

## European women: why do(n't) they work?

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### European women: why do(n't) they work?

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# European women: why do(n't) they work? <sup>1</sup>

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## Abstract

To increase labour market participation is a major challenge currently faced by the EU, and attracting women into the labour force appears as a promising avenue to do so. Therefore, a clear understanding of what the factors influencing the evolution of female participation rates are in Europe is essential for a successful design of policy measures aiming at increasing participation rates. This paper provides empirical evidence on the role that institutions have played in determining participation rates of women in the European labour markets. Our findings discard any doubt on the influence of institutions on women's participation in Europe. The strictness of labour market institutions negatively affects female participation rates. We also find that institutional features aimed at reconciling motherhood with professional life such as maternity leave schemes and part-time work favour participation rates of prime-age women. Additionally, fertility rates and education enrolment have been relevant for the evolution of participation rates during the sample period considered for prime-age and young females respectively, while cohort effects drive the developments of older females.

Keywords: labour force participation, labour market institutions. JEL-Code: J21

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<sup>1</sup> The views expressed in this paper are those of the authors and do not necessarily reflect those of the European Central Bank (ECB). We would like to thank Neale Kennedy, Barbara Petrongolo, Jarkko Turunen and Etienne Wasmer for useful comments. Any errors are of course the sole responsibility of the authors. \* *Kaisserstrasse 29, D-60311, Frankfurt am Main Germany*

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“Despite their gains, women remain perhaps the world’s most under-utilised resource.”

The Economist, April 15<sup>th</sup>-21<sup>st</sup> 2006

## 1. Introduction

More than ever European women are attracting a lot of attention in the context of labour markets performance, because they appear to be an ideal target group to increase labour market participation rates and, therefore, labour supply.

Increasing participation rates is a major challenge currently faced by the European Union (EU) to move towards the targets set by the Lisbon European Council and achieve a more growth oriented, dynamic and competitive economy. This indeed calls for an effort to boost labour force participation and requires a substantial increase in employment, drawing not only from unemployed but also from inactives.

Moreover, increasing participation rates could contribute to alleviate the potential problem of scarcity of labour stemming from the gradual ageing of the European population. A recent policy debate in Europe focuses on harmful consequences of ageing; and several academic papers have analysed this issue,<sup>2</sup> concluding that the potential scarcity of labour associated with the ageing of the population in Europe may jeopardise the sustainability of public pension systems and could have negative effects on productivity and growth.<sup>3</sup>

Attracting female labour supply into the labour force appears as a promising (and potentially fruitful) avenue to increase participation rates in the EU. Women indeed form the largest group from which to draw additional resources as they gather about two-thirds of the inactive population. This fraction is even larger among the high skill “inactives”: 75% of inactives aged 25 to 49 and holding a university degree are women. Of course, increasing female participation could become a concern if it would come coupled with lower fertility rates, thus aggravating the ageing problem in the long term. However, a well-documented fact in the recent literature is that the European countries with higher female participation are the ones that exhibit the highest fertility rates in Europe, namely the Nordic countries and the Netherlands. The opposite situation characterises Mediterranean countries, which combine low participation and low fertility rates.<sup>4</sup>

In order to successfully design policy measures that could help attracting women into the labour force, thereby increasing participation rates, policy makers need to understand what the factors influencing the evolution of female participation rates are. In particular, disentangling the

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<sup>2</sup> See for example Börsch-Supan (2003, 2005) and Hamermesh (2001).

<sup>3</sup> Several measures aiming at increasing labour market participation have been proposed in this context, for example increasing participation of the older workers by delaying the retirement age or attracting more immigrants.

<sup>4</sup> See for example Pissarides *et al.* (2005) and Del Boca *et al.* (2005). This fact also holds for a larger sample of countries as featured by The Economist April 15th-21st 2006, in the article entitled “A guide to Womenomics”.

1  
2 relationship between female participation rates and labour market institutions in the EU is a  
3 relevant prerequisite for reforming legal and institutional frameworks to encourage participation  
4 of women. The aim of this paper is precisely to provide empirical evidence of the role that  
5 institutions, among other factors, have played to shape the evolution of female participation  
6 rates in Europe. Additionally, by focusing on institutions, the evidence presented in this paper  
7 sheds some light on the current debate on whether Europeans work little due to preferences or  
8 due to institutional features.  
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10 The analysis is performed by estimating reduced form participation equations for three different  
11 age groups of women (young (15-24 years old), prime-age (25-54) and older age groups (55-  
12 64)) using annual macro data for a panel of 12 of the EU-15 countries between the early 1980s  
13 and 2000 and accounting for economic, social and institutional factors.<sup>5</sup> During this period  
14 labour market participation in the EU-15 has increased from around 65% to nearly 70% in 2000  
15 (see Chart 1), led by the positive contribution of female participation, which grew by more than  
16 12 percentage points to reach around 60% in 2000.  
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18 We are interested in questions like: (i) Why is participation rate of women and its evolution so  
19 different across countries? (ii) Do labour institutions play a role in explaining these differences?  
20 (iii) Does this role vary for different age groups? and (iv) What other factors are also relevant  
21 for participation rates developments? We will study the evolution of participation rates for  
22 different groups of women across a set of European countries and the role that labour market  
23 institutions and other factors play on shaping that evolution, rather than addressing issues  
24 related to the participation decisions of particular individuals, for which micro panel data will be  
25 better suited.<sup>6</sup>  
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27 The fact that we focus on institutions also favours the use of macro data for the analysis. Since  
28 the dataset compiled by Blanchard and Wolfers (2000) and Nickell and Nunziata (2001) has  
29 become available, many papers have looked into the impact of institutions on European  
30 unemployment and employment developments.<sup>7</sup> This paper is among the first ones to look at the  
31 role that institutions could play on participation rates developments.<sup>8</sup> Other examples are  
32 Blöndal and Scarpetta (1999) who analyse retirement decisions. Jaumotte (2003) also looks at  
33 females' participation, but rather than on labour market institutions, she mainly focuses on the  
34 effects of childcare support.  
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55 <sup>5</sup> Countries include Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain,  
56 Sweden and the UK. Austria, Greece and Luxembourg are not part of our sample due to data availability  
57 constraints.

58 <sup>6</sup> There is a large literature on female labour supply from a microeconomics perspective. See for example the  
59 special issue of the *Journal of Population Economics*, August 2002, and references therein.

60 <sup>7</sup> See for example Nickell (1997), Elmeskov et al. (1998), Belot and van Ours (2000, 2001), Bertola *et al.* (2003),  
Jimeno and Rodriguez-Palenzuela (2001) and Nunziata (2002), etc.

<sup>8</sup> For a rough look at determinants of participation and gender differences on participation rates in Europe, see  
Genre *et al.* (2005).

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The separate analysis for each one of the relevant age groups can be easily justified. For example, factors such as social protection are important determinants for old women, while childcare availability could be determinants for prime-age women but irrelevant for the old ones.

Our findings discard any doubt on the influence of institutions on women's participation in Europe. Institutional factors affect female participation decisions and therefore the dynamics of worked hours per capita and, in turn, GDP per capita and economic growth in the EU. However the degree to which these institutions shape or interact with preferences is outside the scope of this paper.

In particular, the strictness of labour market institutions negatively affects the participation decisions in the three groups considered. Indeed, changes in rules or in features that increased the overall flexibility of labour market institutions in many European countries in recent years (e.g. declining union density, decreasing employment protection, tightening of eligibility criteria for unemployment benefits, etc.) have generally supported female participation. We also find that institutional features aimed at reconciling motherhood with professional life, such as maternity leave schemes, favour participation of prime-age women.

More linked to preferences, but also to social norms and institutions, fertility and education enrolment have been relevant in determining the evolution of participation rates during the sample period considered for prime-age and young females respectively, while the extensive use of part-time employment has been relevant for both age groups. Finally, cohort effects appear to be crucial to understand the developments in participation rates for oldest females.

The paper proceeds as follows. Section 2 presents the empirical model and discusses how the overall institutional framework and other variables traditionally suggested by economic theory are expected to influence labour market participation of women. Section 3 discusses the estimation results. Section 4 reviews the main findings and gives some conclusions.

## 2. Empirical model

To model participation rates, we need to take into account that it is a variable bounded between zero and one. We do so by specifying the regression of participation rates of each age group on the conditioning variables, for country  $i$  and period  $t$ , as  $E(PR_{it}) = F(\beta'X_{it} + \gamma Z_{it} + b_t + c_i)$ , where  $F$  is a probability distribution function. If  $F$  is chosen to be a logistic function, this model will lead to a linear equation with the logit transformation of participation rates as the dependent variable:<sup>9</sup>  $\text{Log}(PR_{it} / 1 - PR_{it}) = \beta'X_{it} + \gamma Z_{it} + b_t + c_i + \varepsilon_{it}$ , where  $b_t$  and  $c_i$  are period and country effects respectively.

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<sup>9</sup> The estimations in this paper were also performed using the actual (non-transformed) participation rate as dependent variable, the results did not show any relevant changes with respect to the ones presented in the paper.

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2 The explanatory variables may be organised into two main groups. Vector  $Z_{it}$  gathers variables  
3 traditionally suggested by standard economic theory and usually found in empirical studies.  
4 Vector  $X_{it}$  is meant to bring together variables reflecting the institutional framework ruling  
5 European labour markets.  
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9 For all age groups, the vector of market institutions  $X_{it}$  includes the following elements: union  
10 density, employment protection, unemployment benefit systems and labour taxes, all of them  
11 taken from Nickel and Nunziata (2001). In addition, this vector includes a number of  
12 institutional features that are thought to be specific to each age group and will be discussed in  
13 more detail in Section 3.  
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18 To discuss the relevance of the institutional framework as a determinant of female participation  
19 decisions one should bear in mind that prime-age males could be seen as insiders because they  
20 show a more stable attachment to the labour market, while women of all ages tend to be less  
21 attached to the labour market and can be seen as outsiders.  
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26 Union density is one of the institutional features we consider as a potentially determining factor  
27 of women's participation.<sup>10</sup> As a rule, we expect more unionised economies to display lower  
28 average participation rates among the less attached workers, e.g. women. As involvement of  
29 unions in the wage bargaining leads to a higher wage compression and larger employment  
30 differences between insiders and outsiders, it will have an impact on the expectations of  
31 outsiders to get a job. During the 1980s and the 1990s, union density has declined in many  
32 countries, including Italy, Germany, France, the Netherlands and the UK among others, and  
33 may have favoured a convergence in participation rates among age and gender groups.<sup>11</sup> By  
34 contrast, it has increased or remained broadly unchanged in Spain and the Nordic countries.  
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41 Employment protection is another institutional feature that should play an important role in  
42 determining participation, while the overall influence may go in any direction. A stringent  
43 employment protection framework should restrain employers' willingness to hire and fire  
44 workers. As a result, employment, hence, participation rates of workers with numerous lapses of  
45 inactivity should be negatively affected. At the same time, employment protection is also meant  
46 to provide a positive incentive to participate in a labour market where risks of getting  
47 unemployed are smaller. In general, employment protection is high in all European countries,  
48 being Ireland and the UK the main exceptions, but the strictness of it has significantly declined  
49 over the last two decades in most countries, such as Denmark, Belgium, Germany and Spain.  
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56 The potential effects of unemployment benefits on participation follow a similar mechanism to  
57 the one of employment protection. On the one hand, the existence of a generous unemployment  
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<sup>10</sup> We have considered, at an early stage, the degree of wage bargaining co-ordination, but it was found to be insignificant in the estimations and, in general, highly correlated with other institutions.

<sup>11</sup> It should be noted that this is a quite imperfect measure of unionisation. There are countries with low affiliation rates like Spain or France where union agreements apply to all workers at a national level.



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2 benefit system could be seen as a positive incentive to participate in the labour market from the  
3 workers' viewpoint. On the other hand, a generous unemployment benefit system can strengthen  
4 union bargaining strategies and consequently reduce outsiders' employment rates and indirectly,  
5 their participation rates. Unemployment benefits may be described by two variables: the income  
6 replacement ratio and benefit duration. Replacement ratios generally decreased in the last two  
7 decades, although this has varied across countries. Germany, the UK, Ireland, France and  
8 Belgium are among those that recorded a decline, while in Italy, Portugal and Finland the  
9 replacement rate increased. Developments in unemployment benefit duration during the last two  
10 decades have varied significantly across European countries: some have extended it, such as  
11 Portugal, Ireland and Denmark, some have reduced it, such as Finland and the Netherlands.  
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18 Finally, labour taxes are also expected to play a role determining women's participation. Any  
19 increase in taxes leading to lower net wages will tend to increase participation in order to keep  
20 the income level constant. However, the substitution effect (cheaper leisure) will tend to lower  
21 participation. Micro evidence on the role of taxes can be found for instance in Gustafsson  
22 (1992), who analysed the disincentives that certain taxation systems may induce on participation  
23 using Sweden and Germany as case studies. He finds that joint income taxes decrease  
24 incentives for married women to work if the tax system is progressive, as the marginal tax rate  
25 of the wife that considers to start working is large. By contrast, a change to separate individual  
26 taxation, combined with reforms in childcare and parental leave systems, should translate in an  
27 increase in the participation of married women. Labour taxes show in general a high dispersion  
28 among EU-15 countries and have increased in all countries (but the Netherlands, Norway and  
29 the UK) in the last two decades. In other words, the evolution of labour taxes is not expected to  
30 have favoured a reduction in the gap of participation rates across age groups.  
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40 Closely related to institutional factors, labour market programmes are also expected to have  
41 some influence on female participation. This influence could be direct, by allowing individuals  
42 to qualify for unemployment benefits, or indirect, by increasing the probability to find a job  
43 after participating in the programme. We use the OECD database on labour market programmes  
44 and concentrate in active labour market programmes (ALMP), in particular, in those policies  
45 that have been found in the literature relevant for females (see Martin and Grubb, 2001).  
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50 The vector  $Z_{it}$  contains variables suggested by economic theory that are usually found in  
51 empirical studies. Economic theory gives a central role to potential earnings or potential wages  
52 as a determinant of participation.<sup>12</sup> If potential earnings in the market (relative to home  
53 productivity) increase, participation decisions will be influenced by an income effect and a  
54 substitution effect. Labour market participation will increase if the positive substitution effect is  
55 larger than the income effect. For instance, Katz and Murphy (1992) have documented how  
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1 changes in the wage structure and labour market returns have influenced the increase of the  
2 labour supply of married women in the US in the second half of the 20<sup>th</sup> century.  
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6 In practice, it is very difficult to find adequate variables to measure potential earnings of each  
7 group of women considered. Average wages for a specific group of women could reflect skill  
8 composition and self-selection rather than participation behaviour. An alternative measure used  
9 in the literature is the level of education of the relevant group.<sup>13</sup> In the case of women, this  
10 variable is likely to capture not only higher potential wages associated to higher human capital,  
11 but also preferences, women with higher education, who have invested more in human capital  
12 accumulation are likely to have higher preferences for market production. However,  
13 disentangling these potential effects is very difficult and in general the coefficient of education  
14 in participation equations cannot be interpreted as capturing exclusively potential earnings. In  
15 addition to the above mentioned shortcomings, it should be added the lack of valid data.  
16 Measures of average wages by gender and age group are not available for our sample. In the  
17 case of education, some comparable indicators exist across countries but only as 5 year  
18 averages.<sup>14</sup>  
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27 The prevailing economic conditions are also expected to influence participation decisions. To  
28 control for the economic business cycle we included the overall unemployment rate. We prefer  
29 this labour market-related proxy to capture business cycle developments to alternative measures  
30 because it is expected to better capture cyclical labour market pressures than other business  
31 cycle indicators.<sup>15</sup> Due to its potential problem of endogeneity we instrumented the overall  
32 unemployment rate using lags, real productivity, and a measure of the output gap. Additionally,  
33 we include average aggregate real wages, which are expected to account also for the general  
34 macro economic and labour market conditions  
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41 Furthermore, while general economic conditions are relevant, more structural sectoral  
42 developments should not be overlooked. The relative importance of service activities in the EU-  
43 15 has increased, fostering certain types of occupation and work arrangements (e.g. part-time  
44 jobs) that are expected to favour female participation.  
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48 Finally, due to the nature of our data the error term in our equations,  $\varepsilon_{it}$ , is likely to suffer from  
49 autocorrelation. Indeed, as population moves in and out of each age group over time, there will  
50 be a kind of cohort effect that could be responsible for autocorrelation. The inclusion of lags of  
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56 <sup>12</sup> The participation decision of women is usually modelled as women choosing between market work, household  
57 work and leisure. See, for example, the work of Becker (1991).

58 <sup>13</sup> One major drawback of education measures used as proxies of human capital is that it does not take into account  
59 on-the-job training and accumulated experience.

60 <sup>14</sup> See Barro and Lee (2000) and De la Fuente and Domenech (2006).

<sup>15</sup> Nevertheless, in our estimations using output gap delivers similar results. Bover and Arellano (1995) also use  
unemployment rate to capture the effect of the business cycle when estimating participation rates of Spanish  
women.

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2 the dependent variable among the explanatory variables would likely bias the estimations by  
3 capturing these slow moving components of the error. Instead, estimations are performed using  
4 feasible GLS allowing for autoregressive, AR(1), and heteroskedastic residuals.  
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### 8 **3. Results**

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10 In this section we estimate participation equations for three different age groups of women using  
11 time series of annual macro data over the 80s and 90s for a panel of 12 EU-15 countries. The  
12 panel is unbalanced for some of the explanatory variables.  
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#### 15 3.1. Participation rates of prime-age women

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17 Within each country prime-age women are the most active ones, with the remarkable exception  
18 of the Netherlands where young and prime age women have similar participation rates.<sup>16</sup>  
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20 On average in the 1990s, participation rates of prime age women in the 12 countries of our  
21 sample rank from below 60% in Spain, Ireland and Italy to well over 80% in Finland, Sweden  
22 and Denmark.  
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26 The main specificity of this age group is that it includes the period of the life cycle during which  
27 women have children. Indeed, in 2000, the average age of European women at the birth of the  
28 first child ranged from nearly 27 years old in Portugal to almost 30 years old in the Netherlands.  
29 Having a family, and especially having small children, conditions the choice of women between  
30 market and home production, as it implies more opportunities for the latter. Consequently,  
31 when estimating the participation equation for this group one needs to account for the  
32 relationship between fertility and participation decisions. In addition to the general determinants  
33 of female participation rates discussed in the previous section, we therefore include fertility  
34 rates among the explanatory variables. In fact, having children and participating in the labour  
35 force could be understood as joint decisions. If this were the case, fertility rates and  
36 participation rates should be modelled simultaneously. It could be argued however that having  
37 children and participating are not simultaneous decisions, but that the fertility decisions precede  
38 participation decisions. Then, only when motherhood and work turn out to be difficult to  
39 conciliate, women leave the job market.<sup>17</sup> Also, causality is more likely to go from fertility rates  
40 to participation rates because having children is a permanent decision, while participation is  
41 reversible, and therefore can be adjusted in the short run. If the latter arguments were the  
42 correct ones, fertility rates should enter as an exogenous regressor in the equation of  
43 participation rates. The empirical literature does not provide strong evidence to take a stance on  
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59 <sup>16</sup> The extended use of flexible working arrangements in the Netherlands allows young people to conciliate studying  
60 and working activities.

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2 this issue. Some studies suggests that motherhood responsibilities constrain labour force  
3 participation - see, for example, Xie (1997) or Kumar Narayan and Smyth (2006). While other  
4 studies rather suggest that women participation decisions could be good predictor of their  
5 expected fertility. Mc Nown and Ridao-Cano (2005) carefully explore the endogeneity issue  
6 between fertility and labour force participation variables for the UK, running Granger causality  
7 tests that show evidence of extensive feedback between the two variables. Consequently, we do  
8 not think that fertility and participation are simultaneous decisions neither that fertility rates are  
9 fully exogenous. To model women's participation rates we will take an intermediate approach,  
10 trying to alleviate potential endogeneity biases by instrumenting fertility rates.  
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17 Other specific determinants of participation for this group are institutional features that help  
18 reconciling motherhood and market production, like maternal/parental leave or more generally  
19 the availability of childcare services. In this case it could be also argued that childcare services  
20 could be endogenous, in the sense that they are more likely to be available in countries where  
21 women participate in the labour force, thus implying that the provision of childcare is demand  
22 driven. However, scarcity of childcare services seems to be common in most of the countries of  
23 our sample (see for example Wrohlich (2005) for Germany, Choné *et al* (2003) for France and  
24 Chevalier and Viitanen (2003) for the UK). Additionally, Chevalier and Viitanen (2002) show  
25 that childcare (granger) causes participation in the United Kingdom, but the reverse does not  
26 hold. In other words, childcare seems to be supply driven, which let us to safely assume that the  
27 direction of the causality goes from childcare availability to female participation.  
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35 Together with maternal/parental leave and the availability of childcare, the possibility of taking  
36 up a part-time job, could play an essential role on the arbitrage faced by prime age women  
37 between leisure, market work and home production, by enabling women to reconcile  
38 motherhood with professional life.<sup>18</sup> Therefore, these features are expected to have a positive  
39 impact on prime age female participation and are included in our equation specifications.  
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44 Estimation results for prime age women are presented in Table 1. Labour market institutions  
45 appear to be relevant for participation decisions of this group. The estimation coefficients of the  
46 unemployment benefit variables (both, replacement ratio and duration) and union density are  
47 negative, significant and very stable across specifications, while employment protection is  
48 found not to be significant. Labour taxes, as measured in Nickell and Nunziata (2001), i.e.  
49 country average tax revenues including income and consumption taxes, do not appear  
50 statistically significant. Column 4 shows the results with an alternative measure of tax burden,  
51 namely income tax net of cash benefits, which excludes consumption tax. The estimate  
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<sup>17</sup> This is confirmed by evidence on the activity rates of women, which drops significantly after the birth of the second child. In 2005, the activity rate of European women aged 20 to 49 years old with no children reached 77%. It drops by 5 percentage points (p.p.) for women with one child of pre-school age; by 19 p.p. with two children; and by 37 p.p. with 3 or more children.

<sup>18</sup> Recent studies using micro data have found evidence in support of this; see for example Del Boca *et al.* (2005).

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2 coefficient for this variable is equally non-significant in our regression. These results were  
3 somehow expected, because both measures are country average tax revenues, while the relevant  
4 variable to capture the impact of taxes on prime age female participation should perhaps refer to  
5 the second earner in the household. This tax rate is not available for our sample due to the fact  
6 that some of the countries have family taxation and it is not possible to allocate the various tax  
7 reliefs between household partners. Additionally, there are difficulties to make comparable the  
8 different tax income legislation across countries. Nevertheless, an interesting attempt to  
9 construct a measure of second earner tax rate for OECD countries has been made in Jaumotte  
10 (2003).<sup>19</sup> We also introduced this variable in our estimations, but it turned out having a non-  
11 significant coefficient. As regards ALMP that may have an impact in this group, OECD  
12 measures of total expenditure on ALMP, expenditure on training programmes and on  
13 employment subsidies, each one of them as percentage of GDP, turned out to be non-  
14 significant in our estimations.

15  
16 Concerning other institutional features as childcare support, maternity/parental leave measured  
17 in weeks (taken from Gauthier and Bortnik, 2001) seem to have an encouraging effect on  
18 participation if the leave is not too long. According to our estimations, the effect of  
19 maternity/parental leave becomes negative after approximately 8 to 9 months.<sup>20</sup> We encountered  
20 difficulties to find proxies for other kinds of childcare support for our sample. We tried three  
21 different variables to account for childcare availability and child benefits, namely public  
22 childcare expenditure per child in formal day care from Jaumotte (2003), family allowances per  
23 child (Gauthier, 2003) and public expenditure in child benefits as percentage of GDP (calculated  
24 from Eurostat data). All of them reduced substantially the size of our sample and none of them  
25 was found to be statistically significant, failing then to capture the potential positive impact of  
26 childcare availability on female participation.

27  
28 If labour market institutions had remained at the 1980's level the participation of women aged  
29 25-54 would have increased in the Netherlands almost 10% less than predicted, 15% less than  
30 predicted in Portugal or 20% less in the UK. By contrast, the development of labour market  
31 institutions has prevented participation rates from further increase in Italy and Finland; this is  
32 mainly due to the rise of unemployment benefit replacement ratio in these two countries. All  
33 this can be seen in the first panel of Chart 2, which gives an idea of the net contribution that the  
34 development of some of the variables considered in the regressions make to the total change in  
35 female labour force participation in each country. It compares changes in participation predicted  
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58 <sup>19</sup> We are most grateful to Florence Jaumotte for kindly allowing us to use tax and childcare related variables from her  
59 database. Jaumotte uses a proxy for relative tax rate on second earners at 67 % of APW (Average Production  
60 Worker earnings) calculated as the ratio between average tax rate on second earner earning 67 % of APW (with  
husband earning 100 per cent of APW, and two children) and average tax rate on a single individual earning 67% of  
APW. For more details see Jaumotte (2003).

<sup>20</sup> Ruhm (1998), Edin and Gustavsson (2005) Ondrich *et al* (2003) also found that very long parental leave could  
make it more difficult for women to return to work.

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2 by our models with those obtained had specific explanatory variables remained constant since  
3 the beginning of the 1980s.  
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6 Regarding the influence of prevailing economic conditions, their role is only captured by the  
7 unemployment rate, with a statistically significant and negative coefficient, which reflects  
8 discouragement effects, due to low attachment to the labour market. Our measure of aggregate  
9 wage turns to be non-significant despite several attempts to improve it. In order to account for  
10 the influence of potential earnings we constructed a measure of real wage for women using the  
11 average wage gap (unadjusted for skills) provided by Eurostat and gender weights in total  
12 employees. Data prior to 1994 was assumed on the basis of qualitative trends reported by the  
13 European Industrial Relations Observatory. This variable did not provide very satisfying results.  
14 Similarly, several interpolations of different indicators of education available on a 5 year  
15 average basis did not provide conclusive results.  
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18  
19 Turning to the results related to the relationship between fertility and participation, the variable  
20 fertility rates as such,<sup>21</sup> turns out to be non-significant when imposing a common coefficient for  
21 all the countries, see column 1 to 4 in Table 1. If we allow for country specific coefficients, they  
22 turn out significant and negative for all the countries except for Sweden, the Netherlands and the  
23 UK for which the estimated coefficients are significant but positive. These results are not  
24 reported to save space (see instead column 5, which reports the result when we impose a  
25 common coefficient for all the countries with negative relationship and a different one for  
26 Sweden, the Netherlands, and the UK). In sum, even after controlling for other covariates, the  
27 relationship between fertility rates and participation rates seems to be quite heterogeneous  
28 across countries to the extreme of being positive in some cases and negative for the rest.  
29 Interpreting these positive coefficients in terms of causality, i.e. having more children causes  
30 female participation rates to be higher, could be quite adventurous.<sup>22</sup> Rather, a positive  
31 relationship could be an indication that we have not fully controlled for some factors that make  
32 fertility and participation moving in the same direction in these three countries, obvious  
33 candidates could be childcare services or any other factor that helps to reconcile family and  
34 work. In other words, the coefficients could be simply partial correlations. Finding valid  
35 instruments could help to disentangle the casual relationship between fertility and participation  
36 rates. We attempt to do this in column 6 of Table 1, using lags of fertility rates and some  
37 indicators on the desirability of having children as instruments.<sup>23</sup> After instrumenting the  
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58 <sup>21</sup> In the estimations reported in Table 1, fertility rates refer to women over 19 year of age, to exclude a potentially  
59 distorting effect of the high teenager's fertility in the UK.

60 <sup>22</sup> Although, one could argue that having more kids will require higher family income and therefore be an incentive  
for women to work (provided that child care services are available).

<sup>23</sup> The social indicators are drawn from the World Values Survey and correspond to the average ideal number of  
children per family and the percentage of the sample that in each country thinks that the ideal number of children  
per family is three or more.

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2 coefficients of fertility rates of Sweden, the Netherlands and the UK, they are still positive; this  
3 could shed some doubts about the adequacy of our instruments.  
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6 The availability of part-time jobs, which can help women to reconcile work and family life, is  
7 found to have a positive influence on prime age female participation. The most remarkable  
8 cases are those of Belgium, Italy, and Ireland where according to chart 2a, keeping the ratio of  
9 part-time jobs at the initial level would have translated into a loss of around 30% of the total  
10 predicted increase in prime age participation, and of around 20% in the Netherlands. In the  
11 results shown in Table 1 we used the percentage of women (of all ages) working part-time as a  
12 proxy to the availability of part-time jobs. Alternatively, we tried the ratio of employment in  
13 services to total employment, since part-time jobs are mainly concentrated in the services sector  
14 and employment in the service sector has been booming over the last two decades. Results were  
15 very similar.  
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19 Finally, we introduced the percentage of parliamentary seats occupied by women as a proxy for  
20 gender discrimination. This variable can be seen as reflecting the changing role of women in the  
21 society. Its coefficient is found to be positive but statistically significant only in a few  
22 specifications.  
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### 25 26 27 28 29 30 3.2. Participation rates of older women

31  
32 The participation rates of women aged 55 to 64 years old have slightly increased in most of the  
33 countries of our sample, with the exception of France and Finland. Sweden, Denmark, Ireland  
34 and the UK kept the highest participation rates during the whole sample period.  
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37  
38 In addition to the general determinants of participation previously discussed, older women's  
39 participation decisions are expected to be influenced by some specific institutional features.  
40 Two specific institutions are considered in this group, both of them trying to capture the  
41 retirement system framework. The first one is the official retirement age, which should enable to  
42 take into account differences in the legal systems across countries. It has remained broadly  
43 stable over time in most countries, but the differences across countries are significant. The  
44 second institutional factor tries to capture differences in social protection across countries, by  
45 measuring the expenditure on social protection for old aged people as a percentage of GDP. In  
46 general, this ratio, which shows some heterogeneity in social protection at the country level, has  
47 increased over time, partly reflecting the ageing of the population in all European countries.<sup>24</sup>  
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51 The participation behaviour today of women aged 55-64 is quite likely to be linked to their  
52 participation decisions when they were 25-54 years old. In order to capture these cohort effects  
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<sup>24</sup> Variables on retirement systems are from Blöndal and Scarpetta (1999). For more details see Data Annex.



1  
2 in our estimations, we also included as a covariate the participation rate of prime-age women  
3 lagged 10 years.<sup>25</sup>  
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5  
6 The results of the estimations are shown in Table 2. Starting with the cyclical factors, which are  
7 measured by the unemployment rate and real wages, both are found to be non-significant. When  
8 separating real wages by gender, although the signs are the expected ones (i.e. negative for  
9 males and positive for females) both are found to be non-significant. This suggests that  
10 participation of the oldest group is mainly explained by factors of a more structural nature.  
11 Indeed, Table 2 shows that cohort effects, which measure mainly preferences, but, indirectly,  
12 could also reflect institutions and social norms, play a determinant role in explaining the  
13 participation rate of this group. Chart 2b shows that keeping the cohort effect at the early 1980s  
14 levels would have resulted in a lower increased in participation levels in all the countries.  
15 Cohort effects have even prevented Italy, France, Finland, and Spain from null or negative  
16 (predicted) increases in participation.  
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24 As regards the institutional framework, retirement age is, as expected, positively correlated with  
25 participation. In this case, however, we need to control for the influence of Spain in our panel,  
26 where the retirement age appears to be relatively less binding than in other countries (see  
27 columns 3 and 4, Table 2). Expenditure in old age social protection programmes is also found  
28 significant and has a negative effect on participation.<sup>26</sup> By contrast, the expenditure, as  
29 percentage of GDP, on ALMP linked to this age group, i.e. training and employment subsidies  
30 were also introduced as regressors, but they resulted to be non-significant and therefore were  
31 not included in the table. Finally, most of the remaining labour market institutions, including  
32 union density, employment protection and labour taxes, have negative effects on participation.  
33 Remarkably, should labour market institutions have remained unchanged since 1980 in  
34 Germany, the Netherlands and Portugal, the change in participation would have halved that  
35 predicted by the model (see Chart 2b).  
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### 45 3.3 Participation rates of young women

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47 Young European women, aged 15 to 24 years, make up for a far more heterogeneous group than  
48 their elders as far as participation to the labour force is concerned. Their participation rate varies  
49 widely across countries, from no higher than 32% in Belgium to nearly 70% in the Netherlands  
50 in 2000. Yet, they all share two common characteristics. First, their participation rates are  
51 generally lower than that of prime-age women and higher than that of older women (aged 55 to  
52 64). Second, unlike their elders, participation rates of young women declined between the 1980s  
53 and the 1990s in virtually all European countries, with the remarkable exception of the  
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<sup>25</sup> Constructed using ten-year data published by the International Labour Office (ILO), which have been interpolated to obtain annual data by dividing the change homogeneously through time.



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Netherlands. On average, the participation rate of young European women fell by nearly 8 percentage points between 1980 and 2000. The magnitude of that fall, however, differs substantially among countries. In general, countries with a high participation rate of young women in the 1980s (such as Denmark or the United Kingdom) saw less of a fall in participation.

Along with the list of general determinants of participation discussed earlier, it is likely that young women are specifically influenced by three additional factors. First, enrolment in education appears to be extremely relevant for this age group. Young women may indeed decide either to continue studying in order to increase their skills and their chances to easily get a job in the future, or simply, to avoid being unemployed. Second, flexible types of contracts (i.e. temporary and part-time jobs) could be an incentive both for firms, since their costs are lower, and for workers, since they provide a temporary attachment or a “stepping stone” to get a better job. Third, the existence of minimum wages could exert a negative influence on the hiring of low productivity workers, and therefore reduce the expectations of young workers, who are likely to have less experience and lower productivity, to get a job and participate.

Estimation results for the younger age group are presented in Table 3. As regards the role of institutions, taxes appear to consistently discourage the labour supply of young women in all estimations. Labour taxes increased in all European countries (but the Netherlands and the United Kingdom) between the 1980s and the 1990s. Their significant negative influence on participation may suggest that, for young women, the substitution effect of taxes exceeds the favourable income effect they might have on participation. In other words, participating in the labour force would not bring along sufficient income to make participation worthwhile compared with staying out of the labour force. The other two institutional features that also appear to have a strong influence on young female participation rates are employment protection and the duration of unemployment benefits. Employment protection is expected to reduce the employability of young workers relative to more experienced and productive workers. The role that unemployment benefits may play is in principle less clear, but the negative sign indicates that, like for the other groups, is strengthening the union bargaining power of the insiders and reducing outsiders’ employability. By contrast, when considering the impact of the overall expenditure in ALMP (as % of GDP), and of the youth measures in particular, we found that both have a positive influence in participation, although only the overall measure turns out to be significant. Looking at country details (Chart 2c), we find that changes in labour institutions did not have a homogenous impact across countries. For example, the impact of labour institutions counteracted the decrease in young female participation in most

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<sup>26</sup> Blöndal and Scarpetta (1999) find that this variable does not influence participation decisions for older males. Our result for females can be possibly explained by a lower degree of attachment of older females to the labour market.

1  
2 European countries, but it had a clear worsening effect in some others (in particular, France,  
3 Ireland and Italy).

4  
5 Economic conditions have a significant impact on the participation rate of young women. The  
6 lower the unemployment rate the higher is participation. This surely illustrates the  
7 discouragement effect; positive economic developments increase the probability to find a job  
8 and attract people on the labour market. Inversely, sluggish developments on that same labour  
9 market discourage people from participating. Wage variables give unsatisfying results although  
10 several different variables have been tested. Neither aggregate real average wages (e.g. equation  
11 4, Table 3) nor female real wages (equation 6, Table 3) seem to matter in explaining young  
12 women participation. However, this may only be due to the shortcomings of our wage variables.  
13 Similarly, a variable measuring minimum wages is found insignificant. Once again, this may be  
14 due to data shortcomings. Information on minimum wage is available for no more than 5  
15 countries, so that estimations including minimum wage reduce the number of observations by  
16 more than half. Moreover, countries which do not have a statutory minimum wage (namely  
17 Denmark, Germany, Italy, Ireland, Sweden and the United Kingdom) may nevertheless have  
18 other means to ensure a minimum remuneration (via collective agreements for example). We  
19 have tried specifications including the level of minimum wage, a dummy for the existence of a  
20 statutory minimum wage and the interaction of this dummy with the level of minimum wage,  
21 without success. We therefore decided to leave minimum wage out of our estimations.

22  
23 As expected, enrolment in the education system seems to affect negatively the participation rate  
24 of young women. There is no doubt that the continued rise of the proportion of young people in  
25 education observed in our sample has been accompanied by a significant reduction of the  
26 participation rate of this group. Chart 2c confirms the importance that education enrolment has  
27 had on all European countries for young participation rates. Like fertility decisions for prime-  
28 age women, education enrolment could present some endogeneity problems. Going to university  
29 or going to find a job can indeed be intermingled decisions. Therefore, in an attempt to control  
30 for potential endogeneity problems, education enrolment has been instrumented using lags.

31  
32 Table 3 also includes estimates of the impact of the part-time ratio on young female  
33 participation. In order to take into account the likely endogeneity problem attached to the use of  
34 a part-time ratio specific to the youngest age group, we reported the results with the share of  
35 part-time employment in the 15-64 age group. Results show that part-time contracts have a  
36 positive influence on participation. Chart 2c shows, with the only exception of Denmark, part-  
37 time employment has significantly contributed to limit the decline in young female participation  
38 rates. In an alternative estimation (column 5, Table 3) we have also included the temporary ratio  
39 but it does not appear to be significant. This can be due to the fact that these types of contracts  
40 can interact between themselves, i.e. part-time contracts can be temporary or permanent, and  
41 therefore some overlap may arise.

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Apparently, these results confirm the influence of the institutional framework in explaining the participation rates of young European women. More importantly, choices of further education or flexible types of work seem to play a prominent role. Yet, staying at school or at university, albeit surely depending on preferences, may indirectly be highly influenced by the government subsidies and grants to education, which in Europe are significantly larger than on the other side of the Atlantic. Similarly, flexible types of work are generally more highly regulated in Europe than they are in the United States, pointing to further indirect influence of the institutional sphere.

#### 4. Conclusions

Why don't European women work more? Is it due to the burden of excessively stringent labour market institutions or to general preference for leisure? By stepping away from the micro-analysis of individual determinants of participation, this study provides an interesting viewpoint from which to consider the question.

Our paper discards any doubt on the influence of institutions on women's participation. For all three age groups considered, the strictness of labour market institutions negatively affects participation decisions. Indeed, the declining tightness of the institutional framework ruling labour markets in some countries over the last two decades appears to have significantly favoured women's participation, in particular of the older age group. We also found that measures aimed at reconciling motherhood with professional life, such as maternity leave, should favour participation to the labour force.

Furthermore, a number of specific decisions appear to have driven participation developments of different age groups. For example, for the younger age group, the increasing use of flexible forms of work (such as part-time employment) has been found to explain a large part of participation developments between the 1980s and the 1990s. Education enrolment, which can be seen as an alternative to finding a job or being unemployed, has been a major driving force behind the decline in young female participation. Turning to prime-age women, a fertility variable, which can be seen as the outcome of the decision to have children versus participation to the labour force, significantly curbs labour force participation. These decisions, although linked to preferences or social norms at first glance, could be also heavily shaped by the changing institutional framework. Finally, the participation of oldest age group appears significantly influenced by the lifetime behaviour of older women. If they did not participate at an earlier age, they are not likely to participate at an older age. This points to the weight and influence of cultural habits, which may also be reflected in the institutional framework.

As pointed out in the introduction of this paper, identifying all factors influencing female labour force participation is a pre-requisite to the successful design of efficient policy measures that can bring inactives to the labour force. This paper takes a step in that direction by showing that

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there is evidence that institutional factors, together with preferences and economic factors have shaped female participation decisions.

For Peer Review

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**Table 1: Panel data estimates of participation rates. Prime-age females 25-54**

	(1)	(2)	(3)	(4)	(5)	(6)*
<b>Labour market institutions</b>						
UB Replc. Ratio	-0.273 (-2.44)	-0.263 (-2.36)	-0.287 (-2.17)	-0.218 (-1.81)	-0.322 (-3.61)	-0.276 (-2.64)
UB duration	-0.229 (-2.10)	-0.222 (-2.03)	-0.242 (-2.13)	-0.243 (-2.18)	-0.295 (-3.07)	-0.314 (-3.03)
Union density	-1.250 (-4.62)	-1.247 (-4.65)	-1.238 (-4.22)	-1.204 (-4.10)	-0.768 (-3.61)	-0.763 (-2.84)
Empl. Protection			0.085 (0.78)	0.098 (0.82)		
Labour taxes			0.317 (1.07)			
Labour taxes - alternative				-0.021 (0.21)		
<b>Group-specific institutional factors</b>						
Maternity leave weeks					0.034 (3.43)	0.024 (2.13)
Maternity leave weeks squared/100					-0.049 (-4.62)	-0.036 (-2.96)
<b>Other determinants</b>						
Unemployment rate	-0.014 (-3.70)	-0.014 (-3.68)	-0.014 (-3.73)	-0.014 (-3.50)	-0.006 (-1.77)	-0.017 (-4.04)
Real wage	0.137 (1.48)					
Real wage – females		0.154 (1.74)	0.149 (1.63)	0.153 (1.67)	0.121 (1.59)	0.090 (0.98)
Fertility rate	-0.036 (-0.50)	-0.040 (-0.55)	-0.023 (-0.33)	-0.028 (-0.39)	-0.393 (-4.93)	-0.228 (-2.06)
Fertility rate* Sweden & Netherlands & UK					1.318 (7.96)	0.907 (3.37)
Female part-time ratio	0.028 (8.03)	0.028 (8.08)	0.028 (7.93)	0.029 (7.97)	0.024 (7.43)	0.026 (7.00)
% Women Parliamentary seats	0.003 (1.13)	0.002 (1.07)	0.003 (1.32)	0.003 (1.29)	0.003 (1.45)	0.002 (1.08)
Obs No.	196	196	196	196	184	184

Except when indicated, estimations are performed by FGLS including time and country dummies. \* 2 stages FGLS. Instruments included in the equation are lagged (3 to 5 lags) fertility, some indicators on the desirability of having children taken from the Word Values Survey, lagged unemployment (2 and 3 lags), productivity and output gap. t-statistics in parentheses. Sample period: 1984-2000. Countries include Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain, Sweden and the UK. For variable definitions see the text and annex.

Table 2: Panel data estimates of participation rates. Old females 55-64

	(1)	(2)	(3)	(4)
<b>Labour market institutions</b>				
UB Replc. Ratio	-0.067 (-0.65)	-0.056 (-0.55)		
UB duration	-0.318 (-3.12)	-0.300 (-2.90)	-0.301 (-2.97)	-0.269 (-2.56)
Union density	-0.937 (-3.74)	-0.857 (-3.31)	-0.878 (-3.54)	-0.927 (-3.53)
Empl. Protection	-0.487 (-4.21)	-0.481 (-4.15)	-0.480 (-4.11)	-0.472 (-4.08)
Labour taxes	-0.469 (-1.79)	-0.457 (-1.76)	-0.516 (-2.05)	-0.434 (-1.78)
<b>Group-specific institutional factors</b>				
Old-age social protection (% GDP)	-0.043 (-2.65)	-0.042 (-2.59)	-0.042 (-2.59)	-0.045 (-2.97)
Retirement age	0.003 (0.11)	0.007 (0.30)	0.119 (7.39)	0.115 (6.89)
Retirement age * Spain			-0.015 (-4.40)	-0.014 (-4.47)
<b>Other determinants</b>				
Unemployment rate	0.004 (0.46)	0.003 (0.33)	0.002 (0.31)	0.005 (0.57)
Real wage	0.106 (0.67)		0.125 (0.79)	
Real wage – males		-0.113 (0.28)		-0.118 (0.32)
Real wage – females		0.235 (0.63)		0.189 (0.53)
Cohort effect	0.610 (4.74)	0.602 (4.65)	0.585 (4.65)	0.648 (4.09)
Obs. No.	236	236	236	236

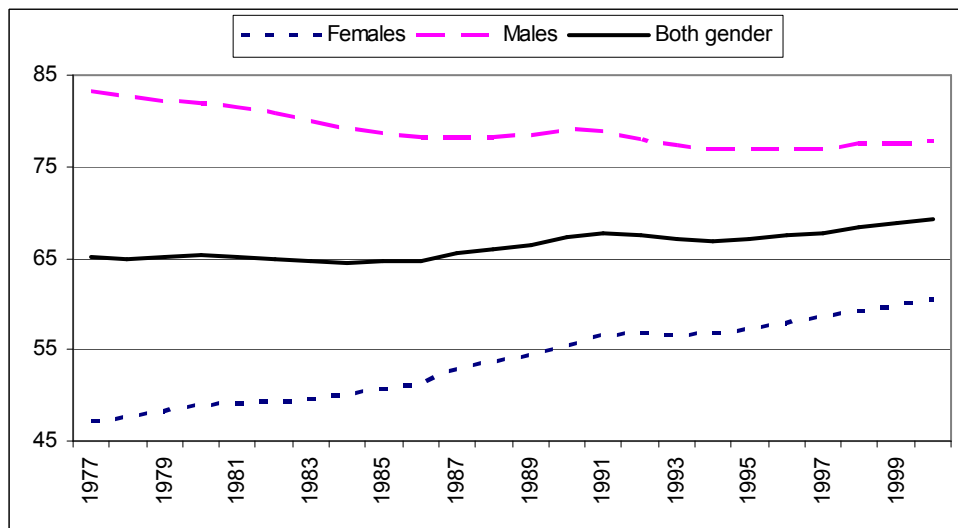
Estimations are performed by 2 stages FGLS including time and country dummies. The instruments included in the equations are labour productivity, the output gap and lags. t-statistics in parentheses. Sample period: 1980-2000. Countries include Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, UK. For variable definitions see the text and annex.

**Table 3: Panel data estimates of participation rates. Young females 15-24**

	(1)	(2)	(3)	(4)	(5)	(6)
<b>Labour market institutions</b>						
UB Replc. Ratio	0.218 (1.32)	0.131 (0.70)	0.163 (0.86)			
UB duration	-0.261 (-2.21)	-0.354 (-3.04)	-0.283 (-2.39)	-0.375 (-3.23)	-0.377 (-3.26)	-0.389 (-3.29)
Union density	0.085 (0.26)	-0.185 (-0.53)	0.039 (0.11)			
Employment Protection	-0.396 (-2.81)	-0.473 (-3.43)	-0.484 (-3.40)	-0.389 (-2.81)	-0.393 (-2.64)	-0.381 (-2.84)
Labour taxes	-1.552 (-3.96)	-1.760 (-4.22)	-1.761 (-4.19)	-1.670 (-4.05)	-1.676 (-3.78)	-1.689 (-4.19)
Active labour market programmes (% GDP)		0.132 (3.49)		0.138 (3.88)	0.122 (3.41)	0.160 (5.07)
Active labour market progr.--youth (% GDP)			0.065 (0.69)			
<b>Other determinants</b>						
Unemployment rate	-0.028 (-5.67)	-0.034 (-6.45)	-0.033 (-6.29)	-0.033 (-6.52)	-0.034 (-5.35)	-0.034 (-6.65)
Real wage	-0.533 (-2.27)	-0.032 (-1.26)	-0.568 (-2.45)	-0.281 (-1.22)	-0.260 (-1.25)	
Real wage females						-0.002 (-0.02)
Young in education	-0.021 (-3.25)	-0.021 (-3.08)	-0.018 (-2.64)	-0.025 (-3.53)	-0.027 (-4.03)	-0.026 (-4.02)
Part-time ratio 15-64	0.019 (3.20)	0.021 (4.10)	0.019 (3.70)	0.020 (4.08)	0.020 (3.70)	0.021 (4.38)
Temporary employment					0.057 (0.28)	
Obs. No.	172	167	167	167	167	167

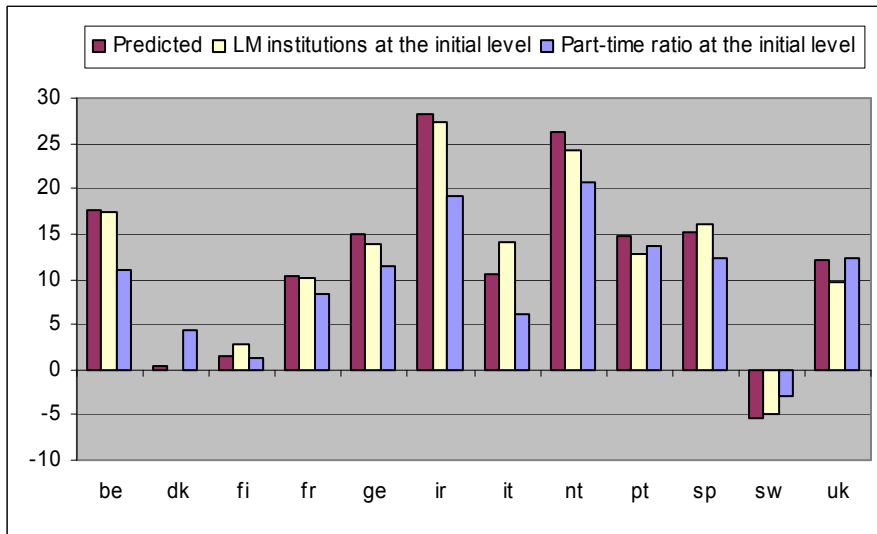
Estimations are performed by 2 stages FGLS including time and country dummies. The instruments included in the equations are labour productivity, the output gap and lags. t-statistics in parentheses. Sample period: 1985-2000. Countries include Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, UK. For variable definitions see the text and annex.

**Chart 1: Labour force participation in the EU**  
(as a percentage of working age population)

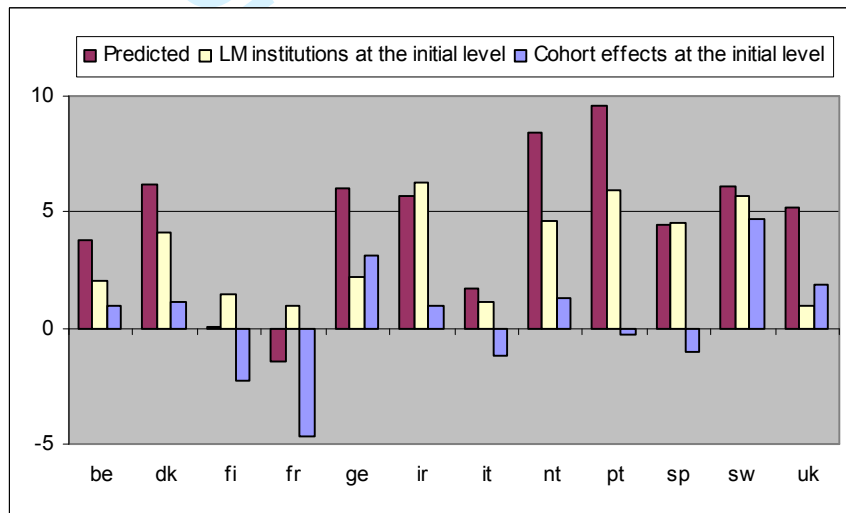


Source: OECD.

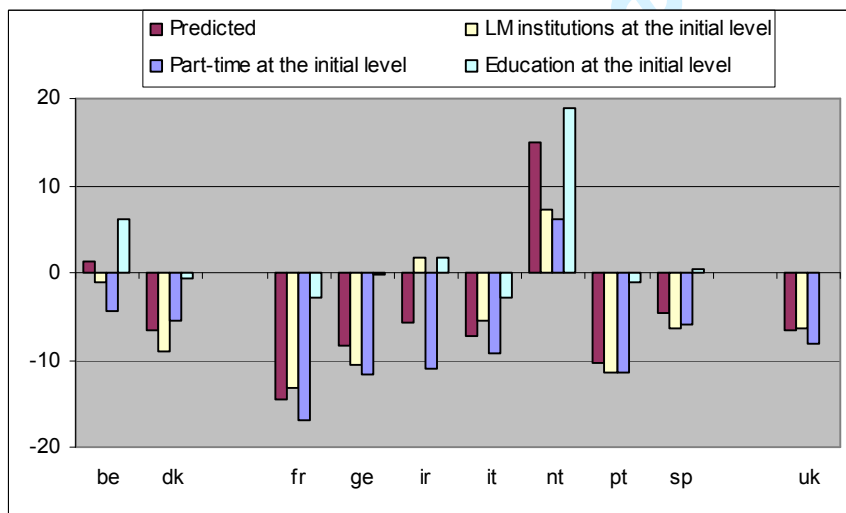
**Chart 2: Contribution of different factors to participation developments<sup>(\*)</sup>**  
*(in percentage points)*  
*a: women 25 to 54 years old*



*b: women 55 to 64 years old*



*c: women 15 to 24 years old*



(\*) This chart compares predicted changes in participation with those obtained if specific explanatory variables are maintained at the levels of 1980, in order to show the relevance of the developments in each selected variable to explain changes in participation. As regards institutions, all institutional determinants shown in Tables 1 to 3 are considered (models 4, 3 and 4 respectively), excluding those that are non-significant. Finland and Sweden are not shown in chart c, given that the predicted series is too short.

## ANNEX: data sources and definitions

**Participation rate:** defined as the percentage of people in the labour force in the total working age population. The total labour force (or currently active population) comprises all persons aged 15 to 64 who are either employed or actively looking for a job. The working age population comprises all people aged between 15 and 64 years old. The data on participation rates and unemployment rates are derived from the annual European Community Labour Force Survey, which has been conducted every year in the spring since 1983.<sup>27</sup> OECD and ILO data have been used to extend participation rates back to 1980.

**Unemployment rate:** defined as the percentage of people actively looking for a job into the labour force. The data on unemployment rates are derived from the annual European Community Labour Force Survey, which has been conducted every year in the spring since 1983. OECD data have been used to prolong the unemployment rate back to 1980.

**Real wage:** defined as overall nominal compensation of employees (national account concept) deflated by the consumption deflator, obtained from the European Commission AMECO database. Male and female real wage have been calculated using annual Eurostat statistics on the average wage gap between male and female workers, non adjusted for the development of part-time.

**Vacancy rate:** defined as the number of vacant jobs as a percentage of the labour force. Vacancy data are obtained from the OECD.

**Fertility rate:** defined as the mean number of children that would be born alive to a woman during her lifetime if she were to pass her childbearing years conforming to the fertility rates by age of a given year. It is obtained from the NewCronos database, Eurostat.

**Part-time ratio:** defined as the fraction of part-time workers in total employment, obtained from the annual European Community Labour Force Survey.

**Services ratio:** defined as the percentage of employment in the services sector, obtained from the European Commission AMECO database.

**Old-age social protection:** includes old age pensions and the provision of goods and services (other than medical care) to the elderly, as a percentage of GDP. These data are drawn from European Social Statistics, Eurostat.

**Children benefit:** Three measures of children benefits were used. First, a measure including support (other than medical care) in connection with pregnancy, childbirth and the care of children and other dependent family members, as a percentage of GDP. These data are drawn from European Social Statistics, Eurostat. Second, we used monthly family allowances for the first, second and third child as a percentage of monthly earnings. These data are drawn from the Gauthier database (2003). Finally, a third measure refers to public childcare spending per child in formal day care and pre-primary school (from Jaumotte, 2003).

**Maternity/parental leave:** refers to the official duration of maternity/parental leave in the event of a child birth (in weeks). In some countries, this leave may be shared between parents. The data is drawn from the Comparative Maternity, parental, and childcare leave and benefits database (Gauthier, 2001).

**Women parliamentary seats:** defined as the percentage of seats in the national parliament occupied by women. United Nations Statistics and ECB calculations.

**Unemployment benefit replacement ratio:** refers to first year of unemployment benefits, averaged over family types of recipients, as a percentage of average earnings before tax. Data are taken from Labour Market Statistics Database, Nickell and Nunziata (2001).

**Unemployment benefit duration:** obtained as a weighted average of the replacement rate received the second and third years of unemployment and in the fourth and fifth years, relative in both cases to the replacement rate in the first year. Data are taken from Labour Market Statistics Database, Nickell and Nunziata (2001).

**Union density:** defined as the ratio of union members to total employees. Data are taken from Labour Market Statistics Database, Nickell and Nunziata (2001).

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<sup>27</sup> Eurostat compiles these data and a detailed description of the sampling methods and adjustment procedures can be found in the latest *Labour Force Survey – Methods and definitions*, 1998. There is no information available for countries before they joined the European Union (i.e. for Spain and Portugal prior to 1986, for Austria and Finland prior to 1995). The series were extended to 1980, whenever possible, using OECD Labour Force Statistics or directly, relevant national sources. German data prior to 1991 only refer to West Germany.

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2 Employment protection: measures in a range between 0 and 2 the strictness of employment protection.  
3 Data are taken from Labour Market Statistics Database, Nickell and Nunziata (2001).

4 Labour taxes: Two measures were used. The first tax measure is defined as the sum of the employment  
5 tax rate, the direct tax rate and the indirect tax rate. Data are taken from Labour Market Statistics  
6 Database, Nickell and Nunziata (2001). The second tax measure is defined as the sum of total personal  
7 income tax and employees' social security contributions minus the cash benefits, as a percentage of total  
8 gross wages. Data are then taken from the OECD tax database.

9  
10 Active labour market programmes (ALMP): Public expenditure on labour market programmes expressed  
11 as a percentage of GDP. It covers five main categories, from which we have focussed on labour market  
12 training, youth measures and subsidised employment. OECD.

13 Retirement age: defined as the official retirement age. Data are taken from Blöndal S. and S. Scarpetta  
14 (1999).

15 Minimum wage: defined as the ratio of the minimum wage to the medium wage. OECD.

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17 World Value Survey: The World Values Survey is a worldwide investigation of socio-cultural and  
18 political change, conducted by a network of social scientists at leading universities all around the world.  
19 Interviews have been carried out with nationally representative samples of the general public in more than  
20 80 countries. A total of four waves have been carried out since 1981 (more information is available on  
21 <http://www.worldvaluessurvey.org>). During our investigation we tested survey replies to questions such  
22 as "What do you think is the ideal size of the family? How many children, if any?"  
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## NOTE

What follows are tables A1, A2 and A3 (mentioned in the cover letter) aiming at illustrating the results, not shown in the paper, when we addressed the referee's suggestion to introduce among our explanatory variables some measures of Active Labour Market Policies (ALMP) as described in Martin (2000) and Martin and Grubb (2001).

These tables are only for information.

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**TABLE A1: Panel data estimates of participation rates. Prime-age females 25-54**  
Specification as column 6 of table 1 (page 20) with ALMP variables

<b>Labour market institutions</b>						
UB Replac Ratio	-0.276 (2.76)**	-0.341 (2.40)*	-0.344 (2.38)*	-0.343 (2.31)*	-0.34 (2.36)*	-0.341 (2.36)*
UB Duration	-0.314 (3.17)**	-0.342 (3.21)**	-0.345 (3.26)**	-0.344 (3.29)**	-0.345 (3.35)**	-0.337 (3.18)**
Union Density	-0.763 (2.97)**	-0.778 (3.04)**	-0.822 (3.21)**	-0.86 (3.35)**	-0.789 (3.06)**	-0.857 (3.34)**
ALMP total expenditure as % GDP		<b>0.004</b> <b>(0.12)</b>				
ALMP training+ Emp subs %GDP).			<b>-0.004</b> <b>(0.1)</b>			
ALMP training (%GDP)				<b>-0.049</b> <b>(0.87)</b>		<b>-0.049</b> <b>(0.87)</b>
ALMP: Empl. Subsidies(%GDP)				<b>0.001</b> <b>(0.02)</b>	<b>0.001</b> <b>(0.02)</b>	
<b>Group specific institutions</b>						
Maternity leave weeks	0.024 (2.23)*	0.025 (2.15)*	0.025 (2.20)*	0.025 (2.23)*	0.029 (2.47)*	0.024 (2.14)*
Maternity leave weeks squared/100	-0.036 (3.10)**	-0.035 (2.97)**	-0.036 (3.00)**	-0.035 (2.97)**	-0.04 (3.30)**	-0.033 (2.88)**
<b>Other determinants</b>						
Real wage - females	0.09 (1.02)	0.106 (1.13)	0.116 (1.23)	0.118 (1.24)	0.123 (1.31)	0.117 (1.24)
Fertility rate	-0.228 (2.16)*	-0.243 (3.61)**	-0.235 (4.00)**	-0.198 (3.61)**	-0.254 (3.54)**	-0.203 (3.95)**
fertility rate * SWD&NL&UK	0.907 (3.53)**	0.97 (3.92)**	0.916 -1.76	0.962 (3.90)**	0.966 (3.73)**	-0.017 (3.61)**
unemployment rate	-0.017 (4.23)**	-0.018 -1.82	-0.017 (3.55)**	-0.016 (1.45)	-0.016 (1.9)	0.965 (1.5)
female part-time ratio	0.026 (7.32)**	0.027 (7.11)**	0.027 (7.17)**	0.027 (7.04)**	0.028 (7.61)**	0.026 (6.89)**
% women in parliamentary seats	0.003 (1.13)	0.002 (0.99)	0.003 (1.04)	0.002 (0.91)	0.002 (1.00)	0.002 (0.89)
Constant	0.393 (0.71)	1.572 (3.62)**	0.864 (2.95)**	0.249 (0.45)	0.809 (2.78)**	2.094 (4.86)**
Obs. No	184	175	175	175	175	175

2 stages FGLS. Instruments included in the equation are lagged (3 to 5 lags) fertility, some indicators on the desirability of having children taken from the Word Values Survey, lagged unemployment (2 and 3 lags), productivity and output gap. t-statistics in parentheses. Sample period: 1984-2000. Countries include Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain, Sweden and the UK. For variable definitions see the text and annex.

**TABLE A2: Panel data estimates of participation rates. Prime-age females 25-54**  
Specification as column 5 of table 1 (page 20) with additionally ALMP variables

<b>Labour market institutions</b>						
UB Replac Ratio	-0.322 (3.61)**	-0.37 (3.03)**	-0.375 (3.01)**	-0.364 (2.91)**	-0.388 (3.15)**	-0.366 (3.03)**
UB Duration	-0.295 (3.07)**	-0.332 (3.19)**	-0.334 (3.41)**	-0.337 (3.32)**	-0.371 (3.83)**	-0.317 (3.17)**
Union Density	-0.768 (3.61)**	-0.801 (3.73)**	-0.824 (3.89)**	-0.78 (3.62)**	-0.785 (3.78)**	-0.813 (3.79)**
ALMP total expenditure as % GDP		<b>-0.007</b> <b>(0.27)</b>				
ALMP training + Employm. subsidies (%GDP)				<b>-0.015</b> <b>(0.48)</b>		
ALMP training (%GDP)			<b>-0.07</b> <b>(1.38)</b>			<b>-0.067</b> <b>(1.33)</b>
ALMP: Empl. Subsidies(%GDP)			<b>0.008</b> <b>(0.20)</b>		<b>0.009</b> <b>(0.23)</b>	
<b>Group specific institutions</b>						
Maternity leave weeks	0.034 (3.43)**	0.034 (3.24)**	0.038 (3.77)**	0.034 (3.30)**	0.038 (3.71)**	0.036 (3.54)**
Maternity leave weeks squared/100	-0.049 (4.62)**	-0.046 (4.32)**	-0.052 (4.85)**	-0.047 (4.37)**	-0.053 (4.86)**	-0.049 (4.59)**
<b>Other determinants</b>						
Real wage – females	0.121 (1.59)	0.151 (1.91)	0.161 (2.04)*	0.142 (1.82)	0.137 (1.78)	0.16 (2.03)*
Fertility rate	-0.393 (4.93)**	-0.44 (4.94)**	-0.436 (4.94)**	-0.441 (4.93)**	-0.443 (5.07)**	-0.436 (4.91)**
fertility rate * SWD&NL&Uk	1.318 (7.96)**	1.345 (8.00)**	1.373 (8.23)**	1.349 (7.98)**	1.358 (8.32)**	1.366 (8.09)**
unemployment rate	-0.006 (1.77)	-0.006 (1.72)	-0.005 (1.42)	-0.006 (1.89)	-0.006 (1.85)	-0.005 (1.50)
female part-time ratio	0.024 (7.43)**	0.025 (7.53)**	0.026 (7.72)**	0.025 (7.52)**	0.026 (8.08)**	0.025 (7.49)**
% women in parliamentary seats	0.003 (1.45)	0.003 (1.16)	0.003 (1.26)	0.003 (1.21)	0.003 (1.29)	0.003 (1.22)
Constant	-0.234 (0.57)	0.97 (4.20)**	0.896 (3.89)**	0.97 (4.18)**	0.943 (4.15)**	0.917 (3.97)**
Obs. No	184	175	175	175	175	175

Except when indicated, estimations are performed by FGLS including time and country dummies.

**Table A3: Panel data estimates of participation rates. Old females 55-64**  
 Specification as column 3 of table 2 (page 21) with additionally ALMP variables

<b>Labour market institutions</b>			
UB duration	-0.301 (-2.97)	-0.302 (-2.68)	-0.273 (-2.53)
Union density	-0.878 (-3.54)	-0.767 (-2.63)	-0.735 (-2.56)
Empl. Protection	-0.480 (-4.11)	-0.514 (-4.05)	-0.532 (-4.42)
Labour taxes	-0.516 (-2.05)	-0.340 (-1.10)	-0.311 (-1.00)
ALMP total expenditure as % GDP		<b>0.000</b> <b>(0.01)</b>	
ALMP training (%GDP)			<b>-0.082</b> <b>(-1.12)</b>
ALMP: Empl. Subsidies(%GDP)			<b>-0.073</b> <b>(-1.30)</b>
<b>Group-specific institutional factors</b>			
Old-age social protection (% GDP)	-0.042 (-2.59)	-0.019 (-1.02)	-0.019 (-0.96)
Retirement age	0.119 (7.39)	0.116 (7.05)	0.112 (6.81)
Retirement age * Spain	-0.015 (-4.40)	-0.010 (-3.01)	-0.010 (-2.80)
<b>Other determinants</b>			
Unemployment rate	0.002 (0.31)	-0.006 (-0.70)	-0.005 (-0.63)
Real wage	0.125 (0.79)	0.212 (1.15)	0.157 (0.83)
Cohort effect	0.585 (4.65)	0.577 (3.03)	0.606 (3.38)
Obs. No.	236	205	205

Estimations are performed by 2 stages FGLS including time and country dummies. The instruments included in the equations are labour productivity, the output gap and lags. t-statistics in parentheses. Sample period: 1980-2000. Countries include Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, UK. For variable definitions see the text and annex.