The Impact of Parenthood on the Gender Wage Gap –
a Comparative Analysis of 26 European Countries

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Abstract

We use cross-national data on 26 EU countries to assess how much children and the responsibilities related to them contribute to the gender wage gap, and how institutional elements - especially family policies - affect this relationship. Our analysis is based on a decomposition that reveals what portion of the gender wage gap may be attributed to: (1) the motherhood wage penalty, (2) the fatherhood wage premium, and (3) the gender wage gap among childless individuals. Our findings suggest that the variability in the magnitude of the gaps is closely related to the institutional context, pointing to different reasons behind the gender wage gap and policy implications. Southern EU countries have low gender wage gaps and low motherhood penalties or even premiums. Short leaves, low childcare coverage, and traditional norms do not support maternal labor supply, but mothers who work do not face a wage penalty. Western EU countries with higher childcare coverage, moderate length leaves, supportive norms, and flexible jobs have relatively high maternal employment and mothers are not faced with significant wage penalties. The highest motherhood penalties are found in CEE countries, where long leaves, low childcare availability under age 3, and preferences for within-family care lead to long absences from the labor market. In all countries, irrespective of cultural norms and policies, we find high positive family gaps among men, which drive men's average wages up, and lead to gender wage inequality.

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A gyermekvállalás hatása a nemek közötti bérkülönbségre – 26 európai ország összehasonlítása alapján

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Összefoglaló

26 EU ország harmonizált adatai alapján azt vizsgáljuk, hogy a gyermekvállalás és ahhoz kapcsolódó kötelezettségek hogyan járulnak hozzá a nemek közötti bérkülönbséghez, és hogy az intézményi környezet – különösen a családpolitikák – hogyan befolyásolják ezt a kapcsolatot. Dekompozíciós eljárás alapján megmutatjuk, hogy a nemek közötti eltérés mekkora részét magyarázza: (1) az anyasági bérhátrány, (2) az apasági bérprémium, és (3) a gyermektelenek nemek közötti bérkülönbsége. Az eredmények alapján a bérkülönbségek méretének országok közötti variabilitása és az intézményi környezet szorosan összefüggnek, a nemek közötti bérkülönbség okai és a szakpolitikai következtetések kontextusonként eltérőek. A deli országokban alacsony a nemek közötti bérkülönbség és az anyasági bérhátrány, sőt, az anyák bérprémiumot kapnak. A rövid anyasági távollét és gyermekellátási lefedettség, valamint a tradicionális normák miatt alacsony az anyák foglalkoztatottsága, de azok az anyák, akik dolgoznak, nem szenvednek el bérhátrányt. A nyugati országokban - ahol kiterjedtebb a gyermekellátás, közepes hosszúságú az anyasági távollét, támogatóak a társadalmi normák, és elérhetőek a rugalmas munkaformák – az anyák foglalkoztatottsága viszonylag magas, és a bérhátrányuk sem jelentős. A legmagasabb anyági bérhátrányok a közép-kelet európai országokban találhatóak, ahol a hosszú anyasági távollétek, a gyermekellátás alacsony szintje (különösen 3 ves kor alatt), és a családon belüli ellátást támogató nézetek hosszú munkapiaci kiesésekhez vezetnek. A normáktól és szakpolitikáktól függetlenül minden országban nagy apasági bérprémiumokat találunk, amelyek jelentősen hozzájárulnak a nemek közötti bérkülönbséghez.

1. INTRODUCTION

Previous empirical research reveals that children lead to a wage decline for women and a slight wage increase for men. These phenomena are usually referred to as 'the motherhood wage penalty' and 'the fatherhood wage premium', or – more generally – 'the family wage gaps'. Given that parenthood is found to positively affect men's wages and negatively affect women's wages, it is likely to contribute to the divergence of men's and women's average wages, and consequently to the formation of the gender wage gap. This link between parenthood, wages, and the overall gender pay gap has been indirectly examined in a number of studies, e.g. Dolton and Makepeace (1986), Waldfogel (1998), Angelov et al. (2013). In this study, we analyze the relationship between parenthood wage gaps and the overall gender wage gap for a large sample of countries, and quantify the role of parenthood gaps in determining the gender wage gap. We then compare the results across countries and interpret them in light of their most relevant institutional characteristics.

Both topics – the gender wage gap and the family wage gap – have been previously examined in a comparative perspective. The variation in the gender gap across the countries has been attributed to several factors, including labor market segregation and women's ability to reach the upper end of the wage distribution (Mandel and Semyonov, 2005; Mandel and Shalev, 2009), wage setting mechanisms (Blau and Kahn, 2003; Mandel and Semyonov, 2005), institutions, including the welfare state and anti-discriminatory laws (Weichselbaumer and Winter-Ebmer, 2005; Mandel and Shalev, 2009), women's lower labor market participation (Olivetti, Petrongolo, 2008) and labor market flexibility (Blau and Kahn, 2013; Magda and Potoczna, 2014). Parenthood wage gaps across the countries have been, in turn, attributed to country-specific institutional context, especially with regard to family policies and cultural attitudes towards the gender division of housework and childcare (e.g. Budig at el, 2012; Boeckmann and Budig, 2013). We combine these two lines of research on the wage effects of parenthood and on the gender wage gap, and analyze their relationship in a comparative perspective.

We carry out the analysis for 26 European countries, based on harmonized EU-SILC data and a consistent methodology. Our empirical strategy is based on several stages. First, we estimate wage equations for men and women, as well as parents and nonparents to derive the gaps between (1) mothers and childless women, (2) fathers and childless men, and (3) childless men and childless women. We use standard OLS estimation and Dubin and McFadden's selection correction model, (Bourguignon et al. 2007, following Dubin and McFadden, 1984) which corrects for selection into employment and parenthood status. In the second step, we use

the estimated equations and concentrate on the gender wage gap decomposition, which is based on a simple modification of the standard Oaxaca-Blinder decomposition (1973). This decomposition allows us to derive the relative contribution of the motherhood and fatherhood wage gaps, as well as the gender wage gap among childless individuals, to the overall wage gap between men and women. Next, we examine the sources of the three gaps by examining the raw gaps, the gaps adjusted for observable characteristics, and the unexplained gaps that are also adjusted for selection into employment and parenthood. We link the country level estimates to data on the institutional context, and draw important new insight regarding the role of such policies in the formation of the gender gap.

Our findings suggest that family policies, cultural norms, and labor market flexibility drive clear patterns in how parenthood shapes gender wage inequality. We distinguish between three main groups of countries: 1) Southern European countries; 2) Western European countries; and 3) Central and Eastern European (CEE) countries. In the first group, female employment is low, and the gender wage gap is relatively small. It is mostly driven by the gender wage gap among childless individuals and a positive fatherhood wage gap, while mothers who work receive a higher wages compared to childless women. The length of leaves in these countries is short, mothers who return to work do so soon after having their child, which does not lead to their wage disadvantage relative to childless women. In Western European countries, the gender wage gap is mostly attributed to the existence of a significant fatherhood premium. Motherhood wage gaps exist but play a marginal role, despite the higher maternal employment rates in these countries. Norms and policies enable mothers to combine work and family obligations - particularly flexible jobs, access to childcare, and moderate length, well-paid leaves - and upon their return to work, they do experience a significant wage penalty. In CEE countries, all three gaps – the motherhood and the fatherhood wage gaps, as well as the gender wage gap among childless individuals – are significant contributors to gender wage inequality. In these countries, the state generally explicitly supports mothers as the primary childcare providers: mothers are granted long paid leaves with job protection, institutional childcare under age 3 is scarce, and societal views are unsupportive of mothers' earlier return to work. This leads to many mothers returning to work following long career breaks, and higher motherhood wage gaps that play an important role in shaping the overall gender wage gap.

The remainder of the paper is structured as follows. In the second section, we summarize theories and previous empirical evidence related to family gaps in labor supply and wages, their role in explaining the gender wage gap, and their relation to the institutional context. We then discuss the relevant institutional characteristics of the countries in our sample and their

implications regarding the expected parenthood effects. In section three, we present the empirical methodology that is used in the cross-country estimation of the family gaps and their contribution to the gender wage gap. Section four describes the datasets used in the analysis, including descriptive country-level statistics. In section five, we present the main comparative country-level results, along with the analysis of the impact of the institutional context on the parent and gender wage gaps. In section six we give concluding remarks.

2. PREVIOUS EVIDENCE AND INSTITUTIONAL CONTEXT

2.1 FAMILY GAPS AND THE GENDER WAGE GAP

The topic of family gaps in the labor supply and wages of men and women has a large literature (among others: Browning, 1992; Korenman and Neumark, 1992; Waldfogel, 1997, 1998; Lundberg and Rose, 2000, 2002; Budig and England, 2001; Davies and Pierre, 2005). These highlight the importance of the impact of parenthood. In terms of the labor supply, the models that treat men's and women's supply collectively highlight the interdependence between men's and women's labor supply, especially when there is a child present in the household (Chiappori 1988, 1992; Blundell et al., 2007). Empirical research and data confirm that mothers' employment is lower than that of childless women, and fathers' employment is higher than that of childless men (OECD, 2004, Boeckmann, Misra, and Budig 2015; Keck and Saraceno 2013). In this study, our focus is on wage gaps, however, the impact of parenthood and institutional elements on employment also affect parent and gender wage gaps, and therefore need to be taken into consideration.

In terms of wage effects, women are generally found to be penalized for motherhood in the form of lower wages, whereas fathers tend to receive a wage premium. The motherhood wage penalty is usually explained using the framework of human capital theory (mothers experience career breaks and a lower accumulation of work experience), work-effort theory (mothers exert less effort at work due to child-related responsibilities) and specialization (mothers are specializing into home production), the theory of compensating wage differentials (mothers choose "mother friendly" jobs and sectors), or unobserved heterogeneity (women who decide to have children differ from childless women in unobserved factors that also affect wages) and discrimination (lower wages due to employers' discrimination). The fatherhood wage premium is in turn attributed to men's increased specialization in the labor market, unobserved factors that lead to the increased productivity of fathers, and employers' positive discrimination due to a high social value assigned to fatherhood.

Previous research documents the lower wages of mothers compared to childless women for numerous countries. The size of the estimated gaps varies and ranges from small penalties in Sweden, Norway, Belgium, and France (0% and 1.5%; Datta Gupta and Smith, 2002; Davies and Pierre, 2005), moderate negative effects in Denmark, Spain, and Portugal (3% to 6.5%; Simonsen and Skipper, 2006; Nielsen et al., 2004; Davies and Pierre, 2005) as well as the US (Waldfogel, 1998), to high negative effects of children on women's wages found in the UK and Germany (12 to 30%; Davies and Pierre, 2005; Gangl and Ziefle, 2009).[1] An extensive overview of empirical works on this topic has been recently provided by Nizalova et al. (2016), who investigates the motherhood wage penalty in the Ukraine. At the same time, a positive premium due to fatherhood has been documented for men in the US (from 4 to 9%, Waldfogel, 1998, Lundberg and Rose, 2000, 2002), Norway (from 1 to 6% depending on the number of children, Petersen et al., 2012), and Hungary and Poland (Cukrowska-Torzewska and Lovasz, 2016).

Despite the growing literature on the topic, there are only a few studies that focus on the contribution of the family gaps to the overall gender wage gap. This is the case in spite of the fact that biological and cultural differences between the genders related to childbearing are clearly an important determinant (Hersch, 2006). For example, Dolton and Makepeace (1986) argued that individual decisions regarding employment as well as the wages received from work may differ for married and single individuals, and for individuals who have and do not have children. Waldfogel (1998) also argued that the family gaps and the gender wage gap are related. Recently, Angelov et al. (2013) examined the within couple gender wage gap in Sweden, and found that fifteen years after the birth of the first child, the male-female wage gap has increased by around 10 percentage points.

In a recent analysis, Cukrowska-Torzewska and Lovasz (2016) provide direct evidence on the relationship between the wage gaps that arise due to parenthood and the total gender wage gap, based on an empirical method that correct for the major selection biases present in the estimation, for two countries, Hungary and Poland. The main findings indicate that the fatherhood premium is a main contributor to the gender wage gap in these two countries, and that the motherhood penalty is also significant, while the gender wage gap among childless individuals plays a smaller role. A comparison of these estimates between the two countries and compared to previous studies from other countries points to a dependence on the particular institutional context. The motherhood penalty is higher when family policies are not supportive of maternal employment at young child ages, and the fatherhood premium appears to be higher

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[1] The results differ in the definition of the motherhood penalty, which may be considered as the effect of at least one child (motherhood in general), one child, two or three and more children.

when cultural views are relatively more traditional. In this paper, we estimate the magnitudes and contributions for 26 EU countries, using a harmonized dataset and the same methodology. This offers us the opportunity to compare estimates from a wide variety of institutional settings, and infer their impact on the composition of the overall gender wage gap.

2.2 THE ROLE OF THE INSTITUTIONAL CONTEXT

Contrary to previous comparative research, the goal of this paper is to study not only how the institutional context affects the magnitudes of the gender and family wage gaps, but also how it affects the relative role of parenthood in shaping the gender wage gap. We therefore consider the most important institutional factors affecting family gaps, as highlighted in previous studies: key family policies, labor market flexibility, and cultural attitudes. We discuss both the direct effects of these policies on wages, as well as their indirect effects through selection into employment and parenthood.

Family policies that are most often considered in this line of empirical research are the length of paid maternity leave and parental leave and childcare coverage. The length of the child-related leave available to mothers affects how long mothers are absent from the labor market, and thereby, their wages.[2] Previous evidence suggests that long leaves decrease women's employment continuity, leading to longer career interruptions, and consequently, the lower average wage of mothers once they return to work (Buligescu et al., 2009). Moderately long leaves, in turn, are likely to reduce family gaps, as they allow mothers to balance their attachments to both the labor market and their family (Budig et al., 2012). Short maternity leaves (or no leave) may cause mothers to decide to stay at home with their child and leave the labor market indefinitely, which may also lead to a higher family gap if they return to work later on for lower wages. Leaves also impact family gaps indirectly through decisions regarding employment as well as parenthood, i.e. the selection of individuals into these groups. Waldfogel et al. (1999) show that short leaves incent lower educated women who earn low wages to drop out of the labor market following childbirth, which may decrease the family gap. In the case of long but unpaid leaves, the opposite applies, since low paid women may not be able to afford to stay home (Lapuerta et al., 2011). Keck and Saraceno (2013) argue that short maternity leaves may have a negative impact on parenthood choices by discouraging women who earn high wages

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[2] We focus on total child-related leave available to mothers, which includes maternity leave as well as parental leave not reserved for fathers. Parental leave is usually available to both parents, so parental leave regulations may have an effect on the labor market outcomes of not only women, but also men. OECD statistics for 2013 show however that except for Scandinavian countries (Sweden, Norway, Denmark and Finland) as well as Portugal, Luxembourg, Belgium, and Germany, the percentage of men who use parental leave is rather low and it is predominantly used by women.

from having children, leading to a greater family gap in wages. The effect of leaves on the family gap is therefore also dependent on these selection mechanisms.

The accessibility of public childcare is also an important factor. Easily accessible childcare is found to affect the labor market participation and the work continuity of women positively (Pettit and Hook, 2005), leading to a lower motherhood penalty. Childcare availability may, however, also indirectly affect the family gap through selection by individual characteristics, as it is an important factor in determining whether a woman returns to work. In particular, when public childcare is limited and private care is costly, low paid women may be more likely to drop out of the labor market. This may lead to a lower family gap, as mothers who work are generally higher earners. The availability of childcare – as well as part-time opportunities - has also been shown to increase the probability of having a child (Del Boca 2002).

Labor market flexibility is also considered a key determinant, since mothers, especially those with young children, may find it more difficult to return to full time positions, or may prefer a more gradual separation from their child. On the one hand, flexible labor markets allow women to combine work with family responsibilities, increasing their labor supply, but on the other hand, this may be costly and lead to lower wages (Hirsch, 2005). Several studies find a negative part-time wage penalty among women (e.g. Gregory and Conolly, 2008; Manning and Petrongolo, 2008; Bardasi and Gornick, 2008). Since mothers more than childless women are likely to work part-time, part-time employment and other work adjustments have been found to explain part of the wage penalty incurred by mothers (e.g. Waldfogel, 1997; Joshi et al., 1999; Budig and England, 2001).

Cultural norms have also been found to impact motherhood related inequalities in wages. Davies and Pierre (2005) report the size of the wage penalty incurred by mothers for a number of European countries, suggesting that family policies and cultural attitudes are likely to explain revealed country-level variation. Budig et al. (2012) not only report the estimates of the family gap in wages for women, but also test these explanations. Their research reveals that there is an interaction effect of policies and culture, so that the effect of policies depends on the perception of women's employment and their caring role in the family. Boeckmann and Budig (2013) analyze cross country wage inequalities due to fatherhood and link the findings to cultural indicators that aim to capture attitudes towards men's and women's employment and caring responsibilities. In countries where men are still regarded the primary breadwinners, men who have children are more likely to work harder and longer hours once they become parents in

order to ensure their family's financial stability. In such traditional countries, the wage premium from fatherhood may be very high.[3]

Family policies and cultural perceptions of women's roles in a society can affect not only the situation of working mothers, but also the situation of women who remain childless. When there are generous family policies paired with a traditional perception of women that translate into the societal expectation that after giving birth women should stay home with their child for a long time period, employers may also discriminate childless women due to expectations that they may have children in the future and the costs associated with their long absences. An institutional context may have a 'spill-over' effect that affects not only mothers, but all women, regardless of the number of children they have. Mandel and Semyonov (2005) argue that mothers are much more likely to use parental leave than fathers, and thus employers who do not have information regarding the fertility plans of a childless female employee may refrain from hiring and promoting them. As a consequence, in countries where the institutional context supports the model of women as the main provider of care within the family, childless women may also earn less compared to childless men.

Table 1 summarizes the main relevant institutional characteristics of the countries in our analysis. In particular, we report institutional variables that refer to the labor market and its flexibility, indicators that pertain to gender norms, and selected family policies measures. The data refer to policies for the years 2004-2013, that roughly correspond to the years studied in the empirical analysis. Policy changes over the period are noted below the table. Based on some general tendencies shown in this table, we distinguish between three main groups of countries characterized by similar contexts, and derive hypotheses regarding the expected magnitudes of the gaps and their contribution to the gender wage gap. In our discussion of the estimation results, we mainly focus on these groups, however, we also note any significant variation among countries within groups.

First, there is a group of Southern European countries (group A) that is characterized by relatively low female employment and strong traditional gender norms. This group includes Italy, Greece, and Spain. The family policies of these countries vary, but are generally characterized by relatively short leaves (especially Spain), and, in some cases, childcare coverage rates below those seen in Western European countries for ages 0-3 (Italy, Greece) and for ages 3-

[3] While the length of leave reserved specifically for fathers is generally low in most countries - with the exception of some Western European countries - it may also be seen as reflecting existing cultural expectations regarding gender roles and the government's commitment to achieving greater gender equality.

6 (Greece). The availability of part-time work in group A countries is generally lower than seen in Western European countries.

The second group of countries consists mostly of Western European countries (group B). This group is characterized by more gender equal cultural views, higher female employment, relatively high labor market flexibility, as well as high childcare accessibility and the availability of paid leaves of moderate length. Using the terminology of Leitner (2003), such a combination of family policies may be referred to as optional familialism, since the state gives mothers an option to choose to either provide childcare within the family using available leaves, or to transfer care outside of the family to institutions. The two exceptions within the group in this respect are the UK and Ireland, where no paid parental leave is available; the length of maternity leave for mothers is however relatively long here, meaning that it may partially take over the role of parental leave policy. Anglo-Saxon countries are perceived as providing mothers less of institutional incentives to combine work and family duties (Baranowska-Rataj and Matysiak 2016; Matysiak and Weziak-Bialowolska 2016). The notable exceptions are also Portugal and Slovenia, which geographically and historically are close to Southern European countries (Portugal) and Central Europe (Slovenia). Portugal differs, however, from other Southern European countries, because of much stronger engagement of women in the labor market (Guerreiro, 2014); yet the society perception of women's role is much more traditional here than in other Western European countries. Slovenia in turn differs from Central and Eastern European countries with respect to family policies – in particular, the leaves are much shorter and the childcare coverage is greater in this country.

The last group of countries consists of Central and Eastern European (CEE) countries (group C). It also includes Austria and Germany. The distinct feature of this group is that there is limited childcare assistance for small children aged 0-3 (in the form of formal care in public and private institutions) and relatively long parental and maternity leaves for mothers. This coexistence of long leaves and a low availability of institutional childcare may be characterized as explicitly supporting the family in its caring role (Leitner, 2003). Poland may be perceived as yet another exception, because for the years 2005-2012 it did not provide any paid parental leave. This changed in 2013, since then, there is 26 weeks of paid parental leave available, and since 2016, 32 weeks. In this group, we also observe strong traditional views regarding the gender division of labor and the provision of childcare within the family, which is strongly related to institutional characteristics. Women's labor market attachment and flexible work forms are also relatively limited in availability compared to western EU countries.

Table 1.

Institutional variables by country

Indicator	GDP	Employment to population ratio		Part-time employment		Overall men are less competent than women to perform household tasks	A father must put his career ahead of looking after his young child	Length of paid leave					Childcare coverage		Familization of policies
	Per capita ($)	Female (%)	Male (%)	Female (%)	Male (%)			Total (weeks)	Maternity leave (weeks)	Parental leave (weeks)	Home care leave	Leave reserved for fathers (including paternity leave; weeks)	Aged 0-3	Aged 3-6	Type
Source	World Bank	Eurostat				Eurobarometer		OECD + Multilinks					Eurostat		Leitner (2003)
Greece*	26868	46	69	11	4	55%	30%	34.3	34.3	0.0	0.0	0.4	12.3	67.9	explicit
Italy	36324	46	68	28	13	71%	43%	47.7	21.7	26.0	0.0	0.0	24.3	90.9	optional
Spain	30899	53	68	23	5	58%	35%	16.0	16.0	0.0	0.0	1.7	36.9	91.3	defamilization
Belgium*	44024	56	68	42	8	36%	26%	28.9	15.0	13.9	0.0	15.9	41.3	98.7	optional
Denmark	59010	72	78	36	14	22%	14%	64.0	18.0	46.0	0.0	2.0	71.9	94.2	optional
Finland	46568	68	71	19	9	37%	23%	159.0	17.5	24.3	117.2	7.4	27.0	77.0	optional
France	40917	59	69	30	6	31%	14%	42.0	16.0	26.0	0.0	2.0	36.9	94.4	optional
Iceland	43438	79	84	34	10	N/A	N/A	26.0	13.0	13.0	0.0	13.0	40.2	97.2	optional
Ireland*	50103	57	70	33	10	54%	31%	24.0	24.0	0.0	0.0	0.0	23.6	85.7	defamilization
Netherlands*	49995	69	81	76	24	20%	16%	29.0	16.0	13.0	0.0	13.4	45.8	88.9	defamilization/ optional
Norway*	88788	73	78	43	14	N/A	N/A	142.5	9.0	37.7	95.8	10.3	39.0	83.2	optional
Portugal*	22152	61	70	16	8	57%	24%	26.7	11.2	15.6	0.0	13.6	33.7	74.4	defamilization/ optional
Sweden	51693	71	75	40	13	30%	6%	67.0	15.6	51.4	0.0	10.0	51.8	92.7	optional
Slovenia	23447	62	70	12	7	47%	25%	52.3	15.0	37.3	0.0	18.0	32.8	86.9	optional
United Kingdom*	39533	65	76	42	11	37%	25%	34.7	34.7	0.0	0.0	2.0	32.9	84.9	defamilization
Austria	46513	64	75	42	8	58%	41%	138.0	16.0	122.0	0.0	16.5	8.9	75.8	explicit
Bulgaria*	6833	57	64	3	2	66%	38%	114.2	35.3	79.0	0.0	2.0	9.5	66.4	explicit
Czech Rep.	19638	57	74	9	2	51%	35%	214.0	28.0	186.0	0.0	0.0	2.4	70.6	explicit
Estonia	15675	64	69	12	5	38%	21%	162.1	20.0	142.1	0.0	2.0	17.8	87.6	explicit
Germany	42026	66	76	45	8	52%	26%	110.0	14.0	96.0	0.0	6.7	20.6	89.2	optional
Hungary	13320	51	62	7	4	71%	48%	160.0	24.0	84.0	52.0	1.0	8.0	77.1	explicit
Latvia	12377	62	66	10	6	56%	39%	121.3	16.0	79.0	26.3	2.0	17.7	68.9	explicit
Lithuania	12543	61	63	10	7	52%	26%	114.5	18.0	96.5	0.0	6.0	10.4	63.9	explicit
Poland*	12074	51	64	12	6	57%	40%	23.1	20.2	2.9	0.0	0.7	3.1	35.8	implicit/explicit
Romania	8475	53	66	11	9	63%	37%	114.0	18.0	96.0	0.0	1.0	7.0	55.9	explicit
Slovak Rep.	16051	53	67	5	2	51%	48%	164.0	30.0	134.0	0.0	0.0	3.4	71.4	explicit

Notes: 1. Data on institutional and family policies (columns 1-5 and 8-14) represent mean values for the years 2004=2013; culture indicators (columns 6-7) represent data from Eurobarometer survey from 2014; familization type (column 15) assigned consistently with Leitner (2003) based on the availability of paid parental leave and childcare coverage rate for children aged 0-3. 2. Countries, in which there was a change in leave policies are marked with an asterisk. Following changes were observed: Greece – an extension of paid maternity leave in 2008 from 17 weeks to 43 weeks, Belgium – an extension of paid parental leave in 2012 from 13 weeks to 17.3 weeks; Ireland – extensions of paid maternity leave in 2006 from 18 weeks to 22 weeks and in 2007 from 22 weeks to 26 weeks, Netherlands – an introduction of paid parental leave of 26 weeks in 2009, Norway – a reduction of paid parental leave in 2009 from 39 weeks to 37 weeks and in 2011 from 37 weeks to 36 weeks, Portugal – an introduction of paid parental leave of 28 weeks in 2009 and a reduction of paid maternity leave from 17.1 weeks to 6.4 weeks in 2009, Bulgaria – a reduction of paid parental leave in 2010 from 92.1 weeks to 65.8 weeks and an extension of paid maternity leave in 2009 from 19 weeks to 45 weeks, Poland – an introduction of paid parental leave of 26 weeks in 2013 and an extension of maternity leave in 2007 from 16 weeks to 18 weeks, in 2009 from 18 weeks to 20 weeks, in 2010 from 20 weeks to 22 weeks, 2012 from 22 weeks to 24 weeks and in 2013 from 24 weeks to 26 weeks.

Based on the reviewed theoretical considerations and the institutional characteristics of the countries, we expect to find relatively high motherhood penalties in the CEE countries, as well as Germany and Austria (Group C).[4] Here, existing family policies explicitly support women acting as the main providers of childcare for young children, and cultural norms reinforce this expectation. This leads to long absences from the labor market, paired with relatively high maternal employment at older child ages, and therefore, a negative parent gap among women. In the case of the Western European countries that provide women more options in the form of paid, moderate length leaves, as well as a high availability of institutional childcare, we expect the family wage gap to be relatively smaller, as mothers return to work more easily and quickly following the birth of their child. The high availability of flexible work also enables mothers to return more quickly but may increase the motherhood penalty due to lower wages paid in these jobs. In Southern European countries, short leaves and lower childcare availability, coupled with traditional views and less flexible work leads to many mothers dropping out of the labor market permanently. Mothers who return to work do so relatively soon after they have a child, and may be a select group of higher-skill or more motivated individuals, which would lead to a smaller or even positive family gap among women. On the other hand, if higher-skilled women are more likely to opt not to have children, the parent gap may be larger in magnitude (more negative). Generally, we expect the wage advantage of fathers relative to childless men to be greater in countries where traditional cultural and gender norms are sustained. Thus, we expect to find higher positive family gaps among men in the groups of Southern and Central and Eastern European countries.

Given these expectations regarding the size of the family wage gaps, we expect to see relatively high gender wage gaps in CEE countries driven by women receiving a wage penalty for parenthood and men receiving a wage premium for it. On the other hand, the expectation of small family wage gaps among men and women in Western European countries makes us anticipate smaller overall gender wage gaps as well. In Southern European countries, we expect relatively low family gaps among women. Low gender wage gaps are more driven by fatherhood premia, mothers are not penalized in wages, however, their employment is low.

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[4] The family gaps for CEE countries have been reported in Cukrowska-Torzewska (2017). These estimates are based on longitudinal EU SILC data and rely on fixed effects models, which compare women's wages before and after the childbirth. The results reveal no significant negative motherhood wage gaps in CEE countries. This finding is, however, to arise as a consequence of the data structure, and in particular collecting the data for few years in relations to the leaves period. The reported gaps therefore reflect a short-term wage decline caused by motherhood. As opposed to the present research, these estimates also do not correct for women's choice whether to return to work or not (selection to employment).

3. EMPIRICAL METHODOLOGY

The estimation and decomposition methodology used here was applied earlier in Cukrowska-Torzewska and Lovasz (2016). We follow that study closely here in the two main steps: the estimation of the wage gaps and the decomposition of the gender wage gap.

3.1 MODELING THE WAGE EQUATIONS

From a methodological point of view, the analysis of the gender wage gap and the family gap is not trivial, since not all the individuals decide to have children and work, and these decisions may be related to unobservable factors that influence wages as well. Most often the previous literature on family gaps deals with only one of these selection concerns. As a result, the obtained estimates corrected for employment selection are still likely to be biased if individuals self-select into parenthood, and the estimates that correct for parenthood selection are biased due to non-randomness of the working sample population. We treat these two selection processes jointly and apply the multinomial correction model proposed by Dubin and McFadden (1984) when estimating wage equations. This model has desirable properties and it is preferred to other selection models that involve several alternatives, such as Lee's (1983) or Dahl's models (2002), (see Bourguignon et al., 2007).[5]

Similarly to other selection models, Dubin's and McFadden's model (hereafter DMF) relies on two stage estimation procedure. In the first stage, individuals choose their particular employment-parenthood status out of four possible alternatives (s= {1,2,3,4}), i.e. being: (1) a working parent, (2) a working non-parent, (3) a non-working parent and (4) a non-working non-parent. This choice is modeled by a multinomial logit model. In our framework, the analysis is performed separately for men and women. Then, the wage equation conditional on choosing s=1 is:

$$ln\, w_j^1 = x_{1,j}\beta_{1,j} + \sigma \frac{\sqrt{6}}{\pi} \sum_{s=2}^{S} r_{s,j} \left[\frac{P_{s,j}\ln(P_{s,j})}{1-P_{s,j}} + \ln(P_{1,j}) \right] + v_{1,j}. \tag{1}$$

Where subscript j={f,m} refers to females (f) and males (m), $P_{s,j}$ is the predicted probability that alternative s is preferred and $r_{s,j}$ denotes correlation coefficient between the error terms from the first stage multinomial logit and wage equations. Because in our framework individuals choose from four alternatives, the wage equation for each alternative includes three correction

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[5] For details regarding the application of Dubin's and McFadden's multiple selection model to the analysis of wages by parenthood status see Cukrowska-Torzewska and Lovasz (2016).

terms referring to the remaining alternative choices. The coefficient that is estimated on a given correction term reflects the correlation between unobservable factors that influence wages in the selected employment-parenthood combination, and unobservable factors that influence the choice of the alternative. The sign of the estimated coefficients therefore indicates the direction of the relation between unobservable factors. For example, a negative coefficient related to alternative *s* in wage equation *s+1* shows a downward bias of wages in s+1 that arises because individuals with better unobserved skills are more likely to choose alternative s than s+1.

We control for several variables in the wage equations, namely education, the age of individuals, and marital status. We do not account for occupation or sector of work, since these may be endogenous in the wage equation and correlated with the decision on parenthood. In addition to individual characteristics, we also control for regional disparities and include the size of the place of residence in terms of the total number of inhabitants and the region. The question of what controls to include is not straightforward, and affects the interpretation of the explained and unexplained portions of the wage gaps, discussed in the next section. When controls are included, they are not considered to be a consequence of parenthood, but an exogenous factor. We do not control for experience, which means that the adjusted gap we measure also includes the effect of lost experience related to absences due to parenthood. In the case of experience, it is easy to see that parenthood has an effect, lowering the experience of mothers due to their absence from the labor market.

The identification of the model requires valid exclusion restrictions, that is, variables that are included in the estimation of the first stage multinomial logit model but are excluded from the wage regression. Given the data, we use a set of exclusion restrictions that have been previously adapted in similar research (Joshi et al., 1999, Cukrowska-Torzewska and Lovasz, 2016): an indicator whether an individual has a spouse who is employed, the age of the spouse, the total number of individuals living in the household, and variables on housing conditions (the total number of rooms).[6] Having a spouse that is employed is expected to decrease the employment propensity for women and increase it for men. Similarly, we expect that living in a bigger household may cause women to decide to stay at home to take care of the household members, whereas for men it might be an incentive for providing financial security of the family. We expect that living with parents and having a spouse that is employed increases the probability of parenthood. Empirical research has shown that childcare by a grandparent is common,

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[6] The choice of exclusion restrictions is largely limited by data availability. Other variables that could be used but are either entire unavailable or missing for certain countries include for example: non-labor income of the household, housing tenure, variables indicating family values and attitudes at the age of 16 (e.g. Korenman and Neumark, 1992, Joshi et al., 1999).

especially when formal childcare is limited (Jappens and Van Bavel, 2012), so living with a parent may assure "free" child care, and serve as a positive incentive for entering the parenthood. Finally, we anticipate that better housing conditions, measures by the number of rooms, will also cause individuals to be more willing to have a child.

A potential weakness of our analysis is that the strength of the exclusion variables used may be low. In this respect, however, we are limited by data availability. While interpreting the results, we thus keep in mind that we may not be capturing all of the selection that takes place based on unobserved characteristics. Additionally, it should be clear that we correct for both types of selection simultaneously, and can eventually only infer which is the dominant selection process. For example, it is plausible that employment selection is positive (better paid and better motivated women come back to work) so that the negative family gap is likely to be underestimated, and selection into motherhood is negative (lower paid, less motivated women decide to have kids), so that the family gap is likely to be overestimated, but we observe the adjustment of the family gap only in the direction that is dominant

3.2 DECOMPOSING THE GENDER WAGE GAP THAT ACCOUNTS FOR THE PARENTHOOD

To assess the role of family wage gaps in the formation of the overall gender wage inequality, we adapt an extension of the standard gender wage gap decomposition commonly referred to as the Oaxaca-Blinder mean decomposition (1973). Using this method we portion the difference in men's and women's averages wages into three main components: 1) the family gap among women; 2) the family gap among men, and 3) the gender wage gap among childless individuals. Denoting the separate wage equation for parents and non-parents as:

$$ln\, w_j^c = X_j^c \beta_j^c + u_j^c \tag{2}$$

Where $c = \{CH, NCH\}$ refers to two observed states of employment and parenthood status (CH - being working parent and NCH - being working non-parent), and $j = \{f, m\}$ refer to females and males, the gender wage gap may be decomposed as follows:

$$\overline{ln(w_m)} - \overline{ln(w_f)} = p_m \left(\overline{lnw_m^{CH}} - \overline{lnw_m^{NCH}} \right) - p_f \left(\overline{lnw_f^{CH}} - \overline{lnw_f^{NCH}} \right) + \left(\overline{lnw_m^{NCH}} - \overline{lnw_f^{NCH}} \right) \tag{3}$$

Note that when women are penalized for motherhood (the family wage gap among mothers is negative) then this contributes positively towards the formation of the overall gender wage gap. Similarly, when men receive premium associated with fatherhood, the premium drives men's average wages up, contributing towards larger gender wage inequality.

Using standard Oaxaca-Blinder decomposition method each of the three components may be additionally decomposed into explained (endowment) and unexplained (remuneration) components. Since the wage equations are corrected for selections, among the explanatory variables we additionally have correction terms, which may be either treated as a separate component of the decomposition or subtracted from both sides of the estimated equation (Neuman and Oaxaca, 2004). In our analysis, we interpret the selection terms as an additional selection component representing the part of the gap that is due to the difference in selection patterns.

When evaluating the hypotheses derived in the previous section, we first analyze the raw gap estimates' magnitudes and contributions. The raw gaps are defined as differences in mean wages between two groups (i.e. mothers vs. non-mothers, fathers vs. non-fathers, childless women vs. childless men). These gaps reflect the wage inequality that arises due to: (1) demographic differences between the groups; (2) selection into employment and parenthood status; (3) unobserved differences between the groups. We then distinguish between the raw gap and the gap adjusted for demographic characteristics, and analyze the adjusted gap in relation to family policies and cultural attitudes. To do so, instead of decomposing the gaps using the estimates from the DMF model, we use the estimates from standard OLS wage equations that control for age, education, marital status, regions, urbanization, and years. The adjusted gap is the unexplained portion of the raw gap in wages obtained from Oaxaca-Blinder decomposition applied to the wage equations estimated using OLS method.

In the case of women, the adjusted gap represents the gap that arises as a consequence of both direct and indirect effects of policies and culture. The indirect effects are realized through women's decisions regarding work and childrearing, which we refer to as selection. For example, long leaves may discourage women who are better paid and more motivated to work from having children, because such women may expect that long employment breaks will translate into lower promotion prospects and lower positions in the workplace. Similarly, societal perceptions that mothers should stay home with a child for a long period after giving birth may affect women's decision to come back to work. Direct effects, in turn, include the impact of employment breaks due to childbearing, mothers' decreased productivity after such breaks, and employers' discrimination.

To distinguish between these two channels, we further examine the gaps that are decomposed into the explained part, the part that is due to selection, and the unexplained gap that remains after adjusting for both, using the results obtained from the DMF model. In our set-up, the indirect effects will thus be reflected in the part of the gap that can be attributed to

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selection, and the direct effects will be reflected in the part of the gap that remains once we adjust the raw gap for demographics and selection. The part of the gap that remains after adjusting for demographics and selection is the unexplained portion of the gap that is obtained from the Oaxaca-Blinder decomposition performed on wage equations estimated using the DMF model.

In the case of men, the interpretation of the gaps is slightly more straightforward, because family policies and cultural context should not affect men's selection into employment and parenthood in a substantial way. We thus interpret the unexplained part of the family gap among men as the gap that most closely reflects the effects of cultural attitudes (e.g. positive discrimination due to employers favoring fathers).

4. DATA AND DESCRIPTIVE STATISTICS

We use the data from the EU-SILC cross-sectional dataset, which is a large data collection distributed by Eurostat for selected European countries. We use data that is available for the years 2004-2013, the exact time span, however, varies by country.[7] Since 2005, the dataset additionally covers Germany, the Netherlands, the UK and nine of the then ten new EU Member States (all except for Estonia). Since 2006 data collection is also carried out in Bulgaria and Turkey and since 2007 in Romania and Switzerland. We carry out the analysis for 26 countries: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden and the UK. We drop Luxembourg, Turkey, Switzerland, as well as Cyprus and Malta from the sample as their sample sizes are relatively low.

The primary goal of this survey is to collect nationally representative, harmonized data regarding detailed information on individual and household level incomes (wage and non-labor income) and spending (exact amounts spent on various goods). Moreover, the database contains the main demographic characteristics of the respondents (gender, age, education), labor market status details (activity, details of current and previous employment), their family situation (i.e. marital status, number of children, the age of the children, total household size, etc.), and home environment (characteristics of the home, durable goods, and location). Spouses and children –

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[7] Countries for which all years are available include: Austria, Belgium, Denmark, Estonia, Spain, Finland, France, Greece, Ireland, Iceland, Italy, Luxembourg, Norway, Portugal and Sweden.

and therefore their characteristics - are linked to each other based on individual and household identification codes.

In the analysis, we consider only employed individuals who are not self-employed, are not studying, and are of working age. We further restrict the sample to individuals aged at most 45 - due to the data limitations which we discuss below. As we are interested in deriving the relative contribution of the parent gaps to the gender wage gap, we also restrict the sample to individuals who are at least 25 years old, when the sample is likely to include parents and non-parents. Additionally, we exclude individuals who are employed in agriculture, since their earnings are subject to high fluctuations.

The principal focus of our analysis is a variable that indicates the presence of a child. Since the aim of this research is to reveal what portion of the gender wage gap may be assigned to gender specific wage gap that arises due to parenthood, we concentrate on whether an individual has a child or not, and we do not account for the exact number of children. The EU-SILC dataset does not provide a direct indicator for the parenthood status; it is, however, possible to derive it using information the indicators assigning the relations within the family, as well as the variables indicating the id of a mother and a father. We thus first derive the variable indicating whether an individual is a child, and then assign children to parents using information on the relations within the family and variables indicating the id of a mother and a father. A parent is defined as an individual who has at least one child living in the same household who is at most 25 years old. Because we examine parents of children aged 0-25, rather than examining the immediate effects of parenthood, our estimates pertain to long-run effects.

As has been shown by Greulich and Dasré (2017) the parenthood status derived with the use of EU SILC data and the procedure outlined above carries a bias, as older parents, whose children have moved to another household, are treated as childless. In particular, Greulich and Dasré (2017) show that the number of children reported in EU SILC systematically declines for individuals aged 40 and older. To address this issue we thus decide to drop from our sample individuals who are older than 45 years.[8]

Appendix Table A.1 summarizes the number of observations of individuals for each country in our sample. Additionally, the table gives the share of employed by gender, and the share of parents. The respective shares in the intersections of these categories used in the multinomial logit specification are shown in Appendix Table A.2. These show that sample sizes differ across

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[8] We keep in our sample individuals aged 40-45, as for the sample aged 25-40 we observe very high shares of parents and insufficient number of observations on childless individuals. As shown by Greulich and Dasré (2017) measurement bias in the number of children of women aged 38-44 in SILC is around -10% on average.

the analyzed countries; the smallest sample size is reported for Iceland (10,924), whereas the greatest for Italy (48,653). The share of sample that is working for a wage varies among the analyzed countries and ranges from around 50-60 to 80-90. The shares of parents, both among men and women, oscillate around 70-90%. The investigation of the intersection of this categories by gender reveals that women, both mothers and childless, are more likely than men – fathers and childless – not to work.

The dependent variable in our analysis is the natural logarithm of hourly wage. There are two measures of earnings available in the dataset: 1) earnings received during an income reference period (IRF), which for most of the countries is a calendar year proceeding the interview, and 2) monthly earnings at the time of the interview.[9] Unfortunately, both measures of earnings are not available for all countries, for some only the first variable is reported. On the other hand, data on working time (hours of work), which would allow us to derive an hourly wage rate, refer to the usual hours worked per week at the time of the interview. Given the data structure, we derive hourly wage based on the re-calculated monthly earnings, using information on earnings received during the IRF, the number of months spent in full-time and part-time employment during the IFR, and the reported working time.[10]

Summary statistics of wages in the countries in our sample by gender and parental status are given in Appendix Table A.3. Wages are expressed in real terms in EUR. The table gives average wages by gender and parent status, as well as the average number of hours worked by each group. These show that in most countries, men that have children receive slightly greater wages than childless men, but also work slightly longer working hours. For women, the opposite pattern is observed: in more than half of countries women who have children receive lower wages, but in almost all countries they work a slightly shorter time than women with no children.

Detailed summary statistics of the control variables in the wage equations are presented in Appendix Table A.4., by gender and country. We include marital status, age, the level of education of individuals, which is defined in accordance with the ISCED classification, [11]

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[9] For some countries income reference period is defined as 12 months preceding the interview.
[10] We consider only individuals, who during the IRF period were either full-time or part-time employed, but not both. We then use working hours to calculate hourly wage only if an individual has been working full-time or part-time during the entire IRF and continues to work in the same working schedule while being interviewed (i.e. when information on usual working hours is collected).
[11] ISCED (International Standard Classifications of Education) distinguishes between different levels of education and assigns detailed description to each level. The lowest level is ISCED 1, which is primary education that usually starts at age of 6 and lasts between 4 to 6 years. ISCED 2 stands for lower secondary education that follows primary education and usually lasts between four to six years. ISCED 3 follows ISCED 2 and lasts between two to five years – students usually leave this level of education at age 17 to 20. Finally ISCED 4 refers to post-secondary but not tertiary education and ISCED 5 and higher for different levels of tertiary education.

geographical variables capturing the density of the population of the place of living and the region of the country, as well as year fixed effects. To evaluate the impact of institutional context, and different family policies in particular, on the family gap and its role in the gender wage gap, we link country-level information to the EU-SILC data. We use institutional data coming from several sources as presented in Table 1.

5. RESULTS

5.1 CONTRIBUTIONS OF THE FAMILY GAPS TO THE GENDER WAGE GAP

The main focus of our analysis is on the relative contributions of the gaps that arise because of the parenthood status to the overall gender gap. These results are depicted in Figure 1. Detailed decomposition results are presented in Appendix Table A.5. For comparison purposes, the countries in each group are sorted based on the size of the gender wage gap.

The results show that for the southern EU countries in group A, the largest contributors to the overall gender gap are the positive wage gap due to fatherhood, and the gender wage gap observed among childless individuals. The family gap among women is found to contribute negatively to the formation of the gender wage gap. Mothers do not receive lower wages than childless women, and women's averages wages are not lower due to motherhood; instead, motherhood is a factor that is associated with higher wages for women, and thus it contributes towards decreasing the overall gender gap. In consequence, the gender wage gap in these countries is smaller than in other countries. As seen in Table 1, women's employment in this group of countries is generally lower than in other groups, and the societal perception of women's roles is highly traditional. Olivetti and Petrongolo (2008) show that low female employment supported by traditional gender norms in these countries translates into smaller gender gaps via women's selection into employment. Our results further show that the smaller gender wage gaps in these countries are due to the positive wage gap between mothers and childless women, i.e. the motherhood gap actually leads to a smaller gender gap, contrary to other countries. Women's selection into employment is therefore particularly relevant to the positive motherhood wage gap.

For the western EU countries in group B, the most significant contributor to the overall gender wage gap is the positive fatherhood wage premium. The size of the motherhood penalty in this group of countries varies, as does its contribution to the gender wage gap. In most countries belonging to this group, the relative contribution of motherhood gap to the total gender wage gap is greater than in the countries from group A, but smaller than in group C. As

seen in Table 1, the countries from group B generally provide women with institutional incentives to combine work and family obligations – mostly via relatively easy access to childcare, moderate length paid leaves, and flexible labor market employment. As a result, mothers return to work soon after childbirth, and are therefore not found to be in a disadvantaged position, i.e. they do not fall far behind childless women in their wages. The gender wage gap is thus not driven as much by women's lower wages due to motherhood, as it is by men's higher wages that arise due to fatherhood. The gender wage gap among childless individuals is also important in determining the total gender wage gap, especially in countries where the gender wage gap is high (countries grouped on the left). With the exception of the UK, these are mostly countries from Northern Europe, which are known to provide women with particularly generous support to aid them in combining work and family obligations.

In the last group of countries, group C, we observe somewhat different patterns. For all countries, the wage penalty associated with motherhood and fatherhood, as well as the gender wage gap among the childless contribute to the formation of the overall gender wage gap. The results clearly show that the greatest gender wage gaps are seen in countries where all three components are positive. As opposed to results for groups A and B, the results for group C point to the high relative importance of both male and female wage inequalities associated with parenthood in shaping gender wage gap. The motherhood wage penalty plays a much greater role in these countries. As seen in Table 1, countries from group C provide women with very long child-related leaves and a low level of childcare, which explicitly supports women staying home and caring for their children at younger ages, as well as their return to work later on. Upon their return, mothers receive a wage penalty that translates into the lower mean wages of women, and consequently to higher gender wage gaps. In addition, similarly to other countries, men's average wages are higher due to the existence of high positive wage gap between fathers and childless men.

Figure 1

**The contributions of the family gaps among women and men,
and the gender gap among childless to the overall gender wage gap**
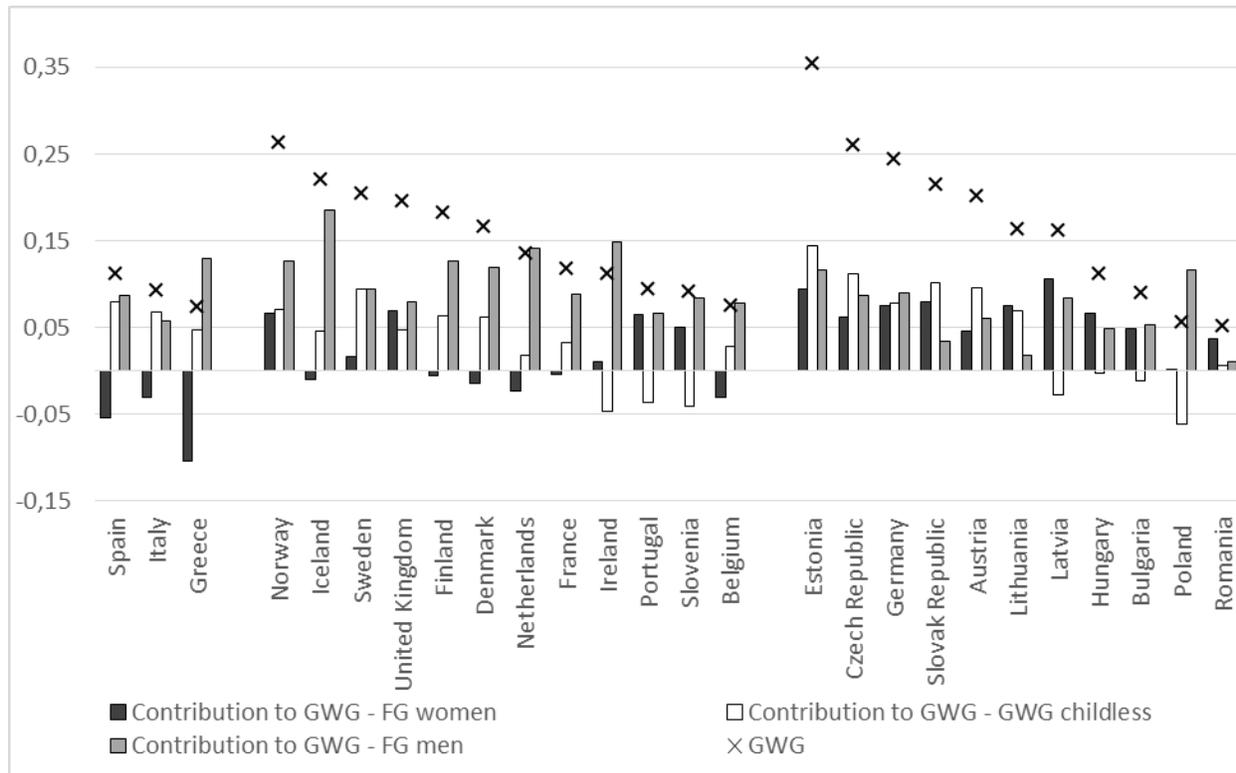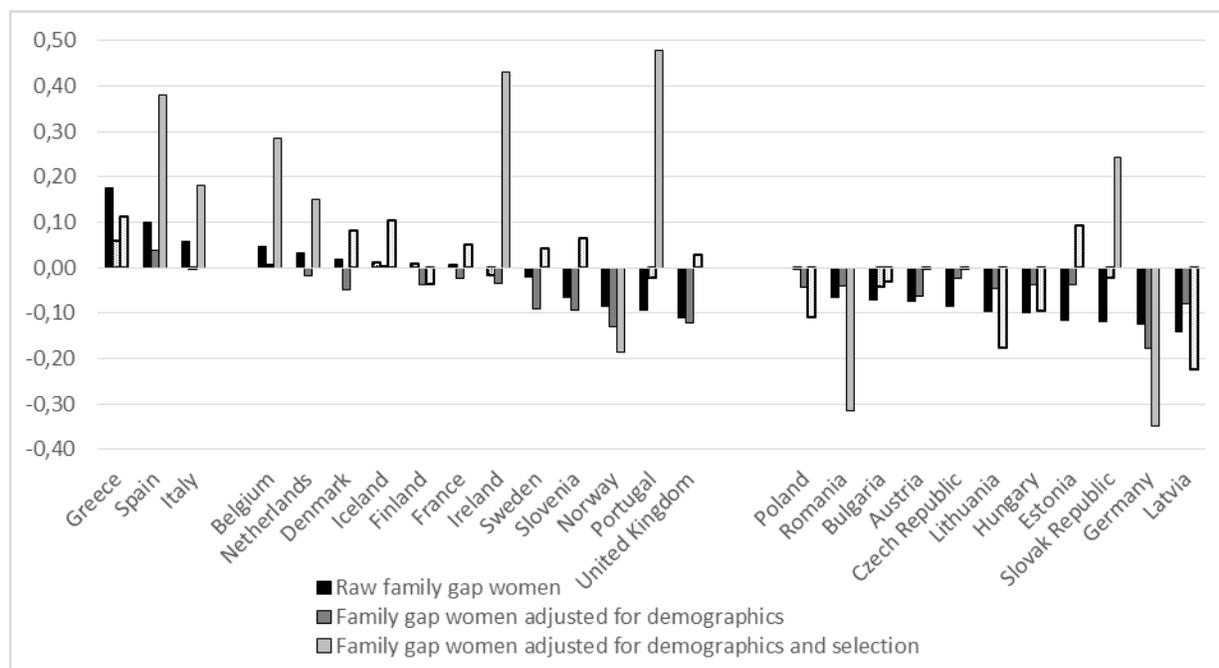

Source: Own estimates based on EU-SILC data.

5.2 MAGNITUDES AND STRUCTURE OF THE FAMILY AND GENDER GAP ESTIMATES

We now move to the discussion of the magnitude and structure of each component of the gender wage gap: (1) the family gap among women; (2) the family gap among men; and (3) the gender wage gap among childless individuals. We present the results based on graphs that depict the raw gaps (represented by black bars), the gaps adjusted for demographic differences (represented by dark gray bars), and the gaps adjusted for demographic differences and selection (represented by light gray bars). Gaps that are significant at the 10% significance level are indicated by solid bars. The comparison of these three types of gaps allows us to hypothesize on the sources of the inequalities, and the role of institutions. Figure 2 depicts the estimates of the family gap among women by group and by decreasing magnitude within groups. The detailed decomposition of the components of the gaps is presented in Appendix Table A.6.

Figure 2

Family gap among women

Source: Own estimates based on EU-SILC data.

For group A countries, we find positive and highly significant estimates of the raw gaps: working mothers receive a positive wage premium compared to working non-mothers. The gaps adjusted for demographics are smaller in magnitude, suggesting that working mothers are positively selected based on observable characteristics, and part of the raw gap is explained by the fact that working mothers have characteristics that are valued more highly compared to working childless women. As described in Section 3.2., the gap adjusted for demographics captures both the direct and indirect effects of policies and institutions. The indirect effects are realized through women's selection into employment and motherhood. As shown by Olivetti and Petrongolo (2009), in Southern countries, women who work are generally highly motivated women who have "better" unobserved characteristics, which leads to the small overall wage disadvantage of women in relation to men. Because the decision regarding work is particularly relevant to women who have children, the positive wage gap between mothers and childless women may also arise as a consequence of mothers' positive selection to work.

Our decomposition results based on the models that correct for selection into work and motherhood do not, however, confirm this hypothesis, as we find larger positive wage gaps once we adjust for selection. There are two likely reasons behind this unexpected finding. First, as

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noted in Section 3.1., the reliability of the results obtained from the DMF model depends on the exclusion restrictions used for the identification. If the variables that we use for the identification do not accurately capture women's choices of labor market and motherhood status, our results may still be biased. Second, we correct for selection into both work and into motherhood simultaneously. Even if women are positively selected into work, there might also be a strong negative selection into motherhood, leaving us with large positive adjusted gaps. The reasons for this type of negative selection may be the traditional gender norms, accompanied by limited childcare availability, and short periods of leaves for mothers, which discourage highly motivated working women from having children, as they are aware that having children means they will drop out of the labor market for some time. The direct effects of institutions (lost experience due to child-related breaks, productivity decline, employer discrimination), reflected in the wage gaps adjusted for demographics and selection, do not appear to lead to the wage disadvantage of mothers. This is likely because mothers who return to work do so soon after having their child.

The estimates obtained for group B reflect high cross-country variation in raw motherhood gaps, ranging from a premium of 0.05 (Belgium) to a penalty of -0.11 (United Kingdom). Adjusting for differences in demographics generally leads to smaller positive gaps or greater negative gaps. This result once again indicates that mothers have characteristics that are valued more highly compared to childless women. Further decomposition that additionally adjusts the gaps for selection based on unobservable characteristics shows that in most countries, the unexplained motherhood gaps are positive (they are negative only in Finland and Norway). The comparison of the gaps adjusted for demographics and for selection suggests that working mothers are negatively selected based on unobservables – a finding that is consistent with the results of group A. As shown in Table 1, countries in group B are characterized by high female employment, which makes us expect that selection is mostly related to women's selection into motherhood, while selection into employment has a lower impact. Positive gaps adjusted for selection are particularly high in the countries where leaves are short (less than 30 weeks). These findings are in line with the arguments of Keck and Saraceno (2013), stating that leaves that are too short discourage highly motivated women who have a potential to earn high wages from having children.

At the same time, the direct effects of leaves, reflected in the unexplained gaps, do not appear to lead to a wage disadvantage for mothers (a finding that is again consistent with the results for group A). The negative selection that we find means that the family gaps adjusted for demographics would have been lower if highly motivated working women did not restrain from having children, which we attribute to leaves that are too short. This is reinforced by the finding

of negative adjusted wage gaps in Norway and Finland - countries from group B where leaves are much longer, and are close to the leave lengths seen in group C. As can be seen in Figure 1, the selection adjustment has a different direction for these countries, and the remaining unexplained gaps, reflecting the direct effects of policies, are negative. Long leaves translate directly into lost work experience and the wage disadvantage of mothers.

Finally, the estimates for CEE countries in Group C, show significant negative raw motherhood penalties, ranging from -0.06 (Romania) to -0.14 (Latvia). For most of these countries, a significant negative motherhood gap is present even after controlling for differences in observable characteristics. Contrary to what is seen in group B countries, in group C, the negative gaps adjusted for differences in demographics are smaller than the negative raw gaps, meaning that differences in demographics explain the raw gaps to some extent. The results also point to the different role of women's selection into work and motherhood in determining the motherhood wage gap. In these countries, women's employment rates are lower than in countries from group B, and cultural views are strongly traditional, so both selection into motherhood and into employment are likely to stand behind these findings. Two subgroups of countries in Group C may be distinguished with respect to the role of selection: (1) countries in which the selection is negative; and (2) countries in which the selection is positive. A detailed examination of the summary data on family policies shows that the first subgroup of countries consists of countries that offer particularly long leaves to mothers, exceeding 130 weeks. For the second subgroup, the leaves are somewhat shorter, though still relatively long.

The negative selection seen in the first subgroup of countries with excessively long leaves suggests that highly motivated women are discouraged from having children by the prospects of having to leave the labor market for several years. Additionally, the negative selection may also reflect employment selection, since very long leaves are usually compensated at a lower level (low replacement rates). Because of financial constraints, low-ability and low paid mothers will thus return to work faster than mothers who can "afford" to stay on low compensated leaves. On the other hand, in the second subgroup of countries, where we find positive selection based on unobservable characteristics, leave policies have positive indirect effects on the size of the motherhood wage gap. Once we adjust the gaps for selection, that is, we take out the indirect effects of the policies from the gaps, the negative wage gaps are even greater. Long leaves - but not as long as in the first subgroup - lead to working mothers being a selected group that has better unobservable characteristics on average than other women. Irrespective of the length of the leaves, the adjusted gaps remain negative for almost all the countries belonging to group C, which points to the wage disadvantage of mothers and the negative direct effects of institutions.

This result indicates that because of long leaves, mothers fall behind childless women due to the loss of human capital during the breaks and hard to reconcile work and family obligations.

Figure 3 depicts the family gap estimates for men. Fathers in most countries receive a premium compared to non-fathers, ranging from a magnitude of 0.26 (Greece, Iceland) to 0.02 (Romania). Detailed decomposition results are presented in the Appendix (Table A.7.). The results show that in the majority of countries, differences in demographics between fathers and childless men partially explain the positive wage gap between them. The gaps, however, remain positive even after this adjustment. As described in Section 3.2., the gaps adjusted for demographics and selection reflect the inequality that results from unobserved factors such as culture, and particularly positive discrimination due to employers favoring fathers. Differences among the groups of countries with respect to cultural attitudes towards men's role in childcare do not seem to correlate with the size of the fatherhood wage premium. For western European countries generally characterized by more egalitarian views regarding men's roles, and for CEE and Southern countries that share more traditional views, we find comparable fatherhood wage premiums.

Figure 3

Family gap among men
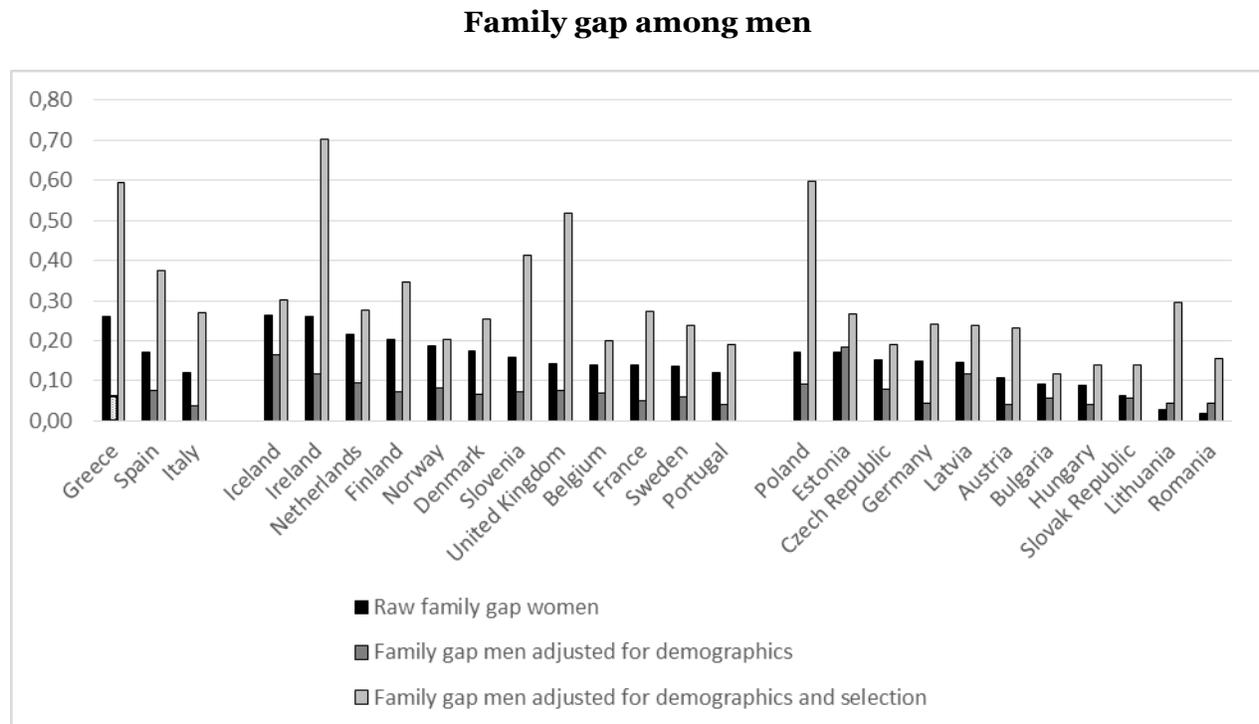
Source: Own estimates based on EU-SILC data.

Figure 4 depicts the structure of the remaining component of the gender wage gap – the gender wage gap among individuals who do not have children - which is positive if childless men receive higher wages than childless women. Detailed results are presented in the Appendix (Table A.8.). We can see that countries with high overall gender wage gaps (Figure 1) also report relatively large gender wage gaps among childless individuals. Detailed decomposition results presented in the Appendix show that in many countries, the unexplained component of the gender gap among childless individuals is larger than the raw gap itself. This means that childless women have better observable characteristics compared to childless men, yet they earn less than comparable childless men. Once we adjust the gaps for selection, we are able to infer the direct effects of institutions, which, in the case of wage gaps among the childless, include the "spill-over" effects of family policies from parents to non-parents. With the exception of a few countries (Greece in Group A, Netherlands in Group B, and Poland and Romania in Group C), we find that the remaining unexplained gaps are positive. This suggests that childless women are penalized in the form of lower wages relative to childless men, which likely arises because of the institutional support to combine work and family obligations aimed at women (that is, family policies that are predominantly addressed to women, and not men), paired with cultural expectations towards women's roles.

Figure 4

Gender wage gap among childless
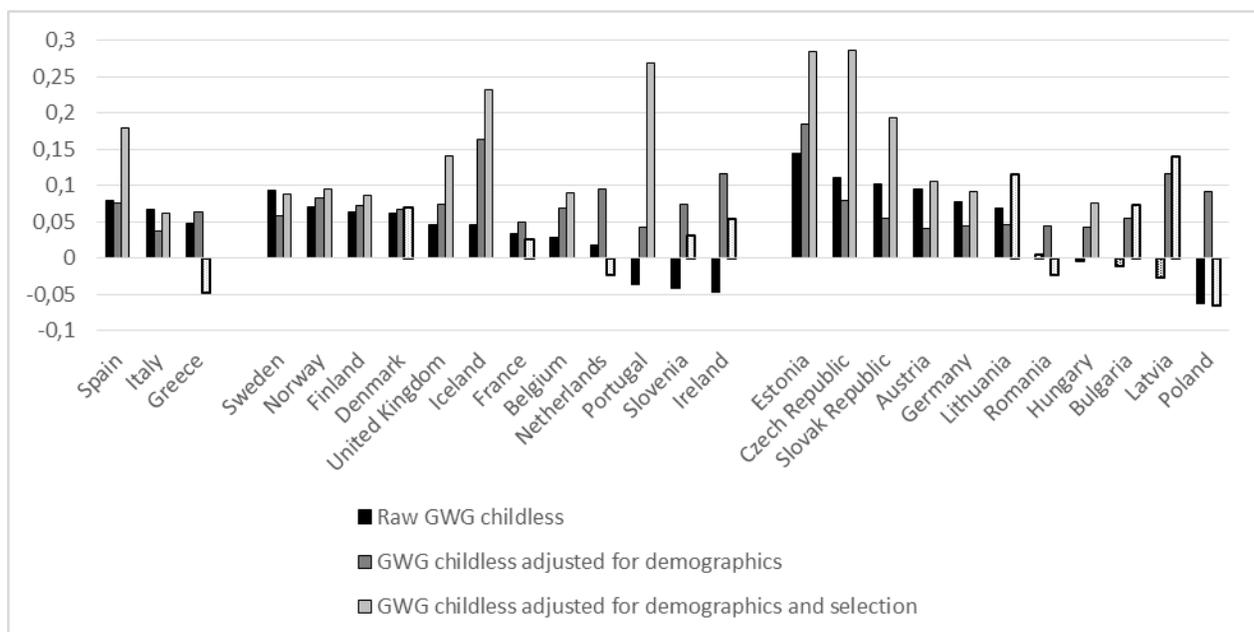
Source: Own estimates based on EU-SILC data.

6.   CONCLUSION

In this study, we estimate the magnitudes of family gaps among men and women, as well as the gender gap among childless individuals, and assess their contribution to the overall gender wage gap for 26 EU countries. We use harmonized EU-SILC data and a methodology that can account for potential selection biases due to employment and parenthood decisions, and allows us to decompose the overall gender gap into these components. We analyze the resulting wage gap estimates and decomposition in light of relevant institutional characteristics of the countries that have been highlighted in previous cross-country analyses of the gender wage gap and the family gaps among men and women. Our study is the first to provide family gap estimates from so many countries using the same methodology, and to assess the cross-country variation in the relative roles of family gaps in shaping the overall gender wage gap. The countries in our analysis are categorized into three groups based on their labor market characteristics, family policies, and cultural norms. Family policies are evaluated based on how well they support maternal labor market activity and the reconciliation of work and family duties, as seen in Leitner (2003).

We find that in Southern European countries, the main contributor to the gender gap seems to be the fatherhood wage gap and the gender wage gap among childless individuals. The low gender wage gap that is observed in these countries is a consequence of a positive wage gap between mothers and childless women. The fact that mothers do not receive lower wages than childless women means that women's averages wages are not reduced because of motherhood. Our decomposition results show that the motherhood gap does not arise because of women's selection to work and motherhood. Because of short leaves, mothers who return to work do so soon after having their child, which does not lead to the wage disadvantage of mothers.

In Western European countries (and Slovenia), the magnitude of the motherhood wage gap varies, but it is not a significant contributor to the overall gender wage gap. More importantly, motherhood wage penalties that do not stem from observable differences between mothers and childless women and selection turn out to be mostly positive, which reflects a relative wage advantage of mothers over childless women. This is likely due to family policies, cultural norms, and labor market characteristics that allow mothers to better reconcile work and family obligations, leading to lower skill depreciation, productivity decline, and employer discrimination. The gender gap in these countries is mostly due to the high positive wage gaps between men that have children and childless men, which remain significant even after adjusting them for the differences in observable characteristics and selection.

In the CEE countries, as well as in Austria and Germany, the motherhood wage gap is significant, and the most important contributor to the overall gender gap in mean wages, alongside the gender wage gap among childless individuals and the fatherhood wage gap. We find that women tend to select differently into motherhood and work: in countries with very long leaves, women's selection into work and motherhood is negative, whereas in countries where leaves are somewhat shorter though still relatively long, selection is positive. Irrespective of the direction of the selection, we find that mothers are faced with a wage penalty that results directly from unfavorable conditions for combing work with family obligations. In particular, family policies, labor market inflexibility, and traditional cultural norms in these countries lead to the long absences of mothers, and their wage disadvantage when they return.

Overall, we find that the most important determinants of the gender wage gap vary highly among countries, and the analysis of these components highlights important policy considerations. We can see that the motherhood penalty is higher, and it contributes more significantly to the overall gender wage gap when policies are unsupportive of maternal employment, as seen in the CEE countries. Greater gender equality in these countries can only be achieved through family policy reforms and the significant shaping of cultural attitudes. The fatherhood premium is an important contributor to the gender gap in most countries. Even when mothers do not receive lower pay than non-mothers, they do not see the gains that fathers do after having a child, leading to the overall divergence of wages by gender. This difference can only be addressed by policies encouraging the greater involvement of fathers in childcare duties.

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APPENDIX

Structure of the data by country and gender

Country	# observations total	% working total	% working men	% working women	% parent total	% parent men	% parent women
Austria	32,917	0.751	0.903	0.615	0.635	0.539	0.718
Belgium	30,201	0.774	0.853	0.699	0.609	0.514	0.696
Bulgaria	22,022	0.704	0.745	0.663	0.648	0.534	0.760
Czech Republic	42,407	0.777	0.910	0.652	0.671	0.541	0.786
Denmark	29,095	0.891	0.929	0.856	0.725	0.643	0.794
Estonia	29,396	0.733	0.783	0.684	0.727	0.611	0.836
Finland	43,499	0.751	0.838	0.670	0.656	0.564	0.738
France	60,010	0.798	0.877	0.723	0.671	0.590	0.744
Germany	54,340	0.772	0.895	0.673	0.639	0.569	0.693
Greece	33,076	0.504	0.668	0.391	0.552	0.425	0.654
Hungary	50,669	0.689	0.782	0.602	0.638	0.523	0.745
Iceland	16,664	0.834	0.898	0.766	0.745	0.652	0.835
Ireland	23,253	0.644	0.729	0.577	0.636	0.527	0.721
Italy	113,331	0.540	0.707	0.415	0.531	0.426	0.619
Latvia	25,492	0.650	0.680	0.622	0.650	0.516	0.770
Lithuania	21,130	0.741	0.744	0.739	0.692	0.580	0.793
Netherlands	47,647	0.849	0.950	0.762	0.676	0.612	0.731
Norway	31,786	0.891	0.937	0.843	0.710	0.637	0.779
Poland	72,030	0.694	0.789	0.609	0.696	0.605	0.778
Portugal	28,509	0.671	0.726	0.626	0.618	0.519	0.707
Romania	26,694	0.750	0.868	0.643	0.590	0.509	0.664
Slovenia	56,428	0.819	0.849	0.790	0.610	0.475	0.743
Spain	83,338	0.588	0.707	0.491	0.556	0.465	0.636
Sweden	35,404	0.889	0.922	0.857	0.705	0.645	0.760
Slovak Republic	34,177	0.801	0.858	0.748	0.598	0.493	0.695
United Kingdom	39,207	0.774	0.867	0.699	0.631	0.536	0.705

Shares of individuals by parenthood and employment status – by country and gender

Country	%working & non-parent	% working & parent	% not working & non-parent	% not working & parent	%working & non-parent	% working & parent	% not working & non-parent	% not working & parent	%working & non-parent	% working & parent	% not working & non-parent	% not working & parent
	total	total	total	total	men	men	men	men	women	women	women	women
Austria	0.310	0.442	0.053	0.196	0.393	0.510	0.059	0.037	0.235	0.380	0.047	0.338
Belgium	0.306	0.468	0.085	0.141	0.379	0.473	0.099	0.048	0.236	0.462	0.071	0.230
Bulgaria	0.250	0.453	0.108	0.188	0.329	0.416	0.142	0.114	0.173	0.490	0.076	0.262
Czech Republic	0.284	0.493	0.047	0.177	0.391	0.519	0.062	0.029	0.184	0.468	0.032	0.316
Denmark	0.234	0.657	0.038	0.071	0.300	0.629	0.043	0.028	0.172	0.684	0.033	0.111
Estonia	0.190	0.543	0.082	0.185	0.254	0.529	0.129	0.088	0.128	0.556	0.037	0.279
Finland	0.266	0.486	0.078	0.171	0.321	0.516	0.107	0.055	0.213	0.457	0.050	0.280
France	0.260	0.538	0.063	0.139	0.317	0.560	0.077	0.046	0.206	0.517	0.049	0.228
Germany	0.306	0.466	0.056	0.171	0.357	0.538	0.068	0.037	0.265	0.408	0.047	0.280
Greece	0.231	0.274	0.207	0.288	0.335	0.333	0.261	0.071	0.158	0.233	0.170	0.439
Hungary	0.275	0.414	0.088	0.223	0.354	0.429	0.120	0.098	0.201	0.401	0.059	0.339
Iceland	0.199	0.635	0.045	0.121	0.266	0.632	0.060	0.042	0.127	0.639	0.028	0.206
Ireland	0.261	0.383	0.101	0.255	0.313	0.416	0.154	0.117	0.220	0.357	0.059	0.364
Italy	0.266	0.275	0.193	0.267	0.372	0.335	0.220	0.074	0.186	0.229	0.172	0.413
Latvia	0.219	0.431	0.139	0.212	0.289	0.392	0.202	0.117	0.157	0.466	0.082	0.296
Lithuania	0.199	0.543	0.109	0.150	0.249	0.496	0.163	0.092	0.152	0.587	0.058	0.204
Netherlands	0.275	0.574	0.031	0.120	0.336	0.614	0.032	0.018	0.223	0.540	0.030	0.208
Norway	0.251	0.641	0.035	0.073	0.306	0.631	0.040	0.023	0.192	0.651	0.031	0.127
Poland	0.201	0.493	0.095	0.211	0.254	0.536	0.131	0.080	0.153	0.455	0.063	0.329
Portugal	0.254	0.417	0.136	0.193	0.324	0.402	0.187	0.087	0.196	0.430	0.094	0.280
Romania	0.326	0.424	0.085	0.164	0.408	0.460	0.085	0.047	0.251	0.392	0.086	0.271
Slovenia	0.290	0.529	0.087	0.094	0.402	0.446	0.112	0.040	0.179	0.612	0.063	0.147
Spain	0.278	0.311	0.157	0.255	0.351	0.356	0.194	0.099	0.218	0.273	0.126	0.383
Sweden	0.249	0.640	0.040	0.071	0.297	0.625	0.046	0.032	0.201	0.655	0.034	0.109
Slovak Republic	0.321	0.480	0.075	0.124	0.400	0.458	0.096	0.046	0.248	0.500	0.054	0.198
United Kingdom	0.314	0.460	0.056	0.170	0.381	0.486	0.076	0.057	0.260	0.439	0.040	0.261

Summary statistics for wage rates and working time by gender and parenthood status

Country	wages						working time					
	men			women			men			women		
	total	parent	childless	total	parent	childless	total	parent	childless	total	parent	childless
Austria	17.43	18.26	16.36	14.23	13.97	14.66	41.46	41.82	41.01	31.75	28.23	38.14
Belgium	17.70	18.68	16.47	16.30	16.59	15.73	40.40	40.79	39.93	33.04	31.61	35.96
Bulgaria	1.82	1.90	1.72	1.68	1.65	1.78	42.08	42.16	41.98	40.83	40.79	40.95
Czech Republic	4.80	5.15	4.34	3.67	3.58	3.91	43.37	43.82	42.78	39.82	39.36	41.08
Denmark	26.02	27.46	22.99	21.74	21.85	21.32	39.46	39.70	38.99	35.41	35.08	36.72
Estonia	4.29	4.57	3.72	2.96	2.90	3.21	41.28	41.53	40.79	39.12	39.04	39.48
Finland	19.40	20.99	16.85	15.68	15.78	15.45	40.14	40.32	39.86	36.60	36.26	37.39
France	14.46	15.15	13.24	12.98	13.10	12.69	40.29	41.02	39.10	34.14	33.35	36.18
Germany	18.10	18.97	16.76	14.40	13.91	15.15	42.41	42.65	42.05	30.48	25.57	38.89
Greece	9.41	10.56	8.27	8.77	9.44	7.79	40.93	41.16	40.72	36.28	35.47	37.48
Hungary	3.13	3.29	2.93	2.70	2.60	2.91	40.95	41.11	40.76	39.16	38.80	39.95
Iceland	17.44	18.77	14.27	13.67	13.76	13.19	47.55	48.02	46.57	37.54	36.84	40.84
Ireland	22.41	24.99	18.97	19.84	20.11	19.40	39.90	40.49	39.16	30.86	27.87	36.01
Italy	12.46	13.28	11.72	11.40	11.68	11.05	40.69	41.18	40.26	34.31	32.56	36.45
Latvia	3.64	3.94	3.22	3.05	2.92	3.41	42.26	42.67	41.73	39.76	39.68	40.04
Lithuania	3.22	3.26	3.14	2.72	2.66	2.93	40.28	40.57	39.73	38.69	38.64	38.86
Netherlands	22.85	24.68	19.50	19.79	20.11	19.03	38.14	38.22	38.01	26.47	23.41	33.40
Norway	28.01	29.67	24.58	21.64	21.47	22.22	40.31	40.43	40.07	34.26	33.37	37.34
Poland	3.77	4.00	3.28	3.58	3.57	3.61	43.03	43.40	42.31	38.44	38.32	38.80
Portugal	6.72	7.23	6.08	6.22	6.10	6.49	41.61	42.18	40.86	38.45	38.27	38.86
Romania	1.80	1.81	1.78	1.71	1.66	1.78	41.96	42.03	41.88	40.94	41.10	40.69
Slovenia	7.87	8.62	7.04	7.28	7.22	7.47	41.18	41.34	41.01	39.81	39.71	40.11
Spain	10.02	10.92	9.10	9.14	9.61	8.55	41.69	42.53	40.85	35.70	34.10	37.76
Sweden	18.67	19.58	16.76	15.87	16.04	15.33	37.33	37.36	37.28	33.07	32.38	35.23
Slovak Republic	3.64	3.75	3.52	2.92	2.81	3.12	42.46	42.83	42.06	39.93	39.61	40.56
United Kingdom	18.31	19.64	16.60	14.68	14.42	15.12	43.60	44.02	43.07	32.80	28.77	39.99

Summary statistics for key demographic variables - by gender

Country	Married		Age		Education (ISCED 1+2)		Education (ISCED 3)		Education (ISCED 4)		Education (ISCED 5)	
	men	women	men	women	men	women	men	women	men	women	men	women
Austria	0.629	0.722	36.570	36.448	0.101	0.174	0.583	0.491	0.105	0.152	0.210	0.183
Belgium	0.653	0.726	35.945	35.945	0.194	0.187	0.373	0.314	0.041	0.034	0.393	0.465
Bulgaria	0.533	0.719	35.385	36.074	0.200	0.225	0.627	0.489	0.009	0.003	0.164	0.283
Czech Republic	0.587	0.766	35.160	35.475	0.046	0.059	0.786	0.756	0.009	0.015	0.160	0.170
Denmark	0.644	0.726	37.222	37.635	0.146	0.119	0.509	0.446	0.000	0.000	0.345	0.435
Estonia	0.511	0.651	35.633	36.699	0.182	0.108	0.598	0.449	0.042	0.082	0.177	0.362
Finland	0.564	0.680	36.248	36.695	0.129	0.073	0.475	0.382	0.007	0.006	0.389	0.539
France	0.510	0.589	35.995	36.224	0.160	0.178	0.499	0.431	0.001	0.002	0.339	0.389
Germany	0.678	0.735	37.872	37.569	0.060	0.080	0.434	0.448	0.085	0.132	0.421	0.341
Greece	0.499	0.764	35.131	35.758	0.233	0.243	0.405	0.371	0.086	0.096	0.276	0.290
Hungary	0.552	0.712	35.288	35.753	0.160	0.175	0.618	0.518	0.048	0.046	0.174	0.261
Iceland	0.502	0.605	35.858	36.654	0.293	0.259	0.346	0.255	0.081	0.070	0.280	0.416
Ireland	0.568	0.638	36.017	36.154	0.282	0.223	0.244	0.258	0.077	0.117	0.396	0.402
Italy	0.495	0.704	35.994	36.534	0.382	0.365	0.436	0.405	0.049	0.066	0.133	0.164
Latvia	0.569	0.686	35.435	35.932	0.238	0.125	0.523	0.446	0.050	0.068	0.189	0.360
Lithuania	0.710	0.844	36.383	37.090	0.134	0.082	0.405	0.273	0.202	0.238	0.258	0.407
Netherlands	0.615	0.703	37.076	36.864	0.176	0.151	0.398	0.438	0.030	0.029	0.396	0.382
Norway	0.535	0.627	36.631	36.932	0.128	0.122	0.463	0.389	0.045	0.024	0.364	0.464
Poland	0.692	0.816	35.063	35.370	0.087	0.074	0.683	0.553	0.031	0.064	0.199	0.308
Portugal	0.538	0.702	35.697	36.382	0.669	0.564	0.198	0.222	0.007	0.006	0.126	0.208
Romania	0.673	0.819	35.899	36.133	0.115	0.200	0.652	0.541	0.042	0.050	0.191	0.209
Slovenia	0.419	0.616	35.419	36.675	0.158	0.146	0.668	0.549	0.006	0.012	0.168	0.293
Spain	0.551	0.708	35.854	36.364	0.451	0.401	0.228	0.233	0.008	0.009	0.313	0.358
Sweden	0.500	0.585	36.266	36.530	0.087	0.068	0.505	0.442	0.082	0.055	0.326	0.435
Slovak Republic	0.596	0.739	34.684	35.592	0.041	0.041	0.745	0.688	0.008	0.016	0.205	0.255
United Kingdom	0.599	0.658	36.019	35.988	0.109	0.105	0.475	0.479	0.018	0.013	0.397	0.403

The contributions of the family gaps and the gender gap among childless individuals to the overall gender wage gap

Country	Group	The size of the gaps				The absolute contribution of the gaps to the gender wage gap			The percentage contribution of the gaps to the gender wag gap		
		GWG	Family gap women	Family gap men	GWG among childless	Family gap women	Family gap men	GWG among childless	Family gap women	Family gap men	GWG among childless
Spain	A	0.111	0.099	0.172	0.080	-0.055	0.087	0.080	-49%	78%	71%
Italy	A	0.093	0.057	0.120	0.067	-0.031	0.057	0.067	-34%	62%	72%
Greece	A	0.073	0.176	0.260	0.048	-0.105	0.130	0.048	-144%	178%	65%
Norway	B	0.264	-0.084	0.186	0.071	0.066	0.127	0.071	25%	48%	27%
Iceland	B	0.221	0.013	0.263	0.046	-0.011	0.185	0.046	-5%	84%	21%
Sweden	B	0.204	-0.021	0.138	0.094	0.016	0.093	0.094	8%	46%	46%
UK	B	0.195	-0.109	0.143	0.047	0.068	0.080	0.047	35%	41%	24%
Finland	B	0.183	0.009	0.204	0.063	-0.006	0.126	0.063	-4%	69%	35%
Denmark	B	0.166	0.018	0.176	0.061	-0.015	0.119	0.061	-9%	72%	37%
Netherlands	B	0.135	0.033	0.216	0.018	-0.024	0.141	0.018	-17%	104%	13%
France	B	0.117	0.007	0.139	0.033	-0.005	0.089	0.033	-4%	76%	28%
Ireland	B	0.112	-0.016	0.260	-0.047	0.010	0.149	-0.047	9%	133%	-42%
Portugal	B	0.095	-0.094	0.120	-0.036	0.064	0.067	-0.036	68%	70%	-38%
Slovenia	B	0.092	-0.065	0.158	-0.042	0.050	0.083	-0.042	55%	91%	-45%
Belgium	B	0.075	0.046	0.140	0.028	-0.031	0.077	0.028	-41%	103%	38%
Estonia	C	0.354	-0.116	0.171	0.144	0.094	0.116	0.144	27%	33%	41%
Czech Rep.	C	0.260	-0.086	0.152	0.111	0.062	0.087	0.111	24%	33%	43%
Germany	C	0.243	-0.125	0.149	0.078	0.075	0.090	0.078	31%	37%	32%
Slovak Rep.	C	0.214	-0.119	0.062	0.102	0.079	0.033	0.102	37%	15%	48%
Austria	C	0.201	-0.074	0.106	0.095	0.045	0.060	0.095	23%	30%	48%
Lithuania	C	0.163	-0.096	0.027	0.070	0.075	0.018	0.070	46%	11%	43%
Latvia	C	0.162	-0.142	0.144	-0.028	0.106	0.084	-0.028	65%	52%	-17%
Hungary	C	0.112	-0.100	0.089	-0.003	0.067	0.049	-0.003	59%	44%	-3%
Bulgaria	C	0.089	-0.070	0.093	-0.012	0.049	0.053	-0.012	55%	59%	-13%
Poland	C	0.056	-0.003	0.171	-0.062	0.002	0.116	-0.062	3%	208%	-111%
Romania	C	0.052	-0.065	0.020	0.006	0.036	0.011	0.006	70%	21%	11%

The decomposition results for the family gap among women

Country	Group	Raw family gap among women		Family gap among women adjusted for demographics		Family gap women adjusted for demographics and selection	
		The estimate of the gap	Standard error	The estimate of the gap	Standard error	The estimate of the gap	Standard error
Greece	A	0.176	0.013	0.059	0.019	0.113	0.108
Spain	A	0.099	0.008	0.039	0.010	0.381	0.061
Italy	A	0.057	0.007	-0.004	0.009	0.181	0.051
Belgium	B	0.046	0.008	0.005	0.010	0.284	0.055
Netherlands	B	0.033	0.006	-0.019	0.008	0.151	0.047
Denmark	B	0.018	0.008	-0.050	0.010	0.081	0.054
Iceland	B	0.013	0.021	0.001	0.024	0.102	0.097
Finland	B	0.009	0.007	-0.038	0.010	-0.038	0.040
France	B	0.007	0.007	-0.023	0.009	0.050	0.048
Ireland	B	-0.016	0.013	-0.036	0.016	0.430	0.135
Sweden	B	-0.021	0.011	-0.092	0.014	0.041	0.048
Slovenia	B	-0.065	0.008	-0.093	0.013	0.064	0.047
Norway	B	-0.084	0.010	-0.129	0.014	-0.187	0.057
Portugal	B	-0.094	0.014	-0.023	0.016	0.478	0.085
United Kingdom	B	-0.109	0.009	-0.121	0.011	0.029	0.088
Poland	C	-0.003	0.009	-0.043	0.012	-0.110	0.081
Romania	C	-0.065	0.011	-0.041	0.012	-0.316	0.069
Bulgaria	C	-0.070	0.015	-0.041	0.026	-0.031	0.153
Austria	C	-0.074	0.010	-0.064	0.013	-0.004	0.073
Czech Republic	C	-0.086	0.008	-0.023	0.012	-0.002	0.054
Lithuania	C	-0.096	0.017	-0.045	0.019	-0.177	0.137
Hungary	C	-0.100	0.009	-0.039	0.013	-0.097	0.063
Estonia	C	-0.116	0.014	-0.038	0.019	0.094	0.116
Slovak Republic	C	-0.119	0.008	-0.023	0.014	0.243	0.058
Germany	C	-0.125	0.008	-0.179	0.010	-0.348	0.051
Latvia	C	-0.142	0.017	-0.079	0.019	-0.225	0.170

Notes: The raw family gap among women is the percentage mean differences in wages of mothers and childless women. The family gap among women adjusted for demographics is the unexplained portion of the raw family wage gap among women obtained from Oaxaca-Blinder decomposition based on wage equations estimated with the use of OLS method. The family gap women adjusted for demographics and selection is the unexplained portion of the raw family wage gap among women obtained from Oaxaca-Blinder decomposition based on wage equations estimated with the use of Dubin and McFadden's selection correction model.

The decomposition results for the family gap among men

Country	Group	Raw family gap among men		Family gap among men adjusted for demographics		Family gap men adjusted for demographics and selection	
		The estimate of the gap	Standard error	The estimate of the gap	Standard error	The estimate of the gap	Standard error
Greece	A	0.260	0.011	0.063	0.018	0.596	0.064
Spain	A	0.172	0.006	0.076	0.009	0.374	0.034
Italy	A	0.120	0.006	0.038	0.008	0.270	0.031
Iceland	B	0.263	0.016	0.164	0.020	0.300	0.056
Ireland	B	0.260	0.013	0.117	0.019	0.701	0.067
Netherlands	B	0.216	0.006	0.095	0.008	0.278	0.032
Finland	B	0.204	0.007	0.073	0.009	0.346	0.029
Norway	B	0.186	0.009	0.082	0.014	0.202	0.041
Denmark	B	0.176	0.008	0.068	0.009	0.256	0.048
Slovenia	B	0.158	0.006	0.074	0.010	0.414	0.028
United Kingdom	B	0.143	0.010	0.075	0.012	0.517	0.043
Belgium	B	0.140	0.007	0.068	0.009	0.198	0.033
France	B	0.139	0.006	0.049	0.008	0.273	0.023
Sweden	B	0.138	0.008	0.059	0.012	0.238	0.033
Portugal	B	0.120	0.013	0.042	0.019	0.192	0.069
Poland	C	0.171	0.007	0.092	0.011	0.597	0.046
Estonia	C	0.171	0.011	0.185	0.016	0.267	0.058
Czech Republic	C	0.152	0.006	0.079	0.009	0.189	0.026
Germany	C	0.149	0.007	0.044	0.009	0.242	0.031
Latvia	C	0.144	0.015	0.117	0.019	0.239	0.074
Austria	C	0.106	0.009	0.041	0.011	0.232	0.032
Bulgaria	C	0.093	0.011	0.055	0.020	0.116	0.068
Hungary	C	0.089	0.008	0.042	0.011	0.139	0.035
Slovak Republic	C	0.062	0.008	0.056	0.011	0.140	0.033
Lithuania	C	0.027	0.015	0.045	0.019	0.295	0.081
Romania	C	0.020	0.009	0.045	0.010	0.154	0.046

Notes: The raw family gap among men is the percentage mean differences in wages of fathers and childless men. The family gap among men adjusted for demographics is the unexplained portion of the raw family wage gap among men obtained from Oaxaca-Blinder decomposition based on wage equations estimated with the use of OLS method. The family gap men adjusted for demographics and selection is the unexplained portion of the raw family wage gap among men obtained from Oaxaca-Blinder decomposition based on wage equations estimated with the use of Dubin and McFadden's selection correction model.

The decomposition results for the gender wage gap among childless individuals

Country	Group	Raw gender wage gap among childless individuals		Gender wage gap among childless individuals adjusted for demographics		Gender wage gap among childless individuals adjusted for demographics and selection	
		The estimate of the gap	Standard error	The estimate of the gap	Standard error	The estimate of the gap	Standard error
Spain	A	0.080	0.007	0.076	0.009	0.180	0.027
Italy	A	0.067	0.007	0.038	0.008	0.061	0.028
Greece	A	0.048	0.012	0.063	0.018	-0.048	0.060
Sweden	B	0.094	0.011	0.059	0.012	0.088	0.037
Norway	B	0.071	0.012	0.082	0.014	0.095	0.041
Finland	B	0.063	0.008	0.073	0.009	0.086	0.027
Denmark	B	0.061	0.010	0.068	0.009	0.069	0.043
United Kingdom	B	0.047	0.010	0.075	0.012	0.140	0.035
Iceland	B	0.046	0.023	0.164	0.020	0.232	0.065
France	B	0.033	0.007	0.049	0.008	0.025	0.023
Belgium	B	0.028	0.008	0.068	0.009	0.089	0.035
Netherlands	B	0.018	0.007	0.095	0.008	-0.024	0.028
Portugal	B	-0.036	0.015	0.042	0.019	0.269	0.061
Slovenia	B	-0.042	0.008	0.074	0.010	0.032	0.031
Ireland	B	-0.047	0.013	0.117	0.019	0.054	0.065
Estonia	C	0.144	0.015	0.185	0.016	0.285	0.066
Czech Republic	C	0.111	0.008	0.079	0.009	0.287	0.029
Slovak Republic	C	0.102	0.009	0.056	0.011	0.194	0.028
Austria	C	0.095	0.010	0.041	0.011	0.106	0.038
Germany	C	0.078	0.008	0.044	0.009	0.092	0.025
Lithuania	C	0.070	0.019	0.045	0.019	0.116	0.090
Romania	C	0.006	0.011	0.045	0.010	-0.024	0.037
Hungary	C	-0.003	0.009	0.042	0.011	0.076	0.029
Bulgaria	C	-0.012	0.015	0.055	0.020	0.073	0.069
Latvia	C	-0.028	0.019	0.117	0.019	0.140	0.107
Poland	C	-0.062	0.010	0.092	0.011	-0.066	0.041

Notes: The raw gender wage gap among childless individuals is the percentage mean differences in wages of childless men and childless women. The gender wage gap among childless individuals adjusted for demographics is the unexplained portion of the raw gender wage gap among childless individuals obtained from Oaxaca-Blinder decomposition based on wage equations estimated with the use of OLS method. The gender wage gap among childless individuals adjusted for demographics and selection is the unexplained portion of the raw gender wage gap among childless individuals obtained from Oaxaca-Blinder decomposition based on wage equations estimated with the use of Dubin and McFadden's selection correction model.