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Comparative analysis of the motherhood gap in employment and wages: The role of family policies and their interaction

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**BUDAPEST WORKING PAPERS
ON THE LABOUR MARKET**

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employment and wages: the role of family policies and
their interaction**

EWA CUKROWSKA-TORZEWSKA

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Comparative analysis of the motherhood gap in employment and wages:
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Comparative analysis of the motherhood gap in employment and wages: the role of family policies and their interaction

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Abstract

The paper documents employment and wage gaps, which arise between mothers and childless women, for a set of 28 European countries. The role of family policies in explaining these inequalities is then examined by looking at a single policy as well as childcare and leave policies interaction. The findings from the fixed effects model reveal that childcare coverage for small children and the length of maternity and paid parental leaves are important for explaining the size of the motherhood gap in employment. The impact of the leaves depends, however, on childcare availability: long maternity leaves combined with high childcare coverage lead to greater employment gap than when the coverage is low. The results do not prove that the interaction effect is present for the motherhood wage gap, which is found to be predominantly affected by the length of paid parental leave.

Keywords: family gap, maternal employment, family policies, childcare

JEL codes: J13, J18, J22, J31

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Az anyasági bér- és foglalkoztatottsági különbségek komparatív elemzése: a családpolitikák és interakcióik szerepe

Ewa Cukrowska-Torzewska

Összefoglaló

A tanulmány az anyák és gyermektelen nők közötti bér- és foglalkoztatottsági különbségeket dokumentálja 28 európai országban. Ezután megvizsgálja a családpolitikák szerepét ezek eléréseinek megmagyarázásában, mind külön-külön, mind az egyes elemek interakcióinak hatását vizsgálva. A fixhatásos modell eredményei azt mutatják, hogy a legfiatalabb korosztály gyermekellátása, az anyasági, valamint a fizetett szülői távollétek hossza jelentősen hozzájárulnak az anyasági foglalkoztatottsági különbséghez. A távollétek hatása függ azonban a gyermekellátás elérhetőségétől: a hosszú anyasági távollét negatív hatása nagyobb, amennyiben a gyermekellátás bőséges. Az anyasági bérkülönbség esetében nem található interakciós hatás, amelyet leginkább a fizetett távollét hossza határoz meg.

Tárgyszavak: szülői különbség, anyai munkapiaci aktivitás, családpolitikák, gyermekellátás

JEL kódok: J13, J18, J22, J31

1. INTRODUCTION

Despite the global upward trend in the labor force participation of women, there are still high differences between the countries in that respect (OECD, 2015). Similarly, in the recent years most of the countries experienced a decrease in the gender wage gap but its size still significantly varies. Countries also differ in the labor market inequalities that persist between parents and childless individuals. For example, Davies and Pierre (2005) and Budig, Misra, and Boeckmann (2012) report wage inequalities between mothers and childless women for several economies, showing that adverse effect of motherhood is not homogenous. Boeckmann, Misra and Budig (2015) moreover reveal that economically developed countries differ by mother-non-mother gap in employment and working time. Research looking at cross-country labor market inequalities caused by motherhood tends to link the uncovered country variation to macroeconomic determinants, such as overall wage inequality, labor market flexibility or women's employment rates. Most attention is, however, devoted to the role of institutions, and especially family policies, which are primarily intended for mothers to facilitate their work-family balance and labor market re-integration following the childbirth.

However, existing evidence on the role of family policies – especially with regards to motherhood wage gap - is still rather limited, which is caused by the problems in the identification of such inequalities. Because what the comparative research often does is to analyze mean differences in mothers' and childless women's outcomes and ignores individual level determinants and individual selection to motherhood. Research focusing on the wage inequality between mothers and childless women, however, proves that the gap partially results both from mothers' observed attributes – such as lower labor market experience – and unobserved factors, such as the ability or the commitment to family values. These results suggest that to provide reliable evidence on mothers' relative disadvantage and the role of institutions in explaining emerging cross-country differences, all these factors should be accounted for. Moreover, available cross-country research on the motherhood related labor market inequalities very often neglects Central and Eastern European countries that compared to Western Europe follow contrasting path of the evolution of family policies (Saxonberg, 2014).

The aim of this paper is to complement existing comparative research by analyzing the role of family policies in shaping motherhood related gaps that may not be attributed to individual – observed and unobserved – determinants of the labor market performance. The analysis concentrates on changes occurring around the childbirth both in employment and

wages. It provides evidence on motherhood induced employment and wage gaps for a set of twenty six European Union (EU) member states as well as Norway and Iceland. Having obtained the estimates, it confronts them with the variability of family policies across the countries, controlling for other macroeconomic factors. As opposed to existing comparative research, the paper looks not only at the effect of a single policy but also at the interaction effect of childcare and leave policies. Consistently with Leitner's concept of familialism (Leitner, 2003) the paper thus reveals whether the combination of childcare and leave policies leads to various forms of state support for the families with children, influencing gender roles and division of labor within the family as well.

The main findings suggest that family policies are important instruments shaping women's labor market inequalities induced by motherhood. Consistently with previous works, the analysis shows that greater availability of childcare increases mother's employment, lowering the employment gap between mothers and childless women. Longer maternity leaves are in turn found to increase the gap, as they negatively affect continuity of mothers' employment. Childcare availability, however, interacts with leave policies: when childcare is limited, longer maternity leave does not have as severe effect as when the childcare is relatively easy to access. The interaction effect of the policies is not found to be important for shaping wage inequalities, which are mainly affected by the length of paid parental leave.

The paper is structured into six main sections. The next section provides a literature review and presents existing theories concerning the variation in the labor market inequalities due to gender and parenthood. Section three discusses theoretical considerations related to the link between selected family policies and women's labor market outcomes. Section four focuses on the data sources and section five presents methods used for the empirical analysis. Finally, in section six main results are presented and carefully discussed. This section first presents country specific inequalities and then relates them to the variety of family policies across the countries. Section seven gives concluding remarks.

2. THEORETICAL FRAMEWORK: INSTITUTIONAL FACTORS DETERMINING WOMEN'S LABOR MARKET PERFORMANCES

Existing empirical research aiming at explaining cross country variation in women's employment patterns may be divided into two main research streams that dominate: 1) comparative welfare regimes theories; 2) culture based theories. The first approach studies employment patterns of women as a consequence of social policies and welfare states and argues that individual labor market performance is shaped by existing social policies and

family policies that aim to balance women's work and care activities (Kremer, 2007). The second approach in turn seeks to explain country variation in women's labor market activity within the framework of cultural attitudes and values and recognizes that they may vary according to the existing country specific gender relations and arrangements (Fernandez, 2007; Fortin, 2005; Kremer, 2007; Pfau-Effinger, 1998). The advocates of culture approach argue that welfare states and family policies cannot explain changes in employment patterns that are observed over time and these may be primarily attributed to social and cultural changes. From the sociological perspective Pfau-Effinger (1998) introduces the notions of 'gender culture', 'gender order' and 'gender arrangements' and argues that both family policies and cultural norms and attitudes interplay and contribute towards the division of labor in the families and women's employment patterns. It is, however, not clear whether there is a direct link between family policies and the cultural factors, and whether the latter influences the former (Kremer, 2007).¹

The above approaches to explain country differences in women's labor market activity are also incorporated into the research looking at country variation in mother's employment and motherhood related gap. Such approach is appropriate, especially that family policies are primarily intend for women that are raising children (Robila, 2014). For example, Keck and Saraceno (2013) look how certain family policies affect mother's employment patterns across European countries. They find that the most effective policy is the provision of childcare services for children aged below three years. Their findings also reveal that parental leaves positively affect mother's employment, unless they are too short. Boeckmann, Misra and Budig (2015) in turn analyze institutional determinants of cross-national variation in the gap between mothers and childless women in the labor force participation and working hours. Their findings indicate that well-paid leaves, publicly subsidized childcare for very young children and cultural support for maternal employment are associated with smaller inequalities. They also report that extended leaves, especially unpaid leaves, lead to a greater motherhood employment gap.²

¹ Empirically it is difficult to assess the role of cultural attitudes as there arise measurement problems and methodological concerns to separate economic and welfare states' general effects from 'pure' cultural effects. Some attempts, however, took place; for example Fernandez (2007) looks at different groups of migrants and argues that while there are subject to the same economic and institutional setting, they differ in culture and norms. Culture has been also tried to be identified through various indexes and variables describing views on child's development and women's employment (Budig, Misra, and Boeckmann, 2012).

² Other works concentrate on a single country and analyze how available family policies impact women's employment around the childbirth. For example, Lovasz and Szabo-Morvai (2013) use regression discontinuity design in the kindergarten enrollment cutoff date to investigate the impact of subsidized childcare availability on Hungarian mother's labor market participation. They find that childcare availability is associated with a 15% increase in mother's labor market participation, which is a smaller effect than previous studies.

On the other hand, family policies and cultural values are also likely to shape the gap in mother's and childless women's wages. For example, Davies and Pierre (2005) report the size of the wage penalty incurred by mothers for a number of European countries suggesting that family policies and cultural attitudes are likely to explain revealed country variation. Budig, Misra, and Boeckmann (2012) not only report the estimates of the family gap in wages but also test these explanations. They show that there is an interaction effect of policies and culture, so that the effect of policies depends on the perception of women's labor market activity and their caring role in the family. The analysis presented in Budig, Misra, and Boeckmann (2012) is, however, based on OLS estimation, which as shown by Davies and Pierre (2005) carries significant bias due to unobserved heterogeneity of mothers and childless women. Boeckmann and Budig (2013) also provide a comparative analysis of parenthood related wage inequalities among men and link the findings to cultural indicators capturing attitudes towards men's and women's employment and their child-related caring responsibilities.

The reviewed cross-country research suffers, however, from several limitations, which this analysis aims to address. First, as opposed to most of the comparative studies examining the role of policies, this research provides policy relevant evidence for motherhood induced inequality in employment and wages that eliminates the potential impact of unobserved individual factors. This means that the estimated gap between mothers and childless women accounts for existing heterogeneity between them, resulting from observable (e.g. differences in age, education and labor market experience) and unobservable sources (e.g. ability, family values). Second, it extends geographical scope of similar research by providing the estimates of the motherhood gap for a set of European countries, including EU member states from Central and Eastern Europe. Finally, drawing on Leitner (2003) this research tests the interaction effect of family policies by showing whether the role of leave policies varies by the provision of childcare for small children.

3. THE WAYS FAMILY POLICIES AFFECT WOMEN'S EMPLOYMENT AND WAGES

In socio-economic literature the term 'family policies' mostly refers to governmental actions aimed at families with children that intend to facilitate their work-family balance. In the empirical research, usually a certain set of policies restricted to leave arrangements, such as maternity, parental or paternity leaves, as well as childcare provision is considered (e.g. Budig, Misra, and Boeckmann, 2012; Gornick and Meyers, 2003; Pettit and Hook, 2009).

Based on the previous research, maternity and parental leaves are expected to impact mostly employment of women, who have children. In general, women's opportunity as employees to take up the leave around the childbirth is intended to facilitate their reentry to the labor market following the break and thus increase the continuity of their employment. Leave policies should therefore allow mothers to stay at the labor market and contribute towards their greater labor force attachment. However, as the previous research shows, the length of the leave matters for the probability of reentry and the relation is likely to be curvilinear (Budig, Misra, and Boeckmann, 2012). In general, very long leaves may discourage women to fully re-integrate into the labor market and lead to their skill and human capital depreciation (Keck and Saraceno, 2013). This may also apply to too short leaves, as they may force women to leave the job in order to stay with a child for a longer time.³ Given that, it is expected that very long maternity and parental leaves will lead to greater employment gap among mothers and childless women, contributing to a lower average level of female employment.

The length of the leaves may also impact women's productivity and employer's perception of mothers, and consequently their earnings. In particular, long leaves may negatively affect mother's earnings, as after a long break in employment they may become less productive and less effective at work. When long leaves are available, employers may also discriminate against mothers and penalize them by offering lower wages. Long maternity and parental leaves are thus expected to negatively impact mother's earnings, leading to greater wage inequalities due to motherhood.

On the other hand, greater accessibility to childcare is likely to positively affect mother's employment continuity leading to a smaller family gap in employment and higher female employment rates in general (Pettit and Hook 2005, 2009). The provision of childcare may also impact wages of mothers and the size of the incurred motherhood penalty in wages. Easily accessible childcare, which is expected to increase mother's chances of returning to job following the childbirth, will also lead to the shorter career breaks and thus lower wage penalty for motherhood (Pettit and Hook, 2005). Easily available childcare may moreover lead to greater productivity and effectiveness of workers that have children leading to their greater wages.

Childcare accessibility and the length of leaves for parents may, however, interact and result in a differentiated impact on women's labor market outcomes. Leitner (2003) argued that family policies may be characterized by their familialistic nature understood as 'the

³ Not only the length of the leave, but also the level of financial benefits received during the leaves matters. Generous financial benefits received during the leaves may encourage women to use all the leaves (e.g. long parental leaves), which may dissuade them from reentering the labor market. On the other hand, unpaid leaves or poorly compensated long leaves may make low-paid women to drop their jobs for longer periods. Alternatively, in the case of unpaid leaves women from the top end of earning distribution may have certain financial incentives to reenter the job after giving birth to a child.

ability to maintain a socially acceptable standard of living outside of family relationships' (Sigle-Rushton, 2009). Familialistic policies therefore aim at strengthening the caring function of the family, whereas de-familialistic policies tend to unburden the family from this responsibility. According to Leitner (2003) the degree of de-familialization may be proxied with the childcare coverage rates and the degree of familialization may be captured by the generosity of paid parental leave, resulting in four different forms of familialism: (1) explicit familialism, which strengthens the family in its caring role by providing long leaves and lacking any alternative to family childcare (i.e. market care); (2) optional familialism, which provides both supportive care policies and an option of childcare out of the family; (3) implicit familialism, which neither offers supportive care policies nor sufficient childcare delivered at the market; (4) de-familialism characterized by a high degree of market childcare and a weak support of the caring function of the family. Leitner (2003) thus argues that the combination of family policies, defined as childcare coverage and the length of paid parental leave, leads to various forms of state support for families, and women with children in particular. It may be thus expected that when the state explicitly supports family in its caring function, by providing long leaves without assuring sufficient number of places in childcare facilities, mothers will not fully reintegrate into the labor market, thereby leading to greater motherhood gap in employment and greater wage inequality resulting from the longer career breaks. On the other hand, when women have an option and transfer care responsibilities outside the family to the care facilities, the effect of the leaves may not be that strong, leading to lower inequalities.

4. METHODOLOGY

This research aims to assess and identify the links between family policies aimed at parents and the labor market consequences of motherhood. To investigate these relations, the analysis is divided into two major steps that include:

1. The identification of the effect of motherhood on the probability of women's employment and wage level for a set of European countries;
2. The identification of the relation between selected family policies and the labor market consequences of motherhood.

4.1 ESTIMATING COUNTRY SPECIFIC MOTHERHOOD EMPLOYMENT AND WAGE GAP

To quantify the effect of motherhood on women's employment and wages, fixed effects panel data model (FE) is used. The use of this model ensures that individual observable determinants as well as unobserved fixed characteristics, which may relate to motherhood

status and thus lead to the bias of the estimate, are controlled for. Panel data methods, such as first differencing or fixed effects models, are commonly applied in the empirical research focusing on the motherhood gap (e.g. Anderson, Blinder and Krause, 2003; Budig and England, 2001; Gangl and Ziefle, 2009; Korenman and Neumark, 1992, Nizalova et al., 2015; Waldfogel, 1997).⁴ The models used to determine the required effects are specified as follows:

$$Employment_{it} = \alpha_0 + \alpha_1 mother_{it} + X\alpha_i + \theta_i + \vartheta_{it}; \quad (1)$$

$$\ln(wage)_{it} = \beta_0 + \beta_1 mother_{it} + Y\beta_i + \mu_i + \xi_{it}. \quad (2)$$

In the above equations, the composite error terms consist of individual time-invariant factors (θ_i and μ_i) and individual and time specific error (ϑ_{it} and ξ_{it}). To reveal country specific effects above models are estimated separately for each country included in the sample. Dependent variables are defined as being working for a wage (equation 1) and the logarithm of an hourly wage (equation 2).⁵ *Mother* is a dummy variable that equals to one if a woman has at least one child that is living in the same household and is at most 18 years old, and zero otherwise.⁶ The coefficients of interest are α_1 and β_1 ; they reveal the impact of motherhood on the probability of women's employment and the percentage impact of motherhood on an hourly wage rate. Apart from the general effect of motherhood, the analysis also shows how the effect depends on the number of children. To do so, mother dummy variable is replaced with the set of dummy variables indicating the exact number of children.

In the employment equation control variable include the measure of non-labor income, a binary variable for the employment status of the partner/spouse, the total number of individuals living in the household and a binary variable reflecting the presence of a mother/father in a given household. Non-labor income is divided into two categories: 1) income from financial assets, that include rents, interests, dividends and profits from capital

⁴ Despite the fact that fixed effects model is commonly used in the literature dealing with the motherhood wage gaps, in international reviews on family gap that aim to identify the sources of cross country variability, simple regression models are usually adapted (e.g. Budig, Misra, and Boeckmann, 2012; Keck and Sareceno, 2013). As a result, in these analyses, the effect of motherhood is not separated from individual factors that shape parenthood decision and at the same time affect labor market performance.

⁵ Since employment is defined as dummy variable, one could also apply fixed effect logit model. However, given that the primary interest is the estimation of the marginal effect of motherhood and further policy-related analysis also involves interaction effects, for which marginal effects are troublesome to derive with the use of non-linear models (e.g. Ai, Norton, 2003, Norton et al., 2004), a linear model with individuals fixed effects is chosen.

⁶ Mothers of children older than 18 years old that are living in the same household are dropped from the analysis. The definition of motherhood status implies that mothers of children that leave parental household before turning 18 are incorrectly assigned into the group of childless women. Data on average age of children leaving their parent's home, however, suggest that the incidence of such a behavior is rather rare, as for most European countries the average age of children leaving home is greater than 18 years old (e.g. Leopold, 2012).

investments; and 2) income from benefits that include income from family and children allowance, housing allowance, inter-household cash transfers and other social exclusion benefits.⁷ The wage equation controls for the labor market experience, part time working schedule and occupations, as it is possible that parenthood effect is a result of working time and job related adjustments.⁸ Both models additionally control for marital status and include year fixed effects. The models rely on the longest time framework that is available for each country.⁹

One of the disadvantages of the fixed effects model is the impossibility to control for variables that are stable over time, because due to model's properties such variables are dropped from the estimation. The possible solution to this problem is the application of the Hausman-Taylor model (1981), which identification relies on instrumental variables from within the model. Given these properties and as a robustness analysis, Hausman-Taylor model is additionally applied. In addition to variables that are included in FE models, this model controls for individual time varying and time invariant exogenous as well as endogenous characteristics, such as education, age, place and region of living.

4.2 ESTIMATING THE RELATION BETWEEN FAMILY POLICIES AND THE MOTHERHOOD EMPLOYMENT AND WAGE GAP

Following the estimation of the motherhood gap in employment and wages for a set of European countries, the focus is placed on explaining cross country differences in the estimated inequalities. The relation between the estimated impact of motherhood on women's employment/wages and family policies is first examined by linking the findings with the available institutional measures. Three main leave policies are considered: 1) the total length of paid leaves available to mothers; 2) the length of maternity and parental leaves and 3) the length of the leaves for fathers. Based on the related empirical literature, the effect of leaves' length is modelled by allowing for a non-linearity, i.e. accounting for the length of the leave and its square. Additionally, the role of childcare is investigated by looking at: 1) childcare coverage for children aged 0-3 and 2) childcare coverage for children aged 3 till schooling age. The findings are also confronted with Leitner's (2003) matrix of familialism to

⁷ The measures of non-labor income are not available for the following countries: Cyprus, Czech Republic, Denmark, Finland, Hungary, Lithuania, Malta, Netherlands, Norway, Slovakia and United Kingdom. For these countries the controls are not included in the regressions.

⁸ Occupations are grouped according to Whelan et al. (2011). Four groups of occupations are defined: high skilled, professionals, associate professionals, services and elementary occupations, operators and trade workers. The last category is left as a reference group.

⁹ Country-specific data are thus not consistent in terms of the time framework. This approach is, however, preferred to limiting the time framework to one period for all the countries, as for most countries this procedure would yield significantly smaller sample size. Since fixed effects model requires that the parenthood status and the number of children change over the time, the longer the time framework, the larger the sample of individuals, based on which the effect is identified.

find out whether countries that ensure the provision of a comparable assistance to parents experience similar gaps due to motherhood.

Next, the relation between the estimated gaps in employment and wages and family policies is assessed using regression analysis. The analysis relies on the re-estimation of equations (1) and (2) and pooling the data over all the countries. The identification of the role of family policies is then achieved by interacting policies' measures with the variable indicating the motherhood status. As a result, the estimated parameters on the interaction terms reveal what portion of the motherhood gap may be attributed to specific policies, controlling for individual characteristics and other macroeconomic factors. Due to model's properties, only FE model is applied in this procedure. Furthermore, following Leitner's argument, the interaction effect of leave policies and childcare coverage is explored. This effect is analyzed by additionally interacting the coverage rate recoded into a dummy variable and the length of leaves. Both maternity and parental leaves are considered.

Pooled models used to identify the role of family policies in shaping motherhood related gap in employment and wages, control both for individual characteristics as well as for other relevant macroeconomic determinants. These include country-level year specific factors such as Gini coefficient capturing overall inequality, structure of the labor market measured by female employment to population ratio and the share of the public sector (wage models) as well as GDP per capita and the share of part time and temporary workers (employment models). In line with the theory presented in section 2, additional control variable capturing cultural variation regarding gender roles is also included. This indicator is based on a share of a country-specific population that agrees with the statement that pre-school children suffer when a mother works.

5. DATA

5.1 INDIVIDUAL LEVEL VARIABLES

The estimation of country specific motherhood effects on employment and wages is performed using micro level secondary data coming from the EU SILC longitudinal dataset. The EU SILC dataset is a rotating 4 year panel, in which each year one quarter of the total sample is replaced with the new respondents. Data collection is currently carried out for 28 EU member states as well as Iceland, and Norway. The time coverage varies by country and the longest time series consisting of the years 2003-2012 are available only for selected countries including Austria, Belgium, Denmark, Ireland, Greece, Luxembourg and Norway. Central and Eastern European countries that are covered by the survey include: Estonia (2004-2012), Latvia, Lithuania, Czech Republic, Poland, Slovakia, Hungary (2005-2012),

Bulgaria (2006-2012) and Romania (2007-2012). The analysis is carried out for all the countries included in the dataset except for Germany and Croatia as for these countries the panel data consist only of two year observation. The final sample is also restricted to individuals aged 16 to 45. This age restriction is based on the minimum employment age (lower bound) and women's fertility period (upper bound).

The EU-SILC dataset contains precise information on employment, earnings, as well as hours worked, which is crucial for the analysis of the inequalities in pay. The wage is defined as the monthly salary recalculated based on yearly gross earnings divided by the number of months spent in full-time or part-time employment, and expressed as the quadruple of usual weekly hours of work.¹⁰ The dataset also includes key demographic data, such as age, level of education and labor market experience. Moreover, all sources of income are identified, including labor income, non-labor income coming from rents, interests or other financial profits, and social benefits, such as family allowance and social exclusion. Country specific means for the key variables involved in the analysis along with the sample sizes are presented in Appendix Table A.1.

5.2 MACROECONOMIC DETERMINANTS AND INSTITUTIONAL VARIABLES

Data concerning macro level determinants as well as institutions, including family policies and culture, are collected from several data sources. In particular, information on the length of paid leaves is gathered from OECD Family Database and supplemented with the data coming from Multilinks dataset (Multilinks, 2011). More specifically, for the countries that are not covered by OECD database, information on the leaves' duration is supplied from Multilinks.¹¹ Multilinks data provide, however, information only for two years 2004 and 2009. To obtain country and year specific data some additional assumptions are therefore imposed. In particular, when the leave duration is the same for 2004 and 2009, the length of the leave is assumed to be stable over the period, for which EU-SILC data are available. When there is a change in the duration of the leave, a desk research is additionally performed to investigate when and what changes took place.¹² Moreover, information on childcare provision is derived from Eurostat data. Childcare availability is measured by the coverage rate for children in the public and the private care, including both full-time and part-time enrollment. Two measures that differentiate between the age of children (aged 0-3 years and

¹⁰ Since data on income refer to income reference period, which for most countries is a previous calendar year, and working hours refer to the current working time, some transformations of the variables are needed. To obtain monthly salary, yearly earnings are lagged one year and then they are divided by the number of months spent in full-time or part-time employment. This transformation is based on Engel and Schaffner (2012); more details on the calculation of an hourly wage may be found in Cukrowska-Torzewska (2015).

¹¹ Following countries are not covered by OECD Family database: Bulgaria, Cyprus, Estonia, Latvia, Lithuania, Malta, Romania and Slovenia.

¹² The change in the duration of the leaves was observed in Bulgaria and Cyprus.

aged 3-scholling age) are used. Detailed characteristics of the family policies are presented in Appendix Table A.2. These statistics reveal that countries considered in this research vary in the family policies they offer, which ensures the variation needed for the identification of their role in shaping motherhood gap in employment and wages.

Country level variables that capture macroeconomic conditions, such as GDP per capita, employment to population ratio, Gini coefficient, share of temporary or part time workers, are incorporated from Eurostat and World Bank databases. The share of public sector employees is derived from ILO LABORSTA dataset. Culture indicator that relies on the share of country population that agrees with the statement that a preschooler suffers when a mother works is derived using information from three data sources. In particular, the data come from 2008 European Value Survey as well as International Survey Program for the years 2002 and 2012.¹³ Detailed summary statistics for these variables are also presented in Appendix Table 2.

6. RESULTS

6.1 COUNTRY VARIATION IN THE MOTHERHOOD GAP IN EMPLOYMENT AND WAGES

The estimates of the motherhood gap in employment and wages obtained with the use of fixed effects model as well as Hausman-Taylor model, serving as a robustness check, for the set of twenty eight European countries are presented in Graphs 1 and 2. Detailed estimates are available in Table 1. The employment gap is defined as a difference in the probability of employment of childless and childrearing women, regardless of their number of children. The estimates of the family wage gap are in turn interpreted as a percentage difference in the hourly wages of childless and childrearing women.

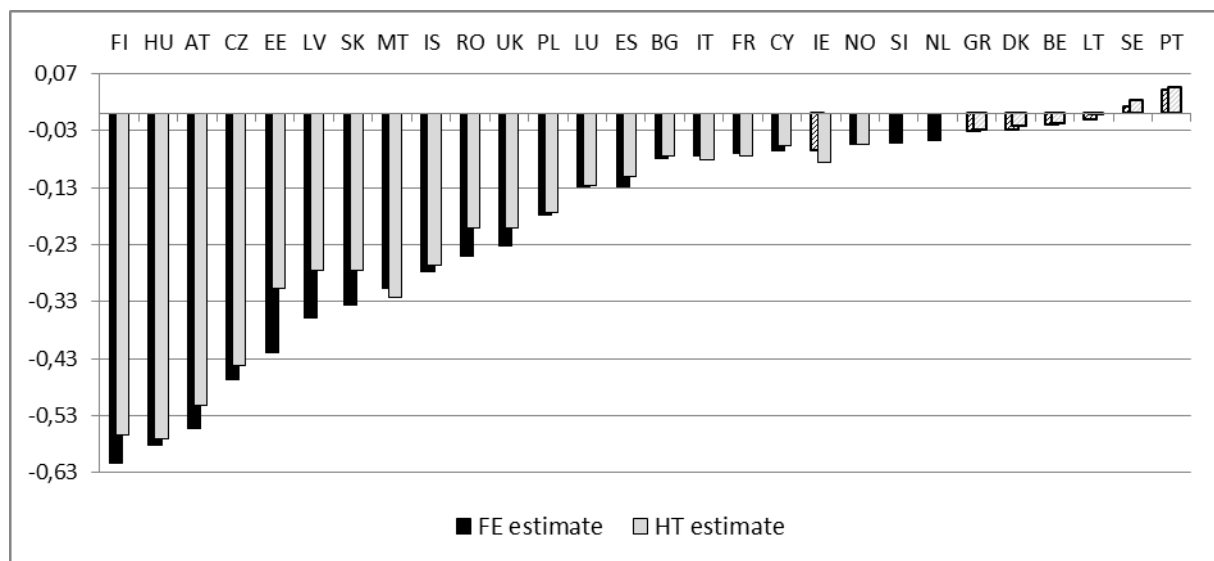
Both FE and HT estimates show that controlling for differences between mothers and childless individuals, in most countries there is a negative relation between motherhood and employment. The results show that countries may be clustered according to the size of the employment gap that arises due to childrearing. High negative association of around 0.5 is particularly found for Finland, Hungary, Austria and the Czech Republic. For some countries the estimated gaps are small and statistically insignificant, these are Portugal, Sweden, Lithuania, Belgium, Denmark and Greece. The lowest and significant gaps of around 0.1 are observed in Bulgaria, Italy, France, Cyprus, Ireland, Norway, as well as the Netherlands and Slovenia. The group of countries that experience moderate motherhood employment gap includes Estonia, Latvia, Slovakia, Malta, Iceland, Romania (app. 0.2-0.3) followed by the

¹³ The data from EVS and ISP are available only for three years: 2002, 2008 and 2012. The information for the remaining years is imputed assuming no change over the 'gap' years.

UK, Poland, Luxembourg and Spain (app. 0.1-0.2). The variation of the obtained gap across the countries moreover suggests that CEE and Western European countries differ with respect to the gap in mother's and childless women's probability of employment. In particular, the results show that mothers in CEE countries leave their jobs relatively more often, so that the resulting employment gap associated with motherhood is higher than the respective gap emerging in Western Europe (with the exception of Finland and Austria).

Figure 1.

Motherhood employment gap by country

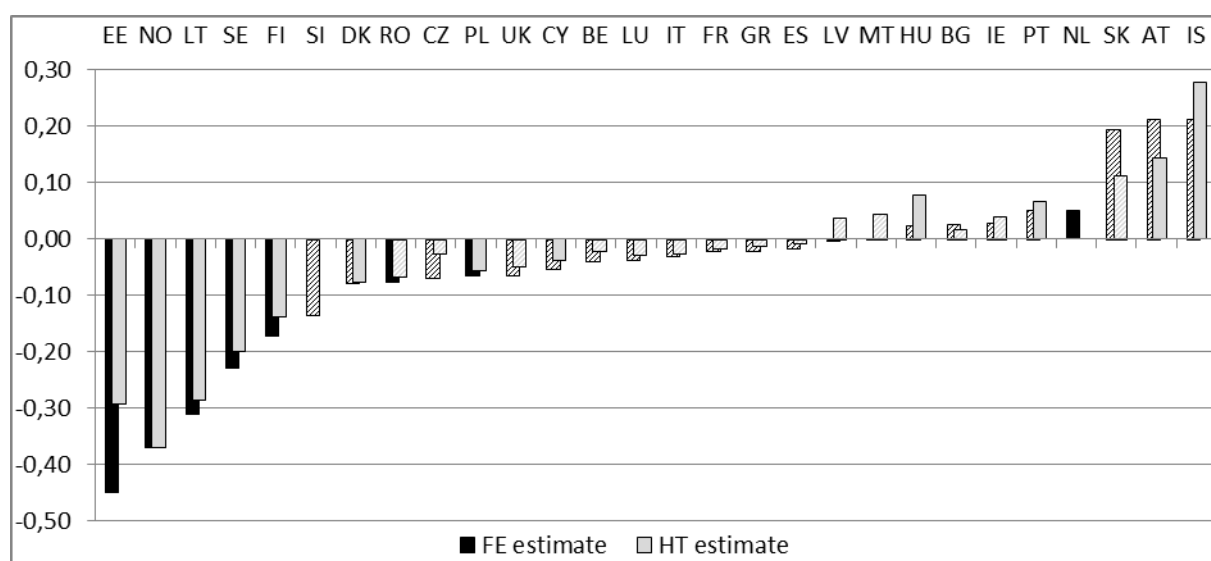


Notes: 1) Colored bars represent statistically significant estimates with p-value < 0.1. Insignificant estimates are marked as dashed bars. 2) The family gap is defined as a difference in employment probability between parents and childless individuals. 3) Coefficients are estimated using fixed effects (FE) and Hausman-Taylor (HT) models. FE model controls for marital status, indicator of spouse employment, household's incomes from non-labor sources. HT model controls for individual age, education, marital status, indicator of spouse employment, household's incomes from non-labor sources as well as regional and urban dummies. Year fixed effects are included in the regressions. 4) For following countries the data lack the measure of non-labor income: Cyprus, Czech Republic, Denmark, Finland, Germany, Hungary, Lithuania, Malta, Netherlands, Norway, Slovakia and the UK.

On the other hand, the results concerning motherhood wage gap reveal that in some – but not all – European countries women are penalized for motherhood in the form of lower wages (Graph 2). For some countries, instead of a motherhood wage penalty, a positive and significant association is found; these countries include: Hungary, Portugal, Austria and Iceland. The highest negative motherhood wage gap is found for Estonia, Norway, Lithuania, Sweden and Finland, moderate gaps are observed in Denmark, Romania, Poland and Cyprus. For the remaining countries, no significant effect is found. As opposed to the motherhood employment gap, there is not clear division of the countries based on the size of the mother wage gap and the geographical location.

Figure 2.

Motherhood wage gap by country



Notes: 1) Colored bars represent statistically significant estimates with p-value at most 0.1. ($p < 0.1$). Insignificant estimates are marked as dashed bars. 2) The family gap is defined as a percentage difference in hourly wages between parents and childless individuals. 3) Coefficients are estimated using fixed effects (FE) and Hausman-Taylor (HT) models. FE model controls for the polynomial in individual labor market experience, marital status, indicator for part-time employment and occupations. HT model controls for the individual age, education, marital status, polynomial in individual labor market experience, indicator for part-time employment, occupations as well as regional and urban dummies. Year fixed effects are included in the regressions.

Appendix Table A.3. additionally presents the estimated motherhood gap depending on the exact number of children. The results confirm the general variation in the motherhood wage and employment gap presented above but additionally show that the negative gap tends to increase together with the number of children the woman has. This is especially true for the employment gap, suggesting that the probability of re-entering the labor market for mothers of several children is even lower as the greater number of children demands greater allocation of mother's time.

6.2 THE LINK BETWEEN THE MOTHERHOOD EMPLOYMENT AND WAGE GAP AND SELECTED FAMILY POLICIES

Table 1 presents the estimates obtained from the country specific estimation of the motherhood and employment gaps tabulated together with the selected family policies. This tabulation suggest that consistently with the expectations, greater employment gaps are observed in the countries, in which available paid leaves are long and childcare availability for small children is limited. As for the motherhood wage gap, this simple tabulation does not provide clear pattern regarding the relation between family policies and the size of the wage penalty incurred by mothers.

Table 1.

Family policies and motherhood gap in employment and wages for the analyzed countries

Country	Total leave	Maternity	Paid parental leave (weeks)	Paternity leave (weeks)	Coverage for children aged 0-3	Coverage for children aged 3-school	Familialization - type	Culture indicator	Employment gap (FE)	Employment gap (HT)	Wage gap (FE)	Wage gap (HT)
CZ	214	28	186	0	2.5	69.88	Explicit	0.401	<u>-0.47</u>	<u>-0.44</u>	-0.07	-0.02
SK	164	29.5	134.5	0	3.38	71.13	Explicit	0.403	<u>-0.34</u>	<u>-0.28</u>	0.19	0.11
EE	150	20	130	2	18.13	88.38	Explicit	0.563	<u>-0.42</u>	<u>-0.31</u>	<u>-0.45</u>	<u>-0.29</u>
AT	138	16	122	16.25	8.5	76.25	Explicit	0.605	<u>-0.55</u>	<u>-0.51</u>	0.21	<u>0.14</u>
HU	108	24	84	1	7.75	76.13	Explicit	0.584	<u>-0.58</u>	<u>-0.57</u>	0.03	0.08
BG	107.57	33.86	73.71	2	9.29	64.71	Explicit	0.500	<u>-0.08</u>	<u>-0.07</u>	0.03	0.02
LT	106	18	88	6	10.75	62.63	Explicit	0.514	-0.01	0	<u>-0.31</u>	<u>-0.29</u>
RO	106	18	88	1	7.17	56.67	Explicit	0.504	<u>-0.25</u>	<u>-0.2</u>	<u>-0.08</u>	-0.07
LV	88	16	72	2	17	67.63	Explicit	0.606	<u>-0.36</u>	<u>-0.28</u>	0	0.04
SE	67.00	15.57	51.43	10	51.25	93	Optional	0.182	0.01	0.02	<u>-0.23</u>	<u>-0.2</u>
DK	64	18	46	2	72.63	93.63	Optional	0.218	-0.03	-0.02	-0.08	<u>-0.08</u>
UK	52	52	0	2	33.25	86.63	Defamilialization	0.333	<u>-0.23</u>	<u>-0.2</u>	-0.06	-0.05
SI	49	15	34	18	32	86.38	Optional	0.372	<u>-0.05</u>	.	-0.13	.
IT	47.67	21.67	26	0	24.63	91	Optional	0.704	<u>-0.07</u>	<u>-0.08</u>	-0.03	-0.02
NO	46.75	9	37.75	8.38	38.75	83	Optional	0.193	<u>-0.05</u>	<u>-0.05</u>	<u>-0.37</u>	<u>-0.37</u>
FR	42	16	26	2	37.25	94.63	Optional	0.398	<u>-0.07</u>	<u>-0.08</u>	-0.02	-0.02
LU	42	16	26	26.4	33.25	70.38	Optional	0.558	<u>-0.13</u>	<u>-0.13</u>	-0.04	-0.03
FI	41.8	17.5	24.3	7.5	26.88	76.88	Optional	0.256	<u>-0.61</u>	<u>-0.56</u>	<u>-0.17</u>	<u>-0.14</u>
IE	37.2	37.2	0	0	23.4	86.2	Defamilialization	0.314	-0.07	<u>-0.09</u>	0.03	0.04
GR	33.25	17	16.25	0.4	12.13	67.75	Explicit/Implicit	0.705	-0.03	-0.03	-0.02	-0.01
NL	29	16	13	13.4	46.5	89.25	Optional	0.384	<u>-0.05</u>	.	0.05	.
BE	28.54	15	13.54	15.54	40.63	98.88	Optional	0.382	-0.02	-0.02	-0.04	-0.02
IS	26	13	13	13	39.75	97.38	Optional	0.159	<u>-0.28</u>	<u>-0.27</u>	0.21	<u>0.28</u>
PT	25.79	11.79	14	12.64	33.13	73.13	Optional	0.690	0.04	0.05	0.05	0.07
PL	19.5	19.5	0	0.5	2.88	35.5	Implicit	0.514	<u>-0.18</u>	<u>-0.17</u>	<u>-0.07</u>	<u>-0.06</u>
CY	17	17	0	0	23.63	78.13	Defamilialization	0.503	<u>-0.07</u>	<u>-0.06</u>	-0.05	<u>-0.04</u>
ES	16	16	0	1.68	37.13	91.5	Defamilialization	0.492	<u>-0.13</u>	<u>-0.11</u>	-0.02	-0.01
MT	14	14	0	12	10.86	72.29	Implicit	0.752	<u>-0.31</u>	<u>-0.32</u>	0	0.04

Notes: 1) Familialization type assigned consistently with Leitner (2003) based on the availability of paid parental leave and childcare coverage rate for children aged 0-3. 2) country specific motherhood employment and wage gap obtained using FE (FE) and Huasmann-Taylor (HT) models; 3) Statistically significant estimates are denoted as follows: underlined $p < 0.1$, bold $p < 0.05$, underlined and bold $p < 0.01$.

Given that, a more rigorous identification of the role of the family policies is needed, and it is achieved by a regression analysis based on the pooled data that controls both for individual determinants and country level institutional factors. The estimation results concerning the relation between family policies and the motherhood gap in employment are presented in Table 2. The leave policies and the childcare coverage are analyzed both separately (columns 1 to 4) and jointly (columns 5 to 7).

Table 2.

Estimated coefficients on policy measures and their interaction with motherhood status based on FE model on pooled data for all the examined countries, dependent variable: female employment

Model	LEAVES			CHILDCARE	LEAVES AND CHILDCARE		
	(1)	(2)	(3)		(5)	(6)	(7)
Mother	0.042 (0.227)	0.121 (0.235)	0.127 (0.232)	0.068 (0.259)	0.160 (0.229)	0.227 (0.236)	0.245 (0.233)
Mother x total paid leave	0.001 (0.002)				0.000 (0.001)		
Mother x total paid leave ²	-0.000** (0.000)				-0.000** (0.000)		
Mother x maternity		-0.003* (0.002)	-0.003* (0.002)			-0.003* (0.002)	-0.003* (0.002)
Mother x parental		0.001 (0.001)	0.002 (0.002)			0.000 (0.001)	0.001 (0.002)
Mother x parental ²		-0.000*** (0.000)	-0.000*** (0.000)			-0.000** (0.000)	-0.000*** (0.000)
Mother x paternity			-0.003 (0.002)				-0.003* (0.001)
Mother x childcare 1				0.006*** (0.002)	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
Mother x childcare 2				-0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Number of observations	334 497	334 497	334 497	334 497	334 497	334 497	334 497
R2	0.025	0.025	0.025	0.023	0.026	0.026	0.027

Notes: 1. Robust clustered standard errors in parenthesis, 2. *** p<0.01, ** p<0.05, * p<0.1, 3 Regressions control for: individual characteristics as in Table 1, GDP per capita, share of female temporary workers, share of female part-time workers, female employment to population ratio, share of public sector employment, culture indicator and their interactions with motherhood dummy variables; as well as for the respective family policies that are interacted with the mother dummy variable, 4) Childcare 1 denotes coverage rate for children aged 0-3; childcare 2 denotes coverage rate for children aged 3 – compulsory schooling age; length of leaves in weeks.

The estimated coefficients on the interaction term of motherhood indicator with the key family policies reveal that childcare coverage for small children is an important policy instrument that significantly affects mother's relative disadvantage in terms of employment. Consistently with the expectations, the estimates show that compared to childless women, who share observable and unobservable characteristics of mothers, probability of mother's employment increases when there is greater availability of childcare for very small children. This finding thus indicates that childcare for very small children facilitates mother's employment, leading to a smaller motherhood employment gap. The length of paid leaves available to mothers is also found to affect motherhood employment gap but the estimated effect is weaker. As expected, very long paid leaves, especially parental leaves, are found to increase the negative employment gap between mothers and childless women. The results also show that the length of the maternity leave is negatively related to mother's employment, as the longer the maternity leave the lower the probability of mother's employment and the greater the employment gap among mothers and childless women. Thus, the regressions results confirm the initial observation that relatively low childcare coverage as well as long paid leaves are associated with significantly greater employment gap between mothers and childless women.

The estimation results concerning the relation between motherhood, wages and family policies are presented in Table 3. The results are consistent with the expectation that the availability of long paid leaves for mothers is associated with greater motherhood wage gap. This relation may arise particularly due to the loss in women's human capital during long employment break, skills depreciation, or loss of efforts and productivity decline induced by long employment breaks. The estimates moreover show that it is mostly parental leave that matters for mother's wage and there is no significant negative relation between the length of maternity leave and the size of the motherhood wage penalty. On the other hand, the estimates on childcare coverage for very small children obtained controlling for individual characteristics and country specific institutional context do not reveal statistically significant association.

Table 3.

Estimated coefficients on policy measures and their interaction with motherhood status based on FE model on pooled data for all the examined countries, dependent variable: female wages

Model	LEAVES			CHILDCARE	LEAVES AND CHILDCARE		
	(1)	(2)	(3)		(5)	(6)	(7)
Mother	0.095 (0.189)	0.078 (0.187)	0.033 (0.191)	0.044 (0.279)	0.026 (0.279)	0.001 (0.306)	0.031 (0.266)
Mother x total paid leave	-0.002** (0.001)				-0.003* (0.001)		
Mother x total paid leave ²	0.000* (0.000)				0.000 (0.000)		
Mother x maternity		0.000 (0.001)	0.000 (0.001)			0.000 (0.001)	0.000 (0.001)
Mother x parental		-0.001* (0.001)	-0.002** (0.001)			-0.002* (0.001)	-0.002** (0.001)
Mother x parental ²		0.000 (0.000)	0.000 (0.000)			0.000 (0.000)	0.000* (0.000)
Mother x paternity			0.001 (0.001)				-0.000 (0.001)
Mother x childcare 1				0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Mother x childcare 2				-0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Number of observations	190 735	190 735	190 735	190 735	190 735	190 735	190 735
R ²	0.029	0.030	0.030	0.043	0.045	0.045	0.045

Notes: 1) Robust clustered standard errors in parenthesis, 2) *** p<0.01, ** p<0.05, * p<0.1, 3) Regressions control for: individual characteristics as in Table 1, Gini coefficients, female employment to population ratio, share of public sector employment, culture indicator and their interactions with motherhood dummy variables; as well as for the respective family policies that are interacted with the mother dummy variable, 4) Childcare 1 denotes coverage rate for children aged 0-3; childcare 2 denoted coverage rate for children aged 3 – compulsory schooling age; leaves in weeks.

6.3 THE INTERACTION EFFECT OF LEAVE POLICIES AND CHILDCARE AVAILABILITY

In addition to specific family policies, tabulation presented in Table 1 also shows the familization scheme the given country enforces, which is assigned based on Leitner (compare column 8 Table 1). This tabulation suggests that in the countries that offer long parental leaves but do not provide sufficient level of childcare services and thus explicitly support family in its caring function, motherhood employment gap is relatively large. This

group of countries includes 10 countries, which can be classified as Central and Eastern EU economies. On the other hand, in the countries, in which existing policies may be described as supporting *optional familialism* that gives women an option either to care for and stay with a newly born child for a longer time or use childcare facilities and return back to paid job, estimated motherhood employment gap is much lower. In contrast to *explicit familialism*, this group of countries mainly consist of Western European economies. The results also show that there are only few countries that do not provide paid parental leave. These countries may be also differentiated by the degree of childcare coverage. However, given the low number of such countries, no clear pattern regarding the relation between motherhood employment gap and childcare availability might be distinguished. At the same time, the analysis of the wage gap from the familialistic perspective does not provide clear results: for some countries, which follow *optional familialism* motherhood wage gaps are high and significant, but for equally many countries from this group there is no significant wage gap estimate.

Tables 4 and 5 present regression results concerning the interaction effect of leave policies and childcare coverage for small children. To ease the interpretation, childcare for small children is recoded into the dummy variable that equals to one if the coverage rate is below twenty percent and zero otherwise. Given the data, the coverage rate below twenty percent is observed for around forty percent of the observations. The reported results are, however, consistent with respect to the choice of other percentage cut-off point, such as fifteen percent.¹⁴

The estimates reveal some evidence for the existence of the interaction effect of leave and childcare policies. First, consistently with the expectations, coefficient on childcare measure interacted with the motherhood dummy is negative and statistically significant, meaning that in the countries in which childcare is low, inequality in mother's and childless women's employment is higher.

¹⁴ The estimation results concerning the interaction effect of leave policies and childcare recoded into dummy variable using fifteen percent childcare cut-off point are available from the author upon the request.

Table 4.

Estimated coefficients on policy measures, their interaction and interaction with motherhood status based on FE model on pooled data for all the examined countries, dependent variable: female employment

Model		LEAVES AND CHILDCARE			
		(1)	(2)	(3)	(4)
Mother		0.097 (0.219)	0.293 (0.238)	0.254 (0.232)	0.309 (0.241)
Motherhood interactions	Mother x paternity	-0.002 (0.002)	-0.003* (0.002)	-0.004** (0.002)	-0.004** (0.002)
	Mother x low childcare 1	-0.021 (0.064)	- 0.156*** (0.056)	-0.048* (0.029)	-0.125** (0.059)
	Mother x childcare 2	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
	Mother x total paid leave	0.003 (0.002)			
	Mother x total paid leave^2	-0.000** (0.000)			
	Mother x maternity		- 0.006*** (0.002)	-0.004* (0.002)	-0.005*** (0.002)
	Mother x parental		0.001 (0.002)	0.004** (0.002)	0.004* (0.002)
	Mother x parental^2		- 0.000*** (0.000)	- 0.000*** (0.000)	-0.000*** (0.000)
	Mother x total paid leave x low childcare 1	-0.002 (0.003)			
	Mother x total paid leave^2 x low childcare 1	0.000 (0.000)			
Motherhood and policy interactions	Mother x maternity x low childcare 1		0.004** (0.002)		0.004* (0.002)
	Mother x parental x low childcare 1			-0.004 (0.002)	-0.003 (0.002)
	Mother x parental^2 x low childcare 1			0.000 (0.000)	0.000 (0.000)
Number of observations		334 497	334 497	334 497	334 497
R2		0.026	0.026	0.026	0.027

Notes: As in Table 2

Table 5.

Estimated coefficients on policy measures, their interaction and interaction with motherhood status based on FE model on pooled data for all the examined countries, dependent variable: female wages

Model		LEAVES AND CHILDCARE			
		(1)	(2)	(3)	(4)
Mother		0.143 (0.324)	-0.007 (0.294)	0.143 (0.334)	0.155 (0.321)
Motherhood interactions	Mother x paternity	-0.001 (0.001)	-0.000 (0.001)	-0.001 (0.002)	-0.001 (0.002)
	Mother x low childcare 1	0.011 (0.037)	0.001 (0.069)	-0.024 (0.023)	-0.041 (0.051)
	Mother x childcare 2	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)
	Mother x total paid leave	-0.001 (0.002)			
	Mother x total paid leave ²	0.000 (0.000)			
	Mother x maternity		-0.002 (0.003)	-0.000 (0.001)	-0.001 (0.002)
	Mother x parental		- 0.002** (0.001)	-0.001 (0.001)	-0.001 (0.001)
	Mother x parental ²		0.000* (0.000)	0.000 (0.000)	0.000 (0.000)
Motherhood and policy interactions	Mother x total paid leave x low childcare 1	-0.002 (0.001)			
	Mother x total paid leave ² x low childcare 1	0.000 (0.000)			
	Mother x maternity x low childcare 1		0.002 (0.004)		0.001 (0.002)
	Mother x parental x low childcare 1			-0.001 (0.001)	-0.001 (0.001)
	Mother x parental ² x low childcare 1			0.000 (0.000)	0.000 (0.000)
Number of observations		190 735	190 735	190 735	190 735
R ²		0.059	0.048	0.059	0.059

Notes: As in Table 3.

Second, for countries, in which childcare coverage for small children is greater than twenty percent, the length of the maternity leave is negatively associated with the size of the motherhood employment gap, which is reflected by the negative coefficient on the interaction term of mother dummy and the length of the maternity leave. At the same time, the coefficient estimated on the triple interaction term of the mother dummy, childcare coverage dummy and the length of the maternity leave, is positive and significant. This suggests that negative effects of long maternity leaves are less severe for the countries, in which childcare for small children is limited than for the countries, in which childcare is relatively rich. In

consequence, in the countries, in which the accessibility to care facilities is low, longer maternity leaves do not discourage mothers from re-entering the labor market after giving birth to a child as much, as it is the case for the countries, in which long maternity leaves are combined with relatively high accessibility of childcare. The result also provide some evidence as regards the role of the length of paid parental leave. In particular, the estimates suggest that when childcare is relatively easy to access this relation is likely to be positive and diminishing, meaning that paid parental leaves are beneficial to reduce the employment gap between mothers and childless women, unless the leaves are too long. Such diminishing association is, however, unlikely to be observed when the childcare is low. The findings thus indicate that when the childcare coverage is low, the role of the leave policies is not as important as when the childcare facilities are accessible for a relatively high share of children. The resulting negative motherhood employment gap found in the countries explicitly supporting women in their caring role is thus likely to be driven mostly by the insufficient provision of childcare outside the family (e.g. nursery school).

Finally, the estimation results concerning the interaction effect of leave policies and childcare coverage for motherhood wage gap presented in Table 5 provide weak support for the hypothesis of policies' interaction. These results rather suggest that negative but diminishing relation between the length of paid parental leave and motherhood wage gap is present irrespective of the availability of care for very small children.

7. SUMMARY AND CONCLUSION

This research asks two main research question concerning family policies: (1) whether family policies shape motherhood related labor market inequalities that emerge after controlling for individual observed and unobserved heterogeneity and other macroeconomic factors, and (2) whether families policies interact with each other, and the combinations of leave policies and childcare coverage affect employment prospects and wages of women with children differently, affecting the gap between them and childless women as well.

The findings obtained from the estimation of fixed effects model suggest that family policies have a significant effect on mother's labor market outcomes and shape the gap between them and childless women – even after controlling for differences in their observed and unobserved individual characteristics. Family policies affect, however, mostly the motherhood gap in employment and their role in shaping motherhood wage gap net of individual determinants is found to be much lower.

With regard to the first question the research finds that while availability of care for small children in the public and private care centers is associated with smaller employment gap

between mothers and childless women, long maternity leaves and very long parental leaves lead to a lower probability of mother's labor market re-entry, and thus greater motherhood employment gap. As for the motherhood wage gap, the analysis reveals that long parental leaves cause greater wage inequality, which may be attributed to skills and human capital depreciation during the time spent not working.

With regards to the second question the analysis confirms that the effect of leave policies differs depending on the degree of childcare, especially when it comes to motherhood gap in employment. When childcare is limited, the negative role of maternity leaves is not as severe as when the childcare is relatively rich. In that case, long parental leaves also contribute towards lower probability of women's labor market re-entry, which is less likely to occur when the childcare is low. The negative effects of long leaves are thus mainly observed when the provision of childcare from other sources is sufficient. In the event of low childcare, the role of the length of paid leaves is not as strong. There is, however, limited evidence that the combination of leave policies and childcare differently affects motherhood wage inequality, which is mostly driven by very long paid parental leaves.

The above findings suggest that though certain policies may have a positive impact on improving the work and family balance of women raising children, the combination of leave policies and childcare may lead to much different situation. These results may serve as a tool to assess consequences of parental leaves extensions that have been observed in the recent years in several European countries, in response to dramatically low fertility rates. Such extensions of the length of parental leaves have been particularly observed in Austria, the Czech Republic, Poland and Portugal. Except for Portugal, all of these countries at the same time register very low coverage rates for small children. Therefore, the recent changes in the length of paid parental leave should not lead to significantly greater motherhood gap in employment, but still may increase the wage gap that evolves between mothers and childless women.

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APPENDIX

Table A. 1.

Means for key individual level characteristics by country, EU SILC longitudinal data

country	N	Parent	Married	Age	Educ1	Educ2	Educ3	Educ4	Parent in the HH	Household size	Spouse working	Working	Wage	log wage	Experience	Part time work
AT	13,179	0.560	0.533	32.459	0.001	0.003	0.206	0.485	0.238	3.548	0.570	0.686	13.968	2.479	12.119	0.416
BE	12,409	0.518	0.483	31.753	0.008	0.035	0.114	0.321	0.237	3.511	0.545	0.776	16.773	2.731	10.654	0.385
BG	9,960	0.599	0.556	31.575	0.016	0.056	0.222	0.498	0.367	4.530	0.492	0.644	1.246	0.069	10.191	0.050
CY	11,657	0.508	0.610	31.820	0.004	0.054	0.132	0.420	0.332	4.193	0.516	0.772	9.476	1.998	10.699	0.108
CZ	20,546	0.606	0.581	31.615	0.001	0.140	0.700	0.013	0.295	3.615	0.574	0.672	3.550	1.162	10.735	0.060
DK	14,161	0.607	0.537	32.851	0.000	0.260	0.387	0.000	0.200	3.593	0.651	0.894	23.039	3.045	11.609	0.221
EE	14,373	0.586	0.398	30.644	0.003	0.024	0.229	0.419	0.386	4.079	0.477	0.725	2.846	0.801	10.614	0.094
ES	34,487	0.491	0.520	33.083	0.085	0.259	0.263	0.006	0.357	3.681	0.462	0.633	9.727	2.115	10.709	0.210
FI	18,283	0.522	0.463	31.314	0.001	0.221	0.403	0.002	0.219	3.601	0.546	0.731	17.660	2.701	10.422	0.154
FR	22,131	0.470	0.383	31.115	0.006	0.017	0.154	0.440	0.211	3.646	0.541	0.758	13.124	2.430	9.667	0.303
GR	17,008	0.533	0.606	32.543	0.002	0.105	0.144	0.405	0.311	3.654	0.454	0.539	9.004	2.040	9.509	0.158
HU	20,008	0.547	0.510	31.260	0.000	0.013	0.217	0.519	0.356	3.810	0.486	0.615	2.852	0.892	10.411	0.071
IE	6,884	0.504	0.441	31.535	0.059	0.166	0.333	0.095	0.345	3.904	0.377	0.668	20.065	2.770	11.482	0.334
IS	6,910	0.525	0.337	29.582	0.011	0.413	0.276	0.018	0.337	4.063	0.453	0.814	15.035	2.464	10.363	0.283
IT	55,348	0.484	0.535	33.024	0.006	0.030	0.298	0.440	0.362	3.519	0.424	0.559	11.732	2.327	10.121	0.255
LT	9,587	0.594	0.619	32.182	0.001	0.023	0.142	0.330	0.386	3.868	0.511	0.769	2.594	0.714	11.855	0.058
LU	12,113	0.589	0.599	32.611	0.216	0.134	0.288	0.005	0.198	3.544	0.654	0.707	19.991	2.807	10.715	0.347
LV	10,853	0.554	0.447	30.569	0.001	0.016	0.209	0.443	0.410	3.894	0.427	0.688	3.023	0.858	10.847	0.080
MT	7,567	0.520	0.533	31.194	0.000	0.012	0.541	0.254	0.444	3.914	0.448	0.586	8.022	1.955	9.060	0.160
NL	26,761	0.591	0.548	33.399	0.001	0.023	0.169	0.439	0.163	3.452	0.672	0.801	20.391	2.915	11.600	0.729
NO	13,957	0.577	0.447	32.012	0.001	0.002	0.207	0.362	0.191	3.622	0.498	0.868	21.683	2.914	9.120	0.223
PL	40,912	0.610	0.632	31.420	0.001	0.061	0.086	0.580	0.377	4.225	0.501	0.637	3.475	1.044	9.735	0.108
PT	16,251	0.525	0.517	31.833	0.000	0.322	0.247	0.247	0.441	3.962	0.445	0.721	6.355	1.647	12.322	0.095
RO	12,073	0.498	0.656	32.216	0.022	0.263	0.547	0.032	0.276	3.800	0.549	0.634	1.455	0.230	11.376	0.083
SE	14,733	0.554	0.373	31.552	0.011	0.155	0.422	0.048	0.207	3.533	0.610	0.880	17.047	2.625	11.233	0.351
SI	34,745	0.501	0.405	31.507	0.001	0.039	0.133	0.623	0.492	4.184	0.440	0.816	6.970	1.581	12.399	0.047
SK	15,953	0.509	0.547	31.068	0.000	0.001	0.138	0.674	0.475	4.318	0.462	0.773	2.506	0.598	12.595	0.039
UK	19,428	0.490	0.440	30.950	0.085	0.549	0.015	0.351	0.258	3.469	0.481	0.739	15.828	2.545	10.811	0.379

Notes: Educ 1 to 4 stands for: lower secondary education or lower (educ 1), upper secondary education (educ 2), post-secondary non-tertiary education (educ 3) and first or second stage tertiary education (educ 4). Wage expressed in euro.

Table A. 2.

Summary statistics for institutional variables by country

Variable	GDP per capita	Gini	Share of temporary employment among women	Share of part-time employment among women	Female employment to population ratio	Share of public sector	Paid parental leave length	Maternity leave length	Paternity leave length	Childcare 1	Childcare 2	Culture indicator
Data source	World Bank	Eurostat				ILO LABORSTA	OECD Family database/Multilinks			Eurostat		EVS 2008, ISP 2002 and 2012
AT	40,178.3	27.04	9.05	42.29	64.41	0.12	122.00	16.00	16.25	8.50	76.25	60.46
BE	37,776.5	26.93	10.34	41.73	55.66	0.19	13.54	15.00	15.54	40.63	98.88	38.24
BG	4,521.37	33.94	4.56	2.53	56.90	0.15	73.71	33.86	2.00	9.29	64.71	50.04
CY	25,039.4	29.51	20.01	12.44	61.35	0.15	0.00	17.00	0.00	23.63	78.13	50.33
CZ	14,527.8	25.18	10.09	8.93	57.05	0.14	186.00	28.00	0.00	2.50	69.88	40.13
DK	48,859.2	25.95	9.76	36.15	72.10	0.31	46.00	18.00	2.00	72.63	93.63	21.79
EE	11,200.5	32.33	2.20	12.90	64.15	0.22	130.00	20.00	2.00	18.13	88.38	56.28
ES	26,584	32.81	30.14	22.78	53.28	0.15	0.00	16.00	1.68	37.13	91.50	49.24
FI	40,350.2	25.93	18.93	19.11	67.71	0.26	24.30	17.50	7.50	26.88	76.88	25.65
FR	35,467.5	29.05	15.74	30.09	59.51	0.24	26.00	16.00	2.00	37.25	94.63	39.79
GR	22,258.3	33.63	13.59	10.31	46.65	0.09	16.25	17.00	0.40	12.13	67.75	70.53
HU	11,337.3	26.78	7.55	7.18	50.64	0.22	84.00	24.00	1.00	7.75	76.13	58.43
IE	50,640	30.98	8.32	32.68	58.68	0.16	0.00	37.20	0.00	23.40	86.20	31.43
IS	58,291.4	26.20	11.59	34.11	78.60	NA	13.00	13.00	13.00	39.75	97.38	15.90
IT	31,455.1	31.83	15.03	27.94	46.45	0.16	26.00	21.67	0.00	24.63	91.00	70.41
LT	9,196.48	34.69	2.16	10.16	60.66	0.25	88.00	18.00	6.00	10.75	62.63	51.37
LU	81,888.7	27.71	7.46	36.65	56.20	0.18	26.00	16.00	26.40	33.25	70.38	55.83
LV	8,627.08	36.53	4.16	9.88	61.30	0.24	72.00	16.00	2.00	17.00	67.63	60.59
MT	15,957.9	27.40	7.04	24.63	38.63	0.28	0.00	14.00	12.00	10.86	72.29	75.18
NL	43,512.5	26.55	19.34	75.76	69.24	0.13	13.00	16.00	13.40	46.50	89.25	38.38
NO	67,197.7	24.91	10.79	43.46	73.53	0.31	37.75	9.00	8.38	38.75	83.00	19.27
PL	9,499.43	32.20	26.54	12.06	51.15	0.11	0.00	19.50	0.50	2.88	35.50	51.37
PT	19,009	35.78	22.28	16.24	61.10	0.13	14.00	11.79	12.64	33.13	73.13	69.01
RO	5,737.62	34.73	1.15	10.87	52.48	0.17	88.00	18.00	1.00	7.17	56.67	50.37
SE	4,4746.1	24.11	18.54	40.26	70.95	0.28	51.43	15.57	10.00	51.25	93.00	18.18
SI	19,425.9	23.51	19.33	12.35	62.21	0.16	34.00	15.00	18.00	32.00	86.38	37.23
SK	13,953.2	25.53	5.55	4.88	52.59	0.15	134.50	29.50	0.00	3.38	71.13	40.31
UK	40,195.6	32.90	6.38	42.50	65.19	0.20	0.00	52.00	2.00	33.25	86.63	33.34

Notes: 1) GDP per capita in constant 2005 \$, 2) Share of public sector derived based on the data for 2001-2010, 3) Childcare 1 denotes coverage rate for children aged 0-3; childcare 2 denotes coverage rate for children aged 3 – compulsory schooling age; length of leaves in weeks.

Table A. 3.

The estimates of motherhood gaps in employment and wages by the number of children and country

Variable	Country	Employment		Wage		Country	Employment		Wage	
		FE	HT	FE	HT		FE	HT	FE	HT
One child	AT	-0.575***	-0.537***	0.217	0.159***	LV	-0.383***	-0.298***	-0.003	0.023
Two children		-0.714***	-0.658***	0.120	0.043		-0.526***	-0.398***	0.014	0.070
Three and more children		-0.835***	-0.759***	0.002	-0.075		-0.661***	-0.481***	0.119	0.190*
One child	BE	-0.575***	-0.537***	0.217	0.159***	LT	-0.011	-0.008	-0.313***	-0.285***
Two children		-0.714***	-0.658***	0.120	0.043		-0.032	-0.030	-0.366***	-0.324***
Three and more children		-0.835***	-0.759***	0.002	-0.075		-0.019	-0.032	-0.796***	-0.738***
One child	BG	-0.575***	-0.537***	0.217	0.159***	LU	-0.175***	-0.160***	-0.039	-0.032*
Two children		-0.714***	-0.658***	0.12	0.043		-0.306***	-0.274***	0.052	0.063***
Three and more children		-0.835***	-0.759***	0.002	-0.075		-0.407***	-0.351***	0.119**	0.134***
One child	CY	-0.022	-0.023	-0.038	-0.022	MT	-0.320***	-0.318***	0.004	0.045
Two children		-0.004	-0.006	-0.045	-0.018		-0.399***	-0.401***	-0.069	0.017
Three and more children		-0.064	-0.078**	-0.031	0.008		-0.403***	-0.416***	-0.237	-0.137
One child	CZ	-0.523***	-0.467***	-0.067	-0.027	NL	-0.034*		0.051**	
Two children		-0.672***	-0.564***	-0.164**	-0.093***		0.002		0.049*	
Three and more children		-0.855***	-0.693***	-0.246***	-0.169***		-0.013		-0.004	
One child	DK	-0.012	-0.006	-0.076	-0.071***	NO	-0.070***	-0.067***	-0.369***	-0.369***
Two children		0.020	0.038	-0.137**	-0.130***		-0.123***	-0.109***	-0.384***	-0.377***
Three and more children		0.045	0.054	-0.158*	-0.153***		-0.169***	-0.144***	-0.433***	-0.419***
One child	EE	-0.454***	-0.322***	-0.458***	-0.308***	PL	-0.195***	-0.190***	-0.063**	-0.055***
Two children		-0.683***	-0.462***	-0.394**	-0.242**		-0.328***	-0.317***	-0.108**	-0.091***
Three and more children		-0.906***	-0.616***	-0.451**	-0.296**		-0.392***	-0.371***	-0.054	-0.027
One child	FI	-0.664***	-0.597***	-0.173***	-0.135***	PT	0.042	0.046	0.048	0.062**
Two children		-0.860***	-0.741***	-0.187**	-0.127***		0.014	0.040	0.070	0.090**
Three and more children		-1.050***	-0.861***	-0.406***	-0.333***		0.043	0.110	0.065	0.073
One child	FR	-0.079***	-0.076***	-0.021	-0.017	RO	-0.267***	-0.227***	-0.072*	-0.068
Two children		-0.159***	-0.158***	-0.017	-0.008		-0.354**	-0.299***	-0.112	-0.070
Three and more children		-0.240***	-0.240***	-0.024	-0.021		-0.490***	-0.430***	0.049	0.113
One child	GR	-0.037	-0.033*	-0.022	-0.015	SK	-0.357***	-0.280***	0.213	0.139
Two children		-0.070**	-0.062**	0.002	0.015		-0.524***	-0.376***	0.264	0.081
Three and more children		-0.093*	-0.088**	0.028	0.046		-0.770***	-0.559***	0.448	0.199

One child	HU	-0.614***	-0.602***	-0.026	0.053	SI	-0.058***	-0.149		
Two children		-0.817***	-0.796***	-0.696	0.071		-0.099***	-0.395**		
Three and more children		-1.027***	-0.996***		0.038		-0.084**	-0.704**		
One child	IS	-0.336***	-0.319***	-0.112	0.285***	ES	-0.134***	-0.108***	-0.015	-0.007
Two children		-0.613***	-0.587***	-0.350	0.145		-0.186***	-0.153***	-0.037	-0.026
Three and more children		-0.859***	-0.818***	-0.221	0.090		-0.176***	-0.143***	-0.011	0.008
One child	IE	-0.080*	-0.096***	0.027	0.036	SE	0.003	0.021	-0.228**	-0.200***
Two children		-0.110*	-0.134***	0.099	0.114**		-0.048*	-0.017	-0.246**	-0.194***
Three and more children		-0.164**	-0.190***	0.032	0.053		-0.044	0.001	-0.337**	-0.263***
One child	IT	-0.079***	-0.082***	-0.031	-0.028*	UK	-0.258***	-0.220***	-0.064	-0.052
Two children		-0.118***	-0.112***	-0.006	0.011		-0.350***	-0.299***	-0.101	-0.070
Three and more children		-0.136***	-0.119***	-0.087	-0.056		-0.421***	-0.406***	-0.195	-0.138

Notes: *** p<0.01, ** p<0.05, * p<0.1. Coefficients are estimated using fixed effects (FE) and Hausman-Taylor (HT) models. FE model controls for the polynomial in individual labor market experience, marital status, indicator for part-time employment and occupations. HT model controls for the individual age, education, marital status, polynomial in individual labor market experience, indicator for part-time employment, occupations as well as regional and urban dummies. Year fixed effects are included in the regressions.