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ABSTRACT

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We consider and attempt to understand the gender wage gap across 24 EU member states, all of which share the objective of gender equality, using 2007 data from the European Union Statistics on Income and Living Conditions.* The size of the gender wage gap varies considerably across countries and selection corrections affect the offered gap, sometimes substantially. Most of the gap cannot be explained by the characteristics available in this data set. Quantile regressions show that, in most countries, the wage gap is wider at the top of the wage distribution ('glass ceilings') and, in fewer countries, it is wider at the bottom of the wage distribution ('sticky floors'). These features are related to country-specific characteristics that cannot be evaluated at the member state level. We use the cross-country variation in this large sample of member states to explore the influence of (i) policies concerned with reconciling work and family life and (ii) wage-setting institutions. We find that policies and institutions are systematically related to unexplained gender wage gaps.

NON-TECHNICAL SUMMARY

We study the wage gaps prevailing in the EU, having taken account of the productivity characteristics of the two genders and selection into working status. We find substantial unexplained gaps which are, however, related to the family reconciliation policies and wage setting institutions prevailing in the various member states. The wage gap is generally wider at the top and sometimes also wider at the bottom of the wage distribution. Policies to deal with the gender gap must be designed with care as they sometimes have unintended effects: For instance, more generous maternity leave policies are associated with higher wage gaps.

JEL Classification: J16, J31, J50, C21

Keywords: gender wage gap, selection, quantile effects, work-family reconciliation, wage-setting institutions

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* European Commission, Eurostat, cross-sectional EU SILC UDB 2007 - version 1 of March 2009. Eurostat has no responsibility for the results and conclusions of this paper.

1 Introduction

The reduction of labour market gender disparities has attracted considerable political and legislative attention in the European Union. Two different directives, the Racial Equality Directive and the Employment Framework Directive, define a set of principles that offer legal protection against discrimination. The EU Employment Guidelines, 2003/58/EC of July 22, 2003, indicate that "Member States will, through an integrated approach combining gender mainstreaming and specific policy actions, encourage female labour market participation and achieve a substantial reduction in gender gaps in employment rates, unemployment rates and pay by 2010". In this paper we examine the gender pay gap across the EU countries, all of which share the principles referred to above.

While a number of important studies have addressed some of these issues for some EU countries (see, *inter alia*, Arulampalam et al (2006), Olivetti and Petrongolo (2008), and Nicodemo (2009)), this paper focuses on the unexplained gaps, 'sticky floors' and 'glass ceilings' that can be discerned in all member states (MSs) and attempts to relate them to country-specific wage-setting institutions and to policies that reconcile work and family life. In order to do this effectively, it is necessary to use the maximum number of MSs available so as to achieve the maximum variability in institutional and policy settings. The 2007 EU Statistics on Income and Living Conditions (EU-SILC) dataset includes information on 24 of the 2007 MSs (all except Malta). This information is available on a consistent basis across MSs, thereby making it possible to implement a common protocol to measure the various gaps. We explore the degree of success of the conditioning set of common variables available in explaining the MS wage gaps, using the benchmark Oaxaca-Ransom (1994) decomposition, with and without Heckman (1974, 1979) corrections. The methodology of Olivetti and Petrongolo (2008) is also used to explore the impact of differential employment rates on the observed wage distributions and some noteworthy differences between the corrected wage gaps and those that emerge through the Heckman (1974, 1979) corrections are discerned. The variation in the gender-wage gap across the wage distribution is examined using quantile regression analysis, following the methodology proposed by Melly (2005). This allows us to

search for possible ‘sticky floor’ and ‘glass ceiling’ effects - see Albrecht *et al* (2003). With these gaps and effects established on a consistent basis across the 24 MSs, we consider the extent to which they are related to various country features. The OECD (2001) work-family reconciliation index, initially covering 14 EU and OECD countries, is recreated for the 24 EU countries in our sample and is used, along with the unionisation rate, to examine the relationship between gaps and effects on the one hand and country features on the other.

We find that the gender wage gap is positive and significant in all 24 EU MSs. Consistent with Nicodemo (2009), Arulampalam *et al* (2006), and other studies, the bulk of the observed wage differences cannot be explained by observed characteristics. When the Heckman (1974, 1979) corrections are carried out, wage gaps are still positive and significant in almost all countries. When the different imputation methodologies proposed by Olivetti and Petrongolo (2008) are used to correct for the possible sample selection created by divergent patterns of non-employment across countries, the median wage gap increases substantially for almost all countries. The quantile-based wage decompositions reveal the presence of ‘glass ceiling’ effects in the majority of countries and ‘sticky floor’ effects in a significant number of countries. Looking across the 24 MSs, the general unexplained part of the wage gap, as well as the glass ceiling and sticky floor effects appear to be systematically related to features of MS work-family reconciliation policies and their wage-setting institutions.

The objective in this literature has largely been to ensure that gender-specific features of wage distributions, especially among countries that share and promote the objective of gender equality, cannot be attributed to unobservable characteristics and that unexplained effects relate truly to female disadvantage. In single-country explorations, country-specific policies must remain an unobservable, captured only by intercept differences among gender-specific wage equations. Some hope of narrowing down the unexplained effects exists when several country experiences can be compared. This likelihood is clearly enhanced when the number of countries studied is increased. Yet, international explorations run the risk of muddling possible gender disadvantage with data consistency problems and country differences in institutions

and policies. By focusing on a set of countries with similar values[1] and the same data, we hope to contribute to this important area.

Section 2 notes briefly the literature that also follows a broad sweep across countries and provides background information on the gender wage gap in the EU. Section 3 describes the EU-SILC data and section 4 the econometric methodology used and the results obtained. Section 5 considers the work-family reconciliation index and unionisation rates and their relation to the wage gap. Section 6 concludes.

2 The gender wage gap in the EU: A brief survey of the literature

The literature on the gender gap is, of course, enormous. A number of papers adopt a cross-country perspective. Plantenga and Remery (2006) examine, for the European Commission, the *unconditional* gender wage gap for 24 EU states (except Malta) plus Iceland, Liechtenstein and Norway and survey policies that aim to reduce this gap. Rubery (2002), examines these policies and targets, concludes that concrete objectives and time frames are needed. Brainerd (2000) examines the gender wage gap in *ex* USSR MSs, while Newell and Reilly (2001) note that the gap in east European countries has not exhibited an upward trend during the transition. Weichselbaumer and Winter-Ebmer (2005), based on a meta-analysis of international gender wage gaps, conclude that between the 1960s and the 1990s unconditional differentials fell. They attributed this to the improved education and training for women. Blau and Kahn (1996), using the Juhn *et al* (1991) decomposition, show that eight European countries have a lower gender gap than the US and attribute this to higher female wages in Europe for low earners. Blau and Kahn (2003) argue that institutional settings affect the gender wage gap.

Olivetti and Petrongolo (2008) examine the non-randomness of selection into work and how this might affect international comparisons of gender wage gaps. They estimate median wage gaps in a sample of employed workers and also in a sample enlarged with the non-employed - for whom wages were imputed. They find that, for

[1] It is conceivable that gender policies and attitudes may not be homogeneous across all MSs. For instance, the countries joining on May 1, 2004 may have not adjusted fully. Also, countries in the former USSR may have a different set of values and practices. We comment on these issues below.

most countries, the median wage gaps in imputed wage distributions are higher than those in the actual wage distributions, suggesting that in those countries female high earners are overrepresented in the workforce. They find a negative correlation between the gender wage gap and gender employment gap, thus resolving the paradox that countries, such as Greece, have a lower wage gap than Anglo-Saxon countries.

Nicodemo (2009) examines the extent of the wage gap in a sample of five Mediterranean EU countries (France, Greece, Italy, Portugal and Spain) in 2001 and 2006, using the EU-SILC and the European Community Household Panel Survey (ECHPS) datasets. She finds a positive wage gap in all countries, in both time periods, the greater part of which cannot be explained by observed characteristics. The gender gap is larger at the bottom of the distribution and smaller at the top of the distribution in most countries in 2006.

Arulampalam *et al* (2006) examine the gender wage gap in 11 European countries using the ECHPS for the years 1995-2001. The gap widens toward the top of the wage distribution in most of countries and, in a few cases, it also widens at the bottom of the distribution. The authors use the OECD (2001) work-family reconciliation index to examine the possible factors that affect the extent of the wage gap. They conclude that differences in family and work reconciliation policies and wage setting institutions (proxied by union membership rates) across EU countries may account for the variation in the wage gap. Child care provision is an important factor that affects the decision of women to enter the labour market. Viitanen (2005), examining UK data, finds that the price of childcare has a significant, negative, effect on the probability of working as well as on using formal childcare. Del Boca and Vuri (2007), using data for Italy, find that policies that reduce the cost of child care and expand the child care system can have a positive impact on female employment. Gustafsson and Stafford (1992) find that the high quality of public child care in Sweden encourages women with small children to enter paid employment.

Despite the wealth of information and methodologies contained in these studies, a gap remains. No study has investigated the conditional gap across a large number of countries, that share similar declared policies, and examined the extent to which the unexplained gender gap may be related to country-specific policies and institutions.

3 Data

The data used for the econometric analysis, available since 2004, is the 2007 EU-SILC prepared by the statistical services of MSs on behalf of Eurostat. EU-SILC collects comparable cross sectional data on income, poverty, and social exclusion. Information is available for all EU countries except Malta; Norway and Iceland are also included but these countries are excluded from our EU sample.

The EU-SILC data set reports a wealth of information on the personal characteristics of each individual. These include age, education, marital status, number of children, and child care details. Also, it reports information on working status, whether an individual was working full time or part time, the industry of employment and his or her occupation and years of working experience (not available for all countries). In addition, information on annual earnings (the variable analysed here) is available - we use the terms earnings and wages interchangeably. In order to keep the length of this paper reasonable, we have placed further explanatory and technical material in a number of Appendices which are not part of the paper; these are available on request.

Beginning with the original-data *base* sample, in the *working* sample we include individuals who (i) are aged between 25 and 54, (ii) work as employees (employers and the self-employed are excluded), (iii) work full time (students and the handicapped are excluded) for the whole of the previous year, worked at least one hour during the week prior to the interview and do not have a second job, and (iv) received an annual wage larger than €1000. These restrictions bypass complications involving further education, preparation for retirement, part-time status and the truthful reporting of incomes and they produce a more homogeneous sample. In our main results, age is used as a proxy for experience. However, some direct-experience information is also available for all countries except Denmark, Finland, Greece, Hungary, Sweden, and the UK. Experience is reported for all individuals in Cyprus, the Czech Republic and Italy. For other countries apart from Slovenia, the number of observations lost is very small. It varies from 0.08% (1 individual) for the female Estonian sample, to 2.24% (24 individuals) for the Irish male sample. In Slovenia, if we exclude individuals who do not report their experience, the male sample decreases by 63.32% and the female sample by 63.5%. Section 4.1 provides further details.

Table 1 presents the average unconditional ln-annual earnings and the employment rate[2], by gender, for each country. The wage gap is defined as the difference between the male and female average ln-wage earnings. The highest male and female earnings are received in Denmark and Luxembourg, while the lowest are received in Latvia and the Slovak Republic. The highest differences between male and female earnings are observed in Cyprus and Estonia, with 0.502 and 0.423 ln-earning units, respectively, while the lowest differences are observed in Slovenia and Hungary, with 0.087 and 0.100 ln-earning units respectively. The highest male employment rates are observed in Denmark and Cyprus (95% and 94%, respectively) and the lowest male employment rates in Finland and Poland (81% and 80% respectively). The highest female employment rates are observed in the Slovak Republic and Estonia (83% and 80%, respectively) while the lowest employment rates are observed in The Netherlands and Greece (30% and 41%, respectively). Figure 1 presents the wage gap by country. The countries with the highest gender wage gap are new MSs (Cyprus, Estonia, the Czech Republic, Latvia, Lithuania and the Slovak Republic). The lowest gender wage gap is observed in Slovenia and Hungary. Thus, of the nine new MSs in the sample, six have the highest and two the lowest unconditional gender wage gaps, with Poland being closer to the middle of the pack. The Scandinavian countries in the sample (Denmark, Finland and Sweden) have middling gender gaps, while Greece, Italy and Spain have relatively low gaps - a fact that motivated the Olivetti and Petrongolo (2008) study. The average gender wage gap across the EU24 is 0.381 ln-wage points and the average employment gap is 27%.

The unconditional correlation between the gender earnings and employment gap is negative though it is quite weak and not statistically significant.[3] Olivetti and Petrongolo (2008), using a different set of countries and data, also found a negative correlation coefficient between the two measures.[4] They attach importance to this

[2] The 'employment' rate is calculated as the number of individuals included in the working sample over the number of individuals in the base sample.
[3] The correlation is -0.23. The estimated coefficient from the regression of the gender wage gap on the gender employment gap is -0.015 and the associated p-value for the hypothesis that the regression coefficient is equal to zero is 0.15.
[4] The database used was the ECHPS and the Michigan Panel Study of Income Dynamics (PSID). The countries included were Austria, Belgium, Denmark, Ireland, Italy, Finland, France, Germany, Greece, The Netherlands, Portugal, Spain, United Kingdom and the United States. The correlation coefficient in the Olivetti and Petrongolo (2008) dataset was -0.474.

correlation because they believe that the low gender wage gap in countries such as Greece and Italy is indicative of positive selection into the working sample, suggesting that the observed wage gap in these countries is not representative.

4 Econometric model

All analysis is conducted separately for each gender. We begin by estimating Ordinary Least Squares (OLS) ln-earnings equations which take account of all relevant characteristics available in the EU-SILC data. When the Heckman (1974, 1979) corrections are implemented in the context of the Probit model, we use additional variables which account for membership in the selected sample. Given this information and following Oaxaca-Ransom (1994), we proceed to decompose the mean difference between the male and female earnings into a portion attributable to characteristics and portions attributable to the 'male advantage' and the 'female disadvantage'. In a second set of decompositions and following Melly (2005), we consider decompositions along the entire wage distribution, not just at the mean, allowing us to establish possible 'sticky floors' and 'glass ceilings'. Following Olivetti and Petrongolo (2008), we impute wages for the observations in the base sample that were not included in the working sample and consider the median wage gap and its relation to employment rates.[5] In section 5, various gaps are examined under the prism of the work-family and wage setting institutions in the 24 MSs.

4.1 The Oaxaca-Ransom decompositions

The Oaxaca and Ransom (1994) decomposition is given by:

$$\bar{W}^M - \bar{W}^F = \left(\bar{X}^M - \bar{X}^F\right)\hat{\beta}^N + \bar{X}^M\left(\hat{\beta}^M - \hat{\beta}^N\right) + \bar{X}^F\left(\hat{\beta}^N - \hat{\beta}^F\right) \qquad (1)$$

where $\bar{W}^M$ and $\bar{W}^F$ are the average values of ln earnings for males and females, $\bar{X}^M$ and $\bar{X}^F$ are vectors with the average characteristics for the two genders and $\hat{\beta}^M$ and $\hat{\beta}^F$ are the OLS estimates of relevant coefficients. $\hat{\beta}^N$ is a non-discriminatory coefficient structure obtained from the pooled regression of males and females.[6] The first term in equation (1) measures the explained part, the second the male advantage

[5] Kunze (2008) summarises the major econometric methodologies used in the literature.

[6] Other ways of defining $\hat{\beta}^N$ were proposed by Reimers (1983) and Cotton (1988).

(i.e., the extent to which the male characteristics are valued above the non-discriminatory coefficient structure) and the third the female disadvantage (i.e., the extent to which the female characteristics are valued below the non-discriminatory coefficient structure). Only the earnings of the individuals who are working are observed and, as a result, the sample may not be random. To deal with this selection problem, we use the Heckman (1974, 1979) model.

Table 2 provides the decomposition results with age used as a proxy for experience. In Table 3, the actual value of experience is used instead of age in a sample where this information in available. In both tables, the set of explanatory variables in the wage equations includes education, firm size, marital status, industry of employment and occupation. The Probit equations include education, marital status, the number of children, income from property rents, financial assets and other allowances, mortgage expenses, child-care provisions and occupation; the additional variables, as well as the non-linearity of the Probit equation, aid in identification.

By a property of OLS, the predicted total gap in column 1, Table 2, is equal the actual gap appearing in Figure 1, so that Cyprus has the highest average predicted gender pay gap and Slovenia the lowest. Column 5, Table 2, reports the pay gap that is predicted to prevail once selection into the base sample is taken into account (the 'offered' gap) and, in some cases (Austria, Belgium, Estonia, France, Germany, Greece, Ireland, Latvia, Poland, Portugal, Spain, and the EU) the selection-adjusted gap is even higher, suggesting that positive selection is at work. The explained part of the decompositions is smaller than the unexplained part (male and female disadvantage combined) for almost all cases, regardless of whether selection corrections have been made. This suggests that the data available do not fully account for the behaviour of earnings and/or that a substantial amount of female disadvantage may exist. Interestingly, Scandinavian countries but also Cyprus (which has the highest gap) have the highest proportion of the gap explained by characteristics, while Greece, Italy, Hungary, Poland, Portugal, Slovenia and Spain have very low proportions of the wage gap explained. In some cases, the explained gap is negative, suggesting that female characteristics are superior to male ones. For the vast majority of countries, the female disadvantage is larger than the male advantage, likely because the non-discriminatory structure is weighted towards the numerically dominant males.

In Table 3 experience is used instead of age in the wage and Probit equations. Allowing for the fact that a number of countries do not have experience data, most of the statements made in the previous paragraph continue to hold and so we do not pursue the experience/age issue any further.

When tables parallel to Tables 2 and 3 but without the industry and occupation effects in the wage and Probit equations (as appropriate), are constructed, the explained parts are significantly smaller, suggesting the importance of industry and occupation effects in explaining the gender wage gap - see Polachek (1981).

4.2 Quantile decompositions of the gender wage gap

The quantile regression methodology (see Koenker and Bassett (1978) allows the characteristics of individuals to have different impacts at different points of the wage distribution; it consequently affects the implied decompositions at each point. This approach allows examination of 'glass ceiling' and 'sticky floor' phenomena. In the case of the former, a larger unexplained gender wage gap is observed at the top of the wage distribution, suggesting that, as women advance to top positions, their pay may not increase *pari pasu*. In the case of the latter, a larger unexplained earnings gap at the lower end of the wage distribution may suggest that females enter occupations and industries with low pay and few advancement opportunities. Decomposition procedures based on quantile regression have been proposed by Melly (2005), Machado and Mata (2005) and Gosling *et al* (2000). We follow Melly (2005).

One of the first studies to use quantile regression to study these phenomena is Albrecht *et al* (2003). The authors examine the gender wage gap in Sweden, using data for 1998, and find noteworthy glass ceiling effects. Arulampalam *et al* (2006) analyze the gender wage gap for eleven European Union countries[7] over the period 1994-2001 and find glass ceiling effects for the majority of the countries in their sample and, in a few cases, signs of sticky floor phenomena.

[7] The countries used in the analysis are: Austria, Belgium, Great Britain, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands and Spain.

Melly (2005) decomposes the difference between male and female wages (the left hand side of equation (2)) into the three factors that appear on the right hand side of equation (2), namely the effect of differences in residuals, in (median) coefficients, and in covariates:

$$\hat{q}\left(\hat{\beta}^M, X^M\right) - \hat{q}\left(\hat{\beta}^F, X^F\right) = \left[\hat{q}\left(\hat{\beta}^M, X^M\right) - \hat{q}\left(\hat{\beta}^{mM,rF}, X^M\right)\right] + \left[\hat{q}\left(\hat{\beta}^{mM,rF}, X^M\right) - \hat{q}\left(\hat{\beta}^F, X^M\right)\right] + \left[\hat{q}\left(\hat{\beta}^F, X^M\right) - \hat{q}\left(\hat{\beta}^F, X^F\right)\right] \quad (2)$$

where and X^M and X^F are vectors with male and female characteristics, $\hat{\beta}^M$ and $\hat{\beta}^F$ are the estimated median coefficients on characteristics, $\hat{q}\left(\hat{\beta}^F, X^M\right)$ is the counterfactual earnings distribution of individuals with characteristics X^M and coefficients $\hat{\beta}^F$, and $\hat{q}\left(\hat{\beta}^{mM,rF}, X^M\right)$ is the distribution that would have prevailed if the median coefficients were the same for males and females but the residuals were distributed as in the female distribution. The set of personal characteristics included are the same as in section 4.1.[8] The decomposition results appear in Table 4 and our findings on sticky floor and glass ceiling effects are summarised in Table 5. Figure 2 presents, by country, decompositions over the male and female earnings distribution.

Table 4 reports the quantile regression decompositions obtained for five quantiles (10%, 25%, 50%, 75%, and 90%). The part of the observed wage gap (not adjusted for selection) that is not explained by observed characteristics (the third term in equation (2)) is shown in square brackets. The last two columns of Table 4 repeat the total and the unexplained part (the sum of the male advantage and the female disadvantage) from Table 2 to facilitate the comparison between the quantile and Oaxaca and Ransom (1994) decomposition results.

[8] Some of the industries and occupations were merged because participation in these was very low for some of the countries and the decompositions could not have been performed if these near-singleton dummy variables where included in the estimation. More specifically armed forces employees were joined with professionals for Austria, Belgium, Germany, Denmark, France, Finland, Ireland, Italy, Lithuania, Luxembourg, Latvia, The Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Sweden and United Kingdom. Agriculture, fishing and mining employees were combined with craft workers for Belgium, Finland, France, Luxembourg, The Netherlands and Poland. Agriculture and the construction sector were merged for France and The Netherlands.

When the total and the unexplained gaps at the 50th percentile of the quantile regression decompositions are compared to the mean values in the Oaxaca and Ransom (1994) decompositions, the results in the quantile decompositions show that many more countries have unexplained components that exceed the total wage gaps. This suggests that, at the median of the wage distribution, females tend to have higher qualifications than men. Indeed, this is generally the case for lower quantiles.[9] By the 75th percentile, this is true for only 13 countries and by the 90th percentile it is true for only 10 countries. Thus, the quantile results reinforce the conclusion in the Oaxaca-Ransom decompositions that a substantial portion of the earnings gap remains unexplained and offer the additional insight that this is more true at the lower than at the higher end of the earnings distribution. As in the Oaxaca and Ransom (1994) results, the quantile decompositions continue to show the six new MSs with the highest unconditional gender gaps (Cyprus, the Czech Republic, Estonia, Latvia, Lithuania, and the Slovak Republic) at the top of the unexplained gap list, while the new MSs at the bottom of the unconditional gap list (Slovenia and Hungary) are now placed 15th and 18th respectively.

We define a sticky floor and a glass ceiling as existing if the 10th percentile and the 90th percentile respectively exceed other reference points of the wage distribution (see Table 5) by at least two percentage points. The results are summarized in Table 5. There is evidence of sticky floors in 10 out of the 24 countries in the sample using the 10-25 difference and 11 countries when using the 10-50 difference. The strongest evidence for sticky floors is found in Cyprus, Luxembourg, Slovenia, and Spain, where differences for all three reference points can be seen. This phenomenon for Cyprus and Luxembourg can be partly attributed to the high segregation of women in low-paying industries and occupations.[10]

A number of countries exhibit significant signs of glass ceiling effects. In Table 5, 14 countries satisfy all three reference standards and a number of other countries meet one or two of the three criteria. Only 6 countries do not exhibit these effects based on any of the three measures used. These countries are Cyprus, Greece, Latvia,

[9] In Hungary, Italy, Portugal, and Slovenia the unexplained part is larger than the total effect throughout the wage distribution. By contrast, in Estonia, the unexplained part is lower than the total difference throughout the wage distribution.
[10] In Appendix F, the industry and occupation segregation index is provided for all EU countries.

Lithuania, Portugal, and Spain and it is surprising that this list does not include the Scandinavian countries. The results for Greece and Spain are very interesting and conform with the motivation of Olivetti and Petrongolo (2008) who argue for an extreme form of positive selection in these countries, i.e. that only the most highly qualified and paid women enter the labour market. Table 5 also summarises the general shape of the total ln earnings distributions in the 24 countries studied.

This feature of our results is examined more conveniently in Figure 2. The blue solid lines plot the actual wage distribution, the red dotted lines show the unexplained component and the blue dashed/dotted lines indicate the explained component. The unexplained gap distribution follows five broad patterns. It is U-shaped (the unexplained component is high at the extreme ends of the distribution, suggesting sticky floor and glass ceiling effects) in Austria, France, Ireland, Italy, The Netherlands, and Sweden. The unexplained gap follows an inverse U-shape (no evidence of sticky floor or glass ceiling effects) in Latvia, Lithuania, Portugal, and Spain. It follows a decreasing pattern (sticky floor effects only) in Belgium, Cyprus, Denmark, Germany, Luxembourg, and Slovenia. The unexplained portion follows an increasing pattern (glass ceiling effects only) in Estonia, Greece, Hungary, and Poland. The Czech Republic, Finland, the Slovak Republic and the United Kingdom display more complex patterns.

4.3 Estimation of a selection-corrected median wage gap

Building on Johnson *et al* (2000) and Neal (2004), Olivetti and Petrongolo (2008) note that some countries (e.g. Greece, Italy and Spain) have a surprisingly low gender wage gap (particularly when compared to the UK and US). Since these countries tend to also have low female employment rates, they speculate that selection affects the observed gender wage gap. They impute the wages for the non-participants and the unemployed and confirm that the difference between the actual and imputed gaps is small for the UK, the US and most central and northern European countries but is larger for Greece, Italy and Spain. This suggests that selection by women into the labour markets of the latter three countries is not random.[11] The imputation procedure

[11] The sample used in their study includes individuals aged 25-54 and excludes the self-employed, individuals working in the military and full-time students.

for those not in the working sample requires only that a missing wage be placed below or above the median. Two approaches are used: The first, imputes the unobserved wage based on educated assumptions about the relative position of the wage of each individual with respect to the median wage in each country. The second, uses probability models to assign individuals to either side of the median wage. We follow this approach, describing first the imputation approaches used.

4.3.1 Imputation of wage using educated assumptions

In the first approach and based on the known characteristics of the non-employed, a wage is assigned to them. The wage $w_{i,c}$, assigned for each individual i in country c by gender takes one of the values $\underline{w}^c$ and $\overline{w}^c$ where $\underline{w}^c$ is the minimum wage in country c and $\overline{w}^c$ is the maximum wage in country c. At least four alternatives are possible in our cross-sectional data: (i) Set $w_{i,c} = \underline{w}^c$ if an individual is non-employed, (ii) Set $w_{i,c} = \underline{w}^c$ if an individual is unemployed, (iii) Set $w_{i,c} = \underline{w}^c$ if an individual is non-employed and has education less than upper secondary and less than ten year's experience and set $w_{i,c} = \overline{w}^c$ if education is greater than upper secondary and the individual has more than ten years of experience (observations that do not meet these conditions are lost), and (iv) Based on assortative matching, set $w_{i,c} = \underline{w}^c$ if the non-employed spouse's wage income belongs to the bottom income quartile of the wage distribution; observations where the spouse's income belonged at the top of the distribution were left out.

Column 1, Table 6, reports the median wage gap for the samples used in sections 4.1 and 4.2, once the number of observations is modified as suggested above. The correction based on alternative (i) assigns the minimum value of each gender distribution to non-employed individuals, increasing the median wage gap for all countries; the gap is not imputed for countries where the female employment rate is lower than 50%. The increase is more significant for countries with low female employment rates like Austria, Belgium, Germany, and Luxembourg. The correction based on alternative (ii), assigns the minimum value of each gender distribution to

unemployed individuals, increasing the median wage gap in countries such as Belgium, Germany, Greece, Slovenia, and Spain. The change in the median wage gap is negligible or negative in Latvia, Luxembourg, United Kingdom, Lithuania, Finland, Sweden, Estonia and Ireland. The correction based on alternative (iii) assigns the minimum value of each gender distribution to low experience and education individuals, increasing the median wage gap substantially in countries such as Austria, Cyprus, Ireland, Italy, Poland, and Spain. It also increases in Greece. The median wage gap decreases or increases only slightly in countries such as Lithuania, Estonia, the Slovak Republic, and Latvia. The correction based on alternative (iv) assigns the minimum value of each gender distribution only if the non-employed spouse's wage income belongs to the bottom income quartile of the wage distribution. This is the least stringent assumption and the median wage gap remains unchanged in many countries.

4.3.2 Imputation of wage using the Probit model

The second methodology consists of two steps. In the first step, a Probit model is used, for each gender, to determine the probability of an individual receiving a wage below the median of the wage distribution. The set of explanatory variables includes the variables used in the first-step Probit equation in the Heckman (1974, 1979)-corrected Oaxaca and Ransom (1994) decompositions. In the second step, the predicted probabilities $\hat{p}_i$ are used as follows: the employed are included with their observed wage and the non-employed with the minimum wage in the gender distribution with probability $\hat{p}_i$ and the maximum wage in a gender distribution with probability$1-\hat{p}_i$. The median gender wage gap is then estimated for the imputed sample for males and females. The gender difference appears in column 6, Table 6.

The median wage gap increases in most countries. It increases considerably in Ireland, Luxembourg, Spain, and The Netherlands, countries with low female employment rates. On the other hand, the median wage gap is reduced in Slovenia and Greece. It remains almost unchanged in Estonia and the Czech Republic.

4.3.3 Discussion

Our results based on the first imputation method are consistent with Olivetti and Petrongolo (2008) in that the revised wage gaps are higher in Greece, Italy and Spain. This is also true for Italy and Spain in the Probit imputation approach. Selection issues are clearly important. The selection adjustments in Olivetti and Petrongolo (2008) result in generally higher imputed wage gender gaps than is the case in the Heckman (1974, 1978) approach. This is likely because of the more conservative approach followed in assigning the missing wages.

5 The role of institutions and work-family reconciliation policies

Labour-market policies are likely to affect the extent of the wage gap both at the mean or median and across the whole wage distribution.[12] In this section, the relationship between the unexplained part of the wage gap (columns 3 plus 4, Table 2 of the Oaxaca-Ransom (1994) approach and column 6, Table 4 of the quantile decomposition approach), the sticky floor (column 3, Table 5) and the glass ceiling (column 6, Table 5) effects on the one hand and, on the other hand, the institutions and gender-specific policies prevailing in the MSs is examined. The trade union membership rate is used as a proxy for the wage-setting environment in each MS.[13] The OECD (2001) Work-family Reconciliation Index is a convenient summary of the policies prevailing in MSs on work-family issues. The original measure used five variables which are not all available for our 24 MSs and so we have constructed a close substitute based on information which is, in fact, available. The new summary measure relies on (i) the availability of formal child care for children under 3 for more than 30 hours a week, (ii) maternity pay entitlement (product of length and generosity), (iii) the extent to which part-time employment for family, children and other reasons is possible, (iv) the extent to which working times can be adjusted for family reasons and (v) the extent to which whole days of leave can be obtained

[12] Family policies may have a positive or negative effect on the wage gap. Extended parental leave may increase out-of-work time and, as a result, employees returning to employment may receive reduced wage growth, resulting in a higher wage gap. On the other hand, parental leave may help preserve the ties of employees with their firms, increasing firms' incentive to invest in human capital, implying a lower wage gap. Such effects may hold with different force at different points of the wage distribution. Child-care policies may have an overall positive effect because they increase attachment to work and the incentive to acquire human capital and because they ease the economic burden of child-care.

[13] Countries with higher unionization rates tend to have lower wage dispersion (Blau and Kahn (1992) and Blau and Kahn (1996)), possibly lowering the wage gap. Trade unions may be less likely to represent the interests of their female electorate because they may be perceived as having less attachment to the labour market - Booth and Francesconi (2003). They may also be less sensitive to the interests of members at the low end of the wage distribution - see also Arulampalam *et al* (2006).

without loss of holiday entitlement for family reasons. The data actually used to produce our composite index (similar to the OECD data[14]), the index itself and the trade union membership rate date appear in Table 7.

Figure 3 presents the relationship between (i) the mean gender wage gap, (ii) the median gender wage gap, (iii) the glass-ceiling effect, and (iv) the sticky floor effect and our family reconciliation index. The first two graphs within Figure 3 show that, across the 24 countries, the unexplained parts of the mean and median wage gap are negatively related to the work-family reconciliation index. That is, countries with generous work-families policies (e.g. Denmark and The Netherlands) tend to have a lower unexplained wage gap compared to countries with less generous policies (e.g. Cyprus, Poland and the Slovak Republic). The index is positively and significantly (at the 10% level) related to glass ceiling effects and it is positively and significantly related to sticky floor effects at the 1% level. That is, in countries with more generous family-work policies, the gender pay gap tends to be higher at the extremes of the wage distribution. At the low end of the distribution (graph 4, Figure 3), this may be caused by an increase in the participation of low-paid female employees who may be responding to better child-care arrangements. At the high end of the wage distribution (graph 3, Figure 3) this may be due to professional women increasing out-of-work time (given more generous maternity leave provisions) and paying a cost for doing so.

Table 8 presents the results of the regression of the unexplained part from the Oaxaca and Ransom (1994) decomposition on the constituent indices as well as the composite family-work reconciliation index. Given that Figure 3 suggests that the Oaxaca and Ransom (1994) average and the Melly (2005) median gender gap behave similarly relative to the family reconciliation index, we present results for the former. The relationship between the unexplained gap and the composite index (this is what appeared in graph 1, Figure 3) is negative and statistically significant at the 1% level (column 6, Table 8). The relationship for the constituent indices is individually negative and significant at least at the 5% level except for the maternity leave variable which is positive and significant at the 5% level. When all indices are entered in the regression equation, only the maternity leave variable maintains its significance.

[14] The correlation coefficient between the fourteen EU countries included in the OECD (2001) and in our composite index is 59% and it is significant at the 5% level.

Thus, it would appear that very generous and extended maternity leaves may have an unintended impact on the mean gender gap, just as the composite index appears to do at the extremes of the wage distribution. Ruhm (1998) using a sample of nine European countries[15] indicated that although parental leave is associated with increases in female employment rates, if it is taken over extended periods it may reduce the relative wage of female employees. This negative effect can be attributed to different reasons. Female labour supply increases in the period prior to childbirth in order to be eligible for parental leave. This is likely to reduce female earnings. Also, women having multiple births over a short period of time may be away from their job for several years causing substantial depreciation of human capital. Beblo and Wolf (2002) find evidence that discontinuous employment caused by maternal leave reduces the wage for females. Gutierrez-Domenech (2005) indicate that an extended period of maternity leave is counterproductive since it postpones return to work, reduces skills and might cause a further disincentive to re-entry.

Figure 4 presents the relationship between the two unexplained wage gaps, the glass ceiling and sticky floor effects on the one hand and the union membership rate on the other. The relationship of the unexplained part of the mean and median wage gap, in Graphs 1 and 2, Figure 4, is negative and statistically significant at the 5% level.[16] Thus, unionism appears to be associated with reductions in the wage gap at the centre of the wage distribution. Graphs 3 and 4, Figure 4, reveal a positive relation between the gender gap at the top and bottom of the wage distribution and the union membership rate but this is not significant at the top and significant at the 5% level at the bottom of the distribution. This latter effect may arise if unions pay less attention to the interests of female and (so they may feel) more marginally attached members.

6 Conclusion

Using data from the 2007 EU-SILC, the gender wage gap is examined for a set of 24 EU member countries. The gender wage gap varies considerably between countries, ranging from 0.502 ln wage points in Cyprus to 0.087 ln wage points in Slovenia.

[15] Ruhm's (1998) dataset includes Denmark, Finland, France, Germany, Greece, Ireland, Italy, Norway and Sweden.
[16] Union coverage data is not available for Cyprus, Latvia, Lithuania and Slovenia.

The empirical results show that a large part of the wage gap is not explained by characteristics and, indeed, in several countries the unexplained gap is larger than the total, suggesting that female characteristics are superior to the male ones. When the decomposition is performed across the wage distribution using quantile regression, the unexplained gender wage gap widens at the top of the distribution (glass ceiling effect) in most countries and, in some cases, it also widens at the bottom of the distribution (sticky floor effect). The wage gap is wider when non-random selection into work is taken into account; this suggests that women in the selected samples are more highly qualified than in the population at large.

The unexplained gender wage may not be due to female disadvantage because data limitations may preclude study of important forces. Such forces may include country-specific institutions and policies which would not show up in individual (or even in a small group of) country studies. To explore these it is necessary to study a large number of countries where the variability is due to policies and not other forces, such as the proclivity to discrimination. Focusing on EU member states is useful in that they all, at least nominally, espouse non-discriminatory attitudes and practices. We find that the trade union membership rate is negatively related to the average and median unexplained wage gaps. Generous policies concerning the reconciliation of work and family life also reduce the mean and median unexplained wage gaps. These effects are rather different at the tails of the unexplained gender wage gaps. There is some evidence that countries with more generous work-family reconciliation policies tend to have stronger glass ceiling and sticky floor effects and regression analysis suggests that, at the mean, this may be due to maternity policies. It is conceivable that, if these are long and generous, they may encourage absences from the labour market which, in the end, have unintended effects as returning female workers are only able to command lower wages. Such effects, if confirmed by further study, would suggest that care should be taken in the design of work-family reconciliation policies.

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Figure 1: Relative wage gap in European countries

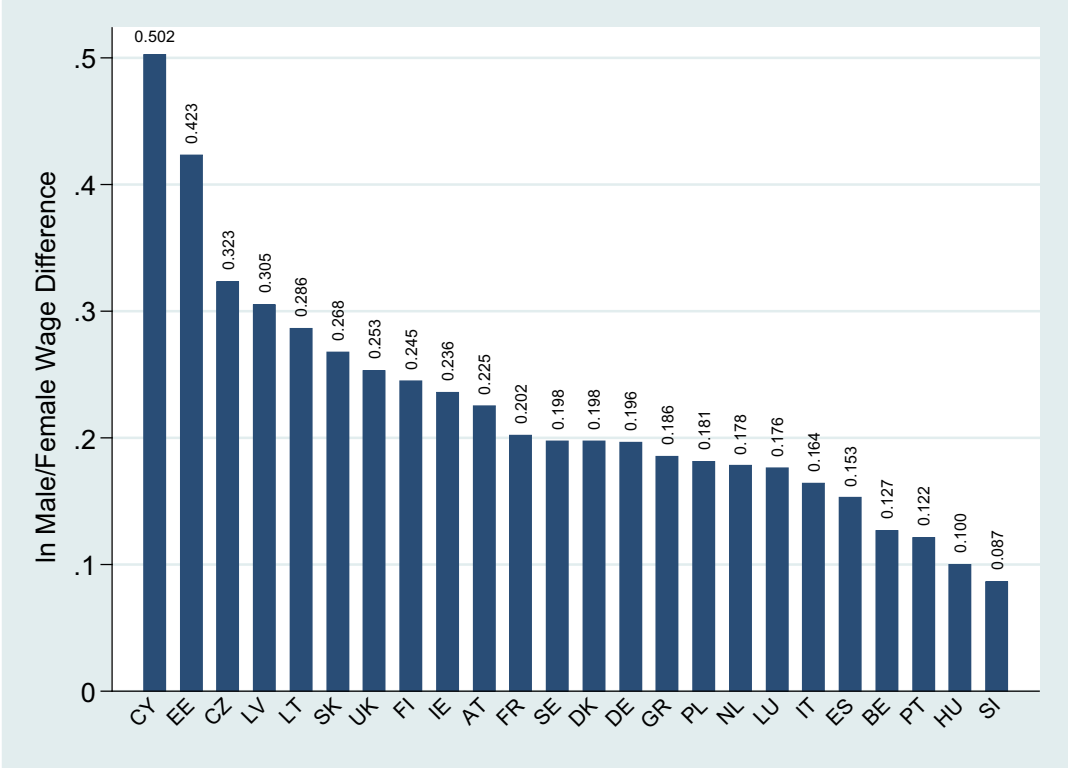


Figure 2: Quantile regression decomposition

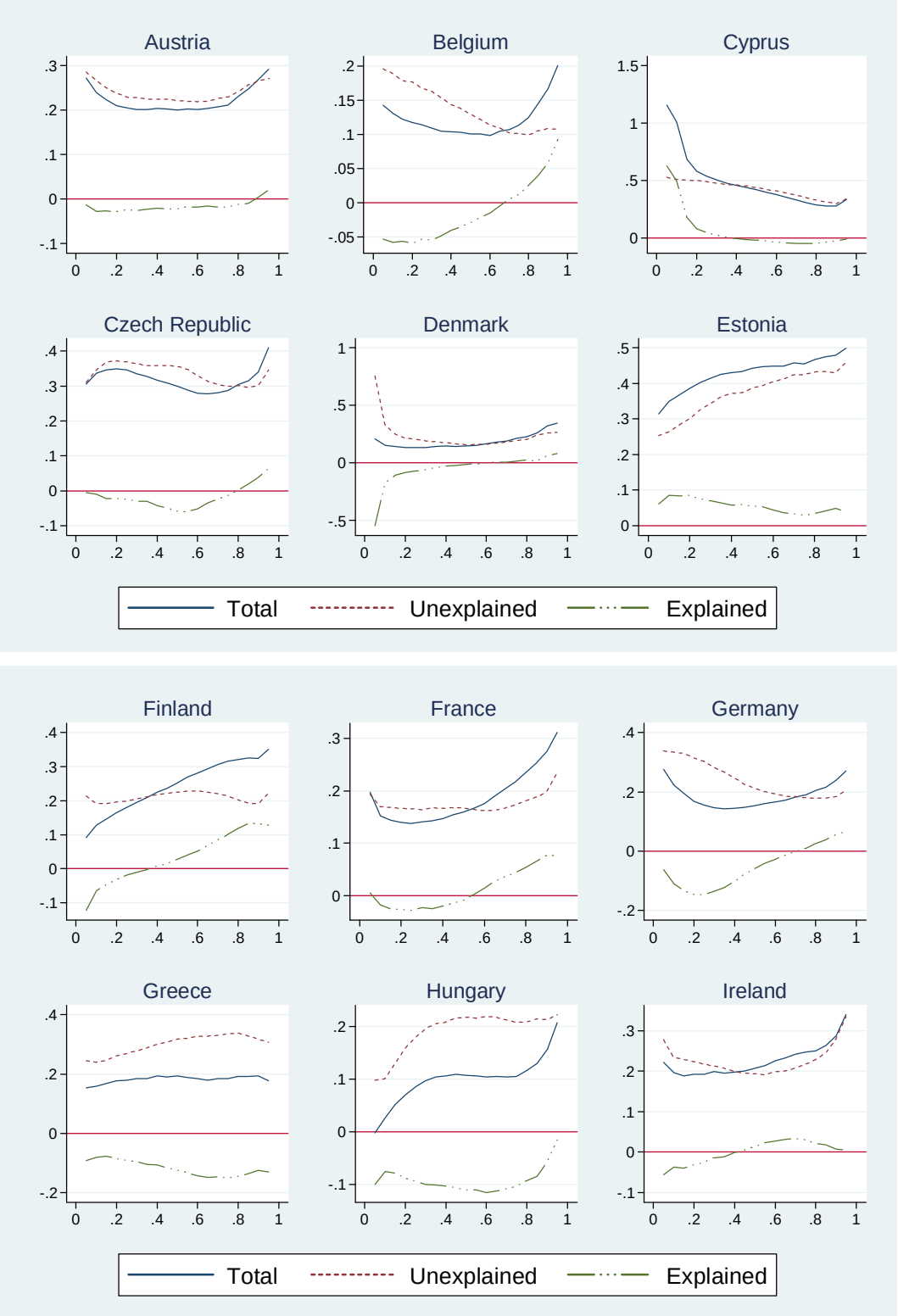


Figure 2 (continued): Quantile regression Decomposition

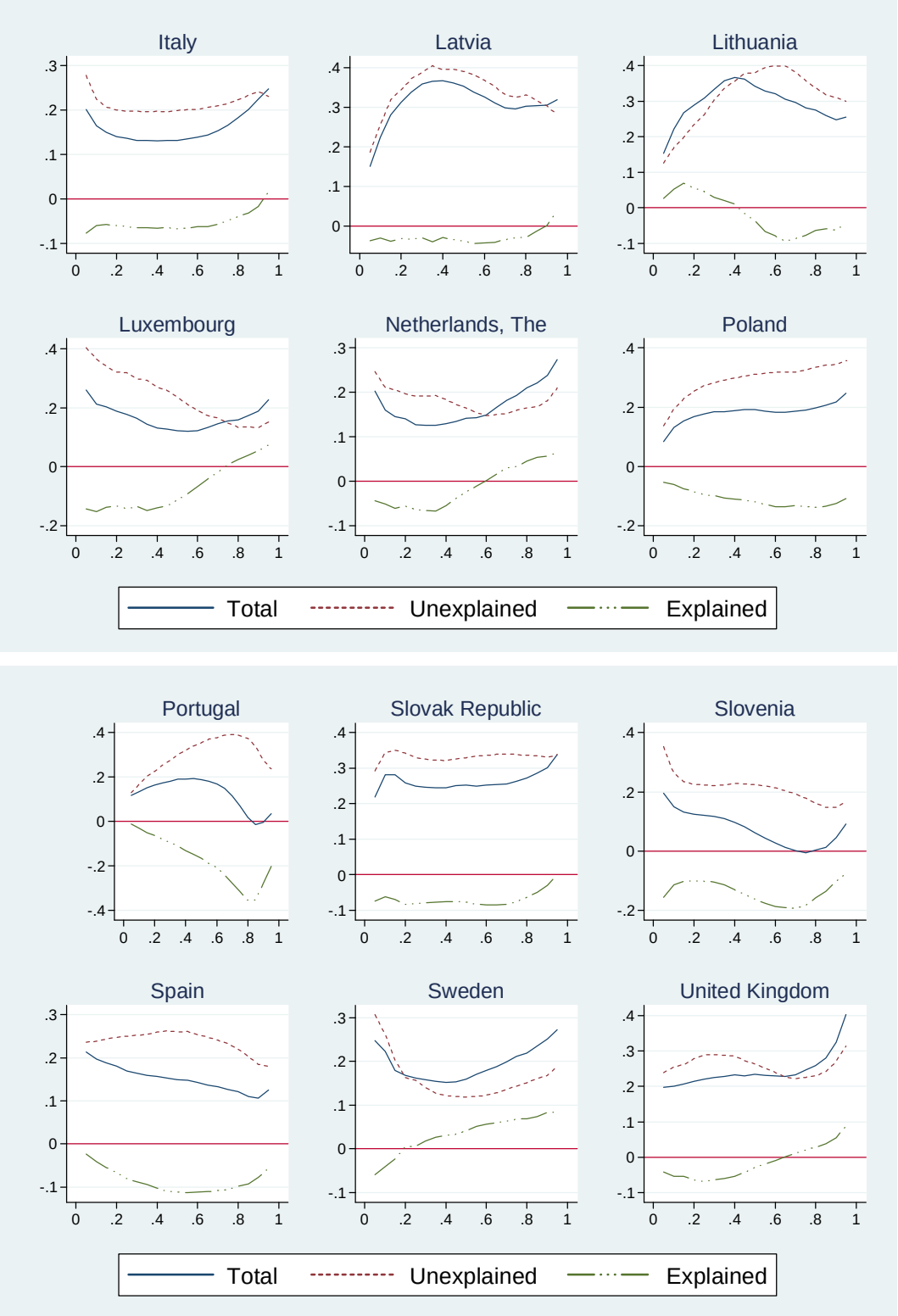
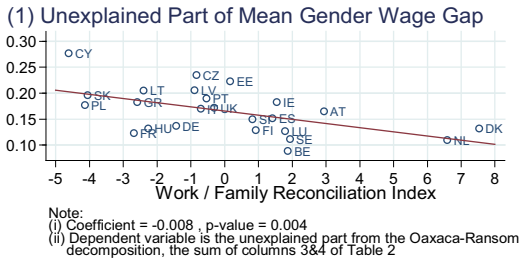
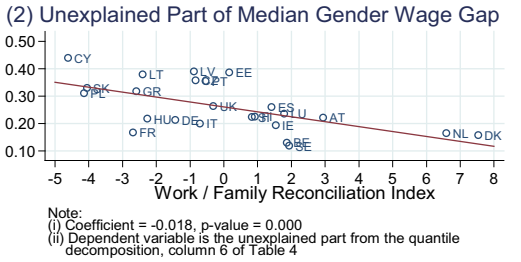


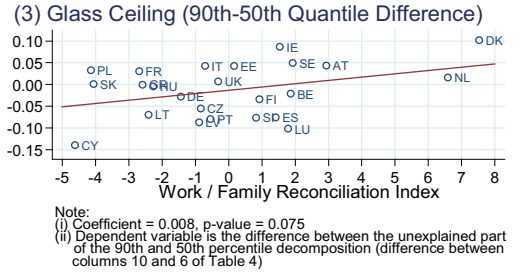
Figure 3: Relation between the wage gap and the work-family reconciliation index



Note:
(i) Coefficient = -0.008 , p-value = 0.004
(ii) Dependent variable is the unexplained part from the Oaxaca-Ransom decomposition, the sum of columns 3&4 of Table 2



Note:
(i) Coefficient = -0.018, p-value = 0.000
(ii) Dependent variable is the unexplained part from the quantile decomposition, column 6 of Table 4



Note:
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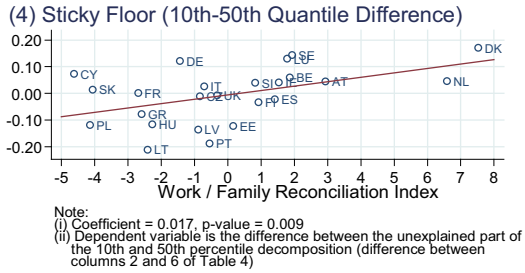
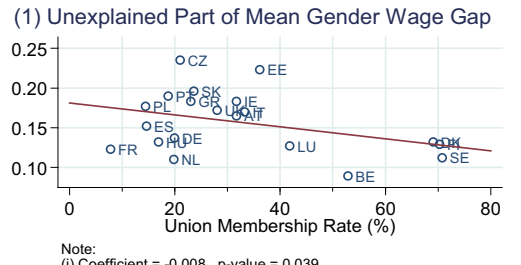
(ii) Dependent variable is the difference between the unexplained part of the 90th and 50th percentile decomposition (difference between columns 10 and 6 of Table 4)



Note:
(i) Coefficient = 0.017, p-value = 0.009
(ii) Dependent variable is the difference between the unexplained part of the 10th and 50th percentile decomposition (difference between columns 2 and 6 of Table 4)

Figure 4: Relation between the wage gap and the union membership rate



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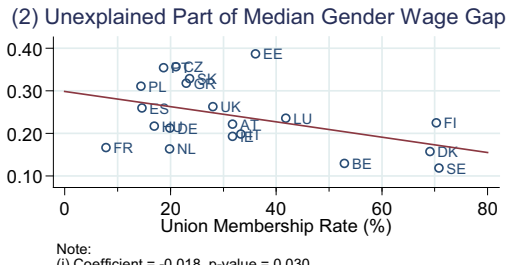
(ii) Dependent variable is the unexplained part from the Oaxaca-Ransom decomposition, the sum of columns 3&4 of Table 2



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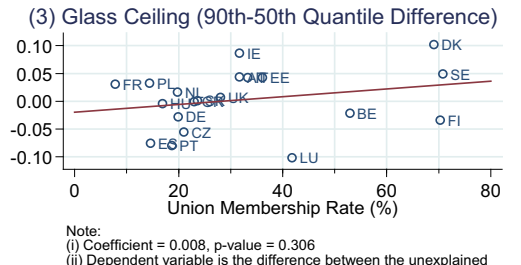

Note:
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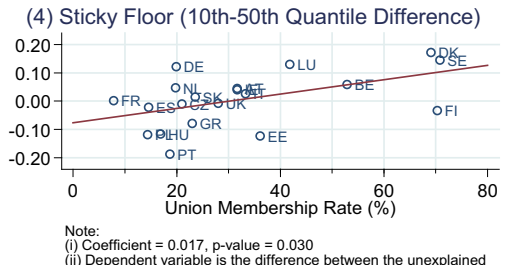
(ii) Dependent variable is the difference between the unexplained part of the 90th and 50th percentile decomposition (difference between columns 10 and 6 of Table 4)



Note:
(i) Coefficient = 0.017, p-value = 0.030
(ii) Dependent variable is the difference between the unexplained part of the 10th and 50th percentile decomposition (difference between columns 2 and 6 of Table 4)

Table 1: Ln-earnings and employment rate by country

	Ln-earnings				Employment Rate (%)			
	Male	Female	Difference	Rank	Male	Female	Difference	Rank
Austria	10.381	10.156	0.225	10	92	55	37	8
Belgium	10.474	10.347	0.127	21	88	54	34	9
Cyprus	10.067	9.564	0.502	1	94	64	30	10
Czech Republic	9.056	8.732	0.323	3	94	72	21	13
Denmark	10.854	10.657	0.198	13	95	76	20	16
Estonia	8.918	8.495	0.423	2	90	80	10	20
Finland	10.514	10.269	0.245	8	80	61	19	17
France	10.233	10.031	0.202	11	91	70	21	14
Germany	10.507	10.311	0.196	14	89	50	39	6
Greece	9.900	9.714	0.186	15	88	41	46	2
Hungary	8.677	8.576	0.100	23	85	68	17	18
Ireland	10.698	10.462	0.236	9	84	46	38	7
Italy	10.156	9.991	0.164	19	84	42	42	3
Latvia	8.616	8.311	0.305	4	85	75	10	21
Lithuania	8.687	8.400	0.286	5	86	80	6	24
Luxembourg	10.672	10.496	0.176	18	92	51	41	4
Netherlands, The	10.613	10.434	0.178	17	94	30	64	1
Poland	8.801	8.619	0.181	16	81	56	25	12
Portugal	9.401	9.279	0.122	22	87	67	20	15
Slovak Republic	8.646	8.378	0.268	6	91	82	8	23
Slovenia	9.598	9.512	0.087	24	88	79	9	22
Spain	9.897	9.744	0.153	20	88	48	40	5
Sweden	10.352	10.155	0.198	12	91	77	14	19
United Kingdom	10.672	10.419	0.253	7	93	67	26	11

Table 2: Decompositions using age as a proxy for experience

	Oaxaca-Ransom decomposition				Heckman-corrected Oaxaca-Ransom decomposition			
	Total	Explained	Unexplained		Total	Explained	Unexplained	
		Endowments	Male Advantage	Female Disadvantage		Endowments	Male Advantage	Female Disadvantage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Austria	0.225***	0.060***	0.051***	0.114***	0.334***	0.024*	0.072**	0.239***
Belgium	0.127***	0.038***	0.029***	0.060***	0.135***	0.025**	0.027***	0.082***
Cyprus	0.502***	0.225***	0.124***	0.153***	0.478***	0.186***	-0.037	0.328***
Czech Republic	0.323***	0.088***	0.107***	0.128***	0.277***	0.062***	0.027***	0.189***
Denmark	0.198***	0.065**	0.055***	0.077***	0.182***	0.037	0.026*	0.119***
Estonia	0.423***	0.200***	0.109***	0.114***	0.602***	0.181***	0.171***	0.250***
Finland	0.245***	0.116***	0.060***	0.069***	0.216***	0.093***	0.029**	0.094***
France	0.202***	0.079***	0.047***	0.076***	0.238***	0.061***	0.030**	0.147***
Germany	0.196***	0.060***	0.043***	0.094***	0.336***	0.037***	0.122***	0.176***
Greece	0.186***	0.003	0.070***	0.113***	0.204***	-0.037**	0.016	0.225***
Hungary	0.100***	-0.031***	0.063***	0.069***	0.042	-0.036***	-0.044	0.122***
Ireland	0.236***	0.053***	0.066***	0.117***	0.281***	0.038**	0.042*	0.201***
Italy	0.164***	-0.007	0.058***	0.112***	0.150***	-0.031***	0.041***	0.141***
Latvia	0.305***	0.099***	0.106***	0.100***	0.392***	0.091***	0.114*	0.186***
Lithuania	0.286***	0.081***	0.102***	0.103***	0.204***	0.076***	-0.076*	0.204***
Luxembourg	0.176***	0.049**	0.039***	0.088***	0.141***	0.019	0.042***	0.080***
Netherlands, The	0.178***	0.068***	0.024***	0.086***	0.159***	0.043***	0.030***	0.086***
Poland	0.181***	0.004	0.079***	0.098***	0.390***	-0.024***	0.155***	0.259***
Portugal	0.122***	-0.069***	0.089***	0.101***	0.125**	-0.111***	0.015	0.220***
Slovak Republic	0.268***	0.072***	0.098***	0.098***	0.223***	0.064***	-0.066***	0.224***
Slovenia	0.087***	-0.063***	0.074***	0.076***	0.059**	-0.106***	0.015*	0.151***
Spain	0.153***	0.001	0.057***	0.095***	0.238***	-0.026***	0.095***	0.168***
Sweden	0.198***	0.086***	0.046***	0.066***	0.178***	0.051***	0.033**	0.094***
United Kingdom	0.253***	0.081***	0.068***	0.104***	0.236***	0.066***	0.026***	0.144***
European Union	*0.381***	*0.194***	*0.077***	*0.110***	*0.461***	*0.168***	*0.053***	*0.240***

Note: Columns 1-4 report the results of the Oaxaca-Ransom decomposition and columns 7-8 the Heckman-corrected Oaxaca-Ransom decomposition. The explained part (the first term of equation (1)) measures the part of the predicted average wage difference that can be explained by the difference between the male and female characteristics. The unexplained part (the second and third terms of equation (1)) corresponds to the male advantage and female disadvantage. Three stars indicate significance at the 1%, two stars at the 5% and one star at the 10% level.

Table 3: Decompositions using experience for the countries where this is available

	Oaxaca-Ransom decomposition				Heckman-corrected Oaxaca-Ransom decomposition			
	Total	Explained	Unexplained		Total	Explained	Unexplained	
		Endowments	Male Advantage	Female Disadvantage		Endowments	Male Advantage	Female Disadvantage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Austria	0.226***	0.070***	0.048***	0.108***	0.333***	0.033**	0.069**	0.231***
Belgium	0.126***	0.037***	0.029***	0.060***	0.136***	0.026**	0.023***	0.087***
Cyprus	0.502***	0.246***	0.115***	0.142***	0.498***	0.211***	-0.018	0.305***
Czech Republic	0.323***	0.094***	0.104***	0.125***	0.277***	0.065***	0.028***	0.184***
Denmark	-	-	-	-	-	-	-	-
Estonia	0.424***	0.201***	0.109***	0.114***	0.588***	0.179***	0.164***	0.246***
Finland	-	-	-	-	-	-	-	-
France	0.202***	0.084***	0.045***	0.073***	0.240***	0.067***	0.031**	0.142***
Germany	0.198***	0.062***	0.042***	0.093***	0.338***	0.040***	0.122***	0.176***
Greece	-	-	-	-	-	-	-	-
Hungary	-	-	-	-	-	-	-	-
Ireland	0.234***	0.060***	0.063***	0.110***	0.271***	0.045**	0.040*	0.186***
Italy	0.164***	0.001	0.056***	0.108***	0.149***	-0.024***	0.036***	0.136***
Latvia	0.308***	0.103***	0.106***	0.099***	0.390***	0.095***	0.115*	0.180***
Lithuania	0.286***	0.080***	0.102***	0.104***	0.203***	0.075***	-0.075*	0.203***
Luxembourg	0.177***	0.066***	0.034***	0.077***	0.149***	0.038*	0.038***	0.074***
Netherlands, The	0.180***	0.070***	0.024***	0.085***	0.167***	0.047***	0.027***	0.093***
Poland	0.184***	0.011	0.077***	0.095***	0.404***	-0.017**	0.167***	0.253***
Portugal	0.121***	-0.061***	0.085***	0.097***	0.117*	-0.104***	0.009	0.212***
Slovak Republic	0.268***	0.073***	0.097***	0.098***	0.228***	0.065***	-0.059***	0.222***
Slovenia	0.076***	-0.068***	0.075***	0.070***	0.172***	-0.113***	-0.012	0.298***
Spain	0.153***	0.017*	0.051***	0.085***	0.250***	-0.011	0.089***	0.171***
Sweden	-	-	-	-	-	-	-	-
United Kingdom	-	-	-	-	-	-	-	-

Note: Columns 1-4 report the results of the Oaxaca-Ransom decomposition and columns 7-8 the Heckman-corrected Oaxaca-Ransom decomposition. The explained part (the first term of equation (1)) measures the part of the predicted average wage difference that can be explained by the difference between the male and female characteristics. The unexplained part (the second and third terms of equation (1)) corresponds to the male advantage and female disadvantage. Three stars indicate significance at the 1%, two stars at the 5%, and one star at the 10% level.

Table 4: Quantile regression decompositions

	Quantile decompositions										Oaxaca-Ransom decompositions	
	10%		25%		50%		75%		90%			
Austria	0.240	[0.267]	0.205	[0.229]	0.200	[0.222]	0.212	[0.230]	0.269	[0.265]	0.225	[0.165]
Belgium	0.131	[0.189]	0.114	[0.168]	0.101	[0.130]	0.114	[0.101]	0.167	[0.109]	0.127	[0.089]
Cyprus	1.012	[0.512]	0.539	[0.491]	0.423	[0.439]	0.309	[0.353]	0.279	[0.299]	0.502	[0.277]
Czech Republic	0.337	[0.347]	0.346	[0.370]	0.299	[0.357]	0.287	[0.300]	0.341	[0.302]	0.323	[0.235]
Denmark	0.153	[0.329]	0.133	[0.204]	0.147	[0.158]	0.215	[0.197]	0.322	[0.260]	0.198	[0.132]
Estonia	0.349	[0.264]	0.402	[0.327]	0.442	[0.387]	0.454	[0.425]	0.479	[0.430]	0.423	[0.223]
Finland	0.128	[0.192]	0.181	[0.199]	0.253	[0.225]	0.316	[0.214]	0.325	[0.192]	0.245	[0.129]
France	0.152	[0.169]	0.137	[0.165]	0.159	[0.167]	0.217	[0.174]	0.275	[0.198]	0.202	[0.123]
Germany	0.224	[0.334]	0.156	[0.303]	0.154	[0.212]	0.190	[0.181]	0.240	[0.185]	0.196	[0.137]
Greece	0.159	[0.240]	0.178	[0.270]	0.194	[0.318]	0.184	[0.335]	0.193	[0.318]	0.186	[0.183]
Hungary	0.027	[0.101]	0.086	[0.179]	0.108	[0.217]	0.105	[0.208]	0.157	[0.213]	0.100	[0.132]
Ireland	0.197	[0.234]	0.193	[0.218]	0.208	[0.194]	0.248	[0.218]	0.288	[0.280]	0.236	[0.183]
Italy	0.165	[0.225]	0.136	[0.198]	0.132	[0.199]	0.167	[0.215]	0.225	[0.242]	0.164	[0.170]
Latvia	0.224	[0.255]	0.339	[0.372]	0.353	[0.391]	0.295	[0.325]	0.305	[0.303]	0.305	[0.206]
Lithuania	0.221	[0.168]	0.309	[0.262]	0.343	[0.380]	0.282	[0.358]	0.248	[0.310]	0.286	[0.205]
Luxembourg	0.213	[0.366]	0.177	[0.320]	0.123	[0.236]	0.156	[0.148]	0.188	[0.134]	0.176	[0.127]
Netherlands, The	0.160	[0.211]	0.127	[0.191]	0.141	[0.164]	0.193	[0.160]	0.238	[0.181]	0.178	[0.110]
Poland	0.131	[0.193]	0.177	[0.273]	0.191	[0.311]	0.191	[0.326]	0.218	[0.344]	0.181	[0.177]
Portugal	0.136	[0.167]	0.173	[0.254]	0.190	[0.355]	0.072	[0.387]	-0.005	[0.275]	0.122	[0.190]
Slovak Republic	0.281	[0.343]	0.250	[0.330]	0.252	[0.329]	0.263	[0.338]	0.301	[0.331]	0.268	[0.196]
Slovenia	0.150	[0.264]	0.121	[0.223]	0.062	[0.224]	-0.005	[0.179]	0.045	[0.147]	0.087	[0.150]
Spain	0.197	[0.238]	0.170	[0.250]	0.149	[0.260]	0.127	[0.233]	0.106	[0.185]	0.153	[0.152]
Sweden	0.223	[0.263]	0.163	[0.157]	0.160	[0.119]	0.212	[0.144]	0.252	[0.168]	0.198	[0.112]
United Kingdom	0.201	[0.255]	0.220	[0.289]	0.235	[0.263]	0.246	[0.226]	0.325	[0.270]	0.253	[0.172]

Note: The decomposition methodology is described in section 4.2. The decompositions are estimated at the 10th, 25th, 50th, 75th and 90th quantile. For each of the reported quantiles, the difference between the actual ln earnings for the two genders is reported first, followed by the portion which is not explained by the quantile regressions in square brackets. The last two columns provide the (no selection) total and unexplained wage gaps from Table 2. The male advantage and female disadvantage are summed up to produce the unexplained part of the Oaxaca-Ransom decomposition.

Table 5: Summary of quantile evidence on sticky floors and glass ceilings

	Sticky floor measured by[a]:			Glass ceiling measured by[b]:			
	10 – all Gaps	10-25 Difference	10-50 Difference	90 – all Gaps	90-75 Difference	90-50 Difference	Shape of actual earnings distribution
	(1)	(2)	(3)	(4)	(5)	(6)	
Austria		Yes	Yes	Yes	Yes	Yes	U-Shaped
Belgium			Yes	Yes	Yes	Yes	U-Shaped
Cyprus	Yes	Yes	Yes				Decreasing
Czech Republic			Yes		Yes	Yes	Complex
Denmark				Yes	Yes	Yes	Increasing
Estonia				Yes	Yes	Yes	Increasing
Finland						Yes	Increasing
France				Yes	Yes	Yes	U-Shaped
Germany		Yes	Yes	Yes	Yes	Yes	U-Shaped
Greece							Flat
Hungary				Yes	Yes	Yes	S-shaped
Ireland				Yes	Yes	Yes	U-Shaped
Italy		Yes	Yes	Yes	Yes	Yes	U-Shaped
Latvia							Reverse U
Lithuania							Reverse-U
Luxembourg	Yes	Yes	Yes		Yes	Yes	U-Shaped
Netherlands, The		Yes		Yes	Yes	Yes	U-Shaped
Poland				Yes	Yes	Yes	Increasing
Portugal							Reverse U
Slovak Republic		Yes	Yes	Yes	Yes	Yes	Comples
Slovenia	Yes	Yes	Yes		Yes		U-Shaped
Spain	Yes	Yes	Yes				Decreasing
Sweden		Yes	Yes	Yes	Yes	Yes	U-Shaped
United Kingdom				Yes	Yes	Yes	Increasing

Notes: [a] A 'glass ceiling' effect is defined to exist if the 90th percentile age gap exceeds the reference gap by at least two percentage points. [b] A 'sticky floor' effect is defined to exist if the 10th percentile wage gap exceeds the reference gap by at least to percentage points.

Table 6: Gender wage gap based on the Olivetti and Petrongolo (2008) selection procedures

	Median wage gap	Imputation based on four alternative assumptions				Probability-based imputation
		(i)	(ii)	(iii)	(iv)	
Austria	0.199	0.496	0.224	0.331	0.245	0.356
Belgium	0.111	0.314	0.169	0.199	0.125	0.195
Cyprus	0.419	0.698	0.436	0.539	0.427	0.538
Czech Republic	0.310	0.426	0.325	0.367	0.308	0.319
Denmark	0.138	0.168	0.145	-	0.139	0.164
Estonia	0.439	0.507	0.397	0.439	0.439	0.443
Finland	0.254	0.311	0.243	-	0.257	0.301
France	0.152	0.236	0.173	0.203	0.164	0.209
Germany	0.139	0.445	0.212	0.158	0.156	0.232
Greece	0.231	-	0.320	-	0.247	0.035
Hungary	0.116	0.288	0.130	-	0.143	0.199
Ireland	0.224	-	0.179	0.340	0.245	0.553
Italy	0.137	-	0.182	0.410	0.177	0.186
Latvia	0.366	0.436	0.375	0.395	0.378	0.398
Lithuania	0.346	0.444	0.344	0.338	0.348	0.366
Luxembourg	0.127	0.781	0.130	0.386	0.189	0.332
Netherlands, The	0.134		0.149	0.228	0.156	0.440
Poland	0.214	0.417	0.292	0.321	0.223	0.318
Portugal	0.187	0.345	0.205	0.267	0.200	0.230
Slovak Republic	0.283	0.307	0.321	0.297	0.285	0.297
Slovenia	0.069	0.120	0.112	0.077	0.073	0.062
Spain	0.145	-	0.215	0.392	0.187	0.299
Sweden	0.164	0.173	0.155	-	0.164	0.172
United Kingdom	0.244	0.461	0.245	-	0.270	0.368

Note: The first column provides the difference between the median ln wage for males and females. In column: (i) min wage assigned if non-employed, (ii) min wage assigned if unemployed, (iii) min wage assigned if education less than upper secondary and less than a ten years of experience and max wage assigned if education greater than upper secondary and more than ten years experience, (iv) min wage assigned if non-employed and spouse's wage income belongs to the bottom income quartile of wage distribution. In the sixth column, the imputation is based on the Probit model. In the column headed (i), the imputation is not estimated for some countries because we assume *ex ante* positive self selection and, in these countries, more than 50% of the female population is not working. In the column headed (iii), experience is not reported for six countries and the imputation cannot be performed.

Table 7: Summary indicators of work-family policies among the EU countries; unionisation rates

	Formal Child-care coverage for under three[§]	Maternity pay entitlement[§]	Voluntary part-time working[§]	Adjust working day for family reasons[§]	Take leave for family reasons[§]	Composite Index[†]	Union membership rate (%)[‡]
Austria	-1.01	0.02	1.50	0.88	1.55	2.94	31.7
Belgium	0.46	-1.63	1.22	0.76	1.06	1.86	52.9
Cyprus	-0.08	-0.81	-0.71	-1.16	-1.85	-4.62	-
Czech Republic	-1.01	1.26	-0.71	-0.38	0.01	-0.84	21.0
Denmark	3.62	0.84	0.00	1.36	1.71	7.53	69.1
Estonia	-0.32	1.67	-0.50	-0.62	-0.07	0.16	36.1
Finland	0.46	0.02	-0.70	1.06	0.09	0.92	70.3
France	0.23	-1.63	0.18	-0.50	-0.96	-2.69	7.8
Germany	-0.39	-0.81	1.22	-0.98	-0.48	-1.44	19.9
Greece	-0.70	0.02	-0.83	-0.68	-0.39	-2.59	23.0
Hungary	-0.62	0.43	-0.83	-0.68	-0.56	-2.27	16.9
Ireland[§]	-0.55	2.08	0.00	0.00	0.00	1.54	31.7
Italy	0.23	0.43	0.04	-0.68	-0.72	-0.71	33.3
Latvia	0.23	0.02	-0.82	-0.32	0.01	-0.89	-
Lithuania	-0.32	0.84	-0.63	-1.34	-0.96	-2.40	-
Luxembourg	-0.39	0.02	1.12	1.36	-0.31	1.79	41.8
Netherlands, The	-0.70	0.02	2.78	2.61	1.88	6.59	19.8
Poland	-0.86	0.02	-0.81	-1.28	-1.21	-4.14	14.4
Portugal	1.00	0.43	-0.85	-0.32	-0.80	-0.54	18.7
Slovak Republic	-0.78	-0.39	-0.83	-0.92	-1.12	-4.05	23.6
Slovenia[§]	0.69	0.00	-0.84	0.16	0.82	0.83	-
Spain	0.07	0.43	-0.51	0.52	0.90	1.41	14.6
Sweden	1.38	-1.63	0.32	0.64	1.23	1.93	70.8
United Kingdom	-0.62	-1.63	1.19	0.58	0.17	-0.31	28.0

Sources: [§]Data for the first five columns are drawn from Eurostat (2009). [‡]Data for union membership rates are taken from OECD (2009) for all countries but Estonia for which data are taken from ILO (1997).

Notes: [§]All indicators in the first five columns are scaled in order to have a zero mean and standard deviation equal to unity. So, a value of zero implies that the country concerned is at the average value for the countries in the table. [†]The composite index is the sum of the first five columns in the table. [§] Maternity pay entitlement is missing for Slovenia and Voluntary part-time working, Adjust working day for family reasons and Take leave for family reasons are missing for Ireland. Missing values are replaced with the mean value of the rest of the sample.

Table 8: Relationship between the Oaxaca-Ransom unexplained gender gap part and the work-family reconciliation index and its constituent indices

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Child Care	-0.014**						-0.007
	(0.006)						(0.007)
Maternity		0.018**					0.013**
		(0.008)					(0.006)
Vol. part-time			-0.024***				-0.008
			(0.007)				(0.009)
Adjust work day				-0.027***			-0.012
				(0.007)			(0.012)
Family days off					-0.025***		-0.008
					(0.008)		(0.015)
Composite index						-0.008***	
						(0.002)	
Constant	0.166***	0.166***	0.166***	0.166***	0.166***	0.166***	0.166***
	(0.009)	(0.009)	(0.008)	(0.007)	(0.008)	(0.008)	(0.007)
Observations	24	24	24	24	24	24	24
R^2 Adjusted	0.053	0.119	0.259	0.348	0.284	0.258	0.401

Note: OLS regression equations; robust standard errors in parentheses. Three stars indicate significance at the 1%, two stars at the 5% and one star at the 10% level.