

GENDER GAPS IN WAGES AND MANAGERIAL POSITIONS:  
DO FAMILY-ORIENTED POLICIES CONTRIBUTE TO ACHIEVING  
GENDER EQUALITY AMONG EUROPEAN UNIVERSITY GRADUATES?

*BRECHAS DE GÉNERO EN SALARIOS Y PUESTOS DIRECTIVOS: ¿CONTRIBUYEN  
LAS POLÍTICAS DE CONCILIACIÓN LABORAL Y FAMILIAR A ALCANZAR LA  
IGUALDAD DE GÉNERO ENTRE LOS TITULADOS UNIVERSITARIOS EUROPEOS?*

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ABSTRACT

This article analyzes the gender gap in wages and access to managerial positions among university graduates in 12 European countries and explores the capability of work-family balance policies to close these gaps. Using the REFLEX database, we apply the coarsened exact matching algorithm to construct a balanced sample of women and men with the same academic characteristics (field of study, internships, and academic achievement, among others). The analysis reveals that the academic program characteristics play a relevant role in labor market outcomes as the gender gaps diminish when controlling for academic features. We find that gender differences in hourly wages and access to top wages are smaller in countries with longer paid paternity leaves and larger enrollment rates of children aged 0-3 years in preschools. In contrast, work-family reconciliation policies have little effect on the constraints women face in accessing high-level positions that require strong commitment and availability.

*Keywords:* Gender Wage Gap, Management Positions, Top Wages, Work-family Policies, University Graduates.

## RESUMEN

Este artículo analiza la brecha salarial de género y en el acceso a puestos directivos entre titulados universitarios de 12 países europeos y explora la capacidad de las políticas de conciliación laboral y familiar para reducir dichas brechas. Utilizando la base de datos REFLEX y aplicando el algoritmo coarsened exact matching para construir una muestra equilibrada de hombres y mujeres con las mismas características académicas (área de estudio, realización de prácticas, resultados académicos, etc.). Los resultados muestran que las características del programa de estudios ejercen un papel importante en los resultados laborales de los titulados y que las brechas de género tienden a estrecharse una vez incorporadas en las estimaciones. Encontramos que las diferencias de género en el salario por hora y en el acceso a empleos con salarios muy altos son menores en aquellos países con mayor duración del permiso de paternidad y tasas más elevadas de matriculación de niños de 0-3 años en guarderías. Por el contrario, los resultados muestran que las políticas de conciliación laboral y familiar ejercen escaso efecto para superar las limitaciones a las que se enfrentan las mujeres para acceder a puestos de alto nivel, caracterizados por requerir elevados niveles de compromiso y disponibilidad.

*Palabras clave:* brecha salarial de género, puestos directivos, salarios altos, políticas de conciliación laboral y familiar, titulados universitarios.

*JEL Classification / Clasificación JEL:* J16, J24, J31, J18.

## 1. INTRODUCTION

The higher level of education among the youngest generation of women has led to a significant improvement in their labor market conditions. Nevertheless, labor gender differences still persist, especially as regards wages and employment in decision-making positions. The Gender Equality Index (2020)<sup>1</sup> shows that the monthly earnings of women were 19.9% below those of men in the European Union, and according to Eurostat only 34.9% of managerial occupations were occupied by women in 2021.Q1.

Career interruptions after childbirth due to the difficulties to achieve a good work-family balance is the main reason behind women's poorer labor market outcomes (Aaronson et al., 2021; Chaudry et al., 2021), resulting in lower wages and underrepresentation in decision-making positions. In its Gender Equality Strategy 2020-2025, the European Commission (2020) states that improving the work-life balance of workers is one of the ways of addressing gender gaps in the labor market.

Higher education graduates are more exposed to the risk of "gender inequality" as quitting the labor market or reducing the number of working hours results in a strong penalty in their professional careers and the gender gap in earnings is highest for the most educated (Anderson et al., 2002; Bertrand et al., 2010; Goldin, 2014; McIntosh et al., 2012).

This paper attempts to contribute to the literature regarding the effects of family-oriented policies on gender equality in the labor market. This is an important issue since despite governments' commitment to promote more egalitarian labor market conditions for males and females (Nieuwenhuis and Van Lancker, 2020), gender differences still persist even among the youngest generations. In particular, we focus on two of the indicators highlighted by the European Commission (2020) to engage gender equality: earnings and employment in managerial jobs.

This investigation is of interest for a number of reasons. First, gender gaps in the labor market are a phenomenon of international relevance and many labor policies aspire to achieve gender equality. Second, highly educated individuals deserve special attention as the gender differences in earnings and leadership are especially important among the most educated workers. While men used to outnumber women in higher education, there are now more

1 <https://eige.europa.eu/gender-equality-index/2020/domain/money>

women than men in tertiary education in most wealthy countries. The gender pay gap is hard to measure but is even more difficult to measure when focusing on university graduates since many complementary factors, such as the field of study, should be taken into account. Imprecise data on human capital factors can result in serious biases in the calculation of the gender discrimination component (Weichselbaumer and Winter-Ebmer, 2005). Although there is a long tradition of studies on the gender pay gap among American college graduates (Bertrand et al., 2010; Blau and Ferber, 1991; Goldin and Katz, 2011; Kirchmeyer, 1998, 2002; Loury, 1997; McDonald and Thornton, 2007; Schmeer and Reitman, 1995), research conducted among European university graduates is much more recent and scarcer due to a lack of specific surveys (Francesconi and Parey, 2018; Fröllich, 2007; García-Aracil, 2008; Machin and Puhani, 2003; Piazzalunga, 2018; Triventi, 2013).

The main contribution of this paper is twofold. First, we provide an estimation of the gender pay gap (hourly wages and top wages) and gender differences in managerial positions for a sample of 12 European countries. Second, we contribute to the literature on the role that family-oriented policies play in closing the gaps in the labor market. Specifically, we analyze the effect of three family-oriented measures: the duration of paid maternity leave, the duration of paid paternity leave, and the enrollment rate of very young children in formal childcare and preschool.

We exploit microdata from the REFLEX survey, the only multi-country representative database in Europe that contains information on the characteristics of higher education programs and labor market outcomes of university graduates. This dataset comprises detailed information that is not usually observed in other databases but which is quite relevant for the professional careers of graduates and allows us to measure their human capital much more accurately. This is an important refinement since a possible explanation for gender gaps in the labor market is that women typically choose fields of study associated with low wage professions and fewer decision-making responsibilities (Francesconi and Parey, 2018; Fröllich, 2007; García-Aracil, 2008; Machin and Puhani, 2003; Piazzalunga, 2018). The methodological approach is based on the construction of a balanced sample of women and men with exactly the same academic characteristics.

The results provide some potentially interesting policy implications. One of the main findings suggests that, overall, family-oriented policies have beneficial effects in reducing the gender earnings gap. Specifically, the length of fathers' parental leave and the provision of childcare for very young children appear to be associated with lower wage gaps in hourly wages and access to top wages. Nevertheless, we find no evidence that work-family reconciliation policies improve females' access to managerial positions. Consequently, policymakers and firms should devote greater effort to designing more efficient and precise policies intended to achieve this objective.

## 2. BACKGROUND

Work-life balance policies have gained a prominent role in achieving labor market equality (Nieuwenhuis and Van Lancker, 2020). Such policies comprise a variety of services and benefits provided by the state to meet the needs of families with children: maternity, paternity, and parental leaves; publicly subsidized childcare services; cash subsidies for childcare; and flexible work schemes. Previous studies support the argument that these policies enable women to join the economically active labor force (Del Boca et al., 2009; De Henau et al., 2010; Esping-Andersen, 1999; Gornick and Meyers, 2003; Han et al., 2009; Nieuwenhuis et al., 2012). Focusing on comparative studies across European and OECD countries, in a sample of seven European countries Del Boca et al. (2009) found that social policies have a large impact on women's employment probability, with larger effects for women with lower education as regards the availability of part-time work and childcare services. Cipollone et al. (2014) found that labor market institutions and family-oriented policies explain nearly 40% of the increase in labor force participation by highly educated women in Europe. Nevertheless, Datta Gupta et al. (2008) reviewed the impact of family-friendly policies on employment, wages, and children's well-being in the Nordic countries, and cautioned that lengthy paid maternal leaves have adverse effects on women's wages. Arulampalam et al. (2007) analyzed the gender wage gap across 11 European countries and found that the magnitude of the gap varied substantially across countries, which may be due to country differences in childcare provision. Likewise, Korpi et al. (2013) exploited data from 18 OECD countries and concluded that the earner-carer policies of the Nordic countries have been successful in enhancing the employment levels of women but have not undermined their opportunities to gain access to top occupations and wages. Similarly, Brady et al. (2020) exploited the LIS Study across 21 rich countries, and concluded that work-family policies do not have adverse labor market consequences for women, and Misra et al. (2011) found that work-facilitating policies such as childcare for young children have positive effects on mothers' employment hours and wages, while parental leaves can have unfavorable effects if they are long. Mandel and Semyonov (2005) concluded that family-friendly policies do not contribute to narrowing the gender gap in earnings.

As regards women's access to managerial positions, Hegewisch and Gornick (2011) argued that employed women who take long leaves or take up part-time work, self-select into less competitive and lower paying jobs; hence, such policies may indirectly reduce women's focus on career advancement. Mandel and Semyonov (2006) exploited data from 22 countries and found that nations characterized by developed welfare policies and a large public service sector tend to have high levels of female labor force participation, but low female representation in managerial occupations. In contrast, Korpi et al. (2013) observed a "managerial gap" varying from 1 to 6 percentage points (pp) across countries, but no significant differences were found regarding

the different types of family policies. Ellingsæter (2012) found an increase in women's share of management positions in Denmark, Norway, and Sweden, while positing that the role of work-family policy on segregation processes is somewhat conflicting. More recently, Kowalewska (2021) found limited evidence in support of that work–family policies undermine women's access to the top jobs across 22 industrialized countries.

In summary, it seems that the marked differences in labor market across countries are related to the social policies implemented by the different governments.

### 3. DATA

The analysis is based on microdata from the REFLEX survey, the largest existing international comparative database on university graduates. The survey was conducted in 2005 among more than 34,000 young European graduates from higher education programs who earned their degree in the academic year 2000/2001 and contains information about the labor market situation of graduates five years after graduation. This dataset is well suited to achieve the main purposes of the paper as it collects very rich information concerning higher education programs that is not usually included in common databases but is likely to play a role in graduates' professional careers. It comprises factors such as academic achievement, which can be interpreted as a proxy of talent and effort; participation in internships; having been abroad for study or work; or foreign language proficiency. A relevant feature included in the survey is the field of study as women and men typically enroll in different degree fields (Ochsenfeld, 2014). The literature has shown that the substantial wage differences between female and male university graduates can be explained to a large extent by their different choices of field of study (Francesconi and Parey, 2018; Frölllich, 2007; García-Aracil, 2008; Machin and Puhani, 2003; Piazzalunga, 2018).

Our study is based on 12 countries: Austria, Germany, Belgium, Spain, Estonia, Finland, France, the Netherlands, Italy, Norway, Portugal, and the United Kingdom. We restrict the sample to graduates aged 25 to 40, excluding self-employed graduates. Our initial sample consists of 13,692 graduates, of whom 92.4% were employed in 2005 (see Table A1 in the Appendix). In accordance with the higher presence of females in tertiary education, women represent 60.6% of the sample. A first glance at the descriptive data reveals noticeable gender gaps: women's hourly wages are 13.9% below those of men, 5.6% of women are employed in a top wage job while the figure is 16% for men, and 28.2% of women hold a managerial position in contrast to 37.6% among males. Regarding the program characteristics, some differences across genders deserve mention. While men are more likely to enroll in longer programs, women are more prone to participate in internships, as well as to study or work abroad during higher education. Additionally, males report higher foreign language proficiency and better academic achievement. By

far, the most significant dissimilarities between women and men are related to the field of study. While women predominate in fields such as education, humanities and arts, and health and welfare, men are much more likely to do programs in the fields of engineering, manufacturing, and construction, as well as science, mathematics, and computing.

This imbalance as regards individuals' program characteristics could produce estimation biases, thus making it difficult to obtain accurate estimations of the gender gaps in wages and managerial positions. To account for these biases, we employ a methodological strategy based on the comparison of a balanced sample of women and men who display identical academic characteristics. The underlying idea is to replicate what would be a random experiment where members of two population groups have the same covariate distributions to ensure that they are comparable. Specifically, we used the coarsened exact matching (CEM) algorithm proposed by Iacus et al. (2009, 2012); a matching method that is designed to improve causal inference by reducing imbalance between two groups in relation to a set of variables.<sup>2</sup> This method ensures that there are no differences in relevant variables between units from the two groups, and there is evidence that CEM has a greater capacity than other matching methods in terms of its ability to reduce imbalance, model dependence, estimation error, bias, variance, mean square error, and other criteria (Iacus et al., 2009, 2012; King and Nielsen, 2019).

The method consists first of coarsening the explanatory variables into subgroups and then identifying strata. Individuals within the same stratum have identical values for all the coarsened covariates. To select our balanced sample of women and men, we consider the program level (programs that lead to a doctoral program or not), the field of study (seven degree fields),<sup>3</sup> academic achievement (graduates reporting an academic achievement above the mean or not), foreign language proficiency (graduates reporting a very high ability to write and speak in a foreign language or not), participation in internships (yes/no), and having studied or worked abroad during higher education (yes/no). Additionally, to reduce the biases that self-selection into employment as well as self-selection into full-time work may produce, our identification of strata distinguishes between full-time workers, part-time workers, and those who are not employed. Finally, since individuals may differ with respect to the importance they attach to different job characteristics, our balanced sample of graduates distinguishes between individuals who declare that high earnings are a very important or important job characteristic for them and individuals who do not.

This combination of variables enables us to identify 938 strata and obtain a matching rate of 93.8% of total graduates in the original sample, which results

<sup>2</sup> The method was originally proposed to improve the estimation of causal effects by reducing imbalance in covariates between treated and control groups in observational studies.

<sup>3</sup> The fields of "Agriculture and veterinary sciences" and "Services" have been merged due to a lack of observations.

in a total of 12,848 matched individuals of whom 12,087 were employed in 2005. Table A1 in the Appendix displays the characteristics of the original and the balanced sample.

#### 4. ECONOMETRIC APPROACH

The empirical analysis is based on mincer equations for wages and on the estimation of the likelihood of accessing top wage jobs and managerial positions. A primary challenge to studying labor market gender differences among a non-randomized sample of individuals is self-selection bias. University graduates are heterogenous as they differ in their choices concerning field of study, their decisions to take part or not in an international mobility program or internships, as well as their academic performance (grades, foreign language proficiency, etc.). Selection bias could also be caused by selection into employment. As we explained in the previous section, we applied the CEM algorithm to improve causal inference by reducing imbalance between females and males in relation to their program characteristics, employment situation,<sup>4</sup> and individuals' preferences regarding job characteristics.

With respect to earnings, our dependent variable is the natural logarithm of hourly contract wages expressed in PPS euros ( $y_{1i}$ ). Regarding access to top wage jobs ( $y_{2i}$ ), we assume that the graduate is employed in a top wage job ( $y_{2i} = 1$ ) if her/his monthly contract wage is in the ninetieth percentile of the wage distribution. Finally, we consider that the graduate is employed in a managerial position ( $y_{3i} = 1$ ) if she/he is employed in a managerial occupation (Major Group 1 of ISCO-88: Legislators, Senior Officials, and Managers) or if she/he supervises other staff members in any other occupation.

The three dependent variables are assumed to be a function of gender ( $f_i$ ), personal, and household characteristics ( $X_i$ ), and other factors that comprise program and academic features ( $Q_i$ ), as well as labor characteristics ( $Z_i$ ):

$$y_{ki} = \beta_0 + f_i \beta_1 + X_i \beta_2 + Q_i \beta_3 + Z_i \beta_4 + \varepsilon_{ki} \quad [1]$$

for  $i = 1, 2, \dots, n$ ,  $k = 1, 2, 3$

Vector  $X_i$  includes age and a dummy indicator of having children. Vector  $Q_i$  includes program level, field of study (seven degree fields), and several dummy indicators for participation in internships, having studied or worked abroad, foreign language proficiency, and academic achievement (1 if the graduate states having had a higher or much higher grade point average compared to other students). The vector  $Z_i$  comprises number of unemployment spells since graduation, labor market experience, type of contract, workday, firm size, economic sector, a dummy for working in the public sector, and the importance

<sup>4</sup> To check for robustness, we also apply Heckman's (1979) two-step statistical approach to account for self-selection bias in employment. Our results are robust to this procedure. Results are not shown but are available upon request.



the individual attached to high earnings among job characteristics. Wage equations also include occupation and a dummy indicating whether or not the job involves supervisory tasks. The regressions are estimated by ordinary least squares for hourly wages and by probit models for the probability of accessing top wage jobs and managerial positions. Standard errors are robust.

## 5. RESULTS

Table 1 displays the results for the pooled sample of countries where coefficients, average partial effects (APE), and robust standard errors are reported. To simplify the presentation of the results, the table only shows the effects of the female indicator and the program characteristics. For each labor market outcome, we present three specifications. A benchmark where each dependent variable is regressed on the original but imbalanced sample and does not include the program characteristics among the explanatory variables, and a second specification based on the balanced sample of graduates and extended to include the different academic features as controls. A third specification also includes the interaction effect between the female indicator and the children variable to test whether there are significant differences between women and men as regards the effect of having children on the analyzed labor market outcomes. Three main conclusions can be drawn. First, while access to higher education has been the main driver of the reduction in labor market gender gaps in the last decades, gender differences still exist in both earnings (hourly wages and top wages) and decision-making (access to managerial positions). Second, there is a decrease in the gaps once the biases in academic characteristics and employment are corrected. This result supports the need to better measure gender gaps in the labor market when analyzing university graduates' labor outcomes by taking into account not only personal and job characteristics, but also the characteristics of the specific academic program. Specifically, the estimated gender pay gap among university graduates would be approximately 10.37%<sup>5</sup> when controlling for the usual determinants of wages but drops to around 8.27% when the selection biases in academic characteristics and employment are considered. Academic characteristics are also of paramount importance for the likelihood of accessing top wages and managerial positions: the probability of a woman occupying a top wage job is 5.2 pp lower than that of men and the managerial gender gap is 4.9 pp, but both figures drop to around 4 pp when controlling for academic characteristics.

The third specification in Table 1 indicates that gender gaps tend to widen among individuals with children, suggesting that the presence of children negatively affects women's professional careers. The gender gap in hourly wages

5 For ease of reading the tables, the approximate percentage change deduced from the estimated log points is used when interpreting the numerical results ( $\beta * 100$ ) rather than the exact calculation  $[\exp(\beta) - 1] * 100$ .

TABLE 1. GENDER GAP IN HOURLY WAGES, ACCESS TO TOP WAGES, AND EMPLOYMENT IN MANAGERIAL POSITIONS

	Hourly wages			Top wages			Managerial positions		
	Total Sample (1)	Balanced sample (CEM) (2)	Balanced sample (CEM) (3)	Total Sample (1)	Balanced sample (CEM) (2)	Balanced sample (CEM) (3)	Total Sample (1)	Balanced sample (CEM) (2)	Balanced sample (CEM) (3)
Female	-0.1037*** (0.006)	-0.0827*** (0.009)	-0.0664*** (0.010)	-0.0518*** (0.005)	-0.0411*** (0.005)	-0.0381*** (0.006)	-0.0488*** (0.009)	-0.0395*** (0.011)	-0.0361*** (0.012)
Children	-0.0251*** (0.007)	-0.0131 (0.010)	0.0292* (0.017)	0.0019 (0.007)	0.008 (0.007)	0.0141 (0.010)	0.0131 (0.011)	0.0032 (0.015)	0.0117 (0.022)
Female* Children			-0.0735*** (0.019)			-0.0138 (0.013)			-0.0152 (0.026)
Second level program		0.0930*** (0.009)	0.0925*** (0.009)		0.0591*** (0.007)	0.0593*** (0.007)		0.0339*** (0.012)	0.0338*** (0.012)
Academic achieve- ment above mean		0.0337*** (0.008)	0.0343*** (0.008)		0.0191*** (0.005)	0.0191*** (0.005)		0.0264*** (0.010)	0.0264*** (0.010)
Advanced foreign language prof.		0.0147 (0.012)	0.015 (0.012)		0.0291*** (0.007)	0.0290*** (0.007)		0.0186 (0.015)	0.0186 (0.015)
Internships		0.003 (0.009)	0.0036 (0.009)		-0.0107* (0.006)	-0.0105* (0.006)		0.0479*** (0.011)	0.0481*** (0.011)
Studied/worked abroad		0.0445*** (0.009)	0.0447*** (0.009)		0.0299*** (0.006)	0.0300*** (0.006)		0.0099 (0.012)	0.01 (0.012)
Degree Field		Yes	Yes		Yes	Yes		Yes	Yes
N	12,658	12,087	12,087	12,658	12,087	12,087	12,658	12,087	12,087

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors in parenthesis.  
Source: Own elaboration (REFLEX database).

is around 14%<sup>6</sup> among individuals with children. The presence of children also increases the gaps in access to top wages and managerial positions, but the differences are not significantly different from zero.

Next, we move on to the cross-country differences. Table 2 displays the results of separate estimations for each country. Only the female coefficient and average partial effects (APE) are reported.

The cross-country analysis confirms that labor market gender gaps among university graduates tend to be reduced once their human capital is correctly measured, but still indicates the presence of a gender gap in hourly wages and in the likelihood of accessing top wages in most countries. Nevertheless, the findings are not homogenous across countries. In particular, the gender gap in hourly wages varies from around 20.4% in Estonia to around 4.6% in Germany and exceeds 10% in Italy, France, and Portugal. It is notable that the gender pay gap is not different from zero in the Netherlands once the biases are corrected. As concerns access to top wage jobs, we find a gender gap in most countries, which is especially large in Portugal and Estonia. Nevertheless, in Germany, Belgium, the United Kingdom, and Spain, the differences are not significant.

There is also wide heterogeneity across countries regarding employment in managerial positions. While for the whole sample the difference between females and males regarding their probability of being employed in managerial positions is 3.9 pp once the biases are corrected (second specification in Table 1), the differences are not statistically significant in the majority of countries. Specifically, and focusing on the balanced sample, only Italy (11.9 pp) and Estonia (19.7 pp) exhibit a gender gap in access to managerial positions. In Spain, Austria, Finland, and Portugal, the gender managerial gap disappears once the biases in program characteristics and employment are corrected.

Specific structural features of countries are probably behind the heterogenous results found across countries. In what follows, we address the question of whether family-oriented policies can mitigate the observed gender gaps in wages and managerial positions. Specifically, we focus on three family-oriented policies: the duration of paid maternity leave, the duration of paid paternity leave—both measured by the number of weeks reserved for exclusive use by mothers or fathers, respectively—and the enrollment rate of children aged 0–3 in formal childcare and preschool. The vast majority of countries have provisions for maternity leave which allow mothers to leave their workplace for a limited time around childbirth and give them the right to return to their previous employment afterwards. However, these provisions vary widely across countries. Paid maternity leaves are probably the most widely studied family policy in the literature, and the existing evidence regarding the effects of these leaves on females' labor market outcomes is mixed. Lalive et al. (2014) highlighted that these outcomes are probably affected by the idiosyncrasies of each policy, country, and most responsive

6 Note that the net effect is a gender gap of 0.1399 log points (-0.0664 – 0.0735), which is significantly different from zero.

TABLE 2. GENDER GAPS IN WAGES AND MANAGERIAL POSITIONS ACROSS COUNTRIES

	Hourly wages		Top wages		Managerial positions	
	Total Sample (1)	Balanced sample (CEM) (2)	Total Sample (1)	Balanced sample (CEM) (2)	Total Sample (1)	Balanced sample (CEM) (2)
	Female (Coef.)	Female (Coef.)	Female (APE)	Female (APE)	Female (APE)	Female (APE)
Italy	-0.1285*** (0.025)	-0.1406*** (0.034)	-0.0795*** (0.020)	-0.0747*** (0.019)	-0.1226*** (0.029)	-0.1195*** (0.031)
Spain	-0.0809*** (0.017)	-0.0647*** (0.024)	-0.0278** (0.012)	-0.0173 (0.012)	-0.0542*** (0.021)	-0.0444 (0.028)
France	-0.1607*** (0.028)	-0.1148*** (0.031)	-0.0770*** (0.017)	-0.0630*** (0.016)	-0.0427 (0.032)	0.0063 (0.037)
Austria	-0.1145*** (0.024)	-0.0759*** (0.025)	-0.0541** (0.021)	-0.0390* (0.021)	-0.0947*** (0.032)	-0.0498 (0.032)
Germany	-0.1016*** (0.024)	-0.0462* (0.028)	-0.0560*** (0.021)	-0.0239 (0.016)	0.0107 (0.031)	0.0261 (0.031)
Netherlands	-0.0266** (0.012)	-0.0137 (0.016)	-0.0219* (0.013)	-0.0269** (0.012)	-0.0379* (0.021)	-0.0123 (0.023)
United Kingdom	-0.0777** (0.035)	-0.0631* (0.034)	-0.0269 (0.022)	-0.0179 (0.022)	0.0138 (0.040)	0.0209 (0.044)
Finland	-0.0837*** (0.015)	-0.0614*** (0.022)	-0.0590*** (0.015)	-0.0691*** (0.016)	-0.0668*** (0.025)	-0.0405 (0.032)
Norway	-0.0836*** (0.015)	-0.0645*** (0.017)	-0.0544*** (0.017)	-0.0235* (0.014)	0.0192 (0.032)	-0.0166 (0.040)
Portugal	-0.0814*** (0.019)	-0.0750*** (0.023)	-0.0340* (0.021)	-0.0201 (0.017)	-0.0372 (0.034)	-0.037 (0.039)
Belgium	-0.1563*** (0.042)	-0.1141*** (0.043)	-0.1007*** (0.030)	-0.1298*** (0.033)	-0.0998** (0.051)	-0.0758 (0.061)
Estonia	-0.1989*** (0.039)	-0.2043*** (0.049)	-0.1141*** (0.021)	-0.1204*** (0.023)	-0.1359*** (0.045)	-0.1975*** (0.053)
Program charact.	No	Yes	No	Yes	No	Yes
Occupation	Yes	Yes	Yes	Yes	No	No
Sector	Yes	Yes	Yes	Yes	Yes	Yes

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors in parenthesis.

Source: Own elaboration (REFLEX database).

sociodemographic groups. Ruhm (1998) showed that although extended entitlements to maternity leaves increase female employment ratios, they decrease hourly earnings. Much less attention has been paid to the effects that non-transferable paid parental leaves for fathers could have on women's labor market outcomes. Paternity leave policies are designed to increase fathers' involvement in childcare activities to promote gender equality. Nevertheless, few studies have been able to identify important effects of paternity leaves on the labor market outcomes of women (Farré, 2016). The third measure we analyze is the enrollment rate of children aged 0–3 in formal childcare and preschool. Although this indicator is not exactly a family policy as it comprises the enrollment of children in both public and private facilities, this variable could be a good proxy of government interventions to increase the preschool enrollment rate of the youngest children.

Data on policy variables were drawn from the OECD Family Database and show that the provision of family policies varies widely across countries. We aim to identify what kind of policies are more likely to reduce gender labor gaps. For this purpose, we pool the balanced sample of countries with country-level data on the abovementioned family-oriented measures as explanatory variables and include the interaction effect between the policy variables and the female indicator as shown in Equation 2:

$$y_{ki} = f_i\gamma_1 + X_i\gamma_2 + Q_i\gamma_3 + Z_i\gamma_4 + P_i\gamma_5 + f_i * P_i\gamma_6 + u_{ki} \quad [2]$$

for  $i = 1, 2, \dots, n$ ,  $k = 1, 2, 3$

where  $P_i$  is the vector of family-friendly measures. The main interest is on the parameter vector  $\gamma_6$ , which captures the interaction effect between the female dummy and the policy variables. Positive and significant estimates of the interaction terms would indicate that work-family policies alleviate, to some extent, such gender differences.

The results in Table 3 reveal that the length of parental leave for fathers and the enrollment rate of children in preschool have significant effects in narrowing the gender pay gaps, both in hourly wages and in access to top wage jobs. These results suggest that promoting gender equality in parental leaves might, to some extent, help to mitigate the observed gender differences in earnings, in addition to the rest of benefits that they add to the family unit. In line with other papers which have reported that higher enrollment rates of children in formal childcare are linked to better labor market outcomes among females (Arulampalam et al., 2007; Brilli et al., 2016; Del Boca et al., 2009; Janta, 2014; Misra et al., 2011; Piazzalunga, 2018), our findings reveal that increasing the state provision of childcare for under-school-age children could be a good measure to close the gender earnings gap.

In our data, longer paid maternity leaves seem to contribute to reducing the gender gap in hourly wages. This could be explained by an anchor effect (Kluve and Schmitz, 2018): if the maternity leave increases the probability

TABLE 3. THE EFFECTS OF FAMILY-ORIENTED POLICIES ON GENDER LABOR GAPS

	Hourly wages	Top wages		Managerial positions	
	Coef.	Coef.	APE	Coef.	APE
Female	-0.1056*** (0.0095)	-0.3269*** (0.0407)	-0.0417*** (0.0053)	-0.1176*** (0.0324)	-0.0400*** (0.0111)
Paid paternity leave	0.0122*** (0.0013)	-0.0142** (0.0056)	-0.0018** (0.0007)	-0.0161*** (0.0047)	-0.0055*** (0.0016)
Paid maternity leave	0.0006*** (0.0002)	-0.0004 (0.0007)	-0.0001 (0.0001)	0.0009 (0.0007)	0.0003 (0.0002)
Childcare enrollment (%)	0.6800*** (0.0811)	0.0659 (0.2857)	0.0084 (0.0364)	-0.2118 (0.2597)	-0.072 (0.0882)
Female* Paternity leave	0.0046*** (0.0015)	0.0174** (0.0072)	0.0022** (0.0009)	0.0055 (0.0056)	0.0019 (0.0019)
Female* Maternity leave	0.0004** (0.0002)	-0.0012 (0.0009)	-0.0002 (0.0001)	-0.0004 (0.0008)	-0.0001 (0.0003)
Female* Childcare enroll.	0.0044*** (0.0009)	0.0086** (0.0038)	0.0011** (0.0005)	0.0042 (0.0030)	0.0014 (0.0010)
Program characteristics	Yes		Yes		Yes
Sector	Yes		Yes		Yes
Occupation	Yes		Yes		-
N	12,087		12,087		12,087

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Robust standard errors in parenthesis.

Notes: Balanced sample (CEM).

Source: Own elaboration (REFLEX database).

of job continuity, employers would reward this return to work by raising job quality, thus avoiding a negative influence on the gender wage gap. Hence, our results for the special case of young university graduates do not support the idea that excessively long leaves could undermine women's position in the labor market as others have pointed out (Datta Gupta et al., 2006; Pettit and Hook, 2005). Nevertheless, in our data, maternity leaves appear to have no effect on reducing the employment gender gap in access to top wages.

It is noticeable that none of the analyzed measures seem to attenuate the gender gap in access to managerial positions, thus reflecting that they have little effect on the constraints women face in accessing leadership positions that require strong commitment and availability. Hence, other kinds of policies should be designed in this respect.

## 6. CONCLUSIONS

This paper analyzes differences across 12 European countries regarding the gender gap in hourly wages and access to top wages and employment in managerial positions among young university graduates, as well as the potential capability of work-family policies to close these gaps. We find wide heterogeneity across European countries. While gender differences appear to be inexistent in the Netherlands, Estonia, and Italy exhibit the worst outcomes. Additionally, the analysis indicates that the characteristics of academic programs are relevant to study gender gaps among university graduates. In most countries, the gender gap in wages and positions of responsibility tends to narrow when controlling for academic features, suggesting that education policies should be aimed at promoting the presence of women in male-dominated fields of study.

As concerns the role of family-oriented policies in achieving gender equality, we find that the gender pay gap tends to narrow in those countries with longer paid paternity leaves. This result suggests that it is necessary to design policies that affect women and men equally, in such a way that the risk of devoting more time to family tasks is correspondingly shared between both partners. In doing so, employers would not perceive workers to have different attitudes towards work that could lead to gender imbalances in terms of wages or level of responsibility. We also find that the gender gap in wages tends to be smaller in countries with higher preschool enrollment rates, thus indicating that increasing the state provision of childcare for under-school-age children is an effective measure to close the gender earning gap among higher education graduates. In contrast, policies designed specifically for mothers such as paid maternity seem to have a much more modest influence.

Finally, this research seems to reflect that reconciliation policies have little effect on the constraints women face in accessing high-level positions that require strong commitment and availability, thus suggesting that this is probably the most difficult glass ceiling women face in the labor market. Consequently, policymakers should be aware of this problem and implement effective policies to help women overcome entrance barriers to this type of positions. A possible way to overcome the barriers facing women is to implement gender quota policies to increase women's access to decision-making jobs. The main criticism of such measures stems from the fact that they are contrary to a meritocracy. On the other hand, there are strong arguments that quota policies tend to increase the education level of men accessing this type of jobs by increasing competition. Future work will explore the effects of this type of policies.

## REFERENCES

- Aaronson, D., Dehejia, R., Jordan, A., Pop-Eleches, C., Samii, C., Schulze, K. (2021). "The Effect of Fertility on Mothers' Labor Supply over the Last Two Centuries", *The Economic Journal*, 131, 1-32.

- Anderson, D.J., Binder, M. and Krause, K. (2002). "The Motherhood Wage Penalty: Which Mothers Pay It and Why?", *The American Economic Review Papers and Proceedings*, 92, 354-358.
- Arulampalam, W., Booth, A.L. and Bryan, M.L. (2007). "Is There a Glass Ceiling over Europe? Exploring the Gender Pay Gap across the Wage Distribution", *Industrial and Labor Relations Review*, 60, 163-186.
- Bertrand, M., Goldin, C. and Katz, L.F. (2010). "Dynamics of the Gender Gap for Young Professionals in the Financial and Corporate Sectors", *American Economic Journal: Applied Economics*, 2, 228-255.
- Blau, F.D. and Ferber, M.A. (1991). "Career Plans and Expectations of Young Women and Men: The Earnings Gap and Labor Force Participation", *The Journal of Human Resources*, 26, 581-607.
- Brady, D., Blome, A. and Kmec, J.A. (2020). "Work-Family Reconciliation Policies and Women's and Mothers' Labor Market Outcomes in Rich Democracies", *Socio-Economic Review*, 18, 125-161.
- Brilli, Y., Del Boca, D. and Pronzato, C. (2016). "Does Child Care Availability Play a Role in Maternal Employment and Children's Development? Evidence from Italy", *Review of Economics of the Household*, 14, 27-51.
- Chaudry, A., Morrissey, T., Weiland, C., Yoshikawa, H. (2021). *Cradle to Kindergarten: A New Plan to Combat Inequality*. The Russell Sage Foundation.
- Cipollone, A., Patacchini, E. and Vallanti, G. (2014). "Female Labour Market Participation in Europe: Novel Evidence on Trends and Shaping Factors", *IZA Journal of European Labor Studies*, 3:18.
- Datta Gupta, N., Smith, N. and Verner, M. (2006). "Child Care and Parental Leave in the Nordic Countries: A Model to Aspire to?", IZA Discussion Paper No. 2014.
- Datta Gupta, N., Smith, N. and Verner, M. (2008). "The Impact of Nordic Countries' Family Friendly Policies on Employment, Wages, and Children", *Review of Economics of the Household* 6, 65-89.
- Del Boca, D., S. Pasquay, and Pronzato, C. (2009). "Motherhood and Market Work Decisions in Institutional Context: a European Perspective", *Oxford Economic Papers* 61, 47-71.
- De Henau, J., Meulders, D. and O'Dorchai, S. (2010). "Maybe Baby: Comparing Partnered Women's Employment and Child Policies in the EU-15", *Feminist Economics*, 16, 43-77.
- Ellingsæter, A.E. (2012). "Cash for Childcare. Experiences from Finland, Norway and Sweden", International Policy Analysis, April 2012, Friedrich Ebert Stiftung.
- European Commission (2020). *Gender Equality Strategy 2020-2025*. COM(2020)-152, Brussels.
- Farré, L. (2016). "Parental Leave Policies and Gender Equality: A Survey of the Literature", *Estudios de Economía Aplicada*, 34, 45-60.
- Francesconi, M. and Parey, M. (2018). "Early Gender Gaps among University Graduates", *European Economic Review*, 109, 63-82.



- Frölich, M. (2007). "Propensity Score Matching Without Conditional Independence Assumption with an Application to the Gender Wage Gap in the United Kingdom", *Econometrics Journal*, 10, 359-407.
- García-Aracil, A. (2008). "College Major and the Gender Earnings Gap: a Multi-Country Examination of Postgraduate Labour Market Outcomes", *Research in Higher Education*, 49, 733-757.
- Goldin, C. (2014). "A Grand Gender Convergence: Its Last Chapter", *American Economic Review*, 104, 1091-1119.
- Goldin, C. and Katz, L.R. (2011). "The Cost of Workplace Flexibility for High-Powered Professionals", *The ANNALS of the American Academy of Political and Social Science*, 638, 45-67.
- Gornick, J.C., and Meyers, M.K. (2003). *Families that Work: Policies for Reconciling Parenthood and Employment*. New York: The Russell Sage Foundation.
- Han, W., Ruhm, C. and Waldfogel, J. (2009). "Parental Leave Policies and Parents' Employment and Leave-Taking", *Journal of Policy Analysis and Management*, 26, 29-54.
- Hegewisch, A. and Gornick, J. (2011). "The Impact of Work-Family Policies on Women's Employment: A Review of Research from OECD Countries", *Community, Work & Family*, 14, 119-138.
- Janta, B. (2014). *Caring for Children in Europe. How Childcare, Parental Leave and Flexible Working Arrangements Interact in Europe*. RAND Europe.
- Kirchmeyer, C. (1998). "Determinants of Managerial Career Success: Evidence and Explanation of Male-Female Differences", *Journal of Management*, 24, 673-692.
- Kirchmeyer, C. (2002). "Gender Differences in Managerial Careers: Yesterday, Today, and Tomorrow", *Journal of Business Ethics*, 37, 5-24.
- Kluve, J., and Schmitz, S. (2018). "Back to Work: Parental Benefits and Mothers' Labor Market Outcomes in the Medium Run", *International Labor Relations Review*, 77, 143-173.
- Korpi, W., Ferrarini, T. and Englund, S. (2013). "Women's Opportunities under Different Family Policy Constellations: Gender, Class, and Inequality Tradeoffs in Western Countries Re-examined", *Social Politics*, 20, 1-40.
- Kowalewska, H. (2021). "Bringing Women on Board? Family Policies, Quotas and Gender Diversity in Top Jobs", *Work, Employment and Society*, 35, 735-752.
- Lalive, R., Schlosser, A., Steinhauer, A. and Zweimüller, J. (2014). "Parental Leave and Mother's Post Birth Careers: The Relative Importance of Job Protection and Cash Benefits", *Review of Economics Studies*, 81, 219-265.
- Loury, L.D. (1997). "The Gender Earnings Gap among College-Educated Workers", *ILR Review*, 50, 580-593.
- Machin, S. and Puhani, P. (2003). "Subject of Degree and the Gender Wage Differential: Evidence from the UK and Germany", *Economics Letters*, 79, 393-400.

- Mandel, H. and Semyonov, M. (2005). "Family Policies, Wage Structures, and Gender Gaps: Sources of Earnings Inequality in 20 Countries", *American Sociological Review*, 70, 949-967.
- Mandel, H. and Semyonov, M. (2006). "A Welfare State Paradox: State Interventions and Women's Employment Opportunities in 22 Countries", *American Journal of Sociology*, 111, 1910-1949.
- McDonald, J.A. and Thornton, R.J. (2007). "Do New Male and Female College Graduates Receive Unequal Pay?", *Journal of Human Resources*, 42, 32-48.
- McIntosh, B., McQuaid, R., and Parviz Dabir-Alai, A.M. (2012). "Motherhood and its Impact on Career Progression", *Gender in Management: An International Journal*, 27, 346-364.
- Misra, J., Budig, M. and Boeckmann, I. (2011). "Work-Family Policies and the Effects of Children on Women's Employment Hours and Wages", *Community, Work & Family*, 14, 139-157.
- Nieuwenhuis, R. Need, A. and Van Der Kolk, H. (2012). "Institutional and Demographic Explanations of Women's Employment in 18 OECD Countries, 1975-1999", *Journal of Marriage and Family*, 74, 640-630.
- Nieuwenhuis, R. and Van Lancker, W. (2020). *The Palgrave Handbook of Family Policy*. Palgrave Macmillan.
- Ochsenfeld, F. (2014). "Why Do Women's Fields of Study Pay Less? A Test of Devaluation, Human Capital, and Gender Role Theory", *European Sociological Review*, 30, 536-548.
- Pettit, B., and Hook, J. (2005). "The Structure of Women's Employment in Comparative Perspective", *Social Forces*, 84, 779-801.
- Piazzalunga, D. (2018). "The Gender Wage Gap among College Graduates in Italy", *Italian Economic Journal*, 4, 33-90.
- Ruhm, C.J. (1998). "The Economic Consequences of Parental Leave Mandates: Lessons From Europe", *Quarterly Journal of Economics*, 113, 285-317.
- Schneer, J.A. and Reitman, F. (1995). "The Impact of Gender as Managerial Careers Unfold", *Journal of Vocational Behavior*, 47, 290-315.
- Thévenon, O. (2008). *Family Policies in Europe: Available Databases and Initial Comparison*, Vienna Yearbook of Population Research 2008, 165-177.
- Triventi, M. (2013). "The Gender Wage Gap and its Institutional Context: A Comparative Analysis of European Graduates", *Work, Employment and Society*, 27, 563-580.
- Weichselbaumer, D. and Winter-Ebmer, R. (2005). "A Meta-Analysis of the International Gender Wage Gap", *Journal of Economic Surveys*, 19, 479-511.

## APPENDIX

TABLE A1. SAMPLE CHARACTERISTICS

	Total sample		Balanced sample (CEM)	
	Men	Women	Men	Women
Total	5,395	8,297	5,251	7,597
Age	30.71	29.94	30.72	29.92
Children	20.8%	22.3%	21.8%	21.7%
Program characteristics:				
Second level program	56.6%	51.3%	51.9%	51.9%
Academic achievement above mean	45.7%	41.0%	41.4%	41.4%
Advanced foreign language proficiency	13.2%	13.7%	10.6%	10.6%
Studied/worked abroad during HE	23.7%	25.9%	23.5%	23.5%
Internships	57.2%	64.7%	65.1%	65.1%
Study fields:				
Education	4.0%	12.8%	11.7%	11.7%
Humanities, arts	6.7%	13.9%	12.8%	12.8%
Social sciences, business, law	30.9%	34.2%	35.7%	35.7%
Science, mathematics computing	16.3%	9.6%	10.0%	10.0%
Engineering, manufacturing, construction	30.0%	7.2%	7.5%	7.5%
Agriculture, veterinary sciences	3.0%	1.9%	2.3%	1.8%
Health, welfare	6.3%	17.4%	17.7%	17.7%
Services	2.7%	3.0%	2.2%	2.8%
Employed	93.9%	91.5%	93.5%	93.5%
Part-time	6.5%	17.8%	15.1%	15.1%
Hourly wage (PPP euros)	65.21	56.17	64.38	55.77
Monthly wage (PPP euros)	2,576	2,011	2,399	2,035
Top wages	16.0%	5.6%	11.8%	5.9%
Managerial/supervisory position	37.6%	28.2%	33.8%	29.2%
Paid leave for fathers (weeks)	5.5	4.4	5.0	4.4
Weeks of maternity, parental, and home care payments for mothers	64.1	61.1	61.3	61.2
Enrollment rate of children 0-3 years in formal childcare/preschool	34.6%	36.1%	36.0%	36.2%
Country:				
Italy	9.9%	8.6%	7.9%	8.7%
Spain	14.9%	19.3%	16.3%	19.7%
France	5.6%	7.7%	5.7%	7.5%
Austria	8.1%	5.4%	7.4%	5.2%
Germany	9.1%	5.4%	8.8%	5.4%
Netherlands	15.6%	15.4%	18.9%	15.2%
United Kingdom	5.2%	5.3%	5.5%	5.3%
Finland	10.9%	12.0%	9.0%	12.1%
Norway	8.7%	8.3%	10.2%	8.5%
Portugal	2.2%	2.9%	2.2%	2.9%
Belgium	6.7%	5.2%	5.3%	5.2%
Estonia	3.0%	4.5%	3.0%	4.4%

Source: Own elaboration (Reflex database, OECD Family Database).

