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Drivers of Female Labour Force Participation in the OECD

Olivier Thévenon

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SUMMARY

This paper analyses the response of female labour force participation to the evolution of labour markets and policies supporting the reconciliation of work and family life. Using country-level data from the early 1980s for 18 OECD countries, we estimate the influence of labour market and institutional characteristics on female labour force participation, and full-time and part-time employment participation. The relationship (interactions, complementarity) between different policy measures is also analyzed, as well as potential variations in the influence of policies across different Welfare regimes. The results first highlight how the increase in female educational attainment, the expansion of the service sector the increase in part-time employment opportunities have boosted women's participation in the labour force. By contrast, there is no such clear relationship between female employment rates and the growing share of public employment. Employment rates react to changes in tax rates, in leave policies, but the rising provision of childcare formal services to working parents with children not yet three years old is a main policy driver of female labour force participation. Different policy instruments interact with each other to improve overall effectiveness. In particular, the coverage of childcare services is found to have a greater effect on women's participation in the labour market in countries with relatively high degrees of employment protection. The effect of childcare services on female full-time employment is particularly strong in Anglophone and Nordic countries. In all, the findings suggest that the effect of childcare services on female employment is stronger in the presence of other measures supporting working mothers (as, for instance paid parental leave) while the presence of such supports seems to reduce the effectiveness of financial incentives to work for second earners. The effect of cash benefits for families and the duration of paid leave on female labour force participation also vary across welfare regimes.

RESUMÉ

Cet article analyse la réponse de la participation des femmes à la force de travail aux évolutions des marchés du travail et des politiques favorisant la conciliation entre travail et vie familiale. Exploitant des données pour 18 pays de l'OCDE depuis le début des années 1980s, on estime l'influence des caractéristiques du marché du travail et institutionnelles sur la participation des femmes au marché du travail, et sur leurs taux d'emploi à temps plein et à temps partiel. Les interactions et complémentarités potentielles entre les mesures politiques sont aussi testées, tout comme les possibles variations de l'influence des politiques entre les différents Etats-Providence. Les résultats montrent, en premier lieu, comment l'élévation des niveaux d'éducation féminins, l'expansion de l'emploi dans les services et le développement du temps partiel ont favorisé la participation des femmes au marché du travail. En revanche, le développement de l'emploi des femmes n'est pas aussi clairement lié à la croissance de l'emploi dans le secteur public. Les taux d'emploi féminins réagissent aux variations de taux d'imposition, aux politiques de congés, mais l'offre de services d'accueil pour les enfants de moins de trois ans semble être le facteur clé du développement de la participation des femmes au marché du travail. Les différentes mesures politiques interagissent et leurs effets se renforcent mutuellement. En particulier, la couverture des services d'accueil de la petite enfance ont un effet plus important sur la participation des femmes au marché du travail dans les pays offrant une plus grande protection de l'emploi. L'effet des services d'accueil de la petite enfance sur l'emploi à temps plein des femmes est particulièrement important dans les pays anglophones et d'Europe du Nord. Par ailleurs, les résultats suggèrent que l'effet des services de la petite enfance sur l'emploi des femmes est renforcé lorsqu'ils sont associés à d'autres mesures favorisant les mères qui travaillent (comme par exemple le congé payé parental), mais que celles-ci réduisent l'efficacité des incitations financières à travailler pour le partenaire. L'effet des aides financières familiales et de la durée des congés payés sur la participation des femmes au marché du travail varie également entre les différents systèmes de prestations sociales.

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1. INTRODUCTION

1. Most OECD countries have experienced a considerable rise in female labour force participation over the past few decades. The timing and pace of that rise have, however, varied across countries and despite the overall increase, differences in levels of female labour force participation were still considerable in the early 2000s.

2. Multiple factors contribute to the increase on both demand and supply sides (Pissarides *et al.*, 2003). The literature identifies economic advancement as the prime driver of women's growing participation in the formal labour market. However, its impact changes over time in an U-shaped curve (Goldin, 1995; Mammen and Paxson, 2000; and, Tam, 2011). In "poor" countries, female labour force participation is high, with women working mainly in family enterprises. Economic development then initially pushes them out of the labour force, partly because of the rise in men's market opportunities and partly because of social barriers against them entering the paid work force (Boserup, 1970). As countries continue to develop, the education levels of women improve and they move back into the labour force as paid employees in productive sectors of economic activity.

3. Changes in labour demand – with, for example, the emergence of new production activities and different working conditions – have been important drivers of expanding female labour force participation (Pissarides, 2003). The switch from manufacturing and agriculture to services accounts for the growing demand for female workers. At the same time, the growth of part-time work has also lured more women into formal labour force by helping them to balance paid work with family life (Buddelmeyer *et al.*, 2004 and OECD, 2011a). Thus, while part-time work often offers the premium of control over working hours, stress and health, it may also be a penalty because of the generally lower hourly earnings, fewer training and promotion opportunities, and less job security. Nevertheless, it appears that in the short-term at least advantages outweigh the disadvantages for a majority of women working part-time. However, in the long-term working part-time reduces long-term career prospects, affects pension benefits of retirees and increases the risk of poverty in old-age (OECD, 2010 and 2012a). When women make the choice to work part-time, they are often not aware of these long-term consequences

4. The development of public sector employment has also attracted more female than male workers for a variety of reasons (Anghel *et al.*, 2011). Women may face less discrimination in the public than in the private sector and, in some countries, may earn higher wages if they belong to certain categories of employees. They may also prefer the greater employment protection and/or opportunities to combine work and family formation (Polachek, 1981 and Begall and Mills, 2012).

5. There have also been changes on the labour supply side. One key driver of women's aspiration to pursue a labour market career is the sharp increase in girls' educational attainment over recent decades. It has boosted female earnings potential, which in turn, however, also increased the opportunity cost of having children (Hotz *et al.*, 1997; and, OECD, 2012a). That being said, greater access to contraception has enabled women to adjust their fertility behaviour to their new role in the labour market. At the same time, social attitudes and life styles have evolved towards childbearing later in life, which have contributed to falls in fertility rates (Goldstein *et al.*, 2009; Lesthaeghe, 2010; and, OECD, 2011). Yet society's attitudes to women's work remain equivocal, and the clash between family values and egalitarian

perspectives are an obstacle to greater gender equality in the labour market (Fortin, 2005; and, Unnk *et al.*, 2005).

6. In this context, cross-national differences in household composition and fertility behaviour are key factors in explaining variations in female employment patterns (Anxo *et al.*, 2006; De Hénau *et al.*, 2007; Michaud and Tatsiramos, 2011; and, Thévenon, 2009). Another factor driving female employment in recent decades has been institutional support to help working parents cope with family responsibilities (Jaumotte, 2003; Misra *et al.*, 2011; and, Blau and Kahn, 2013). The types of support that working women receive from the state or in the workplace vary greatly across countries, however (Gornick and Meyers, 2003; OECD, 2011; and, Thévenon, 2011). Variations in policy and production regimes[1] also create contexts that determine how the labour market integrates women. They have differing effects on gender inequalities in market outcomes (Estevez-Abe *et al.*, 2001; Mandel and Semyonov, 2005; Soskice, 2005; and, Thévenon, 2006). Key in this respect is the fact that governments use different policy instruments to boost female employment and/or help women balance work with family responsibilities. Such instruments may complement each other to a certain degree and their efficiency is likely to depend on how they interact.

7. Against that background, this paper assesses the contribution of key labour market and policy components to the development of female labour market participation in the OECD since the early 1980s. One original addition to earlier work is the focus on certain policy instruments and how they may affect each other and aspects of the labour market. The paper consequently examines the impact on trends in full-time and part-time female labour force participation of instruments related to leave policies and the provision of childcare services and financial support to families with children. Moreover, following the approach developed by Bassanini and Duval (2009), the aim is to assess whether "systemic" complementarities between institutions affect or not the efficiency of policy instruments.

8. The paper comprises six sections. Section 2 presents the data and key cross-national differences in female employment, while considering government policies to help women balance work and family life. Section 3 examines policies that have had the greatest effect on trends in female labour force participation. They include child-related leave entitlements, childcare services, and tax design. Section 4 considers a baseline model for a regression analysis of the female labour supply and discusses how different policy emphases affect determinants. Section 5 discuss the econometric model's results, with a special focus on how they may be affected by two sets of parameters – the specific features of the labour market and work-life balance policies. Section 6 considers how government policy instruments and institutional competencies may interact and complement each other in order to increase female employment rates. Variations in the influence of policy measures across welfare regimes are also tested.

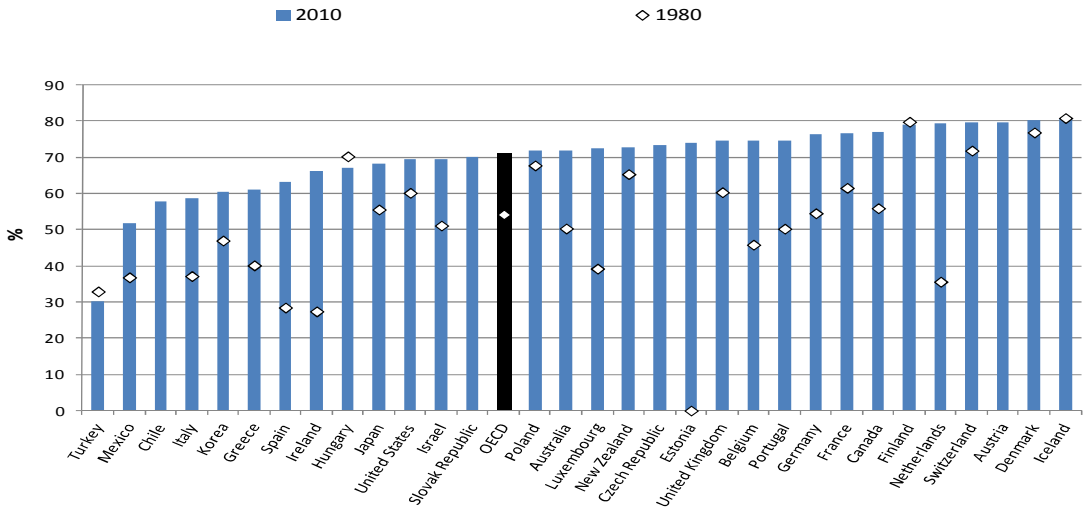
[1] In the "Varieties of Capitalism" approach, production regimes are characterised by various processes of skill production and wage determination, as well as by varying degrees of employment protection legislation. It also coincides with differences in organisations that provide social protection and welfare support to workers and their families (Esping-Andersen, 1999; Estevez-Abe *et al.*, 2001; and, Soskice, 2005).

2. TRENDS IN FEMALE LABOUR FORCE PARTICIPATION

9. Female labour force participation has risen sharply in most OECD countries over the last few decades: among prime-age women (aged 25-54), participation rates climbed steadily from an average of 54% in 1980 to 71% in 2010. Cross-national differences are still wide, however (Figure 1), with female employment rates being persistently high in Denmark and Iceland around 80% and persistently low in Turkey at around 30%.

Figure 1. Female employment rates

Women aged 25-54



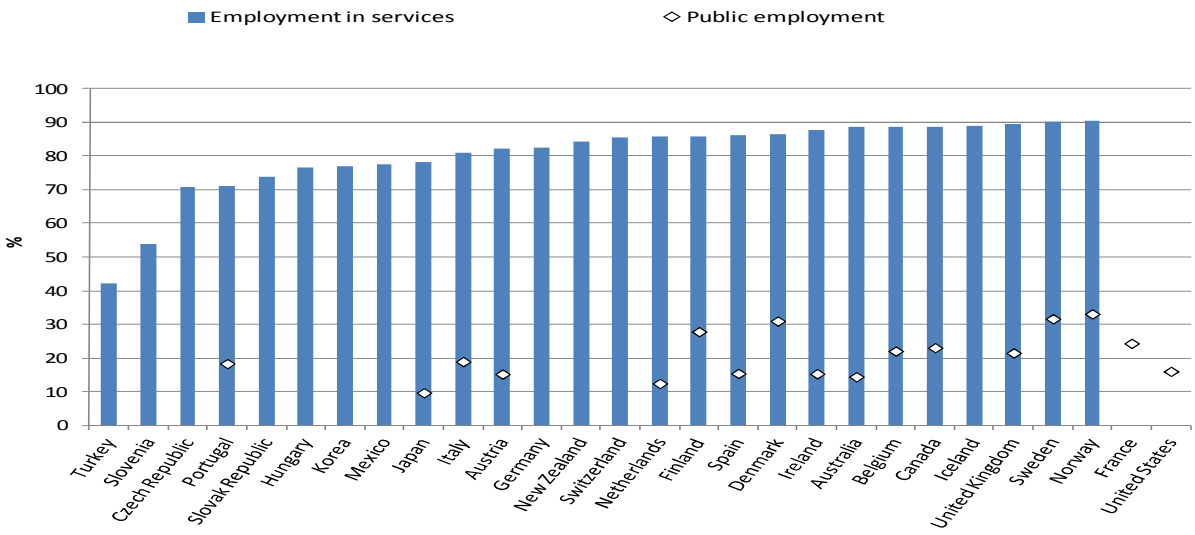
Note: The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.
Information on data for Israel: http://dx.doi.org/10.1787/888932315602

Source: OECD Statistics on Employment (http://dotstat.oecd.org/)

10. The shift of employment to the tertiary (service) sector has considerably increased women's job opportunities. In 2008, an OECD average of one-third of the female working population was employed in the service sector (Figure 2). In addition, the expansion of several tertiary activities (health and education, sales, hotels and catering, and domestic workers) has relied particularly on the use of part-time workers, which to some extent has contributed to women increasing their labour force participation (O'Reilly and Fagan, 1998). The incidence of part-time employment varies greatly across countries, however (Figure 3). The share of women among part-time workers has decreased in many countries since 1990, as men are now also more frequently working on a part-time basis, but often for longer hours than women (Morley *et al.*, 2009).

Figure 2. Employment in services and the public sector

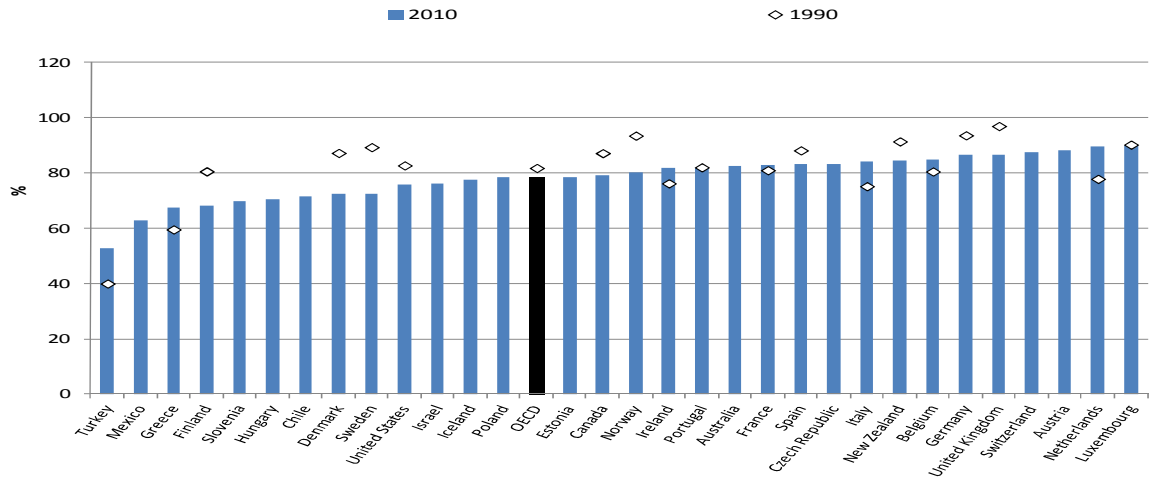
Service sector and public employment as a proportion of total female employment, 2008



Source: OECD Statistics on Employment (http://dotstat.oecd.org/), and ILO statistics (http://laborsta.ilo.org/)

11. Similarly, the development of public employment has made it easier for women to join the labour market in many countries, since it provides them with a more secure labour market position when deciding to start a family (Gornick and Jacobs, 1998). Nevertheless, the International Labour Organisation (ILO) data in Figure 2 (though not available for all OECD countries), show wide variations in the proportion of women working in public employment: in Japan it was less than 10%, for example, while the share is over one-third in Norway.

Figure 3. Proportion of women among part-timers



Source: OECD Statistics on Employment (http://dotstat.oecd.org/). Part-time employment is based on a common 30-usual-hour cut-off in the main job

3. GROWING SUPPORT TO COMBINE WORK AND FAMILY

12. Government policies to help parents achieve work-life balance are also key determinants of the rate at which female participation in the labour force has expanded since the early 1980s. There are three main policy instruments:

- parental entitlements to take leave from work after childbirth;
- the provision of childcare services for working parents with children of pre-school age;
- transfers through tax and benefits systems which affect the financial advantages for women and their families of being in paid employment.

13. The mix between these different types of support varies across countries as family policies reflect different priorities and target different groups of families in each country (Adema, 2012; OECD, 2011; and, Thévenon, 2011).

3.1 Child-related leave entitlements

14. Working parents' entitlements to take leave from work to care for a young or newborn child exist in all OECD countries and in many non-OECD countries. One purpose of this provision is to allow women to improve female labour force attachment. The available evidence suggests that, on average, the provision of paid leave produces a slight increase in the proportion of women engaged in paid work (Del Boca *et al*., 2007; Jaumotte, 2003; Ruhm, 1998; and, Thévenon and Solaz, 2013).

15. National family-related leave policies vary widely, one reason being that they are in fact designed to address economic, social, and demographic concerns (Kamerman and Moss, 2009):

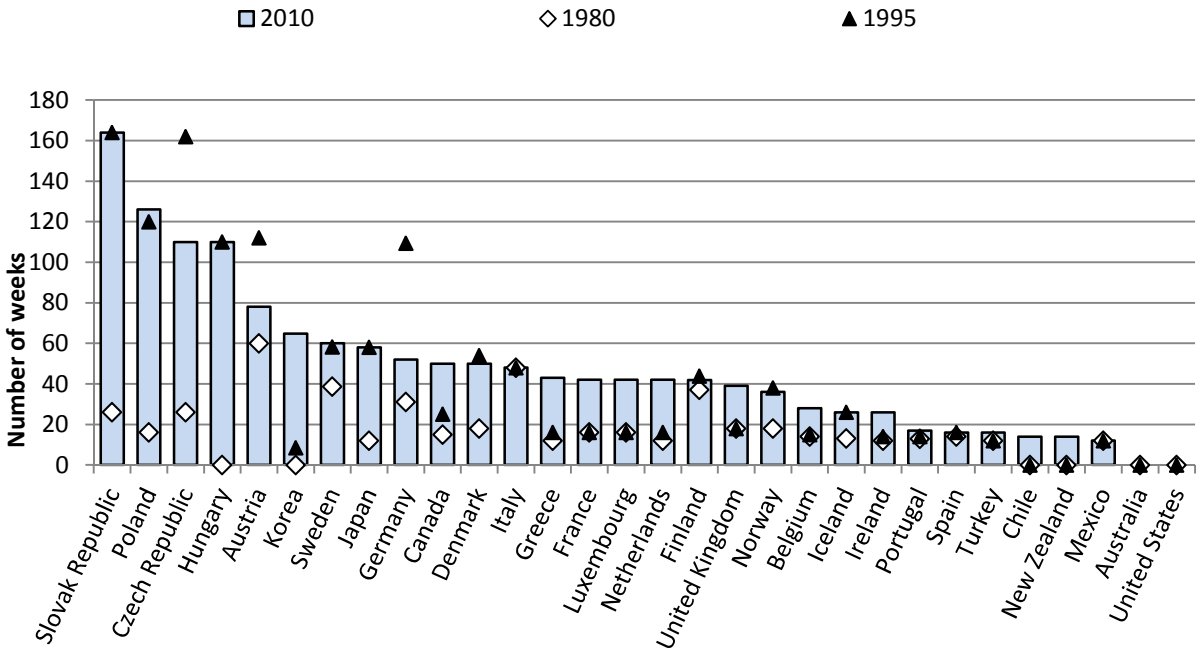
- economic – they affect labour market participation and regulation;
- social – the health of working mothers and their children, the physical and emotional development of children, and gender equality;
- demographic – parents' availability to care for their children can influence fertility decisions.

16. As Figure 4 illustrates, one consequence of international differences in policy approaches is the variety across countries in the total number of paid weeks a mother can claim after childbirth if she takes up her maternity and parental entitlements (see Thévenon and Solaz [2012] for a detailed look at the question). Since 1980, most countries have increased the period during which parents are entitled to temporarily leave work and care for a young child. However, in some countries parents can now take leave for shorter periods at higher payment rates than before. For example, In Germany the maximum rate of income support during leave applies to those who take one year of leave only (Figure 4 shows the shortest period of leave at maximum payment rates). Yet, in almost half of the OECD countries, subsequent to maternity leave, mothers can take parental leave for at least a year, often two years and sometimes three.

They usually take parental leave just after maternity leave, although some countries allow them to do so when the child is much older (sometimes up to the eight birth-day).

17. As payment during leave is a key determinant of uptake, Figure 4 considers the numbers of weeks of paid leave only. All OECD countries provide paid leave, except for the United States, which has no statutory compensation payment.[2] Women can take paid leave for three or more years in six countries – Austria, the Czech Republic, Finland, France (on the birth of a second child), Hungary, and the Slovak Republic. In the other countries, total periods of paid leave are much shorter – one year or less – because the fraction due to *parental* leave is much shorter.

Figure 4. Number of paid weeks of child-related leave



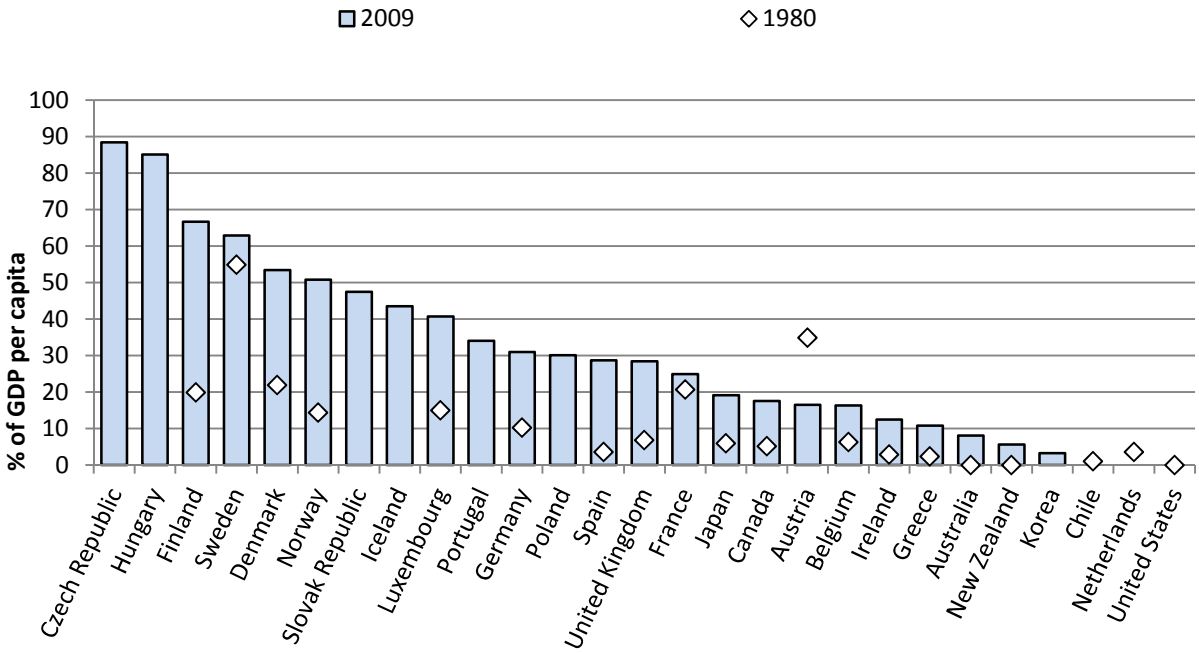
Note: Number of weeks of paid leave for mothers in 1980, 1995 and 2007: countries are ranked by the number of paid weeks available in 1980. The number of weeks of maternity and parental leave women can take after maternity leave is added. The number of weeks of childcare or home-care leave is also added when relevant. In some countries there are different payment options and therefore different periods for which a benefit is received. The figure shows the option with the shortest benefit period.

Source: OECD Family database – indicator PF2.5 (www.oecd.org/social/family/database).

18. Differences in leave duration, payment, and take-up rates explain the wide variations in governments' spending on paid leave and grants paid at childbirth. Figure 5 shows expenditure per childbirth as a ratio of GDP per capita.

[2] However, payment conditions vary across countries. Long leave periods are generally associated with relatively low flat-rate family-based payments, so that only one parent can claim income support while on leave. Shorter periods of parental leave are often associated with higher rates of earnings-related payments, often capped at a specified maximum (see OECD 2011b, indicator PF2.4).

Figure 5. Spending on child-related leave per childbirth as percentage of GDP per capita



Note: 2008 for Germany, Spain, Greece, 2007 for United Kingdom.

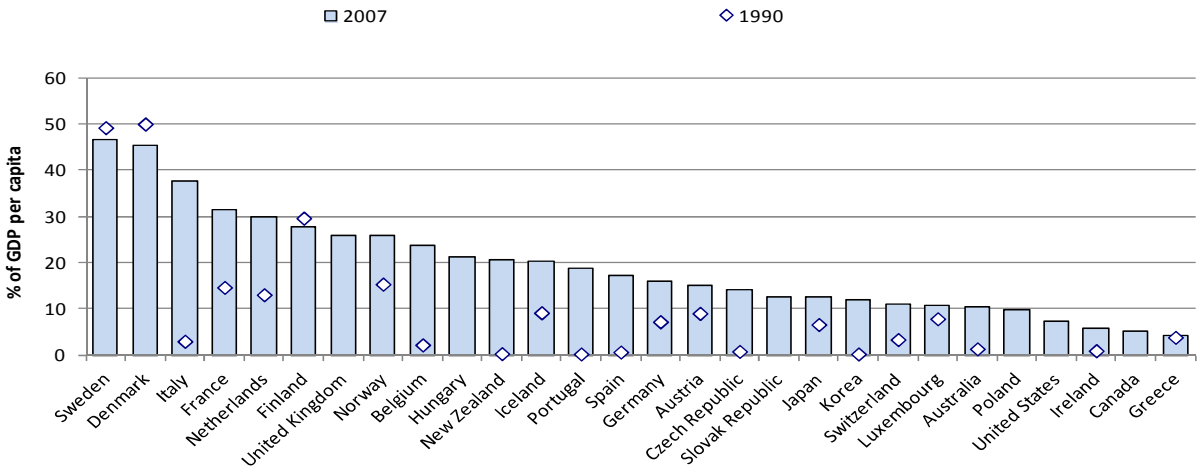
Source: Author's calculation based on data from the OECD's Social Expenditure Database (SOCX), update 20xx, *www.oecd.org/els/familiesandchildren/social/expenditure*.

3.2 Childcare services

19. The provision of childcare services for children under three years of age plays a prominent role in helping women to balance work commitments and family responsibilities (De Henau *et al.*, 2010; Del Boca *et al.*, 2007; and, Jaumotte, 2003). However, cross-national variations in public money invested in the provision of education and childcare services are wide, despite substantial increases in expenditure across countries since 1980.

20. Average in-kind expenditure on children under the age of three is just below 0.9% of GDP in the OECD, which corresponds to roughly one-third of total expenditure on families. Denmark, Finland, France, Iceland, and Sweden are the biggest service providers, with in-kind expenditure exceeding 2% of GDP – more than twice the OECD average. Expenditure can be measured per child under the age of three and expressed as a percentage of GDP per capita. This makes it possible to compare the share of income per inhabitant that different countries actually devote to the provision of childcare services. In this respect, Denmark and Sweden are the two countries spending by far the most per child on childcare services since the early 1990s.

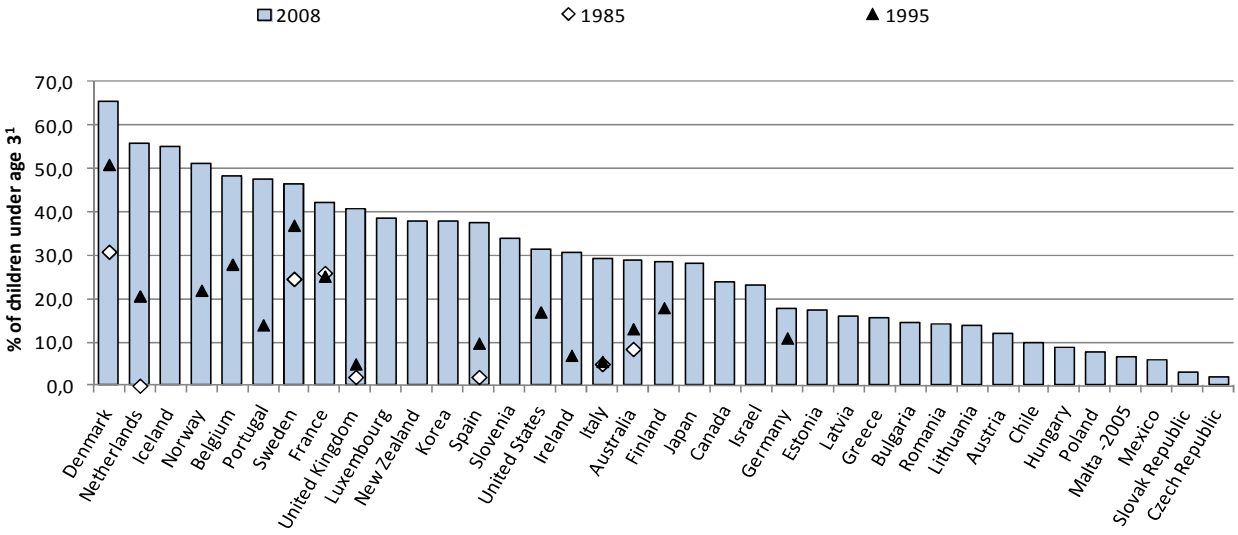
Figure 6. Spending on childcare services per child under age 3 as percentage of GDP per capita



Source: Author's calculation based on data from the OECD's Social Expenditure Database (SOCX), update 2011, *www.oedc.org/els/familiesandchildren/social/expenditure*.

21. In parallel to increases in public expenditure on childcare and pre-school education, the number of children under preschool age in formal day care has risen markedly in many countries. Nevertheless, there are still large differences between countries like Denmark, where some two-thirds of all children below three have a place in day care facilities, and the Czech Republic, Hungary, Poland, and the Slovak Republic at the other end of the spectrum (Figure 7). The low coverage of childcare services in these countries is related to the long periods of paid employment-protected leave (Figure 4).

Figure 7. Proportion of children under age three enrolled in formal care



Source: OECD Family Database and authors' estimates.

3.3 Effects of transfers on effective tax rates

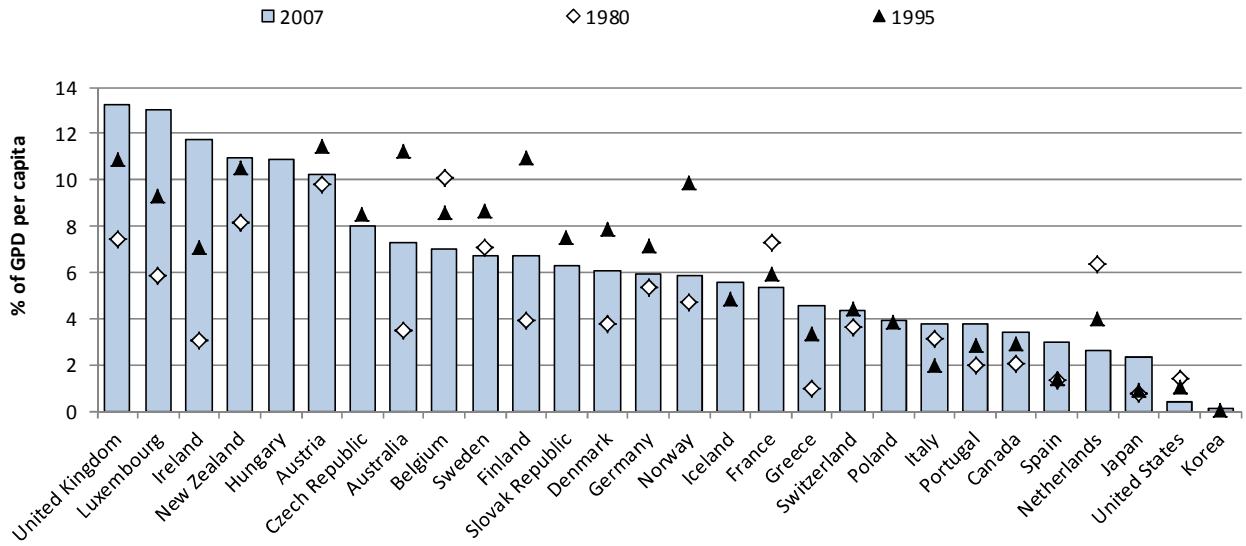
22. The design of tax and benefits systems is also a key dimension of the incentives women may have for entering or staying in employment. Women are often the "second earner" in households. i.e. they earn less than their partner. Their labour supply is highly responsive to variations in tax rates, especially when they can easily substitute their market activities with home production (Garibaldi and Wasmer, 2004). Cash transfers and tax-related support that families with children receive may increase household income in such a way that they weaken women's financial incentives to work, and thus their labour market participation.

23. Generally speaking, public expenditure on financial support to families comes in two forms: child-related cash transfers and tax breaks. The principal kinds of cash benefits are family allowance, child benefit, and working family income support. A number of OECD countries also provide one-off benefits such as back-to-school-supplements or social grants (*e.g.* for housing). Overall, cash transfers are the largest category of expenditure, accounting for 1.25% of GDP on average, and over 2% in Austria, Hungary, Iceland, Luxembourg, New Zealand, and the United Kingdom.

24. Public spending on family benefits is also expressed per child and as a percentage of GDP *per capita* to account for cross-national differences in wealth and numbers of children. Figure 8 shows the cash transfers to each child under 20 as a percentage of average GDP *per capita* in OECD countries. (Birth grants and leave benefits, considered in Section 3.1, are disregarded.) The United Kingdom disburses the highest cash expenditure per child, the United States and Korea the lowest.

Figure 8 Spending on cash benefits per child under age 20

As percentage of GDP per capita



Source: Author's calculation based on the OECD's Social Expenditure Database (SOCX), update 2011, *www.oecd.org/els/familiesandchildren/socialexpendituredatabasesocx.htm*.

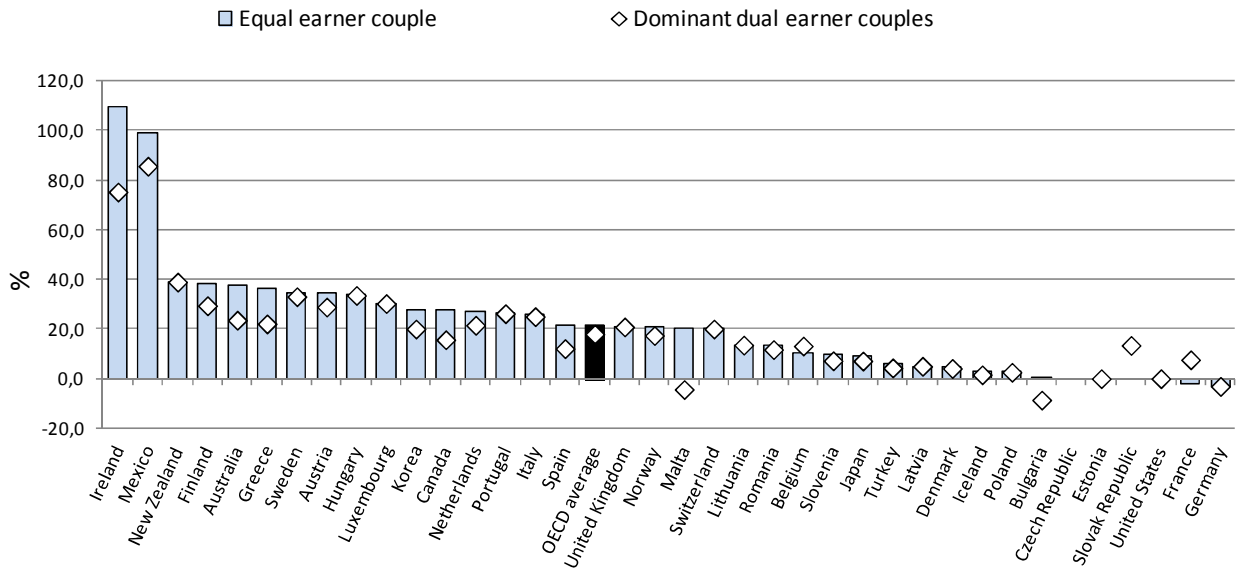
25. Benefits are of importance when considering a household's allocation of time between care and paid work and the division of labour between partners. In particular, the participation of women in paid work could depend on the relative gain in disposable income of two-earner families as compared to one-

earner households with the same initial earnings. Similarly, the proportion of women working part-time is likely to respond to the differences in effective tax rates that apply to households where one spouse earns the income and those where both do.

26. Figure 9 shows a snapshot of the cross-country differences in the net transfer by households with an income equal to 133% of average earnings (before childcare costs) to governments by single-earner families with two children and dual-earner families with two children (where spouses have equal earning or with one spouse earning three times as much as the partner, see notes to Figure 9). Positive values in Figure 9 indicate that a household with a second earner has a financial advantage over one with a single breadwinner. In general, families with a single earner have higher net transfers to governments than those with two equal earners, with for example, the difference in net transfers being highest in Ireland and Mexico where, at this level of earnings net transfers paid by dual-earner families are relatively low. By contrast, Germany is the only OECD country together with Bulgaria and Malta where at this level of household earnings the tax/benefit system significantly favours single breadwinner couples over dual-earner families. There are no large differences in tax treatment between one and two earner families in the Czech Republic, Estonia, the United States or France. However, with differences in the progressive nature of tax systems and the way in which benefits support is phased out as income increases across countries, the results are somewhat different at different household income levels. Also Figure 9 does not include childcare costs, which could significantly alter the two-earner families' relative advantage (OECD, 2011).

Figure 9. Difference in net transfers to government: single and equal dual earner couples, 2010

Household income equals to 133% the average earnings in % of the net transfers made by single earner households[1]



1) For couples with two children age 6 and 11.
2) In dominant two-earner family, the first earner is assumed to earn the average wage while second earner works part-time with earnings equal to one-third of the average wage.

Reading: In Ireland, the surplus of net tax paid by single-earners households is higher than 100% (109%) because the net payment of tax by equal earners is slightly negative at this level of earnings. But in general, the percentage is lower than 100, meaning for instance that dual earner households pay 39% less tax than single earner couple in New Zealand.

Source: OECD Family database (Indicator PF1.4).

3.4 Diversity of family policy patterns

27. There are remarkable cross-country differences in the ways that countries combine policy instruments to provide families with support. The differences are rooted in countries' welfare histories, their attitudes towards families, the role of government, current family outcomes, and the relative weight given to different – but interdependent – underlying family policy objectives. The extent and form of support for working parents with children under three also varies. Thévenon (2011) examines family support policy packages across OECD countries in detail. The classification by country of family policies partially corroborates the standard Esping-Andersen (1999) categorisation of welfare states, albeit with considerable within-group heterogeneity and some outliers.

28. Nordic countries (Denmark, Finland, Iceland, Norway, and Sweden) provide comprehensive support to working parents with very young children (under three years of age). They are far ahead of other OECD countries in this respect. Support takes the form of generous leave conditions for working parents after childbirth, combined with a widely available provision of childcare and out-of-school-hours services. The average amount per child spent by government is thus higher than in other country groups, but the difference is especially large for spending on childcare services and earnings-related parental leave benefits (see Tables A1 in the Appendix).

29. By and large English-speaking countries (Ireland and the United Kingdom in Europe together with Australia, Canada, New Zealand, and the United States) provide much less in-time and in-kind support to working parents with very young children. Their cash benefits are more generous, although they primarily target low-income families and preschool children. Levels of public support in English-speaking countries vary, with Canada and the United States lagging behind.[3] On average per child spending on children services for the under 3s and on paid leave (and birth grants) is lower in Anglophone countries than in other country groupings (Table A1).

30. Continental countries form a more heterogeneous group that occupies an intermediate position between the Anglophone and Nordic countries. They generally provide high levels of financial benefits, although their in-kind support to dual-earner families with children under three is more limited. France stands out from the other Continental countries because of its relatively high public spending on families with children and a stronger support for working women to combine work and family. Countries in Southern Europe are characterised by limited supports for working families and low public spending on family cash benefits, childcares services and thus low childcare participation (Table A1).

[3] To some extent this is related to measurement difficulties. In Canada, information on spending by local governments (that are responsible for childcare and pre-school education) is not reported to Federal government. Available information on public spending on early childhood education and care in the United States may also underestimate the true level amount of local government spending on relevant policies.

4. BASELINE MODEL OF FEMALE LABOUR FORCE PARTICIPATION

31. This section presents the main findings from an econometric analysis of the determinants of the female labour supply. The analysis considers the aggregate labour force participation rates of prime-age women (25-54 years old) in 18 countries from 1980 to 2007. Changes in the composition of the female population through age cohorts are to some extent captured by the length of time women spend in education and other socio-cultural markers, such as the number of children and the proportion of married women.

32. The influence of labour market and policy characteristics on female labour force participation is captured by regressing the following fixed-effect equation[4]:

[1] $$LFP_{it} = \alpha LM_{it} + \beta P_{it} + \phi X_{it} + \alpha_i + \lambda_t + \varepsilon_{it}$$

where:

LM_{it} is the time-varying characteristics of the labour market in each country i,

P_{it} is the time-varying characteristics policy measures,

X_{it} captures other control factors,

α_i and λ_t are country and time dummies and ε_{it} represents the error term.[5]

[4] This fixed-effect approach assumes that the effect of labour market characteristics and policies is homogeneous across countries (a hypothesis which will be further discussed below). To account for this, one frequently followed approach is to estimate the effect of the independent variables separately for each country and then taking the mean (Pesaran and Smith, 1995). However, this approach does not generate credible results for two inter-related reasons. First, our panel data set is highly unbalanced – i.e. 'mean group' estimation produces high standard errors due to the lack of long time series data for some countries (see Appendix, Table A3). Second, the last section of this paper provides evidence that not only the magnitude but also the sign of the influence of policy measures varies across Welfare States; i.e. taking the mean value of coefficients is associated with large standard errors, and should not be used to test for the homogeneity of the effect of labour market characteristics and policies.

[5] In this model specification yearly time dummies control for common shocks (recessions, context of production changes) which are assumed to affect all countries in the same way, and it also implicitly assumes that there are no unobserved common 'factors' whose effect may differ across countries. The errors terms would capture such effects, resulting in a testable cross-sectional dependence of residuals (Pesaran, 2004).. One approach to account for common factors with heterogeneous factor loadings is to use cross-section averages of the dependent and independent variables as additional regressors (Pesaran, 2006). Adding these variables as regressors in a pooled OLS model does not give credible results as our panel data set is too unbalanced and generates coefficient estimates with very large standard errors (see Appendix, Table A3).

33. Two broad groups of indicators relating to the labour market and family-friendly policies are considered as explanatory variables. They are:

- Variations in jobs and labour market characteristics, which includes:
    - the share of employment in the services and the public sector;
    - the proportion of part-time jobs and employment in the public sector;
    - the OECD indicator on the strictness of employment protection legislation[6]; and,
    - total unemployment rates as an indicator of labour market equilibrium.

  Information on the number of years spent by women in education is included to account for changes in the composition of the female workforce.

- Policies which aim to help parents reconcile work and family commitments, which includes:
    - paid leave variables (public spending and duration);
    - childcare services for children under the age of 3 (public spending and enrolment rates);
    - public spending on other family benefits; and,
    - and financial incentives to work (including tax incentives for couple families to have two earners instead of one).[7]

  Government spending is calculated per child in order to reduce the bias caused by expenditure's endogeneity to the number of births.

34. Table 1 summarises the main variables used in the regression analysis (see the Appendix 2 for a comprehensive list and definition of variables):

[6] More information on this indicator is available at: http://www.oecd.org/employment/employmentpoliciesanddata/oecdindicatorsofemploymentprotection.htm.

[7] These incentives are defined as the ratio of the marginal tax rate that a second earner receiving 66% of the average earning will pay in comparison to the payment due by a single-earner couple with two children and the average earnings (see details in the appendix).

Table 1. Variables included in the regression analysis of the determinants of female labour participation (age 25-64)

		Mean	Std. Dev.	Min	Max	Observations
Female employment rate (women aged 25-54)	Overall	65.5	13.4	27.3	89.6	N= 472
	Between		11.4	42.12	83.6	n = 18
	Within		7.3	43.6	89.1	$\bar{T}$=26.2
Full-time female employment rate (women aged 25-54)	Overall	72.2	10.8	39.4	92.4	N = 472
	Between		10.5	45.1	88.4	n= 18
	Within		3.4	61.6	82.7	$\bar{T}$=22.2
Part-time[1] female employment rate (women aged 25-54)	Overall	27.7	10.8	7.5	60.5	N = 472
	Between		10.5	11.5	54.8	n= 18
	Within		3.4	17.2	38.3	$\bar{T}$=22.2
Strictness of employment protection[2]	Overall	2.08	1.06	0.21	4.19	N = 409
	Between		1.03	0.21	3.80	n= 18
	Within		0.33	0.98	2.85	$\bar{T}$=22.7
Proportion of women among part-time workers[3]	Overall	76.4	7.2	59.8	91.9	N = 469
	Between		6.7	66.9	87.0	n= 18
	Within		3.0	66.9	86.8	$\bar{T}$= 22.7
Employment in services[4] (index)	Overall	82.9	14.5	43.3	118.2	N = 428
	Between		8.9	65.9	103.5	n= 18
	Within		12.4	57.9	126.2	$\bar{T}$= 23.7
Employment in the public sector[5]	Overall	78.3	7.2	63.4	92.2	N = 456
	Between		7.4	65.6	91.0	n= 18
	Within		1.6	71.8	83.6	$\bar{T}$= 25.3
Spending on family benefits[6] (US$ PPP)	Overall	1300	976.6	0	19405.9	N = 498
	Between		666.3	194.5	2315.4	n= 18
	Within		735.4	-645.6	5008.9	$\bar{T}$=27.6
Spending on childcare services (per child under age 3, US$ PPP)	Overall	3314.9	3892.1	0	5392.4	N = 504
	Between		2963.7	614.8	10595.0	n= 18
	Within		2614.6	-3002.9	15799.0	$\bar{T}$=28
Spending on leave and birth grants (per childbirth US$ PPP)	Overall	4539.9	5631.6	0	25982	N = 472
	Between		4984	0	14706	n= 18
	Within		3020.5	-8792	15815	$\bar{T}$=26.7

Table 1. Variables included in the regression analysis of the determinants of female labour (cont.)

Weeks of paid leave	Overall	35.5	40.1	0	162	N = 504
	Between		35.6	0	138.8	n= 18
	Within		20.1	-66.6	160.6	$\bar{T}$=28
Service coverage for children under age 3	Overall	22.0	15.1	0.9	66	N = 326
	Between		11.6	4.0	48.6	n= 18
	Within		8.5	-6.9	54.7	$\bar{T}$=18.1
Relative tax rate of second earner[7]	Overall	1.14	0.43	0.43	3.48	N = 398
	Between		0.38	0.60	1.81	n= 18
	Within		0.2	0.51	2.95	$\bar{T}$=22.1
Financial incentive to work part-time[8]	Overall	104.1	3.71	96.3	113.4	N = 384
	Between		3.23	99.8	111.1	n= 18
	Within		1.55	99.7	112.7	$\bar{T}$=21.3
Unemployment rate (15-64 years old)	Overall	7.6	3.8	1.5	24.1	N = 454
	Between		3.0	3.6	16.4	n= 18
	Within		2.4	-0.5	15.7	$\bar{T}$= 25.2
Birth rates	Overall	12.5	2.0	8.1	21.7	N = 478
	Between		1.8	9.8	15.8	n= 18
	Within		1.1	9.7	18.3	$\bar{T}$= 26.5

Note: For each variable, standard deviation into between and within components. The overall and within are calculated over N country-years of data. The between is calculated over 18 countries, and the average number of years the variable was observed for each country is given by $\bar{T}$.

1) Part-time employment rate measures the proportion of employees working usually no more than 30 hours a week in the total of female workers aged 25 to 54.
2) Strictness of employment protection is measured by the OECD indicator on employment protection which measure the procedures and costs involved in dismissing individuals or groups of workers and the procedures involved in hiring workers on fixed-term or temporary work agency contracts (http://www.oecd.org/employment/employmentpoliciesanddata/oecdindicatorsofemploymentprotection.htm)
3) This proportion of women in the total of part-time workers is measured for all workers of active age (15 to 64 years).
4) This variable represents the share of employment in the sectors of services among all employees. Year 2005 is taken as the reference to calculate the index which equals 100 in each country this year.
5) The variable considers the proportion of workers employed in the public sector among all employees, based on index which equals 100 in year 2005. According to ILO definition, the employment in the public sector covers all employment of general government sector as defined in System of National Accounts 1993 plus employment of publicly owned enterprises and companies, resident and operating at central, state (or regional) and local levels of government. It covers all persons employed directly by those institutions, without regard for the particular type of employment contract.
6) This average is calculated on the basis of the population of all children under age 20.
7) The relative tax rate of a second earner is measured by the ratio of the marginal tax rate on the second earner with two thirds of the average wage to the tax wedge for a single-earner couple with two children earning 100% of average earnings. The marginal tax rate on the second earner is in turn defined as the share of the second earner's earnings which goes into paying additional household taxes.
8) The tax incentive to work part-time is measured by the increase in household disposable income between a situation where one partner earns the entire household income (133% of average earnings) and a situation where two partners (a couple with two children) share earnings (100% and 33% of the average earnings respectively).

Sources: OECD and ILO Employment Statistics; OECD Family database (see Appendix 2 for more details).

35. The econometric analysis considers different model specifications. The first is female labour force participation which is set as a function of employment structure, supply side and institutional characteristics. The full model includes the incidence of part-time work as an explanatory variable, but its inclusion can introduce a bias into estimates. That is because part-time work is often the result of labour supply decisions, although it can be shaped by demand-side constraints. For this reason, the contribution that the development of part-time work has had in raising female employment is approached by considering the proportion of women among all part-time workers of active age, i.e. including age categories below and above those of our dependent variable. This proportion is also instrumented by its lagged values (and by the exogenous variables of the model) in order to limit the potential bias due to endogeneity of part-time work. Also tested is a regression analysis which uses the tax incentive to work part-time as an instrument.

36. These efforts to limit potential endogeneity bias might not be enough, however. For this reason, two other model specifications separately address full-time and part-time participation as dependent variables. Tax incentives to work part-time are then included in the equation for part-time participation.

37. Because the decision regarding the use of formal childcare is to some extent simultaneous with the choice between work and inactivity, the use of childcare enrolment rates as a regressor introduces a risk of bias in the estimated coefficients. To address this issue, childcare enrolment rates are instrumented by their lagged values (and by the model's exogenous variables).

38. Other potentially endogenous variables – also instrumented by their lagged values – are unemployment and birth rates. Unemployment rates are defined with respect to the 15-64 year-old age group, while birth rates are calculated as crude birth rates instead of fertility rates.[8]

39. The model is estimated by two-stage least squares with heteroskedasticity-consistent errors. All the estimated models include country-fixed effects to focus on the variations over time and within a given country of the relationship between female labour force participation and its determinants. It should also be noted that variables are defined in natural logarithms. The only exception the indicator on tax incentives to work part time, which is expressed as percentage increases.

[8] The crude birth rate is the number of births per 1,000 people per year, while fertility rates concern the number of children per woman. Hence the risk of the fertility variable to be endogenous to the female employment rate is reduced when using the crude birth rate rather than the total fertility rate.

5. RESULTS

5.1 Influence of labour market characteristics

40. The overall results from model specifications regarding female labour force participation are reported in Table 2. Table 3 shows the results for participation in part-time and full-time employment. The first three rows of Table 2 show that the growth of employment in the services sector and the rising incidence of part-time work had a positive effect on female labour force participation. While the expansion of the service sector appears to be positively correlated with full-time employment (Table 3, Panel A), its effect on part-time employment is less clear (Table 3, Panel B).

41. The contribution of the public sector to female labour market participation is unclear and its influence seems to be related to the development of employment protection. Despite the positive correlation shown in the two first columns of Table 2, the increased share of women in public employment does not significantly change female labour market participation when the degree of employment protection and other institutional features are held to be constant (Columns 3 to 8). Public employment and part-time work are negatively associated (Table 3, Panel B). This appears to suggest that female labour market participation has expanded through two separate channels: an increase in part-time work in some countries and growth of public employment in others.

42. The public employment coefficient's loss of significance – once controls for both unemployment and the degree of employment protection have been incorporated into the model specification (Panel A, Table 3) – suggests that the three variables are closely but negatively correlated. The effect of employment protection, however, is dependent on other institutional variables, as suggested by its coefficient's loss of significance once other policy indicators are factored in (Columns 7 and 8). Columns 4 and 5 in Panel B of Table 3 clearly show a negative correlation between participation in part-time work and stronger employment protection.

43. Educational attainment – as measured by the average number of years spent in education – also appears to be an important driver of female participation in the labour force (Table 2). However, in the model that separates the effects of full-time and part-time work, each additional year in education appears to lower the chances of working full-time. The effect on part-time participation rates is, however, positive (Table 3, Columns 2, 4 and 5), and the reason for this finding could be related to an "income effect": higher education gives access to jobs with higher hourly wage rates which help families to be able to afford having one parent who works part-time. The results do not change significantly when also including control variables with respect to birth rates or variations in GDP *per capita*.

Table 2. Determinants of female labour force participation

Women aged 25-54, OECD 1980-2007

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Employment in services	0.0102*** (0.000857)	0.00908*** (0.000489)	0.00733*** (0.000515)	0.00717*** (0.000511)	0.00856*** (0.000581)		0.00469*** (0.000743)	0.00433*** (0.000759)
Employment in the public sector	0.528*** (0.139)	0.342** (0.160)	-0.137 (0.139)	-0.0514 (0.160)	-0.0189 (0.0156)		-0.462* (0.254)	-0.299 (0.206)
Incidence of part-time employment	0.495*** (0.0945)	0.396*** (0.0635)	0.285*** (0.0550)	0.266*** (0.0554)	0.195*** (0.0605)		0.473*** (0.151)	0.577*** (0.0971)
Strictness of employment protection			-0.0710*** (0.0143)	-0.0573*** (0.0155)	-0.0341** (0.0137)		-0.0309 (0.0292)	-0.000569 (0.0188)
Average years in education		0.536*** (0.0341)	0.560*** (0.0383)	0.574*** (0.0363)	0.515*** (0.0396)		0.309*** (0.0292)	0.334*** (0.0467)
Unemployment rate			-0.0620*** (0.00955)	-0.0571*** (0.0109)	-0.0637*** (0.0105)		-0.0449* (0.0253)	-0.0218* (0.0122)
Birth rate				0.0649 (0.0397)	0.0738* (00.0421)			0.0761* (0.0398)
∆GDP					-0.261*** (0.0539)			
Spending on leave and birth grants						0.0669*** (0.0206)	-0.0105 (0.0123)	-0.00679 (0.0102)
Spending on family benefits						0.00365 (0.0333)	0.0740*** (0.0190)	0.0782*** (0.0196)
Spending on childcare services						0.0443*** (0.00927)	0.000619 (0.00523)	-0.00491 (0.00491)
Weeks of paid leave						-0.0121 (0.0122)	-0.0107** (0.00541)	-0.0141*** (0.00434)
Service coverage for children under age 3						0.0767*** (0.0201)	0.0377*** (0.00547)	0.0438*** (0.00559)
Tax rate of second earner						-0.0183 (0.0284)	-0.0407*** (0.0124)	-0.0487*** (0.0123)
No. of obs.	316	292	268	249	249	216	156	150
R^2	0.963	0.983	0.990	0.991	0.991	0.971	0.997	0.997

The dependent and independent variables are expressed in log. Estimates by two-stage least squares with robust heteroskedasticity-consistent standard errors in brackets. ***, ** and * : significant at 1%, 5% and 10%, respectively.

All the estimated models include country-fixed effects so as to focus on the within-country, over-time variations between female labour force participation and its determinants. In addition, because the decision regarding care is to some extent simultaneous with the choice between work and inactivity, the use of childcare enrolment rates as regressors introduces a risk of bias in the estimated coefficients. Enrolment rates are therefore instrumented by their lagged values. Because of endogeneity concerns, unemployment rates are also instrumented by their lagged values, and cover 15-64 year-olds rather than 25-54.

Country coverage: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, the United Kingdom and the United States.

Table 3. The determinants of full-time and part-time female employment

Panel A. Estimates of female full-time employment, women aged 25-54, OECD 1980-2007

	(1)	(2)	(3)	(4)	(5)
Employment in services	0.00835*** (0.0007)	0.00873*** (0.000761)		0.00587*** (0.00112)	0.00559*** (0.00123)
Employment in the public sector	-0.191 (0.214)	0.0653 (0.223)		-0.359 (0.249)	-0.212 (0.237)
Average years in education	0.141*** (0.0524)	0.115** (0.0536)		-0.346*** (0.0723)	-0.371*** (0.0723)
Strictness of employment protection	-0.0667*** (0.0176)	-0.0564*** (0.0190)		0.0156 (0.0190)	0.0247 (0.0210)
Unemployment rate	-0.0527*** (0.0142)	-0.0376** (0.0156)		-0.0233** (0.0112)	-0.0190** (0.0115)
Birth rate		0.131** (0.0592)			0.0678 (0.0651)
Spending on leave and birth grants			0.0821*** (0.0171)	0.0627*** (0.0160)	0.0587*** (0.0143)
Spending on family benefits			0.0700*** (0.0186)	0.0285 (0.0288)	0.0421 (0.0307)
Spending on childcare services			0.0131** (0.00604)	0.0163** (0.00640)	0.0125* (0.00695)
Weeks of paid leave			0.0310*** (0.00982)	0.0115 (0.00770)	0.0125 (0.00798)
Service coverage for children under age 3			0.0546*** (0.0104)	0.0321*** (0.00946)	0.0369*** (0.00996)
Tax rate of second earner			-0.0903*** (0.0202)	-0.0817*** (0.0190)	-0.0935*** (0.0199)
No. of observers	275	256	208	159	153
R^2	0.982	0.983	0.982	0.993	0.994

Panel B. Estimates of female part-time labour force participation, women aged 25-54, OECD 1980-2007

	(1)	(2)	(3)	(4)	(5)
Employment in services	0.0148*** (0.00349)	-0.00206 (0.00353)		0.00819 (0.00537)	0.0104* (0.00628)
Public sector as a share of employment	-0.675 (0.616)	-1.901** (0.955)		-3.097*** (1.0014)	-3.662*** (1.055)
Average number years in education		2.303*** (0.177)		1.910*** (0.280)	2.073*** (0.276)
Employment protection legislation		-0.127* (0.0721)		-0.313*** (0.115)	-0.315*** (0.110)
Unemployment rate		-0.299** (0.0647)		-0.342*** (0.101)	-0.311*** (0.0971)
Spending on leave and birth grants per childbirth			-0.0131 (0.0760))	-0.192*** (0.0560)	-0.174*** (0.0544)
Spending on family benefits			0.0983 (0.114)	0.102 (0.120)	0.0443 (0.119)
Spending on childcare services per child under 3			0.0755 (0.0522)	-0.0958*** (0.0290)	-0.0882*** (0.0299)
Duration of paid leave			-0.158** (0.0627)	-0.0638*** (0.0247)	-0.0751*** (0.0267)
Enrolment of children in formal childcare			0.204** (0.0831)	0.167*** (0.0411)	0.164*** (0.0422)
Financial incentive to work part-time			0.0353*** (0.00956)	0.0190*** (0.00658)	0.0168** (0.00672)
Birth rate					-0.231 (0.246)
No. of obs.	327	275	195	152	146
R^2	0.911	0.951	0.924	0.980	0.983

Estimates by two-stage least squares with robust standard errors in brackets. Country coverage: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, the United Kingdom and the United States.

5.2 Influence of work-life balance policies

44. The regressions that control for policy but not for labour-market variables show that female labour force participation and spending on leave and childcare services evolve together. However, the sensitivity of female labour force participation to public spending is clearly determined by certain labour market properties.

45. Leave policies are a prime component of the institutional setting that influences women's participation in the labour market. Table 2 indicates that, other things being equal, an increase in the duration of leave is likely to reduce total female labour force participation, while expenditure per childbirth on leave and birth grants appears to have no significant effect. Rates of participation in full and part-time work react differently, however.

46. The provision of paid leave makes it more likely that women work full-time rather than part-time. Full-time employment rates do not appear to be sensitive to the duration of leave but they are positively associated with spending on income support during leave. By contrast, receipt of income support during parental leave and longer durations of paid parental leave both have a negative effect on the incidence of part-time work.

47. There is an unambiguous positive correlation between the provision of childcare services for the under-3s and full-time and part-time female participation in the labour market. Full-time employment is also sensitive to the amount spent per child on childcare services. This outcome might reflect the fact that a greater or higher-quality provision of care increases average expenditure per child, so making it easier to work full-time. By contrast, spending on childcare is observed to exert a negative influence on part-time work, which suggests that women move from part-time to full-time work if, other things being equal, longer and/or better care is provided. Part-time work appears to be more likely when there are constraints in the provision of affordable childcare services of good quality.

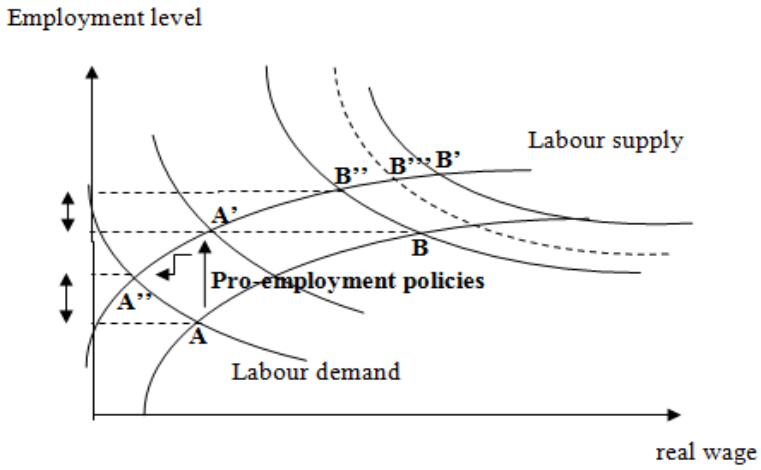
48. As expected, increasing effective tax rates on the second "full-time" earner reduces female labour force participation (Table 2 and 3). Public spending on family cash benefits is sometimes found to have a significant effect on female employment participation, but this finding is not robust across model specifications. In any case, there is no evidence that general child allowances paid out beyond the period of leave upon childbirth reduce significantly female labour supply through an income effect.

6. POLICY INTERACTIONS

49. Thus far, the analysis has focused on the effect of individual policy instruments. However, some institutions may work together in influencing employment levels. Institutional interplay may thus create complementarities between policies, which suggest that the marginal efficiency of a particular kind of support from one institution is likely to depend on the presence or degree of development of others (Aoki, 1994; Bassanini and Duval, 2006; and, Hall and Soskice, 2001).

50. There are potentially two types of interactions – "paired" and "multiple". Institutions or policies may first interact in pairs if, for example, parental leave policies are found to have a greater impact when childcare services are well developed. This kind of complementarity points to policy instruments exerting effects which are not linear but dependent on the properties of another institution. Such a scenario may be tested by including interacting pairs of policy instruments in the model specification. Policy efficiency may also depend on the interplay between institutions acting as a whole, shaping the overall policy context. Positive interactions could happen, for instance, if governments were willing to design policies in such a way that all instruments for boosting female employment complemented each other. In such an event, it is very likely that the effect of the overall set of institutions will be larger than the effect of each institution taken separately, because of a "**systemic**" complementarity created by the development and interplay of all these institutions at the same time. One way to test this assumes that the efficiency of each instrument would be dependent on the sum of effects that all institutions may have together on labour market decisions. Figure 10 helps to illustrate how the overall policy context – shaped by institutions working as one and to which labour supply and demand would adjust – could determine the efficiency of policy changes.

Figure 10. Equilibrium adjustments of female labour force participation to policy changes



51. Figure 10 compares two cases of female employment. Case A is a situation where, women's employment is low but their labour supply is highly responsive to pro-employment policy changes. In Case B employment rates are higher (due to a more women's employment-friendly context) and could develop in two possible directions, depending on the responsiveness of female labour supply to policy reforms.

52. In Case A, it is obvious that pro-female employment policies are expected to drive female labour supply and demand up – theoretically from say A to A'. However, policies might be at least partially financed by employers' social contributions, in which case labour demand will be set at a lower real wage. A'' will be the new equilibrium if the cost of labour rises to a much higher level than in the initial situation in Case A. Such an increase in the labour cost of female workers might also lead to greater differences in employment conditions between sectors and/or employers seeking to foster female employment and sectors and/or employers who want to invest in company-specific skills and are ready to discriminate against women (Estevez-Abe *et al.*, 2001).

53. Case B has a higher base rate of female labour force participation. However, female labour supply is likely to be less responsive to policy changes since the remaining inactive women who could enter the workforce are more likely to face higher opportunity costs. In this case, the marginal effect of policy changes might be weaker than in Case A, as illustrated here by a concave curve of labour supply. However, it might also be that the cost for employers will be lower here than in Case A if economies of scale are generated for employers by continuing the development of policy support. In that event, the labour market equilibrium could move from B to B''' instead of to B''. The overall effect of policy change is thus likely to be smaller than in Case A, unless female labour supply becomes more elastic at higher employment levels, as illustrated by the "dotted-line curve". Social norms can make female labour supply more elastic if, for example, maternal employment becomes progressively more accepted when female employment rates is growing. Case B suggests that pro-female employment policies are likely to be more efficient at higher employment levels.

54. In sum, the effects on employment of changes in family-friendly policies (*e.g.* investment in a childcare service provision) will be greater: (i) the more sensitive female labour supply is to incremental changes in policies (the steeper the female labour supply curve); and (ii) the more insensitive the reaction of employers to the potential increase in labour cost (the flatter the labour demand curve). Virtually all institutions can affect the slope and position of at least one curve, which makes the interaction between institutions so important. A relevant key policy challenge is, then, to identify the most powerful interactions. This is not straightforward, however, in view of data constraints, as discussed below.

6.1 Interaction between pairs of policy instruments

55. A standard approach towards measuring the interplay between policy variables involves augmenting the baseline model with all possible interactions between each individual pair of policy characteristics. Following the approach suggested by Bassanini and Duval (2006), we add multiplicative interactions between policy variables to the baseline model, defined by the products of the deviations of institutional variables from their sample mean.

56. Labour force participation is then modelled as in equation [1], but augmented by interactions between institutions I^k and I^h. Equation [2] applies to one single interaction:

$$[2] \qquad LFP_{it} = \sum_j \beta_j I_{it}^j + \gamma_{kh}\left(I_{it}^k - \bar{I}^k\right)\left(I_{it}^h - \bar{I}^h\right) + \alpha LM_{it} + \beta P_{it} + \phi X_{it} + \alpha_i + \lambda_t + \varepsilon_{it}$$

where $\bar{I}^k$ and $\bar{I}^h$ are the sample means across countries and over time of I^k and I^h. Other variables are denoted as in equation [1]. Coefficients β can be readily interpreted as the marginal employment effects of

institutions I at their sample mean when all other covariates are kept constant at their sample mean. For the two institutions I^k and I^h that increase employment rates, a positive sign for the interaction coefficient would provide evidence of policy complementarity.[9]

57. Undertaking a systematic analysis of policy interactions consistent with Figure 10 in the above framework is not straightforward, however. This is because any extension of equation [2] to more than one type of interaction should also include all "implicit" interactions in order to minimise the risk of coefficient bias (Braumoeller, 2004 and Brambor *et al.*, 2006). The result might be an over-specification of the model that causes a substantial loss of degree of freedom, however.[10] In addition, given the likely correlation among the interaction terms, such an over-specified model specification would raise legitimate multicollinearity concerns. For this reason, it is usual to consider only a small, *ad hoc* number of interactions, while all other interaction coefficients are set to 0. However, if this approach is to yield robust findings, it should at least be shown that the chosen interactions maintain sign and significance regardless of the specification and, in particular, of the inclusion of additional interaction terms (*ibid*). Interaction terms including omitted institutions could particularly bias coefficient estimates.[11]

58. Against this background and in line with Bassanini and Duval (2009), the approach followed here is to first explore the impact of all interactions between policies taken in pairs, and then consider the robustness of findings with changes in the estimation procedure (Table 4). Results from two alternative estimation procedures are reported, in addition to the basic ordinary least square (OLS):

1. an instrumental variable (IV) approach, where any interaction between institutions I^k and I^h is instrumented with the product of the deviations of I^k and I^h from their respective country-specific means;[12]
2. an augmented version of OLS estimations, where the institutions I^k and I^h are interacted with country dummies – thus assuming that the effects of institutions are country-specific.

59. The last column of Table 4 show results of the fixed-effect estimation where all possible interactions between policy components are taken into account.

[9] A positive sign means that the positive effect of a policy indicator on fertility is all the greater if other policy indicators also have a significant effect, so that reforms to improve the levels of these institutions should be undertaken together to maximise their impact.

[10] For example, estimating a model specification with four couples of multiplicative institutions (I^k , I^h), (I^k , I^m), (I^k , I^n), and (Ik , I p) would, in fact, involve incorporating a total of 26 interactions terms in the equation – the total number of combinations of two or more variables within a set of five institutions, thereby causing a substantial loss of degrees of freedom.

[11] Insofar as such omitted variables are approximately time-invariant, country dummies (fixed effects) would be expected to control for them in linear specifications such as the baseline used here. Unfortunately, however, such dummies do not control for the correlation between included and omitted interactions, as the latter are not likely to be time-invariant.

[12] The deviation of a variable from its country-specific means can be considered as a valid instrument when correlation with time-invariant factors is the main source of endogeneity (Hausman and Taylor, 1981). As noted by Bassanini and Duval (2009), this deviation is in fact uncorrelated with any time-invariant unobservable variable.

Table 4. Effects of interactions across institutions on female labour force participation

	Each single pair of interactions taken separately				All interactions taken simultaneously
	OLS	IV	F-test on instruments (p-value)	OLS with country-specific variables	
Spending on leave * spending on family benefits	-0.005 (0.018)	..	2.1 (0.14)	-0.000 (0.000)	-0.002* (0.001)
Spending on leave * spending on childcare services	0.002 (0.009)	-0.010 (0.033)	5.4 (0.021)	0.000 (0.000)	-0.000 (0.000)
Spending on leave * leave duration	-0.000 (0.000)	0.031* (0.017)	215.7 (0.000)	-0.000 (0.000)	0.000** (0.000)
Spending on leave * CC enrolment	-0.0575*** (0.013)	..	0.07 (0.79)	-0.001*** (0.000)	0.002** (0.002)
Spending on leave *Strictness of employment protection	0.224** (0.098)	..	0.04 (0.83)	0.0196*** (0.006)	-0.007 (0.010)
Spending on leave *Rel. tax rate of 2nd earner	-0.053 (0.049)	0.032 (0.028)	19.2 (0.00)	-0.004 (0.003)	0.009** (0.004)
Spending on family benefits * spending on childcare services	-0.006 (0.008)	..	1.1 (0.28)	-0.000 (0.000)	-0.000 (0.001)
Spending on family benefits * leave duration	-0.0018*** (0.000)	0.139*** (0.028)	24.3 (0.00)	-0.000 (0.000)	-0.000 (0.000)
Spending on family benefits * CC enrolment	-0.044*** (0.011)	..	1.4 (0.23)	-0.001*** (0.000)	0.000 (0.002)
Spending on family benefits * EPR	0.377** (0.145)	..	2.1 (0.14)	0.022*** (0.007)	-0.010 (0.008)
Spending on family benefits * *Rel. tax rate of 2nd earner	-0.0421 (0.040)	-0.037 (0.033)	37.3 (0.00)	-0.000 (0.003)	-0.003 (0.003)
Spending on childcare services * leave duration	-0.0008** (0.0003)	0.051*** (0.016)	45.5 (0.00)	-0.000** (0.000)	-0.000 (0.000)
Spending on childcare services * CC enrolment	-0.0197*** (0.0073)	-0.086 (0.057)	3.9 (0.04)	-0.0006** (0.0002)	0.000 (0.000)
Spending on childcare services * Strictness of employment protection	0.113*** (0.040)	..	0.3 (0.57)	0.005* (0.002)	0.000 (0.002)
Spending on childcare services * *Rel. tax rate of 2nd earner	-0.0051 (0.025)	0.005 (0.026)	20.9 (0.00)	-0.000 (0.001)	-0.006*** (0.006)
Weeks of paid leave * CC enrolment	0.001*** (0.000)	0.176** (0.075)	8.2 (0.00)	0.0002*** (0.0000)	0.000*** (0.000)
Weeks of paid leave * Strictness of employment protection	0.002 (0.001)	-0.197** (0.093)	9.3 (0.00)	0.000 (0.000)	-0.000*** (0.000)
Weeks of paid leave * *Rel. tax rate od 2nd earner	-0.002** (0.001)	0.185** (0.078)	16.2 (0.00)	-0.0002* (0.0001)	0.000 (0.000)
CC enrolment * Strictness of employment protection	0.233*** (0.079)	0.310* (0.186)	6.2 (0.01)	0.011* (0.006)	0.006** (0.002)
CC enrolment * *Rel. tax rate od 2nd earner	0.086 (0.101)	..	2.0 (0.15)	0.006 (0.005)	0.006 (0.003)
Strictness of employment protection * *Rel. tax rate of 2nd earner	-0.011 (0.286)	..	1.1 (0.28)	-0.009 (0.017)	0.012 (0.009)
Number of observations	167	167	167		167
R2	0.986	0.999	0.999	0.999	0.999

The dependent and independent variables are expressed in log. Estimates by two-stage least squares with robust heteroskedasticity-consistent standard errors in brackets. ***, ** and * : significant at the 1%, 5% and 10%, respectively.

IV estimates are reported when the instrument is not weak according to the Stock–Yogo test.

60. Table 4 provides little evidence that policies complement each other – at least in the form of interactions among pairs of institutions. What's more, there are few interactions among policy components that are robust across the different estimation procedures. Yet, there is some indication of positive interaction between the coverage of childcare services for children under three and two other variables – (paid) leave duration and the strictness of employment protection. Not surprisingly, it suggests that the provision of formal childcare services is a particularly important incentive for mothers with young children to resume work in countries where longer periods of leave are available; in other words, when there is a

high likelihood that there is no gap between the end of the paid leave entitlement and access to affordable childcare of good quality. By contrast, the effect of services seems to diminish when spending on leave is higher, which may reflect a greater use of leave entitlements by women with very young children. The effect of childcare services is also found to be slightly larger when employment protection legislation is more stringent. More stringent employment protection legislation seems to increase the effect of family policy measures. This suggests that the efficiency of work-life balance policies is affected by the institutional setting in which they play out.

61. Finally, the lack of statistical significance regarding many of the "paired interaction terms" does not necessarily mean that institutions do not interact. Small sample sizes might prevent the emergence of significant terms. Most important, though, is that the above approach may be too narrowly focused on specific policy interactions while, as already ascertained, it is very likely that policy instruments interact with the set of institutions as a whole more than with any of them taken separately. In this case, the combined changes in policy will have a greater effect on female employment than the sum of the marginal effects of isolated changes in policy characteristics. In other words, the more (less) female employment-friendly the overall institutional framework, the greater (smaller) the effect of a given change is likely to be.

6.2 Testing systemic complementarity between institutions

62. One way to test for systemic interaction is to assume that the efficiency of each policy instrument is linked in a non-linear manner with the sum of the direct effects of all institutions, as expressed by the following equation:

$$LFP_{it} = \sum_j \beta_j I_{it}^j + \sum_k \left(\gamma_k \left(I_{it}^k - \bar{I}^k \right) \left(\sum_j \beta_j \left(I_{it}^j - \bar{I}^j \right) \right) \right) + \alpha LM_{it} + \beta P_{it} + \phi X_{it} + \alpha_i + \lambda_t + \varepsilon_{it} \quad [3]$$

where parameters β_j and γ_k are estimated simultaneously by non-linear least squares. β_j denotes the direct effect of institution I^j at the sample average – *i.e.* for a country with an average mix of institutions – while γ_k indicates the strength of the interaction between I^k and the overall institutional framework. The latter is captured by the sum of the direct effects of policies' characteristics, $\sum_j \beta_j \left(I_{it}^j - \bar{I}^j \right)$, expressed in deviation form in the interaction. In fact, additional interactions involving country-fixed effects are also included in the specification in order to avoid potential bias from the correlation between certain institutions and the unobserved (and time-invariant) determinants of employment rates.[13] For any I^k that increases the female employment rate, a positive and significant coefficient γ_k provides evidence of institutional complementarity in the sense that the more employment-friendly the overall institutional context is, the larger the impact of an incremental augmentation of I^j will be.

[13] This implies that the specification actually estimated is a more complex than [X], with

$$LFP_{it} = \sum_j \beta_j I_{it}^j + \sum_k \left(\gamma_k \left(I_{it}^k - \bar{I}^k \right) \left(\sum_j \beta_j \left(I_{it}^j - \bar{I}^j \right) \right) \right) + \sum_h \left(\mu_h \left(C_i^h - \bar{C}^h \right) \left(\sum_j \beta_j \left(I_{it}^j - \bar{I}^j \right) \right) \right) + \alpha LM_{it} + \beta P_{it} + \phi X_{it} + \alpha_i + \lambda_t + \varepsilon_{it}$$

where C_i^h is a country dummy variable, and μ_h is a parameter to be estimated.

Table 5. Systemic interactions across institutions

Effects on Labour force participation, full- and part-time employment.

	Labour force participation			Full-time employment			Part-time employment		
β: Direct effects of policies	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Spending on leave and birth grants per childbirth	0.029 (0.018)	0.032 (0.028)	0.032 (0.027)	-0.028 (0.017)	-0.021 (0.037)	-0.022 (0.034)	0.052* (0.031)	0.059 (0.074)	0.040 (0.076)
Spending on family benefits	0.088*** (0.018)	0.137*** (0.012)	0.166*** (0.008)	0.139*** (0.028)	0.163*** (0.062)	0.175*** (0.015)	0.215 (0.215)	0.306*** (0.036)	0.306*** (0.041)
Spending on childcare services	0.027*** (0.007)	0.050*** (0.008)	0.046*** (0.007)	0.015*** (0.005)	0.043*** (0.014)	0.041*** (0.008)	0.108 (0.097)	0.146*** (0.039)	0.151*** (0.038)
Duration of paid leave	0.034** (0.015)	0.035** (0.016)	0.021** (0.011)	0.052*** (0.014)	0.050** (0.021)	0.050*** (0.012)	-0.051 (0.055)	-0.095** (0.038)	-0.063* (0.035)
Enrolment of children in formal childcare	0.055*** (0.014)	0.104** (0.019)	0.073*** (0.014)	0.069*** (0.023)	0.110*** (0.034)	0.112*** (0.023)	0.101 (0.099)	0.108** (0.053)	0.124** (0.050)
Employment protection legislation	-0.108*** (0.033)	-0.104*** (0.036)	-0.095*** (0.037)	0.074*** (0.024)	0.067* (0.036)	0.073*** (0.028)	-0.479 (0.425)	- 0.673*** (0.212)	- 0.561*** (0.179
Tax rate of a second earner	-0.072*** (0.019)	-0.129*** (0.017)	-0.143*** (0.016)	-0.092*** (0.025)	-0.138*** (0.051)	-0.145*** (0.024)	..	..	..
γ: Interactions between institutions and the sum of direct effects									
Spending on leave and birth grants per childbirth	-0.067 (0.080)	-0.025 (0.053)	..	0.304** (0.128)	0.157* (0.090)	0.170** (0.077)	-0.224 (0.166)	-0.212** (0.089)	-0.183 (0.084)
Spending on family benefits	0.009 (0.065)	-0.044 (0.042)	..	-0.166* (0.095)	-0.175** (0.081)	-0.172*** (0.058)	0.139 (0.105)	0.122** (0.062)	0.120* (0.064)
Spending on childcare services	0.069** (0.034)	0.071*** (0.025)	0.054** (0.023)	-0.062 (0.044)	-0.028 (0.039)	..	0.080 (0.077)	0.064** (0.029)	0.073*** (0.027)
Weeks of paid leave	-0.124* (0.075)	-0.028 (0.032)	..	-0.086 (0.067)	0.003 (0.032)	..	0.011 (0.122)	0.236 (0.146)	..
Service coverage for children under 3	0.168*** (0.057)	0.111*** (0.030)	0.062** (0.028)	0.130** (0.066)	0.102* (0.056)	0.112*** (0.036)	0.027** (0.049)	0.044 (0.044)	..
Strictness of employment protection	-0.308** (0.122)	0.494*** (0.103)	0.428*** (0.097)	0.031 (0.165)	0.295* (0.168)	0.265** (0.119)	0.031 (0.171)	0.165 (0.173)	..
Tax rate of a second earner	0.349*** (0.106)	0.395*** (0.078)	0.401*** (0.072)	0.167 (0.220)	0.364** (0.183)	0.357** (0.1161)	..	..	..
Number of observations	217	181	181	213	177	177	223	185	185
R2	0.992	0.994	0.993	0.989	0.990	0.990	0.986	0.986	0.986

Non-linear least squares.Standard errors in brackets.*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively

63. Table 5 shows the estimation results obtained when allowing for systemic interactions: Column 1 presents the general model specification; Column 2 includes controls for labour market characteristics; and, Column 3 provides the final estimations obtained after eliminating insignificant interactions.

64. Compared with the baseline model reported in Tables 2 and 3, taking systemic interactions into account now affects the direct effects of policies estimated for the "average" country (as reported in the top half of table 5). First, some of the coefficients that were not significant in the baseline model are now

found to have a significant influence on female labour force participation. This, for example, is the case of the following coefficients:

- Coefficients on spending in family benefits in equations for full and part-time employment,
- coefficients on public spending on childcare services in equations for labour force participation,
- coefficients on the duration of paid leave in equations for full-time employment.

65. Direct effects with significant coefficients are also often slightly stronger than in the baseline model, which is not surprising because it assumes the effect of the other variables to be equal to zero (Braumoeller, 2004). More striking, however, is the change in the sign of the coefficient for the effect of the duration of paid leave in the equation for female labour force participation: it now turns positive when all other variables are hypothetically set at zero. However, the significant interactions with the sum of direct effects indicate that the influence of leave duration is closely tied to the overall institutional setting. The negative sign of this interaction suggests – in particular and not surprisingly – that the more employment-friendly the overall setting is, the more the influence of leave duration wanes. The effect of government spending on childcare services is now also unambiguously positive in all employment equations, which includes part-time employment equations where the baseline model had estimated it as insignificant.

66. The bottom half of Table 5 shows that the effects of other key variables on female labour force participation are also highly dependent on the overall institutional context. The effect of childcare services coverage for the under-3s can, in particular, be seen to interact positively with the sum of the direct effects of other policy characteristics, which suggests that its influence increases in a context which is more favourable to women's employment. Conversely, taxing second earners has a negative effect on female labour force participation and full-time employment. However, the negative interaction with the overall institutional context suggests that the influence of taxation weakens the more employment-friendly the policy setting is. By contrast, the positive effect of the interaction between employment protection legislation and other measures towards a better reconciliation of work and family life work-life complement each other in their positive effect on female employment and labour force participation.[14]

6.3 Testing variations across welfare types

67. One limit of the approaches adopted so far is that the effects of variables (including policy instruments) are assumed to be the same across countries and depend on settings shaped by all institutions. This is, of course debatable, as specific measures are likely to have different effects in different countries/welfare states. For instance, the effect of policies will vary across Welfare States which assign different roles to men and women and to public policies in providing welfare to families (Esping-Andersen, 1999 and Thévenon, 2006).

68. An alternative way to look at the influence of social welfare settings is to characterise each country according to its type of welfare state and examine its potential interactions with each policy measures. In this way the terms of interaction will provide some insight into potential variations in the **marginal returns** of policy changes in different welfare-state contexts. In order to investigate such possible heterogeneity, we run regressions that include interactions with country-clusters in line with the categorization of family policy regimes as in Thévenon (2011) using information from the OECD Family database.

[14] In fact , the effect of this interaction on Female labour force participation turns from negative in Column 1 to positive in Columns 2 and 3 which control for labour market characteristics, which suggests a close correlation between employment protection legislation and other labour market characteristics.

69. Country-dummies are thus replaced by dummies for four different country-groupings identified from the combination of a range of key dimensions of family policies (English-speaking, Southern European, Nordic and Continental Welfare States as explained in the previous section and Appendix Table A1), and then interacted with each of the policy variables. The model is then re-written so as to take into account multiplicative interaction between family policy variables and their context of implementation.

70. Labour force participation is now modelled as follows:

[4] $$LFP_{it} = WS_i + \alpha LM_{it} + \phi X_{it} + \varphi_i . P_{it} WS_i + T_t + \varepsilon_{it}$$

where the marginal effect (β) of policy variables P_{it} is now assumed to be conditional on countries' Welfare State context; the eighteen countries being grouped in four categories derived mainly from the differences that concern the extent and form of support provided to working parents with children under age three (Thévenon, 2011 and see above section 3.4).

71. All policy variables in equation [4] are centred beforehand by subtracting the mean score across all observations in the sample in order to facilitate the interpretation of the terms of interaction (Brambor *et al.*, 2006). β measures the effect of family policies on fertility in Continental Welfare States (reference category), whereas φ measures the deviation from the reference effect for English-speaking, Southern European and Nordic Welfare States.

72. Tables 6 and 7 report the results of estimations where labour force and employment equations include:

- The policy and control variables used in former model specifications.
- A variable indicating the welfare state categories (with the group of Continental European countries taken as the reference category) and the terms of interaction between policy variables.

73. Regression results show remarkable differences in the effects different policies generate in different groups of Welfare States on female labour force participation and on full-time employment in particular. For instance, public expenditure on leave and birth grants is found to have a strong positive effect on the participation of women in full-time employment in the countries of "Continental" Europe, but it has a negative effect in "English-speaking" and Nordic economies. Also, the association between the per child spending in family cash benefits and labour force participation and full-time employment is strongly positive in "Continental" European countries and weaker or statistically non significant in other Welfare States environments. It might be the case that in-cash benefits are especially important to cover the fixed cost of mothers' labour force participation at full-time in Continental countries where formal childcare services are relatively scarce (except in France). Family cash benefits also have a positive influence on female labour force participation and on part-time work especially in Nordic countries (even though the proportion of women working part-time (15%) is much lower than the 28% of women aged 25-54 on average in the other country-groupings.

74. Leave duration also has a strong negative impact on female labour force participation and full-time employment in English-speaking countries and to a much lesser extent in Nordic countries where a prolongation of paid leave somewhat increases the likelihood of women working part-time rather than full-time. By contrast, the effect of an increased duration of paid leave on female employment is weak but positive in Continental and especially Southern countries where leave entitlements seem to offer a valuable protection of employment for mothers who often care on a full-time basis for children during their early years. This makes sense in countries where dual labour markets produce high rewards in terms of career

path and social protection for those who remain in employment over the life course (Häusermand and Schwander, 2011).

75. Greater coverage of childcare facilities among children under age 3 helps to raise female labour force participation at full and part-time. Yet, the effect of enrolment rates in childcare services on female full-time employment is particularly strong in both "English-speaking" and "Nordic" groups. There is also a negative association between the enrolment of children under age 3 and part-time employment in the Nordic countries, which suggests that the provision of such childcare services facilitates the transition from part-time to full-time employment.

Table 6. Variations in the influence of policy instruments across welfare state regimes – summary table

Labour Force participation							
	Leave policies		**Childcare services**		**Tax-benefit support**		
	Spending per childbirth	Duration of paid leave	Spending per child	Coverage of children under 3	Spending on family cash benefits per child	Relative tax rate of a second earner	Tax incentive to work part-time
"Continental" countries	++	+	--	+	+++	++	..
"English speaking" countries	Ns	--	Ns	++	Ns	-	..
Southern European countries	Ns	+	+	+	+	Ns	..
Nordic countries	-	-	Ns	Ns	++	++	..
Full-time Employment							
	Leave policies		**Childcare services**		**Tax-benefit support**		
	Spending per childbirth	Duration of paid leave	Spending per child	Coverage of children under 3	Spending on family cash benefits per child	Relative tax rate of a second earner	Tax incentive to work part-time
"Continental" countries	++	Ns	--	Ns	+++	Ns	..
"English speaking" countries	--	--	Ns	++	Ns	--	..
Southern European countries	Ns	+	+	+	Ns	Ns	..
Nordic countries	Ns	-	-	++	Ns	+++	..
Part-time Employment							
	Leave policies		**Childcare services**		**Tax benefit support**		
	Spending per childbirth	Duration of paid leave	Spending per child	Coverage of children under 3	Spending on family cash benefits per child	Relative tax rate of a second earner	Tax incentive to work part-time
"Continental" countries	--	+	Ns	Ns	Ns	..	Ns
"English speaking" countries	Ns	Ns	Ns	Ns	Ns	..	Ns
Southern European countries	Ns	--	-	++	++	..	Ns
Nordic countries	Ns	+	++	---	+++	..	++

+++ to --- show where the effect of the variables is the strongest to the weakest. Ns denotes a statistically non-significant effect, and .. indicates that the variable is omitted. influence of Categorization of countries as follows: "English speaking": Australia, Canada, Ireland, New Zealand, United Kingdom, United States; "Southern European": Italy, Spain, Portugal; "Nordic countries: Denmark, Finland, Norway, Sweden; "Continental": Austria, Belgium, France, Germany and the Netherlands.

76. When considered separately from coverage rates, the effect of per-child expenditure on childcare on female labour market behaviour varies considerably across country-groupings. For instance, there is a very negative association in Continental countries where the money invested does not actually seem to increase female employment, but merely generate a substitution from informal to formal childcare. By contrast, there seems to be a positive association between spending in childcare services and female labour force participation in Southern countries where it adds to the positive effect that an increase in service coverage has directly.

77. The prolongation of paid leave and the associated increase in government spending tend to reduce the proportion of women working full-time in English-speaking countries. Until recently many Anglophone countries included (and Ireland still does) categorical income support for sole parents until their dependent children were in their teens. This helps to explain why expenditure on cash benefits in these countries is found to have a negative effect on full-time female employment. Women's full-time participation in the labour force also appears to be more negatively affected than in other countries by unfavourable tax treatment of second earners in couple families.

78. Surprisingly, increased tax rates on second earners seem to have a positive effect on female employment rates. This finding might be related to "income effects" dominating "substitution effects" in such a way that a tax increase causing a reduction of disposable income to the extent that second earners increase their employment participation to make up for the income loss.

Table 7. Influence of policy instruments across welfare state regimes – full results

	Labour force participation	Full-time employment	Part-time employment
Spending on leave and birth grants per childbirth			
"Continental" countries	0.073*** (0.019)	0.121*** (0.033)	-0.198*** (0.080)
"English speaking" countries	-0.030 (0.043)	-0.120* (0.063)	-0.066 (0.142)
Southern European countries	0.0236 (0.030)	-0.000 (0.042)	-0.114 (0.119)
Nordic countries	-0.017* (0.033)	0.001 (0.070)	-0.119 (0.193)
Spending on family benefits			
"Continental" countries	0.418*** (0.045)	0.484*** (0.082)	0.262 (0.245)
"English speaking" countries	-0.111 (0.076)	-0.060 (0.127)	-0.206 (0.307)
Southern European countries	0.048*** (0.019)	0.019 (0.029)	0.272** (0.123)
Nordic countries	0.150*** (0.056)	0.076 (0.111)	0.580* (0.347)
Spending on childcare services per child under 3			
"Continental" countries	-0.099*** (0.017)	-0.170*** (0.026)	0.030 (0.089)
"English speaking" countries	0.067 (0.041)	0.071 (0.066)	0.187 (0.135)
Southern European countries	0.016** (0.007)	0.031*** (0.007)	-0.096*** (0.028)
Nordic countries	0.012 (0.035)	-0.060* (0.057)	0.295* (0.156)
Duration of paid leave			
"Continental" countries	0.001*** (0.000)	0.000 (0.000)	0.004** (0.002)
"English speaking" countries	-0.015** (0.007)	-0.026** (0.010)	-0.024 (0.021)
Southern European countries	0.002*** (0.000)	0.004*** (0.001)	-0.010*** (0.002)
Nordic countries	-0.001*** (0.000)	-0.003*** (0.000)	0.004*** (0.000)
Enrolment of children in formal childcare			
"Continental" countries	0.051** (0.022)	-0.024 (0.031)	0.139 (0.099)
"English speaking" countries	0.203** (0.094)	0.289* (0.164)	0.326 (0.450)
Southern European countries	0.027*** (0.009)	0.035*** (0.015)	0.154*** (0.055)
Nordic countries	-0.022 (0.025)	0.287*** (0.045)	-0.595*** (0.141)
Relative tax rate of a second earner			
"Continental" countries	0.105* (0.062)	-0.166 (0.114)	..
"English speaking" countries	-0.080*** (0.027)	-0.175*** (0.048)	..
Southern European countries	-0.032 (0.052)	0.024 (0.094)	..
Nordic countries	0.187* (0.097)	0.618*** (0.149)	..
Tax incentive to work part-time			
"Continental" countries		..	0.008 (0.011)
"English speaking" countries	..	..	-0.011 (0.021)
Southern European countries	..	..	-0.006 (0.023)
Nordic countries			0.045*** (0.013)
Number of observations	164	164	156

All models include time and welfare state dummies but their single effects are not reported. t-statistics in parentheses from robust standard errors. Categorization of countries as follows: "English speaking": Australia, Canada, Ireland, New Zealand, United Kingdom, United States; "Southern European": Italy, Spain, Portugal; "Nordic countries: Denmark, Finland, Norway, Sweden; "Continental": Austria, Belgium, France, Germany and the Netherlands.

7. CONCLUSIONS

79. Overall, this analysis has shown that trends in female labour force participation within economies are influenced by:

- the structure of the labour market
- the institutional setting that supports work-life balance
- the improvement in women's average level of educational attainment.

80. The growth of employment in the services and the rising incidence of part-time work have had a positive effect on female participation in the labour force. By contrast, there is no such clear relationship between female employment rates and expanding employment in the public sector. Indeed, the latter has been found to actually lower participation rates in part-time work, which seems to suggest that economies have used public employment and part-time work as two separate channels to boost female labour force participation. Greater strictness of employment protection legislation also seems to have slowed down the growth of part-time work.

81. Policies to encourage two-earner families and help working parents cope with their family commitments are identified as important factors in boosting female labour force participation. Both in-cash and in-kind support have been found to play a significant role. This analysis has considered family policy indicators related to childcare, parental leave and cash benefits in their effect on female labour force behaviour. The analysis suggests that policies to foster greater enrolment in formal childcare have a small but significant effect on full-time and part-time labour force participation – and these effects are much more robust than the effects of paid leave or other family benefits.

82. The main findings of the baseline model can be summarised as follows:

- The growing enrolment of children in childcare has enhanced female employment on a full-time and part-time basis. However, higher public spending on childcare does not necessarily lead to more part-time employment, as it may facilitate moves into full-time work or improve the quality of childcare without affecting hours worked per week.
- Increasing public spending for paid maternal and/or parental leave tends to raise the incidence of full-time employment relative to part-time work. Extending the duration of paid maternal and/or parental leave particularly lowers the likelihood of working part-time instead of no work.
- Higher tax rates on the second earner in a family reduce female labour force participation. And, women are more likely to work part-time when two-earner households are taxed less than one-earner households with a similar income level. By contrast, levels of spending on family benefits per child have no direct bearing on rates of female employment.

83. The analysis of interactions between policy components also shed light on the complementarities between them. In particular, the provision of childcare services is found to increase women's participation in the labour market to a greater extent in countries with comparatively long paid leave and/or a high degree of employment protection. Conversely, higher tax rates on second earners discourage women's participation in the labour market, and that effect is tempered in a work-life balance friendly institutional environment.

84. Finally, the analysis provided evidence of variations in the influence of policy characteristics on female labour force participation in different types of welfare state. The results are preliminary, since the data constraints do affect robustness tests. Nevertheless, the exploratory analysis suggests that female labour force participation can react differently to different policy measures depending on the institutional environment in which they play out. The provision of childcare services for the under-3s is essential to raise full-time employment among women in all countries, but its effect varies. Thus, the development since the early 1980s of childcare services for children under age 3 has been an important driver of full-time rather than part-time female employment. The effect of service coverage is weaker in continental and southern European countries where the expansion childcare services seems to have merely changed informal into formal provision and have made it somewhat more likely for women to work part-time work.

85. Female employment appears also to be particularly responsive to financial incentives to work in English-speaking countries where increases in the duration of paid leave, and/or the relative tax rates faced by second earners in couple families appear to reduce female employment rates. This finding makes sense in countries where labour markets are flexible in terms of moving in and out of the labour force as well as adjustment of working hours to better fit family needs and constraints, such as high childcare costs. In the absence of acces to affordable formal childcare servies, then upon the expiry of parental leave, mothers will adjust their working hours in view of the cost of (available informal and formal childcare) and their earnings profile. In these circumstances, increases in leave duration merely postpone working hours decision for a few weeks/months and may reduce female employment rates, as increased leave durations may make employers hesitant to hire many women of childbearing age.

86. By contrast, an increase in the duration of paid leave and in the spending on cash benefit appeared to slightly raise female labour force participation over the past decades in Continental and Southern European countries. In these countries, there are considerable formal childcare constraints while flexible labour market opportuinities are more limited than in Anglophone countries, In this context, an increase in the duration of paid leave will attract more women to stay in work until childbirth, and the reward of qualifying for paid leave is strongest for low-income workers, with relatively high replacement rates. Especially high-qualified women are also likely to take advantage of the continuity in employment that extended leave provides, as the dualized non-flexible labour markets make re-entyry into work without employment-protected leave more difficult than elsewhere. In Nordic countries the provision of childcare services for the under 3s is compatible with mother's full-time employment. In such a context, additional weeks of paid leave appear to weaken labour force attachment and seem to raise the propensity to work part-time rather than full-time.

APPENDIX 1: ADDITIONAL TABLES

Table A1. Descriptive statistics of policies by welfare regimes

Group of English speaking countries: Australia, Canada, Ireland, New Zealand, the United Kingdom and the United States

		Mean	Std. Dev.	Min	Max	Observations
Spending on family benefits (US$ PPP)	Overall	1377	1180	125	5392	N = 126
	Between		775	194	2187	n= 6
	Within		942	-185	5085	$\bar{T}$=21
Spending on childcare services (per child under age 3, US$ PPP)	Overall	1293	1957	125	5392	N = 168
	Between		598	194	2187	n= 6
	Within		1878	-185	5085	$\bar{T}$=28
Spending on leave and birth grants (per childbirth, US$ PPP)	Overall	1064	1746	0	10482	N = 165
	Between		1116	0	2885	n= 6
	Within		1416	-1256	9604	$\bar{T}$=28
Weeks of paid leave	Overall	10	12	0	50	N = 168
	Between		11	0	27.3	n= 6
	Within		6.3	-1.5	33.4	$\bar{T}$=28
Service coverage for children under age 3	Overall	16.1	9.4	2	35.1	N = 168
	Between		7.7	7.9	30.8	n= 18
	Within		6.7	3.2	35.2	$\bar{T}$=13.5

Group of Southern European countries: Italy, Portugal, Spain

Variable		Mean	Std. Dev.	Min	Max	Observations
Spending on family benefits (US$ PPP)	Overall	410	271	53	1213	N = 80
	Between		150	270	570	n= 3
	Within		241	121	1096	$\bar{T}$=26.6
Spending on childcare services (per child under age 3, US$ PPP)	Overall	1613	2326	0	10559	N = 84
	Between		778	899	2443	n= 3
	Within		2236	-544	9729	$\bar{T}$=28
Spending on leave and birth grants (per childbirth, US$ PPP)	Overall	1882	14666	243	6924	N = 80
	Between		800	1083	2683	n= 3
	Within		1314	161	6983	$\bar{T}$=26.6
Weeks of paid leave	Overall	26.0	15	12.8	48	N = 84
	Between		19	14.7	48	n= 3
	Within		1.7	24.0	32.6	$\bar{T}$=28
Service coverage for children under age 3	Overall	14.2	13.8	2	50	N = 64
	Between		7.4	6.8	21.1	n= 3
	Within		12.4	-1.06	46.9	$\bar{T}$=21.3

Group of Continental countries: Austria, Belgium, France, Germany, the Netherlands

Variable		Mean	Std. Dev.	Min	Max	Observations
Spending on family benefits (US$ PPP)	Overall	1465	813	0	3867	N = 110
	Between		432	855	1946	n= 5
	Within		714	-480	3386	$\bar{T}$=22
Spending on childcare services (per child under age 3, US$ PPP)	Overall	3216	3067	0	16656	N = 140
	Between		987	2244	4389	n= 5
	Within		2936	-784	15700	$\bar{T}$=28
Spending on leave and birth grants (per childbirth, US$ PPP)	Overall	4164	3556	0	1352	N = 132
	Between		3358	174	9272	n= 5
	Within		2123	-1424	8790	$\bar{T}$=26.4
Weeks of paid leave	Overall	46	43	12	162	N = 140
	Between		33	14.7	94	n= 5
	Within		30	9.4	171	$\bar{T}$=28
Service coverage for children under age 3	Overall	20.5	13.5	0.9	53.9	N = 102
	Between		13	4.0	37	n= 5
	Within		6.1	-8.5	37.4	$\bar{T}$=20.4

Group of Nordic countries: Denmark, Finland, Norway, and Sweden

Variable		Mean	Std. Dev.	Min	Max	Observations
Spending on family benefits (US$ PPP)	Overall	1665	742	357	3240	N = 106
	Between		431	1330	2315	n= 4
	Within		651	-197	2594	$\bar{T}$=26.5
Spending on childcare services (per child under age 3, US$ PPP)	Overall	7746	4341	0	19405	N = 112
	Between		3194	4459	10595	n= 4
	Within		3335	1428	17548	$\bar{T}$=28
Spending on leave and birth grants (per childbirth, US$ PPP)	Overall	12499	5963	1374	25982	N = 105
	Between		2178	9624	14706	n= 4
	Within		5660	-832	23775	$\bar{T}$=26.5
Weeks of paid leave	Overall	65.7	49	18	161	N = 112
	Between		49	30.4	138	n= 4
	Within		24	-36	87	$\bar{T}$=28
Service coverage for children under age 3	Overall	36.5	13.2	18	66	N = 79
	Between		11.1	21.7	48.6	n= 4
	Within		9	7.8	53.8	$\bar{T}$=19.75

Table A2. Effects of interactions across institutions on female labour force participation

	OLS	IV	F-test on instruments (p-value)	OLS with country-specific variables
Spending on leave * spending on family benefits	-0.005 (0.018)	-0.016 (0.055)	2.1 (0.14)	-0.000 (0.000)
Spending on leave * spending on childcare services	0.002 (0.009)	-0.010 (0.033)	5.4 (0.021)	0.000 (0.000)
Spending on leave * weeks of paid leave	-0.000 (0.000)	0.031* (0.017)	215.7 (0.000)	-0.000 (0.000)
Spending on leave * CC enrolment	-0.0575*** (0.013)	-1.503 (5.285)	0.07 (0.79)	-0.001*** (0.000)
Spending on leave * Strictness of employment protection	0.224** (0.098)	2.94 (13.45)	0.04 (0.83)	0.0196*** (0.006)
Spending on leave * Rel. tax rate of 2nd earner	-0.053 (0.049)	0.032 (0.028)	19.2 (0.00)	-0.004 (0.003)
Spending on family benefits * spending on childcare services	-0.006 (0.008)	0.040 (0.062)	1.1 (0.28)	-0.000 (0.000)
Spending on family benefits * weeks of paid leave	-0.0018*** (0.000)	0.139*** (0.028)	24.3 (0.00)	-0.000 (0.000)
Spending on family benefits * CC enrolment	-0.044*** (0.011)	-0.220 (0.192)	1.4 (0.23)	-0.001*** (0.000)
Spending on family benefits * Strictness of employment protection	0.377** (0.145)	0.526 (0.332)	2.1 (0.14)	0.022*** (0.007)
Spending on family benefits * Rel. tax rate of 2nd earner	-0.0421 (0.040)	-0.037 (0.033)	37.3 (0.00)	-0.000 (0.003)
Spending on childcare services * weeks of paid leave	-0.0008** (0.0003)	0.051*** (0.016)	45.5 (0.00)	-0.000** (0.000)
Spending on childcare services * CC enrolment	-0.0197*** (0.0073)	-0.086 (0.057)	3.9 (0.04)	-0.0006** (0.0002)
Spending on childcare services * Strictness of employment protection	0.113*** (0.040)	0.470 (0.748)	0.3 (0.57)	0.005* (0.002)
Spending on childcare services * Rel. tax rate of 2nd earner	-0.0051 (0.025)	0.005 (0.026)	20.9 (0.00)	-0.000 (0.001)
Leave duration * CC enrolment	0.001*** (0.000)	0.176** (0.075)	8.2 (0.00)	0.0002*** (0.0000)
Leave duration * Strictness of employment protection	0.002 (0.001)	-0.197** (0.093)	9.3 (0.00)	0.000 (0.000)
Leave duration * Rel. tax rate of 2nd earner	-0.002** (0.001)	0.185** (0.078)	16.2 (0.00)	-0.0002* (0.0001)
CC enrolment * Strictness of employment protection	0.233*** (0.079)	0.310* (0.186)	6.2 (0.01)	0.011* (0.006)
CC enrolment * Rel. tax rate of 2nd earner	0.086 (0.101)	0.089 (0.073)	2.0 (0.15)	0.006 (0.005)
Epr * Rel. tax rate of 2nd earner	-0.011 (0.286)	0.007 (0.153)	1.1 (0.28)	-0.009 (0.017)
Number of observations	167	167	167	167
R2	0.986	0.999	0.999	0.944

The dependent and independent variables are expressed in log units. Estimates by two-stage least squares with robust heteroskedasticity-consistent standard errors in brackets. ***, ** and * : significant at the 1%, 5% and 10%, respectively.

See Table 1 and Appendix 2 for the definition of variables.

Table A3. Determinants of female labour force participation –additional results

Women aged 25-54, OECD 1980-2007

	Pooles OLS	First diff[1]	CCEP[2]	2SLSC[2]	Mean group[3]
Employment in services	0.006***	0.005***	0.007*	0.003***	0.005***
	(0.001)	(0.000)	(0.003)	(0.000)	(0.001)
Employment in the public sector	-0.079	-0.093	-0.316	0.093	2.60
	(0.121)	(0.187)	(0.511)	(0.136)	(2.05)
Incidence of part-time employment	0.191	0.120**	0.039	0.263***	0.684
	(0.127)	(0.058)	(0.372)	(0.048)	(0.733)
Strictness of employment protection	-0.091***	-0.037*	-0.039	0.008	0.067
	(0.029)	(0.020)	(0.044)	(0.014)	(0.047)
Average years in education	-0.274***	0.516*	1.238*	0.704***	4.395
	(0.055)	(0.266)	(0.563)	(0.120)	(3.463)
Unemployment rate	-0.110***	-0.033***	-0.005	-0.023***	0.028
	(0.021)	(0.012)	(0.043)	(0.006)	(0.051)
Spending on leave and birth grants	0.038**	-0.000	-0.029	0.021**	0.028
	(0.015)	(0.015)	(0.040)	(0.009)	(0.034)
Spending on family benefits	0.115***	0.041*	0.028	0.018*	0.166
	(0.016)	(0.024)	(0.027)	(0.011)	(0.135)
Spending on childcare services	-0.051***	-0.000	0.004	0.007**	0.009
	(0.008)	(0.003)	(0.024)	(0.002)	(0.007)
Weeks of paid leave	0.046***	0.002	-0.020	0.032***	-0.039
	(0.011)	(0.003)	(0.028)	(0.006)	(0.031)
Service coverage for children under age 3	0.132***	0.007	0.012	0.014*	0.035
	(0.010)	(0.006)	(0.017)	(0.008)	(0.084)
Tax rate of second earner	-0.135***	-0.060**	-0.014	0.049**	-0.252
	(0.017)	(0.025)	(0.098)	(0.021)	(0.158)
No. of obs.	167	167	167	144	59
R^2	0.944	0.997	0.990	..	..

The dependent and independent variables are expressed in log. Estimates by two-stage least squares with robust heteroskedasticity-consistent standard errors in brackets. ***, ** and * : significant at 1%, 5% and 10%, respectively.

1) Estimation based on the first-differences in dependent and independent variables.

2) The Common Correlated Effects (Pooled or 2SLS) estimators account for unobserved common factors with heterogeneous factor loadings by using cross-section averages of the dependent and independent variables as additional regressors.

3) The mean group estimates ae obtained by estimating the effect of the independent variables separately for each country and then taking the mean (Pesaran and Smith, 1995).

Country coverage: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, the United Kingdom and the United States.

APPENDIX 2: DEFINITION OF VARIABLES AND DATA SOURCES

Public employment rate:

Public employment is defined as a share of the working-age population (15-64 age group), in %.

Source: OECD, Database on Labour Force Statistics; OECD, Annual Labour Force Statistics.

Aggregate unemployment (employment) rate:

Definition: unemployed (employed) workers as share of the labour force (working-age population), in %. Aggregate rates refer to the 15-64 age group.

Source: OECD, Database on Labour Force Statistics; OECD, Annual Labour Force Statistics.

Employment Protection Legislation (EPL):

The OECD indicators of employment protection measure the procedures and costs involved in dismissing individuals or groups of workers and the procedures involved in hiring workers on fixed-term or temporary work agency contracts. It is important to note that employment protection refers to only one dimension of the complex set of factors that influence labour market flexibility. For more information, see: http://www.oecd.org/employment/emp/oecdindicatorsofemploymentprotection.htm

Number of leave weeks:

Definition: maximum number of leave weeks that can be taken by a mother for the birth of a first child as maternity leave, parental leave, and childcare leave.

Data source: OECD Family database (Indicator PF2.5 Trends in leave entitlements around childbirth).

Public spending for families:

The main data source is the OECD "Social Expenditures Database" (SOCX data).
www.oecd.org/els/social/expenditure

Public spending on family benefits includes financial support that is exclusively for families and children. Spending recorded in other social policy areas such as health and housing also assist families, but not exclusively, and it is not included here. One can estimate separately:

Child-related cash transfers to families with children: this includes child allowances, with payment levels that in some countries vary with the age of the child, and sometimes are income-tested, and income support for sole parents families (in some countries).[15] Public income support payments during periods of parental leave and birth grant are identified separately.

These data do not include tax expenditures (i.e., tax allowances and tax credits for childcare expenses) nor family-related in-work benefits which are counted as part of active labour market programs. In English-speaking countries where this type of expenditures is likely to be more important (e.g. Canada and the United States).

Details for each country available at the address:
http://stats.oecd.org/Index.aspx?datasetcode=SOCX_AGG

Public spending on services for families with children includes, direct financing and subsidizing of providers of childcare and early education facilities, public childcare support through earmarked payments to parents, public spending on assistance for young people and residential facilities, public spending on family services, including centre-based facilities and home help services for families in need.

Enrolment in childcare services:

The enrolment rates presented here for 0 to 2 year olds concern formal childcare arrangements such as group care in childcare centres, registered childminders based in their own homes looking after one or more children and, care provided by a carer at the home of the child.

Data on the participation of very young children (under 3 years) in formal day-care services have been taken from different sources.

Source: OECD Family database www.oecd.org/social/family/database

Relative marginal tax rates on second earners (as in Jaumotte 2004**):**

Definition: ratio of the marginal tax rate on the second earner to the tax wedge for a single-earner couple with two children earning 100% of AW earnings. The marginal tax rate on the second earner is in turn defined as the share of the wife's earnings which goes into paying additional household taxes:

[15] Data on cash transfers for Australia, Ireland, New Zealand and the United Kingdom include spending on categorical income support benefits for sole parent families. Other countries also support sole parent families in need, but through general social assistance type payments.

The tax rate on the second earner is so defined as the share of her earnings which goes into paying additional household taxes and is calculated as follows:

$$\text{Tax second earner} = 1 - \frac{(Household\ net\ Income)_B - (Household\ Net\ Income)_A}{(Household\ Gross\ Income)_B - (Household\ Gross\ Income)_A}$$

where A denotes the situation in which the wife does not earn any income and B denotes the situation in which the wife's gross earnings are a certain percentage of the average wage (AW). Two different tax rates are calculated, depending on whether the wife is assumed to work full-time (X = 67%) or part-time (X = 33%). In all cases it is assumed that the husband earns 100% of AW and that the couple has two children. The difference between gross and net income includes income taxes, employee's social security contribution, and universal cash benefits. Means-tested benefits based on household income are not included (apart from some child benefits that vary with income) due to lack of time-series information. However, such benefits are usually less relevant at levels of household income above 100% of AW.

Source: OECD calculations based on OECD "tax models", *Taxing wages*, OECD Publishing.

Tax incentives to part-time

The incentives to share market work between spouses are measured by the increase in household isposable income between a situation where the husband earns the entire household income (133 per cent of APW), and a situation where husband and wife share earnings (100 per cent and 33 per cent of APW respectively). The couple is assumed to have two children. Denoting the first scenario by A, and the second by B, the calculation is simply:

$$\frac{(Household\ net\ Income)_B - (Household\ Net\ Income)_A}{(Household\ Net\ Income)_A}$$

Source: OECD calculations based on OECD "tax models". *Taxing wages*, OECD Publishing.

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