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Individual Choice or Policies? Drivers of Female Employment in Europe

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Abstract

Female labor force participation has increased markedly in many European countries during the past decades. Nonetheless, participation rates remain low in some economies, and a significant gender gap persists in most countries. Using micro-level data to control for factors that influence personal choice, we re-examine the determinants of female employment in Europe. The results highlight the importance of positive attitudes towards women working and individual characteristics such as years of education and number of children. However, even after controlling for these factors, policies are also key drivers of female employment.

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I. INTRODUCTION

Over the past three decades, millions of women in Europe have joined the labor force. Since the early 1980s, female labor force participation rates have more than doubled in countries such as the Netherlands, Spain, and Ireland, substantially lifting the European Union (EU) average. As a result, the share of women working in EU countries is now among the highest in the world, trailing closely behind North America and East Asia and ranking far above countries in the Middle East, Latin America, and South Asia (Figure 1). However, while gender gaps in participation have also narrowed in most European countries, they remain substantial. Moreover, during the past decade, there has been a significant slowdown in the rate at which gender participation gaps are closing.
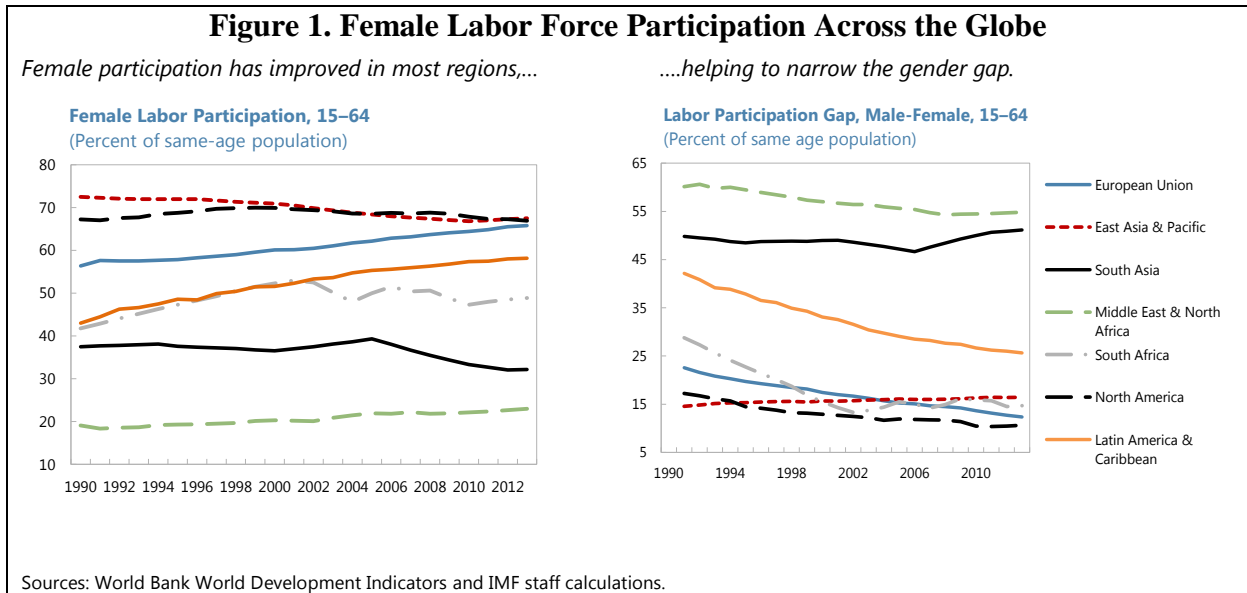
The rise in participation, however, masks significant cross-country differences in the levels of female participation. More than 90 percent of women aged 25–54 in Sweden work, compared to around 65 percent in Italy and Malta. Furthermore, in some countries with relatively high female labor force participation rates—such as Germany and the Netherlands—the incidence of part-time work among women is also substantial, creating a larger gender gap in labor supply than participation rates would suggest.

A large literature has examined the causes of the rise of women's involvement in the labor market in advanced economies. Studies highlight supply-side explanations such as greater investment in human capital, medical advances, technological progress reducing the burden of household work, and changes in policies. The latter includes the removal of legal restrictions for women to work, enhanced provision of child care, and lower tax rates on two-income households.[1]

However, as supply-side constraints to women's engagement in the labor force are relaxed, two questions come to the fore: (i) to what extent does the female employment decision simply reflect individual preferences? and (ii) can the removal of policy distortions and the provision of services that help women reconcile work and family life further boost female labor participation in Europe? Answering these questions is increasingly relevant as women reach or surpass men in educational attainment, gain full control of their fertility, face no legal restrictions to work, and social norms change. Answering these questions is also important given the demographic pressures that many European countries will experience over the coming decades. The aging of the population will put significant downward pressure on labor supply, with negative implications for economic welfare and public finances. In this

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[1] See, among others, Goldin and Katz (2002) and Albanesi and Olivetti (2007), for the role of medical progress, Greenwood and others (2005) for the role of technological progress in the household, Galor and Weil (1996) and Attansio and others (2008) for the role of declining fertility, and Fernández (2013) for the importance of cultural factors. Jaumotte (2003), Bassanini and Duval (2009), Thévenon (2013), and Bick and Fuchs-Schundeln (2014) document the role of government policies in explaining cross-country differences in the share of women working in OECD countries, while Gonzales and others (2015) focus on gender-based legal restrictions to labor force participation.

context, raising female labor supply could partially offset the negative effects of Europe's graying.

Figure 1. Female Labor Force Participation Across the Globe

Female participation has improved in most regions,...   *....helping to narrow the gender gap.*

Female Labor Participation, 15–64
(Percent of same-age population)

Labor Participation Gap, Male-Female, 15–64
(Percent of same age population)

European Union
East Asia & Pacific
South Asia
Middle East & North Africa
South Africa
North America
Latin America & Caribbean

Sources: World Bank World Development Indicators and IMF staff calculations.

Motivated by these considerations, this paper takes a fresh look at the drivers of female employment in Europe in the 2000s. Using micro-level data from two rounds of the International Social Survey Programme (ISSP) across 24 European countries, we assess the relative importance of various demographic characteristics and policy variables for women's employment outcomes. We also include women's self-reported attitudes towards female labor force participation.

The main contributions of this paper are three-fold. First, unlike many studies that conduct analyses across OECD economies, we focus on European economies in the post-2000 period—in many of these countries, the improvement in female labor force participation has slowed down significantly from previous decades, as the rate of female labor force participation has converged to levels that are high by historic standards. Second, we take advantage of micro-level data with individual-level characteristics, allowing us to disentangle the effects on women's employment decision arising from individual (or household) choice[2] and macro-level policy. Third, we explore both the *extensive* (whether or not a woman is working) and *intensive* (how many hours women are working) margins of female employment.

The analysis highlights the importance of both individual attitudes towards women working and government policies. Beyond demographic characteristics, such as the level of education,

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[2] This paper uses "individual choice" and "personal choice" interchangeably and acknowledges that personal choice may be the result of household decision.

and number of children, women's self-reported attitudes towards the desirability of female market work are key predictors of women's decision to join the labor force. However, policies matter as well. On the extensive margin, greater labor tax distortions are significantly correlated with a lower probability of a prime-aged woman working, whereas provision of childcare tends to support women's entry into the workforce. In addition, tax distortions tend to be more important among advanced European countries than among emerging European countries. On the intensive margin, women tend to work fewer hours in settings with greater tax disincentives on the second earner or greater availability of parental leave.

The rest of the paper is structured as follows. Section II discusses the potential role of structural and policy factors in driving female employment, drawing on the existing literature. Section III provides an overview of the stylized facts about female labor participation and its potential determinants, and section IV presents the data and methodology. Section V discusses the empirical results. Section VI conducts a series of robustness checks, and section VII concludes.

II. DRIVERS OF FEMALE EMPLOYMENT: AN OVERVIEW OF THE LITERATURE

Women's decision to join the labor force is often analyzed through the lens of Becker's time allocation model (Becker, 1965), in which women choose not only how much leisure to consume but also between working within the household (for example caring for their children) and working outside the household, thus earning a wage. Within this framework, both individual characteristics (such as age, education, and number of children) and policies that influence the relative returns to market and home production (such as labor taxation or childcare provision) affect female labor supply. Factors that affect the relative demand for female work, for example the expansion of the services sector, where women might have a comparative advantage, will also draw more women into the labor force (Ngai and Petrongolo, 2014). Below, we provide a brief overview of the general findings in the existing empirical literature on the main factors driving female labor supply.

A. Structural characteristics

Demographics. Women's marital status and the number of kids or elderly they care for raise the value of home production, relative to market work. In this context, higher marriage rates and larger families have been shown to be correlated with lower participation rates.[3] Similar to men, women's labor supply also varies over their life cycle, making age an important

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[3] Medical advances and technological change that have helped control fertility and lowered the cost of childbearing and the burden of household chores have enabled married women to increase their participation in the labor force (see, for example, Albanesi and Olivetti, 2007).

determinant of labor force participation (Heckman and MaCurdy, 1980; Bloom, 2009; Mishra and Smyth, 2010; Eckstein and Lifshitz, 2011; and Fernández and Wong, 2014).[4]

Education. Education strengthens women's incentives to provide market work as it raises their potential earnings in the labor market relative to household work (Eckstein and Lifshitz, 2011). Across Europe, better educated women experience higher employment rates than less educated ones; countries with higher female educational attainment also exhibit a smaller gender employment gap (Pissarides and others, 2005).

Social norms and attitudes. Gender attitudes or beliefs about women's role in society determine the disutility of market work from violating personally-held beliefs or social norms (Fernández, 2013). Non-traditional attitudes are associated with better employment outcomes of women and a more egalitarian division of household work (Corrigall and Konrad, 2007; McGinn and others, 2015). Such attitudes, however, are not static; exposure to women in the labor force or in leadership positions can weaken stereotypes about gender roles, thus boosting labor force participation in future generations of women (Beaman and others, 2009; De Paola and others, 2010; and Bonomi and others, 2013).

Structure of the economy. Female employment also responds to changes in demand for female labor, which raises the returns to market work. For example, the expansion of the services sector tends to be positively associated with the share of women in the work force (see, for example, Das and others, 2015, for the case of India, and Thévenon, 2013, for evidence from OECD countries).

Wage gap. A higher hourly wage for men than for women may discourage women from entering the labor market (see, for example, Kinoshita and Guo, 2015, for lessons from Japan, Korean, Finland, and Norway), as female labor supply elasticities with respect to wages can be fairly large (see Keane, 2011 for a review of the literature). Nonetheless, a robust negative relationship between the wage gap and female labor force participation has been hard to establish in the cross-country literature as women's wages and employment participation are affected by the same set of structural characteristics and policies (see, for example, Dao and others, 2015; Steinberg and Nakane, 2012).

B. Policies

Policies can exert a significant impact on female labor force participation through two main channels.[5] The tax system, which *de facto* often taxes married women more heavily than men

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[4] Some studies have found a positive relationship *across* countries between fertility and marriage rates on the one hand and labor force participation on the other hand when accounting for men's contribution to home production (De Laat and Sevilla-Sanz, 2011).

[5] Female labor force participation can be influenced by many other policies, whose study remains beyond the scope of this paper. Such policies include overall labor taxation, the degree of regulation of the labor and product markets (Pissarides and others, 2005), immigration policies that may restrict the supply of potential caregivers, education policy regulating school hours (OECD, 2002), etc.

and single women, and lack of anti-discrimination laws could distort women's labor supply decisions by reducing the return from market work. However, policies that help women combine the responsibilities of market and domestic work, for example allowing employment flexibility in the form of part-time work opportunities, parental leave, and improving access to complementary services, such as child- and elderly care, could support women's decision to participate in the labor market (Blau and Kahn, 2013). Importantly, policies to boost female labor force participation need not come at the cost of reducing fertility, which may be undesirable in light of looming demographic pressures (Jaumotte, 2003).

Taxation. A large literature has examined the role of taxation in explaining differences in labor supply across countries, noting that women's labor supply is quite sensitive to taxation (Keane, 2011).[6] More neutral tax treatment of first- and second-wage earners has been shown to curb disincentives to work for the second-wage earner and is generally associated with higher female labor force participation (Bick and Fuchs-Schündeln, 2014, and Dao and others, 2014).

Part-time work opportunities and incentives. Part-time work may facilitate women's integration in the labor market, allowing them to combine market work with family responsibilities (Kenjoh, 2005; Steinberg and Nakane, 2012). In many OECD countries, switching from full-time to part-time employment is both easy and frequent (OECD, 2004). Indeed, the incidence of part-time employment is in general positively correlated with the rate of female employment. Nonetheless, female participation rates are also high in many countries that promote full-time employment such as Austria, France, and Nordic countries (Jaumotte, 2003).[7] While enhanced opportunities to work part time can level the playing field for women, part-time employment is often involuntary in Europe and can result from policy-induced constraints to taking up full-time work (for example, taxation or under-provision of childcare).[8]

Child benefits and transfers. Higher lump-sum child benefits and tax allowances would tend to discourage female labor force participation, owing to their income effect. However, existing empirical evidence is inconclusive, with some studies reporting a negative

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[6] See, for example, Prescott (2004) and Rogerson (2006) who study the role of taxation in explaining cross-country differences in overall labor supply; and Jaumotte (2003), Bassanini and Duval (2006), and Dao and others (2014) who focus on female labor force participation. A rich stream of country-specific micro-empirical studies also confirms the importance of taxation on labor supply.

[7] See also Sandor (2009) for a review of the literature on part-time work in Europe.

[8] For European countries, part-time work has been found to be more prevalent when fertility rates are higher, employment regulation is more favorable, and employment protection stricter for permanent contracts. The share of the services sector in the economy and that of young adults in tertiary education are also important determinants. Part-time work can also allow employers to adjust hours worked to cyclical conditions, although the responsiveness is higher for male workers (Buddelmeyer and others, 2008). Finally, tax incentives to work part-time are also seem to have a significant effect on part-time participation rates (Thévenon, 2013).

association between child benefits and female labor force participation (Jaumotte, 2003), whereas others find the opposite (Dao and others, 2014).

Childcare. Access to affordable childcare is essential in supporting women in the work force, as it directly affects the implicit monetary value of women's home production. Female labor force participation has been shown to be very sensitive to childcare costs (see, for example, Blau (2002) and Akgunduz and Plantenga (2011) for a review of the literature). Childcare support, both in the form of childcare subsidies and public provision of childcare, has helped boost female labor force participation in OECD countries (see, for example, Jaumotte, 2003; Steinberg and Nakane, 2012; and Thévenon, 2013, for cross-country evidence).

Parental leave. Liberal parental leave policies help women reconcile market and home work and may support their return to market work after childbirth (Jaumotte, 2003; Thévenon, 2013). Excessive parental leave, however, could hurt hiring of women of child-bearing age and make it more difficult to re-enter the workforce due to deterioration of market skills (Ondrich and others, 2003; Edin and Gustavasson, 2008).

In addition, policies and structural factors often interact. Thévenon (2013) argues that among the main drivers of women's decision to join the labor force, access to formal childcare services is particularly effective in boosting female employment, especially if employment protection is high and when combined with other measures supporting working mothers, such as parental leave.

III.   FEMALE LABOR FORCE PARTICIPATION AND ITS DRIVERS: STYLIZED FACTS

A.   Female labor force participation

While female labor force participation rates in Europe are relatively high, considerable variation remains across countries.[9] As of 2014, the average EU female labor force participation rate among the 25–54 year-olds stood at almost 80 percent. However, this masks participation rates ranging from close to 90 percent in Lithuania, Slovenia, and Sweden to 66 percent in Italy and 63 percent in Malta (Figure 2).[10]

Female labor force participation has gradually increased over the past three decades across most advanced economies in Europe, with participation rates converging to those in the Nordic countries. As a result, cross-country differences have narrowed. However,

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[9] See Appendix A for data sources and definitions of variables. We discuss trends in female labor force participation and its key determinants for the 28 EU countries, Iceland, Norway, and Switzerland. The set of countries included in the regression analysis of Sections IV to VI, and listed in Appendix B, is restricted by the availability of data.

[10] Differences are similar when considering participation rates among the 15–64 year-olds. For the purpose of this paper, we focus on women between the ages of 25 and 54, generally considered the prime working age. This age range avoids most problems associated with cross-country differences in education systems, retirement age, and availability of early retirement schemes.

convergence has been notably slower in a handful of economies in southern Europe (such as Italy and Malta) in sharp contrast with developments in Spain, the Netherlands, and Ireland, which had a similar share of working women in the early 1980s but experienced a more pronounced rise in participation rates.[11] In advanced Europe, the increase in female labor force participation has generally slowed over time: the average increase in participation rates stood at less than 6 percentage points in the 2000s, down from 12 percentage points in the 1980s and close to 7 percentage points in the 1990s, respectively.[12]

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[11] In Spain, women's participation rose dramatically after Francisco Franco's dictatorship collapsed, as legal restrictions were removed and social attitudes toward women working gradually became more favorable.

[12] Calculation is based on the simple average of progress made in eight countries (Finland, Germany, Italy, Netherlands, Norway, Portugal, Spain, and Sweden) that have female labor force participation rates available from 1980.

Figure 2. Female Labor Force Participation in Europe

Participation has increased during the past decades,...

Female Labor Participation Rate, 25–54
(Percent of same-age population)

Source: Eurostat.
1/ Or earliest data point available.
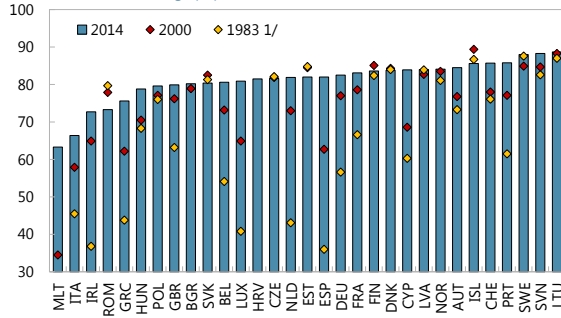
....and the gender gap declined—though it is still sizeable.

Labor Force Participation Gap, Male-Female, 25–54
(Percentage points)

Source: Eurostat.
1/ Or earliest data point available.
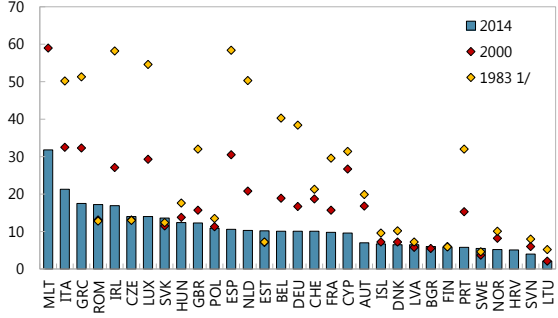
Italy and Malta lag significantly in their convergence,...

Female Labor Force Participation: Other Advanced Economies (Ages 25–54, percent of same-age population)

Source: Eurostat.
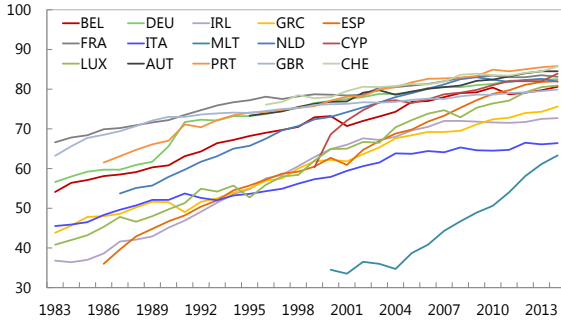
......while the Nordics have a history of high participation.

Female Labor Force Participation: Nordic Countries
(Ages 25–54, percent of same-age population)

Source: Eurostat.
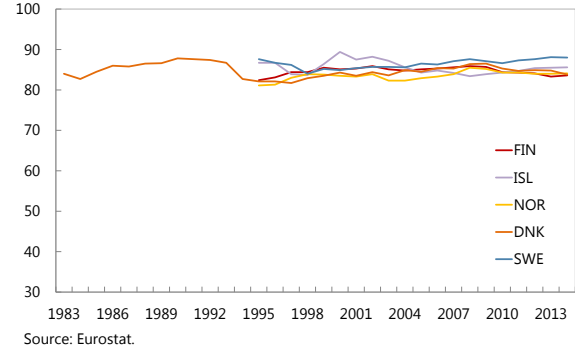
Some Emerging markets have high participation rates,...

Female Labor Force Participation: Rest of Emerging Europe (Ages 25–54, percent of same-age population)

Source: Eurostat.
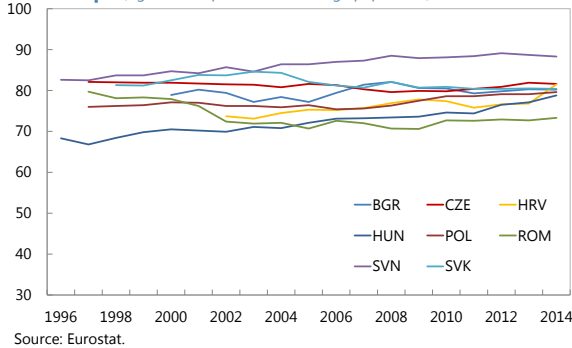
....particularly among the Baltics.

Female Labor Force Participation: Baltic Countries
(Ages 25–54, percent of same-age population)

Source: Eurostat.
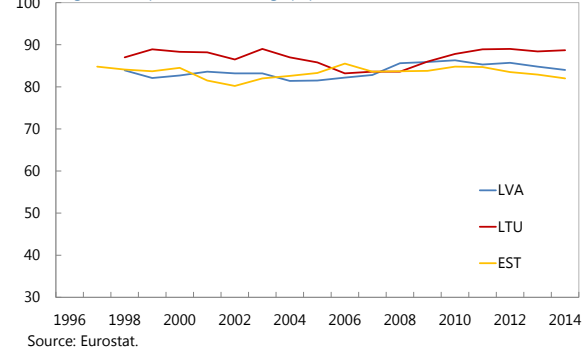
However, progress in raising female labor force participation has been less pronounced in emerging Europe. While female participation rates in many emerging European countries in the late-1990s ranked high relative to advanced Europe, a further significant improvement has been absent in Bulgaria, Latvia, and Lithuania. Romania even experienced a decline in participation from close to 80 percent in the late-1990s to below 75 percent in 2014. Hungary stands out as a notable exception, with participation rate increasing by nearly 10 percentage points during the past two decades.

The gender gap also remains sizable. As a result of the higher entry of women into the labor force, the gender participation gap has narrowed considerably since the early 1980s. Nevertheless, at 12 percentage points for the EU as a whole, it remains large. There is also significant heterogeneity across countries. In Sweden, where the female participation rate ranks highest, the gender gap is only 5 percentage points, whereas in Malta, where the female participation rate ranks lowest, it stands at 32 percentage points. Furthermore, the gender gap varies across age groups and education levels. In Italy, participation gaps are particularly high among women between the ages of 36 and 59, while in Poland, participation gaps are high in the 25–39 age groups. Common for all is that more education appears to be associated with smaller gaps in participation (Figure 3).

The relatively high levels of labor force participation of European women mask the fact that many are employed at less than full time, especially in advanced Europe. In the Netherlands, where more than 80 percent of women are involved in market work, there is a considerable gap in hours worked by men and women, as more than half of prime working-aged women are employed part-time (Figure 4). In Germany, employed men work for nearly 40 hours per week, while women work around 30 hours per week. In contrast, women and men in Bulgaria work approximately equally long work weeks of around 40 hours. The gender gaps in hours worked are narrow at less than 5 percent in the Czech Republic, Romania, and Slovakia. That said, the extent of part-time employment has declined significantly since the beginning of the century in some countries, including Iceland, Norway, Poland, Sweden, and Belgium. In contrast, it has risen in Austria, Italy, Spain, Greece, and Slovenia.

Figure 3. Selected Countries: Labor Force Participation by Age and Education, 2014

In Italy, substantial gaps in the 35-59 age group,...

Italy: Labor Force Participation by Age and Sex
(Percent)
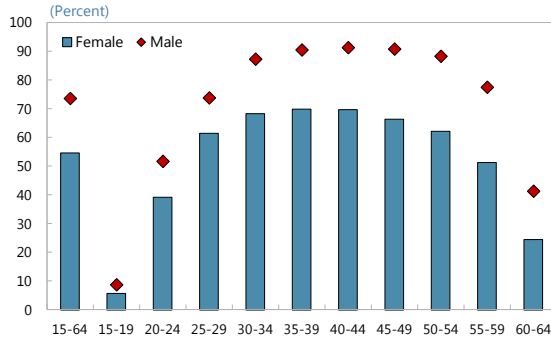
Source: Eurostat.

...as well as among less-educated people.

Italy: Labor Force Participation by Education and Sex
(Percent, ages 25–54)
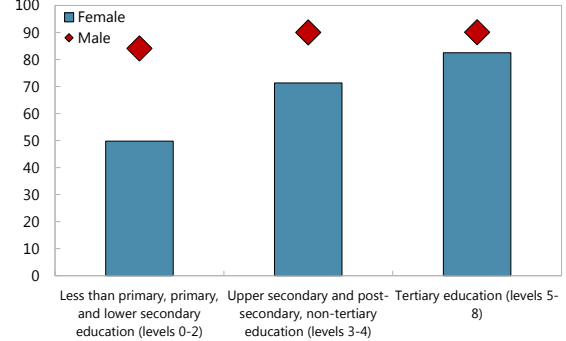
Source: Eurostat.

There is substantially smaller dispersion in Sweden,...

Sweden: Labor Force Participation by Age and Sex
(Percent)
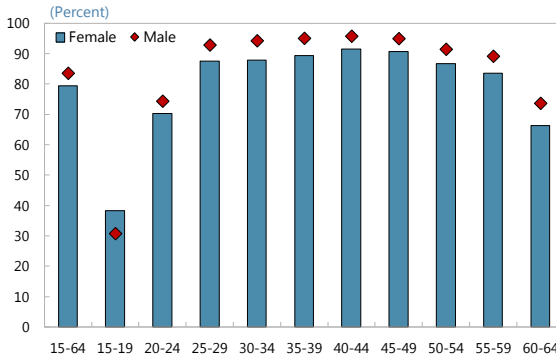
Source: Eurostat.

...where gaps are narrow among highly-educated people.

Sweden: Labor Force Participation by Education and Sex (Percent, ages 25–54)
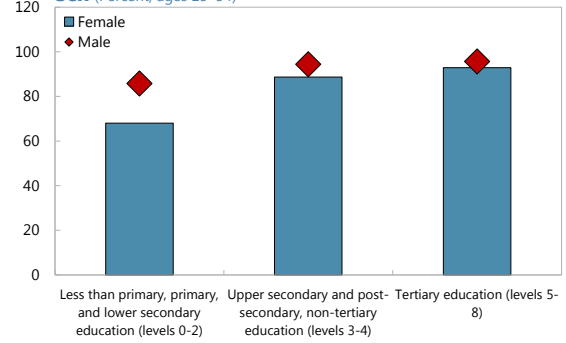
Source: Eurostat.

Relatively small gaps in the 45–54 age groups in Poland...

Poland: Labor Force Participation by Age and Sex
(Percent)
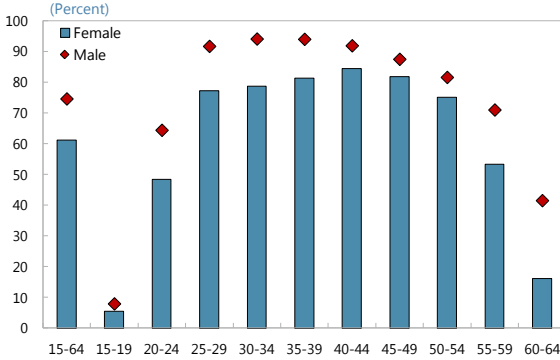
Source: Eurostat.

...but relatively large gaps among less-education people.

Poland: Labor Force Participation by Education and Sex (Percent, ages 25–54)
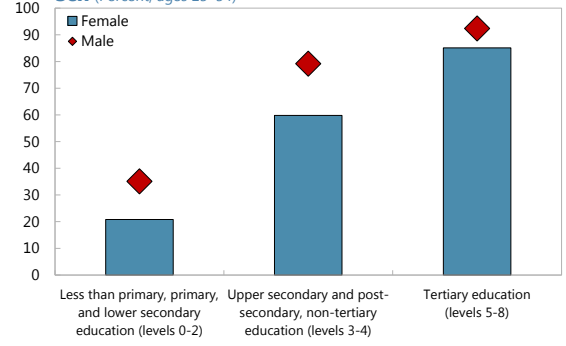
Source: Eurostat.

Figure 4. Part-Time Employment of Women

Prevalent part-time work in advanced Europe…

Female Part-Time Employment
(Percent of total employment, ages 25–54)

…results in low average hours worked in many countries.

Relative Number of Average Hours Worked per Week (Women relative to men, 2014)

Source: OECD.
1/ Or earliest available data.

Sources: Eurostat and IMF staff calculations.
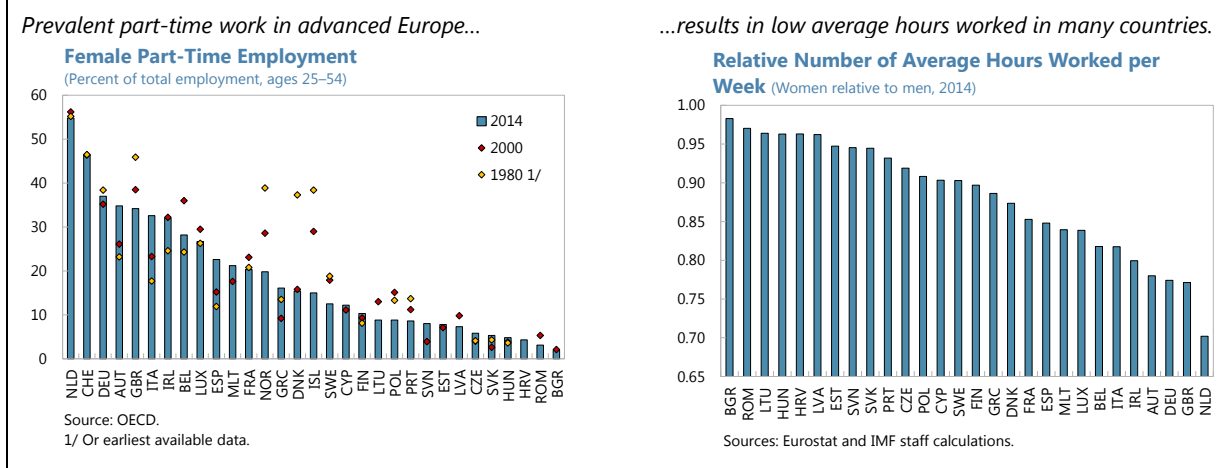
B. Structural characteristics and policies

Structural characteristics have generally evolved to become more favorable towards women working since the early 1980s (Figure 5). Policies related to providing access to childcare and enhancing work flexibility have also become more supportive across most European countries. However, there is no clearly discernible pattern in the change in taxation of secondary earners since the early 2000s across Europe, with some countries reducing the fiscal disincentives for female market work, and others raising it (Figure 6).

Structural characteristics

Demographics. Fertility rates have fallen in most European countries, and are currently at historical lows. In the early 1980s, the average woman had approximately 0.7 children (14 years old or younger). This number fell to 0.5 children per woman in 2012. At the same time, female education levels have risen steadily during the last decades and the education gap (measured in terms of average years of schooling) with men has shrunk from more than one year in 1980 to less than four months in 2012–13.

Attitudes. Social norms and attitudes towards the role of women in the economy have become more favorable to women's market work. Social surveys reveal that both men and women in Europe are increasingly more likely to agree with the statement that working outside the household does not harm women's relationship with their children or family life, and that both should contribute to household income. There has also been a notable increase in women in positions of power: 28 percent of European parliamentarians were women in 2014, up from only 18 percent in 1997—though the numbers vary significantly across countries with 10 percent in Hungary in 2014 and 45 percent in Sweden.

Figure 5. Determinants of Labor Supply: Structural Factors

Fertility has declined markedly...

Number of Children (under 14) Per Woman

Source: OECD.
1/ Or earliest available data point.
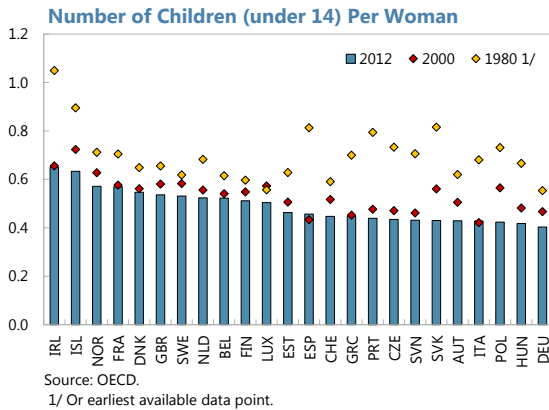
...and women have become more educated.

Female Education
(Average number of years of schooling)

Source: OECD.
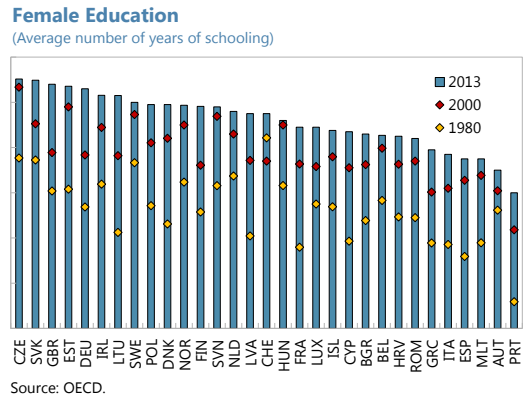
Attitudes towards working have become more favorable,...

Women's Attitudes Towards Gender Roles
(Share of female respondents)

Source: ISSP. The chart plots the share of female respondents who agree or strongly agree with the statements above regarding gender roles. Responses are coded in a way that a positive response reflects a more gender-egalitarian opinion.

...including among men.

Men's Attitudes Towards Gender Roles
(Share of male respondents)

Source: ISSP. The chart plots the share of male respondents who agree or strongly agree with the statements above regarding gender roles. Responses are coded in a way that a positive response reflects a more gender-egalitarian opinion.

The wage gap has declined, but remains sizable.

Gender Wage Gap
(Percent)

Source: OECD.
1/ Or latest available data point.
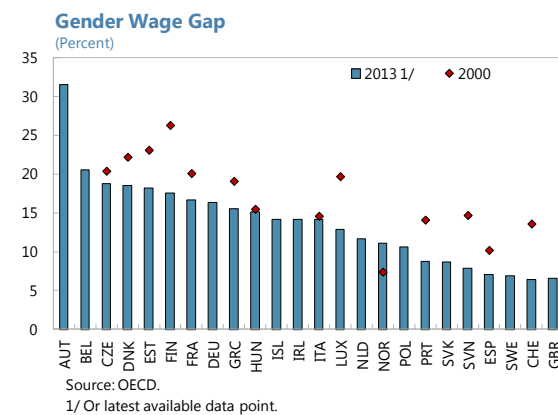
The service sector has expanded across all countries.

Share of Service Sector in Total Economy Employment (Percent)

Source: World Development Indicators.
1/ Or earliest available data point.
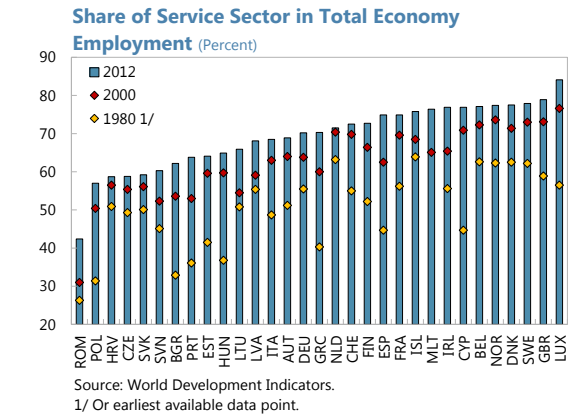
Figure 6. Determinants of Labor Supply: Policies

Large cross-country variation in taxation...

Relative Tax on the Second Earner
(Ratio)

Sources: Thevenon (2013) and OECD.
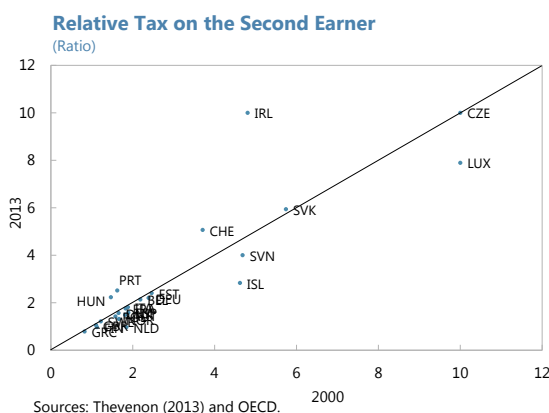
...and in incentives for part-time work.

Incentives to Work Part-Time
(Ratio)

Source: OECD.
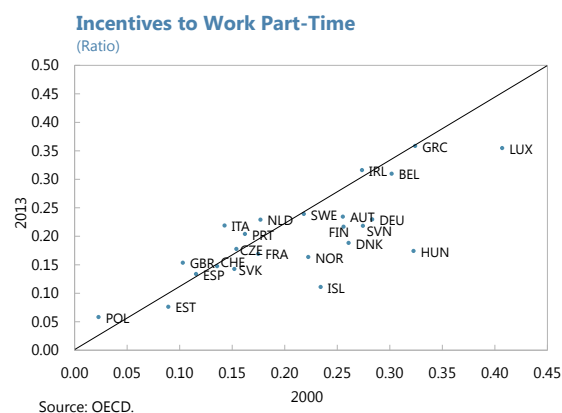
Large dispersion in parental leave with job protection...

Parental Leave
(Weeks)

Source: OECD.
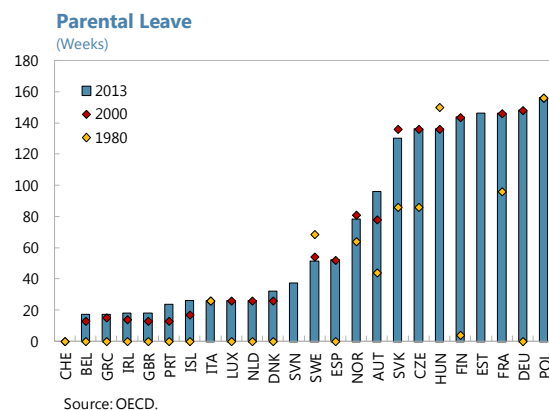
...as well as in paid maternity leave for women.

Maternity Leave
(Weeks)

Source: OECD.
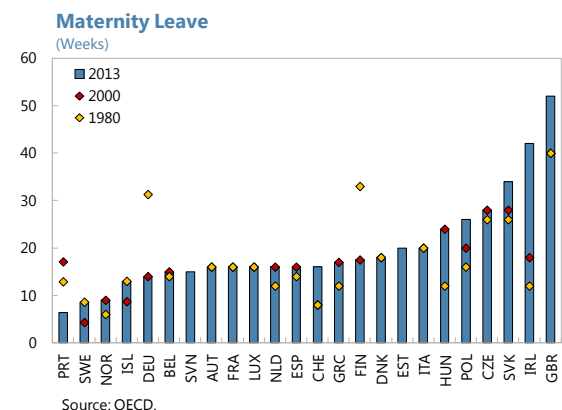
Structure of the economy. All economies in Europe have witnessed their service sectors expand, broadening opportunities for women to join the labor force. The share of employment in the service sector has risen steadily from around 50 percent of GDP in 1980 to around 65 percent of GDP in 2013. In the Nordic countries, the U.K., and Belgium, the services sector now accounts for more than 77 percent of GDP and in Luxembourg, the share is as high as 84 percent.

Wage gap. The gender wage gaps between men and women have also narrowed. However, women continue to be paid substantially less than men—a discount that recently ranged from more than 30 percent in Estonia to about 6.5 percent in Luxembourg.[13]

Policies

Second-earner taxation. Across Europe, the tax treatment of married couples ranges from completely joint taxation (e.g., Germany, Ireland, Portugal) to completely separate taxation

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[13] Based on OECD Employment Database 2014.

(e.g., most Scandinavian, Eastern, and Southern European countries), with a mixture of both systems in Western Europe (Bick and Fuchs-Schündeln, 2014). However, across most countries, tax disincentives for the second earner in the family—usually a woman—to take up work (or to work more than a minimum number of hours) remain substantial. On average in 2000 in the countries included in our sample, the relative marginal tax rate for the second earner in a family was twice as high as the average tax paid by families with a single earner.[14] This tax wedge has historically been low in Nordic countries, relative to countries such as Germany and Switzerland. Furthermore, the relative taxation of secondary earners has generally been quite stable over time.

Part-time work opportunities and incentives. Tax incentives to working part time vary significantly across Europe, with Greece, Luxembourg, and Ireland in the top range, and Poland and Estonia in the opposite end. That said, accurately measuring this variable is challenging, owing to data limitations (see Appendix A).

Family allowance. The composition of family-related public spending has changed quite significantly over the past three decades. Most countries have cut spending on family allowance. For example, in Belgium, public spending on family allowances declined from nearly 3 percent of GDP in 1980 to 1.5 percent in 2011, while in Spain they have been below 0.5 percent of GDP for the past 30 years. In Poland, it was reduced from 1.3 percent of GDP in 1990 to 0.3 percent in 2011.

Childcare. Public spending on early education and childcare, on the other hand, gradually increased over the same time period.[15] While the Nordic countries remain among the countries with the highest share of GDP devoted to early childhood education and childcare, the increase in childcare spending has occurred across nearly all countries. Nonetheless, childcare availability and cost vary markedly across countries. In Germany, where full-day childcare is limited, public spending on childcare and pre-primary education is below the OECD average and a subsidy is paid to families that are *not* using childcare for their young children (OECD, 2014). In Switzerland, the OECD notes that childcare costs are high and afterschool care availability insufficient (OECD, 2013).[16]

Family Allowance and Childcare Spending
(Percent of GDP)

Source: OECD.

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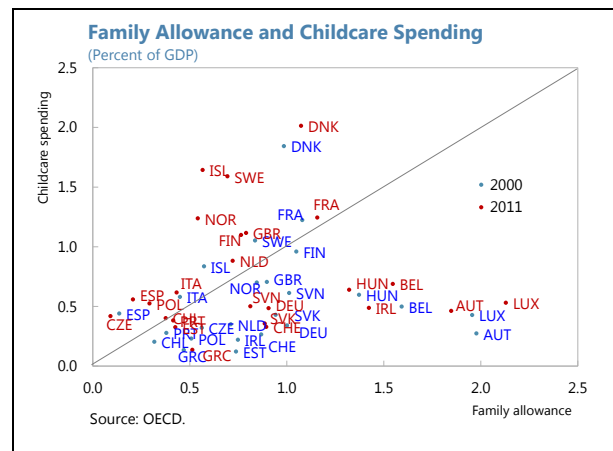
[14] See Appendix A for data sources and detailed definitions of all variables used in the analysis.

[15] Public spending on childcare as a share of GDP is an imperfect proxy of the availability of childcare and after-school programs, yet it is the measure most consistently available across countries and over time.

[16] A tax deduction for childcare costs has recently been implemented.

Parental leave. Parental leave policy has also become markedly more liberal, especially for fathers. Among the countries considered here, paid *paternity* leave has increased from one day in 1990 to ten weeks as of 2013. Furthermore, during this time, paid *maternity* leave has risen from less than 17 weeks to 20 weeks and *parental* leave (for women with job protection, but not necessarily paid) has further increased from just below 60 weeks to nearly 70 weeks. The variation in leave policies across countries is very large. For instance, Slovak Republic raised its parental leave in the late 1980s from 86 weeks to around 135 weeks and has maintained this level since then. On the other end of the spectrum, maternity leave in Greece and Iceland has been less than 20 weeks for the past 30 years.

IV. DATA AND METHODOLOGY

To explore the determinants of female employment rates, we rely on the 2002 and 2012 rounds of the 'Family and Changing Gender Roles' module of the ISSP, combined with country-level information on policies and other factors.[17] The 'Family and Changing Gender Roles' module of the ISSP focuses on attitudes towards gender roles, women's employment, marriage, and children. Using individual-level data allows us to control not only for individual characteristics that have been shown to strongly influence women's labor supply, such as number of children, age, and education, but also for personal preferences when examining drivers of female labor force participation.[18] While the survey for the gender module is not conducted annually, we do obtain a time-series dimension by including data from 2002 and 2012—the two most recent survey years. We thus estimate the following labor supply model:

$$E_{jit} = \alpha + Z_{jit}\beta + X_{it}\delta + \theta_i + \rho_t + \varepsilon_{ijt} \tag{1}$$

Here, E_{jit} is an indicator variable taking the value of 1 if individual *j* living in country *i* is employed at time *t*, as we focus on the extensive margin of female employment. The vector Z_{jit} includes the individual characteristics discussed above (age and its square, number of years of schooling completed and its square, marriage status, whether mother worked, and attitudes towards gender roles).[19] Aggregate country-level policies and other factors are reflected in the vector X_{it}.

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[17] The ISSP is a cross-national collaboration program, which administers surveys on a range of social science topics to nationally representative samples of the adult population in 37 countries. Our analysis focuses on the 24 European economies included. See also McGinn and others (2015), Mayda and Rodrik (2005), Mayda (2006), and Facchini and Mayda (2006) for other studies that have used data from the ISSP.

[18] McGinn and others (2015) use the ISSP to study the effect of childhood exposure to non-traditional gender roles at home on women's employment outcome, work responsibilities, and wages.

[19] Our findings are robust to the inclusion of a proxy for individual predicted wages, following Klasen and Pieters (2015). However, due to the very imperfect nature of the wage information available (the ISSP records total personal income but with varying definitions across countries), the specifications in this paper do not control for potential wage income.

We include a number of controls. In all regressions, we include the three-year average output gap to control for cyclical demand-side effects on female employment. In addition, we control for the country-level average male employment rate among the 25–54 year olds, which should reflect the gender-neutral effect of labor market policies and institutions, such as employment protection regulations, minimum wage, unionization, active labor market policies, and product market restrictions.[20] [21] All regressions include country fixed effects, θ_i, which absorb all time-invariant differences across countries that may affect the share of women in the labor force. Time fixed effects, ρ_t, control for the secular trend in female labor force participation common to all countries in the sample.

We estimate equation (1) using a linear probability model to simplify interpretation of the coefficients. To model labor supply decisions at the intensive margin, we change the dependent variable in eq. (1) to an indicator for whether an employed woman works full time, or, alternatively, the number of weekly hours worked.[22] Heteroskedasticity-adjusted standard errors are clustered at the country-year level.

It is important to stress the limitations that our empirical strategy imposes on the interpretation of the findings. We exploit the variation in the observed changes in structural characteristics and policies between 2002 and 2012 at the country level to capture their relation with female labor supply. However, a causal interpretation of the correlations we document is difficult. Policy changes may simply reflect changes in social norms and preferences, they may be put in place in response to the rise of female labor force participation, or may be correlated with other factors that influence women's decision to work but are not accounted for in our empirical framework. Similarly, women's attitudes could be driven by their participation in the labor market rather than the reverse. These limitations are common to nearly all cross-country studies of the determinants of female labor supply. With these caveats in mind, below we present our main findings.

V. EMPIRICAL RESULTS

A. Extensive margin

The results suggest that even after controlling for structural characteristics and individual preferences, policies are significantly associated with women's employment decisions. Table

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[20] It is possible that these gender-neutral policies may affect disproportionately the employment of women versus men. However, with the relatively small number of countries in the sample, we focus on policies identified in the literature as particularly important for female labor force participation.

[21] We do not include the wage gap in the regressions as wages would tend to be jointly determined with the employment decisions and are affected by structural characteristics and policies already included. In addition, country fixed effects also help capture any potential impact from employment in 'female friendly' sectors such as the service sector.

[22] In section VI we present results from estimating a probit model for women's employment decisions and a tobit model for the number of hours worked.

1 presents the results from estimating equation (1), with all structural controls and a number of different combinations of policy variables.

Table 1. Extensive Margin: Europe—Women
(Dependent variable: whether or not employed)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Structural	Number of children	-0.0614***	-0.0585***	-0.0582***	-0.0573***	-0.0575***	-0.0579***	-0.0562***	-0.0565***
		(0.0067)	(0.0068)	(0.0071)	(0.0072)	(0.0069)	(0.0071)	(0.0072)	(0.0072)
	Education (years)	0.0526***	0.0462***	0.0420***	0.0424***	0.0411***	0.0423***	0.0378***	0.0391***
		(0.0071)	(0.0077)	(0.0073)	(0.0073)	(0.0072)	(0.0074)	(0.0069)	(0.0071)
	Education (years), squared	-0.0013***	-0.0012***	-0.0011***	-0.0011***	-0.0011***	-0.0011***	-0.0010***	-0.0010***
		(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
	Age (years)	0.0677***	0.0680***	0.0658***	0.0650***	0.0656***	0.0649***	0.0624***	0.0618***
		(0.0084)	(0.0097)	(0.0107)	(0.0106)	(0.0106)	(0.0104)	(0.0105)	(0.0104)
	Age (years), squared	-0.0008***	-0.0008***	-0.0008***	-0.0008***	-0.0008***	-0.0008***	-0.0008***	-0.0008***
		(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
	Mother working	0.0385***	0.0237**	0.0214**	0.0213**	0.0215**	0.0227**	0.0220**	0.0227**
		(0.0094)	(0.0101)	(0.0104)	(0.0103)	(0.0104)	(0.0105)	(0.0108)	(0.0108)
	Married	-0.0094	0.0007	-0.0002	-0.0012	-0.0013	0.0004	-0.0001	0.0011
		(0.0121)	(0.0117)	(0.0125)	(0.0124)	(0.0125)	(0.0125)	(0.0126)	(0.0127)
	Attitude		0.0417***	0.0433***	0.0436***	0.0437***	0.0431***	0.0439***	0.0437***
			(0.0042)	(0.0045)	(0.0044)	(0.0045)	(0.0045)	(0.0045)	(0.0046)
Policies	Tax on the second earner			-0.4615***	-0.5330***	-0.3934*	-0.4263**	-0.7531***	-0.6557***
				(0.1676)	(0.1459)	(0.1936)	(0.1586)	(0.0781)	(0.0520)
	Part-time incentives				0.1868***				
					(0.0668)				
	Childcare spending					0.1160*		0.1168**	0.1025***
						(0.0601)		(0.0441)	(0.0363)
	Family allowance						-0.1051**		-0.1048***
							(0.0399)		(0.0280)
	Parental leave							0.1548***	0.2079***
								(0.0174)	(0.0200)
	Parental leave, squared							-0.0004***	-0.0007***
								(0.0001)	(0.0001)
	Observations	14,519	11,793	10,754	10,754	10,754	10,754	10,495	10,495
	Adjusted R-squared	0.1139	0.1417	0.1459	0.1481	0.1468	0.1481	0.1524	0.1535

Source: IMF staff calculations.
Note: Robust, clustered (at the country-year level) standard errors in parentheses. Significance is denoted as follows: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. All regressions include time and year fixed effects and controls for the output gap and the male employment rate.

Structural Characteristics

Our analysis broadly confirms previous theoretical and empirical findings on the importance of women's demographic characteristics in the decision to work.

- A clear life-cycle pattern of market work exists for women, with employment rates increasing with age, peaking around 45 years, and falling thereafter. Lower fertility is

correlated with higher employment. Each additional child living in the household is associated with a 6 percentage point lower likelihood of female employment.[23] Education, on the other hand, relates positively to women's attachment to the labor force. An additional year of schooling is associated with a significantly higher employment probability. Contrary to theoretical predictions, in Europe, married women are not less likely to be employed on average, conditional on other observable characteristics.

- We also confirm the intergenerational transmission of employment outcomes of women. As established by McGinn and others (2015), in Europe, adult daughters of employed mothers are more likely themselves to be employed. This finding underscores the dynamic effects that higher female labor force participation might have on closing employment gender gaps in future generations.

- Not surprisingly, a very powerful predictor of women's employment status is their attitude towards working outside the household. As described in Appendix A, we capture this attitude using principal-component analysis of women's responses to nine questions about whether children are better off being cared for at home, whether women should contribute to household income, etc. Women with more egalitarian gender attitudes are significantly more likely to work outside the household. Controlling for this, individual preference raises the explanatory power of the estimated model in a substantial manner: close to one-fifth of the total variation that the model can explain can be attributed to women's attitudes towards gender roles.

Policies

Despite the important role of individual preferences, policies do seem to matter in our sample. In should be noted, however, that in comparison to individual demographics, attitudes, and time-invariant country characteristics, policies explain a relatively small share of the variation in employment decisions of women, as reflected in the R-squared across the various columns of Table 1.[24] Nevertheless, it must be stressed that their impact may be partially reflected in the country fixed effects as well as in the change in attitudes that likely shape family-friendly policies.[25]

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[23] Although we find a negative relationship between fertility and labor force participation, policies can in fact be designed to support both objectives. Sweden for example enjoys both the highest female labor force participation rate in Europe and one of the highest fertility ratios. Reconciliation of family and work life is facilitated by the combination of individual taxation (low burden on secondary earners), income-related paid parental leave, and high-quality subsidized childcare.

[24] The small increase in the R-squared likely reflects the fact that most of the variation in the sample is between individuals, while policy variables do not vary between individuals of the same country.

[25] Our estimation strategy relies on changes in country policies between 2002 and 2012 to minimize issues related to their potential endogeneity and omitted variables.

- Higher relative tax rates on secondary earners are associated with significantly lower chances of employment, suggesting that fiscal disincentives discourage women from working. The implied magnitude of the effect is rather large: if a country at the 25th percentile of the distribution (of the reduction in the tax ratio during 2002–12) were to reduce the tax ratio further to place at the 75th percentile, the female employment rate would be 5 percentage points higher, assuming all else equal. However, it is also sensitive to the precise definition of the relative tax rate, namely whether taxation of the secondary earner is considered relative to the average tax of single individuals or single earner households.[26]

- The composition of "family-related" public spending seems important in determining female employment rates. Public spending on lump-sum family allowances tends to be negatively correlated with employment at the extensive margin. On the contrary, public spending on childcare appears to positively relate to employment rates, as predicted by theory and demonstrated in previous empirical studies. For instance, if a country at the 25th percentile of the distribution (of the increase in childcare during 2002–12) were to increase childcare further to place at the 75th percentile, the female employment rate would be 2.5 percentage points higher, assuming all else equal. This finding suggests that simply rebalancing the composition of public spending, without increasing the overall spending envelope on family policies, could encourage more women to enter the labor force.[27]

- An inverted U-shape relationship emerges between the length of available parental leave and the likelihood of employment. Women's probability of being employed rises with the number of weeks of parental leave, however there are decreasing returns. The estimated coefficients in Table 1, column (8), would suggest that parental leave beyond around 140 weeks could be qualified as excessive as it would discourage employment at the extensive margin, assuming other variables remain unchanged.[28]

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[26] Our estimates suggest greater sensitivity of female labor force participation to relative taxation of the secondary earner compared to previous studies, namely Jaumotte (2003) and Thévenon (2013). This could be partially due to (i) differences in methodologies—these studies rely on annual cross-country data, while we use micro data from two points in time—(ii) differences in the time period covered, and (iii) differences in the sample of countries included.

[27] The availability of childcare is imperfectly captured by the variable used in the regressions (childcare spending in percent of GDP), as it does not account for differences in countries' demographics, quality of public childcare provision and the availability of full-time childcare services. The latter is a particularly important caveat in the regressions for labor supply at the intensive margin (see below).

[28] The peak effect is computed through standard optimization techniques. Assuming all other variables are constant, parental leave that maximizes the probability of employment in the given example is the value of *leave*, which solves the following equation: $0 = $ (coefficient on leave) $+ 2\times$(coefficient on leave, squared)$\times$*leave*.

Decomposition

Using the estimated coefficients in Table (1), column (8), we can decompose the change in female employment observed in our sample between 2002 and 2012 into the contributions of changes in individual demographics, attitudes and policies. Figure 7 illustrates the average change in the female employment rate across countries that enter the regression sample in both 2002 and 2012, as well as the average change predicted by estimating eq. (1).[29] The predicted change in the share of women working is very similar to the one actually observed. The decomposition clearly shows that higher educational attainment and a reduction in the number of kids, along with more gender-egalitarian attitudes, have supported the rise in female employment. Policies have also helped: within the countries in our sample, public spending on childcare, reductions in the relative tax on the second earner, and reduced family allowance have contributed to raising female employment. Between 2002 and 2012, a few countries lowered the number of weeks of parental leave available, which has contributed to female employment in a negative way.[30] Furthermore, other macro controls, including the output gap, have contributed negatively to female employment.

Figure 7. Decomposing the Change in the Female Employment Rate, 2002–12
(Decomposition based on Table 1, column (8))

Lower relative tax has broadly supported employment, as has childcare spending and reduced family allowance.

The Role of Individual Characteristics and Policies
(Percentage points; based on data for countries with both years in regressions)
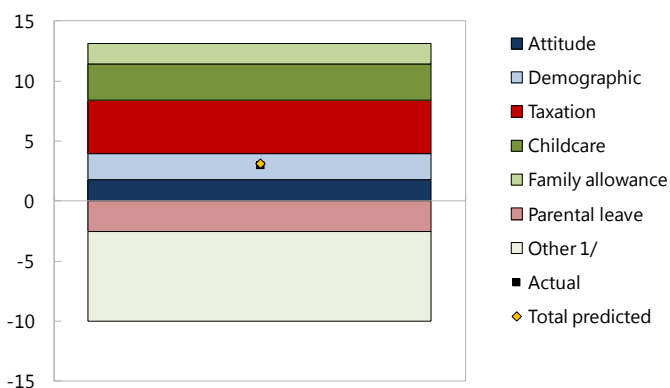
Sources: IMF staff calculations.
1/ Captures time dummy, the male employment rate, and the output gap.

Note: While parental leave in general has become more liberal during the past decades, the countries included here had either not change or some lowering in the number of parental leave weeks between 2002 and 2012.

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[29] The actual and predicted changes are computed as weighted averages of country-level changes.

[30] Parental leave policies change quite infrequently. Between 2002 and 2012, only Norway and the Slovak Republic reduced the number of weeks of parental leave. A larger set of countries changed parental leave policies during 2000–02. Our empirical results are generally robust to considering the lag of parental leave, whose change over the 2002–12 period exhibits greater variation across countries.

Family-friendly policy and employment of men and women

Family-friendly policies may affect employment decisions of both women and men. As education and wage gaps narrow, and social norms and attitudes towards gender roles become more egalitarian, women's comparative advantage in home production declines. Hence, the relative taxation of secondary earners and childcare provision may affect the labor supply of men as well. In Table 2 we test this hypothesis by estimating equation (1) for the prime-aged men in our sample.[31] Columns (1) and (2) replicate our baseline results for women (equivalent to Table 1, columns 7 and 8). Columns (3) and (4) present the corresponding results for men.

The analysis suggests that the policies we examined are more strongly associated with employment of women relative to men. The labor supply of men is sensitive to the relative tax on the second earner; however, the magnitude of the coefficient is much smaller. Provision of childcare does not appear relevant for male labor force participation. This comparative analysis suggests that changes to policies would help narrow the gender employment gap.

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[31] Similar to Table 1, parental leave captures leave for women for better comparability of results.

Table 2. Extensive Margin: Europe—Women versus Men
(Dependent variable: whether or not employed)

		(1)	(2)	(3)	(4)
		Women		Men	
Structural	Number of children	-0.0562***	-0.0565***	0.0016	0.0016
		(0.0072)	(0.0072)	(0.0041)	(0.0041)
	Education (years)	0.0378***	0.0391***	0.0222***	0.0231***
		(0.0069)	(0.0071)	(0.0070)	(0.0072)
	Education (years), squared	-0.0010***	-0.0010***	-0.0005**	-0.0006**
		(0.0002)	(0.0002)	(0.0002)	(0.0002)
	Age (years)	0.0624***	0.0618***	0.0214***	0.0211***
		(0.0105)	(0.0104)	(0.0067)	(0.0067)
	Age (years), squared	-0.0008***	-0.0008***	-0.0003***	-0.0003***
		(0.0001)	(0.0001)	(0.0001)	(0.0001)
	Mother working	0.0220**	0.0227**	0.0234***	0.0237***
		(0.0108)	(0.0108)	(0.0084)	(0.0084)
	Married	-0.0001	0.0011	0.0853***	0.0856***
		(0.0126)	(0.0127)	(0.0130)	(0.0130)
	Attitude	0.0439***	0.0437***	0.0061***	0.0060***
		(0.0045)	(0.0046)	(0.0020)	(0.0020)
Policies	Tax on the second earner	-0.7531***	-0.6557***	-0.2192***	-0.1445***
		(0.0781)	(0.0520)	(0.0492)	(0.0328)
	Childcare spending	0.1168**	0.1025***	-0.0159	-0.0221
		(0.0441)	(0.0363)	(0.0391)	(0.0318)
	Family allowance		-0.1048***		-0.0687***
			(0.0280)		(0.0132)
	Parental leave	0.1548***	0.2079***	0.0025	0.0362***
		(0.0174)	(0.0200)	(0.0088)	(0.0106)
	Parental leave, squared	-0.0004***	-0.0007***	0.0000	-0.0001**
		(0.0001)	(0.0001)	(0.0000)	(0.0001)
	Observations	10,495	10,495	7,563	7,563
	Adjusted R-squared	0.1524	0.1535	0.0819	0.0826

Source: IMF staff calculations.

Note: Robust, clustered (at the country-year level) standard errors in parentheses. Significance is denoted as follows: *** p<0.01, ** p<0.05, * p<0.1. All regressions include time and year fixed effects and controls for the output gap and the male employment rate.

Advanced versus emerging Europe

The importance of policies also differs between advanced and emerging European countries. In Table 3, we include the interaction of our policy variables with a dummy variable for emerging Europe to capture their possible differential effects across this group of economies. Allowing for differential coefficients for advanced and emerging European economies does not affect the sign and significance of individual characteristics and attitudes.[32] However, the estimated coefficients on the policy variables differ across the two groups of countries. In particular, whereas the relative tax on the second earner is negative and highly statistically and economically significant in advanced Europe, its effect in emerging Europe (the sum of the two coefficients for each variable) is not consistent across all specifications. However, the positive and highly significant coefficient on the childcare provision interacted with an emerging Europe indicator suggests that the importance of public support for childcare in driving female employment (as outlined in Table 1) is mainly driven by emerging market countries. This could be consistent with potential decreasing marginal returns, as childcare spending is generally higher in advanced countries than in emerging economies (Figure 6). Parental leave appears to be a stronger determinant of women's employment rates in advanced countries.[33]

B. Intensive margin

To explore the drivers of female employment at the intensive margin, we vary both the dependent variable and the sample of respondents in several specifications. The first column of Table 4 replicates the results in Table 1, column (8), for ease of comparison. The remaining columns focus on the intensive margin. In column (2), the dependent variable takes the value of 1 if a woman reports working at least 30 hours per week (our definition of full-time work) and 0 if she is working but reports between 0 and 30 hours of work per week. In columns (3) and (4), the dependent variable is the actual number of hours worked, considering either the subsample of employed women only (column (3)) or all women (column (4))—thereby allowing for an effect at the extensive margin as well. The regressions are based on the full sample of countries in Europe.

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[32] In a separate analysis (available upon request), we examine whether the association between individual demographics and attitudes differ across advanced end emerging European countries. In the absence of notable differences, we restrict the coefficients on these variables to be the same in Table 3.

[33] The squared term on parental leave has been omitted owing to collinearity concerns.

Table 3. Extensive Margin: Advanced and Emerging Europe—Women
(Dependent variable: whether or not employed)

		(1)	(2)	(3)	(4)	(5)
Structural	Number of children	-0.0580***	-0.0573***	-0.0569***	-0.0559***	-0.0563***
		(0.0072)	(0.0070)	(0.0072)	(0.0072)	(0.0072)
	Education (years)	0.0421***	0.0430***	0.0421***	0.0384***	0.0401***
		(0.0073)	(0.0076)	(0.0072)	(0.0070)	(0.0073)
	Education (years), squared	-0.0011***	-0.0011***	-0.0011***	-0.0010***	-0.0010***
		(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
	Age (years)	0.0657***	0.0641***	0.0638***	0.0619***	0.0613***
		(0.0108)	(0.0106)	(0.0105)	(0.0105)	(0.0104)
	Age (years), squared	-0.0008***	-0.0008***	-0.0008***	-0.0008***	-0.0007***
		(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
	Mother working	0.0210*	0.0222**	0.0230**	0.0217*	0.0225**
		(0.0103)	(0.0105)	(0.0105)	(0.0108)	(0.0108)
	Married	-0.0008	-0.0022	-0.0005	-0.0018	-0.0006
		(0.0124)	(0.0122)	(0.0123)	(0.0124)	(0.0125)
	Attitude	0.0433***	0.0434***	0.0435***	0.0438***	0.0435***
		(0.0045)	(0.0045)	(0.0044)	(0.0045)	(0.0046)
Policies	Tax on the second earner, all	-0.4402**	-0.6209***	-0.6746***	-0.8238***	-0.7992***
		(0.1672)	(0.0803)	(0.0653)	(0.0599)	(0.0515)
	Tax on the second earner, EMs	-0.6465	0.9504*	0.7334**	-1.9733***	1.7026**
		(0.4707)	(0.4777)	(0.2702)	(0.2444)	(0.6483)
	Childcare spending, all		-0.1791*			-0.0739
			(0.0889)			(0.0555)
	Childcare spending, EMs		0.5175***			0.5014***
			(0.1102)			(0.1065)
	Family allowance, all			0.2774***		
				(0.0301)		
	Family allowance, EMs			-0.4292***		
				(0.0247)		
	Parental leave, all				0.0777***	0.0615***
					(0.0063)	(0.0087)
	Parental leave, EMs				-0.0078	-0.0447***
					(0.0062)	(0.0102)
	Observations	10,754	10,754	10,754	10,495	10,495
	Adjusted R-squared	0.1462	0.1514	0.1541	0.1540	0.1549

Source: IMF staff calculations.

Note: Robust, clustered (at the country-year level) standard errors in parentheses. Significance is denoted as follows: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. All regressions include time and year fixed effects and controls for the output gap and the male employment rate. The rows denoted "EMs" should be added to the previous row to obtain the full effect for emerging economies.

Table 4. Intensive Margin: Europe—Women

		(1) Whether or not employed	(2) Fulltime vs. part-time	(3) Hours worked	(4) Hours worked
		All women	Employed women	Employed women	All women
Structural	Number of children	-0.0565***	-0.0659***	-1.8585***	-3.3382***
		(0.0072)	(0.0099)	(0.2765)	(0.3148)
	Education (years)	0.0391***	0.0047	-0.0531	1.3478***
		(0.0071)	(0.0081)	(0.2878)	(0.3210)
	Education (years), squared	-0.0010***	-0.0001	0.0048	-0.0315***
		(0.0002)	(0.0003)	(0.0101)	(0.0100)
	Age (years)	0.0618***	0.0209***	0.7468***	2.7764***
		(0.0104)	(0.0060)	(0.1653)	(0.4164)
	Age (years), squared	-0.0008***	-0.0003***	-0.0098***	-0.0344***
		(0.0001)	(0.0001)	(0.0021)	(0.0050)
	Mother working	0.0227**	0.0175	0.9450***	1.5230***
		(0.0108)	(0.0115)	(0.2935)	(0.4755)
	Married	0.0011	-0.0626***	-1.7242***	-1.3139***
		(0.0127)	(0.0125)	(0.3496)	(0.4749)
	Attitude	0.0437***	0.0281***	0.7490***	2.0261***
		(0.0046)	(0.0038)	(0.1263)	(0.1677)
Policies	Tax on the second earner	-0.6557***	-0.1016	-6.0473***	-23.5055***
		(0.0520)	(0.0816)	(2.1760)	(2.3100)
	Childcare spending	0.1025***	0.0336	-1.6086*	3.0667*
		(0.0363)	(0.0299)	(0.8309)	(1.7079)
	Family allowance	-0.1048***	0.0328	-0.6206	-5.4329***
		(0.0280)	(0.0326)	(1.0011)	(1.1805)
	Parental leave	0.2079***	-0.1338***	-4.9310***	3.5063***
		(0.0200)	(0.0211)	(0.6812)	(1.1097)
	Parental leave, squared	-0.0007***	0.0005***	0.0193***	-0.0121*
		(0.0001)	(0.0001)	(0.0042)	(0.0064)
	Observations	10,495	8,174	8,174	10,479
	Adjusted R-squared	0.1535	0.1575	0.1501	0.1777

Source: IMF staff calculations.

Note: Robust, clustered (at the country-year level) standard errors in parentheses. Significance is denoted as follows: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. All regressions include time and year fixed effects and controls for the output gap and the male employment rate.

A number of differences between the drivers at the extensive and intensive margins become evident:

Structural characteristics. If we focus only on employed women (columns (2) and (3)), education is no longer a significant determinant of labor supply. That is, whereas more years of education are associated with a higher likelihood of working, it does not help explain whether women are employed at full or at part time; or the number of hours they work. Marriage also does not affect the likelihood of being employed for the women in our sample. However, married working women tend to be employed at less than full time.

Policies. A higher relative tax on the second earner is associated with both lower probability of employment and fewer hours worked. Childcare provision appears to be important only at the extensive margin. This result could be driven by the lesser importance of childcare spending in advanced countries (Table 3), where the incidence of part-time employment is more pronounced (Figure 4) relative to in emerging economies, or to the fact that childcare spending may be an imperfect measure of the effective childcare supply across countries. Whereas parental leave is positively associated with employment at the extensive margin (columns (1) and (4), which also allow for an effect on the extensive margin), at the intensive margin, longer parental leave is associated with shorter work weeks for employed women. However, this association is potentially influenced by people who are able to distribute total parental leave over several years, thereby reporting shorter work weeks as a result.[34]

VI. ROBUSTNESS

We perform a number of checks to assess the robustness of our findings. Table 5, columns (1) and (7), repeat the baseline results from Tables 1 and Table 4, respectively. Additionally, it reports a number of alternative specifications at the extensive margins (columns (2) to (6)) and at the intensive margin (columns (8) and (9)).

Probit. The dependent variable in the benchmark regressions at the extensive margin only takes the value of 0 or 1. Hence, as an alternative to the linear probability regression model presented earlier, we estimate the model at the extensive margin with a probit function. Column (2) indicates that this does not alter the main results.

Sample of women with children. As elaborated in the paper, policies affect women's labor supply decision through their effect on the relative returns to working or the relative "value" of household labor. Conceptually, the effects of these policies should be particularly stronger for married women and/or women with children.[35] In columns (3) and (9), we restrict the

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[34] For example, to the extent that parental leave does not have to be taken uninterruptedly, some employed people may take one or two days of parental leave per week.

[35] An argument can be made that women's marriage and fertility decisions take into account the family-friendliness of the existing set of taxation policies, availability of childcare services etc. To the extent this is the

sample to respondents with at least one child living in the household. Indeed, the estimated effects of all policies are larger in magnitude and more precisely estimated when focusing on this set of women.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Extensive margin: weather or not employed						Intensive margin		
		Robustness of benchmark				Tax definition		Hours worked, all women		
		As Table 1	Probit	Women with children	Balanced country sample	Selected countries	Alt. tax variable	As Table 4	Tobit	Women with children
Structural	Number of children	-0.0565***	-0.2043***	-0.0559***	-0.0601***	-0.0523***	-0.0568***	-3.3382***	-4.2590***	-2.5794***
		(0.0072)	(0.0236)	(0.0090)	(0.0082)	(0.0076)	(0.0073)	(0.3148)	(0.4790)	(0.3544)
	Education (years)	0.0391***	0.1535***	0.0347***	0.0351***	0.0403***	0.0414***	1.3478***	1.9196***	1.0396***
		(0.0071)	(0.0250)	(0.0073)	(0.0072)	(0.0071)	(0.0074)	(0.3210)	(0.4458)	(0.3262)
	Education (years), squared	-0.0010***	-0.0040***	-0.0009***	-0.0009***	-0.0011***	-0.0011***	-0.0315***	-0.0463***	-0.0222**
		(0.0002)	(0.0009)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0100)	(0.0131)	(0.0101)
	Age (years)	0.0618***	0.2395***	0.0649***	0.0592***	0.0562***	0.0620***	2.7764***	3.6438***	2.6774***
		(0.0104)	(0.0383)	(0.0118)	(0.0119)	(0.0110)	(0.0104)	(0.4164)	(0.5856)	(0.4706)
	Age (years), squared	-0.0008***	-0.0029***	-0.0007***	-0.0007***	-0.0007***	-0.0008***	-0.0344***	-0.0450***	-0.0309***
		(0.0001)	(0.0005)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0050)	(0.0070)	(0.0056)
	Mother working	0.0227**	0.0792*	0.0265*	0.0216*	0.0242**	0.0218*	1.5230***	1.8882***	2.0876***
		(0.0108)	(0.0431)	(0.0139)	(0.0109)	(0.0102)	(0.0108)	(0.4755)	(0.6173)	(0.5491)
	Married	0.0011	-0.0045	0.0042	0.0001	-0.0003	-0.0011	-1.3139***	-1.3343**	-0.7216
		(0.0127)	(0.0504)	(0.0164)	(0.0142)	(0.0135)	(0.0126)	(0.4749)	(0.6198)	(0.5761)
	Attitude	0.0437***	0.1688***	0.0546***	0.0443***	0.0447***	0.0435***	2.0261***	2.6363***	2.4305***
		(0.0046)	(0.0148)	(0.0058)	(0.0051)	(0.0049)	(0.0046)	(0.1677)	(0.2424)	(0.1922)
Policies	Tax on the second earner	-0.6557***	-3.7114***	-0.8923***	-0.6578***	-0.7062***		-23.5055***	-31.8992***	-26.7073***
		(0.0520)	(0.2232)	(0.0811)	(0.0505)	(0.0434)		(2.3100)	(2.9154)	(2.5689)
	Tax on the second earner, alt. def.						-0.6552*			
							(0.3530)			
	Childcare spending	0.1025***	0.3018**	0.1449***	0.1071***	0.1420***	0.0820	3.0667*	4.5537**	3.9069**
		(0.0363)	(0.1355)	(0.0392)	(0.0356)	(0.0348)	(0.0936)	(1.7079)	(2.2803)	(1.4326)
	Family allowance	-0.1048***	-0.3926***	-0.1295***	-0.1030***	0.4387***	-0.0915*	-5.4329***	-6.7732***	-6.8129***
		(0.0280)	(0.0998)	(0.0381)	(0.0282)	(0.1566)	(0.0514)	(1.1805)	(1.5603)	(1.2601)
	Parental leave	0.2079***	1.5711***	0.2407***	0.2081***	-0.0589	0.1803***	3.5063***	5.8888***	4.1870***
		(0.0200)	(0.0590)	(0.0212)	(0.0199)	(0.0806)	(0.0370)	(1.1097)	(1.4986)	(0.9673)
	Parental leave, squared	-0.0007***	-0.0058***	-0.0009***	-0.0007***	0.0003	-0.0007***	-0.0121*	-0.0203**	-0.0165***
		(0.0001)	(0.0004)	(0.0001)	(0.0001)	(0.0003)	(0.0002)	(0.0064)	(0.0085)	(0.0058)
	Observations	10,495	10,495	6,111	8,618	9,498	10,495	10,479	10,479	6,103
	R-squared	0.1563	0.1676	0.2013	0.1662	0.1570	0.1545	0.1804	0.0264	0.2201

Table 5. Robustness: Europe—Women

Source: IMF staff calculations.

Note: Robust, clustered (at the country-year level) standard errors in parentheses. Significance is denoted as follows: *** p<0.01, ** p<0.05, * p<0.1. All regressions include time and year fixed effects and controls for the output gap and the male employment rate. Pseudo R-squared listed for probit and tobit regressions.

case, one may not expect to see a large difference in the responsiveness of female labor supply to such policies between women with or without kids.

Sample of countries. Owing to changes in the set of countries included in the 2002 and 2012 rounds of the ISSP, some countries only enter the regression analysis in one year. Column (4) shows the benchmark results at the extensive margin, using a panel that is balanced at the country level. The main results are unaffected by this change.

Measuring taxation. The relative tax on the second earner is highly influenced by the size of the denominator, which captures the average tax on a comparable family with only one earner. However, the literature has used various definitions of what constitutes a comparable family (see Appendix A). In our baseline estimation, we use the definition in Thévenon (2013). As a robustness check, we exclude countries with high tax rates to address potential outlier problems (column (5)) and use an alternative definition of the average tax on a comparable family, following Jaumotte (2003), (column (6)). The results confirm that higher relative tax on the second earner is associated with a lower probability of a woman deciding to work.

Tobit. On the combined extensive and intensive margins, hours worked is a variable that is truncated at zero as a lower bound. Hence, an alternative specification to examine the intensive margin is a Tobit estimation. Column (8) re-estimates the baseline specification for hours worked that includes all women, employing a Tobit model instead of linear regression analysis. Again, the main results are unaffected by this change.

VII. CONCLUSION

Taking advantage of micro-level data, we examine the role of both individual preferences and policies in shaping women's decision to work both on the extensive and on the intensive margins. The focus on Europe also allows us to examine differences between advanced and emerging European countries.

Results of the analysis suggest that individual demographics, attitudes towards gender roles, and policies are all important drivers of women's decision to work outside the household. More education, lower fertility, exposure to working mothers, and favorable attitudes towards women working are particularly important. Nonetheless, even after accounting for personal choice, policies matter. The design of tax policy should be mindful of disincentives for the second earner, particularly in advanced countries. The composition of public spending on families could be recalibrated to support women's entry into the labor force. Lump-sum cash family allowance transfers seem to deter women from working, while higher public spending on early childhood education and childcare is associated with a boost in the female employment rate, particularly in emerging European countries.

The study of the intensive margin of female employment provides additional insights. Among individual characteristics, education is not a strong predictor of the number of hours worked, for women who have already joined the labor force. Married women are equally likely to join the labor force but tend to work shorter hours. Furthermore, certain policies

appear to be particularly associated with women's decision to join the labor force, and others, with women's decision on how many hours to work once in the labor force. Fiscal disincentives from the relative taxation on the second earner appear to influence women's employment decisions at both the intensive and extensive margins. In contrast, childcare provision and family allowance appear to be important mainly at the extensive margin.

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<center>APPENDIX A. DATA</center>

In this appendix, we present the specific variable definitions and sources for each of the variables that are included in this paper, whether through figures or regression analyses.

<center>i.   **International Social Survey Programme (ISSP)**</center>

Micro-level data are from the 2002 and 2012 surveys in the 'Family and Changing Gender Roles' module of the ISSP.

Employed. Takes the value of one if hours worked are greater than zero and hours or incidence of work, without specifying specific hours, are reported; 0 if respondent reported not being employed.

Hours worked. Number of weekly hours worked. Responses such as '*time varies*' or '*don't know*' are set to missing.

Number of children. Number of children living in household. Number of children is set to zero in the case of ".n" in the database and set to missing in the case of ".a", except in specific country cases where other information is specifically noted.

Education. Years of schooling.

Age. Age of respondent.

Mother working. Equals one if respondent reports that his or her mother ever worked for pay before respondent turned 14 years old; 0 otherwise.

Married. Equals one if the legal partnership status is married.

Attitude. Principal component of the following responses:

Question 1:
 a) Working mom: as warm relationship with children as a not-working mom;
    Ranking: 1-Strongly disagree, 5-strongly agree.
 b) Working mom: Preschool child is likely to suffer;
    Ranking: 1-Strongly agree, 5-strongly disagree.
 c) Working woman: Family life suffers when woman has full-time job;
    Ranking: 1-Strongly agree, 5-strongly disagree.
 d) Working woman: What women really want is home and kids;
    Ranking: 1-Strongly agree, 5-strongly disagree.
 e) Working woman: Being a housewife is just as fulfilling as working
    Ranking: 1-Strongly agree, 5-strongly disagree.

Question 2:

    a) Both should contribute to household income;
               Ranking: 1-Strongly disagree, 5-strongly agree.
    b) Men's job is to earn money, women's job is to look after home;
               Ranking: 1-Strongly agree, 5-strongly disagree.

Question 3:

    a) Should women work: Child under school age
               Ranking: 1-stay home, 2-part time, 5-full time.
    b) Should women work: Youngest kid at school;
               Ranking: 1-stay home, 2-part time, 5-full time.

Appendix Table A1. Summary Statistics: Individual Attributes 1/

	Number of observations	Average	Std. dev.	Min	Max
Employed	14,519	0.8	0.4	0	1
Hours worked	14,465	28.7	18.3	0	96
Fulltime vs. part-time	14,465	0.6	0.5	0	1
Number of children	14,519	1.0	1.1	0	11
Education	14,519	13.3	3.9	0	30
Age	14,519	39.9	8.4	25	54
Mother working	14,519	0.6	0.5	0	1
Married	14,519	0.6	0.5	0	1
Attitude	11,793	0.7	1.8	-5.3	4.4

Source: ISSP and IMF staff calculations.
1/ Based on the sample in Table 1, column 1.

Appendix Table A2. Pairwise Correlation Coefficients: Individual Characteristics 1/

	Employed	Hours worked	Number of children	Education	Age	Mother working	Married	Attitude
Employed	1							
Hours worked	0.8360*	1						
Number of children	-0.1089*	-0.1644*	1					
Education	0.1803*	0.1722*	-0.0012	1				
Age	0.0272*	0.0166*	-0.1820*	-0.1507*	1			
Mother working	0.0782*	0.1159*	0.0181*	0.1150*	-0.1702*	1		
Married	-0.0552*	-0.0954*	0.2422*	-0.0876*	0.1544*	-0.0671*	1	
Attitude	0.2446*	0.2364*	-0.0595*	0.2891*	-0.0742*	0.1019*	-0.1209*	1

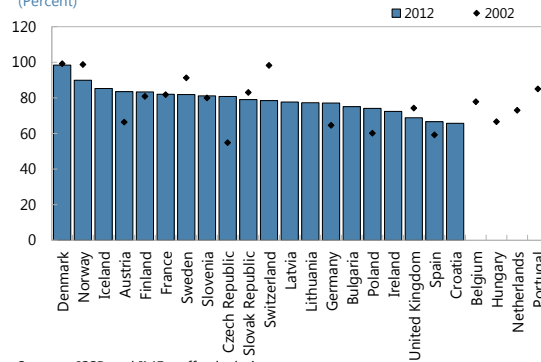Source: ISSP and IMF staff calculations.
1/ Based on the sample in Table 1, column 1. Stars denote significance at the 5 percent level.

Appendix Figure A1. ISSP Statistics
(Country-level averages based on regression sample in Table 1, column 1)
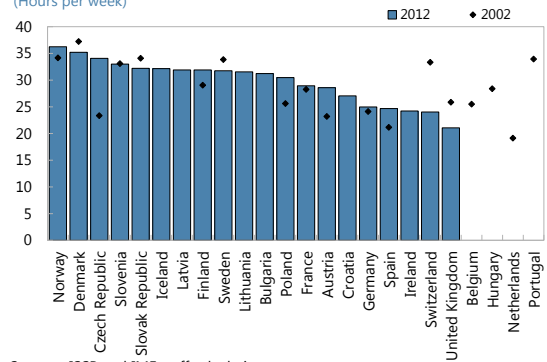
Average Employment Rate for Women Aged 25–54
(Percent)
☐ 2012 ◆ 2002

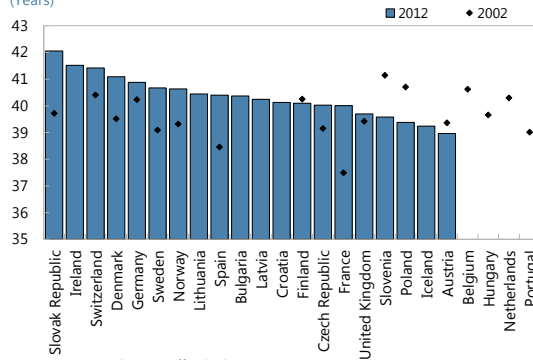Sources: ISSP and IMF staff calculations.

Average Number of Hours Worked
(Hours per week)
☐ 2012 ◆ 2002

Sources: ISSP and IMF staff calculations.

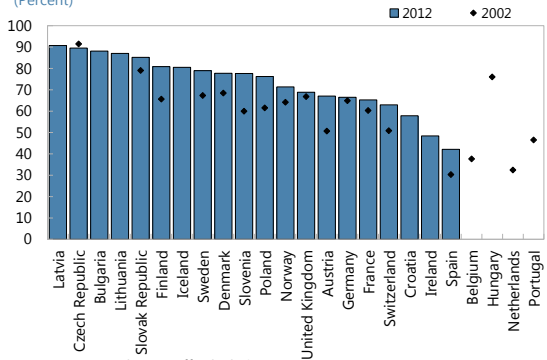**Average Age of Women Aged of 25-54**
(Years)
☐ 2012 ◆ 2002

Sources: ISSP and IMF staff calculations.

Share of Women with Working Mother
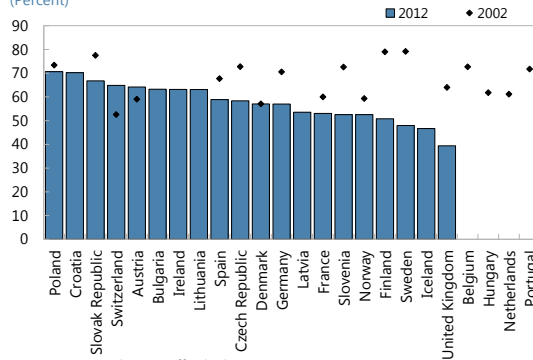(Percent)
☐ 2012 ◆ 2002

Sources: ISSP and IMF staff calculations.

Average Marriage Rate of Women Aged 25-54
(Percent)
☐ 2012 ◆ 2002
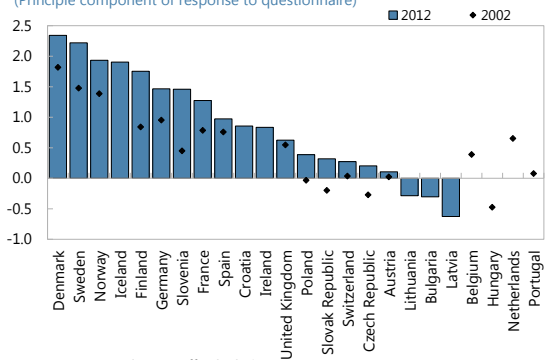
Sources: ISSP and IMF staff calculations.

Attitudes Toward Women Working
(Principle component of response to questionnaire)
☐ 2012 ◆ 2002

Sources: ISSP and IMF staff calculations.

ii. Country-level variables

Country-level data are from the OECD and the IMF's World Economic Outlook database.

Relative marginal tax rates on second earners, Thévenon (2013) (in natural logarithm)
Definition: ratio of the marginal tax rate on the second earner to the tax wedge for a single-earner couple with two children earning 100% of AW earnings. This definition is consistent with Thévenon (2013). The data are winsorized at 10.

The marginal tax rate on the second earner is defined as the share of the wife's earnings which goes into paying additional household taxes:

$$Tax\ second\ earner = 1 - \frac{(Household\ net\ income)_B - (Household\ net\ income)_A}{(Household\ gross\ income)_B - (Household\ gross\ income)_A}$$

Here, A denotes the situation in which the wife does not earn any income and B denotes the situation in which the wife's gross earnings are 67 percent of the average wage (AW). In both situations, it is assumed that the husband earns 100% of AW and that the couple has two children. The difference between gross and net income includes income taxes, employee's social security contribution, and universal cash benefits. Means-tested benefits based on household income are not included (apart from some child benefits that vary with income) due to lack of time series information. However, such benefits are usually less relevant at levels of household income above 100% of AW.

The tax wedge for a single-earner couple with two children earning 100% of AW earnings is defined as:

$$Tax\ single - earner\ couple = 1 - \frac{(Household\ net\ income)_A}{(Household\ gross\ income)_A}$$

Sources: OECD "tax models" and IMF staff calculations.

Relative marginal tax rates on second earners, Jaumotte (2003) (in natural logarithm)
Definition: ratio of the marginal tax rate on the second earner to the tax wedge for a single person with no children earning 67% of AW earnings. This definition is consistent with Jaumotte (2003).

The numerator (the marginal tax rate on the second earner) is defined following the Thévenon (2013) definition of the marginal tax rate above. The denominator (the tax wedge for a single person with no children, earning 67% of AW earnings) is defined as:

$$Tax\ single\ person = 1 - \frac{Net\ income\ of\ single\ person, no\ children, 67\%AW}{Gross\ income\ of\ single\ person, no\ children, 67\%AW}$$

Sources: OECD "tax models" and IMF staff calculations.

Tax incentives to work part-time (in natural logarithm)
Definition: The difference between the net income of two-earner couple with one earning 100% AW and the other 67% AW and the net income of a single person earning 167% AW, as a share of the latter. The two-earner couple has two children and the single person has no child.
Ideally, the definition should reflect the increase in household disposable income between a situation where the husband earns the entire household income (133 percent of APW) and a situation where husband and wife share earnings (100 percent and 33 percent, respectively). The couples in the denominator and numerator should be comparable in having the same number of children. However, data availability limits us to the given specification.
Sources: OECD "tax models" and IMF staff calculations.

Public Expenditures on Child Care (in natural logarithm)
Definition: Public spending on early child education and care, in percent of GDP. As latest data are from 2011, we use the one year lagged observation in the regressions.
Sources: OECD Social Expenditure Database; and IMF staff calculations.

Family allowance (in natural logarithm)
Definition: public spending (allowance) on family, in percent of GDP. As latest data are from 2011, we use the one year lagged observation in the regressions.
Sources: OECD Social Expenditure Database.

Parental leave
Definition: weeks of parental leave for women with job protection.
Sources: OECD Employment Database.

Output gap
Definition: difference between real potential output and real output, in percent of real output. For 2002, the output gap is the three-year average gap during 2000–02. For 2012, the three-year average covers 2010–12.
Sources: IMF World Economic Outlook, October 2015.

Male employment rate (in natural logarithm)
Definition: number of employed men in the age group 25 to 54 years old relative to the population in the same age group. It is calculated as (1-male unemployment rate)*male participation rate.
Sources: OECD Employment Database and IMF staff calculations.

Appendix Table A3. Summary Statistics: Policies 1/

	Number of observations	Average	St. dev.	Min	Max
Tax on the second earner	34	2.9	2.6	1.0	10.0
Part-time incentives	34	0.2	0.1	0.0	0.3
Childcare spending	34	0.7	0.5	0.2	2.0
Family allowance	34	0.9	0.4	0.1	2.0
Parental leave	33	85.1	54.8	13.0	156.0

Sources: OECD and IMF staff calculations.

1/ Based on the sample in Table 1, column 1. Variables in this table are not logged.

Appendix Table A4. Pairwise Correlation Coefficients: Policies 1/

	Tax on the second earner	Part-time incentives	Childcare spending	Family allowance	Parental leave
Tax on the second earner	1				
Part-time incentives	0.2606*	1			
Childcare spending	-0.2783*	0.2141*	1		
Family allowance	-0.0098	0.5347*	0.1066*	1	
Parental leave	0.0487*	0.0959*	0.0128*	0.0723*	1

Source: OECD and IMF staff calculations.

1/ Based on the sample in Table 1, column 1. Stars denote significance at the 5 percent level.

APPENDIX B. COUNTRY COVERAGE

Appendix Table B1. Country Coverage
(Number of observations based on Table 1, column 1)

	2002	2012
Advanced economies		
Austria	730	346
Belgium	348	
Denmark	387	391
Finland	329	313
France	748	737
Germany	353	451
Iceland		272
Ireland		475
Netherlands	345	
Norway	413	377
Portugal	301	
Spain	554	681
Sweden	288	271
Switzerland	289	316
United Kingdom	564	241
Total advanced	*5,649*	*4,871*
Emerging economies		
Bulgaria		253
Croatia		292
Czech Republic	235	526
Hungary	246	
Latvia		323
Lithuania		339
Poland	372	286
Slovak Republic	325	277
Slovenia	270	255
Total emerging	*1,448*	*2,551*
Total Europe	*7,097*	*7,422*

Sources: ISSP and IMF staff calculations.