as firms were asked to comply with the quotas when renewing their board. Figure 45 shows the significant increase in the share of women in listed banks and SOEs after the introduction of the quota system. Note that, despite the fast growth in the share of women sitting on the boards of SOEs, in this case the target of 33 per cent has not been met yet.

Figure 45: Share of women on the boards of Italian banks and publicly owned enterprises
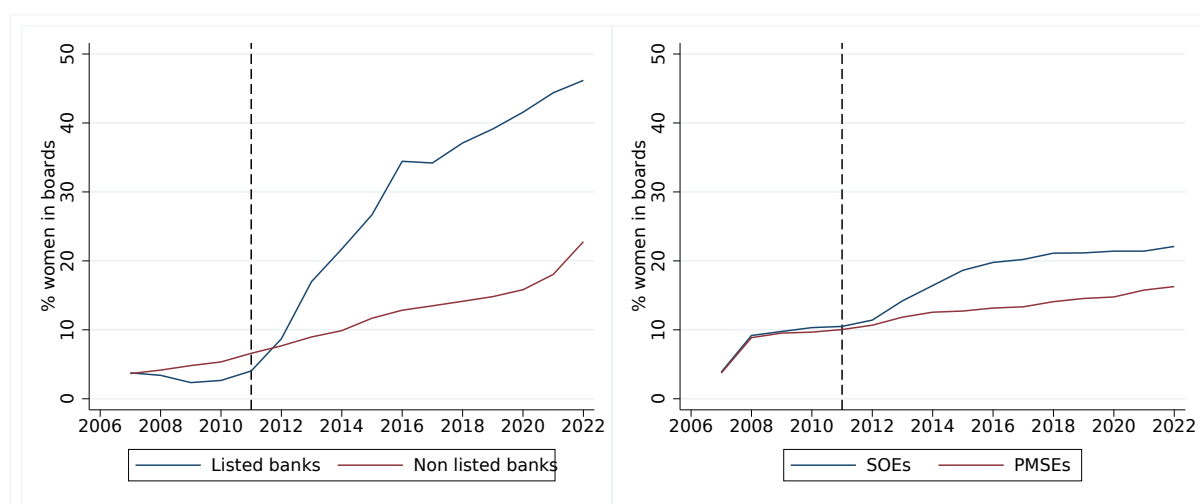
Notes: The figures plot the unconditional averages of the percentage of female directors on boards of (i) listed and non-listed banks (left-hand panel) and (ii) state-owned enterprises (SOEs) and of enterprises with a stock held by the public sector below 50 per cent (PMSE). **Source:** Del Prete et al. (2022); Baltrunaite et al. (2023).

The paper by Del Prete et al. (2022) focuses on three types of outcomes. First, the authors analyse whether the imposition of the quotas affected the composition of boards along other measurable dimensions. They find that the reform improved diversity among board members not just with respect to gender but also relative to age, tenure and geographical origin. Second, they look at whether the reform produced spillover effects on non-listed banks belonging to listed groups. Indeed, bank groups may either substitute board members in listed companies with women sitting on the boards of other (non-listed) banks belonging to the group (negative spillover), or they may replicate the managerial model imposed by the law also in non-listed banks (positive spillover). The empirical analysis finds no significant spillover effect in either direction. Finally, the authors focus

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[82]Starting from 2020 (Law 160/2019) the binding quota has been raised to 40 per cent . Moreover, from 2021, the Bank of Italy, as the regulator of the banking sector, has introduced a binding quota of one third for non-listed banks too.

on measures of firm performance such as profitability (ROA and ROE), riskiness (the share of bad loans over total loans), and efficiency (the ratio between operating costs and total assets) and find no significant change induced by the inclusion of women in the boards.

In the paper by Baltrunaite et al. (2023), the authors similarly look at the composition of the board along dimensions other than gender, finding that the entry of women onto boards led to a decrease in the average age of members and an increase in their talent while it lowered the participation of former politicians.[83] To assess the effects of these board composition changes on firm performance, they analyse balance sheet variables, finding an increase in profitability and a decrease in leverage and thus credit risk, as well as citizens' satisfaction with the provision of local public services and objective measures of their quality, finding significant improvements.[84]

In conclusion, the existing literature on board quotas has provided fairly weak evidence so far of their effectiveness in sustaining women's careers, but also no evidence of adverse effects on firm performance. Coupled with the evidence supporting the positive role of female team managers, this suggests that the imposition of quotas at middle management level may be more effective in helping women reach higher-level positions. As for the second goal of inducing a cultural change through the establishment of novel female role models, the impact of quotas will require a longer time span to be assessed.

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[83]Talent is measured through the indicators built in Baltrunaite et al. (2023).

[84]The objective indicators of the quality of public service output include the leakage rate in water distribution, the extent of waste recycling, and citizens' revealed preferences in the use of public transportation.

7 Discussion and conclusions

The many and marked gender gaps in the Italian labour market documented in this report, albeit smaller than in the past, continue to leave Italy behind the other major EU economies.

Three main critical areas deserve policy interventions: *i)* field of study choices and the gender gaps at entry into the labour market; *ii)* the compatibility of household and work responsibilities and the monetary incentives to work; and *iii)* the slow career progression and the under-representation of women in top positions. These issues are closely inter-related, and the links may go in multiple directions. For example, educational choices strongly influence career progressions throughout the working life; at the same time, weaker occupational outcomes may reduce women's attachment to the labour market and thus increase their likelihood of exiting upon motherhood. On the other hand, some anticipated considerations about the future need to reconcile work and family duties may affect educational and professional choices, and the larger burden of housework borne by women — even when employed — may prevent them from pursuing successful careers and reaching top positions. Thus, interventions that appear to address one specific issue may have significant spill-over effects on the other aspects. Our set of policy suggestions includes both those that can potentially have an immediate impact on participation and reduce the gender pay gap (e.g., reconciling work and family responsibilities, or providing financial incentives to work) and those that can gradually change cultural norms towards less traditional gender roles thus affecting women's labour market outcomes in a longer-term perspective.

As highlighted in Chapter 4, the Italian system of family-friendly policies has two main weaknesses: *i)* the scarce supply of childcare facilities, both public and private, for 0-2 year-olds; and *ii)* the limited use of parental leave entitlements by fathers. Taken together, these issues imply that, in the absence of informal care (such as grandparents or babysitters), women bear most of the costs of parenthood and of raising children.

Promoting the supply of affordable and high-quality childcare facilities may thus successfully boost female labour supply in Italy; according to the literature these measures are particularly effective in contexts where maternal labour market participation is low and there are only limited alternatives to maternal care. One specific measure envisaged in the National Recovery and Resilience Plan (NRRP) goes in this direction. The Plan allocates approximately 2.7 billion for the expansion of publicly provided childcare services for children aged 0-2 (UPB, 2022); this is an important opportunity to catch up with the main EU economies and the targets set by the European Council.[85] Indeed,

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[85]In 2002 the European Council set two targets for providing childcare to be met by 2010: *i)* an enrolment rate of at least 33 per cent for 0-2 y.o. children; and *ii)* of at least 90 per cent for children between the age of 3 and the mandatory school age. In 2022 the European Council revised both targets upwards, to 45 and 96 per cent, respectively, for 2030. Regarding the first target, it is recommended

it can be estimated that the expansion of childcare facilities envisaged by the NRRP, if fully implemented, would increase the coverage rate for children aged 0-2 to almost 40 per cent, from 27.2 as recorded in 2020 (the latest available data). Estimating the effects of this measure on mothers' labour supply is a non-trivial task; for an initial insight, we assume that the increase in childcare places would reduce the share of women with children aged 0-2, who declare that they are inactive due to the inadequacy, lack of or excessive cost of care services, to the level observed for women with children enrolled in primary school.[86] Under this very simple assumption, a conservative estimate would be that the Plan would increase the labour supply of mothers of children aged 0-2 by over 6 per cent. However, the current allocation of NRRP funds across regions, however, does not seem to address the existing geographical gaps in the provision of childcare facilities; in some cases, the resources available are insufficient; in other cases, not enough local authorities have participated in the tenders for the allocation of the available funds (UPB, 2022).

In addition, more generous parental leaves for fathers could rebalance the burden of domestic chores between partners. Inducing fathers to take more parental leave did prove to successfully spillover onto higher female employment rates in countries — like Spain — that have low female labour supply and more traditional gender norms, similarly to Italy's situation. Leave entitlements reserved for fathers are rather limited and Italian men show a low propensity to take advantage of them. Increasing the replacement rate for paternity leave compared with maternity leave, as observed in the Nordic countries, may appear unfair; however, envisaging the same replacement rate for men and women may lead families to renounce to women's earnings — which are typically lower — when choosing which parent should take the leave.

Chapter 5 shows that, given the characteristics of currently non-employed individuals, the participation tax rates — i.e., the implicit taxation that derives not only from income taxes and contributions but also from family transfers that are lost once an individual accepts a job — are higher for women than for men, especially in households at the bottom of the income distribution. This contributes to explaining the low female participation rates, especially among low-income households. Indeed, the overall tax-transfer system must be designed to reconcile the objectives of redistribution and equity with the need to limit distortions to labour supply, especially for women, who tend to be the second earners in the family. Some revisions to the current system would therefore be desirable. First, the tax credit for dependent spouses, aimed at supporting the income of poorer households, fosters partners' specialisation in the market and domestic activities, thereby

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that countries, like Italy, where the enrolment rate is between 20 and 30 per cent, increase it by at least 45 per cent, or until they reach a participation rate of at least 45 per cent.

[86]Looking at data from the Italian Labour Force Survey, a sizeable share of women aged 25-49 with children aged 0-2 declare they are inactive since they need to take care of children and/or other family members due to the lack of or inadequacy of services. The shares are higher at lower education levels (around 35 per cent among those who have only completed only middle school). These shares drop when looking at mothers of slightly older children for any education level.

penalising female labour supply. This measure actually becomes outdated once more specific income-support measures have been implemented (such as *reddito di cittadinanza* or *assegno di inclusione*). Second, the design of the ISEE itself, the means-tested measure of income used to access income-support transfers, also penalises second earners' income. To alleviate such distortions and boost women's incentives to work, it may be desirable to provide tax credits for second earners living in families at the bottom of the income distribution.

Third, together with the *bonus nido*, which could be fine-tuned to avoid large reductions of transfers for middle-income households, new transfers could be introduced for other childcare-related expenses, such as babysitting services and bonuses for summer centres. These transfers could be conditional on both parents being in employment, recognising that this type of family needs to outsource domestic activities in order to combine work and family responsibilities.

In the short run, moreover, policies aimed at promoting women's labour supply should be coupled with interventions aimed at supporting labour demand, especially for women who have already been out of the labour market for some time (e.g., after motherhood), are less educated and live in more deprived areas (such as the Southern regions). In Italy hiring subsidies have traditionally been a widely used tool to support the labour demand of population groups and geographical areas that are particularly disadvantaged in the labour market. They typically take the form of full or partial exemptions from employers' social security contributions for new hires under a permanent contract for a limited time period. The existing empirical evidence shows that these tools have been effective in creating new and long-lasting employment (Saez et al., 2019; Cahuc et al., 2019; Saez et al., 2021; and Sestito and Viviano, 2018; Depalo and Viviano, 2021; Rubolino, 2022 for evidence on Italy).[87] The effectiveness of hiring subsidies, however, crucially depends on their design, particularly on the stringency of the access requirements.[88]

Specific measures can be designed with the objective of sustaining female entrepreneurs and fostering women's involvement in economic activities. The NRRP, for instance, has allocated 400 million euros for this objective. The resources will be used not only to fund new and existing businesses but also to support female-led startups through mentoring and technical and managerial assistance. In light of the evidence provided in Chapter 6, a similar instrument could also help to rebalance the distribution of female firms across sec-

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[87]Rubolino (2022) looks specifically at the Italian case and finds positive effects on female employment of *incentivo donna* (a 50 per cent exemption from the payment of employers' social security contributions for newly hired women introduced in 2013 only for firms that expand their size). He shows that women's employment increases until up to 8 years after the policy, while he finds no offsetting decline in men's labour market outcomes. The women who benefited more from the subsidy were previously unemployed mothers.

[88]By requiring firms to grow in size, the *Incentivo donna* limited the pool of employers that could apply for the subsidy and the take-up of this measure was generally low. Targeted decontribution policies for new hires, that do not impose too stringent entry conditions on firms, can be more effective in stimulating the labour demand for women.

tors, by providing more generous funding to businesses operating in more male-dominated sectors.

On the employer's side, an effective mix of actions in terms of the organisation of the firm, the type of management practices adopted and the composition of the workforce and managers can facilitate women's careers within the firm. While there is a strong and growing emphasis on diversity in the corporate world, with at least larger companies investing considerable resources and effort in promoting gender equality within their organisations, it is less clear which actions are actually most effective. On the basis of the still scattered evidence provided by the most recent literature, in Chapter 6 we argued that a more family-friendly organisation of work, in particular one that relies less on a worker's physical presence in the office, can be an effective policy to retain women in high-paying jobs and on more rewarding career paths even after motherhood. At the same time, the provision of firm-level benefits that include childcare services or of incentives for men to use parental leaves, may level the playing field across genders inside the firm and also improve the allocation of women across employers. Secondly, there is growing evidence supporting the positive role of female team managers in supporting other women's careers within the firm, while evidence on the effectiveness of board quotas in this respect is still relatively weak. On these grounds, it follows that reinforcing a female presence in middle management, including through quotas, may be effective in helping all women to reach higher positions. Finally, there is growing consensus that pay transparency regulation can reduce the gender pay gap, by improving the allocation of women across firms and raising their bargaining power with the employer. The Gender Equality Certification System for companies envisaged in the NRRP can thus be an effective tool inasmuch as it will increase the transparency of employers' behaviour not only in terms of pay policy but also in terms of gender equality agendas and achievements. Its final efficacy will eventually be higher if the information collected is publicly released and highly standardised so as to allow for comparisons across employers.

Last but not least, all the above-mentioned sets of interventions should be coupled with policies aimed at gradually addressing the cultural barriers and stereotypes that still affect women's labour market participation as well as their probability of being employed in high-paying occupations and jobs in the long run. One way to change gender stereotypes is direct exposure to counterstereotypical behaviours. Interventions or events that drive women into work or into high-paying male-dominated jobs or that induce men to take more caregiving roles in the family, indirectly weaken gender stereotypes. For instance, Fernández et al. (2004) show that World War II, by exposing children to working mothers, was key to reshaping gender stereotypes in the US; also the introduction of the EITC in the US — and the consequent large increase in employment among single mothers — also led to shift in beliefs towards gender equality (Bastian, 2020). The promotion of female role models working in male-dominated occupations and jobs (for instance in the

context of school orientation meetings), as well as interventions aimed at revealing implicit stereotypes among employers, parents, and teachers, have also proven to be effective in breaking down some of these cultural barriers and opening up better opportunities for women.

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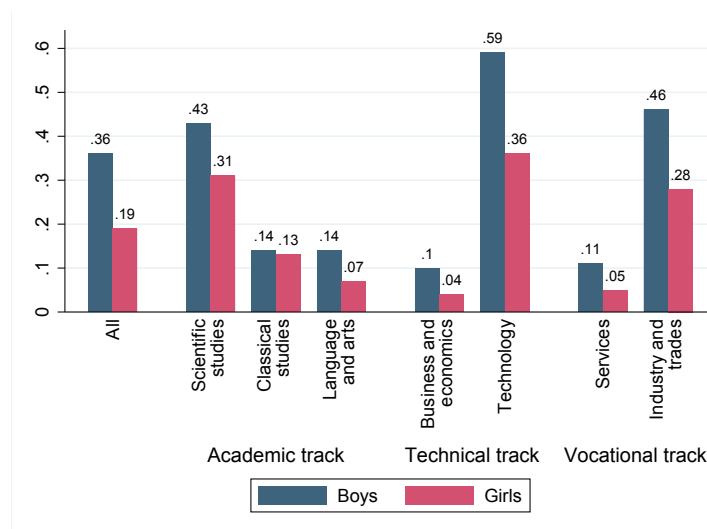
A   Additional tables and figures

Figure A.1: Gender gap in PISA standardised tests
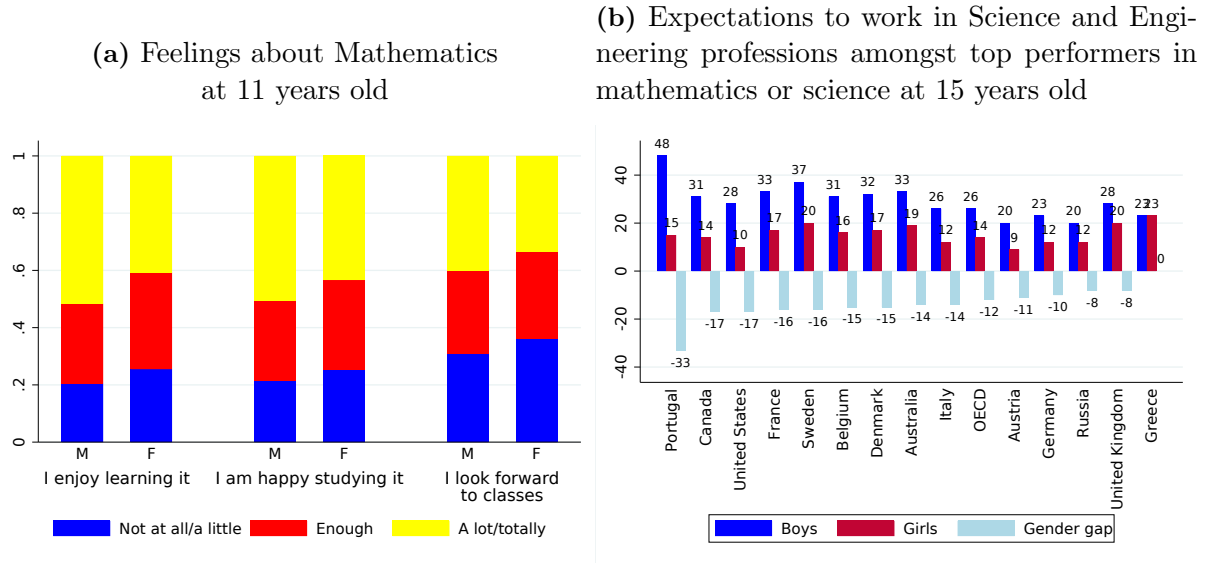
(a) Reading

(b) Mathematics
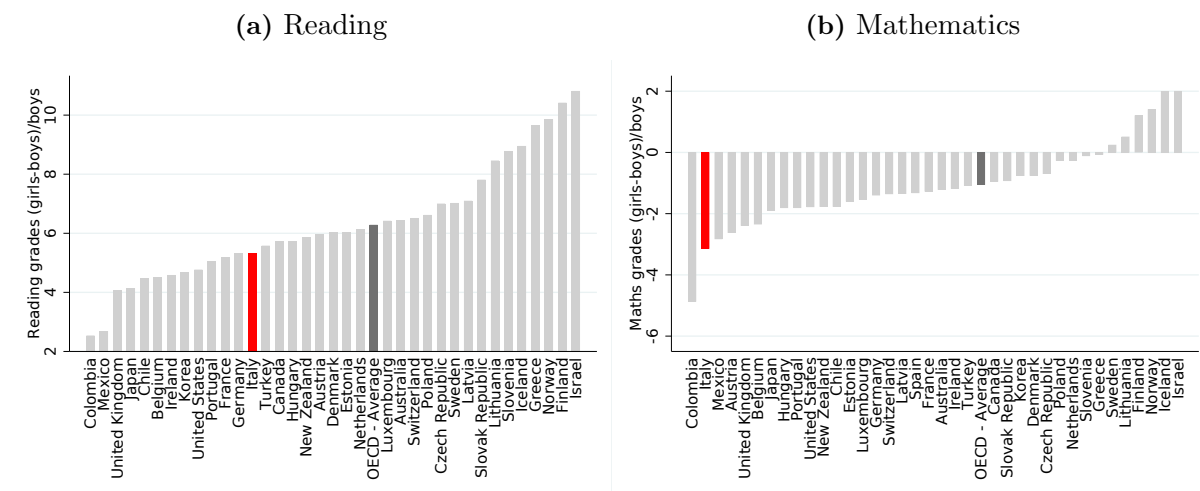
Note: The data refer to the last available year (2019). **Source**: OECD, Education at a Glance, 2021.

Figure A.2: Probability of graduating from a narrow STEM major among university graduates, by gender and secondary school track
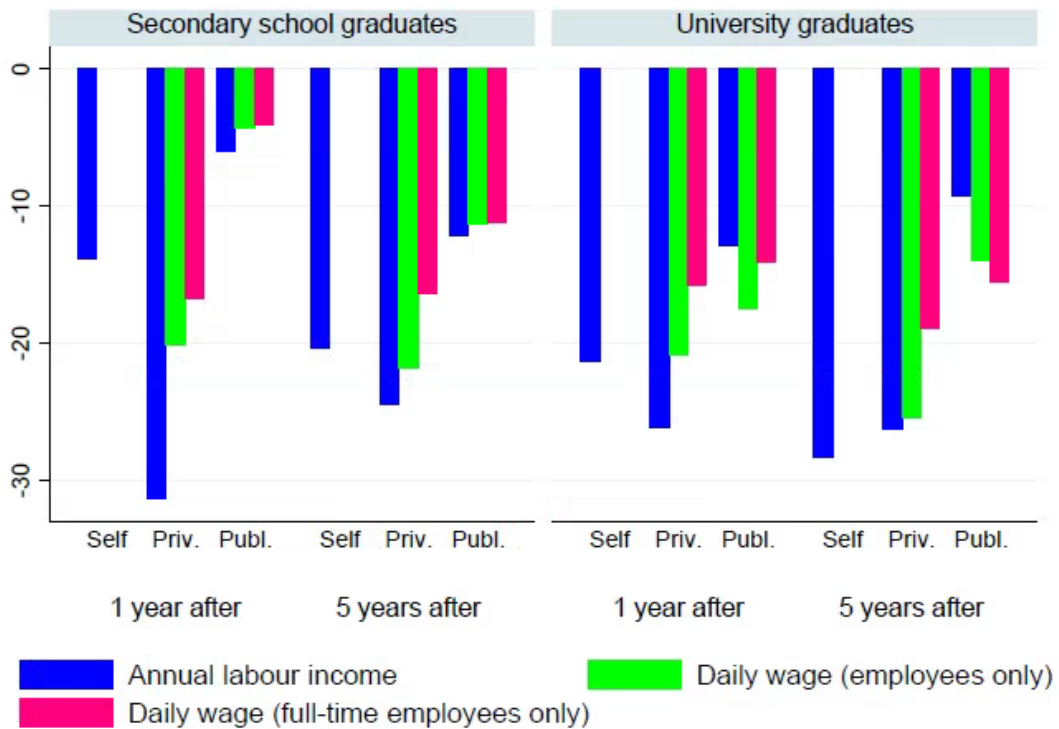

Notes: cohorts who graduated from university (2nd level or a combined bachelor and master's degree) in 2014-2018 and for whom we observe the secondary school track. Narrow STEM majors include: math, Statistics, Physics, Chemistry, Biology, Geology, Engineering and ICT. **Source**: Bovini et al. (2023).

Figure A.3: Preferences and aspirations

(a) Feelings about Mathematics
at 11 years old

(b) Expectations to work in Science and Engineering professions amongst top performers in mathematics or science at 15 years old

Source: Panel a: INVALSI, scholastic year 2017-18. Panel b: OECD-PISA, 2018.

**Figure A.4:** Gender gaps by type of employment after graduation *(percent)*

Note: Gaps 1 year after graduation are computed on cohorts who graduated from upper secondary school or university (2nd level or one-cycle degree (i.e. a combined bachelor and master's) in 2011-2018; gaps 3 and 5 years after graduation are computed on cohorts that graduated in 2011-2016 and 2011-2014, respectively. Only graduates who work and no longer study are considered. Figures are computed on the subset of workers for which the information on the type of employment is available (85 and 78 per cent of high-school and college-educated workers, respectively.). Annual labour income is calculated for all workers; the daily wage is only computed for employees (i.e. those whose prevalent source of labour income is from private employment); the daily wage for full-time workers is computed for the subset of employees for whom the information on their schedule is available (81 per cent of private and public employees 1 year after graduation; 86 per cent 5 years after graduation.). **Source**: Bovini et al. (2023).

**Figure A.5:** Male employment rates along the life cycle, by country and marital status
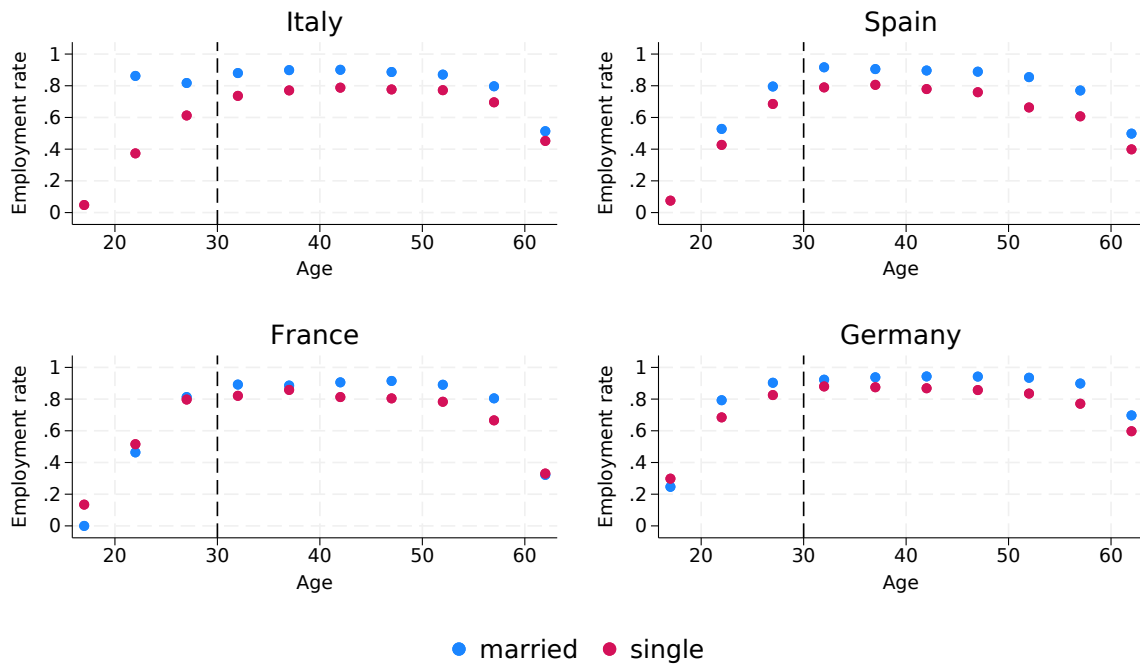
Source: Based on the European Labour Force Survey, 2019.

Figure A.6: Monthly (take home) pay from main job. Gender difference in the probability of falling within each decile of the distribution. Selected countries. Public sector only.
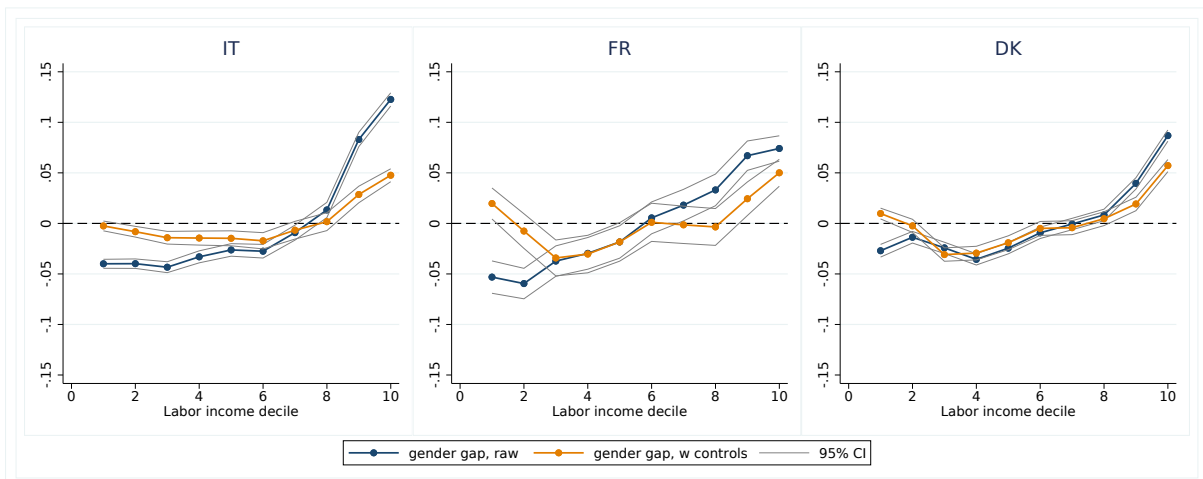

Notes: The figures plot the coefficients of a male dummy in a linear regression where the outcome variable is the probability of falling into a given labour income decile. The two lines correspond to two different specifications: a raw difference which comes from a linear regression with no controls, and one that includes a large set of individual controls, namely: age brackets dummies, educational attainment fixed effects, experience and its square, tenure and its square, occupation and sector fixed effects, weekly hours worked and a dummy for full-time contracts. The public sector is defined as comprising NACE sectors O, P and Q. **Source:** Based on the Labour Force Survey, 2020.

Figure A.7: Cumulative distribution of employees by yearly declared taxable income and gender.
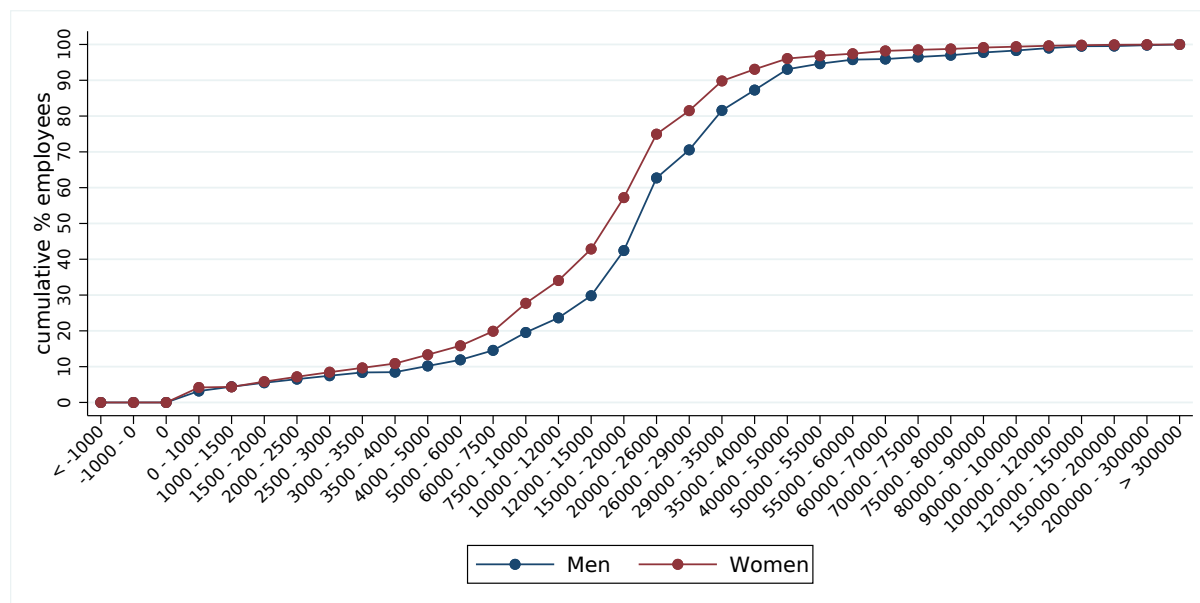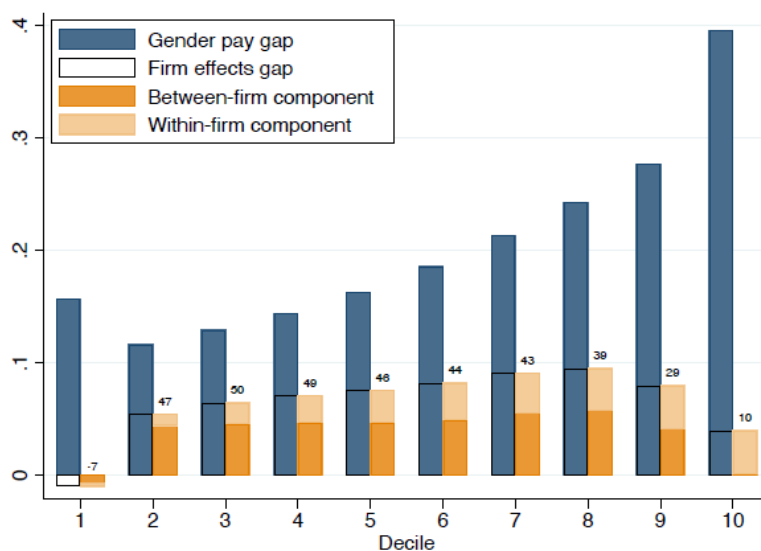

Notes: The figure shows the cumulative distribution of employees' declared taxable income in 2021. Numbers are weighted by the share of individuals for whom the reported type of income is the main source of income. **Source:** Based on tax data statistics and tax declarations from the Ministry of Economy and Finance (*Dati e statistiche fiscali, Dichiarazioni fiscali*).

Figure A.8: Cumulative distribution of entrepreneurs by yearly declared taxable income and gender.
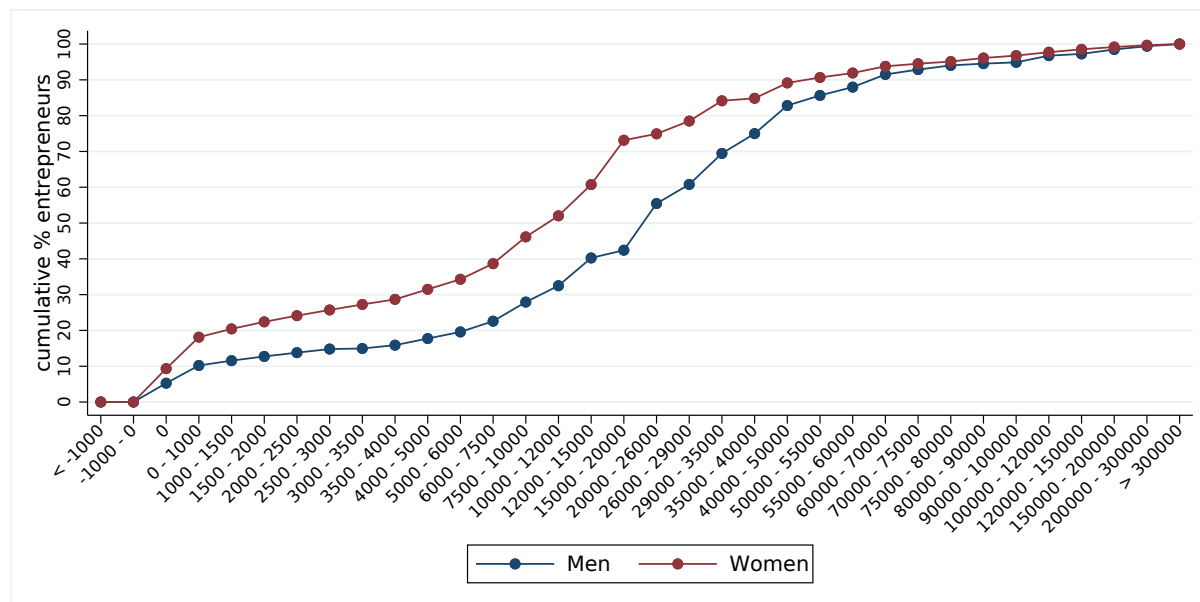
Notes: The figure shows the cumulative distribution of entrepreneurs' declared taxable income in 2021. Entrepreneurs are defined as those who declared: *redditi di spettanza dell'imprenditore in contabilita' ordinaria, redditi di spettanza dell'imprenditore in contabilita' semplificata.* Numbers are weighted by the share of individuals for whom the reported type of income is the main source of income. **Source:** Based on tax data statistics and tax declarations from the Ministry of Economy and Finance (*Dati e statistiche fiscali, Dichiarazioni fiscali*).

Figure A.9: Gender pay gap, firm effects gap, between- and within-firm decomposition along the earnings distribution.

Notes: The figure shows the gender pay gap, the differences between male and female firm effects and their decomposition into between- and within-firm components across the decile bins of the distribution of earnings over the period 1995-2015. We only keep those firms that employ at least one man and one woman in each decile group. The numbers reported at the tops of the bars are the ratios between the firm effects gap and the gender pay gap at each decile. **Source:** Casarico and Lattanzio (2023b).