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## Labor force participation of women in the EU - What role do family policies play?

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**LABOR FORCE PARTICIPATION OF  
WOMEN IN THE EU – WHAT ROLE DO  
FAMILY POLICIES PLAY?**

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# Labor force participation of women in the EU –

## What role do family policies play?

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### **Abstract**

We empirically study the role of different family policies in determining women's labor market behavior in the countries of the European Union between 1997 and 2008. Women tend to assume more family duties than men and, consequently, often participate less in the labor market. At the same time, family policies are to provide support to families while also helping women to reconcile family duties with labor market participation. Their impact, however, is not clear, especially when it comes to different forms of labor market activity. We use a static and dynamic panel econometric framework examining the link between four types of family policies and labor force participation and (part-time and full-time) employment. The results suggest no stable significant impact of any on overall labor force, but higher spending on family allowance, cash benefits daycare benefits appears to promote part-time employment, whereas only spending on parental leave schemes is a significant determinant of women's full-time employment.

**Keywords:** labor force participation, part-time employment, full-time employment, family policies, European Union

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## 1. Introduction

The objective of increasing employment rates with the aim to boost economic growth has been an important element of European Union policy making for decades now. Since the mid-1990s, the focus has increasingly been on increasing female labor force participation rates which differ greatly among EU countries and are an important driver of overall labor force participation rates. In particular, in communications and policy initiatives since 1996, including the Lisbon strategy and the 2020 goals, promoting gender equality in the labor market through measures supporting the reconciliation of family and labor market participation has been seen as a high priority of EU policy goals, shared also by many individual member countries.

Although women's educational attainment in terms of completed university education has been higher than for men<sup>1</sup> and there has been rising women's labor force participation (LFP) over recent years, the gender participation gap (GPG) still persists. In the EU's prime working-age population (aged 25-59), it amounted to 15.1% in 2008 and decreased to 10.3% in 2011.<sup>2</sup> One of the policy responses has been to promote family policies that could play a role in sustaining women's involvement in the labor market. Recently, family policy discussions assumed the central stage in the European institutional framework. In particular, in a Council Directive from 1996, the EU required member states to implement employment-related family policies with the aim to reconcile the life-work balance of both men and women. This so called Parental-Leave Directive introduced the individual right to a minimum of three months parental leave (for fathers and mothers) accompanying the birth or adoption of a child. Moreover, the EU summit in Barcelona in 2002 recommended that by 2010 the member states should provide childcare measures for at least 33% of children aged under three and to at least 90% of children between the age of three and the mandatory school age.<sup>3</sup> The targets from Barcelona were more recently reconfirmed in the employment guidelines for the years 2008-2010 adopted by the Council. The purpose of these recommendations continues to be the enhancement of women's LFP to at least 60%.<sup>4</sup>

In the context of these policy objectives, we investigate the impact of family policies on the labor market involvement of women in the EU. More precisely, we distinguish between four sets of policy measures: family allowance, parental leave, childcare and other cash benefits. Our interest lies in the impact – positive, negative or neutral – that such policies might have on participation of European women in the labor markets. In this way, we relate our work to past investigations focusing on the

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<sup>1</sup> According to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions from November 2012, 60% of university graduates are women.

<sup>2</sup> The GPG in the youngest working group (15-24) actually disappeared: it was equal to 8 percentage points (pp) in 1998, whereas in 2011 it was at the level of -0.7 pp. In the working group aged between 60 and 64 the GPG was negative already in 1998 (-6.8 pp) and further diminished to the level of -17.2 pp in 2011. Especially this last working group should constitute, thus, a quite separate part of the gender-related issues.

<sup>3</sup> This target for children under the age of three has been set to 100% in Germany to be reached until the 1<sup>st</sup> July 2013. The target remains still not fully achieved.

<sup>4</sup> See, for instance, European Commission (2008) and Plantega and Remery (2009).

determinants of LFP for women in developed economies (see Thevenon (2013) for a recent investigation on a sample of OECD countries), but add a particular focus on a disaggregated analysis of different types of family policies. In addition, since the decision to become active in the labor market could result in three different outcomes, part-time employment, full-time employment and job search, we expect that the impact of different family policies might vary substantially between these forms of work activity.

This distinction between part- and full-time work has additional implications in terms of women's satisfaction. More precisely, recent evidence shows that family-constrained non-participating mothers and mothers employed part-time are less satisfied than mothers in full-time employment (Berger, 2013). Moreover, this outcome can be clearly attributed to institutional and social conditions which still prevent mothers from assuming the (full-time) employment status they often wish, or prevent promising career development on part-time employment (Berger, 2013; Del Boca, 2002; Forsa Institute, 2008; Wrohlich, 2008).

To our knowledge, this is the first attempt to empirically test this set of hypotheses in the EU context. The study closest to ours is the one by Akgunduz and Plantenga (2012) who, nevertheless, investigate only the effects of parental leave on labor market outcomes in 16 European countries. Their main results suggest non-linear effects, with increasing participation rates that diminish with the length and generosity of parental leave. Our focus is, instead, in addition to parental leave, also on other family policy measures mentioned before. Moreover, their country coverage differs from ours, as we focus not only on the old EU member states, but extend the sample to include Eastern and Central EU members from the 2004 and 2007 waves of enlargement. We differ also from the methodologically. Whereas Akgunduz and Plantenga (2012) implement the difference-in-difference methodology to account for the difference in the treatment between men and women in the labor market outcomes (relying on the assumption of parallel trends) we apply advanced panel econometric techniques. Moreover, they work exclusively within a static framework, whereas we introduce a dynamic dimension in our analysis.

Another work that partly relates to ours is by Genre *et al.* (2010). They deal with the determinants of women's labor market participation in the EU over the period 1977-1999, with a particular focus on labor market institutions as dominating forces of women's (lack of) participation into work. This study is thus quite dated with respect to our time coverage. Their findings underline a great role played by labor market institutions, the strictness of which depresses women's labor force participation. Among such institutions, they consider maternity leaves schemes, which they find support efforts to reconcile the work-family balance for women.

We use a static and dynamic panel econometric framework examining the link between family policies and labor force participation and total employment, part-time and full-time employment. While the results for overall employment are mixed, the results suggest that part-time employment is associated with higher levels of family allowance, cash benefits and by daycare benefits, whereas only

financial support offered with parental leave schemes is a significant determinant of women's full-time employment.

In what follows, we first design a conceptual framework illustrating the possible explanations of the influence of family policies on women's labor behavior (Section 2). Subsequently, in Section 3, first we discuss facts regarding women in the labor market in different age groups and in different country groupings within the EU. Still in the same section, we describe national level family policies in the EU and give some intuition on their possible impact on the labor involvement of women. Section 4 presents the model, describes the data, their sources, the methodology and the main findings of our empirical work, including different robustness checks. In Section 5, we discuss some caveats of our work. Finally, the last section concludes with the discussion of the results and of the policy implications.

## **2. Labor force participation and family policies – a theoretical view**

From the basic static labor supply model (Blundell and MaCurdy, 1999), we know that increases in unearned income (including earnings of the partner or cash benefits) tend to reduce labor supply, resulting in reduced working hours or in the withdrawal from the labor force (Mammen and Paxson, 2000). Conversely, increases in the net wage (net also of childcare costs) should promote female participation, as there is only a substitution effect at the extensive margin. At the intensive margin (including the choice between part- and full-time employment), the effect of the net wage is ambiguous, as substitution and income effects work in the opposite direction. Since, however, the substitution effect often tends to dominate the income effect a rise in the net wage would promote females moving towards full-time employment (Gustafsson and Stafford, 1992; Powell, 1998).

Apart from the contributions examining a gender-neutral labor supply, there is an extensive literature on female labor supply specifically, reviewed, for instance, by Killingsworth and Heckman (1983). This literature dates back to the contribution of Mincer (1962) who develops a static lifetime model of female labor supply. In his model, the women's choice regarding the *level* of labor market participation will be made based on the permanent wage rates and income levels. Such levels of supply will not vary due to the temporary lifetime events, deriving from giving birth and bringing up children, from the variation in the (un)employment status of their partner or from other economic factors exercising some influence on the business cycle. Such factors will at most modify the *timing* of the decision regarding the participation in the labor activities, but not their level. Thus women might adjust their participation temporarily in response to the presence of children (or other care responsibilities).

More specifically for the purposes of our investigation, these considerations suggest that family policies can affect female labor force participation rates (Blundell and MaCurdy, 1999; Pissarides *et al.*, 2003).

Regarding the latter, family policies comprise different measures which could have different impacts. According to the relevant statistical sources, Eurostat and OECD, a distinction can be made between family allowance, maternity and parental leave, other cash benefits and daycare. They all constitute a central part of welfare-state policies, and they all are expected to impact in one way or another labor market involvement especially of women and – although still to a lesser extent – of men. Indeed, the interaction of family policies with labor market activity assumes significance insofar they influence the time distribution between work and family duties. Nevertheless, depending on the specific policy design, policies can generate a pure income effect which is likely to discourage employment (esp. at the extensive margin), or it can increase the net wage from working, where a substitution effect can increase the incentive to work. These differences in expected effects relate also to the different policy goals pursued with the different instruments.

In particular, based on an *ad-hoc* literature review, Thevenon (2011) identifies six main goals of family policies being: 1) poverty reduction and income maintenance, 2) direct compensation for the economic cost of children, 3) fostering employment, 4) improving gender equality, 5) support for early childhood development, and 6) raising birth rates. Whereas the third, and the fourth goal should lead to implementation of family policies having a positive impact on labor market participation, the labor market outcome of the remaining goals generate largely pure income effects most probably working in the opposite direction, leading – at least in the short-run – to diminishing LFP and employment. This income effect is likely to have a stronger impact on labor market participation of women than men, due to their stronger, voluntary or involuntary, attachment to family-related responsibilities, often strengthened by specific cultural and social factors.

Due to the obvious trade-off between the respective goals of the family policies and additionally due to the aforementioned non-economic factors, the outcomes of the different policy instruments in terms of the labor market could therefore be ambiguous (Buddelmeyer *et al.*, 2004).

For example, a relatively generous family allowance scheme could likely have, *ceteris paribus*, a negative effect on women's LFP through the income effect. Indeed, family allowance tends to increase the disposable income of the family and may lead to a reduction of family's labor supply (Buddelmeyer *et al.*, 2004; Laroque and Salanié, 2003). This, however, will be not the case if the increase in income connected with family allowance would eliminate liquidity constraint of the second earner so that the family could effort childcare (Stiglitz, 2000).

Similarly, well-designed public support consisting in parental leave (with the option to return to the previous job) should in principle enhance labor market participation, as it allows women (and men) to better combine pursuing a career and having children. This should help parents find the right balance between working and staying with their children (Ruhm, 1998; Jaumotte, 2003). In particular, it has been found that in national systems where parental leave schemes are generous the involvement of women in paid labor is higher (Anderson and Levine, 1999; Attanasio *et al.*, 2008; Berlinski and Galiani, 2007; Powell, 1998). However, until now no evidence exists on the effect of parental leave

support on the kind of employment, particularly, full- versus part-time. On the other hand, very extensive parental leave options could promote long absence from the labor market which would contribute to deterioration of working skills and, thus, to lower career and promotion opportunities upon returning, thus depressing the future net wage. This problem could be more serious if there is no or limited job guarantee once the parental leave ceases.<sup>5</sup>

Finally, policies aimed to increase the availability or reduce the costs of childcare would boost LFP as it increases the effective wage they can earn (Berlinski and Galiani, 2007; Cleveland *et al.*, 1996; Powell, 1998). This should be more relevant for women than for men, as women are more regularly involved in family duties after the birth and thus would benefit more from childcare assistance. Nonetheless, in some circumstances, the effectiveness of daycare measures might be reduced due to the substitution of formal with informal childcare (Blau and Hagy, 1998).

Additionally, however, the exact nature of the impact will be also dependent on the kind of contractual arrangements on the job market. Some family policies and their particular design will work better when flexibility in the arrangements through part-time employment is possible or imposed. This could be especially the case with family allowance, which offers some financial support for families with children, and daycare benefits, offering shelter and board to pre-school children during the day. However, the extent of such support could be insufficient, thereby constraining parents, and women in particular, to assume only part-time employment.

Overall, the impact of cash benefits directed towards families with children on part-time employment is argued to be ambiguous (Buddelmeyer *et al.*, 2004).<sup>6</sup> Moreover, if such benefits are means-tested this might provoke an “unemployment trap” for the member of a couple earning an income around the threshold level of the benefit. On the other hand, if the eligibility threshold is high, this could favor engaging in part-time rather than in full-time employment (Buddelmeyer *et al.*, 2004).

### **3. Descriptive evidence on labor force participation and family policies in the EU**

The situation of women in the labor market has changed substantially over the last decades. Changes in patterns have been observed both in the LFP of women and in their part/full-time employment. Such changes are evident at the aggregate EU level and even clearer at a more disaggregated level when considering particularly subgroups.

In particular, Figure 1 summarizes the developments in LFP rates between 1995 and 2013, separately for men and women, distinguishing between the ‘old’ EU (EU-15) and the ‘enlarged’ EU (EU-27). On average, the participation rate for women (which includes the employed and the searching unemployed) has increased in the EU-15 from around 57% in the mid-1990s to more than 67% in 2013. This pattern was very similar for the EU-27, with a slight gap favoring the EU-15

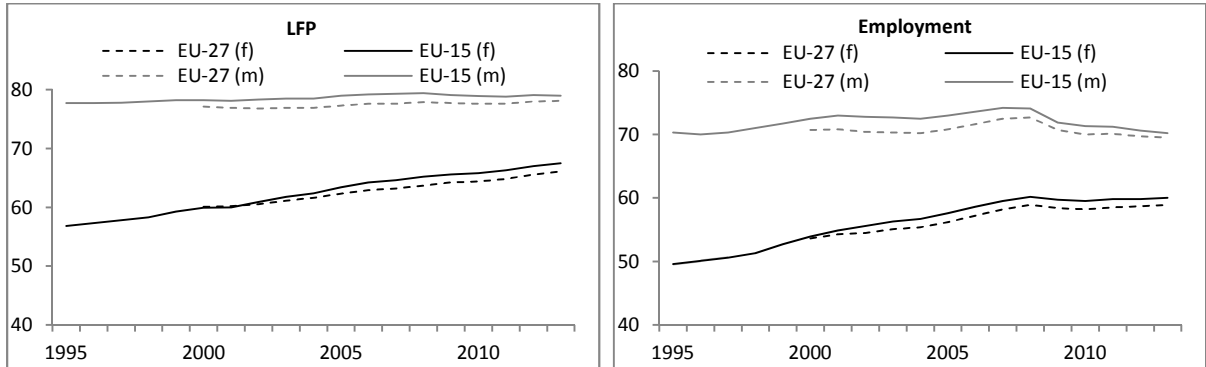
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<sup>5</sup> There is also some evidence suggesting a negative impact of the parental leave on the returning mothers’ wages (Ruhm, 1998).

<sup>6</sup> Investigations on the effects of family policies on the full-time employment are still missing.



emerging in the last years. Also the female employment rate has moved in that same direction, by increasing from below 50% to 60% at the end of the period, but recently stagnated due to rising unemployment associated with the economic crisis in Europe. But overall, this pattern of rising female participation and employment contributed to a steady reduction in the gender participation and employment gap that, nevertheless, continues to persist. Indeed, men continue to more actively participate in the labor market than women although their participation rates have long stagnated and their employment rates have also fallen during the recent economic crises.



**Figure 1.** Labor force participation (LFP) and employment of men and women aged 15-64 in the EU, 1995-2013.

Source: Own elaborations based on Eurostat aggregated LFS statistics.

Nevertheless, the reduction in the gender participation gap (GPG)<sup>7</sup> was developing unevenly between different age-groups, country- groups and over time (Tab. 1 and Fig. 2). In the period before the crisis, the strongest reduction in the gap has occurred in the two main working age-groups (25-39 and 40-59), both in the EU-27 and in the EU-15. The EU-27 GPG fell from 17.9 and 20.5 percentage points in 2000 to 14.9 and 15.8 percentage points in 2008 for the two age groups, respectively,. After 2008 a further reduction followed, due to both a further increasing female LFP and diminishing male LFP. The situation in the first (15-24) and in the last (60-64) age-groups remained relatively more stable over time, with the major changes occurring in the aftermath of the crisis – a modest reduction of the GPG.<sup>8</sup>

<sup>7</sup> We define gender participation gap as the difference between the men LFP rates and women LFP rates.

<sup>8</sup> The age-group 60-64 is of lesser interest for our analysis and we exclude it from our empirical exercise. Clearly, the gender issues related to the family-work balance are much less relevant here, given that the family duties related to own children should be already over. Also, labor force participation trends in that age group are strongly affected by retirement policies which we do not consider in this paper.

**Table 1.** Labor force participation and gender participation gap by age groups, in 2000, 2008 and 2013.

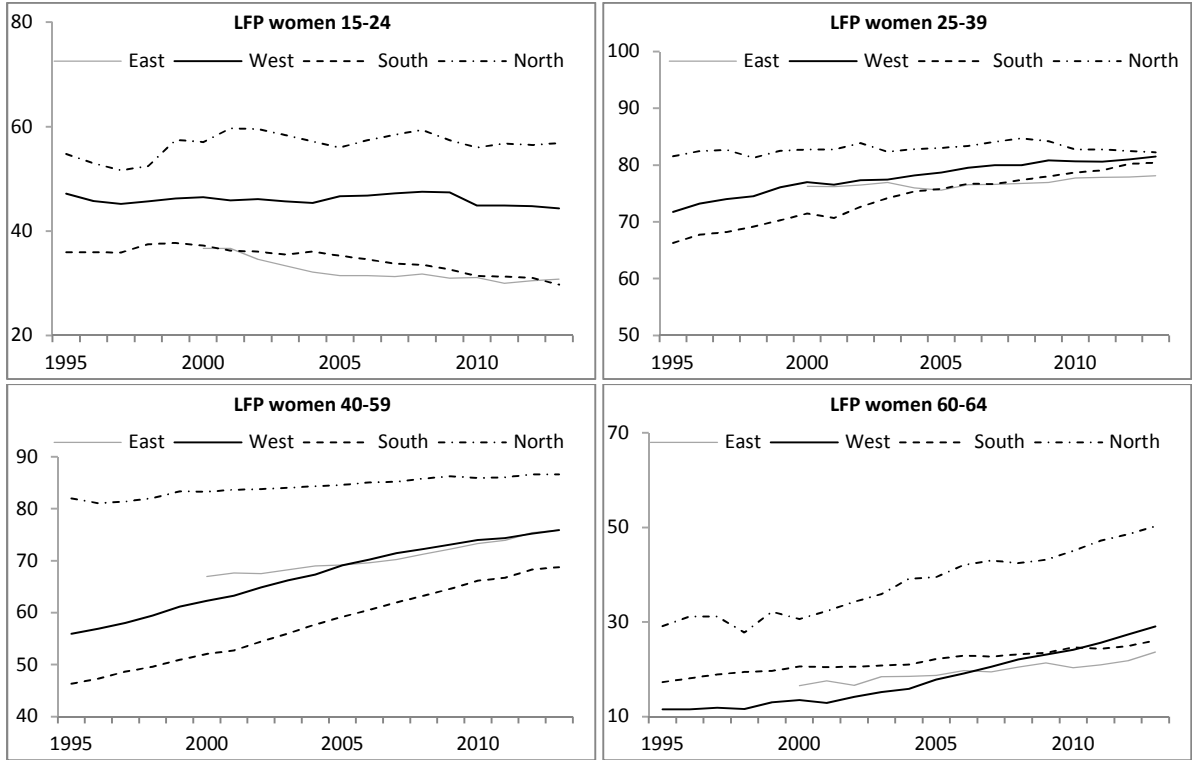
Age group	2000			2008			2013		
	LFP		GPG	LFP		GPG	LFP		GPG
	men	women		men	Women		men	women	
<i>EU-27</i>									
15-64	77.1%	60.1%	<b>17.0</b>	77.9%	63.7%	<b>14.2</b>	78.1%	66.1%	<b>12.0</b>
15-24	48.8%	41.8%	<b>7.0</b>	47.8%	40.7%	<b>7.1</b>	45.0%	39.4%	<b>5.6</b>
25-39	93.1%	75.2%	<b>17.9</b>	92.5%	77.6%	<b>14.9</b>	91.6%	78.7%	<b>12.9</b>
40-59	85.9%	65.4%	<b>20.5</b>	87.2%	71.4%	<b>15.8</b>	88.4%	75.6%	<b>12.8</b>
60-64	32.8%	16.5%	<b>16.3</b>	40.7%	23.0%	<b>17.7</b>	45.5%	29.5%	<b>16.0</b>
<i>EU-15</i>									
15-64	78.2%	59.9%	<b>18.3</b>	79.4%	65.2%	<b>14.2</b>	79.0%	67.5%	<b>11.5</b>
15-24	50.9%	44.1%	<b>6.8</b>	51.4%	44.9%	<b>6.5</b>	47.3%	42.8%	<b>4.5</b>
25-39	93.2%	74.6%	<b>18.6</b>	92.8%	78.2%	<b>14.6</b>	91.6%	79.5%	<b>12.1</b>
40-59	87.0%	64.1%	<b>22.9</b>	88.6%	72.2%	<b>16.4</b>	89.3%	76.0%	<b>13.3</b>
60-64	33.0%	15.5%	<b>17.5</b>	42.1%	24.6%	<b>17.5</b>	47.4%	32.7%	<b>14.7</b>

Source: Own elaborations based on Eurostat aggregated LFS statistics.

Apart from age-group specific differences in the labor force participation of women, there are also profound differences in the geographic patterns (Fig. 2). Generally, women in the South aged 15-59 continue to participate less in labor markets, although at least in the two prime working age groups (25-39 and 40-59) the tendency was clearly converging to the rest of the EU. This development, consequently, implied a substantial decrease in the GPG in the Southern EU members. On the other extreme, women of all age groups in the Scandinavian EU countries were outperforming women in all the remaining country groups. This is particularly the case of the last age-group. Instead, for the two prime-age groups (25-39 and 40-59) there is a clear tendency in women's participation to converge between the North and the rest of the EU. As male labor force participation rates do not differ much by region in the two prime age groups, it is also worth noting that the GPG in the North has been the lowest in the EU for the entire observation period.

Profound differences in labor force participation between women are visible in the respective choices between part-time and full-time employment (Fig. 3). Women in Southern and even more in Eastern EU countries, if active in the labor market, tend to work full-time, with the full-time employment rates (as a share of the active population) being around 80% in Eastern EU countries and around 70% in Southern EU countries. Consequently, the difference in the full-time employment behavior between men and women in Eastern Europe is rather negligible, less so in the South due to the persistence of the relatively high male employment rates. Instead, women in Western and Northern EU countries are more often employed part-time, with the average part-time employment rates for the period 1998-2012 of almost 45% and 39%, respectively. Consequently, the gender gap in full-time

employment in these country-groups is substantial (in 2012, around 26 percentage points in the West and almost 17 percentage points in the North), although slowly diminishing.



**Figure 2.** Labor force participation rates (in %) for men and women in the EU country- and age-groups.

Note: The country-composition is as follows: East – Bulgaria, Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Romania, Slovenia, Slovakia; West – Belgium, Germany, Ireland, France, Luxemburg, Netherlands, Austria, United Kingdom; South – Greece, Spain, Italy, Portugal; North – Denmark, Finland, Sweden.

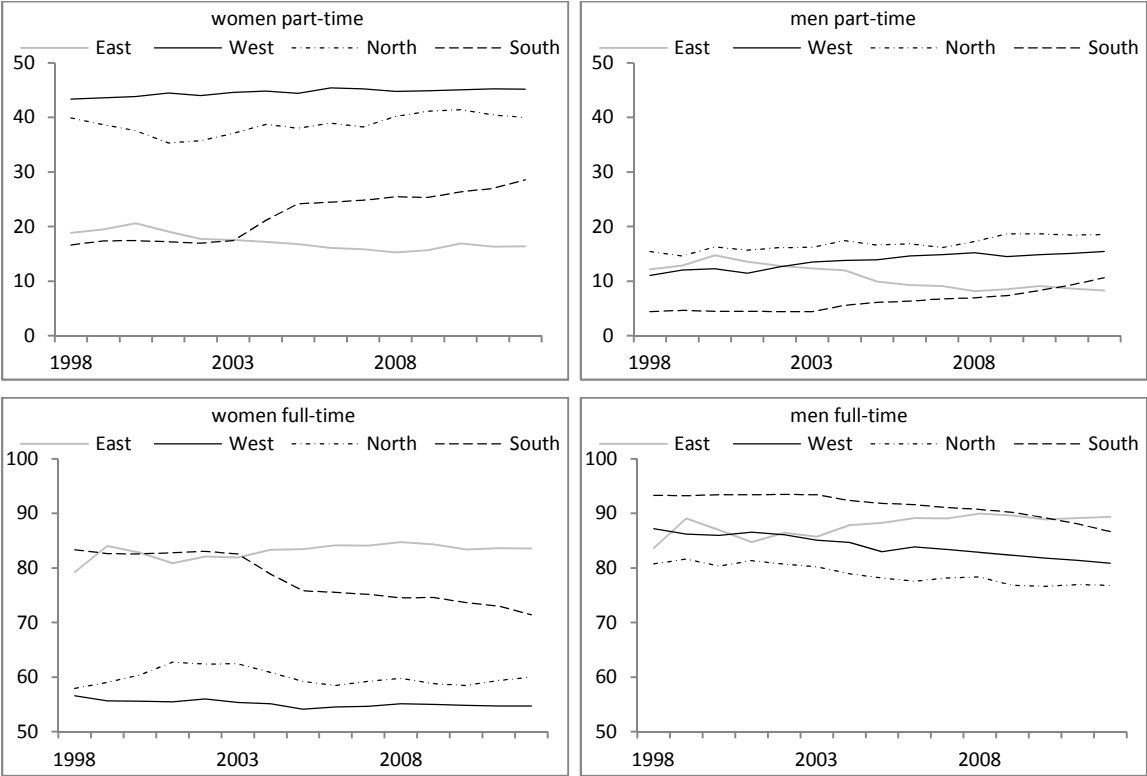
Source: Own elaborations based on Eurostat aggregated LFS statistics.

We expect that the patterns of labor force participation and, particularly, of employment of women are influenced by the differences in the family policy designs. Family policy in the European Union faces a multiple of approaches and instruments aimed at supporting families and reconciling the family life and the working activity. Although a common, EU-wide, policy design exists thanks to directives recommending common policy priorities, differences in the national-level implementation strongly shapes the actual, country-level, family policy framework.<sup>9</sup> Moreover, changes in the family policies in the European countries have been significant, following the European-level impulses given through different directives starting from the mid-90s.

In particular, family allowance policies differ much between countries, but some common patterns can be observed when looking at country groups. In the appendix we list the various country-specific characteristics, which we briefly summarize here, considering the four EU country-groups (Tab. 2). With the exception of Ireland and the Netherlands, Western EU countries are the most

<sup>9</sup> A summary of the different instruments of the national family policies has been offered in Table A.1 in Appendix.

generous regarding family support for children, with 18-25 years of age being the age limit for the payment of financial support to children. On the contrary, Northern European countries offer rather moderate family allowances, with 17 the maximum age limit for family allowance payments.



**Figure 3.** Share of labor force working in part-time and full-time employment, men and women aged 15-64 in Eastern, Western, Northern and Southern EU countries, 1998-2012.

Note: Country composition as explained in the note to Figure 2. The shares do not add to 100% as the unemployed are not considered which are part of the labor force and make up the difference to 100%.

Source: Own elaborations based on Eurostat aggregated LFS statistics.

Both Eastern and Southern European EU members have mixed family allowance schemes, with some countries being more generous (Greece, Portugal, Bulgaria, Cyprus, Hungary, Poland and Slovenia) and those having more moderate schemes (Italy, Spain, Czech Republic and Estonia).

**Table 2.** Summary of different family policy instruments.

	Country-group within the EU			
	East	West	South	North
<i>Family allowance</i>	Mixed schemes: relatively generous in Bulgaria, Cyprus, Hungary, Poland and Slovenia, whereas less in the Czech Republic and Estonia;	Relatively generous: 18-25 the age limit for the payment of the allowance;	Mixed schemes: relatively generous in Greece and Portugal, whereas less in Italy and Spain;	Moderate: 17 the age limit for the payment of the allowance;
<i>Parental</i>	Relatively generous,	Relatively generous	With the exception of	The most generous

<i>leave</i>	especially maternity leave;	maternity leave and moderate parental leave;	Spain, relatively generous maternity (and parental) leave schemes;	and the most flexible in the EU;
<i>Daycare assistance</i>	Under EU-average daycare assistance for children aged both 0-3 and over 3;	Efforts to increase the daycare assistance especially for children under 3 still have to be made;	Portugal and Italy approaching the EU average, whereas Greece and Spain underperforming;	The most developed system of daycare assistance in the EU, also for children under 3;

Parental leave is intended to give the opportunity to the parents to stay with their new-born (or adopted) children for a certain period of time. This family policy instrument consists of a (paid) maternity leave that usually starts some weeks before the expected birth date and lasts for a certain period afterwards. Maternity leave is paid in proportion (about 70-80%) of the last salary. Fathers are sometimes entitled to a few days of leave on the birth that, nevertheless, in many cases is unpaid or little paid. After this first stage of parental (maternity) leave, parents - both mothers and fathers - can decide to stay out of work or to reduce their workload for further period of time and are usually protected from termination of the employment contract.<sup>10</sup> This lasts until the child turns three in some countries, but both shorter and longer parental leaves are being implemented in different countries.

Northern European parental leave systems are among the most generous and, at the same time, the most flexible in the EU. They are often accompanied by measures facilitating parents' return to employment, such as high quality childcare arrangement that are in place in Denmark, or an unconditional right to municipal daycare service for children under seven in Finland and Sweden. Maternity leave in Eastern EU countries are rather generous, amounting to a maximum of 34 weeks of paid maternity leave. The minimum of ca. 16 weeks are provided in Latvia that is similar to the EU average. Also the remaining parental leave schemes are generous both regarding the time and financial dimension, although in some cases they are unpaid or low-paid (for example, Latvia and Slovenia). A distinctive picture regarding parental leave can be observed in Southern Europe, where mothers, especially those employed in the public sectors, have been enjoying extensive means of protection. The exception here is Spain, where the maternity leave stays around the EU averages and parental leave is unpaid. The parental leave system in Western EU countries is rather homogenous regarding maternity leave, amounting to 16 weeks on average. This is accompanied by a further rather moderate but paid parental leave that can be taken both by the mothers and fathers.<sup>11</sup>

Regarding daycare assistance, again the most developed and with the longest tradition childcare system can be observed for Northern European EU members, with extensive opportunities for parents of children under six (the usual school age in Europe) to draw on the daycare assistance. Although

<sup>10</sup> In the Czech Republic, the employer doesn't have to guarantee the return to exactly the same job, but he is obliged to offer a position corresponding to the parent's qualification.

<sup>11</sup> The information on parenting support summarized in this Section come mainly from the European Alliance for Families (<http://europa.eu/familyalliance/>), as well as from the Council of Europe Family Policy Database ([http://www.coe.int/t/dg3/familypolicy/database/default\\_en.asp](http://www.coe.int/t/dg3/familypolicy/database/default_en.asp)) and the recent report on parenting support in Europe (Eurofound, 2013).

many Western European countries have recently organized their systems following the example of the Northern countries, some (including Germany) are still working on expanding childcare opportunities. Also Eastern European countries in many cases lag behind the Northern or even average EU patterns. This is reflected in lower than in the EU average enrollment of children both under the age of three, and between three and the school age, in childcare assistance. Such a situation is related to the transition process, where care facilities were often reduced during the early phases of transition, and the responsibilities for bringing up children were taken over by the grandparents or other family members. This notwithstanding, efforts have been made in the last years to improve the situation, as the example of Estonian program of state support for local authorities shows. In between the EU average and the Eastern European average, are the Southern European EU countries, with Greece possessing an underdeveloped childcare provision and financial support for families, Spain having care for children under three entrusted largely to informal arrangements and Italy and Portugal approaching the EU average.

The above synthesis of family policies in the EU member states indicates a priori suggestive differences between country groups in the precise design of policy instruments. At the same time, it can be observed that such differences go hand in hand with differences in levels and developments of labor market behavior especially of women. In particular, the most stable and at the same time the highest LFP rates in the EU observed in Northern EU members correspond to the most developed, the most flexible and the most persistent family support policies in the EU. In contrast, both Eastern and Southern as well as to a certain extent also Western EU members introduced significant policy modifications regarding measures directed towards easing the compatibility of family duties and employment. As already anticipated, the most important among them were regarding parental leave (often in the form of introducing or extending leave for fathers) and daycare assistance, with measures tending towards assuring enough childcare assistance to parents. But the exact impact of the specific measures on labor market participation remains still unclear and constitutes the central research framework of the forthcoming empirical analysis.

#### **4. Estimation strategy and data**

The main focus of the empirical analysis is on assessing the impact of different instruments of family policy on women's labor market behavior. To this end, we first look at the influence of such policy measures on the labor force participation of women of all age groups together (15-64) and for three age-groups, 15-24, 25-39 and 40-59, considered separately. Such a differentiated look makes sense, as the descriptive data analysis has shown that there is much heterogeneity in the labor market participation between the different age groups.

Furthermore, women deciding to become active in the labor market may choose between either part-time or full-time employment or they could be forced to search for a job for a certain period of time while being temporary unemployed. In turn, the decision of women with children whether to

work part time or full time will often be dependent on the availability and the structure of public support for families. Depending on the specific policy design, part-time employment for women could be favored relative to full-time employment, given that, due to insufficient availability of institutional support, women are constrained to reduce their working time. Consequently, it seems reasonable to investigate how family policies differently influence part-time and full-time employment of women. Also here the distinction between the three age groups will be applied.

Our overall sample consists of women from 21 EU member states, observed annually over the period 1998-2007 and divided in three age groups.<sup>12</sup> In particular, women are classified in a young-age group (15-24) and two prime-age groups (25-39 and 40-59). By distinguishing between different age groups, we are able to account for the between group heterogeneity that is strongly perceived when looking at the specific determinants of labor market involvement of women.

Whereas our dependent variables vary considerably between countries, they are much more persistent over time. This fact has two important implications on the choice of our estimation method. First, the idiosyncratic error term is subject to autocorrelation.<sup>13</sup> One possibility to deal with this issue could be the inclusion of the lagged dependent variable on the right hand side of the estimating equation, but the estimations would be biased in this case (Nickell, 1981). An alternative is to run estimations using feasible generalized least squares method (FGLS) that allows accounting for the autoregressive (AR1) process in the residuals (Wooldridge, 2002). This is the method we prefer. Second, due to the fact that most of our variables, dependent and explanatory, show significant between but limited within variability, we perform our main regressions on the pooled data, including time effects and age-group dummies manually. Indeed, applying the fixed effect model is undesirable in such a case, as the fixed effect model uses only the within variance for the estimation, removing entirely the between variance. In that way, it does not allow the estimation of time-invariant variables (Baltagi, 2001; Wooldridge, 2002; Hsiao, 2003) and it inefficiently estimates the effects of variables showing only limited within variance (Plümper and Troeger, 2007), as is the case of most of the variables in our framework (see Table 2 below with the descriptive statistics).<sup>14</sup> In the sensitivity check, we show and discuss also the results obtained from the fixed and random effects estimations, where we allow for AR(1) disturbances.<sup>15</sup> Additionally, however, since random effects model assumes no correlation between unobservable (country) effects and observed variables – which is a strong assumption – we follow the

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<sup>12</sup> Due to lacking data on family policies, we had to exclude from our empirical analysis some Eastern European countries, particularly Bulgaria, Cyprus, Latvia, Lithuania, Malta and Romania. Our sample is therefore composed of Belgium, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Luxemburg, Hungary, Netherlands, Austria, Poland, Portugal, Slovenia, Slovakia, Finland, Sweden and the UK.

<sup>13</sup> We run the Arellano-Bond test and confirmed the presence of first order autocorrelation.

<sup>14</sup> This argument has been made also in the context of macroeconomic investigations, like for instance, in the cross-country growth analysis by Quah (1996) and Lane (1998), as well as in Chinn and Prasad (2003) in a panel data analysis of the determinants of current accounts. In our context, the contribution of the cross-sectional variation is even stronger than in the aforementioned analyses, which is much supportive to our methodological choice.

<sup>15</sup> On the other hand, using pooled cross-sections or random effects limit our ability to control for potential unobserved heterogeneity, an important element of endogeneity in our setting. In that sense we are cautious about interpreting our results as causal effects.

Mundlak (1978) approach, which relaxes this assumption. In particular, the approach consists in estimating the random effect model augmented by the means of explanatory variables over time for each country. The test of the statistical significance of the estimated coefficients on the means suggests, indeed, that such a correction is meaningful. The estimation results of the time means can also be interpreted as long-term effects while the coefficients of the regular explanatory variable can be considered as short-term effects as they measure the deviation of the time-averaged mean.

#### 4.1. Model, variables and data source

The baseline model to estimate is given by:

$$dep\_var_{kat} = \beta_1 + \beta_2' \mathbf{X}_{kat} + \beta_3' \mathbf{Z}_{kat} + \gamma_a + \tau_t + \varepsilon_{kat} \quad (1)$$

where  $dep\_var_{kat}$  refers to one of the three dependent variables – being LFP rates, part-time or full-time employment rate of women – in country  $k$ , age group  $a$  and at time  $t$ . Specifically, part- and full-time employment rates are expressed as a share of the women’s total population in a given age-group working part- or full-time, respectively. Vector  $\mathbf{X}_{kat}$  collects the main explanatory variables referring to the four different measures of family policies as described below. In vector  $\mathbf{Z}_{kat}$ , we include other control variables that refer to the standard determinants of LFP considered in the past literature. Parameters  $\gamma_a$  and  $\tau_t$  refer to the age-group and time specific effects, respectively. Finally,  $\varepsilon_{kat}$  is the idiosyncratic error term. Data on labor force participation and employment are taken from Eurostat.

We focus on four different categories of expenditures on public support for families (expressed as a share of per capita GDP). Among them, we consider three kinds of cash benefits 1) *family allowance* defined as “periodical payments to a member of a household with dependent children to help with the costs of raising children”; 2) *parental leave* defined as “benefit paid to either mother or father in case of interruption of work or reduction of working time in order to bring up a child”. Note that we focus here on the amount of money spent by the state to make up for lost earnings during parental leave, rather than the generosity of the leave policy itself.<sup>16</sup> 3) *other cash benefits* defined as “benefits paid independently of family allowances to support households and help them meet specific costs, such as costs arising from the specific needs of lone parent families or families with handicapped children”. The last category refers to benefits in kind and is given by *daycare benefits* defined as “shelter and board provided to pre-school children during the day or part of the day. [...]Financial assistance towards the payment of a nurse to look after children during the day is also included here.”<sup>17</sup> All the policy variables are expressed in terms of natural logarithm and are obtained from the OECD Social Expenditure database.

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<sup>16</sup> To the extent that these payments can be seen as a boost to the (inter-temporal) net wage, we would expect them to promote female participation rates.

<sup>17</sup> All definitions are based on the Eurostat’s European System of integrated Social PROtection Statistics (ESSPROS): Manual and user guidelines (Eurostat, 2012).



Note that these variables only capture the monetary dimension of different types of family policies in Europe. They are therefore not fully able to capture the nuances of differences in types of policies and incentives that we discussed above. Unfortunately, it is very difficult to develop indicators that would capture these differences more fully. But we believe that substantial differences in monetary arrangements will be a reasonable proxy for the complexity of existing policies in EU countries.

Among the controls, we include factors suggested in the past literature as affecting the labor market behavior of women. The standard determinants comprise the fertility rate, educational attainment, and the share of part-time employment overall in the economy, and the unemployment rate. The data on fertility are not age-group specific and are taken from the World Development Indicator database. In principle, it can be argued that becoming parents should influence the choice between assuming family responsibilities and market activity. In particular, the intensity of tasks connected with the parental responsibilities makes parents leave the job market at least in the very first period of the child's life. There should, thus, emerge incompatibility between childrearing and female employment (Pampel, 2001; Rindfuss *et al.*, 2003). However, the enhancing role played by public policies aiming at reconciliation between work and family could also lead to a positive association between fertility and labor market participation (Sleeboos, 2003). This positive association is plausible both in the case of labor force participation in general – as women having offspring generally do not drop out of the labor market– and, more specifically, for part-time employment. Indeed, women having children could be a constraint leading them to reduce their full-time participation. For that reason, fertility is expected to contribute negatively to the full-time employment status of women, since they still decide more often than men to take on parental responsibilities, with a negative effect on the working hours that can be spent in employment.

The *educational attainment* of women is measured as the percentage share of women's age-group specific population with the 3<sup>rd</sup> and 4<sup>th</sup> educational degree (corresponding to upper secondary and tertiary education). This variable is aimed to grasp the effort put into accumulation of personal human capital stock. In principle, we expect that the higher intensity of education attainment in an age-group, the stronger should be the participation in the labor activities. Indeed, women with higher educational attainment are likely to be more motivated to get their return from hardly accumulated skills (Jaumotte, 2003). On the other hand, however, women with higher educational attainment could prefer not to engage into full-time employment, especially if marital matching brings them to be married to a man with similarly high educational level. The main reason for this is that, as the husband earnings are high enough, the income effect could discourage such employment (Klasen and Pieters, 2015).

Regarding the *opportunities of part-time employment* as a determinant of women's LFP, the chance to reduce the working hours could additionally alleviate the balance between family responsibilities and working (Del Boca *et al.*, 2005; Genre *et al.*, 2010). It should be noted thus that, ideally, we should include an indicator measuring not the part-time employment actually observed, but

the opportunities to assume part-time jobs. It is, nevertheless, impossible to obtain such a measure, as data on this issue are not collected. Our choice is, thus, to include not the female part-time employment rates specific for each age-group, but the country-level part-time employment for all ages and both sexes. In that way, for each age-group in a given country and in a given year, we are measuring the average, country-level situation regarding the part-time employment. Finally, *unemployment rate* is aimed to measure the prevailing economic circumstances and business cycle developments that could in principle have also some influence on labor force participation and employment patterns (Bover and Arellano, 1995; Genre *et al.*, 2010). Data on educational attainment, part-time employment and unemployment rates are taken from Eurostat.

In Table 3, we show descriptive statistics. LFP of women in our sample is on average slightly above 51%. There are, however, significant differences between the countries, as is confirmed by a relatively high between standard deviation (SD). As already mentioned, the latter was accounting for much of the overall variability, with only moderate contribution of the within SD. A similar conclusion regards both part-time and full-time employment, as well as family policies, fertility, education and the country-level part-time employment rate in the last row.

**Table 3.** Descriptive statistics.

	obs.	mean	SD overall	SD between	SD within	min.	max.
<i>dependent variables:</i>							
LFP	840	51.42	25.24	25.20	3.04	3.10	91.40
part-time employment	840	12.69	11.61	11.46	2.16	0.00	56.70
full-time employment	840	33.26	20.73	20.62	3.02	1.20	82.70
<i>family policies:</i>							
family allowance	828	11.36	1.21	1.21	0.15	8.60	13.70
parental leave	828	10.10	1.50	1.48	0.23	6.00	12.40
other cash benef.	788	8.80	2.09	1.99	0.64	3.80	13.60
Daycare	828	10.09	1.52	1.52	0.19	7.40	13.50
<i>other controls:</i>							
Fertility	840	1.51	0.24	0.23	0.07	1.13	2.01
Education	824	64.43	13.47	13.06	3.19	20.80	82.80
Unemployment	838	8.15	3.93	3.53	1.78	1.80	20.20
part time	840	14.14	9.47	9.49	0.58	1.80	46.30

### 4.3. Results

Main estimation results using FGLS and time fixed effects are presented in Table 4. We show three panels of results, corresponding to three dependent variables: in panel (a) the dependent variable is the age-group specific LFP rate, in panel (b) are estimations for part-time employment rates and in panel (c) for full-time employment rates, each calculated as a share of the population in the particular

age group. Moreover, for each set of estimations, we first run a regression pooling all age-groups together and then performing the analogous estimations for the three age groups separately.

Before commenting on the results for family policies, let us briefly mention the effects for our control variables. Interestingly, higher fertility is associated with higher female labor force participation, and particularly part-time employment, while the association with full-time employment is only positive in the full sample, but insignificant otherwise.<sup>18</sup> Higher education also promotes FLP and part-time employment, but actually not more full-time employment. And higher unemployment is (as expected) associated with less full and part-time employment, but has apparently no deterring effect on overall LFP.

The results show that family policies have a strong, significant and sizable effect on women's decision to work part-time and full-time, while the impact on overall LFP is smaller and only occasionally significant in some age groups. The effects of family policies on LFP are strongly determined by the combined and often opposite effects on part-time and full-time employment.<sup>19</sup> Indeed, since the family policies influence part-time and full-time employment often exactly in the opposite direction, the effect on participation almost neutralizes. The only effect that is visible is that more generous provision of daycare is associated with higher LFP in all age groups. For the younger age group, family policies play a larger role but for this age group one should note completing education is influencing LFP and unemployment rates are much higher so that a significant share of women in the labor force are actually job-seekers. Bearing this in mind, family allowances, other cash benefits, and daycare are associated with higher LFP among the 15-25 year old while parental leave is associated with lower participation; the latter could be related to the fact that more generous parental leave leads women to drop out of the labor force altogether in this age range.

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<sup>18</sup> This suggests that higher fertility leads to higher female participation over the entire age range, implying dynamic positive effects.

<sup>19</sup> The last group among those participating is the unemployed but they only make up a small share of the economically active (below 10% in most countries and time periods).

**Table 4.** Family policies and women's labor activity in the EU.

	All age groups		25-39		40-59		15-25	
<b>a) LFP</b>								
<i>family allowance</i>	-0.337	(0.463)	-0.335	(0.592)	-0.552	(0.713)	2.360**	(0.994)
<i>parental leave</i>	-0.355	(0.331)	-0.388	(0.397)	0.869*	(0.507)	-3.580***	(0.699)
<i>Daycare</i>	0.622*	(0.337)	0.479	(0.464)	0.411	(0.521)	1.420*	(0.737)
<i>other cash benefits</i>	0.147	(0.141)	-0.561***	(0.196)	0.321	(0.219)	0.697**	(0.311)
<i>fertility</i>	7.080***	(1.710)	2.710	(2.060)	4.700*	(2.640)	11.70***	(3.640)
<i>education</i>	0.136***	(0.036)	0.106***	(0.038)	0.347***	(0.055)	0.132*	(0.074)
<i>unemployment</i>	0.015	(0.063)	0.143	(0.098)	-0.026	(0.101)	0.054	(0.146)
<i>part time</i>	0.018	(0.058)	-0.169***	(0.058)	0.079	(0.083)	-0.036	(0.122)
<i>age-group dummies</i>	Yes		no		No		No	
<i>time dummies</i>	Yes		yes		Yes		Yes	
N. obs.	770		193		193		193	
Wald Chi-sq.	1750.86 [0.000]		52.10 [0.000]		181.37 [0.000]		59.34 [0.000]	
<b>b) part-time employment</b>								
<i>family allowance</i>	2.144***	(0.439)	4.387***	(0.839)	4.376***	(0.963)	-0.391	(0.643)
<i>parental leave</i>	-3.603***	(0.296)	-5.174***	(0.558)	-4.885***	(0.651)	-5.688***	(0.417)
<i>daycare</i>	2.370***	(0.334)	2.635***	(0.648)	2.226***	(0.731)	5.511***	(0.511)
<i>other cash benefits</i>	0.203	(0.144)	0.041	(0.280)	0.146	(0.315)	0.367*	(0.219)
<i>fertility</i>	13.54***	(1.534)	11.76***	(2.883)	17.62***	(3.380)	11.75***	(2.126)
<i>education</i>	0.115***	(0.029)	0.131**	(0.052)	0.114*	(0.063)	0.220***	(0.037)
<i>unemployment</i>	-0.125*	(0.069)	-0.222	(0.142)	-0.078	(0.155)	-0.182	(0.117)
<i>age-group dummies</i>	yes		no		no		no	
<i>time dummies</i>	yes		yes		yes		yes	
N. obs.	770		193		193		193	
Wald Chi-sq.	513.68 [0.000]		204.31 [0.000]		159.30 [0.000]		408.70 [0.000]	
<b>c) full-time employment</b>								
<i>family allowance</i>	-0.979	(0.972)	-4.428**	(1.615)	-5.640***	(1.110)	3.747***	(1.085)
<i>parental leave</i>	2.185***	(0.712)	5.018***	(1.069)	6.388***	(0.946)	0.635	(0.724)
<i>daycare</i>	-0.977	(0.690)	-2.958**	(1.252)	-1.613	(1.053)	-2.628***	(0.834)
<i>other cash benefits</i>	-0.194	(0.287)	-0.775	(0.541)	0.018	(0.454)	0.523	(0.360)
<i>fertility</i>	8.157**	(3.660)	-1.513	(5.522)	-0.948	(4.920)	-0.162	(3.750)
<i>education</i>	0.062	(0.081)	-0.045	(0.099)	0.226**	(0.093)	-0.060	(0.376)
<i>unemployment</i>	-0.164	(0.126)	-0.157	(0.276)	-0.079	(0.222)	-0.507**	(0.181)
<i>age-group dummies</i>	yes		no		no		no	
<i>time dummies</i>	yes		yes		yes		yes	
N. obs.	770		193		193		193	
Wald Chi-sq.	57.73 [0.000]		62.28 [0.000]		94.13 [0.000]		47.14 [0.000]	

Note: \*, \*\* and \*\*\* refer to 1%, 5% and 10% significance level, respectively. Estimations are run using cross-sectional time-series FGLS methodology, accounting for serial correlation. Standard errors are in parenthesis. Wald Chi-squared statistics refers to the overall specification test. P-values of the test are in squared parenthesis.

As already noticed, family policies typically influence part-time employment exactly in the opposite direction to how they influence full-time employment, so that the results should be interpreted together. Focusing first on the combined age group, there is clear evidence of a positive impact of family allowance schemes on the part-time employment of women. This means that women receiving this kind of financial support for raising children are better able to reconcile their family

duties and working activities, probably by reducing their working time from full-time employment. At the same time, cash benefits connected with periods of parental leave are supportive in working in full-time employment. Clearly, such payments are usually only temporary, during the first months after the child birth, so that women deciding to participate were searching to get full-time employment and, consequently, earn higher income in the longer-term. There is also evidence of a positive impact on part-time employment of measures offering daycare protection to pre-school children; no effect is found for full-time employment. Given, however, that such measures of daycare provision are offered often on a less than a full-day basis, part-time and not full-time working arrangement appear to have been chosen by women. Finally, other cash benefits do not have any clear effect on women's employment.

It is also worth noticing that these general results could be broadly confirmed for both prime-age groups (25-39 and 40-59), with only minimal differences regarding the magnitude of the influence. The only different in daycare spending is associated with significantly lower full-time employment in the two prime age groups. For the group of youngest women the difference is in the direction of influence coming from family allowance benefits: they are stimulating rather than discouraging full-time employment; but since women in that age group still have few children, this might be related to women working more prior to having children and rather than reducing (full-time) employment later on.

#### **4.4. Sensitivity checks**

As argued in Section 4.2, due to the very limited within variability of our variables, the estimation with the fixed effects model would deliver inconsistent estimations. In Table 5 we nevertheless report the results from the estimations using fixed effects method applied to our three models of LFP, part-time and full-time employment. Despite this problem, they largely corroborate our findings from the pooled regressions. The significant impact of parental leave in lowering part-time employment and promoting full-time employment remains; also the impact of family allowance on encouraging part-time and discouraging full-time employment remains, although it is no longer significant in the latter case. Interesting is also that other cash benefits now have a significant effect of increasing part-time and (insignificantly) lowering full-time employment.

Additionally, in the same Table 5, we report the results from the random effects method. Similarly as the pooled OLS, in random effects estimations the unobserved time-invariant effects are put into the error term. At the same time, however, random effects method imposes more assumptions than pooled OLS does. In addition to the strict exogeneity between the idiosyncratic error term, the other explanatory variables and the unobserved effects it also imposes orthogonality between the unobserved effects and observed explanatory variables. This condition is needed because the random effects method applies the generalized least squares approach to exploit the serial correlation of the (composite) error term. In turn, applying our FGLS approach to the pooled regressions allows more

flexibility than the random effects framework and, at the same time, is as efficient as the random effects estimator. For this reason, in interpreting our results we also prefer our pooled estimations. It is, however, worth noting that the direction and the magnitude of the influence of the single covariates are very similar between the pooled and random effects estimations.

**Table 5.** Estimations with alternative methods, fixed effects and random effects.

	FE		RE		Mundlak	
<b>a) LFP</b>						
<i>family allowance</i>	0.586	(0.551)	0.366	(0.493)	0.586	(0.547)
<i>parental leave</i>	-0.136	(0.433)	-0.289	(0.374)	-0.134	(0.430)
<i>daycare</i>	0.018	(0.382)	0.150	(0.346)	0.014	(0.379)
<i>other cash benefits</i>	-0.046	(0.141)	0.017	(0.136)	-0.046	(0.141)
<i>fertility</i>	3.409*	(2.045)	4.860***	(1.940)	3.390*	(2.030)
<i>education</i>	0.077	(0.057)	0.105**	(0.046)	0.073	(0.056)
<i>unemployment</i>	0.019	(0.059)	0.021	(0.058)	0.020	(0.058)
<i>part time</i>	0.153	(0.155)	0.073	(0.090)	0.163	(0.155)
<i>mean family allowance</i>					-4.720**	(1.834)
<i>mean parental leave</i>					-0.074	(1.202)
<i>mean daycare</i>					3.601**	(1.586)
<i>mean other cash benefits</i>					0.855	(0.607)
<i>mean fertility</i>					7.187	(5.652)
<i>mean education</i>					0.165	(0.101)
<i>mean unemployment</i>					-0.452	(0.387)
<i>mean part time</i>					-0.227	(0.197)
<i>age-group dummies</i>	Yes		yes		yes	
<i>time dummies</i>	Yes		yes		yes	
N. obs.	770		770		770	
R-squared (overall)	0.903		0.836		0.858	
Wald test					[0.050]	
<b>b) part-time employment</b>						
<i>family allowance</i>	1.727***	(0.541)	2.324***	(0.456)	1.723***	(0.537)
<i>parental leave</i>	-1.491***	(0.411)	-2.785***	(0.324)	-1.495***	(0.408)
<i>daycare</i>	0.423	(0.406)	1.342***	(0.346)	0.419	(0.402)
<i>other cash benefits</i>	0.307**	(0.141)	0.321**	(0.135)	0.306**	(0.140)
<i>fertility</i>	7.810***	(1.864)	11.59***	(1.584)	7.833***	(1.849)
<i>education</i>	0.028	(0.055)	0.075**	(0.037)	0.026	(0.054)
<i>unemployment</i>	0.069	(0.056)	0.041***	(0.056)	0.071	(0.056)
<i>mean family allowance</i>					-0.920	(1.304)
<i>mean parental leave</i>					-3.320***	(0.876)
<i>mean daycare</i>					4.309***	(1.081)
<i>mean other cash benefits</i>					0.186	(0.426)
<i>mean fertility</i>					0.726	(4.086)
<i>mean education</i>					0.177**	(0.078)
<i>mean unemployment</i>					-0.723***	(0.269)
<i>age-group dummies</i>	Yes		yes		yes	
<i>time dummies</i>	Yes		yes		yes	
N. obs.	770		770		770	
R-squared (overall)	0.765		0.587		0.680	
Wald test					[0.000]	

**Table 5. cont.**

<b>c) full-time employment</b>						
<i>family allowance</i>	1.144	(0.847)	-1.164*	(0.699)	1.144	(0.847)
<i>parental leave</i>	0.893	(0.628)	2.270***	(0.486)	0.893	(0.628)
<i>daycare</i>	0.311	(0.677)	-0.970*	(0.552)	0.311	(0.677)
<i>other cash benefits</i>	-0.332	(0.221)	-0.248	(0.207)	-0.332	(0.221)
<i>fertility</i>	11.56***	(2.813)	4.583***	(2.346)	11.55***	(2.790)
<i>education</i>	0.102	(0.085)	0.073	(0.056)	0.103	(0.084)
<i>unemployment</i>	-0.243***	(0.086)	-0.282***	(0.082)	-0.244***	(0.085)
<i>mean family allowance</i>					-5.428***	(1.898)
<i>mean parental leave</i>					3.490***	(1.275)
<i>mean daycare</i>					-1.713	(1.587)
<i>mean other cash benefits</i>					0.547	(0.617)
<i>mean fertility</i>					-10.99	(6.850)
<i>mean education</i>					-0.211	(0.143)
<i>mean unemployment</i>					0.673	(0.418)
<i>age-group dummies</i>	Yes		yes		yes	
<i>time dummies</i>	Yes		yes		yes	
N. obs.	770		770		770	
R-squared (overall)	0.837		0.758		0.800	
Wald Chi-sq.					[0.000]	

Note: \*, \*\* and \*\*\* refer to 1%, 5% and 10% significance level, respectively. Estimations are run according to fixed effects (FE), random effects (RE), and Mundlak correlated random effects methodology, accounting for serial correlation in the disturbance term. Standard errors are in parentheses. Wald test has as a null hypothesis that all the estimated coefficients on the group-mean variables included in the augmented Mundlak estimation are equal to zero. The numbers in squared brackets report the p-values from the test.

The assumption of no correlation between the unobserved and observed variables in the random effects framework could be of course too restrictive. As a remedy, we follow the approach proposed by Mundlak (1978), also known as correlated random effects model, which is based on augmenting the random effects specification with time-averaged means of independent variables included in vectors  $\mathbf{X}$  and  $\mathbf{Z}$ . We also test for the statistical significance of the estimated coefficients on the variables in means, in order to assess whether the Mundlak's correction is useful in our framework. In particular, if the estimated coefficients were all equal to zero, this would imply that the explanatory variables in  $\mathbf{X}$  and  $\mathbf{Z}$  would be uncorrelated with the unobserved time-invariant individual effect.

We report the results of the Mundlak correlated random effects model in Table 5. Mundlak (1978) argued that the estimates according to his approach of the time-varying covariates (which can be interpreted as short-run effects) should typically resemble the ones from the fixed effects method. This is also the case in our setting. Consequently, the results from the Mundlak and from the fixed effects estimations differ from the random effects coefficients, both regarding the magnitude and, in some cases, also the direction of the influence. Moreover, given the results from the Wald test, we can reject the assumption of no correlation between unobserved and observed variables underlying the standard random effects model, so that we can meaningfully interpret the Mundlak results. Not only do they confirm the results from the fixed effects regressions for the short-term effects, but they indeed provide important insights regarding the long-term influence of the regressors on the labor market

outcomes of women. This can be done by looking at the coefficients of the time-averaged variables. In particular, labor force participation is negatively affected by family allowances and positively by spending on daycare. In the case of part-time employment, the negative impact of parental leave measures could be also confirmed in the long-term. Additionally, however, daycare spending, fertility and educational attainment appear to be supportive to the part-time employment of women, whereas unemployment is negatively associated. Finally, regarding the full-time employment, the positive short-run impact of parental leave has been confirmed in the long-run, whereas daycare spending continues have a negative impact, as also found in the pooled regressions.

Comparing the results of the Mundlak regression with the random effects estimation, despite the differences in estimation approach, the results regarding parental leave remain stable and highly significant. This clearly suggests that the current design of the parental leave schemes is supportive of full-time employment, whereas it diminishes the part-time employment of women – this is true in the short and long-run. Additionally, both from the Mundlak and from random effects regressions there is evidence of a positive impact of family allowance and of other cash benefits on part-time employment, with the opposite effect on full-time employment. Finally, it appears that daycare spending is supporting female labor force participation but only part-time and not full-time employment.

Both from the pooled OLS estimations and from other estimation procedures discussed above in this section we cannot be fully sure about the direction of causality. Correspondingly, the results obtained could be so far only interpreted as associations between the left and right-hand side variables. This implies the need to tackle with the potential endogeneity concerns, deriving for instance from the fact that the policy makers could decide to adjust the given framework of family policies on the background of the current participation behavior of women in the labor market.

One possibility to account for endogeneity issues is to apply dynamic panel technique, such as system or difference GMM method, permitting to instrument the regressors with their lagged observations. In particular, difference GMM estimator of Arellano and Bond (1991) is an IV estimation of the parameters in the first-difference model, using appropriate lags of regressors as the instruments. The system GMM estimator, or the Arellano-Bover/Blundell-Bond estimator (Arellano and Bover, 1995; Blundell and Bond, 1998), augments the difference GMM framework by a set of additional assumptions that first differences of instrument variables are uncorrelated with the fixed effects. Under these assumptions, it first estimates the original equation in first differences and then it uses the transformed equation in level, where the regressors in levels are instrumented with their lagged differences. In so doing, this estimator can substantially improve efficiency.

The clear advantage of these methods in the microeconomic frameworks of analysis, with large N and small T, for which such methods were developed, could become problematic in our – macroeconomic – setting. Indeed, the number of instruments very easily could become larger than the number of groups, creating potential problems of inconsistency of the results. This notwithstanding, and taking advantage from the methodological possibilities to collapse the number of instruments (so



that the number of instruments is always lower than the number of groups, see Roodman (2009) for a discussion on the issue), we perform both difference and system GMM estimations.

The results are reported in Table 6. Comparing them with the previous results it emerges that the results are rather similar, especially compared to the pooled regressions. While the results concerning LFP report again very little evidence of effects for any of the family policy instruments, the influence both on part-time and full-time employment of women is significant and goes in the same direction as in the case of the pooled regressions, with family allowance and daycare measures being supportive for part-time employment and parental leave sustaining full-time employment. Nevertheless, the magnitude of the influence is generally smaller in the dynamic GMM setting.

**Table 6.** Estimations with dynamic panel data methods, difference and system GMM.

	LFP		part-time		full-time	
	Diff GMM	Sys GMM	Diff GMM	Sys GMM	Diff GMM	Sys GMM
<i>lagged dep. var.</i>	0.927*** (0.028)	0.959*** (0.023)	0.025** (0.011)	0.556*** (0.016)	-0.253*** (0.010)	-0.096*** (0.008)
<i>family allowance</i>	-0.341 (0.267)	-0.585 (0.219)	-0.899*** (0.270)	2.374*** (0.222)	-0.845** (0.424)	-0.070 (0.420)
<i>parental leave</i>	-0.010 (0.150)	-0.123 (0.123)	-1.559*** (0.282)	-1.062*** (0.138)	2.574*** (0.314)	3.800*** (0.482)
<i>daycare</i>	2.875*** (0.402)	1.037*** (0.172)	6.187*** (0.446)	-0.328 (0.276)	3.604*** (0.765)	-2.554*** (0.513)
<i>other cash benefits</i>	0.039 (0.109)	-0.133 (0.067)	0.367*** (0.092)	0.201 (0.068)	0.567*** (0.160)	0.647*** (0.161)
<i>fertility</i>	-0.937 (0.878)	-0.150 (0.668)	8.475*** (1.318)	10.22*** (0.644)	17.64*** (2.011)	0.492 (1.540)
<i>education</i>	-0.083** (0.031)	-0.018 (0.011)	0.186*** (0.029)	0.142*** (0.022)	0.256*** (0.037)	0.040 (0.034)
<i>unemployment</i>	-0.123*** (0.025)	-0.080 (0.022)	0.223*** (0.024)	-0.039** (0.021)	-0.133* (0.069)	0.067 (0.054)
<i>part time</i>	-0.143 (0.115)	-0.159*** (0.047)	--	--	--	--
<i>time dummies</i>	yes	yes	yes	yes	yes	yes
N. obs.	635	715	635	715	635	715
A-B test for AR(2)	0.533	0.359	0.305	0.136	0.227	0.275
Hansen	0.279	0.386	0.042	0.266	0.100	0.509
Diff-in-Hansen						
<i>excluding gmm instr.</i>	0.142	0.242	0.038	0.113	0.038	0.297
<i>exogeneity of gmm instr.</i>	0.912	0.847	0.343	0.971	0.883	0.958

Note: \*, \*\* and \*\*\* refer to 1%, 5% and 10% significance level, respectively. Estimations are run according to difference GMM and system GMM methods. Standard errors are in parentheses. A-B test for AR(2) is the check of the second order serial correlation in residuals. Hansen is the test of overidentifying restrictions with the null hypothesis that the population moment conditions are correct. Diff-in-Hansen tests the validity of the instruments' subset: excluding the subset and the exogeneity of the instruments' subset. For all tests, we report p-values.

## 5. Discussion and Caveats

From the above analysis, a stable set of results emerges which are almost independent of the method used and the way endogeneity issues are tackled. Nevertheless, there still remain some caveats in our approach.

First, given data availability, we were able to measure different family policies in terms of financial support classified in four different categories. Although such a measure captures the material incentive/disincentive that women may perceive in deciding whether and to which extent to participate in the labor market, it does not permit to verify the more detailed and often immaterial impact of each policy measure. This is, for instance, the case of the quality of the daycare facilities. If mothers are unsure about the quality of the service, this could determine their limited participation in the labor market, although they could in principle receive financial assistance to benefit from daycare assistance. Correspondingly, the certain level of spending on parental leave doesn't fully describe the exact conditions that rule the job's contractual agreements, which are often crucially determining the choice of the mothers regarding their working hours. Supposing, for instance, that the financial support in terms of parental leave is relatively generous, but mothers are given limited possibilities to flexibly choose their working hours, they could be constrained to limit the intensity of their labor market activity. Although we believe that the financial dimension of the policies constitutes a crucial element in determining labor market behavior of women, further research is needed to fill the aforementioned gap.

Second, there might be other factors left out of our investigation framework, which could play a role. Most importantly, the tax regime and the system of benefits are supposed to influence the labor market choices of lone individuals and individuals within couples (Alesina *et al.*, 2009; Apps and Rees, 1999, 2004 and 2007). Given the complexity of the issue, the theoretical discussion is still ongoing. Consequently, it is difficult to find adequate indicators, which would suitably measure the impact of the tax and benefit system on labor market behavior of women. Moreover, data availability regarding our sample is also limited, which ultimately has driven our choice not to deal with the question in our empirical setting.

## **6. Conclusions**

The relevance of creating a framework where the work-family balance is assured is placed at a central stage in the policy discussion at the European and national level. At the same time, women assume family duties more than men and, consequently, participate less in the labor market. In this respect, family policies, if properly designed, could contribute to enhance women's involvement in the labor market.

The empirical investigation regarding a panel of women classified in three age groups in 21 EU countries over the period 1998-2007 shows that family policies currently only have a moderate influence of female labor force participation, but they have a larger influence on the kind of employment behavior of women. More precisely, we find that family allowance and daycare measures positively influence women's part-time employment, whereas parental-leave exercised a positive impact on full-time employment of European women.

The policy implications of our investigation are important. The European family policies of the late 1990s and up to 2007 were not very effective in promoting female labor force participation. Policy actions that aim at increasing women's LFP through family policy should take note of this result. Particularly, it appears that different family policy instruments work often in the opposite direction when it comes to part-time versus full-time employment. Generally, family policies acting through the daycare arrangements and through financial support of families with children (family allowance) are effective in enhancing part-time employment of women of age 25-59 and appear counterproductive in terms of full-time employment. When designing particular family policy schemes it would be crucial to establish clear goals that the respective family policy measures should achieve.

Finally, regarding the dichotomy part-time versus full-time employment, the room for improvements still exists. The empirical results suggest that family policies were insufficiently acting in support of full-time employment of women. Since there exists evidence that this effect goes hand in hand with the demand for more comprehensive childcare arrangements that are currently on offer, policy actions should be taken to close the persisting gap.

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## Appendix A

Table A.1 Family policy designs in the EU member states

	Family allowance*	Parental leave – in months paid	Daycare
Austria <sup>a</sup>	18/26	22; “fathers only paid leave” of 3/4/6 months	9% of children 0-3 years and 84% of children between 3 and compulsory school age; <sup>b</sup>
Belgium	18/25	6; “fathers only paid leave” of 3 months	36% (0-3) and 99% (3-school age);
Bulgaria	20	13.5 (+12 unpaid)	
Cyprus <sup>c</sup>	18/23	6.5 (unpaid)	24% (0-3) and 81% (3-school age);
Czech Rep.	15	30.5	10,5% (0-3) and 71% (3-school age); in the 1990s, there was a massive closedown of care facilities for children under three;
Denmark	17	8	78% (0-3) and 90% (3-school age);
Estonia	15/19	31.5	The Estonian government has been actively trying increase the number of childcare places, mainly through a programme of state support for local authorities that was developed in 2007;
Finland	17	27; “fathers only paid leave” of 1 months	Unconditional right to municipal day care services for all children under seven; pre-primary education for six-year-old children is free of charge;
France	20	33 (if 2 <sup>nd</sup> child)	A comprehensive system of high-quality childcare and pre-school services has been developed;
Germany <sup>d</sup>	18/25	12 (+22 unpaid); “fathers only paid leave” of 2 months	Good-quality childcare and early-years support for all children are some of the most important tasks for the future in Germany;
Greece	18/22	7 (+6 unpaid)	Childcare provision and financial support for families less developed than in other EU countries;
Hungary	18/23	30	9% (0-3) and 79% (3-school age);
Ireland	16/19	7 (unpaid)	90% (3-school age);

\* Financial support until the age limit/further education.

<sup>a</sup> Parents can stay on parental leave for the first two years of the child’s lie, although the parental benefits are paid for longer.

<sup>b</sup> The EU averages are respectively 28% (0-3) and 84% (3-school age).

<sup>c</sup> Maximum 4 weeks parental leave per year.

<sup>d</sup> The period of 12 months can be replaced by 24 months, but with the proportional reduction of the monthly amount paid (from 67% to 33%); four Länder provide parental leave during the second or third year of parental leave.

Table A.1 cont.

	Family allowance *	Parental leave – in months paid	Daycare
Italy	18	10; “fathers only paid leave” of 6 months	22% (0-3) and 94% (3-school age);
Latvia	15/20	18	16% (0-3) and 64% (3-school age); action has been taken by the government to improve levels of childcare provision;
Lithuania	18	22 (+12 unpaid)	13% (0-3) and 67% (3-school age);
Luxembourg	18/27	12; “fathers only paid leave” of 6 months	The voucher-service system for childcare facilities introduced in Luxembourg’s legislation in 2009 provides payment for childcare services offered by childcare facilities and parental assistance.
Malta	16/21	6 (unpaid)	11% (0-3) and 74% (3-school age);
Netherlands	17	6.5 (unpaid)	50% (0-3) and 70% (3-school age);
Poland	18/24	24 (36 if >1 child)	2% (0-3) and 42% (3-school age); the provision of childcare does not meet parents’ needs;
Portugal	18/24	10.5 (+24 unpaid); “fathers only paid leave” of 4 months	39.5% (0-3) and 85.7% (3-school age);
Romania	18/?	21.5	Legal provisions forbidding the placement of a child under two in residential care;
Slovakia	16/25	30.5	Below the EU average in terms of childcare provision for children both below and above the age of three;
Slovenia	18/26	9	37% (0-3) and 91% (3-school age);
Spain	18	32 (unpaid)	Children can be enrolled in school from age three, but care for children 0-3 takes place in informal context (family or babysitters); school is free of charge and compulsory from the age of six;
Sweden	16	14 (+2 unpaid); “fathers only paid leave” of 2 months	51% (0-3) and 94% (3-school age);
UK <sup>c</sup>	16/20	6.5 (unpaid)	39% (0-3) and 84% (3-school age); three and four-year- old children are entitled to 15 hours per week of free early education for 38 weeks a year; compulsory school age of five is among the earliest in Europe;

\* Financial support until the age limit/further education.

<sup>c</sup> Maximum 4 weeks parental leave per year.

Source: European Alliance for Families, Eurostat and OECD.