WeLaR

Fertility, household models and labour market outcomes in EU countries

An analysis of the gender gap in parenthood penalty and the moderating role of family policies

Piotr Lewandowski, Cristiano Perugini, Fabrizio Pompei, Laurène Thil, Maryna Tverdostup, Wojciech Szymczak

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Abstract

In this paper, we analyse the interactions between fertility, parenthood, household characteristics, labour market outcomes and institutions through the lens of gender inequality. In the first part of the report, we use HETUS data for ten EU countries for the period 2008-2015 to provide a cross-country descriptive analysis of the disparities in time allocation to paid work, housework and childcare within the household. In the second part, we analyse gender asymmetries in labour market outcomes in relation to parenthood across the EU and different household types. To this aim, we use the European Union Survey on Income and Living Conditions (EU-SILC) data to assemble a longitudinal dataset at the demographic group (gender, age, education) level for twenty-three EU countries over the period 2006-2018. This dataset is also used, in the third part of the report, to analyse how gender asymmetries in the effects of parenthood on labour market outcomes are moderated by an array of family-related public policies. Our results provide a widely informative mapping of the asymmetries in parenthood penalty in labour market outcomes across the EU and suggest that only some of the existing policies help reduce this gender gap in labour supply (at the intensive and the extensive margin), employment and some job attributes. However, none of them plays any role in moderating gender disparities in labour remuneration related to parenthood.

1. Introduction

Understanding the drivers and evolutions of labour supply is key to assessing labour market performance and designing policy interventions. Individual labour supply choices are not isolated from decisions and circumstances shaped by non-strictly economic factors. In particular, the household structural features related to the presence and rearing of children have been investigated as one major driver of labour market behaviour. As such interlinks are not symmetric across genders, the interest in these factors extends well beyond the labour market spheres, reaching the domain of gender economic and social inequality. In the EU, the still large and persistent gender imbalances in formal and informal work and the heterogeneous (across countries) fertility dynamics represent key areas of debate and policy intervention. This calls for a comprehensive effort to analyse how the distribution of housework responsibilities in general, and the presence of children in particular, shape labour market outcomes and which policy/institutional settings moderate the link.

The last decades marked an unprecedented shift in the work and family roles of women, which has materialised in a significant improvement in female labour market performance. Increased labour market participation, especially among mothers with small children, narrowing gender inequalities in wages, thinning of the glass ceiling effect[1] and more gender equality in job promotion and career progression are among the main domains in which achievements have been observed (Schröder and Burow, 2016; Bertrand et al., 2015; Greig and Bohnet, 2009; Albanesi and Olivetti, 2009; Aguiar and Hurst, 2007; Fuwa, 2004; Álvarez and Miles, 2003). This transformation of female labour market position and diminishing gendered allocation of paid work, has fostered women's sounder employment commitment, higher career aspirations and stronger bargaining power at the workplace and within the family. Despite this progress, women still perform most of the housekeeping and childcare work (Sánchez et al., 2021; Zamberlan et al., 2021; Lee et al., 2021; Sullivan and Gershuny, 2016; Bianchi et al., 2012; Blau and Kahn, 2007). Female achievements in the labour market have indeed not translated into an equivalent increasing role of male spouses in at-home labour and, more generally, into a more egalitarian gender division of housework and care (Mandel and Lazarus, 2021; Fuwa, 2004); this situation places an additional burden on women, often referred to as "double days". Within-family division of housework loads along traditional

[1] The term "glass ceiling" implies that while individuals from underrepresented groups (such as women) may be able to see the opportunities for advancement, they are hindered by an invisible barrier that prevents them from reaching top-level positions within an organization. This barrier can manifest in various forms, including discriminatory hiring practices, unequal pay, lack of mentorship and sponsorship opportunities, and biased promotion decisions.

gendered lines is documented to be extensive and persistent, with unpaid care work being placed at the core of gender inequality throughout Europe (Gálvez-Muñoz et al., 2011). This gender-asymmetric time allocation pattern holds across countries, individual (men and women) profiles, household types and female bargaining power levels, measured by earnings (Sevilla-Sanz et al., 2010; Gupta, 2007).

The presence of children magnifies gender-uneven allocation of household work (Kimmel and Connelly, 2007) and inevitably reverberates on labour supply decisions. This link appears so much disproportionally stronger for women that the presence of children is today seen as the main driver (if not the only remaining one) of labour market gender inequality (see Juhn and McCue, 2017; Vladisavljević et al., 2023). Numerous studies have highlighted that the association between children and labour market outcomes, referred to as child or parenthood penalty, is complex and depends on a variety of factors. Parenting can impact labour market outcomes by shaping labour supply decisions, employment opportunities, and labour returns. Regarding the first domain, extensive evidence exists that childbirth decreases participation rates and hours worked only for mothers (OECD, 2007; Schönberg and Ludsteck, 2014; Brewer and Paull, 2006). This effect is observed even after accounting for the possible endogeneity of fertility and for adverse selection (e.g., Angrist and Evans, 1998; Jacobsen et al., 1999; Cruces and Galliani, 2007). This loss is often paralleled by a penalty in the wage rate (e.g., Lundborg et al., 2017; Adda et al., 2017), especially when mothers experience substantial interruptions in employment (Lundberg and Rose, 2000). Mothers accumulate less job experience and, due to continuing responsibilities in child rearing, face more challenging career/family conflicts in coping with long hours, heavy travel commitments and inflexible work schedules. As a result, they tend, more often than men, to choose family-friendly jobs and to be less competitive for higher-paid jobs (Bertrand et al., 2010; Kleven et al., 2019a; Perugini and Pompei, 2023). An interesting branch of the literature has identified several individual and household attributes that can mitigate or exacerbate the negative effects of childbirth. Among the individual attributes, age, education and the type of occupation pre-birth emerge as relevant in one direction or the other depending, to a significant extent, on the socio-economic and institutional context (see Sigle-Rushton and Waldfogel, 2007; Davies et al., 2000). Household characteristics (income, age/employment composition) have been less explored, despite their ability to shed light on aspects related to gender role beliefs and stereotypes. Interestingly, a few contributions focus on the role of spouses' attributes. Bertrand et al. (2010) show that US graduate mothers with lower-earning spouses suffer only a modest and temporary penalty compared to those with higher-earning spouses, who tend to reduce their labour supply considerably more. Fernàndez et al. (2004) focus on the role of the family model in which the man grew up and find that the spouses of men whose mothers worked are themselves significantly more likely to work. Kleven et al. (2019a) find

that the child penalty for mothers in Denmark is strongly related to the labour supply history of maternal grandparents: women whose mothers worked very little compared to their father suffer a larger child penalty when they become mothers.

Various studies have devoted attention to the role of institutions and policies in shaping the consequences of parenthood on labour market outcomes; most of them refer to a specific country or a limited set of countries, due to the demanding nature of data needed to identify the key relationships. They suggest that high fertility rates are associated with a decrease in women's labour force participation, especially in countries with inadequate childcare support (e.g., Herbst, 2010). In contrast, family-friendly work policies, such as well-paid parental leave and flexible working hours, have been shown to support the labour force participation of individuals with children and positively impact fertility rates (Del Boca, 2015). As for the EU context, recent empirical evidence on single countries about fertility and labour supply suggests that there is a negative relationship between fertility and women's labour force participation, particularly those with lower levels of gender equality and a more generous infrastructure of childcare and family policy provision (see Fehr and Ujhelyiova, 2013; Neyer, 2006). In some contexts, access to high-quality, affordable childcare has been associated with higher levels of labour force participation among women with children (e.g., Gehringer and Klasen, 2017). Despite the abundant body of knowledge produced in the last decades, a fine-grained, EU-wide, and updated analysis of gender asymmetries associated with the presence of children is not available; similarly, further studies are needed to understand the interplay between family policies and labour market outcomes in the presence of children (Blau and Winkler, 2017).

This paper aims to provide an overview of the relationship between parenthood and labour market asymmetries across genders in EU countries; it also aims to shed light on the moderating effects of institutional and policy settings on the extent and asymmetry of the child penalty across genders. To this aim, we assess the work-life balance by organising our research into two main stages, devoted to different domains of gendered division of labour: housework and childcare. As a first step, we provide a cross-country analysis of the disparities in time allocation to paid work, housework and childcare within the household. Specifically, we rely on the Harmonized European Time Use Survey (HETUS) micro-level data from ten European countries (in the reference year 2010) to analyse the scale and cross-country variation in within-couple gender gaps in employment, housework and childcare, in relation to a broad range of spousal and household characteristics and of country-level indicators of gender equality. In the second part of the analysis, we focus on gender asymmetries in labour market performance related to the presence of children. To this aim, we use microdata from the European Union Survey on Income and Living Conditions (EU-SILC) to assemble a longitudinal dataset at the demographic group (gender, age, education) level for twenty-

three EU countries over the period 2006-2018. We first map the gender gap in labour market outcomes related to children across country groups and household characteristics. We then assemble a multi-level dataset by matching the demographic group database with higher level information (at country-level) to analyse how changes in a broad array of institutional settings and policies (such as length and generosity of parental leave, childcare services, child-related benefits, family benefits, work-life balance, and gender-balanced parenting) affect the asymmetry in fertility-related labour market outcomes.

The rest of the paper is structured as follows. Section 2 provides an overview of gender disparities in the allocation of paid work and housework in selected EU countries. After a presentation of the data and the methods of analysis, we provide a descriptive picture of gender disparities in time use, the role of different individual and household contexts and country-level institutional factors. Section 3 maps the magnitude and variability of the parenthood penalty in the EU in a broad set of labour market outcomes: labour force participation, employment, hours worked, type of employment and earnings. After an illustration of the data and methods used, the presentation of the outcomes is detailed by groups of geographically contiguous countries (Southern, Continental, Northern, and Central-Eastern countries) and by household typologies. In Section 4 we analyse the moderating effects of various policy measures and reforms on the gender asymmetry in the parenthood penalty in labour market outcomes, identifying those measures that alleviate women's disadvantage compared to men. To this aim, we first describe the country-level data assembled and the empirical approach; we then highlight which policy and reform contexts can alleviate the gender asymmetry in the parenthood penalty in labour force participation, employment, and job characteristics. Section 5 summarizes and concludes.

2. Gender gaps in paid work and housework in the EU

2.1. Data and methods

This analysis uses Harmonized European Time Use Survey (HETUS) round 2 data, with reference year 2010[2]. Apart from a range of core socio-demographic, household, and employment characteristics of respondents, HETUS collects information, by means of a self-recorded diary by all household members, on how individuals spend their time in various activities such as work,

[2] For more information on HETUS data, see: https://ec.europa.eu/eurostat/documents/203647/10397147/HETUS_variables+description.pdf/54efe947-767f-2e46-09ee-fc13688f04ac

leisure, household chores, and caregiving. The country selection used in this analysis is constrained by the availability of some important information used as control variables (gender, age group, household size, number of children by age, education level, migration background, marital status, self-declared labour market status, being self-employed, working full-time, industry of employment, household total income interval). Our sample covers ten countries: nine EU member States (Belgium, Germany, Estonia, Greece, Finland, France, Luxembourg, Poland, Romania) plus the UK, which serves as an interesting comparative case. We include one- and two-generation households (only spouses and spouses with children), with spouses being heterosexual and in a registered marriage or partnership[3]. We consider only households with both spouses aged between 20 and 64 and both being employed.

In exploring the gender disparities in time allocation, we focus our analysis on the time spent on employment, housework and childcare, as defined in line with earlier research (Gimenez-Nadal and Molina, 2020; Gimenez-Nadal and Sevilla, 2012). Specifically, the time spent on employment, referred hereinafter as worktime, incorporates time allocated to the main job, secondary job, job-related tasks and commuting, whereas the time spent on the housework comprises various activities related to household production (cooking, cleaning, shopping, washing, gardening, etc.). We keep childcare separate from housework for two reasons. Firstly, childcare activities are to a certain extent of a different nature than housework, as they include both routine and leisure aspects. Earlier studies, including Sevilla-Sanz et al. (2010), suggest that childcare should be addressed as a separate time-use domain. Time devoted to childcare is inherently different from the time devoted to housework, as activities performed when caring for minor children vary greatly, from feeding and basic hygiene to unsupervised play with the child(ren) and joint leisure-related pastime. Secondly, our sample includes both families with and without minor children. Hence, excluding childcare ensures comparability of the housework time use measure across these two groups of families. The analysis of the effects of the presence of children on labour market outcomes is the focus of the extensive analysis of sections 3 and 4.

[3] We did not include cohabiting couples (not registered) as a part of our identification strategy. To match partners within the household we used marriage status variable (with categories married/in registered partnership; single; widowed) and it appears that absolute majority of one and two-generation households (parents/parents with kids) include married spouses or partners in a registered partnership. There was a tiny fraction of one- and two-generation households with seemingly cohabiting male and female individuals, but since they both reported themselves as 'single', it is hard to argue if they actually see themselves as a couple, or they live in the same house for other types of relationships (e.g., friendship, kinship, etc.).

Restricting our sample to dual-earner couples induces a certain degree of sample selection, which might bias our results. Couples in which the husband only does paid work may be the ones where the wife has a stronger preference for housework or adheres to the traditional gender norms more sturdily (Bertrand et al., 2015). If this is the case, our estimates are likely to be a lower bound of actual gender disparities in time allocation into employment and housework. Yet, we equally exclude couples with the wife being a sole earner, for which the opposite may hold – the husband may have a relatively stronger preference for housework, whereas the wife has a stronger labour market commitment. Under this assumption, true gender disparities may be smaller than the ones estimated. Hence, the direction and strength of the bias are uncertain, and our findings cannot be generalized to all couples.

Besides the distortions due to missing data that limit the geographical scope of the analysis, we should acknowledge several other data limitations. Firstly, the reliability and representativeness of self-reported time-use diary data, as it is the case for the HETUS datasets, pose some concerns. Albeit the application of robust survey design principles and sampling techniques, the act of recording time usage within short intervals (ten-minute intervals over 24 consecutive hours) demands significant effort and time commitments, thereby implying that respondents who agree to participate in the study may possess distinct characteristics that render them atypical within the broader population. Secondly, respondents may have limited ability to interrupt their daily activities for the purposes of diary completion, so most of them are likely to complete their diaries retrospectively. Thirdly, the precision of time-use reporting, especially concerning employment-related and housework time use may pose concerns. Furthermore, the coding of activities may be subjective and dependent on the judgment of the coder, which can introduce some degree of variation in the data (Sturgis, 2004). Yet, these limitations do not bias our estimates if there are no systematic gendered patterns in misreporting or misinterpreting time use, as well as systematically biased coding patterns.

To measure within-couple disparities in time allocation, we compute individual relative worktime and housework as a share of the wife's or husband's hours on the total hours spent by both spouses on employment and household work. The wife's or husband's relative worktime, housework and childcare ratios as defined as $\rho_{ik} = \frac{T_{ik}^{own}}{T_{ik}^{own}+T_{ik}^{partner}}$, where T_{ik}^{own} and $T_{ik}^{partner}$ denote, respectively, own and partner's time spent on activity k ($k = 1$ denoting worktime, $k = 2$ housework, and $k = 3$ childcare) by individual i.

The paper conducts a two-step empirical analysis. First, we investigate general patterns of within-couple division of worktime and housework by estimating adjusted and unadjusted gender gaps in relative worktime and housework across sample countries. In doing so, we rely on single-country

samples of both spouses and employ weighted maximum likelihood tobit regression of the following form, following the approach of Sevilla-Sanz et al. (2010), which allows to account for censoring of the dependent variable ρ_{ik} at zero and one:

$$\rho_{ik} = \alpha_k W_i + \beta_k D_i' + \gamma_k H_i' + \delta_k FE_j' + \epsilon_{ik}, \quad (1)$$

where W_i stands for wife identifier; D_i' denotes a vector of individual i characteristics, including 5-year age group, being foreign-born, education level, the industry of employment, full-time work; H_i' stands for a vector of individual i household characteristics, including household size, number of children aged 0 to 6, number of children aged 7 to 17, household net income band; FE_i' stands for a set of fixed effects, including year, month and day of a week when the time diary was filled in; ϵ_{ik} is a random error term. The dependent variable, being individual relative worktime, housework or childcare is censored at zero and one, due to a frequent occurrence of husbands spending no time at all on housework or childcare (9.2% and 56.9% respectively) and a non-negligible, albeit drastically smaller, share of households where wives spend no time on housework or childcare (1.2% and 40% respectively). Coefficient α_k captures the major effect of interest, being the gender gap in relative worktime and housework – an estimation of the men-women gap in their relative contribution to a couple's joint total worktime and housework. We report weighted estimates, which account for a combined individual response and day-of-a-week weight.

2.2. Descriptive evidence on gender disparities in time use

We start by estimating the descriptive time use profile of dual-earner couples in a pooled sample of European countries (reference year 2010). Table 1 depicts the average time spent by wives and husbands on employment and housework across a set of core demographic and household characterises, along with the wife's average relative worktime and housework. In line with earlier studies (Gimenez-Nadal and Molina, 2020; Gálvez-Muñoz et al., 2011), we document systematic specialization patterns, with wives spending less time on employment and more time on housework. Wives invest on average 557 minutes in paid work per day, whereas husbands work for 634 minutes. This implies that the average wife's share of a couple's joint total worktime amounts to 47%. Allocation of time in housework reveals the opposite pattern – the wife's relative share of housework in the total sample is 63%, with wives doing around 171 minutes of housework per day and husbands only 99 minutes.

Further disaggregation of time use patterns uncovers several unambiguous evidence. Wife's relative worktime converges to 0.5 in dual-earner couples but declines with larger household sizes. In particular, both in absolute and relative terms, worktime decreases remarkably in the presence of children; female spouses restrict on average their daily working time by one hour in the presence of one child and by almost two hours when there are two or more children in the household. Conversely, the husband's working time remains virtually unchanged. This evidence descriptively confirms the existence of a remarkable asymmetry in the labour market parenthood penalty across genders. The next sections will deal extensively and directly with this specific pattern.

Couples in which the husband is older or more educated than the wife also achieve notably less gender equality in worktime allocation. For the latter types of couples, the wife's relative worktime ranges between 43% and 45% of couples' joint total worktime. In all other types of households, wives contribute between 46% and 49% to the couple's joint worktime. The middle panel of Table 1 reveals that all types of couples appear far from within-couple gender equality in housework, as the wife's relative housework remains around or significantly over 60% for all household types. Household income level appears detrimental to the wife's time spent on housework. Women in households at the 4th and 5th income quintiles spend, respectively, 144 and 131 minutes on housework per day, as opposed to 201 and 160 minutes, respectively, of women from lower income groups. The detrimental role of income in the absolute amount of housework as well as within-couple division of household chores was widely documented in earlier literature (Lachance-Grzela and Bouchard, 2010). The outcome is interpreted in relation to housework outsourcing and the availability of home appliances, which spare time for various home chores.

Table 1. Worktime, housework and childcare, by demographic and household characteristics

Time use in minutes	Worktime			Housework			Childcare(i)			N
	Wife	Husband	Wife's relative share	Wife	Husband	Wife's relative share	Wife	Husband	Wife's relative share	
Total time per day	557	634	0.47	171	99	0.63	66	32	0.70	15070
By household size										
2 persons	593	642	0.48	162	103	0.61	-	-	-	3898
3 persons	554	634	0.47	167	95	0.64	73	38	0.67	4584
4 persons	536	627	0.46	173	95	0.65	64	30	0.71	4800
5 and more persons	537	634	0.46	186	109	0.63	59	26	0.74	1788
By number of kids aged 0 to 6										
No children	578	636	0.48	175	102	0.63	25	11	0.73	11256
1 child	515	628	0.45	157	85	0.65	98	50	0.68	2822
2 and more children	463	625	0.43	157	95	0.62	147	67	0.69	992
By household net income band										
<P20*	489	585	0.46	210	131	0.62	74	38	0.73	987
P20 to <P40	557	645	0.46	173	91	0.66	65	25	0.71	1781
P40 to <P60	581	615	0.49	160	108	0.60	62	34	0.72	2931
P60 to <P80	593	635	0.48	144	100	0.59	64	27	0.69	3325
>P80**	606	644	0.48	131	93	0.58	66	34	0.62	4557
By employment type										
Part-time	502	557	0.47	197	133	0.60	69	39	0.73	13105
Full-time	600	638	0.48	149	97	0.61	62	31	0.66	1965
By within-couple age gap										
Same 5-year age group	563	635	0.47	165	101	0.62	62	31	0.70	6942
Husband older	519	623	0.45	190	107	0.64	67	35	0.68	6728
Husband younger	561	636	0.47	170	94	0.64	74	25	0.78	1400
By within-couple education gap										
Same education level	560	636	0.47	169	95	0.64	63	32	0.70	10594
Husband more educated	537	647	0.45	181	95	0.66	67	30	0.70	1736
Wife more educated	554	614	0.47	160	115	0.58	74	30	0.71	2740
N	7535	7535	-	7535	7535	-	7535	7535	-	-

Source: HETUS wave 2010 data, own calculations.

Notes: The estimates account for combined individual response and day weight. * First income quintile group. ** Fifth income quintile group. (i) Only households with children aged under 17 are considered.

High-income households are also the ones achieving the most wife-husband equality in housework time, along with couples where the wife has a higher formal education than the husband. Nevertheless, we document much lower variability of housework gap across couple's characteristics, as compared to worktime gap, signalling inertia in housework division, with the latter remaining strongly gendered in all types of couples.

Childcare disparity within couples is more pronounced than the gap in housework (right panel of Table 1). On average, women invest 66 minutes per day in childcare, while men invest 32 minutes. The wife does 70% of the total childcare time, with the division of childcare being more equal in high-income families, as well as in families with both spouses working full-time and with the husband being older than the wife. However, even in these cases, the wife does between 62% and 68% of childcare. In low-income households, in families with both spouses working part-time or with the husband being younger than the wife, as well as in households with children aged over 6, the wife's share of childcare is the largest and ranges between 73% and 78%[4].

2.3. Time allocation gender disparities in European couples

Next, we investigate cross-country variation in within-couple time use disparities, measured as the wife's relative worktime and housework. Figure 1 plots estimated unadjusted and adjusted gender gaps in relative worktime and housework based on the empirical specification (1). Unadjusted gaps represent raw within-couple gender disparity in time use, estimated controlling for year, month, and day-of-the-week fixed effects. Adjusted gender gaps in relative worktime and housework are estimated by adding the full set of demographic, household and employment controls described in section 2.2. Complete Tobit regression estimation results are available in Tables A1 and A2 in the Appendix.

Our results confirm that, consistently with earlier studies and as anticipated by the descriptive evidence from Table 1, husbands invest, on average, more time in employment: conversely, wives spend more time in housework and childcare even in dual-earner couples in all countries in our sample. Yet, there are several important cross-country differences. Finland appears the most gender-equal country in terms of time allocated in employment, as both unadjusted and adjusted

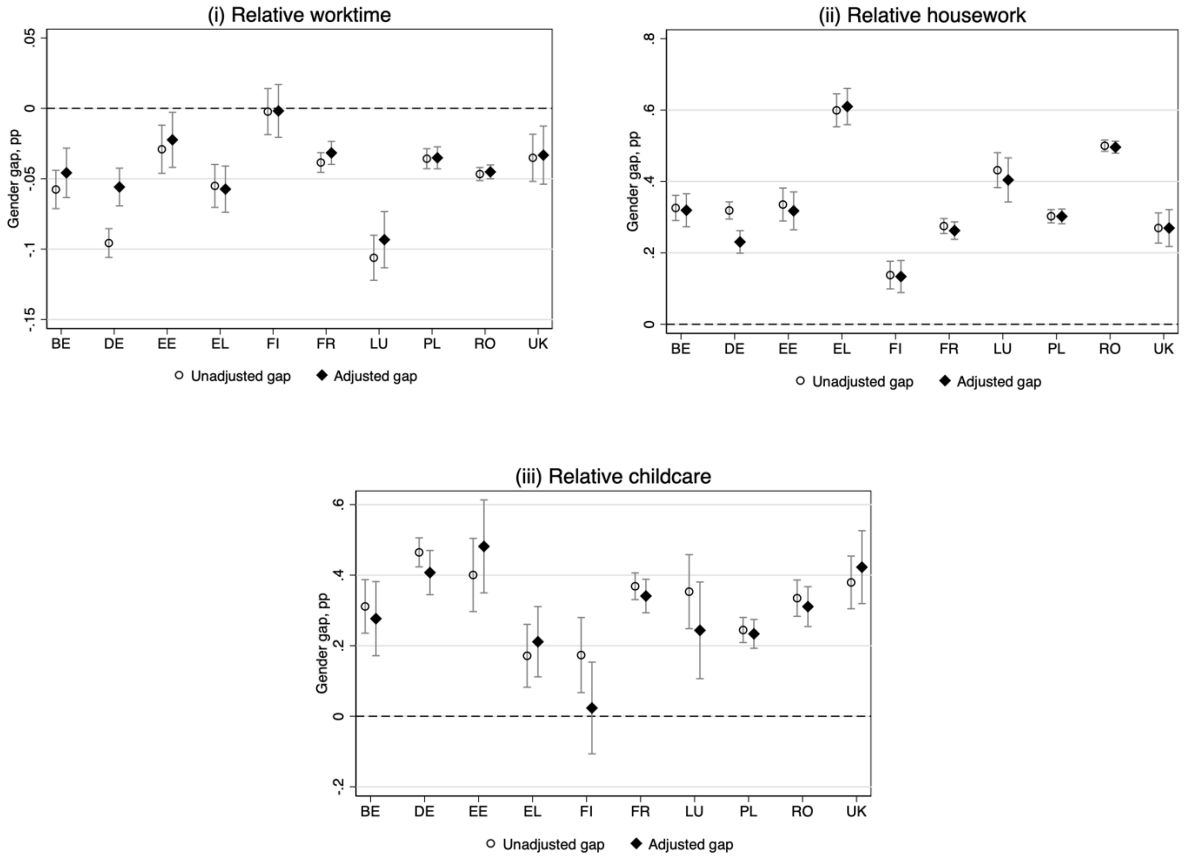
[4] The analysis considers only one- and two-generation households (spouses/partners without and with children aged under 17). Thus, the largest wife's relative childcare estimated for families without children aged under 6 (73% vs. 68% and 69% in families with one and two and more children aged under 6 respectively) is likely driven by presence of older children.

gaps turn out not significantly different from zero (see panel (i)). In Estonia the gender disparity in relative worktime turns statistically insignificant upon controlling for a full set of individual and household characteristics. This evidence suggests that, in Finland and Estonia, the worktime gap between wives and husbands in dual-earner couples stems from observed disparities in individual demographic and employment profiles, with the type of employment contract (part- or full-time) emerging as the main driver (see Tables A1 and A2 in Appendix). In all other countries, wives work drastically fewer hours than their husbands, even demographic and employment profile being equal, with adjusted gender gaps in relative worktime ranging from 9.3 p.p. in Luxembourg (implying that husband's adjusted average share of worktime is 54.7% and wife's is 45.3%) to around 3 p.p. in France, Poland, and the UK (51.5% and 48.5% are the average worktime shares of husbands and wives, respectively).

Panel (ii) of Figure 1 reveals even stronger gender-based segregation. In all sample countries, the time wives invest in housework exceeds the time invested by their husbands enormously, even when demographic, employment and household characteristics are controlled for. Albeit cross-country variation in the magnitude of the gender gap in housework is remarkable, no country appears gender-equal in terms of within-couple allocation of time in housework. In Finland – the country with zero gender gap in relative worktime – wives invest, on average, 13.4 p.p. more time in housework than their husbands, implying that within-couple share of wives' housework time is around 56.7% and husbands' is around 43.3%. In Estonia – the other country posting a non-significant adjusted gender gap in relative worktime – adjusted gender disparity in relative housework climbs to 31.9 p.p.; this means that 66% of the couple's joint total housework time is allocated to the wife, as opposed to 34% of the husband. The absolute largest within-couple gender inequality in housework is recorded in Greece, where wives are allocated 80.5% of the couple's housework time and husbands only 19.5%. These findings indicate that, even if women achieve equality in terms of their labour market commitment and work comparable hours as their husbands, like in Finland, the workload at home is still disproportionally on them.

Panel (iii) of Figure 1 displays the unadjusted and adjusted gender gaps in relative childcare. The results reveal a stark variation in within-couple equality in childcare across the sample countries. Finland appears to be the most equal country in terms of within-couple division of childcare, where wives and husbands assume equal shares of childcare once observable characteristics are controlled for. However, all other sample countries deviate from this equality, yet to varying extents. In Greece, Luxembourg, and Poland, wives do, on average, 60% of childcare time. Germany, Estonia, and the UK appear to be the most unequal, with the wife's average contribution to childcare time ranging from 70% to 75%. The stark within-couple childcare inequality in Estonia appears rather surprising, given the insignificant wife-husband gap in worktime (panel (i) of Figure 1).

Figure 1. Gender gaps in relative worktime, housework and childcare, by country



Notes: Tobit regression estimates based on HETUS wave 2010 data. The dependent variable is relative worktime (panel i) and relative housework (panel ii) censored at 0 and 1. The point estimates are reported with 95% confidence intervals. The unadjusted gap is estimated controlling for gender and year, month and day of the week fixed effects. The adjusted gap is estimated controlling for gender, age group, education level, migration status (being born in the survey country), household size, number of kids aged 0 to 6, number of kids aged 7 to 17, household net income band, full-time employment, industry of employment, as well as year, month, and day of a week fixed effects. The estimates account for combined individual response and day weight. Country sample sizes are as follows: Belgium – 790; Germany – 1632; Estonia – 532; Greece – 420; Finland – 600; France – 2992; Luxemburg – 426; Poland – 3132; Romania – 3752; the United Kingdom – 694.

2.4. Within-couple time allocation gaps and macro-level factors

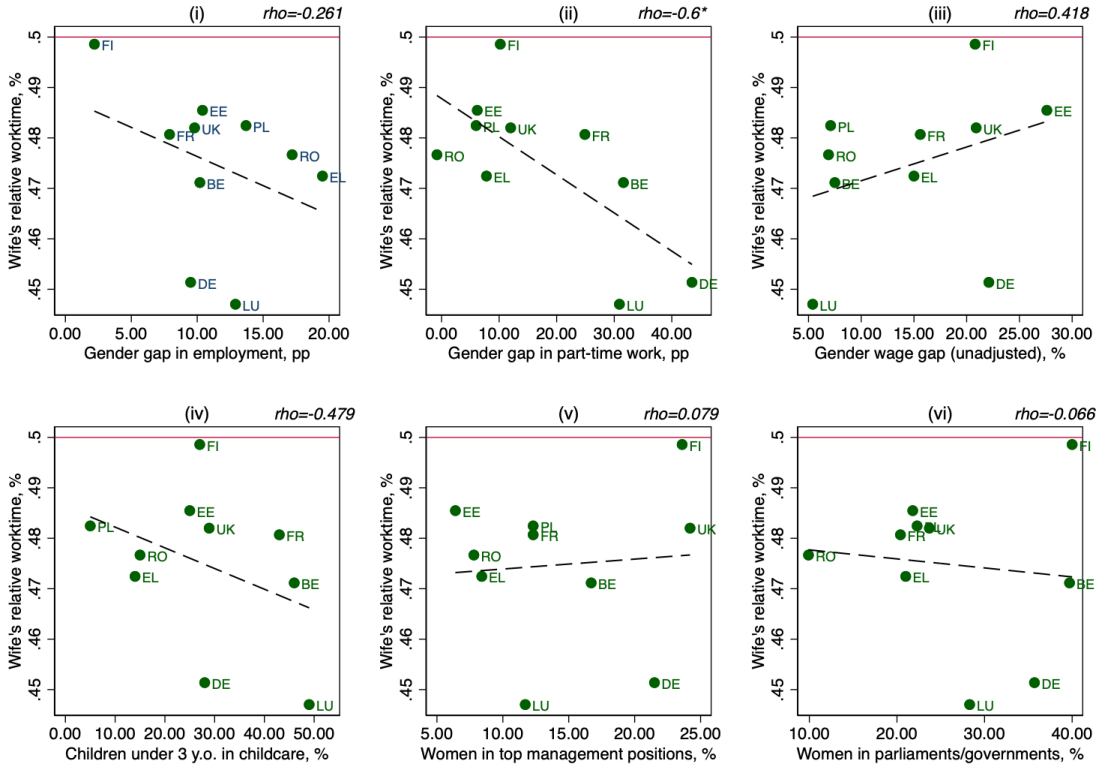
The magnitude of gender inequalities in within-couple time allocation is related, to a certain extent, to the overall level of gender equality in the labour market and in society. Earlier studies highlighted a significant association between country-specific macro-level factors and the level of gender equality in time use (Mandel and Lazarus, 2021; Grunow, 2019; Fuwa, 2004); similarly, several studies emphasised the importance of prevailing religion and cultural background for gender equality in time use (Burda et al., 2013).

Our sample covers an array of European countries having a heterogenous degree of gender equality, religious background, and stringency of gender norms[5]. In this section, we investigate whether such differences reverberate in the level of asymmetry in time use allocation. To this aim, we use six macro-level indicators extracted from the Eurostat database broadly capturing the level of gender equality and gender disparities in labour market participation and conditions: *(i)* the gender gap in employment, measured as the difference between the employment rates of men and women aged 20-64; *(ii)* the gender gap in part-time employment, defined as the difference between the share of part-time employment in total employment of women and men aged 20-64; *(iii)* unadjusted gender wage gap, measured as the difference between average gross hourly earnings of male paid employees and of female paid employees as a percentage of average gross hourly earnings of male paid employees; *(iv)* childcare enrolment, defined as the percentage of children (under 3 years old) cared for by formal arrangements other than by the family; *(v)* female representation in top management positions, defined as the share of female board members and executives in the largest publicly listed companies; *(vi)* female representation in executive government positions, defined as the proportion of women in national parliaments and national governments. Table A3 in the Appendix reports the levels of the sex indicators for the countries covered in our analysis in the years around the reference year of the HETUS data used here (2010).

Figure 2 plots country-average estimates of the wife's relative worktime against the macro-level indicators. The results suggest that the overall gender gap in part-time employment is, not surprisingly, the only macro-level indicator from our selection having a strong negative association with the wife's average relative worktime (Spearman's correlation coefficient $\rho = 0.6$, $p < 0.1$). What seems more surprising is that all other macro-level characteristics have a statistically weak association with the within-couple gap in worktime, even though the small sample size makes the identification of statistically significant correlations difficult. The magnitude of the correlation coefficients between a wife's average relative worktime and higher gender wage gap on one side ($\rho = 0.418$) and a higher share of children aged under 3 in pre-school education on the other ($\rho = 0.479$), signal that a significant association might exist. However, we lack statistical power to precisely estimate it.

[5] According to wave 6 (2010-2014) of the World Value Survey, only 19% of respondents in Estonia find religion important in their lives, as opposed to 52% of Romania. Similarly, only 38% of respondents in Estonia see no problem in a wife's income surpassing her husband's, while in Poland the corresponding share is 65% (see: https://www.worldvaluessurvey.org/WVSOnline.jsp).

Figure 2. Country-level correlation of wife's relative worktime and gender equality indicators

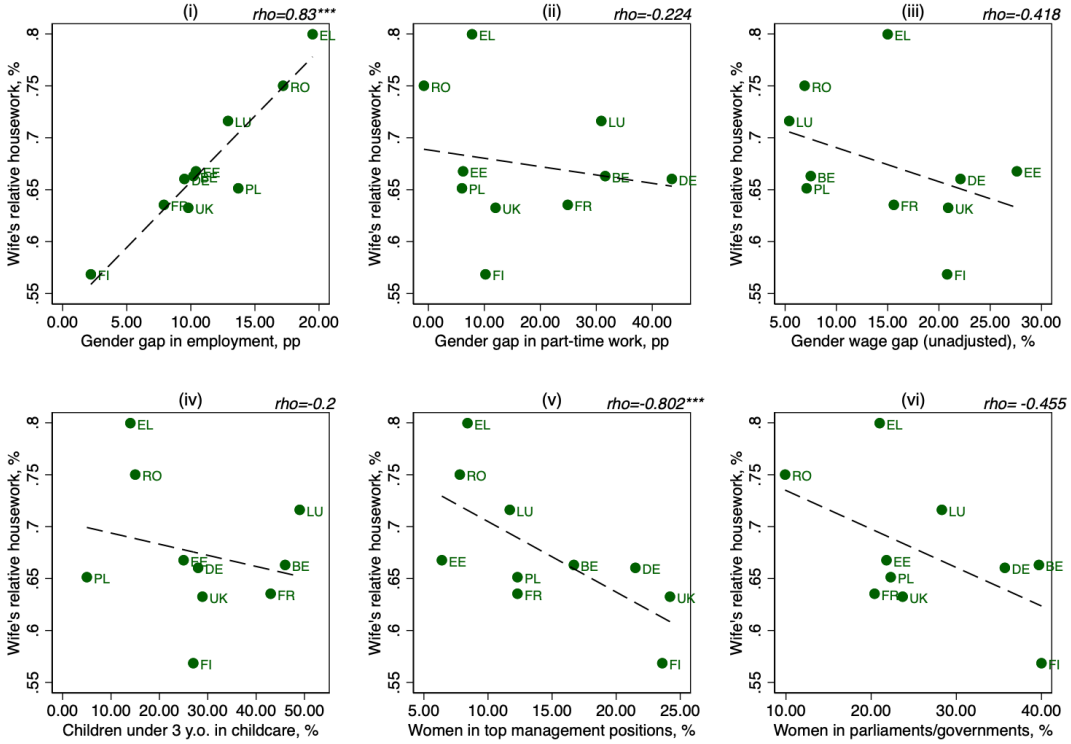


Source: Macro-level indicators are available at https://ec.europa.eu/eurostat/web/main/data/database. Average estimates of the wife's relative worktime are estimated using HETUS wave 2010 data.

Notes: The correlation between relative worktime and macro indicators is estimated using Spearman's rank correlation coefficient (*rho*). Each panel depicts country-level correlation between the average female within-couple relative worktime and (i) the male-female gap in employment; (ii) the female-male gap in part-time employment; (iii) the male-female unadjusted wage gap; (iv) the percentage of children (under 3 years old) cared for by formal arrangements other than by the family; (v) share of female board members and executives in the largest publicly listed companies; (vi) the proportion of women in national parliaments and national governments. Country sample sizes are as follows: Belgium – 790; Germany – 1632; Estonia – 532; Greece – 420; Finland – 600; France – 2992; Luxemburg – 426; Poland – 3132; Romania – 3752; the United Kingdom – 694.

Figure 3 plots the same associations but for the wife's average relative housework. Two out of six macro-indicators have a significant association with the country's average share of housework done by wives. The gender gap in employment is strongly and positively related to within-couple housework disparity ($\rho = 0.83$, $p < 0.01$). A similar association between female labour market participation and the average gap in housework was documented by Mandel and Lazarus (2021).

Figure 3. Country-level correlation of wife's relative time spent on housework, including childcare, and gender equality indicators

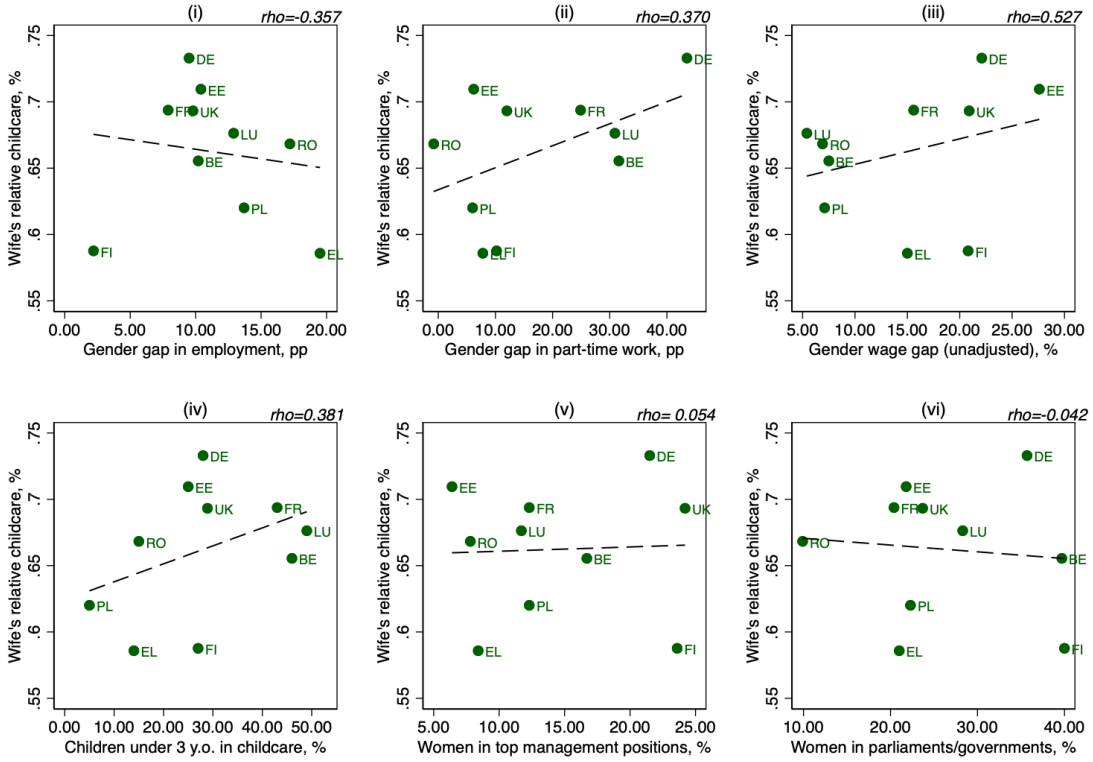


Source: Macro-level indicators are available at https://ec.europa.eu/eurostat/web/main/data/database. Average estimates of wife's relative worktime are estimated using HETUS wave 2010 data.
Notes: The correlation between relative worktime and macro indicators is estimated using Spearman's rank correlation coefficient (*rho*). Each panel depicts country-level correlation between the average female within-couple relative time spent on housework, including childcare, and (i) male-female gap in employment; (ii) female-male gap in part-time employment; (iii) male-female unadjusted wage gap; (iv) the percentage of children (under 3 years old) cared for by formal arrangements other than by the family; (v) share of female board members and executives in the largest publicly listed companies; (vi) the proportion of women in national parliaments and national governments. Country sample sizes are as follows: Belgium – 790; Germany – 1632; Estonia – 532; Greece – 420; Finland – 600; France – 2992; Luxemburg – 426; Poland – 3132; Romania – 3752; the United Kingdom – 694.

Yet, the association grew weaker over the last decades suggesting a strengthening position of women in within-couple bargaining over housework even if their relative advantage on the labour market sees no major improvements. Furthermore, we document an important correlation between

a share of women in top-level management positions in the country and the average within-couple gender gap in housework. In countries with higher representation of women in top management, within-couple division of housework appears more balanced ($\rho = -0.802$, $p < 0.01$). While the gender gap in employment is a direct indicator of female labour market attachment, the share of women in top managerial positions is an indicator of gender-unbiased labour market, providing equal career growth opportunities to both men and women.

Figure 4. Country-level correlation of wife's relative time spent on childcare, and gender equality indicators



Source: Macro-level indicators are available at https://ec.europa.eu/eurostat/web/main/data/database. Average estimates of wife's relative worktime are estimated using HETUS wave 2010 data.

Notes: The correlation between relative childcare and macro indicators is estimated using Spearman's rank correlation coefficient (*rho*). Each panel depicts country-level correlation between the average female within-couple relative time spent on housework, including childcare, and (i) male-female gap in employment; (ii) female-male gap in part-time employment; (iii) male-female unadjusted wage gap; (iv) the percentage of children (under 3 years old) cared for by formal arrangements other than by the family; (v) share of female board members and executives in the largest publicly listed companies; (vi) the proportion of women in national parliaments and national governments. Country sample sizes are as follows: Belgium – 790; Germany – 1632; Estonia – 532; Greece – 420; Finland – 600; France – 2992; Luxemburg – 426; Poland – 3132; Romania – 3752; the United Kingdom – 694.

Thus, the association we have identified signals that overall gender equality in society and in the labour market translates into the couple-level arrangements related to house chores. The share of women in local governments and in the parliament reveals economically meaningful, yet statistically weak association presumably due to insufficient sample size, with wife's average relative housework ($\rho = -0.455$). Nonetheless, the direction and strength of the association appear sufficient to argue that representation of female in political decision-making contexts captures the level of female emancipation on societal level, which shapes an environment conducive to more balanced within-couple housework arrangements.

Figure 4 illustrates the relationship between the wife's average relative housework and the six macro-level indicators. None of the association is statistically significant. The gender gap in part-time work and wages has an economically meaningful, yet statistically weak, correlation. The direction of the latter associations is rather expected, with the wife's average relative childcare being higher in countries where part-time work is more prevalent among women and wages are more unequal. However, there is a weak, but economically non-negligible positive association between the share of children aged under 3 in childcare and the wife's relative childcare, which is surprising. This suggests that the accessibility of early age childcare does not reduce within-couple inequality in childcare.

Our results suggest that within-couple gendered disparity in worktime is narrowing and, in some European countries, including Finland and Estonia, it turns insignificant once spousal and housework characteristics are controlled for. This finding indicates that the discrepancy between the wife's and the husband's workhours is gradually vanishing, and that the wife's labour market attachment is strengthening. Nevertheless, housework and childcare remain divided along traditionally gendered lines within a couple, with the wife assuming a larger share of the household chores and childcare duties even in dual-earner couples in all the sample countries. Thus, if women achieve equality in terms of their labour market commitment, as is the case in Finland and Estonia, they still contribute to housework and childcare disproportionally more than their husbands. However, within-couple housework disparity does appear to be smaller in countries with higher female labour market attachment and higher degrees of overall gender equality on the labour market and in the society.

3. Mapping labour market parenthood penalties in the EU

3.1. Data and methods

In this section, we use data from the European Union Survey on Income and Living Conditions (EU-SILC) to provide a descriptive picture of the gender gap in labour market outcomes associated with parenthood. EU-SILC is a household and individual data collection that provides comparable data on income, poverty, social exclusion and living conditions in European countries, along with detailed individual- and household-level demographic, socio-economic and labour market information. EU-SILC provides two types of microdata: (i) cross-sectional data over a given time or a certain period with variables on income, poverty, social exclusion, and other living conditions; (ii) longitudinal data on individual-level changes over time, observed periodically over a 4-year period. Unfortunately, the length of the longitudinal dimension is not sufficient to carry out the analysis of the effects of the parenthood penalty using an event-study approach, which is standard in this type of research (see Kleven et al., 2019a and 2019b). For this kind of analysis, we would indeed need to observe each individual over a time interval ranging from a few years before the event (birth of a child) to some years after. Due to the limited availability of appropriate (longitudinal) datasets, such studies are indeed normally conducted for a single or a limited set of countries: the US (Bertrand et al., 2010; Cortés and Pan, 2020), Sweden (Angelov et al., 2016), Denmark (Kleven et al., 2019a), Russia (Vladisavljević et al., 2023), and a set of six developed economies (five European countries plus the US) (Kleven et al., 2019b).

Restricting the sample to the limited set of EU countries for which adequate and accessible longitudinal data are available (basically, the four countries used by Keleven at al., 2019a, i.e., Sweden, Denmark, Austria and Germany) proved to be not functional to the main aim of our analysis. To assess how policies and institutional settings moderate the association between parenthood and labour market outcomes (see section 4) we indeed need to observe policy variability across countries and, more importantly, over time. Restricting the analysis to a few countries and for the time intervals available would have limited the scope of the analysis in terms of policy changes considered and posed serious limitations to the generalization of results. As a second-best solution, we use EU-SILC microdata to assemble a pseudo-panel dataset in which the unit of observation is a demographic group (see Doorley et al., 2023). Specifically, for each country, we identify 90 demographic groups defined by gender (men and women), education level (basic, secondary, tertiary), age (five 10-year age groups: 20-29, 30-39, 40-49, 50-59, 60 or more years-old) and number of children (zero, one, two or more). Our sample includes 23 out of 27 EU countries; Bulgaria, Romania, Malta and Croatia have been excluded due to unavailability of data for some crucial variables. For descriptive purposes, we group the countries of the sample as follows: Austria,

Belgium, France, Germany, Netherlands, and Luxembourg (Continental European countries); Denmark, Finland, Sweden, and Ireland (Northern European countries); Cyprus, Greece, Italy, Spain, and Portugal (Southern European countries); Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovak Republic (Eastern European countries). Although the grouping is geography-based, it also reflects some common historical, cultural, and institutional features relevant to the aims of the analysis[6]. The analysis covers the years from 2006 to 2018, a period long enough to include a variety of policy changes implemented before the outburst of the labour market effects of the Covid-19 pandemic, which might be a confounding factor difficult to handle.

EU-SILC data provides a rich set of variables that can be used as metrics of labour market performance and as their drivers (see Table A4 in the Appendix). To the aims of this analysis, we consider the following set of labour market outcomes at the demographic group level: labour force participation rate, employment rate, weekly hours worked, employment status (self-employed, employee), type of contract (permanent/temporary and part-time/full-time), and hourly remuneration (real hourly wage and real hourly earnings). The set of individual/household characteristics used as drivers and controls include self-reported health status, marital (married on consensual union) status, migration, whether the individual is the respondent of the survey, household disposable equivalent income, household size, household dependency ratio, total time spent in caregiving activities by the household members. As all variables are defined as shares or averages at the demographic group level and to guarantee their reliability, we restrict the sample used for the whole empirical analysis to those demographic groups in which we observe at least 10 individuals. To control for country-specific structural features and for the macroeconomic cycle, we also include country-level controls for the unemployment rate, per capita GDP, and employment shares in the secondary and tertiary sectors. Table 2 provides a descriptive picture of labour market outcomes in the total sample and in subsamples identified by the individual characteristics that define the demographic groups.

[6] The group of the Northern European countries is probably the most heterogeneous due to the presence of Ireland, where the characteristics and the generosity of family policies differ substantially from the other three Nordic countries. Nonetheless, as the measurement of the child penalty (and of the moderating effects of policies) is carried out by means of a regression approach, the allocation of Ireland into one of the macro-groups was needed to keep the number of observations adequate. As all regressions include time and country fixed effects, the otherwise unobserved specificities of single countries are accounted for in the estimation of the child penalty.

Table 2. Descriptive labour market outcomes by gender, education and age (23 EU-countries, 2006-2018)

	lab force	employed	hours	full time	permanent	self employed	wage h	earn h
Total Sample	0.766	0.679	48.022	0.862	0.899	0.138	10.695	12.125
Gender								
Men	0.841	0.754	52.459	0.951	0.914	0.175	11.370	13.246
Women	0.688	0.601	43.009	0.765	0.882	0.099	9.939	10.856
Education								
Low	0.608	0.466	48.122	0.830	0.836	0.196	6.869	7.512
Medium	0.771	0.673	48.932	0.849	0.897	0.130	8.479	9.708
High	0.838	0.790	47.062	0.886	0.922	0.128	13.704	15.572
Age								
20-29	0.735	0.608	46.954	0.851	0.802	0.064	7.902	8.480
30-39	0.870	0.776	47.930	0.879	0.889	0.111	9.650	10.666
40-49	0.875	0.795	48.340	0.863	0.926	0.144	10.923	12.530
50-59	0.829	0.744	49.067	0.870	0.942	0.179	13.230	14.945
60-	0.182	0.162	46.757	0.813	0.937	0.250	12.240	14.878

Source: Own elaborations on EU-SILC data

Notes: The unit of observation is a country/year-specific demographic group defined by gender/age/education/number of children. For the variables' definition, see Table A4 in the Appendix.

The first interesting piece of information relevant to our purposes regards the gender gaps that, as expected, are large in all labour market metrics. However, the significant heterogeneity also existing across education and age groups confirms the importance of controlling for such characteristics to avoid biased results and interpretations of gender disparities. The demographic groups with low levels of education are clearly in a weaker labour market position in terms of labour market performance and remunerations; they also exhibit higher self-employment rates, probably related to small businesses in specific sectors (such as farming or trade). The distribution of labour market participation and employment is also unequal by age group with the youngest and the oldest classes exhibiting, as expected, lower levels; average hourly wage and earnings increase with age, reflecting the role of experience and seniority.

In Table 3 we provide a description of the gender gaps in the labour market indicators used, in the rest of the analysis, in association with parenthood. Men have on average a 15.2% positive gap in terms of labour force participation rates and employment compared to women; they work 9.5 hours more per week and significantly more on a full-time (18.5%) and permanent (3.1%) basis and as self-employed (7.6%). The unadjusted gender wage and earning gaps are also significant (about 14% and 22%, respectively). Those gender gaps calculated for the whole sample exhibit a remarkable heterogeneity across subsamples describing different household compositions related to children. The presence and number of children exacerbate all labour market gender disparities.

For the demographic groups of individuals with no children (aged 0-15) gender gaps still exist and are of a non-negligible size; however, they increase dramatically with parenthood. The presence of one child is associated with a doubling and (more than) tripling gender gap in labour force participation and employment, respectively. With the presence of additional children, the gender gaps climb to 27% and 28%, respectively. A similar pattern emerges for all remaining indicators, highlighting that the asymmetry in the parenthood penalty, despite not being the sole driver of the remaining gender gap in the EU, accounts for a significant share of it.

Table 3. Descriptive gender gaps in labour market outcomes for parents (23 EU-countries, 2006-2018)

	lab force	employed	hours	full time	permanent	self employed	wage h	earn h
Total sample	0.152	0.152	9.449	0.185	0.031	0.076	1.431	2.390
No children	0.080	0.056	7.580	0.133	0.020	0.071	0.656	2.205
One child	0.165	0.191	10.536	0.211	0.037	0.075	1.746	2.110
Two children or more	0.269	0.279	12.190	0.256	0.045	0.086	2.599	3.048

Source: Own elaborations on EU-SILC data

Notes: The gender gaps are computed as male/female differences. The unit of observation is a country/year-specific demographic group defined by gender/age/education/number of children. For the variables' definition, see Table A4 in the Appendix.

The aggregate descriptive evidence presented so far hides remarkable heterogeneity across countries, time and additional individual and household characteristics. To account for all those factors simultaneously, we use an empirical model that enables estimating an adjusted gender gap in various labour market aspects. The baseline empirical model read as follows:

$$Y^{z}_{g,k,t} = \alpha(fem)_{g,k,t} + \beta_e(ed_e)_{g,k,t} + \delta_j\left(age_j\right)_{g,k,t} + \varphi_c(child_c)_{g,k,t} + \gamma_i\,(D'_i)_{g,k,t} + \kappa_h(H'_h)_{g,k,t} + \omega_m(M'_m)_{k,t} + \eta_k + \tau_t + \varepsilon_{g,k,t} \quad (2)$$

Where $Y^{z}_{g,k,t}$ describes the set of z labour market outcome variables of interest that includes labour force participation, employment, hours worked, full-time employment, permanent employment, self-employment, hourly wage, and hourly earnings for the demographic group g, in country k and year t. Our coefficient of interest is α, which can be interpreted as the adjusted gender gap in the outcome variable, once all characteristics observable at the demographic group level, country- and time-specific effects are controlled for. Coefficients β_e and δ_j measure heterogeneity across $e-1$ education levels (the reference group is low education) and $j-1$ age groups (the reference group is the class 20-29 years-old). φ_c measures heterogeneity of labour market outcomes in relation to

the presence of one or two children or more (the reference demographic group is the one with no children). D_i' denotes a vector of i addition individual characteristics computed as shares or average at the demographic group level (being foreign-born, health status, marital status, being the survey questionnaire respondent). H_h' stands for a vector of h household characteristics (equivalised income, size, dependency ratio and total care workload) and M_m' for a vector of m macro-level controls (unemployment rate, per capita real GDP, employment shares of the secondary and tertiary sectors) common to all demographic groups of the same country and in the same year. η_c and τ_t are two sets of dummy variables controlling for unobserved country- and year-specific shocks and $\varepsilon_{g,c,t}$is the usual error term.

Equation 2 is estimated by OLS; this is preferred to a panel estimation (at the demographic group level) for two main reasons: first, it allows to highlighting of the gender gap (estimated coefficient α) which, being gender a time-invariant characteristic of the demographic group, would be not possible in FE panel approach; second, it allows taking advantage of both longitudinal and cross-section variability, which is particularly important in a later stage of the analysis on the moderating effects of policies on the relation between parenthood and labour market outcomes. Despite giving up the advantages of a panel estimation, we are confident that the large number of controls for individual, household, and macroeconomic factors, along with country- and time-specific dummies, help in providing an accurate estimate of the gender gap. Regressions are weighted by the population share of each demographic group in the country/year, and standard errors are clustered at country/year level.

As regards the effects of the presence (or not) of children, it is important to underline and emphasise that our results should be interpreted in terms of association, not causation. We are indeed aware that labour market participation and fertility decisions (or intentions) are intertwined and that a very extensive literature has developed an array of methods to investigate the link casually (see Bloom et al., 2009; Klemp and Weisdorf, 2019; Clarke, 2018; Angrist et al., 2010; Angrist and Evans, 1998; Aaronson et al., 2021; Rosenzweig and Wolpin, 1980; Vere, 2011). However, given the characteristics of our dataset and the aims of the analysis, they are not applicable here. As already explained, we prioritized a large country coverage of the analysis (over country-level case studies), as our principal aim is to investigate the moderating impact of policies on asymmetries in labour outcomes related to parenthood.

For this purpose, the first step is to measure how the gender gap changes in the presence (or not) of children). One obvious way to do that would be to add an interaction term between the variables fem and $child$ in equation 2. However, to assess the moderating effects of policies in the following step pf the analysis (section 4), we would need to add a triple interaction term (*fem*child*policy*), which would render the interpretation of results problematic. To avoid this unnecessary complexity,

we estimate equation (2) by subsamples of demographic groups identified by the presence and number of children: the comparison of the significance and magnitude of the gender coefficients across samples highlights the heterogeneity of the gender gap in labour market features related to parenthood. The approach also allows for alleviating the endogeneity issue previously mentioned, even though the existence of a self-selection mechanism into subsamples cannot be excluded. Once again, it is worth remarking that, for our purposes, the focus is on the association between parenthood and labour market outcomes, not on the identification of a causal link.

The estimation of equation 2 is hence replicated for the three subsamples c (with c = 1, 2, 3) of demographic groups of individuals with no children (c=1), one child (c=2) and two or more children (c=3), respectively:

$$Y^{z}_{g,k,t} = \alpha_c(fem)_{g,k,t} + \beta_e(ed_e)_{g,k,t} + \delta_j\left(age_j\right)_{g,k,t} + \gamma_i\,(D'_i)_{g,k,t} + \kappa_h(H'_h)_{g,k,t} + \omega_m(M'_m)_{k,t} + \eta_k + \tau_t + \varepsilon_{g,k,t}$$

for c=1, no children (3.1)

for c=2, one child (3.2)

for c=3, two children or more (3.3)

The comparison between the estimated coefficients α_1, α_2, and α_3 for the three subsamples illustrate the heterogeneity of the gender gap in labour market features related to parenthood (α_2, and α_3) vis-à-vis the gender gap in the absence of children (α_1).

To complete the descriptive picture, we also estimate the same three equations (equation 3.1, 3.2 and 3.3) for subsamples of demographic groups identified by geographical macro-areas (Southern, Continental, Northern, and Central-Eastern countries) and by a set of household characteristics. The threshold value for the splitting of the sample (high/low levels of a given characteristic) is the median value of the distribution of the demographic group for the variable in the same country and year. The following household characteristics have been considered in the split sample analysis: labour force participation rate; elderly dependency rate; single parent household; disposable equivalised income; and gender of the breadwinner.

3.2. Gender gaps and parenthood across the EU

Table 4 reports the estimates of equation (2) over the whole sample (23 EU countries, years 2006-2018), using labour force participation as the dependent variable. Column 1 in Table 4 illustrates the results for the whole sample of demographic groups considered. Before focusing on the gender gap and the effects of parenthood, it is worth noticing that the other variables included in the model indicate that, as expected, labour force participation increases with higher levels of education, age (except for the older age class - over 60 years old), and better health status. Conversely, labour market participation decreases with increasing household size and dependency ratio, as well as with the increasing burden of domestic caregiving tasks in the household. This confirms that the presence of inactive household members poses significant constraints even once some crucial household characteristics are controlled for.

The coefficient of the gender dummy indicates that the adjusted gender gap in labour market participation rate amounts to 10%, which is in line with the Eurostat and OECD figures for the same period. The coefficients of the dummy variables describing the presence of children reveal that demographic groups of parents have a higher labour force participation rate compared to those with no children. The explanation of this seemingly counterintuitive result is provided by the evidence presented in columns (2) and (3), which report the estimates of equation (2) by subsamples of demographic groups of men and women. While parenthood implies a fatherhood premium, a parenthood penalty emerges for women who, compared to childless women, suffer a decrease in labour market participation by 3% in the presence of one child and 14% in the presence of two children or more, respectively. This gender asymmetry in the association of children and labour market outcomes is not new and is consistent with a large body of empirical evidence (Koslowski, 2011; Bygren and Gähler, 2012; Gash, 2009; Budig and Misun, 2016). In the estimates of the empirical model by gender subsamples in columns (2) and (3), some additional information on existing gender asymmetries in various social, economic, and household domains emerge: (i) the attainment of tertiary education has a much stronger effect in favouring labour market participation for women compared to men; (ii) being born in a country different from the one of residence is only significant (and positive) for men; (iii) household burdens (as described by the number of members, dependency ratio and domestic/caregiving burden) have a clear gendered nature, as they impose constraint only (or significantly more) on women.

Table 4. Baseline estimates: gender gap in labour force participation and parenthood

VARIABLES	(1) total	(2) male	(3) female	(4) no_child	(5) one_child	(6) two_child_more
female	-0.103***			-0.078***	-0.158***	-0.199***
	(0.003)			(0.003)	(0.006)	(0.007)
one_child	0.082***	0.051***	-0.030***			
	(0.008)	(0.008)	(0.011)			
two_child_more	0.113***	0.038**	-0.139***			
	(0.020)	(0.018)	(0.025)			
sec_educ	0.051***	0.038***	0.052***	0.051***	0.066***	0.067***
	(0.005)	(0.005)	(0.006)	(0.005)	(0.006)	(0.009)
ter_educ	0.119***	0.059***	0.141***	0.133***	0.103***	0.122***
	(0.009)	(0.009)	(0.012)	(0.010)	(0.009)	(0.012)
age30_39	0.197***	0.166***	0.184***	0.232***	0.093***	0.125***
	(0.006)	(0.007)	(0.007)	(0.009)	(0.006)	(0.007)
age40_49	0.220***	0.164***	0.216***	0.232***	0.102***	0.141***
	(0.006)	(0.008)	(0.009)	(0.010)	(0.008)	(0.008)
age50_59	0.131***	0.107***	0.089***	0.140***	0.062***	0.097***
	(0.009)	(0.010)	(0.013)	(0.012)	(0.008)	(0.011)
age60_	-0.488***	-0.545***	-0.532***	-0.480***	-0.344***	
	(0.011)	(0.013)	(0.013)	(0.015)	(0.032)	
health	-0.034***	-0.063***	-0.038***	-0.049***	-0.038***	-0.008
	(0.006)	(0.006)	(0.008)	(0.006)	(0.008)	(0.011)
migrant	0.001	0.045**	-0.021	-0.052***	0.018	-0.039*
	(0.017)	(0.019)	(0.018)	(0.018)	(0.017)	(0.022)
partner_house	0.001	0.028***	0.017**	-0.001	0.019	0.040***
	(0.004)	(0.005)	(0.008)	(0.005)	(0.012)	(0.015)
respond	-0.016	0.061***	0.010	0.041***	0.038**	-0.152***
	(0.012)	(0.015)	(0.023)	(0.011)	(0.016)	(0.020)
rel_disp_eq_income	0.015	0.024**	0.032**	0.015	-0.016*	-0.004
	(0.010)	(0.009)	(0.014)	(0.011)	(0.009)	(0.011)
nhousehold	-0.027***	-0.015***	-0.033***	-0.006	0.010	-0.026***
	(0.004)	(0.004)	(0.006)	(0.006)	(0.007)	(0.006)
household_d	-0.082***	0.023	0.090***	0.025	0.109***	-0.111***
	(0.020)	(0.017)	(0.024)	(0.025)	(0.036)	(0.020)
n_care_hh	-0.011***	-0.002**	-0.017***	-0.005***	-0.025***	-0.014***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)
ur	-0.000	-0.001**	0.001	-0.001**	0.001	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
lr_pc_gdp	-0.026	-0.018	-0.028	-0.010	-0.052	-0.005
	(0.017)	(0.015)	(0.026)	(0.015)	(0.033)	(0.030)
s_emp_sec	-0.015	-0.026	-0.313	-0.142	-0.181	0.157
	(0.198)	(0.190)	(0.286)	(0.177)	(0.278)	(0.343)
s_emp_ter	-0.148	-0.201	-0.446***	-0.190	-0.308	-0.150
	(0.130)	(0.149)	(0.170)	(0.129)	(0.197)	(0.270)
Constant	1.038***	1.029***	1.194***	0.924***	1.307***	1.074***
	(0.146)	(0.176)	(0.184)	(0.146)	(0.220)	(0.297)
Observations	17,575	8,929	8,646	7,871	5,359	4,345
R-squared	0.942	0.967	0.940	0.957	0.631	0.747

Source: Own elaborations on EU-SILC data

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Pooled sample of demographic groups for 23 EU-countries from 2006 to 2018. For the variables' definition, see Table A4 in the Appendix.

Columns (4), (5) and (6) report the results of the estimation of equations 3.1-3.3 and provide another perspective to look at the asymmetry in the effects of parenthood across genders. The comparison of the magnitude of the gender dummy across the three subsamples reveals that the gender gap of 10% estimated for the whole sample (column 1) hides a dramatic heterogeneity. For demographic groups of non-parents, the gap amounts to 7.8%, but it doubles for parents of one child (15.8%) and climbs to 19.9% in association with two or more children. This indicates that parenthood, despite far from being the only source of the gender labour force participation gap, still accounts for a significant part of it.

The evidence just described for labour force participation is largely confirmed for employment (Table 5) concerning the control variables. The effects of parenthood are instead magnified. The presence of children is associated with a motherhood penalty in employment of 6.8% in the case of one child and 22.5% in the case of two children or more; the fatherhood premium is also significantly higher in terms of employment compared to labour force participation. Columns (4), (5) and (6) also highlight that gender gaps in employment depend on parenthood even more than gender gaps in labour market participation: the gap amounts to 5.7% for childless women and climbs to 17.8% and 21.5% in for mothers of one or more children, respectively.

Table 6 summarizes the results obtained using as the dependent variable of equations 2 and 3.1-3.3 additional labour market outcomes and supplies information limited to the magnitude of the gender gap. Shorter working hours and more intensive resort to part-time employment are well-known components of gender disparities in the labour market (Weeden et al., 2016; Landivar, 2015; Tverdostup, 2021; Hegewish and Lacarte, 2019). Panel (1) indicates that employed women work, on average, 6.2 hours less per week than men; however, the disparity is “only” 5.5 for childless women and increases to 10 and 11 hours for mothers of one child or more, respectively. Similarly, our results accurately depict gender inequalities in terms of full-time employment and the way part-time contractual options serve the purpose of reconciling work and family life asymmetrically (see Beham et al., 2019; Lyonette, 2015; Pech, 2021).

Table 5. Baseline estimates: gender gap in employment and parenthood

VARIABLES	(1) total	(2) male	(3) female	(4) no_child	(5) one_child	(6) two_child_more
female	-0.093***			-0.057***	-0.178***	-0.215***
	(0.003)			(0.003)	(0.006)	(0.007)
one_child	0.095***	0.081***	-0.068***			
	(0.008)	(0.009)	(0.010)			
two_child_more	0.124***	0.071***	-0.225***			
	(0.020)	(0.020)	(0.024)			
sec_educ	0.040***	0.033***	0.040***	0.035***	0.072***	0.080***
	(0.005)	(0.005)	(0.006)	(0.005)	(0.008)	(0.010)
ter_educ	0.121***	0.065***	0.144***	0.120***	0.131***	0.148***
	(0.009)	(0.010)	(0.011)	(0.010)	(0.011)	(0.013)
age30_39	0.185***	0.140***	0.180***	0.190***	0.114***	0.159***
	(0.006)	(0.007)	(0.006)	(0.009)	(0.006)	(0.007)
age40_49	0.223***	0.140***	0.233***	0.203***	0.143***	0.185***
	(0.007)	(0.008)	(0.009)	(0.011)	(0.007)	(0.009)
age50_59	0.128***	0.075***	0.093***	0.104***	0.090***	0.123***
	(0.009)	(0.010)	(0.013)	(0.013)	(0.008)	(0.010)
age60_	-0.428***	-0.512***	-0.481***	-0.461***	-0.313***	
	(0.011)	(0.014)	(0.013)	(0.016)	(0.031)	
health	-0.019***	-0.056***	-0.017*	-0.038***	-0.048***	-0.022*
	(0.007)	(0.007)	(0.009)	(0.008)	(0.008)	(0.012)
migrant	-0.045**	-0.010	-0.076***	-0.072***	-0.049***	-0.095***
	(0.019)	(0.021)	(0.018)	(0.020)	(0.018)	(0.024)
partner_house	0.011***	0.058***	0.021***	0.021***	0.034***	0.041***
	(0.004)	(0.005)	(0.007)	(0.005)	(0.010)	(0.013)
respond	-0.014	0.088***	-0.013	0.070***	0.054***	-0.123***
	(0.012)	(0.017)	(0.021)	(0.011)	(0.016)	(0.019)
rel_disp_eq_income	0.080***	0.083***	0.098***	0.084***	0.043***	0.057***
	(0.012)	(0.011)	(0.015)	(0.013)	(0.010)	(0.012)
nhousehold	-0.036***	-0.026***	-0.040***	-0.021***	-0.007	-0.057***
	(0.004)	(0.004)	(0.005)	(0.006)	(0.007)	(0.007)
household_d	-0.047**	0.043**	0.198***	0.093***	0.107***	-0.112***
	(0.021)	(0.020)	(0.023)	(0.027)	(0.038)	(0.019)
n_care_hh	-0.010***	-0.005***	-0.016***	-0.006***	-0.023***	-0.013***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
ur	-0.005***	-0.006***	-0.004***	-0.005***	-0.007***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
lr_pc_gdp	-0.008	0.031	-0.036*	0.009	-0.039	-0.015
	(0.017)	(0.019)	(0.021)	(0.015)	(0.031)	(0.033)
s_emp_sec	0.185	0.133	-0.089	0.050	-0.269	0.323
	(0.209)	(0.194)	(0.261)	(0.193)	(0.306)	(0.324)
s_emp_ter	-0.165	-0.340**	-0.391**	-0.225	-0.683***	-0.443
	(0.166)	(0.165)	(0.185)	(0.167)	(0.230)	(0.274)
Constant	0.778***	0.692***	1.031***	0.682***	1.482***	1.360***
	(0.168)	(0.183)	(0.191)	(0.171)	(0.248)	(0.286)
Observations	17,575	8,929	8,646	7,871	5,359	4,345
R-squared	0.927	0.955	0.934	0.944	0.716	0.800

Source: Own elaborations on EU-SILC data

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Pooled sample of demographic groups for 23 EU-countries from 2006 to 2018. For the variables' definition, see Table A4 in the Appendix.

Table 6. Gender gap in other labour market outcomes and parenthood (EU 23 countries)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1): hours				
female	-6.195***	-5.537***	-10.171***	-11.094***
	(0.379)	(0.406)	(0.840)	(0.990)
(2) Full-time				
female	-0.100***	-0.087***	-0.185***	-0.244***
	(0.009)	(0.008)	(0.016)	(0.020)
(3) Permanent				
female	-0.000	-0.002	-0.018***	-0.021***
	(0.003)	(0.003)	(0.004)	(0.004)
(4) Self-employment				
female	-0.063***	-0.060***	-0.066***	-0.067***
	(0.003)	(0.003)	(0.004)	(0.004)
(5) Hourly wage				
female	-0.075***	-0.053**	-0.150***	-0.238***
	(0.018)	(0.021)	(0.046)	(0.051)
(6) Hourly earnings				
female	-0.098***	-0.078***	-0.141***	-0.198***
	(0.017)	(0.020)	(0.037)	(0.038)

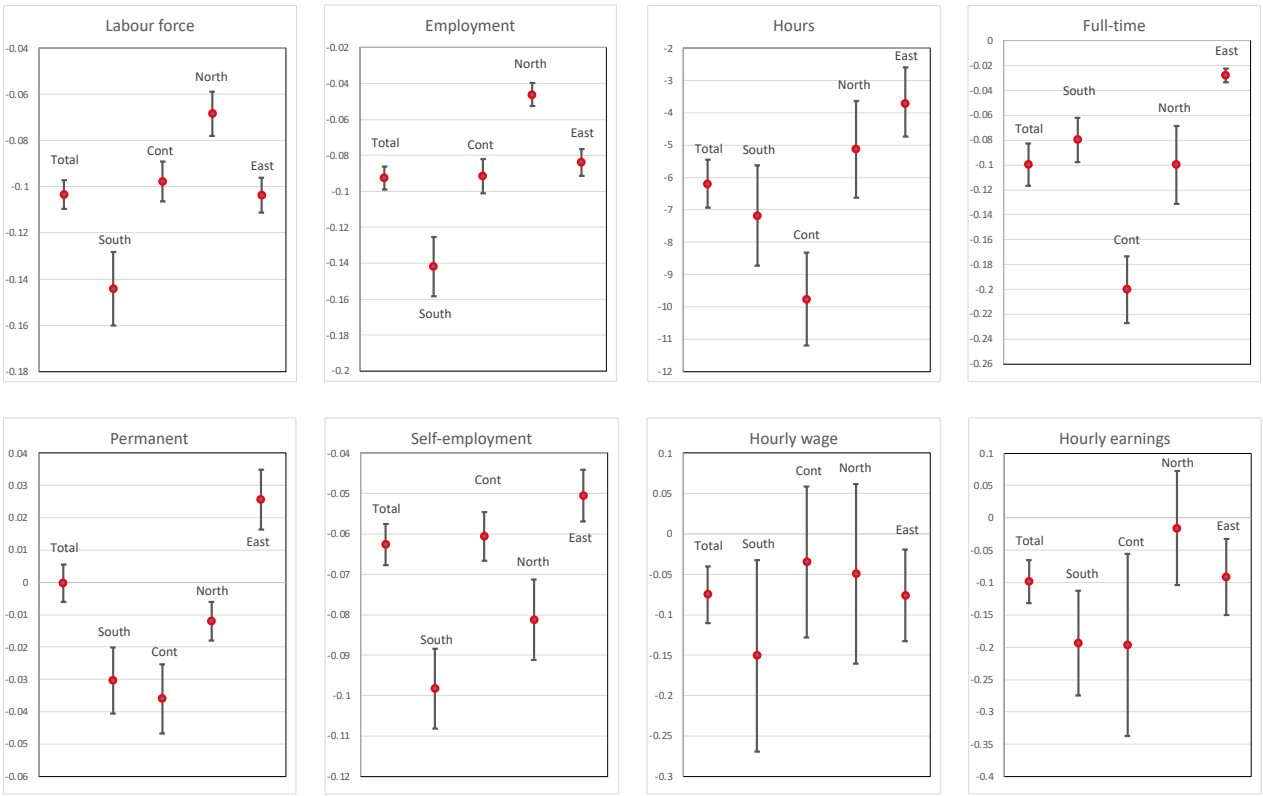
Source: Own elaborations on EU-SILC data

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Pooled sample of demographic groups for 23 EU-countries from 2006 to 2018. Complete estimates are available upon request.

The full-time employment gap amounts to 8.7% for childless women indicating that, besides childcare, part-time positions are a crucial mean to cope with other asymmetric work burdens (as highlighted in the previous section). Panel (3) of Table 6 suggests that parenthood is the only factor preventing gender-equal access to permanent employment, as the gender gap is significant only for groups with children (2% lower permanent employment rate for women). Self-employment, especially if without employees, has been often seen as offering a potential solution to work-family conflict, due to greater flexibility and control over the timing and conditions of work (Bari et al., 2021; Goldina and Katz, 2011). As such, encouraging women's self-employment and reducing the gender gap in participation have become policy priorities at the EU level, presented as a way to improve both labour market participation of women and gender equality more broadly (European Commission, 2015; Fackelmann and De Concini, 2020; Tervo and Haapanen, 2010; Georgellis and Wall, 2005). Panel (4) of Table 6 suggests that a gender gap in self-employment exists (around 6%); however, parenthood is not associated with a significant change in the disparity. This is not the case for hourly wage and earnings (which include returns from self-employment). Parenthood emerges as a significant driver of the adjusted gender wage gap, as in the presence of one or more children the gap is three times higher (15%) and almost five times higher (24%), respectively, compared to the gender wage disparities between non-parents (5.3%). Although on a smaller scale, the same pattern is confirmed if we consider return from dependent and self-employment jointly.

Figure 5 illustrates the heterogeneity in gender gaps in various labour market outcomes across four groups of countries (Southern, Continental, Northern, and Central-Eastern countries).

Figure 5. Gender labour market gaps in macro-groups



Source: Own elaborations on EU-SILC data
Notes: The dots are the coefficients obtained using weighted OLS (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Pooled sample of demographic groups for EU countries from 2006 to 2018. The coefficients (with statistical significance level) and the standard errors of the female dummy are reported in Tables 5 and A5.
Total (total sample): 23 EU countries; South (Southern European countries): Cyprus, Greece, Italy, Spain, and Portugal; Cont (Continental European countries): Austria, Belgium, France, Germany, Netherlands, and Luxembourg; North (Northern European countries): Denmark, Finland, Sweden, and Ireland; East (Eastern European countries): Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovak Republic.

Despite being based on geographical proximity, the classification reflects also institutional similarities in historical-political developments. The diagrams (see Table A5 for the point estimates and statistical significance of the coefficients) confirm well-known facts in the geography of gender inequality in Europe; Southern EU countries exhibit the largest gaps in labour force participation, employment, permanent employment, self-employment, and hourly wage. As a result of low female employment rates and of a relatively less intensive diffusion of part-time contracts, gender gaps in hours worked and full-time employment are instead aligned to the average levels. Conversely, in Northern EU countries gender differences are of a lower magnitude in basically all labour marker

domains, and continental EU countries sit in an intermediate position. The highest gaps emerging in terms of full-time employment, permanent employment and hours worked are consistent with the relatively low gender gaps in employment facilitated by the extensive use of flexible contractual arrangements. Eastern EU countries stand in different relative positions depending on the specific labour market indicator considered. They have average gender gaps in employment, labour force participation and labour remunerations; however, they exhibit low gender disparities in hours worked, full-time and permanent employment and self-employment.

Figure 6 (and Table A5 in the Appendix) provides a picture of the association between parenthood and labour market gender gaps in the four country groups. The two diagrams in the top panel of Figure 6 indicate that parenthood exacerbates gender gaps in labour force participation and employment in all macro-groups; however, the magnitude of the gender gap and the jump due to the presence of children is more pronounced in Southern Europe. Similarly, the wage gap is in all groups higher in the presence of children and, in the case of the Continental and the Northern EU countries, parenthood emerges as the sole driver of wage inequality. Results for the gender gap in hours worked and full-time employment highlight that the flexibility associated with such contracts is more intensively used in continental Europe countries to reconcile participation in the labour market and asymmetric childcare workloads charged on women. Lastly, parenthood seems not to be blamed, in any region of the EU, for the existing gender disparities in permanent and self-employment.

Figure 6. Gender labour market gaps and parenthood in macro-groups

Source: Own elaborations on EU-SILC data

Notes: The bars are the coefficients of the female dummy of equations 31.-3.3, obtained using weighted OLS (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Pooled sample of demographic groups for EU countries from 2006 to 2018. The coefficients (with statistical significance level) and the standard errors of the female dummy are reported in Table A5. Total (total sample): 23 EU countries; South (Southern European countries): Cyprus, Greece, Italy, Spain, and Portugal; Cont (Continental European countries): Austria, Belgium, France, Germany, Netherlands, and Luxembourg; North (Northern European countries): Denmark, Finland, Sweden, and Ireland; East (Eastern European countries): Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovak Republic.

3.3. Gender gaps and parenthood across household types

In this section, we describe the heterogeneity in labour market gender gaps associated with parenthood in households with different characteristics. Figure 7 and Table A6 report the results of the gender dummy coefficients estimated using equations 3.1-3.3 for subsamples of demographic groups with a low/high level of the following household characteristics: household labour force participation rate, elderly dependency rate, single-parent household, disposable equivalised income, and gender of the breadwinner. The threshold for the allocation of the demographic groups into low/high subsample is based on their position on the country-year distribution (below and above the median) of the specific variable.

The first piece of information we can draw from Figure 7 is that in households with low labour force participation, the gender gap in activity rates and employment is higher (top-left panels). This probably indicates that the allocation into low/high subsamples is driven by the labour market position of female household components and, particularly, of mothers. Interestingly, once the analysis is restricted to employed only, there are no significant differences in gender gaps in hours worked: this suggests that the presence of household members not in the labour market does not help alleviate the motherhood penalty in labour supply at the intensive margin. However, it exacerbates the gap in full-time employment in the presence of two children or more. Conversely, gender gaps in permanent employment and hourly wage are clearly related to the household activity rate (see columns 5 and 7 of Table A6). In low labour force participation households, the gender gap is not statistically different from zero; higher household participation rates, on the contrary, are associated with larger gender differences in hourly wages, especially for parents. This suggests that, although the presence of non-active household members does not enable higher female and mothers' employment or labour supply, it helps attain more equal outcomes (in stable employment and remunerations) within employment.

The second household characteristic considered (elderly dependency ratio) helps shed light on the way elderly household components affect parenthood gender gaps. Outcomes (second row of Figure 7 and panel 2 of Table A6) suggest that the two samples do not differ significantly in terms of gender gaps in labour supply at the extensive margin and employment. Conversely, the presence of elderly household members exacerbates the motherhood gap in hours worked, full-time and self-employment; this suggests that they impose an additional workload disproportionately burdened on women. However, employed mothers in households with more elderly people achieve levels of permanent employment and pay comparable to their male counterparts.

Figure 7. Gender labour market gaps and parenthood by household type

Source: Own elaborations on EU-SILC data

Notes: See Figure 5. The coefficients (with statistical significance level) and the standard errors are reported in Table A6.

Demographic groups with a more intensive presence of single parents exhibit smaller gender gaps in labour force participation and employment, indicating that the economic consequence of the absence of a partner imposes a higher labour market attachment for women and mothers. However, single parenting exacerbates the gender gap in basically all other outcomes (particularly full-time employment, permanent employment, and wages). This suggests that, despite being obliged for economic reasons to participate in the labour market, childcare tasks impose tight constraints on single mothers and probably force them to accept lower-quality jobs.

The analysis of gender gaps in subsamples of low/high-income households, despite being the economic conditions endogenous to the labour market fate and performance of female members, offer interesting descriptive insights. While gender gaps in the absence of children are substantially equal across subsamples, gender disparities associated with parenthood are systematically higher for low-income households. This suggests that in such contexts, possibly for social and cultural reasons associated with economic conditions, the child-related workload and constraints within the household are even more disproportionally placed on women.

Lastly, we look at the role of the gender of the household breadwinner, as a proxy of the asymmetry in power related to unbalanced economic positions. As expected, a male breadwinner is associated with higher gender disparities, both in the presence and in the absence of children, in employment and labour supply. Surprisingly, gender inequality in job characteristics (especially permanent employment and wages) is instead lower, indicating that the relatively fewer women who enter the labour market manage to attain positions closer to their male counterparts.

4. Policies, reforms, and gender disparities in parenthood penalty across the EU

4.1. Data and methods

In this section, we use data from various sources to assemble a dataset of variables that describe institutional and policy settings related to family and parenthood, with the aim of assessing their impact on parenthood penalty in a set of labour market outcomes. The empirical literature has devoted extensive attention to highlight if and to what extent the size of the child penalty depends on the architecture of parental leave and childcare systems and on the model to which the division of labour within the family is inspired (see Waldfogel, 1998a, 1998b and 2001; Haan and Wrohlich, 2009). Parental leave policies positively impact women's employment continuity and careers only when they guarantee job security (Hegewisch and Gornick, 2011) and when the leave is paid (De

Henau et al., 2007). Its length should also be appropriate: an excessive duration keeps mothers out of employment for too long (Pettit and Hook, 2005; Jaumotte, 2003); in contrast, if it is too short, leave increases the risk of women dropping out of the labour market altogether (Keck and Saraceno, 2013). Cross-country comparisons show that paid maternity and family leave provisions of up to one year increase the likelihood of employment shortly after childbirth and have either positive or zero impacts on women's medium- and long-run employment and earnings (Rossin-Slater, 2018). Longer paid leave entitlements can negatively affect women's wages in the long term (Blau and Kahn, 2013) and for all skill levels (Olivetti and Petrongolo, 2017).

The impact of parental leave provisions is also found to depend crucially on the availability of complementary measures, particularly formal childcare and tax/benefit systems (OECD, 2007), especially for full-time employment (Pettit and Hook, 2009). Its importance is lower where part-time jobs are more widely available (Steiber and Haas, 2012; Havnes and Mogstad, 2009). The availability of places and opening hours of kindergartens (see Jaumotte, 2003), as well as positive attitudes towards formal childcare (Hegewisch and Gornick, 2011), also play a crucial role.

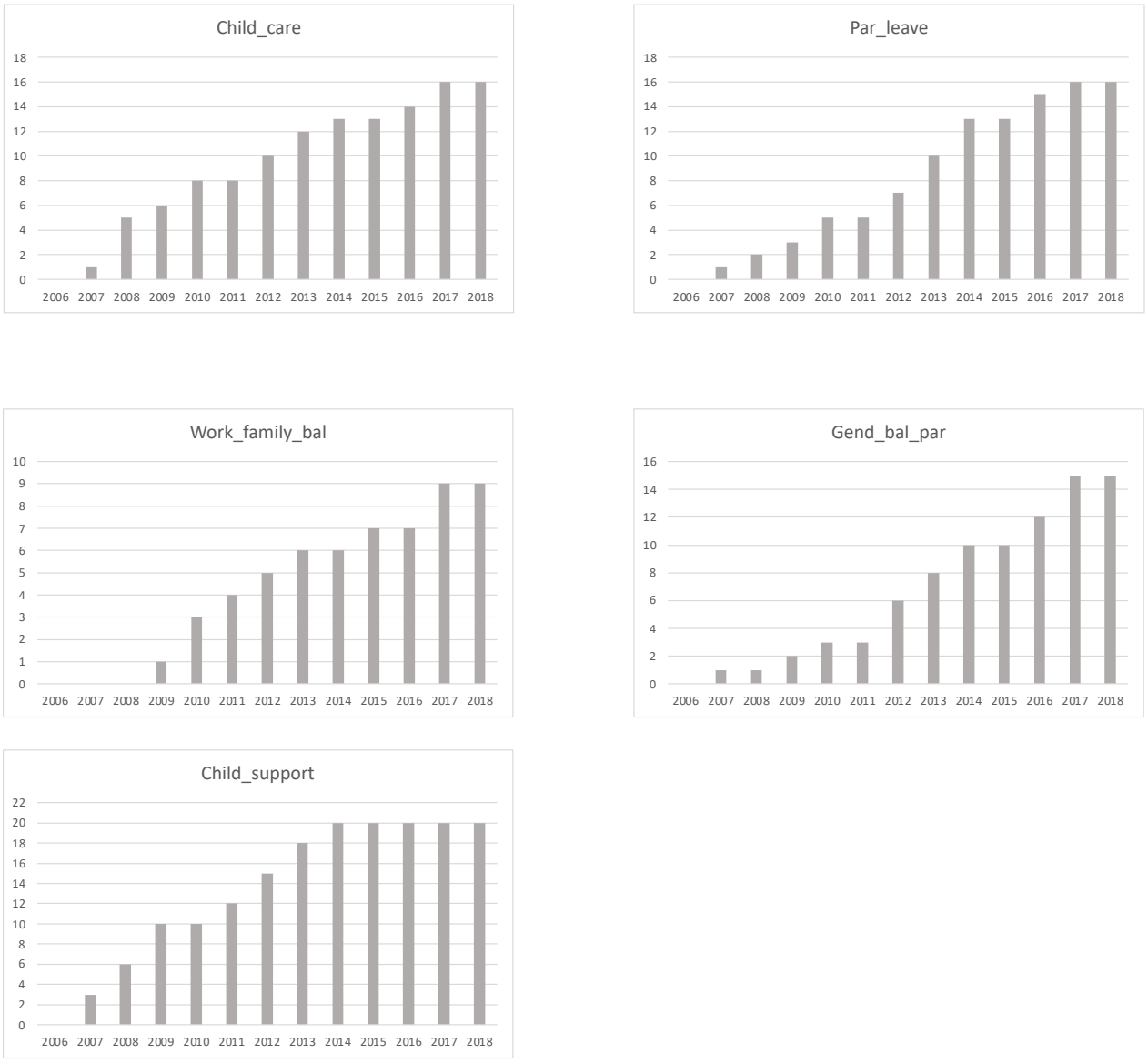
Asymmetries in parental leave and childcare provisions across genders still permeate virtually all societies and depends on a number of factors (Valentova et al., 2022). Even when fathers have leave opportunities like those of mothers, as in northern Europe, the gender gap in the take-up rate remains remarkable (see Thorsdottir, 2013, and Hegewisch and Gornick, 2011). Mandatory paternity leave is instead found to reduce gender imbalances in household tasks, with persistent effects after the leave period (Patnaik, 2019). Better availability of childcare facilities is only partially able to reduce the asymmetry; this translates into higher difficulties for mothers to re-enter employment and into higher part-time rates (Paull, 2008), when this is an option. Availability and fiscal incentives for part-time work may indeed represent better chances to return to employment (see Jaumotte, 2003) and the main channel through which the child penalty for mothers materializes (see Budig and England, 2001; Gangl and Ziefle, 2009; Davies and Pierre, 2005).

Obviously, due to data limitations, we cannot account for the complexity of the institutional and policy environment just sketched out. However, this limitation is offset by the large geographical coverage of our analysis and by the relatively high number of policy/reform variables we were able to assemble, which are suitable to describing the heterogeneity of policies across the EU and their most important evolution over time. To this aim, we use a combination of data sources.

The first one is the Labour Market Reform database (LABREF), provided by the DG for Employment, Social Affairs and Inclusion of the European Commission. LABREF is an open-access descriptive database that records labour market and welfare policy measures introduced by the EU Member States. It has become one of the standard references in the employment field, providing information

on adopted reform measures and their key design characteristics. To date, it provides information on the reform measures passed in the EU between 2000 and 2018.

Figure 8. Number of countries with a policy change, by year (cumulative)

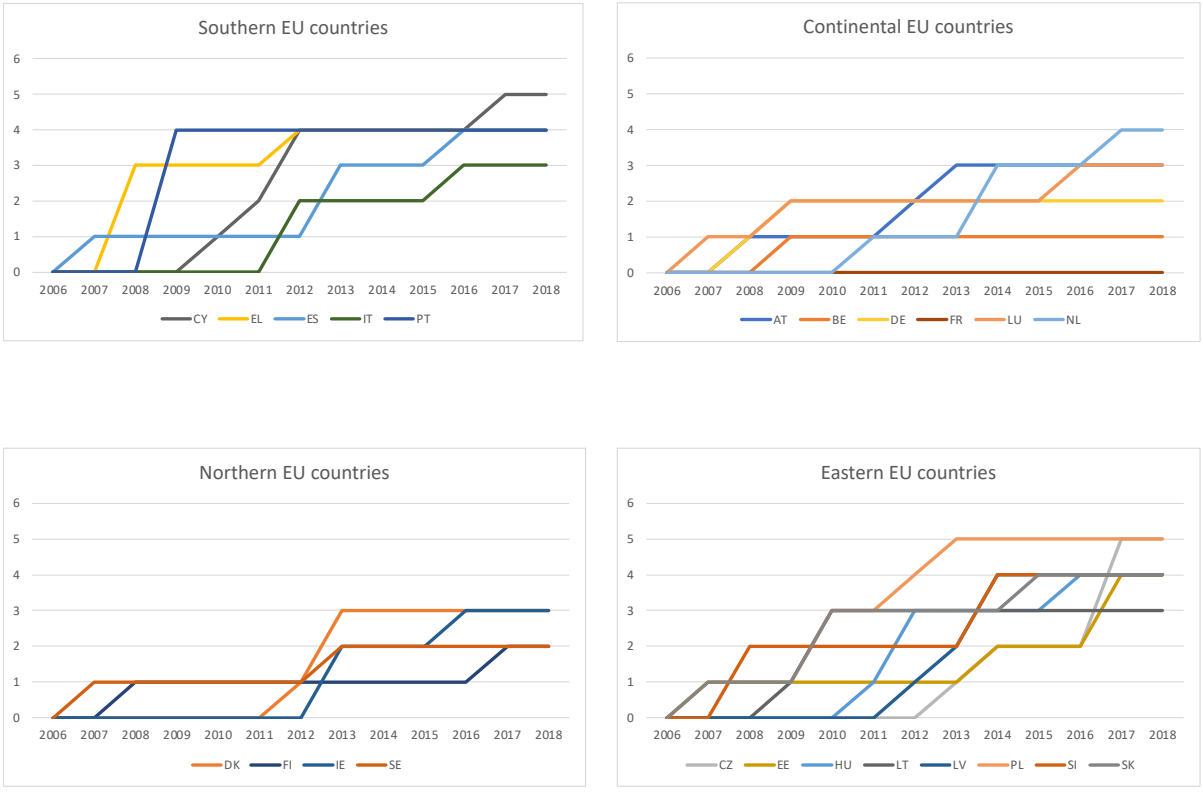


Source: Own elaborations on LABREF (Labour Market Reform) data
Notes: For the variables' definition, see Table A7 in the Appendix

For our 23 EU countries and over the period 2006-2018, we extracted all policy measures implemented in the policy fields "Family-related working-time organisation" and "Family-related benefits". This resulted in a total of 111 reforms implemented, which we classified into the following groups based on the detailed description available in the dataset: (i) Expanding access to childcare (Child_care); (ii) Expanding parental leave (Par_leave); (iii) Facilitating work-life balance

(Work_family_bal); (iv) Favouring gender-balanced parenting (gen_bal_par); (v) Increasing child support measures (Child_support). Each variable has been coded as binary variable equal to zero in the years before the first reform of each group was adopted and one in the year of adoption and afterwards. As reported in Table A7 in the Appendix, the number of countries that have adopted the various reforms ranges from 9 to 20, which is large enough to guarantee adequate variability for the econometric analysis. Figures 8 and 9 provide aggregate information on the pattern over time and across counties of the reforms adopted, respectively. Figure 8 reveals that measures related to child support (Child_support) were concentrated in the first half of the 2010s; conversely, changes in parental leave, work-life balance and gender-balanced parenting took place mainly in the last period observed; the first year in which in all other policy fields they were adopted more smoothly over time. Conversely, changes in parental leave, work-life balance and gender-balanced parenting took place mainly in the last part of the period observed. Childcare and work-life balanced reforms highlight smoother distributions over time, but the first measures aimed at facilitating reconciliation between paid work and family loads were only observed in 2009.

Figure 9. Number and timing of reforms, by country



Source: Own elaborations on Labref (Labour Market Reform) data
Notes: For the variables' definition, see Table A7 in the Appendix

Figure 9 highlights how, with some exceptions, the timing of the various reforms implemented by each country is distributed over time. The only exception is Cyprus, where all 4 reforms observed and included in the dataset were implemented in the same year (2009). This guarantees that different binary reform variables (pre- and post-reform) do not overlap; should this have been the case, the identification of which reform plays a role on the labour market effects of parenthood would have been problematic.

The second set of variables assembled pertains to parental leave measures and public expenditures in the fields of interest (see bottom panel of Table A7 in the Appendix). Information on the length and generosity of maternity and paternity leave is retrieved from the dataset of the International Network on Leave Policies & Research. The length of the leave is expressed in the number of weeks; the generosity of the leave allowance is coded from zero to three ((0: doesn't exist; 1: unpaid; 2: paid (<66% income); 3: well paid (>66% income)). Differences between maternity and paternity leave measures are reported in Table 7. For the 22 EU countries considered (data on Cyprus are not available), the length of maternity leave is on average around 19 weeks, as opposed to 2 weeks for fathers; the trend over time is inverted U-shaped for the maternity leave and (weakly) increasing for the paternity leave, respectively. If we look at differences across the country considered, we observe that Finland and Slovenia exhibit the smallest difference in the length of maternity and paternity leave (17.5 and 9 weeks in the most recent years in Finland; 15 and 13 weeks in the mid-2010s in Slovenia). Substantial differences also emerge, on average, concerning the generosity of the leave allowance, which is regularly higher for maternity leave. However, in most countries, the level of payment is substantially aligned, and the average difference depends on the strong asymmetry in some countries, namely Slovakia, Italy before 2013, Ireland, Czech Republic and Austria.

The public expenditures variables are two broad measures of the relative amount of public spending on family benefits and on early education and care (both as a % of GDP). In both cases, we observe an upward trend in the first years of the period considered, followed by a stabilisation around 2013/2014 at around 2.45% and 0.7%, receptively (see Table 7). Once again, the average figure hides significant cross-country disparities, with the Nordic countries (Finland, Denmark, Finland, and Sweden) and some continental European countries (Belgium, France, Germany and Luxembourg) exhibiting the highest levels. Conversely, most Southern and Eastern EU countries exhibit lower levels of relative expenditures.

Table 7. Parental leave length and generosity, public spending on family benefits and early education and care (average EU 22 countries)

year	Length_maternity	Length_paternity	Paid_maternity	Paid_paternity	Ps_family_ben	Ps_early_ed_care
2006	18.09	1.86	2.81	2.13	2.07	0.55
2007	18.31	1.75	2.78	1.89	2.21	0.55
2008	18.31	1.75	2.78	1.94	2.24	0.62
2009	18.42	1.86	2.78	1.83	2.72	0.65
2010	18.39	1.94	2.74	1.89	2.61	0.65
2011	18.39	1.99	2.74	2.16	2.54	0.66
2012	18.48	2.15	2.85	2.20	2.44	0.68
2013	20.74	2.15	2.86	2.24	2.47	0.70
2014	20.74	2.15	2.86	2.24	2.45	0.72
2015	19.50	2.15	2.81	2.24	2.44	0.71
2016	19.21	2.05	2.81	2.24	2.51	0.71
2017	19.21	2.00	2.81	2.33	2.51	0.72
2018	18.89	2.01	2.82	2.55	2.53	0.73
Total	19.03	1.99	2.80	2.16	2.44	0.67

Source: Own elaborations on International Network on Leave Policies & Research database and OECD Family Database
Notes: Cyprus is not included due to incomplete/missing information. For the variables' definition, see Table A7 in the Appendix

The analysis of the effects of institutional features and reforms on the asymmetry in the labour market parenthood penalty takes advantage of structure of the dataset (demographic groups nested by countries) to estimate the key parameters that vary at multiple levels (see Bryan and Jenkins, 2016). This is done is carried out by augmenting equations 3.1-3.3 with an interaction term between the gender dummy and the policy/reform variable:

$$Y^{z}_{g,k,t} = \alpha_c (fem)_{g,k,t} + \theta^r (Ref^r)_{k,t} + \rho^r_c \left[(fem)_{g,k,t} \cdot (Ref^r)_{k,t}\right] +$$

$$+ \beta_e (ed_e)_{g,k,t} + \delta_j \left(age_j\right)_{g,k,t} + \gamma_i \, (D'_i)_{g,k,t} + \kappa_h (H'_h)_{g,k,t} + \omega_m (M'_m)_{k,t} + \eta_k + \tau_t + \varepsilon_{g,k,t}$$

for c=1, no children (4.1)

for c=2, one child (4.2)

for c=3, two children or more (4.3)

The equation-specific ρ^r_c coefficients associated to the interaction term $fem \cdot Ref^r$, with $r = 1,..,11$ corresponding to the policy/reform variables considered, describe the moderating effect of the reform on the labour market gender gap for non-parents (Equation 4.1, c=1, the benchmark case),

for parents of one child (Equation 4.2, c=2) and for parents of two children or more (Equation 4.3, c=3). Hence, the existence or not of a moderating effect is described by the difference between the estimated ρ_c^r coefficients of equations 4.2 and 4.3 and that of equation 4.1.

4.2. Policies and motherhood penalty in labour supply and in employment

Table 8 reports a summary of the results of the estimation of equations 4.1-4.3 for the first set of reform variables (pre- and post-reform); the labour market outcome variable considered is labour force participation. The first panel highlights that measures aimed at increasing access to childcare facilities have an impact on reducing the gender gap associated with parenthood, as revealed by the significant and positive coefficients of the interaction term in columns (3) and (4) as opposed to the insignificant one for the subsample of childless demographic groups. The extension of parent leave provisions (panel 2) also has a beneficial effect on reducing the gender gap, but the magnitude of the effects does not seem remarkably different between parents and non-parents. Although to a slightly lower extent, their introduction is indeed also impacting the gender gap for non-mothers; this suggests that such measures can improve the labour market participation of female members of the household who are not the mothers, by lifting them from workloads related to care activities for children present in the family (Rose, 2021). The introduction of work-family reconciliation policies (panel 3) and of measures aimed at the favouring gender-balanced parenting (panel 4) helps more clearly to reduce the parenthood gender disparity. In both cases, the coefficients of the interaction term for the subsamples with children are positive, significant and of a size two or three times higher than in the case of non-parents. Lastly, the increase in child support measures (panel 5) is not having any effect on the gender gap in labour force participation associated to parenthood.

Table 8. Reforms on the gender gap in labour force participation (0 before the reform, 1 after the reform)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	-0.127***	-0.090***	-0.219***	-0.264***
	(0.006)	(0.005)	(0.009)	(0.010)
child_care	0.001	0.002	-0.013**	-0.015*
	(0.004)	(0.005)	(0.006)	(0.008)
female * Child_care	0.015***	0.007	0.038***	0.041***
	(0.006)	(0.006)	(0.009)	(0.012)
(2)				
female	-0.133***	-0.107***	-0.190***	-0.236***
	(0.005)	(0.004)	(0.010)	(0.012)
par_leave	-0.019***	-0.015***	-0.024***	-0.035***
	(0.004)	(0.004)	(0.007)	(0.009)
female * par_leave	0.024***	0.020***	0.029***	0.032**
	(0.005)	(0.004)	(0.011)	(0.015)
(3)				
female	-0.119***	-0.095***	-0.187***	-0.233***
	(0.005)	(0.004)	(0.009)	(0.010)
work_family_bal	-0.009*	-0.004	-0.035***	-0.034***
	(0.005)	(0.004)	(0.009)	(0.010)
female * work_family_bal	0.027***	0.019***	0.055***	0.067***
	(0.005)	(0.005)	(0.009)	(0.012)
(4)				
female	-0.125***	-0.100***	-0.183***	-0.229***
	(0.005)	(0.004)	(0.010)	(0.012)
gen_bal_par	-0.013***	-0.006	-0.030***	-0.039***
	(0.004)	(0.004)	(0.007)	(0.010)
female * gen_bal_par	0.028***	0.019***	0.042***	0.065***
	(0.006)	(0.005)	(0.012)	(0.017)
(5)				
female	-0.114***	-0.090***	-0.154***	-0.199***
	(0.005)	(0.004)	(0.008)	(0.012)
child_support	-0.010**	-0.010***	-0.002	-0.001
	(0.004)	(0.004)	(0.006)	(0.009)
female * child_support	0.025***	0.024***	0.014	0.013
	(0.005)	(0.005)	(0.009)	(0.014)

Source: Own elaborations on EU-SILC data.
Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

Table 9 illustrates the effect of the second set of reform/institutional variables (continuous or ordered metrics) on the parenthood gender gap in labour force participation. The first four panels offer insights complementary to the evidence presented in Table 8 with reference to parental leave. The detail of the policy variables used (length and generosity of the leave, separated by maternity and paternity leave) allows indeed uncovering crucial aspects. Results clearly highlight that only extensions of length and generosity of paternity leave can reduce the parenthood gender gap in labour force participation; conversely, longer and better paid parental leave for mothers exacerbate the gendered effects of parenthood on labour supply at the extensive margin.

Table 9. Effects of reforms on the gender gap in labour force participation (continuous and ordered variables)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	-0.055*** (0.005)	-0.040*** (0.005)	-0.086*** (0.010)	-0.100*** (0.011)
length_maternity	0.002*** (0.000)	0.001*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
female * length_maternity	-0.003*** (0.000)	-0.002*** (0.000)	-0.004*** (0.001)	-0.006*** (0.001)
(2)				
female	-0.114*** (0.004)	-0.082*** (0.004)	-0.183*** (0.007)	-0.227*** (0.008)
length_paternity	-0.005*** (0.001)	-0.004*** (0.001)	-0.006*** (0.001)	-0.008*** (0.001)
female * length_paternity	0.006*** (0.001)	0.003** (0.001)	0.014*** (0.001)	0.017*** (0.002)
(3)				
female	-0.084*** (0.009)	-0.071*** (0.008)	-0.105*** (0.009)	-0.110*** (0.012)
paid_maternity	0.001 (0.006)	-0.002 (0.005)	0.013 (0.008)	0.025*** (0.010)
female * paid_maternity	-0.006** (0.003)	-0.002 (0.003)	-0.019*** (0.004)	-0.031*** (0.005)
(4)				
female	-0.126*** (0.006)	-0.089*** (0.006)	-0.212*** (0.009)	-0.271*** (0.010)
paid_paternity	0.000 (0.002)	0.002 (0.002)	-0.007*** (0.003)	-0.017*** (0.003)
Female * paid_paternity	0.011*** (0.002)	0.006*** (0.002)	0.024*** (0.003)	0.034*** (0.004)
(5)				
female	-0.146*** (0.008)	-0.128*** (0.006)	-0.196*** (0.016)	-0.245*** (0.021)
ps_family_ben	-0.007** (0.003)	-0.007** (0.003)	-0.012** (0.006)	-0.018*** (0.006)
female * ps_family_ben	0.018*** (0.003)	0.021*** (0.002)	0.016*** (0.005)	0.020** (0.008)
(6)				
female	-0.144*** (0.005)	-0.113*** (0.005)	-0.215*** (0.010)	-0.298*** (0.011)
ps_early_ed_care	-0.048*** (0.010)	-0.041*** (0.010)	-0.057*** (0.012)	-0.067*** (0.016)
female* ps_early_ed_care	0.066*** (0.005)	0.054*** (0.005)	0.087*** (0.008)	0.146*** (0.010)

Source: Own elaborations on EU-SILC data.
Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

This is in line with the evidence that excessively extensive maternal leave policies can produce a long discontinuity in labour market participation and reduce the probability of re-entering after childbirth (Pettit and Hook, 2005; Jaumotte, 2003; Keck and Saraceno, 2013). On the contrary,

extension of leave provisions for father enables mothers to re-enter the labour market (Thorsdottir, 2013; Patnaik, 2019). Panels 5 and 6 of Table 9 refer to the effects of aggregate public spending on family benefits and on early-stage education and care; results indicate that only the second type of public spending alleviates the parenthood gender gap, as the coefficient of the interaction terms is significantly higher for demographic groups of parents compared to the benchmark of non-parent demographic groups.

The replications of the estimates of equations 4.1-4.3 with the employment rate (rather than participation rate) as the dependent variable (see Tables 10 and 11) generally confirm the outcomes of the beneficial effect of measure improving access to childcare facilities, work-family reconciliation, and gender balanced parenting. They also confirm that child support tax/benefits are not effective in reducing the motherhood penalty. Interestingly, the aggregate metric for the extensions of parental leave (panel 2 of Table 10) shows that the weak effect emerged for labour force participation disappears for employment.

However, the detail on parental leave policies by gender helps clarifying the overall picture (Panels 1-4 of Table 11). Once again, a clear dichotomy exists between the effects of enhancing maternity leave and paternity leave measures which exacerbate and reduce the motherhood penalty in employment, respectively. The effects of aggregate measures of public spending (panels 5 and 6 of Table 10) on the gender parenthood gap in employment are similar to labour force participation.

Table 10. Effects of reforms on the gender gap in employment (0 before the reform, 1 after the reform)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	-0.114***	-0.071***	-0.230***	-0.271***
	(0.007)	(0.007)	(0.008)	(0.009)
child_care	0.001	0.000	-0.005	-0.009
	(0.005)	(0.006)	(0.008)	(0.010)
female * child_care	0.012*	0.009	0.021***	0.020**
	(0.007)	(0.005)	(0.008)	(0.010)
(2)				
female	-0.122***	-0.087***	-0.206***	-0.250***
	(0.005)	(0.004)	(0.010)	(0.012)
par_leave	-0.021***	-0.018***	-0.017**	-0.026***
	(0.004)	(0.004)	(0.008)	(0.009)
female * par_leave	0.023***	0.022***	0.015	0.021
	(0.005)	(0.004)	(0.010)	(0.014)
(3)				
female	-0.110***	-0.080***	-0.203***	-0.246***
	(0.006)	(0.005)	(0.010)	(0.010)
work_family_bal	-0.013**	-0.009*	-0.029***	-0.032***
	(0.006)	(0.005)	(0.010)	(0.011)
female * work_family_bal	0.029***	0.025***	0.040***	0.054***
	(0.007)	(0.007)	(0.010)	(0.013)
(4)				
female	-0.108***	-0.076***	-0.201***	-0.238***
	(0.005)	(0.005)	(0.011)	(0.012)
gen_bal_par	-0.009*	-0.005	-0.020***	-0.022**
	(0.005)	(0.004)	(0.008)	(0.009)
female * gen_bal_par	0.023***	0.018***	0.023**	0.041**
	(0.006)	(0.005)	(0.012)	(0.016)
(5)				
female	-0.104***	-0.073***	-0.169***	-0.208***
	(0.005)	(0.005)	(0.009)	(0.011)
child_support	-0.015***	-0.015***	-0.008	-0.005
	(0.004)	(0.004)	(0.007)	(0.009)
female * child_support	0.026***	0.029***	0.005	0.002
	(0.006)	(0.005)	(0.009)	(0.013)

Source: Own elaborations on EU-SILC data.

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

Table 11. Effects of reforms on the gender gap in employment (continuous and ordered variables)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	-0.064***	-0.033***	-0.130***	-0.147***
	(0.004)	(0.005)	(0.010)	(0.012)
length_maternity	0.001***	0.001***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.001)
female * length_maternity	-0.001***	-0.001***	-0.003***	-0.004***
	(0.000)	(0.000)	(0.001)	(0.001)
(2)				
female	-0.103***	-0.062***	-0.200***	-0.235***
	(0.004)	(0.003)	(0.008)	(0.008)
length_paternity	-0.005***	-0.004***	-0.005***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
female * length_paternity	0.006***	0.003**	0.011***	0.013***
	(0.001)	(0.001)	(0.001)	(0.002)
(3)				
female	-0.068***	-0.049***	-0.103***	-0.104***
	(0.005)	(0.005)	(0.008)	(0.007)
paid_maternity	-0.003	-0.006	0.008	0.028**
	(0.005)	(0.005)	(0.010)	(0.012)
female * paid_maternity	-0.008***	-0.003	-0.028***	-0.039***
	(0.002)	(0.002)	(0.003)	(0.004)
(4)				
female	-0.108***	-0.065***	-0.221***	-0.266***
	(0.006)	(0.006)	(0.010)	(0.012)
paid_paternity	0.004**	0.005***	-0.001	-0.010***
	(0.002)	(0.002)	(0.002)	(0.003)
Female * paid_paternity	0.007***	0.004*	0.018***	0.025***
	(0.002)	(0.002)	(0.003)	(0.004)
(5)				
female	-0.144***	-0.110***	-0.246***	-0.301***
	(0.009)	(0.007)	(0.015)	(0.019)
ps_family_ben	-0.011***	-0.009***	-0.030***	-0.032***
	(0.003)	(0.003)	(0.006)	(0.006)
female * ps_family_ben	0.021***	0.021***	0.028***	0.034***
	(0.003)	(0.003)	(0.005)	(0.007)
(6)				
female	-0.131***	-0.088***	-0.246***	-0.321***
	(0.005)	(0.005)	(0.010)	(0.010)
ps_early_ed_care	-0.028***	-0.021**	-0.052***	-0.049***
	(0.010)	(0.010)	(0.013)	(0.015)
female* ps_early_ed_care	0.063***	0.048***	0.101***	0.153***
	(0.005)	(0.006)	(0.008)	(0.009)

Source: Own elaborations on EU-SILC data.
Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

Tables 12 and 13 illustrate the effects of policy reform variables on gender parenthood gaps in intensive labour supply margin (hours worked per week of those in employment).

Table 12. Effects of reforms on the gender gap in hours worked (0 before the reform, 1 after the reform)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	-4.698***	-4.342***	-8.175***	-10.498***
	(0.681)	(0.743)	(1.330)	(1.858)
child_care	0.310	0.465	0.398	-1.491*
	(0.562)	(0.630)	(0.816)	(0.789)
female * child_care	-0.850	-0.657	-1.593*	-0.549
	(0.675)	(0.720)	(0.951)	(1.110)
(2)				
female	-6.637***	-5.759***	-11.784***	-12.394***
	(1.261)	(1.191)	(2.150)	(2.301)
par_leave	-1.509*	-1.404*	-0.940	-2.676**
	(0.773)	(0.773)	(1.119)	(1.030)
female * par_leave	1.005	0.651	2.362**	2.322**
	(0.969)	(1.051)	(1.080)	(0.910)
(3)				
female	-3.274***	-3.017***	-7.094***	-6.990***
	(0.912)	(0.972)	(2.231)	(1.613)
work_family_bal	0.147	-0.078	-0.053	1.969
	(0.865)	(0.931)	(1.281)	(1.326)
female * work_family_bal	-2.447***	-2.598***	-1.708	-0.349
	(0.861)	(0.956)	(1.287)	(1.319)
(4)				
female	-5.713***	-5.308***	-7.653***	-10.696***
	(0.525)	(0.582)	(1.133)	(1.046)
gen_bal_par	-1.216*	-0.912	-1.750*	-2.833***
	(0.682)	(0.738)	(1.033)	(0.973)
female * gen_bal_par	0.866	0.659	0.625	3.093***
	(0.685)	(0.769)	(0.882)	(0.978)
(5)				
female	-6.396***	-5.877***	-9.326***	-11.425***
	(0.696)	(0.748)	(1.226)	(1.400)
child_support	-0.611	-0.419	-0.490	-1.823**
	(0.624)	(0.669)	(0.907)	(0.861)
female * child_support	0.958	0.760	0.797	2.277**
	(0.753)	(0.817)	(0.940)	(1.038)

Source: Own elaborations on EU-SILC data.
Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

The first piece of information emerging from the summary of results is that while for labour force participation and employment many reforms impacted the magnitude of the parenthood gender gap, this is not the case for hours worked. Only the extension of parental leave clearly helps decreasing the gender gap in hours worked (panel 3 of Table 10). Once again, in combination with the more detailed indicators of maternity and paternity leave (panels 1-4 of Table 13), we conclude that the beneficial effect is limited to the extension of length and payment for fathers. However, contrary to what we observed for employment and participation, the extension of maternity leave measures is neutral, not exacerbating, the motherhood gap.

Table 13. Effects of reforms on the gender gap in hours worked (continuous and ordered variables)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	-6.186***	-5.767***	-10.605***	-8.290***
	(0.934)	(1.019)	(1.257)	(1.491)
length_maternity	0.018	0.013	-0.044	0.076*
	(0.046)	(0.059)	(0.039)	(0.044)
female * length_maternity	-0.018	-0.006	0.033	-0.126**
	(0.048)	(0.053)	(0.054)	(0.054)
(2)				
female	-7.629***	-6.739***	-12.314***	-12.836***
	(0.470)	(0.508)	(0.913)	(1.095)
length_paternity	-0.155	-0.105	-0.787***	-0.165
	(0.117)	(0.139)	(0.192)	(0.155)
female * length_paternity	0.434***	0.332***	0.769***	0.871***
	(0.073)	(0.084)	(0.105)	(0.140)
(3)				
female	-6.176***	-5.947***	-8.039***	-9.183***
	(1.031)	(1.153)	(1.323)	(1.489)
paid_maternity	-2.836*	-3.323*	2.607	-3.089*
	(1.647)	(1.969)	(2.579)	(1.605)
female * paid_maternity	-0.112	0.030	-0.722*	-0.426
	(0.335)	(0.369)	(0.374)	(0.388)
(4)				
female	-7.965***	-6.715***	-12.694***	-15.601***
	(0.825)	(0.885)	(1.233)	(1.399)
paid_paternity	-0.689**	-0.599*	-0.896**	-1.076***
	(0.293)	(0.328)	(0.399)	(0.395)
Female * paid_paternity	0.641**	0.375	1.055***	2.062***
	(0.313)	(0.346)	(0.365)	(0.411)
(5)				
female	-4.597***	-4.283***	-8.161***	-9.349***
	(1.019)	(1.123)	(1.534)	(1.902)
ps_family_ben	1.467**	1.613**	1.131	0.453
	(0.616)	(0.682)	(0.718)	(0.750)
female * ps_family_ben	-0.674*	-0.543	-0.823*	-0.582
	(0.357)	(0.387)	(0.472)	(0.571)
(6)				
female	-6.844***	-6.167***	-11.657***	-13.798***
	(0.711)	(0.762)	(1.376)	(1.548)
ps_early_ed_care	2.948**	2.633*	5.419**	2.359
	(1.321)	(1.548)	(2.553)	(2.194)
female* ps_early_ed_care	0.762	0.782	1.407	2.820***
	(0.746)	(0.814)	(1.061)	(1.043)

Source: Own elaborations on EU-SILC data.

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

As regards, the other reforms, gender balanced parenting and child support measures are effective in reducing the gender gap in hours worked only for mothers with two children and more. While for more gender balanced parenting measures the outcome is difficult to explain, in the case of child

support measures, a possible explanation is that only by cumulating the benefits (or tax rebates) for more children allows reaching the economic capacity to afford additional childcare services (baby-sitting, extension of hours in childcare facilities) that enable mothers to participate more intensively in employment.

4.3. Policies and motherhood penalty in employment characteristics

In this section we summarize the outcomes of the estimation of equations 4.1-4.3 using as a dependent variable various metrics of labour market outcomes. All results are summarized in the set of Tables (A8–A17) placed in the Appendix.

When the full-time employment rate is used as the labour outcome variable, the analysis of the effects of policies and reforms on the parenthood penalty (Table A8 and A9) supplies evidence that is, not surprisingly, largely overlapping with the one for hours worked. The only measures able to attenuate the gender gap associated to the presence of children are related to the extension of parental leave (panel 2 of Table A8); once again, the effect is limited to paternity leave length and generosity (Panels 2 and 4 of Table A9). The extension of the length of maternity leave is, differently from the case of hours worked, also inequality-reducing. However, the magnitude of the effect is smaller compared to paternity leave and independent on the presence of children or not (Panel 1 of Table A9, columns 2, 3, and 4). More generous child support measures also emerge as beneficial for closing the gender gap between mothers and fathers in full-time employment (panel 5 in Table A8). A last result worth to be highlighted is the negative sign of the coefficients of the interaction terms of the public spending variables (Panels 5 and 6 of Table A9). They indicate, not unsurprisingly, that higher spending in family benefits and early education and care services increase the gender gap in all subsamples (hence, irrespective of the presence of children). One tentative explanation, to be scrutinized in future research efforts, is that more generous family benefits increase household disposable income and, consequently, decrease labour market involvement of second earners (usually female household components) who are more willing to accept part-time positions.

When we look at the parenthood gender gap in permanent employment (Tables A10 and A11), we substantially find no significant outcomes (the only exception being the detrimental effect of an increase in the generosity of maternity leave). This is not totally surprising, as we already highlighted how this is the labour market outcome in which the gender gap related to parenthood is generally low.

The analysis of the effects of policy/reforms on self-employment gender gap provides richer results, substantially concentrated on parental leave measures. In general, reforms expanding parental

leave are found to decrease the gender gap. However, this happens irrespective of the presence of children (see the size of the coefficient of the interaction terms in panel 2 in Table A12). A closer look at the detail of the parental leave measures (panels 1-4 of Table A13) suggests that the result is certainly driven by paternity leave policies. However, it is interesting to note that also better paid maternity leave contributes closing the gender gap in self-employment. The interpretation of this evidence is not straightforward, as it is not possible here to distinguish which type of self-employment is described by the data (professionals, large, small, or micro entrepreneurship). However, this is an interesting research pattern for future research, as self-employment has been identified as one of the most resilient in labour participation (Ferrín, 2023).

A last, interesting set of results regards gender wage and earnings inequality. According to our estimates, with very few exceptions (work-family reconciliation policies and length of maternity leave for the subsample of two children and more) none of the policies or reforms considered has an impact on the (large) parenthood gender gaps documented in the previous section (see Tables A14-A17). This suggests that, although being important in supporting higher levels of labour market participation, employment and certain desirable job characteristics, such policies are not able to affect the labour market spheres in which the remuneration of labour is decided. Particularly, we refer to the gender asymmetry in bargaining power of employees vis-à-vis employers who implement statistical gender discrimination practices in wage setting. Possibly, institutional dimensions not considered here and more directly related to wage setting (centralisation, coordination, minimum wage regulation, social dialogue practices, etc.) have a better capacity to affect this side of the parenthood gender gap.

5. Summary and concluding remarks

In this paper, we analyse the interactions between childcare, parenthood, household characteristics, labour market outcomes and institutions through the lens of gender inequality. Our contribution to the existing knowledge lies in the first place in the comparative approach of the analysis, which covers many EU countries. This is a distinctive feature of our work, as most of the studies looking at the association between parenthood and labour market outcomes are carried out for single country or for a small set of them, due to the demanding nature of (longitudinal) data required for the analysis. Our approach to overcome such constraints is to assemble a pseudo-panel dataset, in which the units of analysis are not the individuals but the demographic groups (defined by gender, age, and education) for a large set of countries and a relatively long period of time. A second distinctive feature of our work is the analysis of how a large set of policies related to family and childcare moderate the relationship between parenthood and labour market outcomes in the EU.

The report is organised into three sections. In the first one, we have used HETUS data to provide a cross-country descriptive analysis of the disparities in time allocation to paid work, housework and childcare within the household. Employing micro-level data from ten European countries (year 2010), we analyse the scale and cross-country variation in within-couple gender gaps in time allocation in relation to a broad range of spousal and household characteristics and of country-level indicators of gender equality. Our outcomes suggest the existence of systematic specialization patterns, with wives spending less time on employment and more time on housework and childcare. Wife's relative worktime converges to 0.5 in dual-earner couples but declines with larger household sizes. Both in absolute and relative terms, worktime decreases remarkably in the presence of children; female spouses restrict on average their daily working time by one hour in the presence of one child and by almost two hours when there are two or more children in the household. Conversely, the husband's working time remains virtually unchanged. This evidence descriptively confirms the existence of a remarkable asymmetry in the labour market parenthood penalty across genders. Couples in which the husband is older or more educated than his wife also achieve notably less gender equality in worktime allocation. However, all types of couples appear far from within-couple gender equality in housework and childcare, as the wife's relative housework remains around or significantly over 60% and close to 70%, respectively, for all household types. The country-specific analysis confirms that significant gender asymmetries exist in all countries in our sample, but their magnitude differs. Specifically, as regards worktime, Finland appears the most gender-equal country in terms of time allocated in employment; in Estonia the gender disparity in relative worktime turns statistically insignificant upon controlling for a full set of individual and household characteristics. As for housework and childcare, in all sample countries the time wives invest in housework exceeds the time invested by their husbands enormously, even when demographic, employment and household characteristics are controlled for, and relative worktime is more balanced. One notable exception, with reference to childcare, is Finland, where the time allocation if gender balanced. Lastly, our analysis reveals that larger country-level gender asymmetries in worktime and housework are correlated with various metrics of gender equality in the labour market and in society. The association between asymmetries in childcare and such macroeconomic indicators is more nuanced.

In the second part of the analysis, we focus on gender asymmetries in labour market performance related to parenthood. To this purpose, we have employed microdata from the European Union Survey on Income and Living Conditions (EU-SILC) to assemble a longitudinal dataset at the demographic group (gender, age, education) level for twenty-three EU countries over the period 2006-2018. We first provide a measure of the asymmetries across genders in parenthood penalty/premium in various labour market outcomes: labour force participation, employment, hours

worked per week, job characteristics. We then map this gender disparity across groups of countries and household characteristics that describe different household models. Our results for the whole sample of EU-countries, consistently with a large body of empirical evidence, indicate that parenthood implies a labour market participation and employment premium for fathers and, conversely, a penalty for mothers. This means that the presence of children exacerbates labour market gender inequalities and accounts for a significant share of the observed disparities. This applies to labour supply (at both the extensive and the intensive margins), employment, full-time employment, permanent employment, hourly wage, and hourly earnings. The analysis of the parenthood penalty for sub-groups of countries confirms well-known facts in the geography of gender inequality in Europe. Southern EU countries exhibit the largest gaps in labour force participation, employment, permanent employment, self-employment, and hourly wage. Conversely, in Northern EU countries gender differences are of a lower magnitude in basically all labour marker domains, and continental EU countries sit in an intermediate position. Eastern EU countries stand in different relative positions depending on the specific labour market indicator considered: they have average gender gaps in employment, labour force participation and labour remunerations. However, they exhibit low gender disparities in hours worked, full-time, permanent employment and self-employment.

As regards gender inequality and parenthood penalty across household types, our evidence reveals that households with low labour force participation exhibit higher gender gaps in activity rates and employment in the presence of children. Conversely, higher household participation rates are associated with larger gender differences in permanent employment and wages, especially between parents. The presence of elderly household members is found to exacerbate the motherhood gap in hours worked, full-time and self-employment; however, employed mothers in households with more elderly people achieve levels of permanent employment and pay comparable to their male counterparts. Single parenting is associated to smaller gender gaps in labour force participation and employment, indicating that the economic consequence of the absence of a partner imposes a higher labour market attachment for women and mothers. At the same time, it exacerbates the gender gap in basically all other outcomes. This suggests that, despite being obliged for economic reasons to participate in the labour market, childcare tasks impose tight constraints on single mothers and probably force them to accept lower-quality jobs. As for the analysis for subsamples of low/high-income households, we find that gender disparities associated with parenthood are systematically higher for low-income households. This suggests that in such contexts, possibly for social and cultural reasons associated with economic conditions, the child-related workload and constraints within the household are even more disproportionally placed on women. Lastly, household in which the breadwinner is a man exhibit higher gender disparities, both

in the presence and in the absence of children, in employment and labour supply; gender inequality in job characteristics (especially permanent employment and wages) is instead lower.

In the third part of the report, we analyse how gender asymmetries in the labour market effects of parenthood are moderated (or not) by an array of family-related public policies. To this aim, we assemble a country-level policy/reform dataset composed of: (i) binary indicators (pre-and post-introduction) of specific measures related to access to childcare, parental leave, work-family reconciliation, gender-balanced parenting and child tax/benefits; (ii) ordered or continuous variables that describe the length and generosity of maternity and paternity leave, public spending on family benefits and on early education and childcare. Our evidence suggests that most policies included in our analysis have in general a better capacity to reduce gender gaps in parenthood penalty in labour supply and employment, rather than in job characteristics. This is particularly the case for measures aimed at increasing access to childcare facilities, favouring work-family reconciliation, and promoting gender-balanced parenting. As regards parental leave policies, a clear dichotomy emerges between the moderating effects of paternity and maternity leave policies. Only extensions of the length and generosity of paternity leave is able to reduce the parenthood gender gap in labour force participation, employment and hours worked; conversely, longer and better paid parental leave for mothers exacerbate the gendered effects of parenthood (in the case of labour force participation and employment) or play a neutral role (on labour supply at the intensive margin). The impact of family policies/reforms on parents' gender gap in full time employment is, not surprisingly, like the case of hours worked. However, as a distinctive feature, higher spending in family benefits and early education and care services increase the full-time employment gender gap in all subsamples (hence, irrespective of the presence of children). One tentative explanation, to be scrutinized in future research efforts, is that more generous family benefits increase household disposable income and, consequently, decrease labour market involvement of second earners (usually female household components) who are more willing to accept part-time positions. The analysis of the effects of policy/reforms on self-employment gender gap reveals that reforms expanding parental leave are found to decrease the gender gap. However, this happens irrespective of the presence of children, and it is mainly driven by paternity leave policies. However, it is interesting to note that also better paid maternity leave contributes closing the gender gap in self-employment, which addresses towards a further research effort on the effects of different types of self-employment. Lastly, we find no significant impact of policies and reforms on the parents' gender gap in labour remunerations. This suggests that the measures considered here are not able to affect the gender asymmetries in wage bargaining, which are probably more sensitive to institutional features more directly related to wage setting.

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Appendix

Table A1. Tobit regression results for relative worktime, by country

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Country	BE	DE	EE	EL	FI	FR	LU	PL	RO	UK
Gender gap	***-0.046******	***-0.056******	***-0.022****	***-0.057******	***-0.002***	***-0.032******	***-0.093******	***-0.035******	***-0.045******	***-0.033******
	(0.009)	(0.007)	(0.010)	(0.008)	(0.010)	(0.004)	(0.010)	(0.004)	(0.003)	(0.011)
Age (base: 20-24)										
25-29	-0.011	0.007	0.026	-0.015	0.012	-0.008	-0.009	-0.025*	-0.003	0.022
	(0.037)	(0.037)	(0.041)	(0.062)	(0.066)	(0.023)	(0.051)	(0.015)	(0.013)	(0.109)
30-34	0.025	0.026	0.054	-0.075	0.014	-0.017	-0.044	-0.020	0.015	0.010
	(0.038)	(0.038)	(0.040)	(0.052)	(0.066)	(0.023)	(0.050)	(0.015)	(0.013)	(0.108)
35-39	0.016	0.048	-0.007	-0.050	0.057	-0.018	-0.019	-0.022	0.019	-0.011
	(0.037)	(0.037)	(0.040)	(0.052)	(0.065)	(0.023)	(0.050)	(0.015)	(0.013)	(0.109)
40-44	0.012	0.040	0.004	-0.047	0.063	-0.013	0.023	-0.027*	0.014	0.024
	(0.037)	(0.037)	(0.040)	(0.052)	(0.065)	(0.023)	(0.051)	(0.015)	(0.013)	(0.108)
45-49	-0.012	0.037	0.013	-0.053	0.056	-0.017	-0.001	-0.021	0.012	0.003
	(0.037)	(0.037)	(0.040)	(0.052)	(0.065)	(0.023)	(0.051)	(0.015)	(0.013)	(0.108)
50-54	0.007	0.046	0.006	-0.050	0.043	-0.017	0.003	-0.015	0.008	-0.003
	(0.037)	(0.037)	(0.040)	(0.052)	(0.065)	(0.023)	(0.051)	(0.015)	(0.013)	(0.109)
55-59	0.001	0.049	0.001	-0.045	0.034	-0.019	-0.043	-0.021	0.010	0.007
	(0.037)	(0.037)	(0.041)	(0.054)	(0.065)	(0.023)	(0.054)	(0.016)	(0.013)	(0.108)
60-64	0.027	0.013	-0.001	-0.041	0.040	-0.028	0.115	-0.048**	-0.023	-0.001
	(0.049)	(0.038)	(0.046)	(0.117)	(0.065)	(0.027)	(0.092)	(0.020)	(0.019)	(0.110)
Migration status (base: foreignborn)										
Born in country	-0.001	-0.006	-0.007	0.012	0.073*	-0.002	0.023**	-0.003	0.008	-0.014
	(0.016)	(0.013)	(0.012)	(0.014)	(0.040)	(0.010)	(0.010)	(0.062)	(0.033)	(0.018)
Household size (base: 2 persons)										
3 persons	0.002	0.010	-0.006	-0.016	-0.005	-0.000	0.009	0.002	-0.002	0.005
	(0.013)	(0.008)	(0.015)	(0.018)	(0.017)	(0.006)	(0.016)	(0.006)	(0.004)	(0.015)
4 persons	0.003	0.009	-0.002	-0.022	-0.013	0.003	0.003	0.002	-0.002	0.003
	(0.014)	(0.011)	(0.017)	(0.021)	(0.024)	(0.008)	(0.017)	(0.007)	(0.004)	(0.018)
5 and more persons	0.013	0.011	0.003	-0.023	-0.008	0.002	0.011	0.004	-0.003	0.009
	(0.018)	(0.015)	(0.024)	(0.030)	(0.033)	(0.010)	(0.023)	(0.009)	(0.005)	(0.026)
Education (base: low)										
Education medium	0.009	0.001	0.030	-0.043***	-0.027*	-0.003	-0.021*	0.013	0.011*	0.011
	(0.010)	(0.019)	(0.025)	(0.013)	(0.015)	(0.005)	(0.012)	(0.010)	(0.006)	(0.030)
Education high	0.009	0.015	0.003	-0.031**	-0.018	0.013**	0.006	0.012	0.001	0.010
	(0.011)	(0.019)	(0.026)	(0.014)	(0.016)	(0.007)	(0.013)	(0.011)	(0.007)	(0.030)
Number of children aged 0 to 6 (base: 0)										
1 child	-0.014	0.004	-0.013	0.009	0.009	-0.004	0.008	0.004	0.002	-0.001

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Country	BE	DE	EE	EL	FI	FR	LU	PL	RO	UK
	(0.015)	(0.009)	(0.016)	(0.015)	(0.017)	(0.006)	(0.014)	(0.005)	(0.004)	(0.016)
2 and more children	-0.017	0.008	-0.019	0.031	0.015	0.000	0.015	0.009	0.002	0.008
	(0.019)	(0.015)	(0.035)	(0.025)	(0.028)	(0.011)	(0.020)	(0.009)	(0.008)	(0.022)
Number of children aged 7 to 17 (base: 0)										
1 child	-0.004	0.002	0.000	0.009	-0.000	-0.003	-0.010	-0.001	-0.004	-0.005
	(0.012)	(0.009)	(0.013)	(0.015)	(0.017)	(0.006)	(0.012)	(0.005)	(0.003)	(0.015)
2 and more children	-0.011	0.005	0.006	0.020	-0.000	-0.001	-0.014	-0.001	-0.003	-0.004
	(0.015)	(0.012)	(0.020)	(0.019)	(0.025)	(0.009)	(0.018)	(0.008)	(0.005)	(0.021)
Household net income band (base: <P20)										
P20 to P40	0.014	0.022	0.000	-0.014	0.061	0.022	-0.007	-0.010	0.002	-0.002
	(0.048)	(0.031)	(0.017)	(0.075)	(0.062)	(0.023)	(0.026)	(0.021)	(0.012)	(0.039)
P40 to P60	0.010	0.004	0.006	-0.010	0.034	0.003	-0.015	-0.013	0.001	-0.011
	(0.046)	(0.013)	(0.018)	(0.059)	(0.033)	(0.007)	(0.025)	(0.020)	(0.008)	(0.037)
P60 to P80	-0.001	0.007	0.005	-0.001	0.006	0.003	-0.012	-0.013	-0.002	-0.015
	(0.046)	(0.006)	(0.017)	(0.058)	(0.011)	(0.004)	(0.025)	(0.020)	(0.007)	(0.037)
>P80	-0.003	0.000	0.005	-0.003	0.000	0.000	-0.025	-0.014	-0.001	-0.013
	(0.046)	(.)	(0.021)	(0.059)	(.)	(.)	(0.025)	(0.021)	(0.007)	(0.036)
Employment type (base: part-time)										
Full time	0.027***	0.061***	0.037**	0.020	0.058***	0.022***	0.032***	0.030***	0.060***	0.029**
	(0.009)	(0.007)	(0.018)	(0.015)	(0.020)	(0.005)	(0.012)	(0.009)	(0.013)	(0.012)
Industry (base: Other community, social & personal service)										
Agriculture, fishing, mining & quarrying, utility supply	0.039	-0.030*	0.044	-0.021	-0.003	-0.015	-0.017	-0.020	-0.010	-0.055
	(0.033)	(0.018)	(0.031)	(0.038)	(0.033)	(0.015)	(0.033)	(0.014)	(0.009)	(0.039)
Manufacturing and construction	0.070***	-0.009	0.012	-0.011	0.003	0.000	0.008	-0.007	-0.004	-0.023
	(0.025)	(0.013)	(0.028)	(0.025)	(0.023)	(0.010)	(0.020)	(0.012)	(0.008)	(0.030)
Wholesale and retail trade	0.062**	-0.019	0.035	0.013	0.022	0.015	0.043*	0.001	0.000	-0.043
	(0.026)	(0.015)	(0.029)	(0.025)	(0.024)	(0.010)	(0.022)	(0.013)	(0.008)	(0.031)
Hotels and restaurants, transport, storage and communication	0.022	0.000	0.051*	0.038	0.005	-0.011	0.044**	-0.013	-0.006	-0.038
	(0.026)	(0.014)	(0.029)	(0.025)	(0.025)	(0.010)	(0.021)	(0.013)	(0.008)	(0.030)
Financial intermediation; real estate, renting and business activities	0.050*	-0.011	0.064**	0.038	0.032	-0.001	0.033	-0.008	-0.001	-0.035
	(0.026)	(0.014)	(0.029)	(0.027)	(0.024)	(0.010)	(0.021)	(0.013)	(0.009)	(0.031)
Education, health and social work	0.054**	-0.027**	0.027	0.028	0.011	-0.011	0.009	-0.013	-0.011	-0.012
	(0.025)	(0.013)	(0.028)	(0.024)	(0.022)	(0.010)	(0.021)	(0.012)	(0.008)	(0.029)
Public administration, defense, social security, extra-territorial bodies	0.036	-0.022	0.045	-0.019	0.021	-0.001	0.015	-0.017	0.006	-0.013
	(0.026)	(0.013)	(0.031)	(0.025)	(0.025)	(0.010)	(0.021)	(0.013)	(0.008)	(0.032)
N	790	1632	632	420	600	2992	426	3132	3752	694
Pseudo R-sq	-0.095	-0.192	-0.067	-0.135	-0.038	-0.048	-0.265	-0.029	-0.061	-0.043

Notes: Tobit regression estimates based on HETUS wave 2010 data. Dependent variable is relative housework censored at 0 and 1. All models additionally control for year, month and day of a week fixed effects. The estimates account for combined individual response and day weight.

Table A2. Tobit regression results for relative housework, by country

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Country	BE	DE	EE	EL	FI	FR	LU	PL	RO	UK
Gender gap	***0.319******	***0.231******	***0.318******	***0.610******	***0.134******	***0.262******	***0.404******	***0.302******	***0.496******	***0.269******
	(0.024)	(0.016)	(0.027)	(0.026)	(0.023)	(0.012)	(0.032)	(0.010)	(0.009)	(0.026)
Age (base: 20-24)										
25-29	-0.166*	0.090	-0.161	0.066	-0.046	0.022	0.290*	-0.009	-0.063	-0.175
	(0.096)	(0.088)	(0.111)	(0.193)	(0.157)	(0.069)	(0.158)	(0.039)	(0.044)	(0.273)
30-34	-0.137	0.073	-0.024	0.143	0.034	0.055	0.422***	-0.003	-0.099**	-0.098
	(0.099)	(0.089)	(0.109)	(0.163)	(0.157)	(0.068)	(0.156)	(0.038)	(0.043)	(0.272)
35-39	-0.138	0.064	0.046	0.037	-0.035	0.036	0.368**	-0.000	-0.087**	-0.046
	(0.097)	(0.087)	(0.108)	(0.162)	(0.156)	(0.069)	(0.155)	(0.039)	(0.043)	(0.272)
40-44	-0.145	0.051	0.045	0.068	-0.049	-0.011	0.244	-0.005	-0.096**	-0.156
	(0.097)	(0.087)	(0.108)	(0.161)	(0.155)	(0.068)	(0.157)	(0.039)	(0.043)	(0.271)
45-49	-0.081	0.065	0.057	0.045	-0.010	0.024	0.342**	0.017	-0.074*	-0.115
	(0.098)	(0.087)	(0.109)	(0.162)	(0.156)	(0.068)	(0.158)	(0.039)	(0.044)	(0.271)
50-54	-0.085	0.056	-0.026	0.084	-0.008	0.048	0.339**	-0.021	-0.084*	-0.024
	(0.096)	(0.087)	(0.108)	(0.162)	(0.155)	(0.068)	(0.158)	(0.040)	(0.044)	(0.272)
55-59	-0.127	0.003	0.029	0.124	-0.017	0.019	0.464***	-0.004	-0.098**	-0.075
	(0.098)	(0.088)	(0.110)	(0.166)	(0.156)	(0.069)	(0.166)	(0.041)	(0.046)	(0.271)
60-64	-0.103	0.082	-0.047	-0.107	-0.006	0.049	0.025	0.012	-0.047	-0.083
	(0.129)	(0.089)	(0.124)	(0.363)	(0.156)	(0.081)	(0.285)	(0.053)	(0.064)	(0.275)
Migration status (base: foreignborn)										
Born in country	0.050	0.050*	0.000	0.006	-0.195**	-0.005	-0.035	-0.020	0.021	-0.012
	(0.041)	(0.030)	(0.033)	(0.044)	(0.096)	(0.030)	(0.032)	(0.163)	(0.114)	(0.044)
Household size (base: 2 persons)										
3 persons	-0.007	-0.024	-0.010	0.015	0.006	0.006	-0.046	-0.010	0.001	-0.006
	(0.034)	(0.019)	(0.040)	(0.055)	(0.041)	(0.018)	(0.050)	(0.016)	(0.013)	(0.037)
4 persons	-0.026	-0.032	-0.030	0.004	0.021	0.002	-0.041	-0.017	0.003	-0.001
	(0.037)	(0.026)	(0.047)	(0.064)	(0.057)	(0.024)	(0.052)	(0.019)	(0.015)	(0.045)
5 and more persons	-0.034	-0.028	-0.032	0.003	0.026	0.001	-0.062	-0.023	0.006	-0.026
	(0.048)	(0.035)	(0.065)	(0.092)	(0.078)	(0.031)	(0.072)	(0.023)	(0.019)	(0.065)
Education (base: low)										
Education medium	0.032	-0.054	-0.019	0.048	0.017	0.015	0.045	-0.048*	-0.002	-0.026
	(0.027)	(0.045)	(0.068)	(0.041)	(0.036)	(0.015)	(0.036)	(0.026)	(0.021)	(0.074)
Education high	0.013	-0.086*	0.077	0.003	0.016	-0.043**	-0.018	-0.060**	0.008	-0.018
	(0.030)	(0.045)	(0.070)	(0.045)	(0.037)	(0.020)	(0.042)	(0.028)	(0.022)	(0.074)
Number of children aged 0 to 6 (base: 0)										
1 child	0.035	-0.006	0.032	-0.003	-0.006	0.002	0.005	0.010	-0.002	0.016
	(0.038)	(0.022)	(0.043)	(0.047)	(0.040)	(0.018)	(0.042)	(0.014)	(0.013)	(0.039)
2 and more children	0.053	-0.012	0.022	-0.023	-0.020	0.007	0.013	0.003	-0.008	0.017
	(0.051)	(0.035)	(0.095)	(0.076)	(0.067)	(0.032)	(0.063)	(0.024)	(0.027)	(0.055)
Number of children aged 7 to 17 (base: 0)										

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Country	BE	DE	EE	EL	FI	FR	LU	PL	RO	UK
1 child	0.017	-0.008	-0.019	0.005	-0.012	0.010	0.028	-0.001	0.003	0.017
	(0.032)	(0.021)	(0.036)	(0.045)	(0.041)	(0.018)	(0.038)	(0.013)	(0.011)	(0.037)
2 and more children	0.035	-0.010	-0.026	-0.001	-0.011	0.017	0.057	0.006	0.000	0.039
	(0.040)	(0.029)	(0.054)	(0.060)	(0.060)	(0.026)	(0.056)	(0.020)	(0.018)	(0.053)
Household net income band (base: <P20)										
P20 to P40	0.005	-0.036	-0.015	0.013	0.043	-0.040	0.037	0.017	0.001	0.034
	(0.126)	(0.073)	(0.046)	(0.234)	(0.149)	(0.069)	(0.079)	(0.055)	(0.042)	(0.097)
P40 to P60	-0.014	-0.003	-0.027	-0.005	-0.035	-0.008	0.041	0.014	-0.003	0.024
	(0.122)	(0.030)	(0.050)	(0.184)	(0.080)	(0.021)	(0.076)	(0.054)	(0.027)	(0.093)
P60 to P80	-0.006	-0.013	-0.027	-0.013	-0.000	-0.020	0.025	0.022	0.003	0.024
	(0.121)	(0.014)	(0.046)	(0.181)	(0.026)	(0.012)	(0.078)	(0.054)	(0.024)	(0.092)
>P80	-0.009	0.000	-0.035	0.013	0.000	0.000	0.057	0.022	0.002	0.018
	(0.122)	(.)	(0.056)	(0.184)	(.)	(.)	(0.078)	(0.054)	(0.023)	(0.090)
Employment type (base: part-time)										
Full time	-0.020	-0.130***	-0.032	-0.039	0.005	-0.032**	-0.051	-0.032	-0.065	-0.028
	(0.024)	(0.017)	(0.050)	(0.045)	(0.049)	(0.015)	(0.037)	(0.023)	(0.044)	(0.031)
Industry (base: Other community, social & personal service)										
Agriculture, fishing, mining & quarrying, utility supply	0.007	0.024	-0.064	0.092	-0.054	0.066	-0.099	0.040	-0.025	0.256***
	(0.088)	(0.042)	(0.085)	(0.119)	(0.079)	(0.046)	(0.103)	(0.035)	(0.029)	(0.099)
Manufacturing and construction	-0.061	0.019	-0.026	0.081	-0.027	0.027	-0.077	-0.009	-0.038	0.020
	(0.066)	(0.031)	(0.076)	(0.077)	(0.055)	(0.029)	(0.061)	(0.032)	(0.026)	(0.075)
Wholesale and retail trade	-0.107	0.028	-0.045	0.020	-0.026	-0.051*	-0.026	-0.038	-0.061**	-0.054
	(0.068)	(0.036)	(0.079)	(0.078)	(0.058)	(0.031)	(0.069)	(0.033)	(0.027)	(0.076)
Hotels and restaurants, transport, storage and communication	-0.047	-0.008	-0.096	-0.018	-0.057	0.021	-0.143**	-0.000	-0.050*	-0.005
	(0.068)	(0.034)	(0.079)	(0.077)	(0.059)	(0.031)	(0.065)	(0.033)	(0.028)	(0.076)
Financial intermediation; real estate, renting and business activities	-0.083	0.054	-0.124	-0.067	0.003	0.003	-0.097	0.002	-0.017	0.013
	(0.068)	(0.033)	(0.080)	(0.083)	(0.058)	(0.031)	(0.064)	(0.033)	(0.029)	(0.076)
Education, health and social work	-0.070	0.054*	-0.089	-0.036	0.000	0.048*	-0.073	0.021	-0.015	0.004
	(0.065)	(0.031)	(0.076)	(0.076)	(0.053)	(0.029)	(0.064)	(0.033)	(0.028)	(0.073)
Public administration, defense, social security, extra-territorial bodies	-0.052	0.054*	-0.042	0.038	-0.109*	0.019	-0.049	0.002	-0.070**	0.025
	(0.068)	(0.031)	(0.084)	(0.078)	(0.060)	(0.031)	(0.065)	(0.034)	(0.029)	(0.080)
N	790	1632	632	420	600	2992	426	3132	3752	694
Pseudo R-sq	0.541	0.761	0.323	0.700	0.446	0.189	0.809	0.475	0.643	0.361

Notes: Tobit regression estimates based on HETUS wave 2010 data. Dependent variable is relative housework censored at 0 and 1. All models additionally control for year, month and day of a week fixed effects. The estimates account for combined individual response and day weight.

Table A3. Sample countries macro-level indicators of gender equality over years when HETUS wave 2010 was conducted

Country	Year	Gender gap in employment, `pp	Gender gap in part-time employment, pp	Children under 3 y.o. in childcare, %	Females in top management positions, %	Females in top governmental positions, %	Unadjusted gender wage gap, %
BE	2013	10,20	31,60	46,00	16,70	39,70	7,50
DE	2013	9,50	43,50	28,00	21,50	35,70	22,10
EE	2009	10,40	6,20	25,00	6,40	21,80	27,60
EL	2013	19,50	7,80	14,00	8,40	21,00	15,00
FI	2009	2,20	10,20	27,00	23,60	40,00	20,80
FR	2010	7,90	24,90	43,00	12,30	20,40	15,60
LU	2014	12,90	30,90	49,00	11,70	28,30	5,40
PL	2013	13,70	6,00	5,00	12,30	22,30	7,10
RO	2012	17,20	-0,80	15,00	7,80	9,90	6,90
UK	2014	9,80	12,00	28,90	24,20	23,70	20,90

Sources: Macro-level indicators are available at https://ec.europa.eu/eurostat/web/main/data/database

Notes: The indicators are defined as (i) male-female gap in employment; (ii) female-male gap in part-time employment; (iii) male-female unadjusted wage gap; (iv) the percentage of children (under 3 years old) cared for by formal arrangements other than by the family; (v) share of female board members and executives in the largest publicly listed companies; (vi) the proportion of women in national parliaments and national governments

Table A4. Children and labour market outcomes: variables and definitions

Variable	Definition
Individual characteristics	*(Defining the demographic group - dg)*
female	Gender (0/1)
prim_edu	Primary Education (0/1)
sec_educ	Secondary Education (0/1)
ter_educ	Tertiary Education (0/1)
age20_29	20 to 29 years-old (0/1)
age30_39	30 to 39 years-old (0/1)
age40_49	40 to 49 years-old (0/1)
age50_59	50 to 59 years-old (0/1)
age60_	60 years-old and more (0/1)
no_child	No children (0/1)
two_child_more	One child (0/1)
two_child_more	Two children or more (0/1)
Labour market outcomes	
lab force	In the labour force (% of the dg population)
employed	In employment (% of the dg population)
hours	Number of hours worked per week (dg average of employed individuals)
self	Self-employed (% of the dg total employment)
Full_time	Employed on a full-time contract (% of the dg total employment)
Permanent	Employed on a permanent contract (% of the dg total employment)
hwage	Real hourly wage (average of real hourly wage of employees in the dg)
hearnings	Real hourly earnings from dependent work or self-employment (dg average of real hourly earnings)
Other individual characteristics	
health	Self-perceived general health (dg average) (ranging from 1 – very good to 5 very bad)
migrant	Born outside the country of residence (% of the dg population)
partner_house	Married or in a consensual union (% of the dg population)
respond	Person responding the household questionnaire (% of the dg population)
Household characteristics	
rel_disp_eq_income	Disposable equivalised household income relative to the country/year average (dg average)
nhousehold	Household size (dg average)
household_d	Household dependency ratio (n of 0-14 y.o. + n of 65+/n of 15-64) (dg average)
elderly_d	Elderly dependency ratio (n of 65+/n of 15-64) (dg average)
n_care_hh	Total months spent in domestic/caregiving tasks in the household (dg average)
labour force participation rate	Share of adult household components in the labour force (dg average)
single_parent	Households in which children are associated to only one parent (%in the dg)
breadwinner_m	Household with a male breadwinner (%in the dg)
Country-level controls	
ur	Unemployment rate
lr_pc_gdp	Real per capita GDP (log)
s_emp_sec	Share of employment in the secondary sector
s_emp_ter	Share of employment in the tertiary sector

Notes: Elaborations from EU-SILC data and Eurostat data (country-level indicators)

Table A5. Gender gap in labour market outcomes and parenthood (macro groups)

		total	no_child	one_child	two_child_more
(1) Labour force	South	-0.144***	-0.120***	-0.232***	-0.274***
		(0.008)	(0.006)	(0.014)	(0.014)
	Cont	-0.098***	-0.070***	-0.140***	-0.196***
		(0.004)	(0.004)	(0.008)	(0.010)
	North	-0.068***	-0.051***	-0.100***	-0.125***
		(0.005)	(0.006)	(0.009)	(0.011)
	East	-0.104***	-0.101***	-0.184***	-0.136***
		(0.004)	(0.004)	(0.014)	(0.024)
(2) Employment	South	-0.142***	-0.104***	-0.256***	-0.297***
		(0.008)	(0.007)	(0.014)	(0.013)
	Cont	-0.091***	-0.057***	-0.151***	-0.206***
		(0.005)	(0.005)	(0.008)	(0.011)
	North	-0.046***	-0.024***	-0.112***	-0.133***
		(0.003)	(0.005)	(0.010)	(0.011)
	East	-0.084***	-0.082***	-0.217***	-0.190***
		(0.004)	(0.004)	(0.013)	(0.019)
(3) Hours	South	-7.178***	-6.617***	-10.450***	-10.885***
		(0.776)	(0.855)	(1.668)	(1.639)
	Cont	-9.765***	-8.672***	-15.657***	-16.915***
		(0.722)	(0.801)	(1.327)	(1.733)
	North	-5.127***	-4.002***	-5.191***	-6.646***
		(0.743)	(0.913)	(1.831)	(1.711)
	East	-3.720***	-4.215***	-4.009***	-4.109**
		(0.507)	(0.692)	(1.207)	(1.866)
(4) Full-time	South	-0.080***	-0.066***	-0.165***	-0.200***
		(0.009)	(0.007)	(0.019)	(0.021)
	Cont	-0.200***	-0.170***	-0.311***	-0.406***
		(0.013)	(0.009)	(0.033)	(0.026)
	North	-0.100***	-0.080***	-0.122***	-0.170***
		(0.016)	(0.017)	(0.019)	(0.032)
	East	-0.028***	-0.032***	-0.031***	-0.045***
		(0.003)	(0.004)	(0.005)	(0.008)
(5) Permanent	South	-0.030***	-0.033***	-0.004	-0.009
		(0.005)	(0.006)	(0.008)	(0.008)
	Cont	-0.036***	-0.040***	-0.029***	-0.041***
		(0.005)	(0.006)	(0.007)	(0.006)
	North	-0.012***	-0.011***	-0.006	0.008
		(0.003)	(0.004)	(0.008)	(0.006)
	East	0.026***	0.033***	-0.007	-0.002
		(0.005)	(0.007)	(0.006)	(0.011)
(6) Self-employment	South	-0.098***	-0.101***	-0.070***	-0.081***
		(0.005)	(0.006)	(0.009)	(0.006)
	Cont	-0.061***	-0.058***	-0.062***	-0.072***
		(0.003)	(0.004)	(0.005)	(0.005)

	North	-0.081***	-0.066***	-0.060***	-0.058***
		(0.005)	(0.008)	(0.010)	(0.010)
	East	-0.051***	-0.048***	-0.074***	-0.022**
		(0.003)	(0.004)	(0.007)	(0.009)
(7) Hourly wage	South	-0.151**	-0.160**	-0.233**	-0.336**
		(0.059)	(0.070)	(0.115)	(0.132)
	Cont	-0.035	0.005	-0.055	-0.314***
		(0.047)	(0.059)	(0.090)	(0.106)
	North	-0.050	-0.021	-0.129	-0.284**
		(0.055)	(0.073)	(0.122)	(0.120)
	East	-0.076***	-0.095***	-0.304***	-0.384*
		(0.029)	(0.031)	(0.091)	(0.198)
(8) Hourly earnings	South	-0.194***	-0.193***	-0.102	-0.215**
		(0.041)	(0.049)	(0.101)	(0.106)
	Cont	-0.196***	-0.153*	-0.129	-0.413***
		(0.071)	(0.086)	(0.079)	(0.086)
	North	-0.016	0.004	-0.069	-0.106
		(0.044)	(0.056)	(0.090)	(0.111)
	East	-0.091***	-0.121***	-0.265***	-0.166
		(0.030)	(0.033)	(0.082)	(0.105)

Source: Own elaborations on EU-SILC data

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. South (Southern European countries): Cyprus, Greece, Italy, Spain, and Portugal; Cont (Continental European countries): Austria, Belgium, France, Germany, Netherlands, and Luxembourg; North (Northern European countries): Denmark, Finland, Sweden, and Ireland; East (Eastern European countries): Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovak Republic. Complete estimates are available upon request.

Table A6. Gender gap in labour market outcomes and household characteristics

		(1) Labour foce	(2) Employment	(3) Hours	(4) Full-time	(5) Permanent	(6) Self-empl	(7) Hourly wage	(8) Hourly earn
(1) LF part rate									
Low	No child	-0.097***	-0.075***	-5.737***	-0.101***	-0.001	-0.062***	-0.035	-0.049*
	One_child	-0.175***	-0.189***	-9.758***	-0.174***	-0.008	-0.073***	-0.081	-0.104*
	Two child +	-0.357***	-0.341***	-12.267***	-0.355***	0.015	-0.062***	-0.360	-0.227*
High	No child	-0.034***	-0.026***	-5.224***	-0.081***	-0.003	-0.055***	-0.069**	-0.064***
	One_child	-0.143***	-0.170***	-10.766***	-0.197***	-0.030***	-0.055***	-0.278***	-0.233***
	Two child +	-0.180***	-0.201***	-10.958***	-0.226***	-0.026***	-0.066***	-0.202***	-0.179***
(2) Elder dep rate									
Low	No child	-0.111***	-0.098***	-3.150***	-0.032***	-0.004	-0.046***	0.002	0.062
	One_child	-0.167***	-0.189***	-9.960***	-0.192***	-0.018***	-0.065***	-0.153***	-0.140***
	Two child +	-0.201***	-0.216***	-10.634***	-0.245***	-0.019***	-0.068***	-0.256***	-0.215***
High	No child	-0.077***	-0.055***	-5.687***	-0.093***	-0.001	-0.062***	-0.049**	-0.083***
	One_child	-0.159***	-0.163***	-11.588***	-0.168***	-0.017*	-0.082***	-0.070	-0.032
	Two child +	-0.199***	-0.217***	-14.123***	-0.294***	-0.018	-0.077***	-0.031	-0.039
(3) Single parent									
Low	No child	-0.065***	-0.045***	-5.736***	-0.092***	0.002	-0.061***	-0.056**	-0.090***
	One_child	-0.240***	-0.242***	-6.882**	-0.153***	0.013	-0.043*	-0.425**	-0.216
	Two child +	-0.245***	-0.259***	-12.087***	-0.116***	0.001	-0.062***	-0.238	-0.080
High	No child	-0.128***	-0.102***	-4.308***	-0.064***	-0.007	-0.053***	-0.054	-0.052
	One_child	-0.162***	-0.180***	-10.775***	-0.203***	-0.014***	-0.070***	-0.148***	-0.159***
	Two child +	-0.182***	-0.196***	-11.685***	-0.270***	-0.021***	-0.070***	-0.278***	-0.264***
(4) Equiv income									
Low	No child	-0.092***	-0.062***	-5.759***	-0.098***	-0.000	-0.047***	-0.015	0.022
	One_child	-0.205***	-0.233***	-12.081***	-0.226***	-0.006	-0.082***	-0.234***	-0.207***
	Two child +	-0.256***	-0.280***	-13.180***	-0.306***	-0.013**	-0.080***	-0.290***	-0.255***
High	No child	-0.075***	-0.059***	-5.668***	-0.074***	0.001	-0.066***	-0.095***	-0.132***
	One_child	-0.119***	-0.134***	-8.375***	-0.146***	-0.020***	-0.051***	-0.124**	-0.113**

	Two child +	-0.149***	-0.161***	-9.035***	-0.195***	-0.026***	-0.059***	-0.155**	-0.141**
(5) Breadw male									
Low	No child	-0.082***	-0.064***	-5.407***	-0.074***	-0.009**	-0.070***	-0.085***	-0.118***
	One_child	-0.148***	-0.162***	-9.690***	-0.171***	-0.016***	-0.070***	-0.206***	-0.177***
	Two child +	-0.177***	-0.193***	-11.959***	-0.275***	-0.022***	-0.075***	-0.266***	-0.209***
High	No child	-0.180***	-0.178***	-14.095***	-0.143***	0.046*	-0.118***	-0.157	-0.092
	One_child	-0.237***	-0.265***	-15.137***	-0.327***	-0.020**	-0.067***	0.013	-0.039
	Two child +	-0.248***	-0.265***	-9.793***	-0.099	-0.011	-0.045***	-0.211**	-0.145*
(6) Breadw female									
Low	No child	-0.087***	-0.072***	-7.588***	-0.161***	-0.005	-0.083***	-0.112**	-0.195***
	One_child	-0.204***	-0.230***	-12.483***	-0.219***	-0.025***	-0.070***	-0.175***	-0.163***
	Two child +	-0.229***	-0.247***	-10.987***	-0.245***	-0.029***	-0.063***	-0.252***	-0.211***
High	No child	-0.085***	-0.062***	-3.792***	-0.029***	0.009	-0.048***	-0.097***	-0.055*
	One_child	-0.137***	-0.145***	-7.435***	-0.122***	-0.003	-0.064***	-0.157**	-0.112*
	Two child +	-0.166***	-0.173***	-13.681***	-0.299***	0.001	-0.081***	-0.221*	-0.156

Source: Own elaborations on EU-SILC data

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. South (Southern European countries): Cyprus, Greece, Italy, Spain, and Portugal; Cont (Continental European countries): Austria, Belgium, France, Germany, Netherlands, and Luxembourg; North (Northern European countries): Denmark, Finland, Sweden, and Ireland; East (Eastern European countries): Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovak Republic. Complete estimates are available upon request.

Table A7. Policy reforms variables: definition, source and number of countries

Variables	Description	Source	n. countries
Binary variables			
child_care	Expanding access to childcare (0 before the reform, 1 after the reform)	Labref – Labour Market Reform Database	16
par_leave	Expanding parental leave (0 before the reform, 1 after the reform)	Labref – Labour Market Reform Database	16
work_family_bal	Facilitating work-life balance (0 before the reform, 1 after the reform)	Labref – Labour Market Reform Database	9
gen_bal_par	Favouring gender-balanced parenting (0 before the reform, 1 after the reform)	Labref – Labour Market Reform Database	15
child_support	Increasing child support measures (0 before the reform, 1 after the reform)	Labref – Labour Market Reform Database	20
Ordered/continuous variables			
length_maternity	Length of maternity leave (n of weeks)	International Network on Leave Policies & Research	22
length_paternity	Length of paternity leave (n of weeks)	International Network on Leave Policies & Research	22
paid_maternity	Paid maternity leave (0: doesn't exist; 1: unpaid; 2: paid (<66% income); 3: well paid (>66% income))	International Network on Leave Policies & Research	22
paid_paternity	Paid paternity leave (0: doesn't exist; 1: unpaid; 2: paid (<66% income); 3: well paid (>66% income))	International Network on Leave Policies & Research	22
ps_family_ben	Public spending on family benefits (% GDP)	Oecd Family Database	22
ps_early_ed_care	Public spending on early education and care (% GDP)	Oecd Family Database	22

Table A8. Effects of reforms on the gender gap in full-time employment (0 before the reform, 1 after the reform)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	-0.052***	-0.041***	-0.166***	-0.243***
	(0.014)	(0.012)	(0.031)	(0.046)
child_care	0.005	0.006	0.008	-0.011
	(0.012)	(0.011)	(0.016)	(0.020)
female * Child_care	-0.006	-0.005	-0.021	0.024
	(0.019)	(0.016)	(0.027)	(0.037)
(2)				
female	-0.108***	-0.086***	-0.225***	-0.300***
	(0.015)	(0.014)	(0.023)	(0.033)
par_leave	-0.019	-0.008	-0.045***	-0.067***
	(0.012)	(0.011)	(0.015)	(0.019)
female * par_leave	0.036*	0.019	0.069***	0.114***
	(0.019)	(0.016)	(0.026)	(0.034)
(3)				
female	-0.042**	-0.049**	-0.049	0.036
	(0.021)	(0.019)	(0.031)	(0.064)
work_family_bal	0.010	0.007	0.014	0.013
	(0.016)	(0.014)	(0.020)	(0.029)
female * work_family_bal	-0.029	-0.027	-0.027	-0.058
	(0.026)	(0.021)	(0.034)	(0.057)
(4)				
female	-0.065***	-0.058***	-0.126***	-0.176***
	(0.009)	(0.008)	(0.015)	(0.018)
gen_bal_par	0.000	0.001	-0.002	-0.011
	(0.006)	(0.006)	(0.008)	(0.009)
female * gen_bal_par	-0.014	-0.014	-0.011	-0.011
	(0.011)	(0.009)	(0.014)	(0.019)
(5)				
female	-0.111***	-0.097***	-0.182***	-0.259***
	(0.007)	(0.008)	(0.013)	(0.019)
child_support	-0.007	-0.001	-0.015	-0.040***
	(0.006)	(0.007)	(0.010)	(0.013)
female * child_support	0.030***	0.020***	0.042***	0.084***
	(0.006)	(0.007)	(0.010)	(0.013)

Source: Own elaborations on EU-SILC data.

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

Table A9. Effects of reforms on the gender gap in full-time employment (continuous and ordered variables)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	-0.179***	-0.152***	-0.296***	-0.340***
	(0.018)	(0.016)	(0.025)	(0.028)
length_maternity	-0.002***	-0.002***	-0.004***	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)
female * length_maternity	0.004***	0.003***	0.006***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)
(2)				
female	-0.151***	-0.130***	-0.267***	-0.333***
	(0.010)	(0.010)	(0.016)	(0.019)
length_paternity	-0.001	0.001	-0.010***	-0.012***
	(0.002)	(0.002)	(0.002)	(0.002)
female * length_paternity	0.015***	0.012***	0.024***	0.030***
	(0.002)	(0.001)	(0.002)	(0.003)
(3)				
female	-0.153***	-0.142***	-0.230***	-0.275***
	(0.016)	(0.015)	(0.021)	(0.032)
paid_maternity	-0.008	-0.010	-0.008	-0.013
	(0.008)	(0.009)	(0.011)	(0.008)
female * paid_maternity	0.014***	0.015***	0.012**	0.009
	(0.005)	(0.004)	(0.006)	(0.008)
(4)				
female	-0.137***	-0.115***	-0.275***	-0.308***
	(0.018)	(0.015)	(0.031)	(0.036)
paid_paternity	-0.009**	-0.007	-0.023***	-0.013**
	(0.004)	(0.004)	(0.006)	(0.006)
Female * paid_paternity	0.011*	0.007	0.031***	0.023**
	(0.006)	(0.005)	(0.010)	(0.011)
(5)				
female	0.008	0.006	-0.063*	-0.134***
	(0.023)	(0.021)	(0.034)	(0.049)
ps_family_ben	0.022**	0.021**	0.023**	0.021*
	(0.010)	(0.011)	(0.009)	(0.012)
female * ps_family_ben	-0.044***	-0.038***	-0.049***	-0.042**
	(0.008)	(0.007)	(0.012)	(0.017)
(6)				
female	-0.045***	-0.039***	-0.140***	-0.205***
	(0.014)	(0.013)	(0.029)	(0.036)
ps_early_ed_care	-0.015	-0.021	-0.019	-0.017
	(0.018)	(0.019)	(0.024)	(0.025)
female* ps_early_ed_care	-0.077***	-0.069***	-0.061***	-0.050*
	(0.014)	(0.012)	(0.022)	(0.027)

Source: Own elaborations on EU-SILC data.

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

Table A10. Effects of reforms on the gender gap in permanent employment (0 before the reform, 1 after the reform)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	0.008*	0.006	-0.002	-0.004
	(0.005)	(0.005)	(0.006)	(0.007)
child_care	0.004	0.004	0.009*	0.005
	(0.004)	(0.005)	(0.004)	(0.004)
female * child_care	-0.001	0.002	-0.008*	-0.006
	(0.005)	(0.005)	(0.004)	(0.005)
(2)				
female	0.004	0.002	-0.005	-0.011*
	(0.005)	(0.005)	(0.005)	(0.006)
par_leave	-0.002	-0.003	0.001	0.003
	(0.005)	(0.006)	(0.005)	(0.004)
female * par_leave	0.002	0.004	-0.009**	0.001
	(0.005)	(0.006)	(0.004)	(0.005)
(3)				
female	0.005	0.001	-0.006	-0.012
	(0.007)	(0.008)	(0.009)	(0.013)
work_family_bal	-0.009	-0.007	-0.012*	-0.010*
	(0.006)	(0.007)	(0.007)	(0.005)
female * work_family_bal	0.013*	0.019**	-0.008	0.002
	(0.007)	(0.009)	(0.006)	(0.007)
(4)				
female	0.005	0.002	-0.010*	-0.016***
	(0.005)	(0.005)	(0.006)	(0.006)
gen_bal_par	-0.005	-0.006	0.003	-0.001
	(0.005)	(0.005)	(0.005)	(0.004)
female * gen_bal_par	0.011**	0.015***	-0.005	0.001
	(0.005)	(0.006)	(0.004)	(0.005)
(5)				
female	-0.000	-0.003	-0.008	-0.008
	(0.005)	(0.006)	(0.006)	(0.006)
child_support	0.003	0.002	0.006	0.002
	(0.004)	(0.005)	(0.004)	(0.004)
female * child_support	0.004	0.005	-0.002	0.001
	(0.005)	(0.006)	(0.004)	(0.004)

Source: Own elaborations on EU-SILC data.

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

Table A11. Effects of reforms on the gender gap in permanent employment (continuous and ordered variables)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	0.000	-0.000	-0.023***	-0.019***
	(0.005)	(0.006)	(0.006)	(0.006)
length_maternity	-0.001***	-0.001**	-0.001***	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
female * length_maternity	-0.000	-0.000	-0.000	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
(2)				
female	-0.003	-0.005	-0.025***	-0.025***
	(0.003)	(0.004)	(0.005)	(0.005)
length_paternity	0.007***	0.007***	0.005***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)
female * length_paternity	0.001	0.001	0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)
(3)				
female	0.010**	0.012**	-0.012**	-0.012**
	(0.005)	(0.006)	(0.006)	(0.005)
paid_maternity	-0.010	-0.011	-0.007	-0.002
	(0.006)	(0.008)	(0.006)	(0.005)
female * paid_maternity	-0.004***	-0.005***	-0.004***	-0.005***
	(0.001)	(0.001)	(0.002)	(0.001)
(4)				
female	-0.009	-0.012*	-0.024***	-0.033***
	(0.006)	(0.007)	(0.005)	(0.006)
paid_paternity	-0.004*	-0.004	-0.004*	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)
Female * paid_paternity	0.003	0.004*	0.000	0.003**
	(0.002)	(0.003)	(0.001)	(0.002)
(5)				
female	-0.001	-0.002	-0.028***	-0.028***
	(0.005)	(0.006)	(0.007)	(0.007)
ps_family_ben	0.004	0.004	-0.000	0.003
	(0.004)	(0.004)	(0.004)	(0.003)
female * ps_family_ben	0.001	0.001	0.003	0.002
	(0.002)	(0.002)	(0.002)	(0.002)
(6)				
female	-0.000	-0.004	-0.015**	-0.024***
	(0.005)	(0.005)	(0.006)	(0.006)
ps_early_ed_care	0.007	0.010	-0.002	-0.001
	(0.010)	(0.011)	(0.010)	(0.010)
female* ps_early_ed_care	0.004	0.007	-0.006	0.003
	(0.005)	(0.006)	(0.005)	(0.004)

Source: Own elaborations on EU-SILC data.

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

Table A12. Effects of reforms on the gender gap in self-employment (0 before the reform, 1 after the reform)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	-0.068***	-0.065***	-0.081***	-0.084***
	(0.004)	(0.005)	(0.005)	(0.005)
child_care	0.004	0.003	0.004	0.010**
	(0.004)	(0.004)	(0.005)	(0.004)
female * Child_care	0.005	0.007	0.000	0.005
	(0.004)	(0.005)	(0.005)	(0.004)
(2)				
female	-0.072***	-0.070***	-0.071***	-0.077***
	(0.004)	(0.005)	(0.005)	(0.005)
par_leave	-0.021***	-0.022***	-0.010**	-0.020***
	(0.005)	(0.006)	(0.005)	(0.005)
female * par_leave	0.011**	0.011**	0.008*	0.015***
	(0.005)	(0.006)	(0.005)	(0.005)
(3)				
female	-0.043***	-0.039***	-0.060***	-0.042***
	(0.004)	(0.004)	(0.009)	(0.013)
work_family_bal	0.004	0.008	-0.011*	-0.020***
	(0.005)	(0.006)	(0.007)	(0.007)
female * work_family_bal	0.001	-0.001	0.016**	0.011**
	(0.004)	(0.005)	(0.007)	(0.006)
(4)				
female	-0.063***	-0.063***	-0.064***	-0.064***
	(0.004)	(0.005)	(0.005)	(0.007)
gen_bal_par	-0.007	-0.008	-0.006	-0.001
	(0.005)	(0.006)	(0.004)	(0.005)
female * gen_bal_par	0.007	0.009	0.003	0.007
	(0.005)	(0.006)	(0.005)	(0.005)
(5)				
female	-0.059***	-0.056***	-0.065***	-0.067***
	(0.004)	(0.005)	(0.005)	(0.007)
child_support	-0.014***	-0.013**	-0.014***	-0.016***
	(0.005)	(0.005)	(0.004)	(0.004)
female * child_support	0.008*	0.008	0.007	0.008*
	(0.004)	(0.005)	(0.004)	(0.005)

Source: Own elaborations on EU-SILC data.

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

Table A13. Effects of reforms on the gender gap in self-employment (continuous and ordered variables)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	-0.044*** (0.007)	-0.037*** (0.008)	-0.054*** (0.006)	-0.067*** (0.006)
length_maternity	0.001** (0.000)	0.001* (0.000)	0.001* (0.000)	0.001** (0.000)
female * length_maternity	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001* (0.000)
(2)				
female	-0.070*** (0.003)	-0.066*** (0.004)	-0.075*** (0.004)	-0.084*** (0.004)
length_paternity	-0.001 (0.001)	-0.001 (0.001)	-0.002** (0.001)	-0.001 (0.001)
female * length_paternity	0.003*** (0.001)	0.002*** (0.001)	0.002*** (0.001)	0.003*** (0.001)
(3)				
female	-0.089*** (0.007)	-0.088*** (0.008)	-0.087*** (0.006)	-0.097*** (0.006)
paid_maternity	-0.001 (0.005)	0.001 (0.006)	-0.004 (0.009)	-0.002 (0.004)
female * paid_maternity	0.009*** (0.002)	0.010*** (0.003)	0.006*** (0.002)	0.008*** (0.002)
(4)				
female	-0.074*** (0.005)	-0.070*** (0.006)	-0.083*** (0.005)	-0.089*** (0.005)
paid_paternity	0.004* (0.002)	0.005* (0.003)	0.002 (0.003)	0.002 (0.003)
Female * paid_paternity	0.005*** (0.002)	0.005** (0.002)	0.006*** (0.002)	0.005*** (0.002)
(5)				
female	-0.053*** (0.007)	-0.047*** (0.008)	-0.076*** (0.007)	-0.067*** (0.008)
ps_family_ben	0.009** (0.004)	0.010** (0.004)	-0.001 (0.003)	0.006* (0.004)
female * ps_family_ben	-0.003 (0.002)	-0.005* (0.003)	0.002 (0.002)	-0.001 (0.002)
(6)				
female	-0.058*** (0.005)	-0.052*** (0.006)	-0.071*** (0.006)	-0.078*** (0.006)
ps_early_ed_care	0.023* (0.012)	0.023* (0.013)	0.008 (0.012)	0.020* (0.011)
female* ps_early_ed_care	-0.007 (0.005)	-0.010* (0.006)	0.003 (0.005)	0.008* (0.005)

Source: Own elaborations on EU-SILC data.

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

Table A14. Effects of reforms on the gender gap in hourly wage (0 before the reform, 1 after the reform)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	-0.112***	-0.099***	-0.111*	-0.232**
	(0.026)	(0.032)	(0.058)	(0.095)
child_care	-0.000	0.009	-0.039	-0.002
	(0.034)	(0.042)	(0.041)	(0.044)
female * Child_care	0.009	0.025	-0.083**	0.014
	(0.028)	(0.036)	(0.041)	(0.047)
(2)				
female	-0.105***	-0.081**	-0.206***	-0.275***
	(0.026)	(0.032)	(0.058)	(0.072)
par_leave	0.022	0.006	0.125***	0.024
	(0.036)	(0.044)	(0.048)	(0.048)
female * par_leave	0.012	0.023	-0.034	0.003
	(0.031)	(0.040)	(0.043)	(0.050)
(3)				
female	-0.081**	-0.078*	-0.249***	-0.311***
	(0.035)	(0.042)	(0.080)	(0.108)
work_family_bal	-0.085*	-0.082	-0.011	-0.181***
	(0.049)	(0.057)	(0.056)	(0.060)
female * work_family_bal	0.043	0.046	0.016	0.123**
	(0.041)	(0.051)	(0.053)	(0.056)
(4)				
female	-0.120***	-0.112***	-0.220***	-0.294***
	(0.024)	(0.028)	(0.059)	(0.081)
gen_bal_par	-0.069**	-0.085**	0.006	-0.005
	(0.033)	(0.038)	(0.047)	(0.046)
female * gen_bal_par	0.032	0.046	0.016	-0.045
	(0.032)	(0.040)	(0.041)	(0.052)
(5)				
female	-0.103***	-0.094***	-0.187***	-0.242***
	(0.025)	(0.031)	(0.053)	(0.073)
child_support	-0.115***	-0.131***	-0.031	-0.089**
	(0.030)	(0.035)	(0.042)	(0.044)
female * child_support	0.030	0.043	0.005	-0.029
	(0.026)	(0.034)	(0.036)	(0.046)

Source: Own elaborations on EU-SILC data.

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

Table A15. Effects of reforms on the gender gap in hourly wage (continuous and ordered variables)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	-0.115***	-0.075	-0.210***	-0.392***
	(0.040)	(0.053)	(0.066)	(0.066)
length_maternity	-0.005**	-0.005**	-0.007***	-0.004
	(0.002)	(0.002)	(0.002)	(0.004)
female * length_maternity	0.002	0.001	0.003	0.007***
	(0.002)	(0.002)	(0.003)	(0.002)
(2)				
female	-0.090***	-0.070**	-0.170***	-0.313***
	(0.024)	(0.028)	(0.056)	(0.063)
length_paternity	0.007	0.009	-0.005	0.004
	(0.009)	(0.009)	(0.010)	(0.013)
female * length_paternity	0.004	0.004	0.003	0.012*
	(0.004)	(0.005)	(0.006)	(0.006)
(3)				
female	-0.033	0.006	-0.143	-0.263***
	(0.039)	(0.047)	(0.091)	(0.061)
paid_maternity	0.036	0.040	0.062	0.006
	(0.049)	(0.056)	(0.071)	(0.085)
female * paid_maternity	-0.016	-0.022	-0.006	-0.001
	(0.012)	(0.014)	(0.026)	(0.015)
(4)				
female	-0.144***	-0.141***	-0.209***	-0.225***
	(0.031)	(0.037)	(0.060)	(0.067)
paid_paternity	0.006	0.009	0.015	-0.016
	(0.019)	(0.022)	(0.019)	(0.020)
Female * paid_paternity	0.027**	0.036**	0.018	-0.014
	(0.011)	(0.014)	(0.014)	(0.017)
(5)				
female	-0.078*	-0.057	-0.091	-0.337***
	(0.042)	(0.053)	(0.074)	(0.098)
ps_family_ben	0.075**	0.087**	0.029	0.026
	(0.033)	(0.037)	(0.039)	(0.048)
female * ps_family_ben	0.002	0.003	-0.022	0.033
	(0.016)	(0.020)	(0.022)	(0.027)
(6)				
female	-0.114***	-0.103***	-0.178***	-0.262***
	(0.029)	(0.034)	(0.066)	(0.072)
ps_early_ed_care	0.152	0.144	0.028	0.308**
	(0.093)	(0.103)	(0.132)	(0.135)
female* ps_early_ed_care	0.064**	0.087**	0.038	0.009
	(0.032)	(0.040)	(0.054)	(0.047)

Source: Own elaborations on EU-SILC data.

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

Table A16. Effects of reforms on the gender gap in hourly earnings (0 before the reform, 1 after the reform)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	-0.088***	-0.059**	-0.137***	-0.160***
	(0.025)	(0.030)	(0.051)	(0.052)
child_care	0.004	0.022	-0.061*	-0.012
	(0.030)	(0.035)	(0.035)	(0.033)
female * Child_care	-0.044	-0.042	-0.059	0.007
	(0.030)	(0.036)	(0.036)	(0.035)
(2)				
female	-0.111***	-0.092**	-0.157***	-0.221***
	(0.031)	(0.036)	(0.046)	(0.057)
par_leave	0.055**	0.050	0.104***	0.029
	(0.027)	(0.032)	(0.038)	(0.034)
female * par_leave	-0.027	-0.024	-0.063*	0.040
	(0.033)	(0.040)	(0.038)	(0.041)
(3)				
female	-0.057*	-0.045	-0.155**	-0.247**
	(0.031)	(0.038)	(0.067)	(0.097)
work_family_bal	-0.022	-0.016	-0.034	-0.107*
	(0.041)	(0.047)	(0.046)	(0.056)
female * work_family_bal	-0.011	-0.019	-0.004	0.121**
	(0.037)	(0.043)	(0.050)	(0.047)
(4)				
female	-0.132***	-0.130***	-0.158***	-0.179***
	(0.023)	(0.027)	(0.049)	(0.065)
gen_bal_par	-0.068**	-0.083**	-0.012	-0.007
	(0.029)	(0.033)	(0.039)	(0.039)
female * gen_bal_par	0.020	0.022	0.024	0.022
	(0.030)	(0.035)	(0.037)	(0.041)
(5)				
female	-0.076**	-0.060*	-0.126***	-0.152**
	(0.029)	(0.035)	(0.047)	(0.059)
child_support	-0.036	-0.039	-0.003	-0.041
	(0.029)	(0.034)	(0.037)	(0.034)
female * child_support	-0.008	-0.002	-0.028	-0.017
	(0.031)	(0.038)	(0.034)	(0.038)

Source: Own elaborations on EU-SILC data.

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

Table A17. Effects of reforms on the gender gap in hourly earnings (continuous and ordered variables)

	(1) total	(2) no_child	(3) one_child	(4) two_child_more
(1)				
female	-0.134*** (0.038)	-0.105** (0.047)	-0.173*** (0.058)	-0.295*** (0.050)
lengthmaternity	-0.004** (0.002)	-0.004** (0.002)	-0.004** (0.002)	-0.003 (0.002)
c.female#c.lengthmaternity	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.003 (0.002)
(2)				
female	-0.157*** (0.026)	-0.148*** (0.029)	-0.174*** (0.045)	-0.278*** (0.048)
lengthpaternity	0.005 (0.008)	0.006 (0.008)	0.001 (0.009)	0.010 (0.010)
c.female#c.lengthpaternity	0.017*** (0.005)	0.020*** (0.006)	0.004 (0.005)	0.009 (0.006)
(4)				
female	0.051 (0.036)	0.113*** (0.041)	-0.085 (0.089)	-0.242*** (0.046)
paidmaternity	0.096** (0.046)	0.130*** (0.049)	0.079 (0.071)	-0.079 (0.049)
c.female#c.paidmaternity	-0.055*** (0.012)	-0.071*** (0.013)	-0.025 (0.027)	-0.001 (0.012)
(5)				
female	-0.184*** (0.041)	-0.186*** (0.048)	-0.186*** (0.052)	-0.243*** (0.051)
paidpaternity	-0.021 (0.019)	-0.023 (0.022)	0.001 (0.017)	-0.003 (0.015)
c.female#c.paidpaternity	0.032** (0.014)	0.041** (0.016)	0.010 (0.014)	0.000 (0.013)
(7)				
female	-0.160*** (0.039)	-0.139*** (0.049)	-0.160*** (0.061)	-0.311*** (0.067)
psfamilybenefits	0.016 (0.031)	0.014 (0.033)	0.037 (0.034)	0.013 (0.038)
c.female#c.psfamilybenefits	0.027* (0.015)	0.027 (0.018)	0.006 (0.020)	0.034* (0.020)
(8)				
female	-0.197*** (0.029)	-0.195*** (0.033)	-0.216*** (0.056)	-0.252*** (0.054)
psccandee	0.089 (0.084)	0.081 (0.091)	0.057 (0.123)	0.074 (0.130)
c.female#c.psccandee	0.141*** (0.030)	0.171*** (0.037)	0.084* (0.049)	0.034 (0.039)

Source: Own elaborations on EU-SILC data.

Notes: Weighted OLS estimates (weights: population share of the demographic group in the country/year); Robust SE clustered at country/year level; all regressions include time and country fixed effects. Complete estimates are available upon request.

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