

LABOUR FORCE PARTICIPATION OF WOMEN: EMPIRICAL EVIDENCE ON THE ROLE OF POLICY AND OTHER DETERMINANTS IN OECD COUNTRIES

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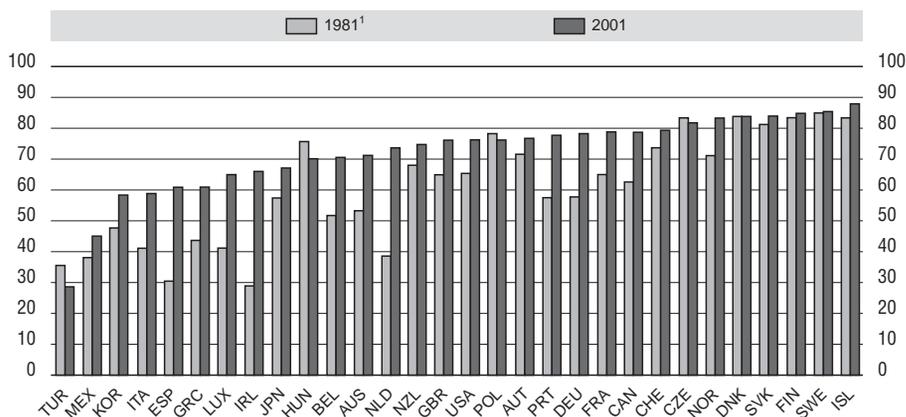
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INTRODUCTION

Female labour force participation has increased strongly in most OECD countries over the last few decades (Figure 1). The timing of the increase has varied across countries, with some countries starting earlier (*e.g.* the Nordics and the United States), and in the last two decades the largest increases have been observed in lower income countries (Greece, Ireland, Italy, Portugal and Spain) as well as in some northern European countries (Belgium, Germany, Luxembourg and the Netherlands). However, large cross-country differences in the levels of female participation persist. Focusing on prime-age women (aged 25-54), their participation rate ranges from values close to or below 60 per cent in Turkey, Korea, Mexico, and southern European countries (with the exception of Portugal) to values well above 80 per cent in the Nordic countries and some eastern European countries. Female labour force participation is the most important factor in explaining increases in

Figure 1. Labour force participation rates of prime-age women (aged 25-54), 1981 and 2001



1. 1983 for Greece and Luxembourg, 1986 for New Zealand, 1988 for Turkey, 1991 for Switzerland, Iceland and Mexico, 1992 for Hungary and Poland, 1993 for the Czech Republic, 1994 for Austria and the Slovak Republic.
Source: OECD Labour Market Statistics.

aggregate participation rates as well as the current cross-country variation of aggregate participation rates (Burniaux *et al.*, 2003).

A high female participation rate is desirable on several grounds. In most countries, preferences for female participation (in particular among couples with young children) are much higher than actual female participation rates. To the extent that female participation remains at a depressed level due to market failures and policy distortions, removing these could lead to a higher level of welfare. The analysis in this paper essentially focuses on identifying such market failures and policy distortions. However, the issue of female participation is also the nexus of concerns about gender equity, poverty, and child well-being. Gender equity and poverty reduction (particularly in the case of marital separation) provide grounds to advocate an increase in female participation. The issues of child development and well-being are more complex. On the whole, the empirical evidence seems to find a beneficial effect of high-quality childcare on the child's development, except for very young children (less than one year old) where negative effects are more commonly found (see Kamerman *et al.*, 2003 for a review of the literature).

More recently, interest in female participation has been grounded in preoccupations about population ageing. The greying of the population will put downward pressure on labour supply, with negative implications for material living standards and public finances. Increasing female participation could partially help resolve this problem (Burniaux *et al.*, 2003). Policies helping women to reconcile work and family life may also be politically more acceptable than policies aimed at maintaining older people longer in work.

This paper assesses the role of various factors in determining the pattern of female participation rates in OECD countries. The main focus of the policy analysis is on married women with children, for whom actual participation is well below preferences. A number of policy instruments are included in the analysis, such as the tax treatment of second earners (relative to single individuals), childcare subsidies, child benefits, paid parental leave, and tax incentives to share market work between spouses. The role of other determinants, such as female education and labour market conditions, is also considered. The originality of the econometric study lies in the broad country coverage (17 OECD countries over the period 1985-1999), in contrast with the single-country focus of most studies. OECD countries present a wide range of policies and experiences in the area of female participation, thereby providing a valuable source of information on the relative effectiveness of various policies. The analysis is based on macroeconomic data which allows estimating the aggregate impact of policy instruments rather than the responsiveness of individuals to microeconomic incentives.¹ One other advantage of the use of macroeconomic data is that the estimated coefficients incorporate to some extent general equilibrium effects (at least those on women themselves).

The results of the empirical analysis can be summarised as follows. Policies which stimulate female participation include a more neutral tax treatment of second earners (relative to single individuals), tax incentives to share market work between spouses, childcare subsidies, and paid parental leave. Contrary to childcare subsidies, child benefits exert a negative impact on female participation, due to an income effect. Childcare subsidies and paid parental leave tend to stimulate full-time rather than part-time participation. The availability of part-time work opportunities also raises participation, at least in countries with a strong female preference for part-time work. Female education, well-functioning labour markets (which translate into low unemployment) and cultural attitudes (captured as part of the fixed effects) remain major determinants of female participation. However, policy simulations illustrate that some of the policy instruments could exert a potentially significant impact on female participation.

The remainder of the paper is organised as follows. After discussing preferences for female participation across countries and over time, the paper reviews factors which depress female participation, and policies to stimulate female participation. The relative role of these factors is assessed using a multivariate econometric analysis and the effects of policy reforms are simulated based on these results. Finally, the paper discusses some considerations for policymaking before concluding.

PREFERENCES FOR FEMALE PARTICIPATION

As a framework for analysing female labour supply, the time allocation model (Becker, 1965) recognises that women not only arbitrate between leisure and labour, but between leisure, labour (supplied in the market in order to buy goods and services) and home production of goods and services. The latter includes caring for their children. Supplying (additional) labour to the market (and earning a wage) is worthwhile as long as the (additional) earnings can purchase more goods and services than required to make up for the lost home production (and possibly also some loss of leisure). Home production is crucial to explain women's weaker attachment to the labour market as, traditionally, home production is often regarded as a better alternative to market production for women than for men. Related to this, the elasticity of female labour supply to the market wage is higher, in particular for married women (*e.g.* Triest, 1990). Children further increase the elasticity of female labour supply to the market wage, as they provide more opportunities for home production. On the other hand, education strengthens the attachment of women to the labour market, by increasing their potential earnings in the labour market. Accordingly, the trend increase in female participation rates has usually been associated with a decline in the proportion of married women or more generally women living in couples, a decline in the number of children per woman,² and an increase in female educational levels, though the direction of causality is uncertain. Other fac-

tors which have contributed to the rise in female participation (more so in earlier years than in the last two decades) include the diffusion of new household technologies which have freed part of women's time for participation in the labour market, and the improvement in working conditions (both in terms of status and work hours).

Preferences for female participation are high in most countries. A survey carried out in EU countries in 1998, which examined the preferences of couples with small children, found that only one in ten couples preferred the traditional male (only) breadwinner model (except in Spain where preferences were somewhat higher) (Table 1). Preferences, however, differ with respect to the extent of participation – full-time or part-time (see next section). Another international survey which is more dated (carried out in 1994) but has wider coverage suggests that the traditional male breadwinner model is the preferred model only in eastern European countries (the Czech Republic, Hungary and Poland); this result is somewhat surprising as during the communist era female labour participation was very high and it also differs from preferences in eastern Germany which are clearly (and much more than in western Germany) in favour of the dual-earner model.³ According to this survey, preferences for female labour participation are highest in Scandinavian countries, but also in North America, and this is also reflected in relatively high actual participation rates.

Large discrepancies remain between actual and preferred employment patterns, pointing to a large potential for increasing female labour participation. Indeed, Table 1 shows that the male breadwinner model is still much more common among couples with young children than seems to be desired. According to the European Labour Force Survey, the percentage of inactive women who would like to work is, on average, 12 per cent in the 19 countries covered by this survey. It is higher for inactive women of prime-working age (18 per cent), for women with middle or higher education levels (15 per cent), and amongst women who do not seek a job because of family responsibilities (21 per cent). The implied increase in the participation rate of women aged 25-54 years if these groups of women were to participate would be 4 percentage points on average. It would be higher in eastern European countries, Italy, the United Kingdom and, to a lesser extent, in Austria and Denmark. These estimates of volitional participation would, however, not suffice for low-participation countries to converge to high-participation countries. In reality, it is likely that the willingness of currently inactive women to work is distorted by a multitude of factors, the most important of which are examined in the next section. Removing some of these barriers may stimulate more activity than is implied by the volitional estimates just discussed.

Table 1. **Actual and preferred employment patterns by full-time and part-time working, 1998**Couples with child under 6
Percentages

| | Man full-time/ woman full-time | Man full-time/ woman part-time | Man full-time/ woman not employed | Other |
|--------------------|-----------------------------------|-----------------------------------|--------------------------------------|-------|
| Finland | | | | |
| Actual | 49.3 | 6.4 | 32.8 | 11.5 |
| Preferred | 80.3 | 8.6 | 10.2 | 0.8 |
| Sweden | | | | |
| Actual | 51.1 | 13.3 | 24.9 | 10.7 |
| Preferred | 66.8 | 22.2 | 6.6 | 4.4 |
| Greece | | | | |
| Actual | 42.2 | 7.9 | 36.1 | 13.8 |
| Preferred | 65.6 | 10.6 | 9.4 | 14.4 |
| Italy | | | | |
| Actual | 34.9 | 11.8 | 43.3 | 10.0 |
| Preferred | 50.4 | 27.7 | 10.7 | 11.2 |
| Portugal | | | | |
| Actual | 74.5 | 4.7 | 18.7 | 2.2 |
| Preferred | 84.4 | 8.0 | 4.0 | 3.6 |
| Spain | | | | |
| Actual | 25.6 | 6.3 | 56.9 | 11.2 |
| Preferred | 59.7 | 11.6 | 19.7 | 9.0 |
| Ireland | | | | |
| Actual | 30.8 | 18.7 | 37.0 | 13.5 |
| Preferred | 31.1 | 42.3 | 8.1 | 18.5 |
| United Kingdom | | | | |
| Actual | 24.9 | 31.9 | 32.8 | 10.4 |
| Preferred | 21.3 | 41.8 | 13.3 | 23.6 |
| Austria | | | | |
| Actual | 19.1 | 28.2 | 48.1 | 4.5 |
| Preferred | 35.6 | 39.9 | 3.9 | 20.7 |
| Germany | | | | |
| Actual | 15.7 | 23.1 | 52.3 | 8.9 |
| Preferred | 32.0 | 42.9 | 5.7 | 19.4 |
| Netherlands | | | | |
| Actual | 4.8 | 54.8 | 33.7 | 6.7 |
| Preferred | 5.6 | 69.9 | 10.7 | 13.8 |
| Belgium | | | | |
| Actual | 46.0 | 19.4 | 27.3 | 7.3 |
| Preferred | 54.8 | 28.8 | 13.4 | 3.0 |
| France | | | | |
| Actual | 38.8 | 14.4 | 38.3 | 8.4 |
| Preferred | 52.4 | 21.9 | 14.1 | 11.7 |
| Luxembourg | | | | |
| Actual | 23.5 | 27.0 | 49.1 | 0.4 |
| Preferred | 27.5 | 29.9 | 12.4 | 30.2 |
| Unweighted average | | | | |
| Actual | 34.4 | 19.1 | 38.0 | 8.5 |
| Preferred | 47.7 | 29.0 | 10.2 | 13.2 |

Source: Based on OECD (2001a). Secretariat calculations on the basis of microdata from the Employment Options of the Future Survey.

POLICIES AFFECTING FEMALE LABOUR FORCE PARTICIPATION⁴

Family taxation

The tax system imposes excessive distortions on the labour supply decisions of married women relative to those of men and single women. Optimal taxation implies that the total deadweight loss of the tax system is reduced if marginal tax rates are lower for those individuals whose labour supply is more elastic and, thus, more sensitive to marginal tax rates (Boskin and Sheshinski, 1983).⁵ The implication would be to tax married women and mothers less than men and single women, since their labour supply is more elastic to tax rates. This may be unrealistic, however, because it conflicts with the principle of equal taxation for equal income. However, in most OECD countries married women are effectively taxed more heavily than men and single women, providing scope for a move to neutrality. The relevant “marginal” tax rate for a married woman’s decision to participate or not in the labour market is the average tax rate on the second-earner’s earnings, defined as the proportion of these earnings that goes into paying increased household taxes. Table 2 compares tax rates on second earners and on single individuals, for earnings levels of 67 per cent and 100 per cent of Average Production Worker earnings (APW).⁶ Only in a few countries (Finland, Greece, Hungary, Korea, Luxembourg, Mexico, Sweden and Turkey) are second earners and single individuals taxed equally. At the other extreme, the Czech Republic, Iceland and Ireland have very high relative tax burdens for second earners. In some countries the difference is bigger for lower income earners. There is ample evidence that high marginal tax rates reduce labour supply⁷ and, as labour supply is more elastic for females than for males, the impact on female labour participation could be significant.

Starting at the beginning of the 1970s, the focus of tax policy in OECD countries has shifted from equal treatment of families toward equal treatment of individuals and more neutrality with respect to individual work incentives, in particular for married women. While most OECD countries applied joint taxation of couples at the beginning of the 1970s, almost all countries now have separate taxation or at least offer the option of separate taxation for couples (OECD, 2001a). However, the tax rate on second earners remains significantly higher than on single individuals, even in countries with separate taxation. To a large extent this is due to the loss of the dependent spouse allowance which still exists in most systems. On the other hand, some countries have introduced a number of family-based tax measures. Smith *et al.* (2003) show for Britain, Denmark, Ireland, and East and West Germany that the tax system – joint, split or separate taxation – as well as the level and progressivity of the tax rates have large effects on the labour supply of married women. Over the past two decades, relative tax rates of second earners declined in mainland Nordic

Table 2. Comparison of tax rates of single persons and second earners, 2000-2001¹

| | Women earning 67 per cent of APW, 2001 | | | Women earning 100 per cent of APW, 2000 | | | Type of taxation system, 1999 ² |
|--------------------|--|--------|----------------------------|---|--------|----------------------------|--|
| | Second earner | Single | Ratio second earner/single | Second earner | Single | Ratio second earner/single | |
| Australia | 27 | 19 | 1.4 | 32 | 23 | 1.4 | Separate |
| Austria | 25 | 22 | 1.1 | 29 | 28 | 1.1 | Separate |
| Belgium | 51 | 34 | 1.5 | 53 | 42 | 1.3 | Separate |
| Canada | 32 | 21 | 1.5 | 36 | 27 | 1.4 | Separate |
| Czech Republic | 40 | 21 | 1.9 | 39 | 23 | 1.7 | Separate |
| Denmark | 50 | 41 | 1.2 | 51 | 44 | 1.2 | Separate |
| Finland | 26 | 26 | 1.0 | 34 | 34 | 1.0 | Separate |
| France | 26 | 21 | 1.2 | 26 | 27 | 1.0 | Joint |
| Germany | 50 | 34 | 1.5 | 53 | 42 | 1.3 | Joint |
| Greece | 16 | 16 | 1.0 | 18 | 18 | 1.0 | Separate |
| Hungary | 29 | 29 | 1.0 | .. | .. | .. | Separate |
| Iceland | 42 | 15 | 2.8 | 42 | 21 | 2.0 | Separate |
| Ireland | 24 | 10 | 2.3 | 31 | 20 | 1.5 | Optional/Joint |
| Italy | 38 | 24 | 1.6 | 39 | 29 | 1.4 | Separate |
| Japan | 18 | 15 | 1.2 | 18 | 16 | 1.1 | Separate |
| Korea | 8 | 8 | 1.1 | 10 | 9 | 1.0 | Separate |
| Luxembourg | 20 | 19 | 1.0 | 28 | 27 | 1.1 | Joint |
| Mexico | -4 | -4 | 1.0 | 3 | 3 | 1.0 | Separate |
| Netherlands | 33 | 27 | 1.2 | 41 | 36 | 1.1 | Separate |
| New Zealand | 23 | 19 | 1.2 | 23 | 19 | 1.2 | Separate |
| Norway | 30 | 26 | 1.2 | 32 | 29 | 1.1 | Optional |
| Poland | 39 | 30 | 1.3 | 37 | 31 | 1.2 | Optional |
| Portugal | 17 | 13 | 1.3 | 20 | 18 | 1.1 | Joint |
| Slovak Republic | 27 | 18 | 1.5 | 35 | 20 | 1.7 | n.a. |
| Spain | 21 | 13 | 1.6 | 23 | 18 | 1.3 | Separate (Joint) |
| Sweden | 30 | 30 | 1.0 | 28 | 33 | 0.9 | Separate |
| Switzerland | 24 | 19 | 1.3 | 26 | 21 | 1.2 | Joint |
| Turkey | 29 | 29 | 1.0 | 29 | 29 | 1.0 | Separate/Joint |
| United Kingdom | 24 | 19 | 1.3 | 26 | 24 | 1.1 | Separate |
| United States | 29 | 22 | 1.3 | 30 | 26 | 1.2 | Optional/Joint |
| Unweighted average | 28 | 21 | 1.4 | 31 | 25 | 1.2 | |

1. The relevant "marginal" tax rate for a married woman's decision to participate or not in the labour market is the average tax rate on the second-earner's earnings, defined as the proportion of these earnings that goes into paying increased household taxes. The husband is assumed to earn 100 per cent of APW and the couple is assumed to have two children. This tax rate is compared with the average tax rate for a single individual with the same gross earnings as the second earner. The tax rates include employee's social security contributions and are netted from universal cash benefits. But they do not include employer's social security contributions, indirect taxes, nor means-tested benefits (except some child benefits that do vary with income). See Appendix I for details.

Table 2. Comparison of tax rates of single persons and second earners, 2000-2001¹ (cont.)

2. This information is taken from OECD (2001a). According to O'Donoghue and Sutherland (1999), while the systems in Greece, Italy, Austria and the Netherlands are best classified as separate taxation systems, they have a significant number of family-based tax measures. It should also be noted that several countries with separate taxation nevertheless give a small amount of extra tax relief in respect of a wife who is non-working, or working very little.

France: The system is a "quotient" system, which includes earnings from children.

Germany: Although spouses have the option of being assessed separately, according to Dingeldey (1998) there is never any financial advantage in doing so.

Norway: In most cases, the individual, but in some cases (spouse with no earned income or low income) optional taxation as a couple is more favourable.

Poland: "Splitting" system used, so joint taxation will normally be more advantageous.

Spain: According to Dingeldey (1998), although couples can opt for joint taxation, this is only advantageous for couples with a very low primary income and a minimal second income.

Turkey: Independent assessment unless one of them earns more than TL 2.25 billion, in which case it is joint.

United Kingdom: Married couples tax relief abolished in 2000.

United States: Married couples generally benefit if they opt for a joint return.

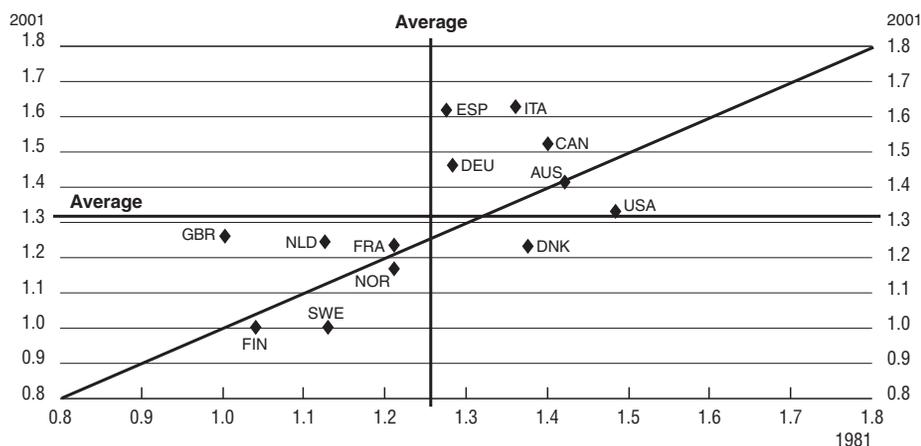
Source: OECD database "Taxing Wages"; OECD *Tax Models*; OECD (2001a).

countries and the United States, while they increased significantly in some other countries (Figure 2).

Note that the average rate of taxation of the household (as opposed to the second earner) has an income effect on the participation of the second earner. Thus, a low household average tax rate leads to a lower participation of the second earner (see for example Smith *et al.*, 2003).

Figure 2. Evolution of the relative tax rate of second earners and single persons, 1981-2001

Ratio of average tax rates at earnings of 67 per cent of APW¹



1. See notes to Table 2.

Source: OECD database "Taxing Wages"; *The OECD Jobs Study: Taxation, Employment and Unemployment*, (OECD, 1995).

Childcare subsidies⁸ and child benefits

A number of arguments have been used to justify childcare subsidies, in particular in cases where the tax and benefit system discourages the female labour supply, when a compressed wage structure limits the supply of affordable childcare, or when there are imperfections in credit markets. In the first instance, childcare subsidies help reduce the effective tax burden on mothers (see for example Krashinsky, 1981). In the second case, the distortion arises from an excessive compression of the wage structure (*i.e.* beyond the distribution of marginal productivities), which raises the wages of carers (who tend to be concentrated at the bottom of the wage distribution) relative to those of mothers and thereby reduces access of mothers to childcare (wages are the main component of childcare costs). Depending on the specific circumstances, it may not be possible or desirable to remove the cause of wage compression, and childcare subsidies may be seen as a partial fix.⁹ The case that imperfections in the credit market justify subsidised childcare is limited to low-income families. Credit market imperfections (such as adverse selection and moral hazard) may prevent women in low-income families from borrowing against future earnings to finance childcare and break away from welfare dependence (Walker, 1996). The implicit assumption is that employment facilitates the accumulation of human capital and work experience which will generate future earnings sufficiently high to repay the initial loan. Thus, childcare subsidies could be expected to result in lower future welfare spending (Robins, 1991).¹⁰ Other justifications for childcare which are beyond the scope of this paper include child development and social integration, as well as gender equity.

The empirical evidence shows that childcare subsidies do increase female labour supply, though in some instances their effectiveness is reduced as, for example, women substitute formal for informal childcare (see Box 1). Another form of government support for families with children is child benefits, which are essentially lump-sum transfers for the maintenance of children. While childcare subsidies reduce the relative price of formal childcare and, therefore, increase the relative return of market work, child benefits only have an income effect and may just lead to a reduction in labour supply.¹¹ Thus, although they may be justified on grounds of horizontal equity across different family types and reducing child poverty, child benefits are less desirable than childcare subsidies from the angle of raising female participation.

The size of government childcare support and the kind which is provided differ across countries. On average, OECD countries (for which data are available) spent 0.7 per cent of GDP on formal day care and pre-primary education in 1999 (Table 3). This spending is highest in mainland Nordic countries, where it amounts to between 1.5 to 2.7 per cent of GDP; these countries have increased their spending significantly since the mid-1980s. Spending per child¹² is lowest in Australia, Korea,

Box 1. Empirical evidence on the effectiveness of childcare subsidies in raising female labour supply

A number of micro-econometric studies, in particular for the United States, find a negative elasticity of female labour force participation (or employment) to childcare costs.¹ Gelbach (2002), for example, finds large positive effects of access to free public kindergartens on the employment probability of single mothers in the United States. Chevalier and Viitanen (2002) find that the availability of formal childcare increases female labour force participation in the United Kingdom.

However, there are different views about the size of the effects of childcare support on female labour participation or employment. For example, the estimated elasticity of female labour supply to childcare cost ranges for the United States between 0.06 to -1.24, depending on the underlying model and the measure of childcare cost. Blau (2000) and Anderson and Levine (2000) argue that the more plausible values are relatively low, of the order of -0.1/-0.2 up to a maximum of -0.4. There is also some evidence that the childcare cost elasticity differs with the level of education and income, and may be higher for low-income/less skilled mothers.

The effectiveness of childcare support is, however, reduced by two types of substitution effects. First, public provision of childcare partly substitutes for private expenditure, to the extent that working mothers previously bought private childcare services. Second, childcare subsidies may encourage working mothers to switch from unpaid and informal childcare arrangements to paid and formal childcare. Blau and Hagy (1998) find that full subsidiation of all non-parental care would induce a 10 per cent increase in mothers' employment, but a 19 per cent increase in the use of paid childcare arrangements.² Michalopoulos *et al.* (1992) also find that an increase in childcare subsidies stimulates labour supply, but considerably less so than childcare expenditures. They conclude that the primary beneficiaries of more generous subsidies are current users of high-quality free care who are induced to purchase slightly higher-quality market care.

Another important issue is that of causality between female participation and childcare support for families. Chevalier and Viitanen (2002) for example test for "Granger causality", and find that while childcare "Granger-causes" female participation in the United Kingdom, the reverse does not hold. Gelbach (2002) provides for the United States strong evidence of causality from childcare support to female participation. However, for some countries, the sequencing of labour supply changes and policy changes over time seems to point to some reverse causation, from strong female full-time participation to strong pro-full-time paid work institutions (*e.g.* Denmark).

1. See for example Anderson and Levine (2000) and Blau (2000) for a review of studies on the United States; Gustafsson and Stafford (1992) for Sweden; Del Boca (2002) for Italy.

2. The probability of choosing family day care would increase by 23 per cent, centre care by 12 per cent, and other forms of non-parental care would decrease by 2 per cent.

Table 3. Childcare support, child benefits, and paid maternity leave

| | Public expenditures on formal day care and pre-primary education, 1999 ¹ | | Child benefits, 2001 | Maternity, parental, and childcare leave, 1999 | | |
|--------------------------|--|----------------------|-------------------------|---|------------------------------|-------|
| | In 1995 PPP-US\$ per child ² | As a per cent of GDP | | Percentage increase in disposable income between families with 2 children and without children ³ | Maximum number of weeks | |
| | | Total | Total | | Of which: formal day care | Total |
| Australia | 874 | 0.2 | 0.2 | 4 | 52 | 0 |
| Austria | 3 251 | 0.9 | 0.4 | 18 | 86 | 38 |
| Belgium | 1 900 | 0.5 | 0.1 | 15 | 67 | 31 |
| Canada ⁵ | 1 294 | 0.3 | 0.1 | 4 | 27 | 14 |
| Czech Republic | 1 507 | 0.5 | 0.0 | 12 | 214 | .. |
| Denmark | 8 009 | 2.7 | 1.7 | 8 | 54 | 42 |
| Finland | 4 186 | 1.5 | 1.2 | 9 | 164 | 55 |
| France ⁶ | 4 009 | 1.3 | 0.7 | 9 | 162 | 73 |
| Germany | 3 084 | 0.8 | 0.4 | 12 | 162 | 38 |
| Greece | .. | .. | 0.4 | 1 | 29 | 8 |
| Hungary | .. | .. | .. | 21 | 160 | 58 |
| Iceland | 3 408 | 1.1 | 0.8 | 7 | .. | .. |
| Ireland ⁶ | 1 430 | 0.5 | 0.2 | 5 | 28 | 10 |
| Italy | .. | .. | .. | 5 | 65 | 30 |
| Japan ⁷ | 1 252 | 0.3 | 0.2 | 2 | 58 | 8 |
| Korea | 144 | 0.1 | 0.0 | 0 | 61 | .. |
| Luxembourg | .. | .. | .. | 17 | 42 | 32 |
| Mexico | 612 | 0.5 | 0.1 | 0 | 12 | 12 |
| Netherlands ⁸ | 2 025 | 0.6 | 0.2 | 8 | 29 | 16 |
| New Zealand ⁹ | 672 | 0.3 | 0.1 | 0 | 52 | 0 |
| Norway | 6 085 | 1.6 | 0.8 | 8 | 116 | .. |
| Poland | .. | .. | .. | 4 | 122 | 35 |
| Portugal | 1 289 | 0.5 | 0.2 | 7 | 121 | 17 |
| Slovak Republic | 1 110 | 0.6 | 0.1 | 10 | 162 | 59 |
| Spain ⁶ | 1 234 | 0.4 | 0.1 | 2 | 164 | 16 |
| Sweden | 5 530 | 1.9 | 1.3 | 10 | 85 | 40 |
| Switzerland | 919 | 0.3 | 0.1 | 10 | 16 | .. |
| Turkey | 72 | 0.0 | 0.0 | 0 | 12 | 8 |

Table 3. **Childcare support, child benefits, and paid maternity leave** (*cont.*)

| | Public expenditures on formal day care and pre-primary education, 1999 ¹ | | | Child benefits, 2001 | Maternity, parental, and childcare leave, 1999 | |
|--------------------|---|----------------------|-------|---|--|-------|
| | In 1995 PPP-US\$ per child ² | As a per cent of GDP | | Percentage increase in disposable income between families with 2 children and without children ³ | Maximum number of weeks | |
| | | Total | Total | | Of which: formal day care | Total |
| United Kingdom | 1 850 | 0.5 | 0.1 | 9 | 31 | 8 |
| United States | 1 803 | 0.5 | 0.1 | 7 | 12 | 0 |
| Unweighted average | 2 302 | 0.7 | 0.4 | 7.5 | 81.5 | 26.0 |

1. Public expenditures on formal day care do not include tax expenditures (*i.e.* tax allowances and tax credits) unless they are refundable.

2. Children between 0 and the age of admission to primary school.

3. The husband is assumed to earn 100 per cent of APW, and the wife 33 per cent of APW.

4. The number of paid leave weeks is calculated by weighting the various leave weeks by the corresponding income replacement rate. The latter is the statutory replacement rate and does not take into account means-tests or private negotiated arrangements that top up legislated provisions. Only the national legislation is used. Leave reserved for the father is not included.

5. Legislation introduced in 2001 increases the duration of parental leave from 10 to 35 weeks.

6. Public expenditures on formal day care and pre-primary education refer to 1998.

7. Formal day care expenditures are for 2002.

8. Formal day care expenditures are for 2001.

9. Recent legislation introduced a paid parental leave of 12 weeks with full pay up to a cap corresponding approximately to the minimum wage.

Source: For public expenditures on childcare (*i.e.* formal day care and pre-primary school): OECD Education database; OECD social expenditures database; Eurostat; various sources (see Appendix I for details). For child benefits: OECD database "Taxing Wages". For parental leave: Gauthier and Bortnik (2001) and "Social Security Programs Throughout the World" from the United States Social Security Administration (see Appendix I for details).

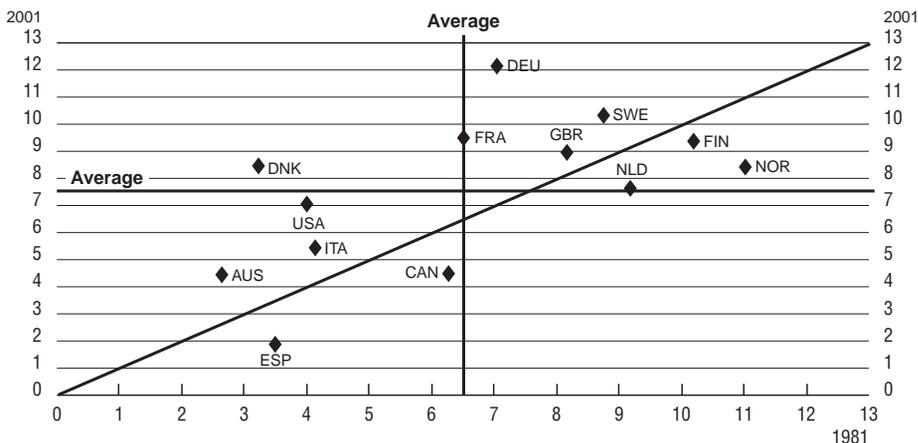
Mexico, New Zealand, the Slovak Republic, Switzerland and Turkey. However, the need for childcare subsidies may be less in some of these countries due to relatively small distortions arising from the tax system or from policies that compress the wage structure.

Child benefits (including tax allowances) increase the disposable income of families with two children on average (for countries where data are available) by 7.5 per cent. In a number of countries this increase amounts to between 10 and 20 per cent and some of these countries have significantly increased spending on child benefits over the past decades (Table 3 and Figure 3). By contrast, child benefits are very low in some countries which also have relatively low public childcare spending (Greece, Japan, Korea, Mexico, New Zealand, Spain and Turkey).

Governments also support families by granting tax allowances for private childcare expenses. However, comparable data on tax expenditures for childcare are not available for most countries and are therefore not included in Table 3. These expenditures are a more important component of childcare support in English-speaking countries. However, even in the United States and Canada, for which data are available, they only account for about 10 per cent of total public spending on childcare (including pre-primary school).

Figure 3. **Evolution of child benefits, 1981-2001**

Per cent increase in disposable income between families with two children and without children¹



1. The husband is assumed to earn 100 per cent of APW and the wife 33 per cent of APW.

Source: OECD database "Taxing Wages"; *The OECD Jobs Study: Taxation, Employment and Unemployment* (OECD 1995).

Parental leave

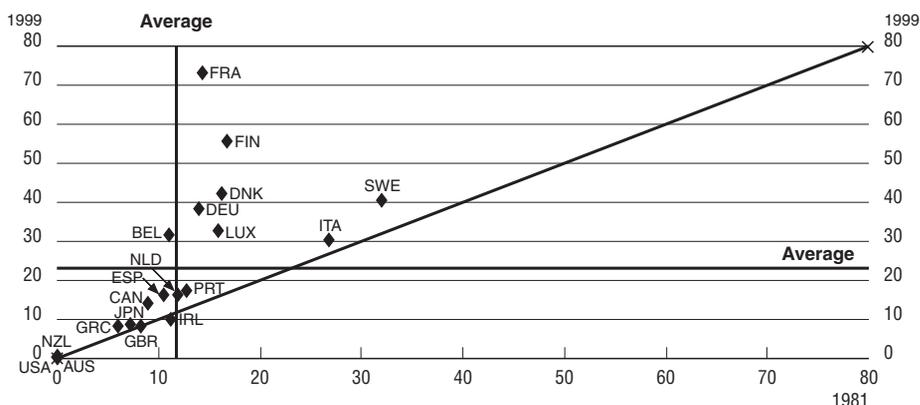
Another form of childcare support most governments provide to parents is maternity leave, parental leave, and childcare leave. These leaves boost female participation by helping women to reconcile work and family life. The job security dimension also strengthens the continuity of their attachment to the labour market, though negative effects on hiring cannot be excluded. Ruhm (1998) finds evidence that paid parental leave increased employment rates in the nine OECD countries covered by his study.¹³ However, taking parental leave for an extended period may also deteriorate labour market skills, and damage future career paths and earnings (Edin and Gustavsson, 2001). There is some evidence that very long parental leaves make it more difficult for women to return to the labour market (*e.g.* Ondrich *et al.* 1998). The problem is more acute when the parental leave is not accompanied by a job-guarantee, and the mothers are low-skilled. Ruhm (1998) and OECD (2002a) also find evidence that extended parental leaves have a negative impact on the salary of returning mothers. A recent Danish study, however, reports a (progressive) catch-up of mothers' salary to those of childless women, as they compensate for their lack of human capital accumulation (Gupta and Smith, 2002).

Table 3 reports the maximum number of paid leave weeks to which a mother is entitled, calculated as the maximum number of leave weeks multiplied by the income replacement rate. The latter is the statutory replacement rate and does not take into account means-tests or private negotiated arrangements that top up legislated provisions. Only national legislation is used. Leave reserved for the father is not included. In 1999, the average length of paid leave was 26 weeks. There was no paid leave entitlement in Australia, the United States, and New Zealand (New Zealand recently introduced paid leave). Paid leave was also relatively short (less than three months) in the United Kingdom, Ireland, Japan, Greece, Turkey, and Mexico. The longest paid leave is found in France, the Slovak Republic, and the mainland Nordic countries. Figure 4 shows the evolution of paid parental leave between 1981 and 1999. The generosity of paid parental leave has increased in all countries, with the exceptions of the United Kingdom and Ireland.

Flexibility of working-time arrangements

In OECD countries about one-quarter of female workers at age 25-54 have part-time jobs. Countries where this share is high include the Netherlands (54 per cent), Australia, Japan, Switzerland and the United Kingdom (between almost 40 and almost 50 per cent). The countries with the least women in part-time jobs are those in eastern Europe, Finland, Korea and Portugal (Table 4). While average proportions of part-time work barely changed over the past two decades, it declined signifi-

Figure 4. Evolution of paid parental leave, 1981-1999
 Maximum leave weeks weighted by corresponding income replacement rate¹



1. Leaves considered are maternity, parental and childcare leaves. The number of paid leave weeks is calculated by weighting the various leave weeks by the corresponding income replacement rate. The latter is the statutory replacement rate and does not take into account mean-tests or private negotiated arrangements that top up legislated provisions. Only national legislation is used. Leave reserved for the father is not included.
 Source: Gauthier and Bortnik (2001) and "Social Security Programs Throughout the World" from the United States Social Security Administration.

cantly in Scandinavian countries (as women moved to full-time jobs) and increased most in some other European countries and in Japan (Figure 5).

Part-time working is often seen as a means to facilitate the integration of women in the labour market, by allowing them to combine market work with family responsibilities. According to the 2001 European Labour Force Survey, the percentage of women who work part-time because of family responsibilities (which include childcare and care for elderly family members) is quite high (above 40 per cent) in a number of countries (namely Austria, Germany, Switzerland and the United Kingdom). The possibility of finding a part-time job may be crucial to participation under such circumstances. One indication of this is that even in a country like the Netherlands, where part-time working is fairly common, Euwals (2001) finds that the flexibility of working hours is low,¹⁴ and women who want to work substantially fewer hours have a higher propensity to leave the labour market.

Preferences for part-time work, however, differ across countries. The previously mentioned EU survey, which examined the preferences of couples with small children, found that part-time participation is the most frequently preferred working arrangement for women in Austria, Germany, Ireland, the Netherlands and the United Kingdom (Table 1). Preferences for part-time work are lower in some Nordic

Table 4. Female part-time incidence (age 25-54) and tax incentives to share market work within the couple, 1999

| | Percentage of employed women aged 25-54 in part-time jobs ¹ | Increase in household disposable income when earnings are split 100/33 instead of 133/0 ² |
|----------------------------|--|--|
| Australia ^{3, 4} | 38.3 | 5.8 |
| Austria | 26.2 | 6.4 |
| Belgium | 37.1 | 1.9 |
| Canada | 22.3 | 4.8 |
| Czech Republic | 4.0 | 0.9 |
| Denmark | 15.1 | 2.8 |
| Finland | 9.5 | 10.6 |
| France | 23.5 | -0.3 |
| Germany | 34.3 | 0.5 |
| Greece | 13.3 | 4.8 |
| Hungary | 4.4 | 6.0 |
| Iceland | 31.3 | 1.9 |
| Ireland | 32.1 | 3.2 |
| Italy | 23.8 | 6.3 |
| Japan ^{3, 5} | 39.2 | -0.1 |
| Korea ³ | 9.2 | 1.8 |
| Luxembourg | 29.2 | 2.8 |
| Mexico | 27.0 | 11.0 |
| Netherlands ⁶ | 54.3 | -1.1 |
| New Zealand | 34.1 | 4.6 |
| Norway | 30.7 | 3.7 |
| Poland ³ | 16.5 | 0.9 |
| Portugal | 11.1 | 2.8 |
| Slovak Republic | 2.7 | .. |
| Spain | 15.7 | -0.3 |
| Sweden | 19.0 | 6.8 |
| Switzerland ⁴ | 47.4 | 1.9 |
| Turkey | 14.5 | -1.5 |
| United Kingdom | 38.6 | 8.1 |
| United States ⁷ | 13.0 | 0.0 |
| Unweighted average | 23.9 | 3.3 |

1. Part-time employment refers to persons who usually work less than 30 hours per week in their main job. Data include only persons declaring usual hours.

2. 100/33 refers to a situation where the husband earns 100 per cent of APW and the wife 33 per cent of APW; 133/0 refers to a situation where the husband earns 133 per cent of APW and the wife has no earnings.

3. Part-time data are based on actual hours worked. For Poland until 2000 only.

4. Part-time employment based on hours worked at all jobs.

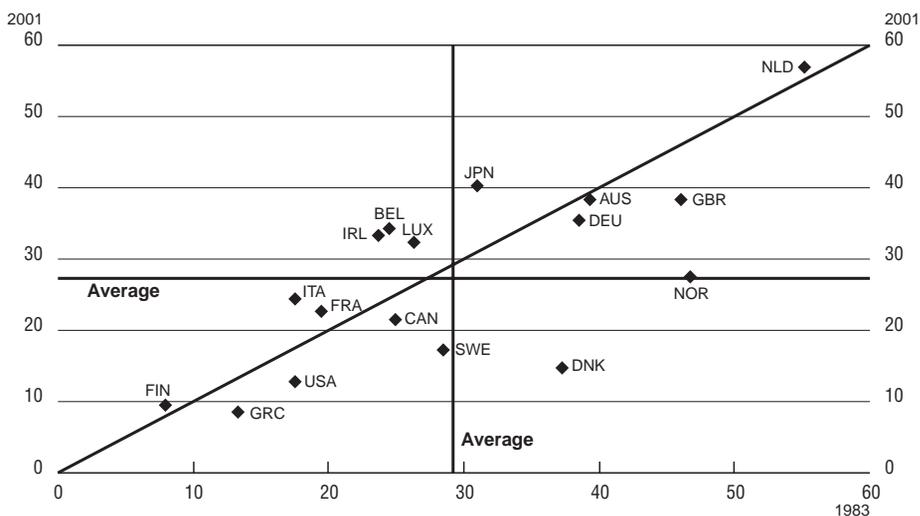
5. Part-time employment is defined as less than 35 hours per week.

6. If account is taken that the husband has to buy private health insurance when he earns 133 per cent of APW, while his income falls below the income limit for the mandatory health care insurance when the household income is split (into a wage of 100 per cent of APW for the husband and 33 per cent for the wife), the tax incentive to share market work between spouses amounted to 6.9 per cent in 1999, and to 10.2 per cent after the 2001 tax reform.

7. The share of part-time in employment is for wage and salary workers only.

Source: OECD Labour Market Statistics; OECD database "Taxing Wages"; OECD Tax Models.

Figure 5. Evolution of the female part-time incidence, 1983-2001
 Proportion of employed women aged 25-54 who are in part-time jobs¹



1. See notes to Table 4.
 Source: OECD Labour Market Statistics.

countries (Finland, Sweden), southern European countries (Greece, Italy, Portugal and Spain), and in some western European countries (Belgium, France). Preferences for part-time are well above the current level of part-time in some countries, notably Germany, Ireland, Italy and the Netherlands, and to a lesser extent Austria, Belgium, Sweden and the United Kingdom. In these countries, an increase in part-time work opportunities would most likely raise female participation.

Box 2 reviews the determinants of the supply of and demand for female part-time work. Tax incentives to share market work between spouses may have a substantial impact on the female supply of part-time labour. Table 4 shows the increase in household disposable income which results from sharing market work. In the first situation, the husband earns 133 per cent of APW and the wife does not participate in the labour market while in the second situation, the husband earns only 100 per cent of APW and his wife earns the remaining 33 per cent, most likely by taking a part-time job.¹⁵ The resulting increase in household disposable income was only 3 per cent on average across OECD countries in 1999. However, it was close to 10 per cent in Finland, Mexico and the United Kingdom. The tax incentives to share market work between spouses reflect the type of household taxation (joint or individual), the dependent spouse allowance, and the degree of progressivity in the tax schedule.

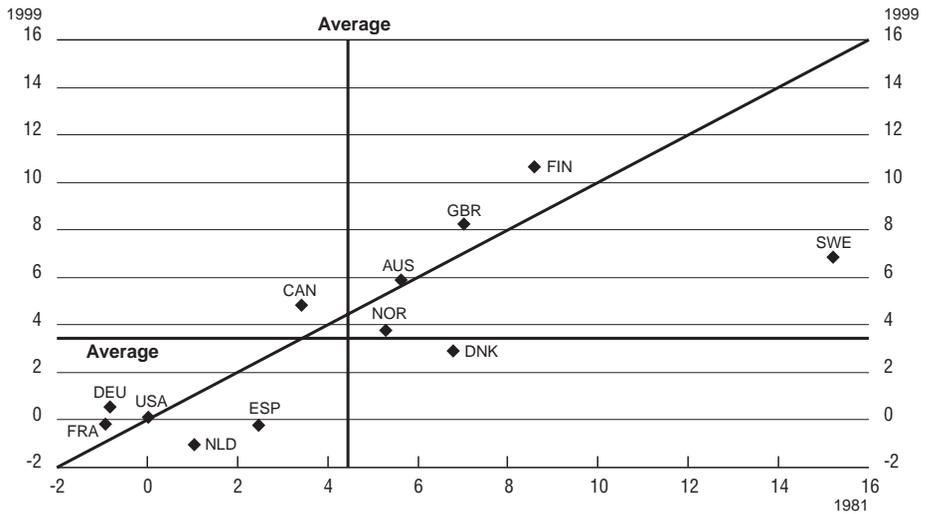
Box 2. Determinants of the supply of and demand for female part-time labour

The supply of part-time labour by women is, to a large extent, driven by gender roles and women's education level. Thus, a part-time job is usually preferred over a full-time one by married women, mothers of young children, and wealthy women (high husband's income), but tends to be less preferred by more educated women. For example, Falzone (2000) finds that the number and younger ages of children, and the husband's income, increase the probability that a married woman works part-time rather than full-time. Policy variables also influence the supply of part-time labour. Tax incentives to split income – and thus work hours – between spouses can influence the choice of married women between inactivity and part-time participation (OECD, 1990). On the other hand, the availability of affordable childcare and parental leave can affect both the choice between inactivity and activity, and the choice between part-time and full-time participation. For Canada, Powell (1998) finds that childcare subsidies stimulate both part-time and full-time employment, but more so full-time employment. The respective elasticities of full-time and part-time female employment to childcare costs are -0.71 and -0.21 . Gustafsson and Stafford (1992) also find a very large elasticity (-1.88) of full-time employment, compared with elasticities of employment (including both part-time and full-time) typically found in the literature.

Demand for part-time workers by firms can arise from at least three motives. First, in the optimal staffing model, part-time jobs enable firms to better match labour to a changing workload. This model is particularly relevant for some segments of the service sector, where demand peaks at certain times of the day. In the secondary labour market model, firms create part-time positions to get cheaper and/or more flexible labour. This model applies when earnings and benefits are lower for part-time (even on a pro rata basis) and/or when full-time contracts benefit from high employment protection legislation. Finally, in the responsive firm model, firms create part-time jobs because their labour needs would otherwise remain unmet, particularly in female-dominated sectors, or because they wish to retain productive female workers who are temporarily facing family responsibilities. This model is more likely to apply when the female labour supply is low relative to the demand from firms. Firms then offer better working conditions for women in order to attract and/or retain more qualified and productive female workers.

Tijdens (2002) uses proxies for the gender-roles model and each of the three demand models (optimal staffing, secondary labour market, and responsive firm) to test their respective predictive power for the probability that a woman works part-time in the European Union. The gender-roles model and the responsive firm model rank first and second, respectively. Tijdens also finds some evidence of the secondary labour market model in Austria, France, Great Britain, Ireland, and eastern Germany. His findings should be taken with caution, however, as his proxies of the secondary labour market model do not include direct earnings or social security coverage data. He uses instead indicators on the existence of a basic fixed salary or wage and extra pay compensation for overtime or for unsocial hours.

Figure 6. **Evolution of the tax incentives for female part-time work, 1981-2000**
 Increase in household disposable income when household earnings are split
 100/33 instead of 133/0^{1,2}



1. 100/33 refers to a situation where the husband earns 100 per cent of APW and the wife 33 per cent of APW; 133/0 refers to a situation where the husband earns 133 per cent of APW and the wife has no earnings.
2. For the Netherlands, if account is taken that the husband has to buy private health insurance when he earns 133 per cent of APW, while his income falls below the income limit for the mandatory health care insurance when the household income is split (into a wage of 100 per cent of APW for the husband and 33 per cent for the wife), the tax incentive to share market work between spouses amounted to 6.9 per cent in 1999, and to 10.2 per cent after the 2001 tax reform.

Source: OECD database "Taxing Wages"; *The OECD Jobs Study: Taxation, Employment and Unemployment* (OECD, 1995); *OECD Tax Models*.

These part-time incentives declined over the past two decades in Scandinavian countries and Spain, while they increased slightly in Canada, Finland, France, Germany and the United Kingdom (Figure 6).

Anti-discrimination laws

Gender discrimination in pay and promotion opportunities reduces the return to female market work and tends to depress female labour supply. Irrefutable empirical evidence on the existence of gender discrimination is difficult to obtain, because theoretically gender differences in pay and promotion could result from gender differences in unobserved characteristics (OECD, 2002b). It has also been argued that women may be under-represented at higher job levels because they

voluntarily choose jobs that offer fewer opportunities for promotion, and not because of discrimination. However, it is equally impossible to demonstrate that there is no discrimination against women.

Most countries have introduced gender-specific anti-discrimination laws. These have been relatively effective in lowering the gender pay gap (*e.g.* Australia, the United Kingdom and the United States), and more rapidly so in countries that had more centralised wage bargaining structures at the time of introduction of the law (*e.g.* Australia and the United Kingdom, as opposed to the United States). The higher wages stimulate female participation, but the evidence on employment effects is mixed. Research on comparable worth policies in Australia, and for government employees in some US states, finds evidence of some modest employment losses. On the other hand, Manning (1996) finds no employment losses for women, despite substantial gains in relative wages due to the introduction of the UK's Equal Pay Act of 1970 and the Sex Discrimination Act of 1975.

Even in the absence of anti-discrimination laws, Blau and Kahn (1996) find that centralised wage-setting institutions greatly lower the gender pay gap (in addition to lowering the pay differentials along other dimensions). Minimum wage laws also improve the relative pay of women because a relatively high percentage of women are at the bottom of the wage distribution. The evidence shows limited employment effects of such institutions and policies. For example, Bertola, Blau, and Kahn (2002) find no effect of a larger role for unions (and higher relative earnings for women) on male-female employment differentials, although female unemployment rises relative to male unemployment due to an increase in female participation. Minimum wage laws also had little effect on employment, except in France, the Netherlands, and Spain (Blau and Kahn, 1999). These findings suggest that minimum wages have generally been set at sufficiently modest levels to have only small effects on female employment.

Other policies

Female participation may also be affected by other policies, albeit indirectly in some cases. First, labour market policies affect the participation decision of women through their impact on the unemployment rate. On the one hand, a high female unemployment rate tends to discourage female participation. On the other hand, a high male unemployment rate may stimulate female participation, as women join the labour market in order to compensate for the loss of family revenue due to their husband's unemployment. This is the so-called "added worker" effect.

High welfare and other income support payments relative to wages tend to discourage employment and activity, in particular of low-skilled people who have low potential earnings. In some countries, single mothers are particularly affected due to the fact that a large fraction of them are low-skilled. Evidence has been found that

make-work-pay schemes (such as the Earned Income Tax Credit in the United States) significantly increase the activity rate of low-income people in general, and of single mothers in particular (see for example Meyer and Rosenbaum, 2000 and 2001).¹⁶ Other key issues include job search obligations (in particular the age of the youngest child at which single mothers are required to look for work), and access to labour market programmes. Recently, labour market programmes for “mother returners” (not exclusively single mothers) have been introduced in some countries (*e.g.* Australia) to help women who have been out of the workforce for a long period of time while caring for their children to return to employment (OECD, 2002a).

Excessive regulations of the service market can hamper female participation in several ways. First, excessive regulation will tend to restrict the supply and drive up the prices of services such as childcare and household services. Restricted opening hours of shops also make it difficult for women to reconcile work and family life. Finally, by hindering the development of the service sector, excessive regulations of the service market may limit the creation of employment opportunities for women, who tend to be predominantly employed in the service sector. Pissarides *et al.* (2003) find evidence that product market regulation (measured as the administrative cost of set-up) has a strong negative impact on the growth of female employment.

The supply of affordable childcare may also be affected by immigration policies, as female immigrants from poorer countries seem to constitute an important pool of potential carers in some countries. Grandparents are another source of cheap childcare. Thus, population ageing may increase the supply of affordable childcare, although an increase in the retirement age would tend to decrease it. The rising share of older people may also create more caring responsibilities for women. In some countries (*e.g.* Ireland) a rapid increase in maternal labour supply was permitted by the existence of a large stock of informal carers, which resulted from initially low female participation. However, there is a dynamics at work, in that the very same increase in maternal labour supply reduces the available stock of informal carers for future cohorts.

Finally, short school hours in some countries make it difficult for mothers to take on full-time jobs. Recent surveys (OECD, 2002a) have identified this factor as a major constraint on passing from part-time to full-time work.

Participation and fertility

There could be a concern that raising female participation will reduce fertility as, historically, these two variables have been negatively correlated over time. However, the cross-sectional evidence and recent time-series evidence for some countries do not support such concerns and point to the role of work-family reconciliation policies in avoiding this trade-off. Despite high female participation rates, Nordic countries are characterised by a high number of children relative to the OECD

average, while southern European countries have both low female participation rates and low fertility. Policies which help women reconcile work and family may actually stimulate both participation and fertility (see Sleebos, 2003 for a review of the literature), providing an additional channel to reduce the future burden on younger generations of financing a growing number of retirees. On the one hand, such policies enable women who previously stayed at home to take care of their children to combine family life with participation in the labour market. On the other hand, women who had previously chosen to reduce their family size to participate in the labour market can now have more children.

Characterisation of the general environment for female participation

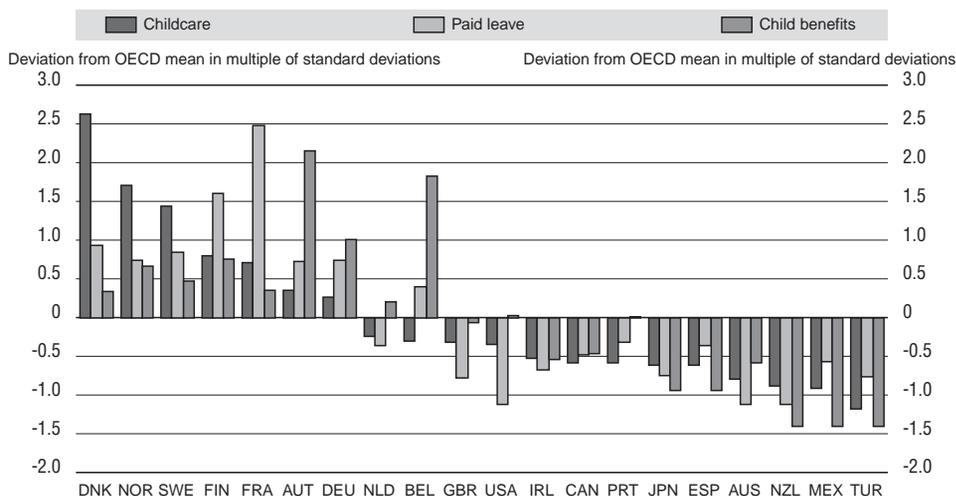
While the preceding sub-sections have described individual policies, this sub-section takes an overall view and attempts to characterise the general environment for female participation. This broad classification is based on the level of child support (public childcare spending per child, paid parental leave, and child benefits), the incidence of female part-time work, and to a lesser extent the tax treatment of second earners. With some exceptions, countries tend to fall into three groups:¹⁷

- Mainland Nordic countries, Austria, and France: these countries feature a relatively favourable tax treatment of second earners, reinforced by a high level of child support, but relatively low part-time work (with the exception of Norway). These countries thus promote a model of full-time female participation through generous child support. They also have high participation rates of prime-age women, close to or higher than 80 per cent.
- Other northern European countries and Pacific countries (Australia, Japan, and New Zealand): these countries are characterised by a high prevalence of part-time work and a relatively low level of child support (with the exception of Germany and, to a lesser extent, Belgium). The tax treatment of second earners does not show a clear pattern in this group: it is in general close to average with the exception of the United Kingdom, where it is quite favourable. Female participation rates range from close to 80 per cent in Switzerland and Germany to about 65 per cent in Ireland and Japan.
- The United States, Canada, and lower income countries (the Czech Republic, Korea, Mexico, Portugal, Spain and Turkey): despite being at opposite ends of the wealth spectrum, these countries share the features of a low level of child support and low part-time incidence. However, their female participation rates fluctuate tremendously, ranging from very high levels in the Czech Republic, Canada, Portugal, and the United States (close to 80 per cent) to very low levels in Korea, Mexico, Spain and Turkey (60 per cent and below), despite a favourable tax treatment of second earners in some of the latter countries.

It is also interesting to examine how countries differ in the way they allocate child support, through public childcare spending, child benefits, and paid parental leave (Figure 7). Although these three policies might be seen as substitutes, countries that do more of one seem to do more of all. Thus, these policies are highly positively correlated. Even so, public childcare spending appears to be a relatively more important component of child support in Denmark, Japan, New Zealand, Norway and Sweden. Paid parental leave is relatively more important in Finland, France, Mexico, Spain and Turkey. Finally, child benefits are more important in Australia, Austria, Belgium, Germany, the Netherlands, Portugal, the United Kingdom and the United States.

Except for public childcare spending, there is little evidence of simple correlation between the participation of prime-age women and the main determinants of female participation examined in this section (Figure 8). In several instances, the sign of the simple correlation is contrary to what theory predicts. However, such

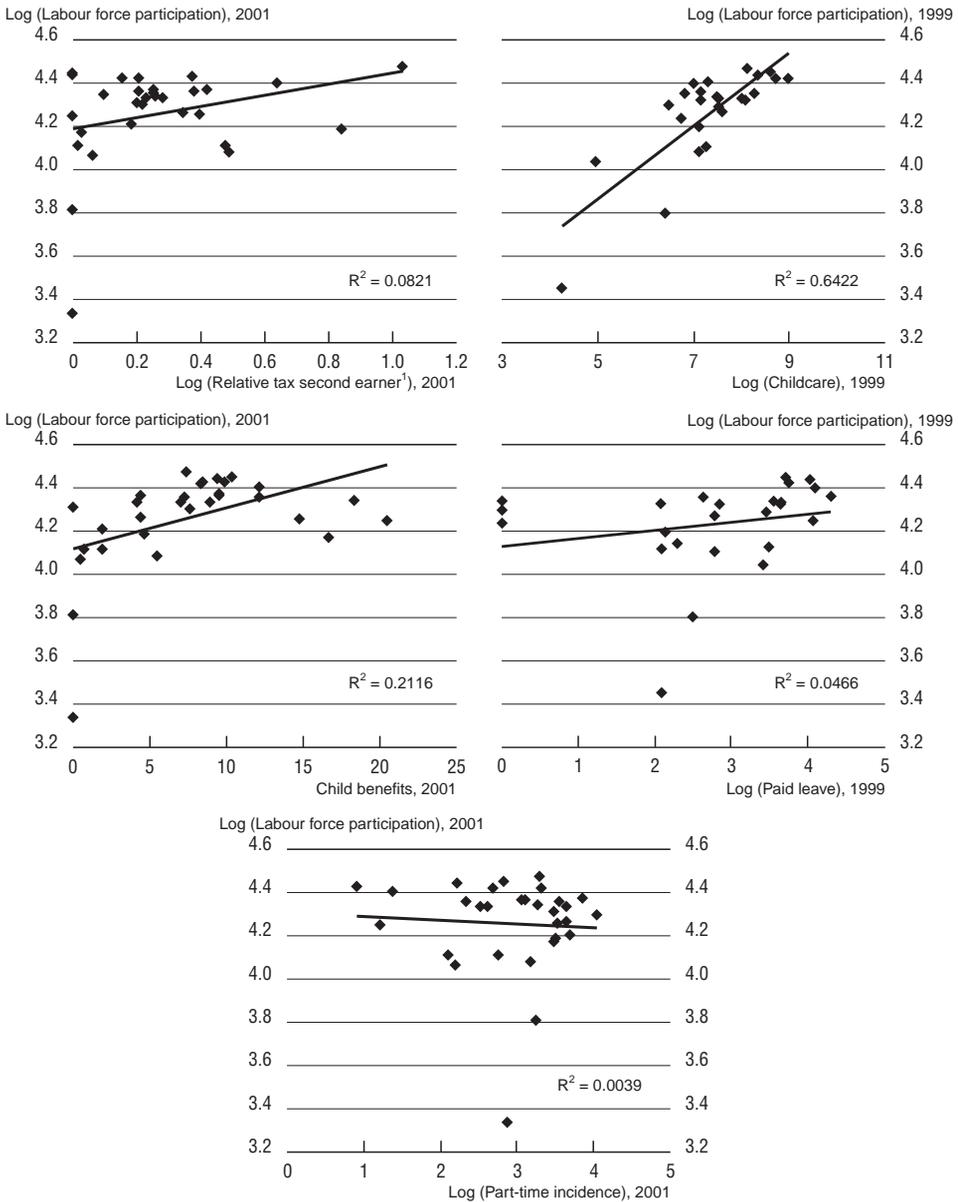
Figure 7. Composition of child support, 1999¹



1. Childcare designates public childcare spending per child (including formal day care and pre-primary school); Paid leave is the maximum number of weeks of paid maternity, parental and childcare leave a woman is entitled to; and Child benefits is the increase in disposable income from child benefits for two children in a family where the husband earns 100 per cent of APW and the wife 33 per cent. For countries for which data was not available for 1999, the closest available year was used. See notes to Table 3 for details.

Source: See Table 3.

Figure 8. Simple correlations between labour force participation of women aged 25-54 and selected variables, latest available year



1. The relative tax of the second earner is calculated at an earnings level of 67 per cent of APW.
 Source: Tables 2, 3 and 4.

links are better identified by a multivariate econometric analysis, allowing the estimation of partial correlations after controlling for other determinants.

MULTIVARIATE ECONOMETRIC ANALYSIS

This section is devoted to an econometric analysis of the determinants of female participation. The sample covers 17 OECD countries over the period 1985-1999 (most countries have data only for a sub-period). Due to data limitations, the analysis could not be made by cohort and uses instead the aggregate participation rate of prime-age women (25-54 years old) (see Burniaux *et al.*, 2003 for an analysis of cohort effects). However, to a large extent, cohort effects are captured by changes in the social-cultural variables, namely the proportion of married women, the number of children, and the female educational level (see specification below).¹⁸ Two different models are used for the estimation. In a first model (Model I), the dependent variable is the total female participation rate and the policy variables include the tax wedge between second earners and single individuals, public childcare spending per child, child benefits, paid parental leave, and the share of part-time in employment as a proxy for the flexibility of working-time arrangements. The specification also includes the proportion of married women, the number of children per woman (measured by the ratio of children aged 0-14 years to women aged 15-64 years),¹⁹ the level of female education (average years of education of women aged 25 years and over), the female and male unemployment rates, the degree of employment protection legislation (EPL),²⁰ the degree of product market regulation (PMR),²¹ and country fixed effects. Because the choice between part-time and full-time is to some extent simultaneous to the choice between activity and inactivity, the use of the share of part-time in employment as a regressor introduces a risk of bias of the estimated coefficients. To reduce this risk, the incidence of part-time work is instrumented by the variable measuring tax incentives to part-time. Other potentially endogenous variables include the unemployment rates and the public childcare spending. To minimise the risk of endogeneity, the unemployment rates are defined with respect to a larger age group (15-64 instead of 25-54). In addition, the unemployment rates and public childcare spending per child are instrumented by their lagged values, as well as all the exogenous variables of the model. All variables are in natural logarithms except child benefits and tax incentives to part-time work, which are already in per cent increase²². The equations are estimated by two-stage least squares with heteroskedasticity-consistent standard errors.

The results from the estimation of this first model are reported in Table 5 (column 1). The main correlations can be summarised as follows (some of the coefficients are only significant at the 10 per cent level). First, the wedge between the tax rates of second earners and single individuals (measured at an earnings level of 67 per cent of APW) has a negative impact on female labour force participation. Second, female participation appears to be stimulated by public spending on childcare

Table 5. **Econometric estimates of the determinants of female labour force participation (women aged 25-54), OECD 1985-1999^{1, 2}**

Two-stage least squares with heteroskedasticity-consistent standard errors

| Dependent variable | Model I: Part-time as a regressor | Model II: Part-time as an endogenous variable | |
|---|--------------------------------------|--|--|
| | log (total participation rate) | log (full-time participation rate) | log (part-time participation rate) |
| log (part-time incidence) | 0.21 (1.77)* | | |
| log (relative tax second earner at 67% APW) | -0.22 (2.01)** | -0.29 (2.84)*** | |
| log (childcare) | 0.05 (1.81)* | 0.05 (3.65)*** | |
| log (paid leave) | 0.11 (1.64)* | 0.17 (2.47)** | |
| [log (paid leave)] ² | -0.02 (1.84)* | -0.02 (2.06)** | |
| Tax incentives to part-time | | | 0.04 (4.53)*** |
| Child benefits | 0.00 (0.17) | | -0.03 (2.46)** |
| log (employment protection legislation) | 0.02 (1.37) | | 0.07 (2.60)** |
| log (product market regulation) | 0.03 (1.51) | | |
| log (male unemployment rate) | 0.10 (2.95)*** | 0.14 (5.34)*** | -0.17 (2.58)** |
| log (female unemployment rate) | -0.17 (4.28)*** | -0.21 (6.74)*** | 0.22 (3.64)*** |
| log (education) | 0.51 (4.00)*** | 0.74 (6.01)*** | -0.31 (2.05)** |
| log (number of children per woman) | -0.18 (0.83) | | -1.78 (8.57)*** |
| log (proportion married) | -0.08 (0.63) | | |
| Observations | 129 | 123 | 256 |
| Adjusted R-squared | 0.99 | 0.99 | 0.95 |

1. Absolute value of t-statistics in parentheses. * significant at 10% level, ** significant at 5% level, *** significant at 1% level.

2. Country fixed effects are included. See section on Multivariate econometric analysis for details on the specifications and estimation procedures.

Source: OECD estimates.

(formal day care and pre-primary school) while child benefits, which do not alter the relative return of market work, have an insignificant effect. Third, paid parental leave has a positive impact on female participation though, as found by other researchers, the marginal effect becomes negative for very long parental leaves (in excess of the equivalent of 20 weeks of full pay according to this paper's estimates). Fourth, the

flexibility of working-time arrangements, imperfectly proxied by the share of part-time in female employment, also contributes to boost female participation. Finally, female participation remains determined to a significant extent by the level of female education and the general labour market conditions (captured by the unemployment rate). The net effect of the unemployment rate on female participation is negative, but is somewhat reduced by an added worker effect linked to the male unemployment rate.

The drawback in this first model is that, despite the use of instrumental variables, the causal links are complicated by the endogeneity of part-time work. Therefore a second model is estimated which endogenises part-time and distinguishes between full-time and part-time participation as dependent variables (Model II). The supply of part-time and full-time labour cannot be measured perfectly, as the preferences for part-time or full-time cannot be observed for unemployed people, nor for employed people who are constrained in their choice of hours worked. However, a proxy can be calculated by assuming the same distribution between part-time and full-time for the labour supply as for employment. Thus, the full-time and part-time participation rates are defined as the product of the share of full-time (respectively part-time) in employment and the participation rate. Model II is composed of two equations relating part-time and full-time participation respectively to the policy variables and other determinants. The set of policy variables does not include the share of part-time in employment anymore (since it has been endogenised) but it includes the tax incentives to part-time. Each participation rate (full-time and part-time) was initially regressed on all explanatory variables. The model was then re-estimated including only the variables which were significant, and allowing for maximum sample size in each equation (Table 5, columns 2 and 3).²³ Some sensitivity tests are performed for the influence of the tax wedge between second earners and single individuals, and of public childcare spending (Table 6). The estimation of this second model confirms the results of the first model with statistical significance at the conventional level but also yields several new insights related to the distinction between part-time and full-time participation.²⁴

First, the estimations confirm that a high tax wedge between second earners and single individuals exerts a negative impact on female participation. The effect is mostly on full-time participation, because of the level of earnings at which the tax wedge is measured (67 per cent of APW in Table 5 and 100 per cent of APW in Table 6). When introduced separately, the tax rates on second earners and single individuals have coefficients of similar magnitude but opposite sign (Table 6). The restriction of introducing them as a ratio can thus not be rejected.²⁵ Family taxation also appears to matter for part-time participation. The tax incentives to part-time, measured by the increase in household disposable income resulting from sharing market work between spouses (involving earnings of 33 per cent of APW for the wife), are shown to have a strong positive effect on part-time participation.

Table 6. **Sensitivity tests of the effects of the taxation of second earners and public childcare spending, OECD 1985-1999^{1, 2}**

Two-stage least squares with heteroskedasticity-consistent standard errors

Dependent variable: log (full-time participation rate of women 25-54 years old)

| | Alternatives ³ | | | |
|--|---------------------------|--------------------|-------------------|-------------------|
| | Basic model | 1 | 2 | 3 |
| log (relative tax second earner at 67% APW) | -0.29 (2.84)*** | | | -0.22 (2.23)** |
| log (childcare) | 0.05 (3.65)*** | 0.05 (3.43)*** | 0.05 (3.42)*** | |
| log (paid leave) | 0.17 (2.47)** | 0.18 (2.55)** | 0.16 (2.23)** | 0.12 (1.56) |
| [log (paid leave)] ² | -0.02 (2.06)** | -0.02 (2.10)** | -0.02 (1.79)* | -0.01 (1.2) |
| log (tax single individual at 67% APW) | | 0.31 (3.02)*** | | |
| log (tax second earner at 67% APW) | | -0.27 (2.78)*** | | |
| log (relative tax second earner at 100% APW) | | | -0.25 (2.05)** | |
| log (formal day care) | | | | 0.02 (2.21)** |
| log (pre-primary school) | | | | -0.01 (0.46) |
| Observations | 123 | 123 | 123 | 123 |
| Adjusted R-squared | 0.99 | 0.99 | 0.99 | 0.99 |

1. Absolute value of t-statistics in parentheses. * significant at 10% level, ** significant at 5% level, *** significant at 1% level.
2. See section on Multivariate econometric analysis for details on the specifications and estimation procedures. Although control variables were included as in Model II (Table 5), their coefficients are not reported here.
3. Alternative 1 decomposes the relative average tax rate of second earners and single individuals earning 67 per cent of APW into their respective average tax rates. Alternative 2 tests the effect of the relative average tax rates of second earners and single individuals at earnings of 100 per cent of APW instead of 67 per cent. Finally, alternative 3 splits public spending on childcare into formal day care and pre-primary school spending per child of the relevant age category.

Source: OECD estimates.

Second, public childcare spending and paid parental leaves stimulate mostly full-time participation of women. This result is in line with Powell's findings (1998) on the effects of childcare subsidies, although she finds a small positive effect of childcare subsidies on part-time participation. This result suggests that inadequate childcare is more a constraint for full-time than part-time participation. A sensitivity test (Table 6) shows that, when entered separately, only public spending on formal day care seems to have a significant effect on female participation, while this is not the case for spending on pre-primary school. The lack of significance of public spending on pre-primary school could reflect the fact that many non-working mothers put their children in pre-primary school for educational purposes.

Third, although they did not appear to have a significant effect in Model I, once the distinction is made between full-time and part-time participation, child benefits appear to have a clear negative impact on participation, mostly through part-time participation. It is indeed only for women working part-time that the income effect from child benefits is likely to be large enough to induce a reduction in participation. This confirms that, strictly from the point of view of raising female participation, childcare subsidies are preferable to child benefits which do not increase the return from market work of the mother.

Fourth, the degree of employment protection legislation seems to exert a positive influence on part-time participation. One possible reason for this effect is that a high degree of EPL may induce firms to resort to part-time contracts in order to achieve greater flexibility. This result could then be interpreted as showing that the availability of part-time work opportunities exerts a positive influence on part-time participation. The discussion of Figure 9 (see below) suggests however that the positive effect of the availability of part-time jobs on female participation may only apply in countries where female preferences for part-time are high.

Fifth, the degree of product market regulation has no direct effect on female participation. However, part of this lack of effect is due to the fact that the regressions control for the unemployment rate and public childcare spending, which are themselves affected by PMR.²⁶ When these indirect influences are taken into account, PMR appears to exert a negative effect on female participation. The increase in participation between the lowest and highest sample values of PMR in 1999 is just below 2 percentage points. Pissarides *et al.* (2003) find a much stronger negative effect of product market regulation, although on female employment.²⁷

Finally, the estimations confirm the strong positive effect of education and the net negative effect of unemployment on female participation. However, these factors also affect the composition of participation in terms of full-time and part-time participation. Full-time female participation increases with the level of female education and the male unemployment rate (household wealth effect), and decreases with the female unemployment rate. The opposite relationships hold for part-time participation. Surprisingly, the number of children has a negative impact on part-time participation. This seems to suggest that the number of part-time employed women who quit their jobs when they have a relatively high number of children is much larger than the number of full-time mothers who switch from full-time to part-time jobs.

The econometric estimations allow quantifying the contributions of policies and other variables to differences in female participation rates. Based on Model I, Figure 9 decomposes the percentage deviation of each country's female participation rate from the OECD average (for included countries in 1999) into the contributions

Figure 9. **Contributions of explanatory variables to female participation, 1999**
 Per cent deviation of female participation from OECD mean^{1,2}

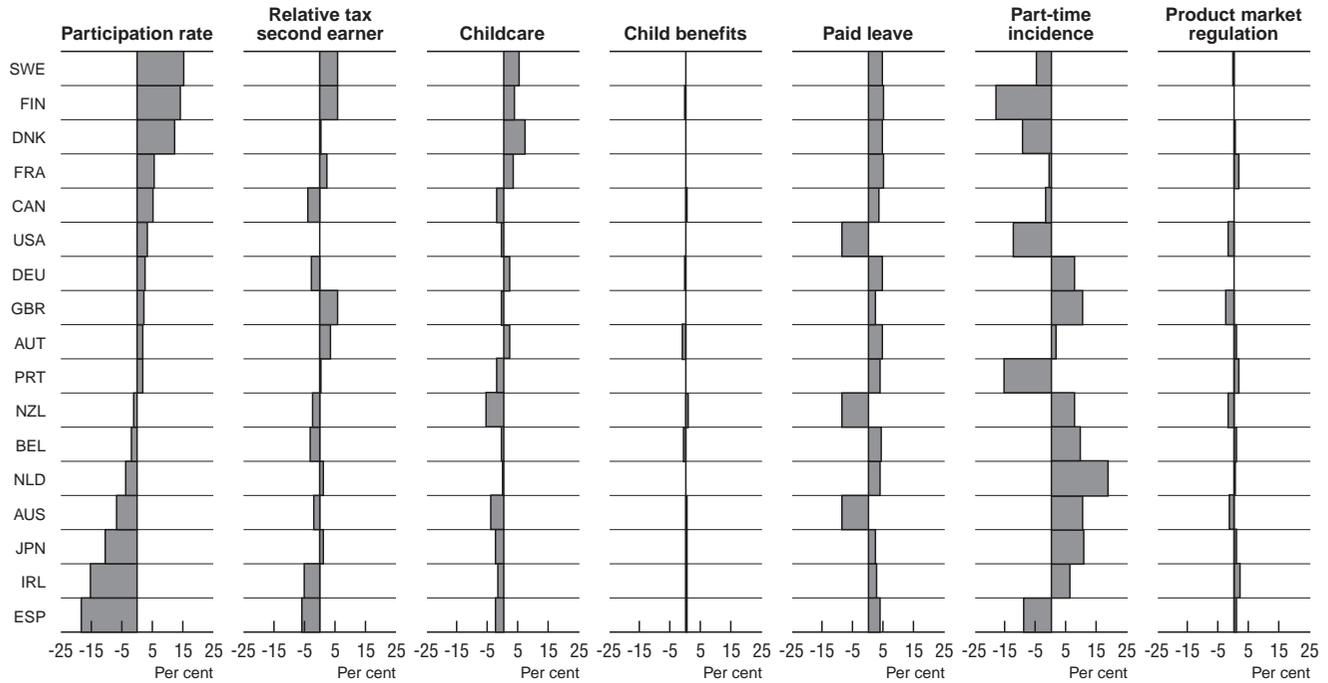
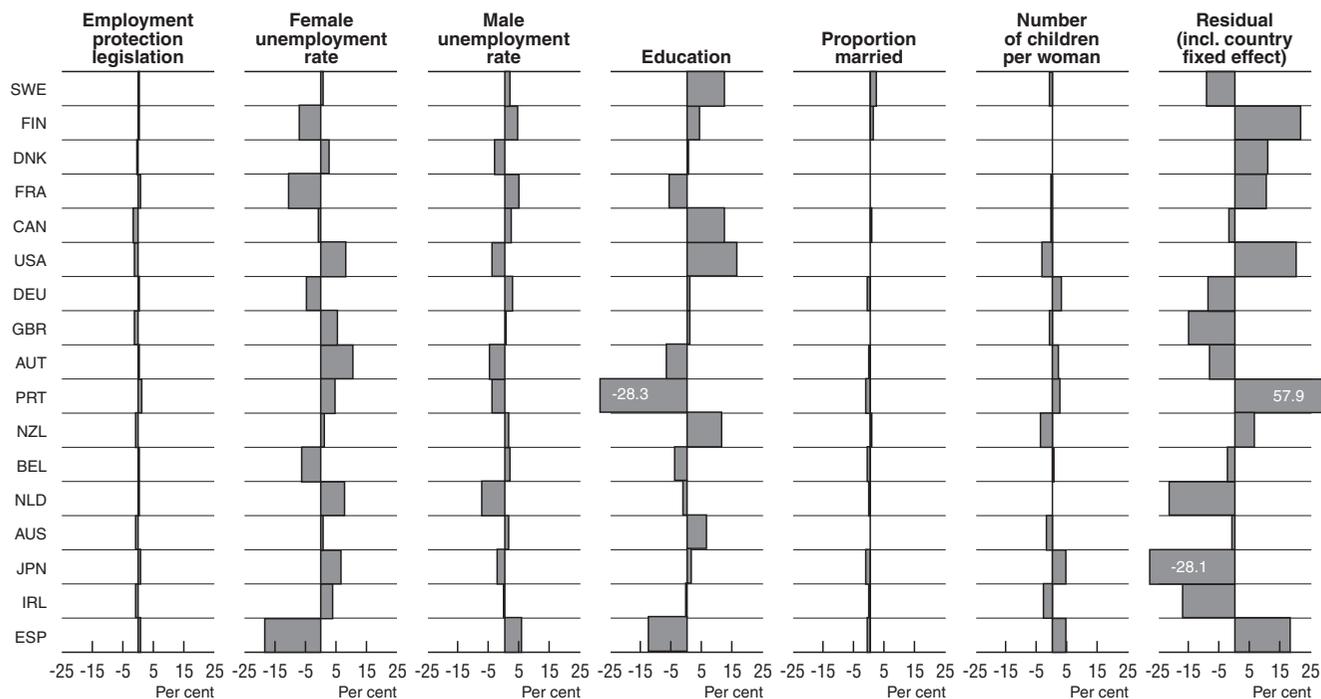


Figure 9. Contributions of explanatory variables to female participation, 1999 (cont.)

Per cent deviation of female participation from OECD mean^{1,2}

1. The contribution of a variable to the per cent deviation of a country's female participation rate from the OECD mean is calculated as the product of the variable's per cent deviation from its OECD mean and the variable's coefficient estimated in Model I of Table 5. See Appendix II for more details on the calculations of the contributions.

2. The relative tax rate of second earners is calculated at an earnings level of 67 per cent of APW. The variables "Child benefits", "Product market regulation" "Employment protection legislation", "Proportion married" and "Number of children per woman" were not statistically significant.

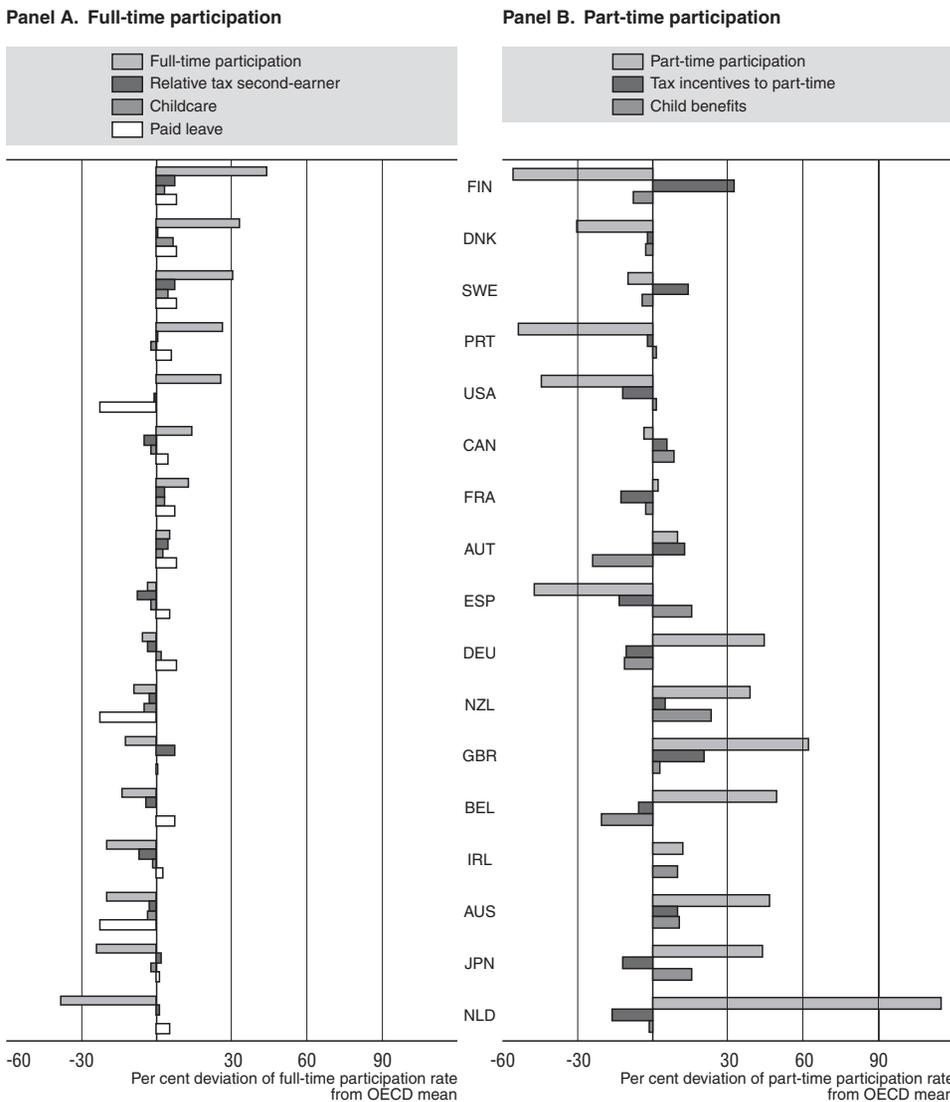
Source: OECD estimates.

of the various explanatory variables.^{28, 29} The mainland Nordic countries and France have the highest participation rates. As seen in the previous section, these countries share a similar policy mix. Their above-average performance is explained by the relatively favourable tax treatment of second earners, high public spending on childcare, generous parental leave, but also high female education (except in France). The negative participation effect implied by the relatively low part-time incidence is outweighed by large country fixed effects, possibly reflecting a misspecification of the role of part-time in these countries where preferences for part-time are relatively low.³⁰ In France and Finland, high unemployment exerts a negative effect on female participation. Other northern European countries and Pacific countries (Australia, Japan and New Zealand) feature lower levels of participation. These countries are characterised by an above-average contribution of the incidence of part-time and paid parental leave (except in Australia and New Zealand), but lower-than-average public childcare spending. The relatively low unemployment in most countries and high female education in Australia and New Zealand also contribute positively to female participation. The country fixed effects are below average, possibly reflecting weaker preferences for work or a misspecification of the part-time influence.

Despite having a low level of policies supporting female participation, the United States and Canada have high female participation rates, mostly due to low unemployment, high female education levels, and a large country fixed effect in the case of the United States. The latter may reflect a strong taste for work, though it may also capture other effects such as a misspecification of the part-time influence and the availability of market-based affordable childcare. Portugal's female participation rate is also higher than the OECD average, thanks to low unemployment, an above-average contribution of paid parental leave, and a large country fixed effect. The large country fixed effect in this case possibly reflects the availability of informal care, or the fact that low income levels make it necessary for both partners in the couple to work. Contrary to the United States and Canada, female participation in Portugal is hindered by low female education. Finally, female participation is very low in Spain, despite a large country fixed effect and an above-average contribution of paid parental leave. Beyond the low level of policies supporting female participation, further barriers to female participation include a low level of female education and a high unemployment rate.

Finally, Figure 10 highlights the contributions of the policy variables to full-time and part-time participation (measured in per cent deviations from the OECD geometric average) using Model II, where part-time participation is endogenous. "Full-time policies", which include the tax treatment of second earners, public childcare spending, and paid parental leave, explain at least 45 per cent of the deviation of full-time participation from the OECD average in about half of the sample countries (Australia, Austria, France, New Zealand, mainland Nordic countries and Spain). The

Figure 10. Policy contributions to full-time and part-time participation rates, 1999^{1,2}



1. The contribution of a variable to the per cent deviation of a country's female full-time (part-time) participation rate from the OECD mean is calculated as the product of the variable's per cent deviation from its OECD mean and the variable's coefficient estimated in Model II of Table 5. See Appendix II for more details on the calculation of the contributions.

2. The relative tax rate of second earners is calculated at an earnings level of 67 per cent of APW.

Source: OECD estimates.

explanatory power of “part-time policies” – tax incentives to part-time and child benefits – is somewhat lower, with these policies explaining at least 40 per cent of the deviation of part-time participation from the OECD average in Australia, Ireland, New Zealand and the United Kingdom, and 25 per cent in the United States.

POLICY SIMULATIONS FOR FEMALE PARTICIPATION

In order to illustrate the potential impact of policy measures in the area of female participation, a number of policy scenarios can be simulated using the estimated equations (see Burniaux *et al.*, 2003 for details). The simulated policy measures are by necessity stylised and in some cases they imply a radical departure from current policies and may be exploiting the equations beyond the estimated marginal changes. Moreover, the financing requirements associated with the simulated policy changes may be large in some countries, implying a need for significant increases in (other) tax rates with repercussions on labour force participation. These general equilibrium effects have not been taken into account in the simulations, which therefore may give a biased picture of the effects from policy reform. Furthermore, both the policy changes themselves and their financing requirements may lie outside the field of realistic policy options.

With these caveats in mind, four policy simulations were carried out. The first scenario assumes an equal tax treatment of second earners relative to single individuals, implying for most countries a reduction of the average tax rate on second earners. The second scenario simulates the impact of an increase in public childcare spending (per child) to the OECD average, for countries with below-average expenditures, while the third scenario assumes an increase in public childcare spending (per child) to the cross-country maximum value of \$8 009 observed in Denmark. Finally, the fourth scenario simulates the impact of increasing the tax incentives to share market work between spouses to the maximum value observed in the sample (an increase in household disposable income of 11 per cent in Finland and Mexico). There may be some overlap between the two simulated tax reforms, as changes in the tax system – such as a reduction of the dependent spouse’s allowance – may at the same time increase the neutrality of taxation of second earners (compared with single individuals) and the tax incentives to share market work between spouses.

The simulations are based on Model II (Table 5), which provides distinct prediction equations for part-time and full-time participation rates. The predicted changes for part-time and full-time participation are then aggregated to yield the change in aggregate female participation. The baseline participation rates, which provide the starting point of the simulations, are the projected female participation rates for 2025 taken from Burniaux *et al.* (2003).³¹ The reason for using predicted 2025 participation rates as a baseline is that it may take time for the reforms to be implemented and have their full effect. The simulations impose the constraint that the

Table 7. Predicted labour force participation rate of women aged 25-54 years, 2025^{1, 2}

| | Baseline participation rate (per cent) | Predicted increase in full-time participation (percentage points) | | | Predicted increase in part-time participation (percentage points) | Predicted total participation (per cent) | | Baseline participation rate of men aged 25-54 (per cent) |
|---------------------------------|--|---|---------------------------------------|--|---|--|-------------------------------|--|
| | | Scenario 1 | Scenario 2 | Scenario 3 | Scenario 4 | Cumulative scenario low-case | Cumulative scenario high-case | |
| | | Equal tax treatment second earner | Increase in childcare to OECD average | Increase in childcare to Denmark's level | Favourable tax treatment part time | | | |
| Australia | 78.4 | 4.8 | 3.0 | 6.4 | 6.1 | 86.7 | 86.7 | 86.7 |
| Austria | 75.6 | 1.7 | 0.0 | 2.6 | 3.5 | 80.8 | 83.5 | 92.1 |
| Belgium | 83.2 | 6.8 | 0.5 | 4.1 | 10.3 | 93.5 | 93.5 | 93.5 |
| Canada | 85.7 | 6.7 | 2.0 | 6.6 | 4.3 | 92.4 | 92.4 | 92.4 |
| Czech Republic | 81.5 | 9.7 | 1.7 | 7.0 | 0.0 | 91.2 | 91.2 | 91.2 |
| Denmark | 85.0 | 4.7 | 0.0 | 0.0 | 4.1 | 90.5 | 90.5 | 90.5 |
| Finland | 87.7 | 0.0 | 0.0 | 2.7 | 0.1 | 87.8 | 90.5 | 92.4 |
| France | 79.0 | 2.6 | 0.0 | 2.2 | 8.9 | 90.4 | 92.7 | 92.8 |
| Germany | 80.7 | 6.2 | 0.0 | 2.6 | 13.6 | 97.2 | 97.2 | 97.2 |
| Greece | 77.4 | 0.3 | .. | .. | 1.1 | 78.8 | 78.8 | 94.2 |
| Hungary | 70.7 | 0.0 | .. | .. | -0.1 | 70.7 | 70.7 | 76.5 |
| Iceland | 95.9 | -0.1 | -0.1 | -0.1 | -0.1 | 95.8 | 95.8 | 95.8 |
| Ireland | 80.9 | 13.7 | 1.4 | 5.0 | 8.5 | 94.6 | 94.6 | 94.6 |
| Italy | 64.5 | 7.6 | .. | .. | 2.7 | 74.7 | 74.7 | 89.8 |
| Japan | 68.3 | 2.4 | 1.4 | 4.2 | 13.2 | 85.2 | 88.2 | 96.6 |
| Korea | 59.6 | 1.2 | 8.3 | 12.4 | 1.2 | 70.4 | 74.5 | 86.3 |
| Luxembourg | 79.1 | 1.8 | .. | .. | 8.0 | 88.9 | 88.9 | 94.4 |
| Mexico | 58.4 | 0.1 | 3.0 | 6.1 | 0.0 | 61.6 | 64.6 | 95.9 |
| Netherlands | 82.2 | 2.4 | 0.0 | 2.3 | 13.8 | 96.0 | 96.0 | 96.0 |
| New Zealand | 74.5 | 4.2 | 3.8 | 7.3 | 6.3 | 85.4 | 85.4 | 85.4 |
| Norway | 88.6 | 2.9 | 0.0 | 0.9 | 5.2 | 93.8 | 93.8 | 93.8 |
| Poland | 77.8 | 5.1 | .. | .. | 4.4 | 86.2 | 86.2 | 86.2 |
| Portugal | 79.4 | 4.9 | 2.1 | 6.9 | 2.2 | 88.7 | 90.9 | 90.9 |
| Slovak Republic | 84.8 | 5.4 | 3.2 | 5.4 | .. | 90.2 | 90.2 | 90.2 |
| Spain | 73.2 | 9.8 | 2.0 | 6.2 | 4.9 | 89.9 | 92.9 | 92.9 |
| Sweden | 80.4 | 0.0 | 0.0 | 1.3 | 2.0 | 82.4 | 83.6 | 88.0 |
| Switzerland | 87.0 | 3.6 | 1.8 | 5.0 | 8.4 | 95.5 | 95.5 | 95.5 |
| Turkey | 15.5 | 0.0 | 2.5 | 3.4 | 1.5 | 19.4 | 20.4 | 76.1 |
| United Kingdom | 79.4 | 2.5 | 0.6 | 3.8 | 3.4 | 85.8 | 89.2 | 90.3 |
| United States | 78.2 | 4.9 | 0.9 | 5.4 | 3.8 | 87.7 | 92.0 | 92.0 |
| OECD average³ | 76.4 | 3.9 | 1.5 | 4.4 | 4.9 | 84.4 | 85.5 | 91.0 |

Table 7. Predicted labour force participation rate of women aged 25-54 years, 2025^{1, 2}
(cont.)

1. Scenario 1 assumes equal tax treatment of second earners and single individuals (at 67 per cent of APW), as is already the case in Finland, Sweden, Hungary, Mexico, and Turkey. The second scenario assumes a catch-up of public expenditures on childcare to the OECD average of \$2 314 per child, only in countries with below-average expenditures. Scenario 3 assumes that public childcare spending converges in all countries to the OECD maximum of US\$8 009 observed in Denmark. Finally, scenario 4 sets the increase in household disposable income between a situation where husband and wife share market work (100 per cent and 33 per cent of APW, respectively) and a situation where the husband earns all the market income (133 per cent of APW) to the maximum value of 11 per cent observed in Finland and Mexico. The "low-case cumulative scenario" combines the effects of scenarios 1, 2, and 4, while the "high-case cumulative scenario" combines scenarios 1, 3, and 4.
2. All scenarios are simulated under the constraint that the female participation rate cannot exceed the male participation rate projected in the baseline for 2025.
3. Unweighted average.

Source: OECD estimates.

female participation rate cannot exceed the male participation rate projected in the baseline for 2025 ("participation constraint").

Table 7 shows the increase in female participation which can be achieved under each scenario. The average participation gain from equalising the tax treatment of second earners is about 4 percentage points. The increase in public childcare spending to the OECD average level results in a moderate increase in female participation of 1.5 percentage points,³² while the assumption of convergence to the Danish level of public childcare spending yields an average increase in participation of 4½ percentage points. Finally, the higher tax incentives to share market work between spouses lead to an average gain in participation of 5 percentage points. Combining scenarios 1, 3, and 4 yields an average female participation rate of 85.5 per cent, against 76.4 per cent in the baseline scenario, *i.e.* an average gain of about 9 percentage points. This combined result is for many countries affected by the fact that the participation constraint is binding.

ADDITIONAL CONSIDERATIONS FOR POLICY

Part-time versus full-time work

There is evidence that countries have different preferences regarding the choice between part-time and full-time participation. High preferences for part-time work in some countries may reflect genuine preferences of parents to spend time with their children, with both social and economic benefits. However, these preferences may also be shaped by current policies. For example a low supply of affordable childcare or short paid parental leave make full-time work difficult and part-time work a more attractive option. In these cases, there may be room to increase full-time participation with more supportive policies.

There is also a concern that in some countries part-time jobs may marginalise women in the labour market. This is the case when part-time jobs are characterised by poor wages and benefits, low job tenure, and absence of training, reducing women's prospects of promotion and putting them at a higher risk of dropping out of the labour force (Box 3).³³ Such conditions may result from an excess supply of part-time work by women or from a negative signalling effect linked to part-time jobs. In these cases, raising the availability of affordable childcare and parental leave could possibly alleviate the marginalisation of women, by helping them turn to full-time jobs with more prospects. An alternative solution may be to reduce the negative future career consequences of a period spent in part-time work, for example by giving parents greater rights to change hours (including the right to work part-time but also to resume their full-time job).

Enhancing the efficiency of childcare subsidies and tax cuts

There are limits to the appropriate increases in childcare subsidies and cuts in tax rates. These policies will most likely impose a net budgetary cost, even though they may be partially self-financing (see Burniaux *et al.*, 2003).³⁴ In turn, this may require an increase in tax rates creating other distortions in the economy, or a cut in other budgetary expenditures. Beyond the budgetary cost, childcare subsidies may encourage excessive consumption of childcare (both in quantity and quality) by reducing its price below its true social cost, and inefficiently discourage the consumption of material goods (Rosen, 1996).³⁵ For example, Rosen argues that childcare subsidies in Sweden are too large, in the sense that a reduction in the subsidies accompanied by a budget-balancing reduction in marginal income taxes would increase efficiency, by reducing the excessive production of household services.³⁶

Childcare subsidies can be made more effective, and hence less costly, by conditioning their receipt on the employment of the mother, or at least on active job search. From the perspective of stimulating female labour force participation, childcare subsidies conditioned on the mother's employment are preferable to child benefits which, due to their lump-sum character, have a negative impact on female participation. However, child benefits may be justified on grounds of horizontal equity across different family types and reducing child poverty.

Effectiveness can also be enhanced by targeting tax cuts and childcare subsidies to low-income mothers whose labour supply is more elastic to the net wage (Del Boca *et al.*, 2003). Low-income mothers are also more likely to be liquidity-constrained and, therefore, less able to finance the childcare needed in order to reach self-sufficiency (through the accumulation of work experience and human capital). However, greater targeting implies higher marginal effective tax rates as income

Box 3. Features of part-time and the risk of marginalisation of women

There is a risk of marginalisation of women when part-time jobs are characterised by poor wages and benefits, low job tenure, and absence of training. The table below compares earnings and social security coverage in part-time and full-time jobs. The earnings figures show (for included countries) an average gap of 14 per cent in median hourly earnings of female part-time workers relative to their full-time counterparts. The gap is largest in English-speaking countries, namely Canada, the United Kingdom and the United States. However, to measure the possible wage penalty, it is necessary to control for a number of earnings determinants. Such a study by Pissarides *et al.* (2003) for EU countries finds evidence of an hourly earnings penalty for part-time jobs in Ireland, the Netherlands and the United Kingdom, but an hourly earnings premium in Austria, Germany and southern European countries. Blank (1990) also finds evidence of a small wage penalty associated with part-time work in the United States, after controlling for earnings determinants. The second part of the table shows the minimum thresholds that apply (in terms of hours worked or earnings) for social security coverage of part-timers (OECD, 1998). Thresholds are highest in Germany and Japan, and lowest in southern European countries (except for public health benefits in Italy). In the United Kingdom, the threshold for social security coverage is quite low, however many women work very short hours (Daune-Richard, 1998). In the United States, part-timers have little access to company benefits, such as health and pension plans (Houseman and Osawa, 1998). Finally a study by the OECD (1999) shows that female part-timers are generally much less likely to receive employer-provided training than their full-time counterparts, even after controlling for a number of relevant determinants of the incidence of training.

Marginalisation can be measured by a difficulty to move to full-time jobs and/or a weak attachment to the labour market. For example, O'Reilly and Bothfeld (2002) find that in Germany and the United Kingdom only a small number of women are able to use part-time work as a bridge back into a full-time job. Instead, a substantial percentage drops out of employment, especially mothers of more than one child. For the United States, Miller (1997) finds that part-time experience increased the probability of part-time employment and decreased the probability of full-time employment, even if part-time work was taken up temporarily due to the existence of children. On the other hand, Blank (1989) and Farber (1999) conclude from evidence on labour market transitions in the United States that part-time and temporary work are often part of the transition out of unemployment, leading to regular full-time employment in the future.

Box 3. Features of part-time and the risk of marginalisation of women
(cont.)

Earnings levels and social security coverage of part timers

| | Median hourly earnings of female part-time workers, ^{1, 2} 1995 | Thresholds for social security coverage of part timers, 1998 | | |
|----------------|--|--|---|--|
| | | Public health benefits | Old-age pension benefits | Unemployment benefits |
| Austria | .. | Sch 3 830/month (15 per cent of APW) | Sch 3 830/month (15 per cent of APW) | Sch 3 830/month (15 per cent of APW; earnings above this level for at least 52 weeks over preceding 2 years) |
| Belgium | 86.8 | 400 hours in preceding 6 months or 3 hours/day | 4 hours/day | – |
| Canada | 69.8 | – | C\$ 67/week or C\$ 3 500/year (10 per cent of APW) | No weekly minimum as of January 1997 |
| Czech Republic | .. | – | – | 22 hours/week |
| Denmark | 76.4 | – | 9 hours/week for Supplementary pensions and 15 hours/ week for labour market pension schemes in certain sectors | 37 hours/week for at least 52 weeks over preceding 3 years |
| Finland | 90.2 | – | – | 18 hours/week |
| France | 81.7 | 200 hours in last 3 months | – | 4 months contributions in last 8 months |
| Germany | 87.5 | 15 hours/week (45 hours/month for blue collar workers) | 15 hours/week | 18 hours/week |
| Greece | 108.8 | – | – | – |
| Ireland | .. | Earnings over Ir£ 9 256 (61 per cent of APW) | Earnings over Ir£ 2 600 (17 per cent of APW) | Earnings over Ir£ 2 600 (17 per cent of APW) |
| Italy | 103.0 | 24 hours/week | – | – |
| Japan | .. | 20 hours/week | 20 hours/week | 20 hours/week |
| Luxembourg | 77.5 | – | – | – |

Box 3. Features of part-time and the risk of marginalisation of women
(*cont.*)

Earnings levels and social security coverage of part timers

| | Median hourly earnings of female part-time workers, ^{1, 2} 1995 | Thresholds for social security coverage of part timers, 1998 | | |
|--------------------|--|--|------------------------------------|---|
| | | Public health benefits | Old-age pension benefits | Unemployment benefits |
| Netherlands | 93.1 | – | – | 26 weeks work during previous 39 for basic benefit (52 days/year in 4 out of 5 previous calendar years for wage-related benefits) |
| Portugal | 113.0 | 12 days in last 4 months | – | – |
| Spain | 84.0 | – | – | – |
| Sweden | 92.3 | SKr 6 000/year (3 per cent of APW) | SKr 6 000/year (3 per cent of APW) | 17 hours/week |
| United Kingdom | 69.6 | – | £61/week (18 per cent of APW) | £61/week (18 per cent of APW) |
| United States | 62.5 | – | – | Depends on the State |
| Unweighted average | 86.4 | | | |

“–” means that there are no thresholds.

1. Percentage of median hourly earnings of full-time workers. The fact that the median earnings of women part timers is higher than those of full timers in a few southern European countries could in part be due to a statistical artefact if some employees with short hours but without a definite part-time contract are not counted as working part time.

2. 1993, industry only for Greece; 1994 for France; 1996 for the United States; 1997 for Canada.

Source: Based on OECD (1998) and OECD (1999). Data on part-time earnings: Canada, *Labour Force Survey*, 1997; EUROSTAT, *Structure of Earnings Survey*, 1995; United States, OECD Secretariat calculations using the 1996 US Bureau of Labor Statistics Current Population Survey annual earnings file. Data on social security coverage were supplied by national authorities on the basis of a questionnaire sent to all OECD member countries and taken from the OECD *Taxes and Benefits* database.

rises, and careful design of the tax cuts and childcare subsidies is needed to limit the negative impact on the supply of hours.

The case for conditioning and targeting childcare subsidies also has to be weighted against the potential benefits of childcare subsidies for the children's future development and their integration into society, as well as equity concerns. There is evidence that high-quality childcare is beneficial for the children at least when the child is three (see Kamerman *et al.* (2003) for a review of the literature). For children below nine months or one year, negative effects from maternal employment are more commonly found.

Finally, the effectiveness of childcare subsidies and tax cuts in raising female participation requires that the childcare supply be responsive. Blau (2001) argues that the supply of childcare is very responsive because of the low capital requirement for home-based childcare arrangements. Indeed, he finds a high responsiveness of childcare supply in the United States.³⁷ Policies that may improve the responsiveness of the supply of affordable childcare include a lower degree of product market regulation,³⁸ and less restrictive immigration policies.

Trade-offs in the taxation of the family

The choice between joint and separate taxation of the household involves trade-offs. Separate taxation is definitely preferable from the perspective of raising female participation, because it reduces distortions to married women's work incentives. However, this greater neutrality towards work incentives of second earners is achieved at the cost of less horizontal equity between families of different types. Indeed, under separate taxation, the tax paid by families with a same gross household income varies with the split of this income between the two spouses.

CONCLUSIONS

This paper has examined the factors underlying female participation in OECD countries. Surveys show preferences for the traditional male breadwinner model to be low among couples with small children, and point to a large potential for increasing female labour supply. After reviewing the market failures and distortions that may impede female participation, the paper provided new empirical evidence on the effects of various policy instruments on female participation. Several policy conclusions emerged from the analysis.

First, a more neutral tax treatment of the work incentives of second earners compared with single earners boosts female participation by increasing the return on married women's market work. Moreover, higher incentives to share market work between spouses lead more inactive women to take part-time jobs. These two measures of family taxation are not completely independent and a more neutral tax treatment of second earners may contribute to increase the tax incentives to share

market work between spouses. For example, a reduction of the dependent spouse's allowance, which reduces the taxation of second earners, will also increase the incentives to share market work between spouses.

Second, child benefits and tax allowances, essentially lump sum transfers for the maintenance of children, generate an income effect that reduces female labour supply, particularly of potential part-time workers. Child benefits however may be justified on grounds of horizontal equity between families of different types and reducing poverty. A better alternative to child benefits – from the point of view of raising female labour supply – is childcare subsidies as they increase the return on market work. The case for childcare subsidies may be particularly strong where high tax wedges between second earners and single individuals distort female labour supply and/or where an excessive compression of the wage structure limits the supply of affordable childcare (by making the relative cost of childcare higher). Childcare subsidies will be more effective and, hence, less costly, when conditioned on female labour force participation. Effectiveness can also be enhanced by targeting tax cuts and childcare subsidies to low-skilled women who suffer the largest distortion to their labour supply decision. The well-known incentive problems associated with targeting on income need, however, to be taken into account.

Third, the provision of paid parental leave also tends to boost female labour participation, by helping women to reconcile work and family life and strengthening their attachment to the labour market through a job guarantee. However, taking parental leave for an extended period of time may deteriorate labour market skills, and damage future career paths and earnings. Beyond 20 weeks, the marginal effect of additional parental leave on female participation appears to become negative.

Fourth, inadequate childcare is more a constraint for full-time than part-time participation. Indeed, the supply of affordable childcare and the provision of parental leave tend to stimulate more full-time than part-time participation. In addition, the supply of childcare appears more inadequate at the formal day care level rather than at the pre-primary school level.

Fifth, increasing the availability of part-time work opportunities also tends to raise female participation, though not by the same extent in all countries. Indeed, preferences for part-time work vary across countries. Though the preferred working arrangement in many European countries, part-time working is not considered attractive by women in most Scandinavian and southern European countries. Finally, when part-time working entails a wage penalty, low social security coverage, job insecurity, and little training, it risks marginalising women in these jobs. In such instances, policy should aim at fostering better access to full-time jobs, or reduce the negative future career consequences of a period spent in part-time work.

Simulations illustrate that policies can exert a significant impact on female participation. For example, assuming a neutral tax treatment for second earners, public

childcare spending per child at the level of Denmark's, and tax incentives to share market work between spouses at the highest sample value, yields an average participation gain of 9 percentage points in the sample countries. This combined result is for many countries affected by the fact that the participation constraint is binding.

Female education, well-functioning labour markets (which translate into low unemployment), and cultural attitudes (captured by fixed effects) remain important determinants of female participation. Public policies fostering female education could thus also have a major impact on female participation. However, it should also be noted that the education choice of a woman may depend to a large extent on her future career prospects and in particular on the policies which would help her reconcile work and family life. Where these policies are more developed, women should be more likely to invest in their education.

Finally, the evidence in the recent literature suggests that an increase in the level of female participation does not necessarily come at the cost of a reduction of fertility. Indeed, when the increase in female participation is supported by appropriate work-family reconciliation policies, women tend to achieve a higher level of labour force participation without reducing fertility, and even perhaps with a small increase in fertility.

NOTES

1. Although the literature has evolved towards the use of microeconomic data, there are examples of recent papers using macroeconomic data (*e.g.* Bertola *et al.*, 2002; and Pissarides *et al.*, 2003).
2. It is interesting to note that there was no decline in the number of children per woman in the United States, and a positive trend in Luxembourg and Switzerland. A trend reversal could also be observed recently in Denmark, Norway, and the Netherlands.
3. To some extent preferences may be formulated subject to the current policy environment and labour market conditions. They may thus understate the underlying preferences to work in countries with a low level of policies supporting female participation and/or high unemployment.
4. Appendix I describes in detail the definition and sources of the data used in the first four sub-sections under the heading "Policies affecting female labour force participation".
5. A more general analysis of the deadweight loss of the income tax recognises that it depends on the cross-elasticities of labour supply within the couple (between the male and female partners, and with other income earners in the household), on distortions to the pattern of consumption, as well as distortions to the nature of labour supply. Some of these issues are addressed later in the policy discussion under the heading "Additional considerations for policy".
6. The husband of the married woman is assumed to earn 100 per cent of APW, and the family is assumed to count two children. The tax rates include employee's social security contributions and are netted from universal cash benefits. A more complete measure would have included employer's social security contributions (which in the long run are paid by employees through lower wages) and indirect taxes. However, this would not affect significantly the tax wedge between second earners and single individuals (defined as the ratio of tax rates). Finally, means-tested benefits based on household income are not included (apart from some child benefits that vary with income) due to limited time-series information. However, these are less relevant for household earnings levels of 100 per cent of APW or more.
7. See for example *Journal of Human Resources* (1990) for evidence on various countries.
8. Childcare can take several forms: maternal care (when the mother takes care of her own child), informal care (when relatives or friends take care of the child for free or at a low cost), formal day care (which includes day-care centres, family day care provided at the home of the carer, care provided by live-in nannies), and pre-primary school. Childcare subsidies are usually targeted at formal day care and pre-primary school.
9. Note that such a wage structure will directly or indirectly affect virtually every good or service produced in the economy, though not to the same extent. There are other policy instruments to tackle the distortion, including a more general one which some countries

have tried, namely reduced employers' social security contributions for low-skilled workers.

10. Recent evidence (OECD, 2003a) shows however that many low-skilled workers have difficulties moving up the wage and career ladder.
11. However, if liquidity constraints prevented the second earner from working because she was unable to pay for childcare, the increase in income could lead to an increase in labour supply (Stiglitz, 2000).
12. Spending per child is calculated as total government spending on formal day care and pre-primary education in a given year, divided by the number of children of age lower than the age of entry to primary school. Cross-country differences in ages of entry to primary school are thus taken into account.
13. A portion of the positive relationship between paid leave duration and the employment-population ratio reflects the fact that mothers on parental leave are counted as employed (but absent from work), rather than not employed. Ruhm (1998) estimates that it accounts for between one-quarter to one-half of the total estimated employment effect.
14. The adjustment rate of actual to preferred lower hours was only 21 per cent within a job and 64 per cent across jobs (conditional on being able to adjust hours) (Euwals, 2001).
15. This measure of the tax incentive to split income may be theoretical in some cases because the shift of work hours between spouses may be difficult in practice. Where this shift of work hours is feasible, the increase in female participation could in principle be offset by a reduced labour supply from men, leaving total participation unchanged. However, this is not very likely to happen as men's labour supply is quite stable. The tax indicator used here is more a proxy for the tax treatment of second earners working part-time than for the incentives to share market work between spouses *per se*.
16. Note that the predicted effects of the EITC are not all pro-work, especially with respect to hours and the labour market incentives for two-earner couples. The literature provides consistent evidence that the EITC positively affects labour force participation. However, it also finds smaller, negative effects on hours of work for people already in the labour market and for secondary earners (Hotz and Scholz, 2001).
17. A country is defined as having a high value for an indicator if it is higher than the average value for all countries. Iceland, with relatively high child support, relatively high part-time incidence, and unfavourable tax treatment of second earners, does not fit in any of the groups.
18. A time trend turned out insignificant, probably because the time span of the sample is relatively short and recent.
19. The stock of children currently aged 0-14 is divided by the number of women in the age category 15-64 instead of 25-54 because some of these children are presumably cared for by younger mothers (aged 15-24) and perhaps some older mothers (aged 55-64). Note that this measure is just a proxy, as it does not factor in information about the distribution of births across women's ages.
20. The index of employment protection legislation covers both permanent and temporary contracts and is taken from Allard (2003) who, building on the OECD methodology, has developed a time-series for this variable.
21. This OECD index of product market regulation covers seven non-manufacturing sectors for which time-series data is available. See Nicoletti and Scarpetta (2003) for more details.

22. Because the natural logarithm of zero is not well defined, paid parental leave is assumed to take the value of 1 (week) in countries where there are no paid parental leaves. It is indeed possible that women may be authorised, formally or informally, to take a few days of paid sick leave at the time of birth in some of these countries.
23. Similarly, regarding the instrumenting of the unemployment rates and of public childcare spending per child, only the instruments which were significant in the initial estimation were kept for the re-estimation. They include the lagged values of the potentially endogenous variables, the index of employment protection legislation, the index of product market regulation, and the tax incentives to part-time.
24. Although not reported here, the results are robust to the exclusion of outliers, and the correlation between the residuals of the two equations, for full-time and part-time participation (tested over a same sample size), is not significant. There may be omitted variables, in particular for the determinants of the demand for part-time workers by firms, but one can reasonably assume that they are not correlated with the supply side regressors.
25. In this paper, the positive coefficient on the tax rate of single individuals has been interpreted as resulting from the use of the tax rate of single individuals as a benchmark against which the excess taxation of second earners is gauged. At least two other interpretations are possible. First, the general tax rate (proxied by the average tax rate of a single individual) may reflect the size of the public sector, and the positive coefficient may capture the beneficial effect which a larger public sector may have on female participation. Indeed, a larger public sector may imply a higher provision of public services which facilitate female participation and have not been controlled for in the regression (*e.g.* care for older people). It may also reflect more employment opportunities for women, as the public sector is a large employer of women in some countries. Recent research (Cavalcanti and Tavares, 2003) finds a positive relationship between the female participation rate and the size of government. Second, the general tax rate captures to some extent the level of taxation of the husband. But a higher taxation of the husband will lead, through an income effect, to a higher participation of the wife. However, the similarity in the magnitudes of the coefficients on the taxation of single individuals and second earners seems to favour the interpretation retained in this paper.
26. PMR has a negative indirect effect on female participation by raising the unemployment rate, and reducing public childcare spending in the first-stage regressions of the two-stage least squares. The negative effect on public childcare spending per child may reflect less demand for formal childcare services by mothers, as the private cost of such services and other household services is driven up by product market regulation.
27. In addition to considering female employment instead of participation, their study differs from this paper in two other respects. First, their measure of product market regulation is limited to the cost of start-up of a business while this study includes an overall measure of product market regulation. Second, they only have an observation for the end of the 1990s (which they interact with time dummies) while this study uses yearly observations.
28. Model I is used instead of Model II because it is not possible to calculate contributions to female participation which are additive using Model II. Indeed, the specifications for full-time and part-time participation are logarithmic (geometric additivity), while total female participation is the sum of full-time and part-time participation (arithmetic additivity). Model I also presents the advantage of identifying directly the effect of the flexibility of working-time arrangements. See Appendix II for details on the methodology.

29. Due to the logarithmic specification, the average actually refers to the geometric average. In the previous section, the general environment for female participation was characterised relative to the arithmetic average of policy variables in OECD countries. It is, therefore, possible that a given policy, which had a below-average value in the policy mix of a country, provides an above-average contribution to its female participation rate. This mostly occurs for paid parental leave, due to the fact that the specification is logarithmic and that the effect of this variable is not linear (square of the logarithm also matters).
30. Country fixed effects capture factors that cannot be explained by the model, and this is only one plausible interpretation.
31. These projected female participation rates present the advantage of including cohort effects, which refer to the gradual replacement of currently older by younger women. Thus, the baseline projections assume that future generations of women share the same characteristics (education, propensity to marry, and number of children), and hence have the same lifetime profile of labour participation as women who entered the labour force in 2000.
32. This does not necessarily imply that increasing childcare subsidies is a less effective policy. Rather, this policy scenario did not imply a policy change for a significant number of countries which already had above-average public childcare spending. The average participation gain is calculated for all countries, including those for which the scenario does not imply a policy change.
33. Note that this does not necessarily imply that part-time work is second best. Making such a case would require assessing the consumption and production benefits of parental care.
34. They are partially self-financing because the resulting increase in female labour supply leads to higher government revenues.
35. Rosen emphasises the trade-off between distortions to labour supply and to consumption. In his model, an increase in the childcare subsidy rate decreases the distortion to labour supply but increases the distortion to consumption of childcare. In addition, an increase in the marginal income tax rate, which may be required to finance the subsidies, further increases the distortion to consumption of household services (by subsidising the cost of own time in non-market household uses), while partially offsetting the reduction in the distortion to labour supply enacted by the subsidy.
36. Of course, a full evaluation of the costs and benefits of childcare subsidies would have to take into account positive externalities on child development and socialisation, as well as considerations of equity (including gender equity). However, the magnitudes of efficiency losses estimated by Rosen are quite large, perhaps as large as half of the total value of household production attributed to women with small children.
37. On the other hand, Chevalier and Viitanen (2002) cast doubt on the responsiveness of childcare supply in the United Kingdom, because they do not find “Granger causality” from female participation to childcare supply.
38. Although regulations which ensure a minimum quality of childcare may be desirable, excessive regulations and administrative burden may discourage the supply of valuable childcare services.

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*Appendix I***DEFINITION AND SOURCES OF DATA FOR VARIABLES USED
TO CHARACTERISE POLICIES AFFECTING FEMALE LABOUR SUPPLY****Tax data****Data sources**

The two main sources of data on family taxation are the OECD publications *Taxing Wages* (for 1995 and later years) and *The OECD Jobs Study: Taxation, Employment and Unemployment* (OECD, 1995) (for 1981, 1985, 1989, and 1992). The latter only covers fifteen countries (Australia, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, Norway, Spain, Sweden, the United Kingdom and the United States). Several corrections had to be made to reconcile both series.

- The data from the *OECD Jobs Study* are not perfectly comparable with those of *Taxing Wages*, because they do not net tax rates from universal cash benefits. Hence, they were corrected for universal cash benefits using information from the OECD publications *The Tax/Benefit Position of Employees* and *The Tax/Benefit Position of Production Workers* (earlier versions of *Taxing Wages*) for various years.
- Tax data for Belgium in the *OECD Jobs Study* are based on an outdated APW earnings series. The tax wedge between second earners and single individuals (at 67 per cent and 100 per cent of APW) was reconstructed for 1989 and 1992 using information from the OECD publications *The Tax/Benefit Position of Employees* and *The Tax/Benefit Position of Production Workers*. Data from the *OECD Jobs Study* for earlier years (1981 and 1985) were not used.
- Data for Japan from the *OECD Jobs Study* are not comparable with those from *Taxing Wages* for later years (due to some change in calculations) and were not used.
- Data from *Taxing Wages* had to be completed by simulations based on the OECD *Tax Models* (which are used to produce the data in *Taxing Wages*) for some family situations not included in the publication's tables (*e.g.* husband and wife both earning 100 per cent of APW with two children).

Data for missing years were interpolated.

Definitions

Tax wedge between second earner and single individual at 67 per cent and 100 per cent of APW

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

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

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 67 per cent (100 per cent respectively) of APW. It is assumed that the second-earner's husband earns 100 per cent of APW and that the couple has two children. The difference between gross and net income includes income taxes, employee's social security contributions, 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. They are less relevant at levels of household income above 100 per cent of APW.

The tax wedge (*Relative tax second earner*) is calculated as the ratio of *Tax second earner* and the average tax rate of a single individual earning the same gross income as the second earner (*Tax single individual*).

Child benefits (including tax allowances)

The child benefits index is defined as the increase in household disposable income from child benefits for two children, at a gross earnings level of 133 per cent of APW (of which 33 per cent is earned by the wife). It is calculated as follows:

$$\text{Child Benefits} = \frac{(\text{Household Net Income})_B - (\text{Household Net Income})_A}{(\text{Household Net Income})_A}$$

where A denotes a household earning 133 per cent of APW without children, and B denotes a household earning 133 per cent of APW with two children.

Tax incentives to part-time

The incentives to share market work between spouses are measured by the increase in household disposable 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:

$$\text{Tax incentives to part time} = \frac{(\text{Household Net Income})_B - (\text{Household Net Income})_A}{(\text{Household Net Income})_A}$$

Public spending on childcare

Formal day care

The main data source is the OECD "Social Expenditures Database" (henceforth SOCX). For some countries for which SOCX data on formal day care is missing or seems implausible, data is taken from another source or an estimate is constructed. Details are given in Jaumotte (2003).

One drawback of the SOCX data is that they do not include tax expenditures (*i.e.* tax allowances and tax credits for childcare expenses) unless they are refundable. Data on tax expenditures are not readily available for most countries. However, even in English-speaking countries where this type of expenditure is likely to be more important (*e.g.* Canada and the United States), they constitute 20-25 per cent of spending on formal day care, but only about 10 per cent of spending on childcare (*i.e.* formal day care and pre-primary school), the main indicator used in this paper. These tax expenditures are not included in the measure of childcare spending due to lack of comparable data for other countries and because of their relatively small size.

Pre-primary school

The main data source is the OECD "Education Database". Spending on pre-primary school includes both direct and indirect expenditures. Indirect expenditures (transfers and payments to private entities) were not recorded over the period 1985 to 1991. However, they are negligible in most countries over the period 1992-1999, and are thus set to zero for the earlier period. The exceptions are Denmark, Ireland, the Netherlands, New Zealand and Spain, where indirect spending is projected for the earlier years based on their share in public spending over the period 1992-1999. See Jaumotte (2003) for country notes.

Public childcare spending per child

Public spending in per cent of GDP is multiplied by GDP in 1995 PPP-US\$ to obtain the level of spending in 1995 PPP-US\$. The target population of children for formal day care and pre-primary school is calculated using data on age of entry to primary school from the UNESCO *Statistical Yearbook* (various years) and data on the number of children by age category. The latter is obtained from national sources for EU countries and from the *United Nations World Population Prospects 1950-2050* (The 2000 revision, February 2001) for other countries. The target population of children can further be split between formal day care and pre-primary school using data on age of entry to pre-primary school from the UNESCO *Statistical Yearbook*.

Maternity, parental, and childcare leave

The main data source is the "Comparative Maternity, Parental, and Childcare Database" from Gauthier and Bortnik (2001). The total number of leave weeks is the 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. In some countries, leave of a longer duration is available for the second and subsequent children. Only the national legislation is used; variations in schemes by region, province, Länder, or canton are not included. The provisions for the most generous scheme are used, even though they may not apply to all women depending on their employment history or income. The total number of paid leave weeks is the sum of leave weeks, each multiplied by the corresponding replacement rate. When the replacement income is specified as an absolute amount, it is divided by the average manufacturing wage for women to obtain a proxy of the replacement rate. The replacement rate does not take into account means-tests or

private negotiated agreements to top up formal entitlements. Leave reserved for the father is not included.

For some countries not included in the database, an estimate was constructed based on information from *Social Security Programs Throughout the World* published by the United States Social Security Administration (various years). These countries are the Czech Republic, Hungary, Iceland, Korea, Mexico, Poland, the Slovak Republic and Turkey. See Jaumotte (2003) for country notes.

Appendix II

CALCULATION OF THE CONTRIBUTIONS OF EXPLANATORY VARIABLES TO FEMALE PARTICIPATION

These calculations are based respectively on Model I for Figure 9 and on Model II for Figure 10 (see Table 5). For a given country i in a given year t , the specification of Model I reads:

$$\ln(PR_{i,t}) = \sum_k \alpha^k \ln(X_{i,t}^k) + \beta Y_{i,t} + \gamma (\ln(Z_{i,t}))^2 + \mu_i + \varepsilon_{i,t} \quad [1]$$

where PR denotes the female participation rate, X denotes variables which enter in natural logarithm, Y denotes the variable Child benefits (not transformed), Z denotes Paid leave (entered as the square of the natural logarithm), μ denotes the country fixed effect and ε denotes the residual.

Taking the average over all countries for which data are available in this given year yields:

$$\overline{\ln(PR)}_t = \sum_k \alpha^k \overline{\ln(X^k)}_t + \beta \overline{Y}_t + \gamma \overline{(\ln(Z))^2}_t + \overline{\mu} + \overline{\varepsilon}_t \quad [2]$$

where the upper-bar denotes the arithmetic average over countries in the year t .

Taking the difference between [1] and [2] yields:

$$\begin{aligned} \ln(PR_{i,t}) - \overline{\ln(PR)}_t &= \sum_k \alpha^k \left[\ln(X_{i,t}^k) - \overline{\ln(X^k)}_t \right] + \beta (Y_{i,t} - \overline{Y}_t) + \gamma \left[(\ln(Z_{i,t}))^2 - \overline{(\ln(Z))^2}_t \right] \\ &+ \mu_i - \overline{\mu} + \varepsilon_{i,t} - \overline{\varepsilon}_t \end{aligned} \quad [3]$$

The contribution of each explanatory variable to the log-deviation of the female participation rate of a given country from the OECD mean is given by the product of the coefficient and the log-deviation of the explanatory variable from its OECD mean value. Due to the logarithmic econometric specification, the OECD means actually refer to geometric means. The contributions of all explanatory variables are additive in the sense that they add up to the log-deviation of the female participation rate from the OECD mean. These contributions can simply be expressed in terms of per cent deviation of the female participation rate from the OECD mean by taking exponentials, subtracting one, and multiplying by 100. These per cent deviations add up to the actual per cent deviation of the female participation rate from the OECD mean. A similar derivation can be done for each equation of Model II (part-time and full-time participation).

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