Securing women's employment: A fertility booster in European countries?

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Abstract

This article gives evidence that differences in completed fertility among European countries emerge mainly as a result of fewer women having a second child in low fertility countries and analyses the impact of women's employment on the probability of second child birth. With longitudinal data from the European Survey of Income and Living conditions (EU-SILC) and aggregated data from the OECD Family Database, we find that, on average within European countries, women in stable employment have a significantly higher probability of second childbirth than inactive or unemployed women. However, while female employment generally favours a transition to second childbirth in high-fertility countries, the impact is heterogenous in low-fertility countries. This points to a work-life balance conflict that is stronger in low-fertility countries. To address this issue, multilevel models are run to compare the role of various policies: not surprisingly, they show that childcare policies – which are the most effective policies to secure women's employment – are the most likely to encourage couples to enlarge their families and that the positive effect of stable employment on fertility is reinforced by this policy.

Keywords: low fertility, female employment, work-life balance, Europe, family enlargement

JEL codes: J13, J16

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Data Used: European Commission, Eurostat, cross-section 2011 and longitudinal EU-SILC for the years 2003-2011. Eurostat has no responsibility for the results and conclusions of the authors.

1. Introduction

Since the late 1960s, birth rates have been falling across Europe and other economically advanced countries. In some of these countries, the decline continued until the late 1990s and, since then, fertility has stagnated at very low levels that are below the replacement level. These so-called 'lowest-low-fertility countries' have total fertility rates persistently around 1.3 children per woman (Kohler *et al.*, 2002). Several Eastern and Southern European countries, as well as Germany and Austria, are particularly concerned. As fertility levels that are significantly below the replacement level have important negative consequences for the macroeconomic equilibrium of a country, identifying the reasons behind low fertility becomes essential.

It is all the more important that total fertility rates have started to re-increase slightly in many Western and Northern European countries. The recovery started relatively early in France, while it has been particularly steep since the start of the new century in the United Kingdom, Finland and Iceland, for example. The trend reversal is often seen as a logical consequence of the process of postponement of childbearing (Goldstein et al., 2009; Bongaarts and Sobotka, 2012): fertility levels initially fall because births at young ages are postponed; they recover after a certain lapse of time, due to the 'recuperation' of births taking place at older ages.

However, the fact that the re-increase in fertility occurred in some countries but not in others raises questions about factors that lead households to postpone but not forgo having children in low-fertility countries. In most European countries, the two-child family undoubtedly became the norm (between 40% and 55% of women of cohorts born in the 1950s and 1960s have 2 children in Europe). Yet, childlessness increases among younger cohorts, and there is a marked decrease in families with two or more children (Frejka and Sardon, 2007; Frejka and Sobotka, 2008; Breton and Prioux, 2009).

Recent research suggests that fertility differentials between European countries cannot fully be explained by the process of postponement. Structural and cultural changes that go hand in hand with economic development are likely to affect fertility decisions not only in terms of timing, but also in terms of quantum (Lesthaeghe, 2010; Goldstein *et al*., 2009; Myrskyla et al., 2009). Luci-Greulich and Thévenon (2013, 2014) show that the re-increase in total fertility rates happened mostly in those highly developed countries in which economic development occurred concomitantly with increases in female employment. This points to the importance of the labour market and other institutions as possible determinants for fertility levels: the upturn in total fertility rates has occurred first and foremost in countries where public support for parents' work-life balance has been enhanced. Increases in total fertility rates are associated with increases in female employment rates in those highly developed countries that provide substantial coverage of child care services for young children.

A strong association between fertility and employment is also emphasized by other studies, showing for example that fertility levels tend to decline in times of high and sudden unemployment (Ahn and Mira, 2002; Adsera, 2004; Sobotka *et al.*, 2011; Pailhe and Solaz, 2012; Goldstein *et al.*, 2013).

The possibility of combining work with family formation thus emerges as a key parameter explaining variations in fertility trends in developed countries. This conclusion is consolidated by several recent studies analysing the cross-country link between fertility and gender equality (Goldscheider, Bernhardt and Lappegard 2015; Balbo, Billari and Mills 2013; Goldscheider, Bernhardt and Brandén 2013; Neyer, Lappegård and Vignoli 2013; Thévenon and Gauthier 2011; Arpino and Esping-Andersen 2015; Baizan, Arpino and Delclos 2015). These macro studies agree that the fertility turnaround is strongest in those developed countries which have the most experienced changing gender relationships towards more gender equality, as measured for example by gender-equitable attitudes towards female employment, by an increasing number of out-of-wedlock births reflecting modern family norms or by increasing men's involvement in the home.

It is still debatable whether or not the macro-level evidence of a positive link between fertility and female employment reflects differences in individual behaviour. Earlier studies most often looked at completed fertility in relation with employment (e.g., Willis 1973). Pioneering studies using micro data to examine birth decisions jointly with employment decisions are, for example, Blau and Robins (1989), Hotz and Miller (1988), Moffitt (1984) and Butz and Ward (1979), which illustrate that the fertility-employment relationship changes over time and differs across countries, depending on preferences, labor market situations and institutions.

Matysiak and Vignoli (2008) performe a systematic review (a meta-analysis) of more recent studies that analyze the effects of female employment on fertility. They confirm high variations in the effect among institutional settings and find a significant reduction in the conflict between work and family life over time in countries with re-increasing fertility. They also demonstrate that potentially biased estimation results can arise from failing to adequately account for unobserved heterogeneity, the respondent's social background as well as partner, job, and macro-contextual characteristics.

Few studies have investigated the link between women's employment status and fertility. The available evidence suggests that female labour force entry goes hand in hand with the birth of a first child in those countries where the institutional setting is comprehensive enough to support the combination between work and family (Rendall et al. 2014; Wood et al. 2015; Schmitt 2012). Based on a synthetic cohort approach, d'Albis, Greulich and Ponthière (2015) find that in European countries, women who invest in higher education and career development have their first child later than low educated women and those without successful labour market integration, but are also less likely to stay childless. Adsera (2011) shows using data for 13 European countries that the effect of working status on transitions to higher-order births differs significantly between public and private sector and by the length of contract. Based on hazard models for the transition to the first and second birth, Matysiak and Vignoli (2013) find that women's employment conflicts with childbearing in Italy, while in Poland women tend to combine the two activities

There is still no systematic analysis of whether female labour market participation affects the propensity to have a second child in European countries. This is quite surprising, as several studies suggest (though without concrete quantifications) that the decrease in the number of families with two or more children is a key factor in explaining cross-country differences in fertility (Sobotka, 2013; Thévenon, 2015).

By employing data from the European Survey of Income and Living Conditions (EU-SILC), the present study takes a two-step approach in responding to the research gap. First, we identify the child rank that is most important for explaining differences in completed fertility between European countries. We show that fewer women having two children in low fertility countries contribute to nearly half of the fertility gap between high- and low-fertility countries in Europe, whereas the other child ranks are less influential. Against the background of rather homogenous preferences in European countries for a two-child family, our findings suggest that parents in low-fertility countries actually face barriers to having a second child.

The second step in our approach tackles these barriers by investigating the potential determinants of second childbirth for women aged 15 to 45 who already have one child. We look at determinants both at the individual and at the macro level. At the individual level, we focus on whether the activity status of women and their partners has any impact on the probability of having a second child. In particular, we investigate to what extent integrating into a 'stable' labour market position makes a difference in deciding for or against a second child – while considering women, their partners and the partner interactions. Endogeneity between households' family enlargement projects and parents' activity status is taken into account by mobilizing longitudinal data (follow-up of individuals), completed by an instrumental-variable approach. We find that, overall within European countries, women's successful integration into the labour market after the birth of a first child is significantly and positively related to the probability of having a second child. The magnitude of the effect differs, however, among individuals and country groups. The positive impact is stronger for highly educated women and for women with partners who are themselves in stable employment. The positive impact is large in high-fertility countries and weaker in low-fertility countries, pointing to a work-life balance that is more conflictual in low-fertility countries, in particular for low-educated women. Multilevel models are then run to examine the role of reconciliation policies in encouraging family enlargement. We observe a positive correlation between childcare development at the national level and the individual probability of having a second child. The positive effect of stable employment on fertility is reinforced by this policy.

This paper is organized as follows. Section 2 provides the theoretical background of our analysis. Section 3 presents the SILC data, quantifies the importance of children of rank two for explaining fertility differences between European countries and describes the empirical strategy used to identify the impact of women's labour market integration on second childbirth. We explain in particular how we exploit the longitudinal structure of the data and how we implement multilevel models. Section 4 presents our results. Section 5 provides our conclusions.

2. Literature background

In economic theory, decreasing fertility levels have been explained as an overall result of the increasing level of education among women, which is strengthening their labour market attachment and career aspirations. In the absence of possibilities for combining work and family life and the presence of a strong division in gender roles, increasing career and income options for women lead to the fact that women tend to replace work with childbearing (substitution effect). In contrast, increasing career and income options for their male partners rather favour fertility decisions (income effect) (Becker 1960, Mincer 1958). Increasing possibilities for combining work and family life, which are often accompanied by weakening normative gender roles (McDonald, 2000; Neyer, Lappegard and Vignoli, 2013) may result in the income effect dominating the substitution effect for women: in those countries where parents can successfully combine work and family life, women's labour market participation is likely to facilitate the decision to start or enlarge a family. Women do not have to chose between work and childbearing any more (the negative substitution effect of female employment on fertility gets weaker) and their participation in the labour market generates (additional) household income which facilitates starting and enlarging a family (the positive income effect of female employment on fertility gets stronger). In this scenario, a woman's and her partner's career and income options no longer have opposite impacts on fertility. Both partners might first want to benefit from their educational investments and integrate themselves into the labour market before starting a family. The successful integration of both partners, hand in hand with increased household income, is then likely to facilitate family formation as well as family enlargement.

Following these arguments and the macroeconomic empirical evidence of a positive link between fertility and female employment, it seems that women succeed in combining work and family life in countries with high fertility and high female employment rates. On the other hand, parents and women in particular face barriers in combining work and family life in low-fertility countries, leading them to choose between labour market integration and childbearing. Fertility levels below replacement levels seem to reflect barriers to realizing fertility plans rather than indicating lower fertility intentions, as surveys find no significant difference in average fertility intentions between low- and high-fertility countries, but instead a convergence to the norm of a two-child family (Testa 2012; Sobotka and Beaujouan, 2014).

Women's integration into the labour market has become one of the main key variables in fertility decisions for many reasons. First, the steep increase in female educational attainment has made it very costly for women and their households to interrupt employment for reasons of childbearing and/or child-raising. Women's labour force participation not only provides households with additional income, but it also ensures that the household will continue to earn income during times of growing uncertainty when partners are at risk of losing their jobs and becoming unemployed. In addition, the increasing risk of divorce and/or couple separation makes it preferable for women to work and be prepared for such events. In these circumstances, it has become increasingly important not only for women to work, but for them to secure their labour market situations before getting started on family formation. Succeeding in this step before childbirth is crucial for women's potential to continue contributing to household income and maintaining their economic independence during and after the birth of children (Blossfeld, 1995). Women's labour market participation before as well as during the years of family formation and enlargement not only reflects women's desire for self-fulfilment and economic independence, but it is also an increasing response to economic necessity. In other words, the possibility of family enlargement is likely to depend more and more on women's ability to contribute continuously to household income.

As this ability also depends on a country's degree of support for combining work and family, the relation between female employment and fertility might differ across countries. In countries that provide institutional support (for example, in the form of public child care), it is feasible that couples in which both partners are successfully integrated into the labour market are more likely to decide in favour of an (additional) child than those in which at least one partner is inactive or unemployed: the couple's joint income creates a secure economic environment for founding or enlarging a family. The fact that both partners contribute to the household income not only removes budget constraints but also provides mutual insurance against sudden income loss. Income can be maintained after the birth of children thanks to institutional support in terms of child care. In low-fertility countries, however, the impact of parents' successful labour market integration might be ambiguous, due to the absence of child care options (Matysiak and Vignoli, 2008): a childbirth would imply a reduction in family income, as at least one partner has to stop or reduce his or her labour market activity in order to care for the child. For couples depending on both earnings to make ends meet, starting and especially enlarging a family risks becoming no option at all, due to the resulting income reduction. Consequently, couples with both partners active in the labour market might be more likely to decide against childbirth as compared to couples with one partner already inactive. Hence, regarding the impact of women's activity status on childbirth, various side effects come into play. These may be institutional or individual (like education and individual income options), or they may relate to the couple's joint level of income before and after childbirth.

Against the background of these hypotheses, only a few empirical papers take into account side effects when performing micro-level analyses on how labour market integration impacts the probability of childbirth. Existing micro studies are either country-specific or they focus on first childbirth (Schmitt 2012; Rendall et al. 2014). Schmitt (2012) finds that occupational uncertainty – part-time work or work with a fixed-term contract – hampers transitions to parenthood in Germany but is inconclusive for the UK. Among highly educated women in both Germany and the UK, however, family formation is found to be delayed by a high degree of labour market integration, which is indicated by high working hours and/or gains in earnings. Rendall et al. (2014) find that it is women and men in 'dual-earner' regimes who have higher rates of entry into first parenthood when they have 'full-year, full-time' employment in the year prior to fertility exposure, particularly when compared to those who are little employed or not at all in the year prior to fertility exposure. Wood et al. (2015) find that increasing education and labour force entry (as well as variations in macroeconomic conditions) play a substantial role in driving the postponement of the first childbirth in 22 European countries. They also show that women's first entry into the labour force is a precursor to motherhood. The association between entry into employment and first childbirth is stronger for highly educated women, which suggests that highly educated women more often choose to invest in a career before becoming mothers. The authors also point out variations across groups of countries: a positive association between labour force entry and entry into motherhood is found in Northern and Western Europe, while no effect is found for Southern European and CEE countries.

Our study provides important novelties when compared to hitherto existing analyses. First, it focuses on second childbirth since we demonstrate that this rank explains a large part (38%) of the fertility gap between European countries. Several efforts to reduce endogeneity are made, helping us to disentangle a causal effect of women's labour market status on the probability of having a second child. Using harmonized survey data for a large set of European countries enables us not only to identify marginal effects, but also to analyze the combined effects of individual characteristics (especially women's succesfull integration in the labour market after the birth of a first child) and national policies which influence parents' possibilities to combine work and family life (childcare, parental leave, family cash transfers).

3. Data and methods

This article uses microeconometric models (probits, bivariate probits, IV 2SLS, IV probit) and multilevel models. Data comes, at the micro level, from the EU-SILC database (European Union Survey on Income and Living Conditions) and, at the macro level,from the OECD Family database (for aggregated indicators used in multivel models).

3.1. EU-SILC data

The European Union Survey on Income and Living Conditions (EU-SILC) is a European survey provided by Eurostat. It was created in 2003 to replace the European Community Household Panel (ECHP) and now includes thirty-one European countries. This survey captures individual and household situations by using a large number of economic and social variables that may be considered determinants in deciding to have children. It displays basic information on age and education level as well as variables on an individual's labour market status (reported on a monthly basis) and income. This information is rarely available in other, more 'demographic' surveys. One exception is the Gender and Generations Surveys, but this survey has relatively limited country coverage (19 countries for wave one). Other surveys such as the European Labour Force survey contain information on work, but not on income. Some surveys exist that contain both demographic and economic variables, with individuals being followed up for several years. However, these datasets are limited to their national focus, since these long-run surveys are generally run in only one given country (for example, the German Socioeconomic Panel or the American Panel Study of Income Dynamics).

Grouping together harmonized survey data for a large set of countries allows us to obtain sample sizes that are large enough for breakdowns. This is important, as it allows us to differentiate the impact of activity status on childbirth according to demographic and socioeconomic characteristics, such as: education, partner situation, household income, etc.

EU-SILC is composed of two datasets: one cross-sectional and one longitudinal. The longitudinal dataset of EU-SILC contains a rotational panel of four years for the majority of countries. The annual cross-sectional data are produced from the longitudinal panel by rotating a part of the sample from one year to the next while leaving the remaining part unchanged (integrated design). For the cross sectional data, this procedure implies a larger sample size and a reduction in the measurement bias which can be caused by cumulated respondent burden and sample attrition over time.

We use the cross sectional data base (year 2011) to evidence the importance of families having two children in explaining differences in aggregate levels of completed fertility among European countries. The analysis of how activity status impacts the probability of giving birth to a second child is then based on the longitudinal database (follow-up of individuals between the years 2003 or later and 2011). We observe determinants of childbirth before the event potentially occurs, which allows us to reduce the risk of obtaining biased estimation results due to endogeneity.

The survey contains information on both individuals and households. It is possible to identify adult women, their partners (if they have them) and the children who live in the same household. Children are observed with a proper identification number when living in their parents' households, and households are followed if the families move. Measurement biases in terms of fertility emerge due to the fact that EU-SILC does not directly report information on the number of children; i.e., children outside the household are not observed. Therefore, considering that children start to move out of their parents' household when the mother is of a certain age, Dasre and Greulich (2015) show that, from around the age of 40 on, SILC reports a downward bias in the number of children per woman, as compared to the unbiased measures reported by the Human Fertility Database. This leads to an overestimation of childless women and of women with only one child. However, for the majority of European countries, the country classification for countries with fertility below and above the EU-average is the same for the two databases. They also show that even though SILC underestimates the probability of first childbirth for women aged 20-30 due to attrition, the birth of a child of higher rank is rather well reported for all ages in SILC[1]. In general, childless households are underrepresented in SILC, but weights are adjusted to reduce selection bias due to non-response.

3.2. *The importance of the child of rank two for explaining the fertility gap between European countries*

The aim of this section is to identify which child rank is most important for explaining the gap in completed fertility among European countries. For our calculations, we employ the cross-sectional SILC database for the year 2011. We do not use the Human Fertility Data Base, as information on the number of children by age and rank is only available for a subset of 10 European countries, whereas SILC allows us to cover nearly 30 countries.

To distinguish between high- and low-fertility countries, we first calculate the weighted average number of children per woman aged 38 to 44 for each country (approximate completed fertility rates). Figure A in the appendix reveals that, according to the measure of approximate completed fertility, countries with fertility below the arithmetic EU-mean of 1.61 are: Germany, Spain, Italy, Switzerland, Bulgaria, Luxembourg, Portugal, Belgium, Latvia, Greece, Austria, Estonia and the UK. Countries with fertility above the average are: Lithuania, the Netherlands, Denmark, France, Norway, the Czech Republic, Finland, Poland, Slovenia, Slovakia, Sweden, Hungary and Iceland[2]. The average approximate completed fertility is 1.46 for the group of countries with fertility below the EU-mean and 1.72 for the group of countries with fertility above the EU-mean. We thus have an absolute fertility gap of 0.26 children between high- and low-fertility countries.
We now calculate the proportions of women having zero, one, two, three and four or more children in high- and low-fertility countries. Figure B in the appendix illustrates these proportions for each country. In both high- and low-fertility countries, having two children on average is the most frequent situation for women aged 38 to 44 (40% in low-fertility countries and 42% in high-fertility countries). At the same time, 62% of women aged 38 to 44 have two or more children on average in our group of high-fertility countries; whereas this proportion is only 52% in low-fertility countries. This lower proportion of women with at least two children goes hand in hand with higher proportions of childless women (22% against 15%) and of women having only one child (27% against 23%) in low-fertility countries. However, figure B suggests that childlessness is not generally higher in low-fertility countries. We observe a certain degree of polarization into two groups among low-fertility countries: German-speaking and Mediterranean countries have a relatively high proportion of childless women,

[1] First child birth for women can go hand in hand with a household split, i.e., women move away from their parents' household and set up their own household. As these women are not likely to be the principal survey respondents, they risk dropping out of the survey once they have moved. SILC is more successful at following up moving households if the whole household moves, which is why the attrition problem is much lower for the birth of a child of a higher rank.

[2] Several Eastern European countries figure among the high-fertility countries, as the observed cohorts of women in those countries (1969-1973) did not yet experience strong birth postponement. Schmertmann et al. (2014) predict that the quantum measure of completed fertility will be below average for cohorts born after 1970 in these countries.

while the proportion of childless women in Eastern European countries is similarly low as in high-fertility countries.

The absolute differences in the proportions give, however, no direct information about the rank that is most responsible for fertility being low in the first group of countries. The proportion of women having three and four children might be higher in high fertility countries, but at the same time, in both country groups, only a relatively small fraction of women is concerned. This lets us suggest that the weight of children of rank three and four for explaining differences in fertility between the two groups is smaller than the absolute difference in the proportions lets expect. The same logic applies for childless women: the difference in the proportion of childless women between high and low fertility countries is considerable, but the proportions itself are relatively small in comparison to the proportion of women having one and two children. At the same time, the proportion of women having two children is important in the two country groups. Consequently, even if the absolute difference between the two groups for this proportion is small, it can lead to high differences in fertility levels.

To identify which rank is most responsible for the fertility gap between high- and low-fertility countries, we follow d'Albis, Greulich and Gobbi (2015) and proceed in two steps. First, we calculate for each country group the proportions of women having at least *n* children ('fertility rates by rank'). The sum of these cumulated frequencies yields the country group's approximate completed fertility. In a second step, we calculate the differences among the country groups' fertility rates by rank. Per definition, these differences sum up to the gap in approximate completed fertility between high- and low-fertility countries (0.26 children). Comparing the differences in fertility rates by rank allows to identify the child rank that is most responsible for the fertility gap.

Figure 1 illustrates the contribution of each child rank to the gap in approximate fertility between high- and low-fertility countries, in absolute terms (left panel) as well as relative (right panel). Within the absolute difference of 0.26 children, 0.06 children are explained by fewer children of rank one, 0.10 children by fewer children of rank two, 0.08 children by fewer children of rank three and 0.02 children by fewer children of rank four or higher children in low-fertility countries.

In relative terms, fewer children of rank one in low-fertility countries accounts for 23% of the gap in completed fertility between high- and low-fertility countries. At the same time, fewer children of rank two account for 38% of the gap, children of rank three account for 30%, and fewer children of rank four or higher account for 9% of the gap.

[Insert figure 1 here]

This implies that fewer children of rank two in low-fertility countries contributes almost two times more to the fertility gap between high and low-fertility countries than the fact that there are fewer children of rank one in low-fertility countries. The result is very clear, despite the fact that the proportions of childless women and those with one child are somewhat overestimated by SILC as some children have already left their parent's household. On average, low approximate completed fertility levels are thus rather a consequence of barriers for family enlargement (most women have one child but few have a child of a higher rank) than of barriers for starting a family which concern at least a certain group of women (polarization between childless women and those who have two or more children)[3]. In line with this, the difference between our two country groups in the transition probability from a second to a third child (women aged 38 to 44) is slightly higher than the one for the transition from a first to a second child, while differences in the transition to a first child are relatively

[3] Note that Breton and Prioux (2005) find a somewhat higher contribution of children of rank three in comparison to children of rank two to fertility differences between European countries. This is due to the fact that they do not include Eastern European countries in their sample and focus on a generation that is 10 years older. At the same time, their study and ours consistently find that fewer children of rank one are not the main explanation for low fertility levels.

small. Since we find that cross-national differences in European fertility patterns are mainly due to children of rank two, our empirical analysis focusses on the factors that are conducive to the birth of a second child.

Figure C in the appendix illustrates the absolute contribution of the over/underrepresentation of children of rank *n* to the gap in approximate completed fertility between each country and the European average (1.61 children per woman). Even though the contribution of fewer children of rank one to the gap is important in Germany, Austria, Spain and Italy, the underrepresentation children of rank two contributes equally or more to the gap in these countries. Exceptions are Switzerland and Luxembourg, where the underrepresentation of children of rank one is most important, which suggests that childless women are the main factor that accounts for completed fertility below the EU-mean in these countries. In most Eastern European countries (Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland and Slovakia), we see an overrepresentation of children of rank one, while children of rank two are underrepresented in Eastern European countries where completed fertility is below or around the average (Bulgaria, Estonia, Lithuania, Latvia). This means that those Eastern countries with fertility below average, most women have one child but few have a child of a higher rank[4]. This suggests that barriers for having a second child are most important for explaining why fertility is low in the majority of European countries which have fertility levels beyond the EU average.

Our microeconomic analysis of the determinants of childbirth therefore focuses on the birth of a second child. This also entails some methodological advantages in comparison to analyzing first childbirth: We implicitly control for unobserved variables such as general sterility and are less exposed to attrition, as individuals who already formed their own households have a higher probability of being followed up.

3.3. Using SILC to analyze determinants of having a second child

Our objective is to estimate women's probability of having a second child as a function of individual, partner and household characteristics. We focus on women aged 15 to 45 who already have a first child. Our determinants of interest are the mother's and her partner's activity statuses, which are observed during a certain period *before* the potential conception of a second child. Activity status is thus modelled as a *determinant* rather than as a consequence of childbirth.

However, inverse causality cannot be completely ruled out, as couples (most likely the fathers) choosing to have a second child may increase labour market participation before childbirth in order to prepare for cost increases. At the same time, couples (most likely mothers) may anticipate the time needed for the second child by reducing or stopping labour market participation; or, at least, they may reduce or cease efforts to find a job, even before the birth of the second child.

We try to reduce this endogeneity bias through two procedures. First, we observe parents' labour market status not only before potential *childbirth*, but before potential *conception* of the second child. As the EU-SILC longitudinal dataset contains information about labour market status on a monthly basis as well as about the quarter of birth of children, we are able to identify parents' labour market status before potential conception. Second, as a robustness check, we apply an instrumental variable-approach in order to reduce the endogeneity bias.

[4] At the same time, barriers to having a first child can appear in low-fertility countries that postpone rather than hinder first childbirth. In this case, the birth of a second and third child can be impeded due to biological factors linked to mother's age rather than to institutional barriers to having children of a higher rank. To get an idea about the timing of birth, we calculate the average mean age of mothers at first, second and third childbirth, as well as the average mean age of mothers at first childbirth conditioned on the fact of only having one child (results available upon request). We find that, independently of the measure, mother's age at childbirth is not higher in low-fertility countries, which reinforces our claim that barriers in low-fertility countries are more important for second than for first childbirth.

We use the longitudinal EU-SILC dataset on 25 countries covering survey years 2003 to 2011[5]. The sample is restricted to women aged 15 to 45 years old who already have one child at the beginning of the observed period. A dummy variable indicating the birth of a second child during the observed period serves as an endogenous variable, while we observe the characteristics of women and their partners (if existing) before potential conception. The construction of the database, as described in detail in the following, allows us to apply a simple probit model with robust standard errors[6].

In order to obtain the information needed, individuals must be observed for at least three consecutive survey years[7]. The following diagram (figure 2) summarizes how the necessary information is collected.

[Insert figure 2 here]

The dependent variable is thus built as follows:

- Y = 1 if the woman gives birth to a second child in year *t* (test group)
- Y = 0 if the woman does not give birth to a second child in year *t* (whatever happens in year *t+1*) (control group)

We want to consider all the events 'second childbirth / no second childbirth' in year *t*. Data from year *t+1* are thus used to make sure that we observe all childbirths in year *t*. Individual characteristics that we consider as possible determinants of the 'event' are observed in year *t-1*.

In the majority of countries, around 40% of individuals are observed over four years[8]. A subgroup of individuals who are observed over four years (*t-1* to *t+2*) will be considered twice in our sample: we first consider the sequence from year *t-1* to *t+1*. If no second childbirth is observed for this period, we also consider the sequence from year *t* to *t+2*. Allowing for two potential 'events' increases the number of observations. In order to avoid estimation bias due to unbalanced panel data (the number of observed years may influence the probability of observed childbirths), we include 'second event fixed effects' for individuals observed for the second time.

Overall, we obtain 36,729 observations (person-years) for women aged 15 to 45 with one child in the beginning of the observed period, who are thus 'at risk' of having a second child in the following year (covering survey years 2003 to 2009 for 25 countries; individual characteristics are observed before the potential conception of a second child to reduce endogeneity). All countries combined, the event 'birth of a second child' can be observed for 9% of observations in our sample. Table A in the appendix presents a descriptive overview of the probability of second childbirth by country.

Our computed probabilities of second childbirth vary considerably across countries. Figure 3 illustrates that the probability is actually higher in countries with higher period total fertility (as measured by the World Bank's World Development Indicators (WDI) in 2011). Figure 3 suggests a polarization of European countries: one group has high total fertility rates and a high probability of having a second child (Iceland, Ireland, France, Belgium, Denmark, Finland, Norway, Sweden,

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[5] The 25 countries are: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Spain, Finland, France, Greece, Hungary, Ireland, Iceland, Italy, Lithuania, Luxembourg, Latvia, the Netherlands, Norway, Poland, Portugal, Sweden, Slovenia and Slovakia. UK and Romania are excluded due to serious measurement errors in terms of childbirth and activity status. Longitudinal data is not available for Germany and Switzerland.

[6] Regressions with bootstrapped standard errors obtain the same significance levels as regressions with robust standard errors for all models presented in this paper.

[7] This is because children born in the third and fourth quarters of each year are generally declared in the subsequent survey year, as interviews usually take place during the first half of each year.

[8] In a few countries (France, Lithuania, Luxembourg, Norway, Portugal and Slovakia), some individuals are observed for more than four years. To avoid an overrepresentation of these individuals, only four years are taken into account for them (2007-2010, which is the period with the largest data coverage for these six countries).

Netherlands, Luxembourg); and another group has low total fertility rates and a low probability of having a second child (Estonia, Bulgaria, Latvia, Portugal, Hungary, Slovakia, Italy, Portugal, Austria, Spain, Czech Republic, Slovenia, Greece, Cyprus). This suggests that barriers for second child birth are an important determinant not only for low approximate completed fertility (women aged 38-44) but also for low total fertility rates (a period measure which represents the sum of age-specific fertility rates of women aged 15 to 49).

[Insert figure 3 here]

To test the extent to which women's and their partners' stable labour market integration influences the decision of having a second child, we observe women's and men's activity status during a period of three months[9] previous to potential conception.

We define labour market status as 'stable' if it does not change during the three months before (potential) conception. The following categories are created for women's activity status during three months before (potential) conception of a second child:

- Stable employment (self-employed and employed):
  - stable full-time employment
  - stable part-time employment
- Stable unemployment
- Stable inactivity
- Stable student
- Stable retirement
- Stable military service
- Unstable:
  - found job (switched from unemployed, inactive, student or retired to employed)
  - lost job (switched from employed to unemployed, inactive, student or retired)
  - switch from full-time to part time
  - switch from part-time to full time
  - any other change in activity status during the observed period of three months before potential conception of a second child

In all categories, 'stable' means that activity status has not changed during the three months before potential conception of a second child. Conversely, 'unstable' means that there has been a change in activity status during the three months before potential conception of a second child. Due to the short period of only three months, our 'stable *employment*' variable does in no way reflect a long-term '*stability* of employment'

Table 1 provides a descriptive overview of the exogenous variables and shows that, on average, most women surveyed in the 25 observed countries were in employment during the three

[9] EU-SILC provides information on the quarter of birth of children in year *t* (1: January-March; 2: April-June; 3: July-September; 4: October to-December). Given that pregnancy usually lasts nine months, we use information on the mother's labour market status for the same quarter of year *t-1*, so that we have a measure of labour market stability over the three months before conception. (For children born in quarters 2, 3 and 4, we would be able to have information on labour market stability over a longer time period, but we use only the three-month information to avoid distortion in the measure of stability, depending on the quarter of birth of children). For instance, for children born in quarter 1 in year *t*, we observe their mother's activity status in January, February and March of year *t-1*. For children without birth period information, we observe mother's labour market status from January to March in the year before childbirth to make sure that labour market status is observed before conception. For women in the control group, we randomly chose a consecutive three-month period to observe labour market status in *t-1* (the year before the event 'no birth of a second child' for these women). In Denmark, Finland, Iceland, the Netherlands, Norway and Sweden, activity status is not observed on a monthly basis but only at the time of interview for about 50% of individuals. We have compared status for the remaining 50% of individuals, for whom both variables are available, and we find no significant differences. Therefore, for those without activity status information on a monthly basis, we use the information given at the time of the survey in the year before potential second childbirth.

months before potential conception of a second child. The second group of women fall within inactivity, and the third group are in unemployment. Among women who give birth to a second child, 55% are in full-time employment, 13% in part-time employment, 8% in unemployment and 18% inactive during the three months before conception of the second child. Among women who do not give birth to a second child, 46% are in full-time employment, 19% in part-time employment, 7% in unemployment and 23% in inactivity during the three months before "potential", but not-realized conception.

Aside from women's activity status, we include a series of control variables in order to isolate other potential determinants from the impact of stable employment on women deciding to have a second child. Most importantly, we include information on the woman's partner in our models. We control for the presence of a partner and the couple's marital status. We also observe men's activity statuses during the same period that we chose for their female partners (three months before potential conception of a second child). We distinguish the partner's activity status in 'stable employment' versus 'not in stable employment'; as, on average in the EU, the large majority of partners are in stable employment (88% for those without second childbirth and 92% for those with second childbirth; see Table 1).

Table B in the appendix gives a descriptive overview of women's and their partner's activity status by country. While the large majority of partners are in stable employment in all countries, women's activity statuses differ widely among countries, especially in terms of inactivity (lowest proportion in Denmark, Norway and Slovenia; highest in the Czech Republic, Hungary, Italy and Greece). At around 80%, the proportion of women in stable employment is highest in Denmark, France, Lithuania, the Netherlands, Norway, Sweden and Slovenia. Part-time employment is relatively high in comparison to full-time employment in Continental countries, such as Belgium, Austria, France, Ireland and the Netherlands. The proportion of unemployed women is highest in Bulgaria, Spain, Greece and Poland. Women with one child mostly work full-time in most Eastern European countries. In addition, we control for individual demographic variables such as women's age as well as the age and sex of the first child. We also control for women's education (using UNESCO ISCED classification[10] to distinguish between three categories) and household labour income, which includes the woman's and her partner's (if in a couple) gross employment income, as well as their benefits from self-employment (observed for the whole year before the potential birth of a second child). Four categories are created for household labour income: zero, low, middle and high – with the latter three representing income terciles calculated separately for each country[11].

[Insert table 1 here]

We run our probit models not only with year fixed effects but also with country fixed effects, in order to capture the effects of country-specific unobserved characteristics, thereby focussing only on within-country variations.

[10] *Low education* for pre-primary, primary and lower secondary education; *medium education* for upper secondary and post-secondary non-tertiary education; and *high education* for first stage of tertiary education (not leading directly to an advanced research qualification) and second stage of tertiary education (leading to an advanced research qualification).

[11] Other potential determinants of second childbirth are not explicitly modelled due to data availability. Information about migrant background is not available in the EU-SILC longitudinal waves before 2008. Information on general health status and chronic diseases of women is not included in the regression, as EU-SILC provides a very low number of observations for these variables. For those observations, the health status generally does not vary much between women with and without second childbirth. The focus on women who already have a first child allows us to implicitly control for biological determinants of second childbirth, such as infertility. The same is valid for the existence of a strong individual normative attitude against having children.

Our outcome of interest is a binary variable, which indicates the birth of a second child (*Ch = 1* if a woman has a second child during the observation period) and *0* otherwise. The underlying unobserved propensity to have a second child (Ch^*) can be modelled as a function of a set of covariates (X) and female labour market status (W^f):

$$Ch_{ij}^{*} = \alpha . X_{ij}^{Ch} + \beta W_{ij}^{f} + C_{j}^{Ch} + T^{Ch} + \varepsilon_{ij}^{Ch} \tag{1}$$

Where Xij is a set of covariates for individual i in country j; Cj is a country dummy and T is a time dummy.

The appropriateness of this simple probit approach relies on the assumption of selection on observable characteristics: in order to guarantee that the estimation of β is unbiased, we have to rule out the possibility that unobserved individual characteristics simultaneously influence labour market stability and the probability of having a second child. There are several reasons, however, for believing that the labour market situation is endogenous to fertility decisions. One could think of some unobserved preferences of women – such as greater professional ambition, for instance – that would impact both the probability of being in stable employment and the probability of having a second child. In this case, one may expect the error term to be correlated with the variable of interest (W^f), and ultimately that β is biased.

To address the issue of endogeneity, we use, besides time-lagged exogenous variables, an instrumental variable (IV) approach which serves as a robustness check. We implement the IV-approach using a bivariate probit model that is estimated using full information maximum likelihood, as implemented by the biprobit command in STATA.

Instruments Z are variables associated with the endogenous variable (*Wf*) and are supposed to influence the outcome (*Ch*) only through the effect on *Wf* – and not with a direct effect on *Ch*.

In this case, the labour status of women (W^f) depends on a set of covariates X, which may (or may not) coincide with those affecting the decision to have a second child. To measure the impact of actual labour market situation on fertility decision, we adopt a recursive model in which women's labour market positions are assumed to influence the birth of a second child:

$$\begin{cases} Ch_{ij}^{*} = \alpha X_{ij}^{Ch} + \beta W_{ij}^{f} + C_{j}^{Ch} + T^{Ch} + \varepsilon_{ij}^{Ch} \\ W_{ij}^{f*} = \alpha X_{ij}^{W} + C_{j}^{W} + T^{W} + \varepsilon_{ij}^{W} \end{cases} \tag{2}$$

The error terms of the two equations are allowed to be freely correlated[12] in order to account for the possibility that some unobserved factors influence the two decisions to work and have a child. The sign of the correlation gives the direction of the bias in the simple probit model.

The choice of instruments (to be correlated with the endogenous variables but not with the outcome) is crucial for this approach. Here, there is clearly no ideal choice, since we need such information for the 25 countries covered in our study. Moreover, only very few variables can be expected to impact the labour market situation without having a direct effect on fertility decisions.

[12]More precisely, we assume here that the error terms follow a bivariate normal distribution with 0 mean and a variance equal to 1.

Regional unemployment rates (matched with our individuals using NUTS-2 codes[13]) are assumed to be relatively good instruments, since they are expected to be associated with women's labour market situations and not with their fertility decisions (our tests, available on request, show that the instrument is actually valid).

3.4. Using multi level models to analyze the role of policies and their interaction with individual characteristics

The multilevel analysis aims at showing how public policies shape opportunities for families. More precisely, it focuses on how the probability of having a second child might be correlated to some family policies and how this correlation might differ according to some individual characteristics of the mother (especially her labour market status).

Multi-level models offer an interesting framework enabling both individual and contextual determinants of an observed event to be taken into account. These models are thus very useful when individuals are supposed to be 'nested' into higher level structures (Snijders, Bosker, 1999) that may play a role in explaining events that occur at the individual level. This is of particular interest in international comparative research: we can indeed consider that individuals are 'nested' in countries, each country being characterized by specific national institutions that may play a role on individual choices or situations.

Multi-level models are used here in complement to purely micro-level models since we assume that the decision of having a child may be correlated to some institutions such as family (leave policies, childcare policies etc.) or fiscal policies.

The dependent variable of our models being a dummy, we use binomial logit models. Equations of our binomial logit model are the following (*i* being the individual subscript and *j* the country-level subscript):

$$P\left(dv_{ij} = 1 \mid \beta_j\right) = \phi_{ij} \quad (3)$$

$$\log\left[\frac{\phi_{ij}}{1-\phi_{ij}}\right] = \eta_{ij} = \quad (4)$$

$$\beta_{oj} + \beta_1 stable_{employment} + \beta_2\ nopartner + \beta_3 partner_{not_{stable_{employment}}} + \beta_4 partner_{not_{married}} + \beta_5 age1524 + \beta_6 age3545 + \beta_7 firstchild_{aged_0} + \beta_8 firstchild_{aged_{3to6}} + \beta_9 firstchild_{aged_{7more}} + \beta_{10} firstchildfemale$$

In all our multilevel models, the intercept β_{oj} is made random and is at least composed of two parts: one being the average expected log-odds of having a second child relative to not having one; the other, a country-specific effect so that we have: $\beta_{oj} = \gamma_{00} + u_{0j}$.

Then, in order to see how national contexts and institutions affect the individual probability of having a second child, we include one or more explanatory variables in the equation of the intercept. These

[13] In a few of the EU-SILC countries, the NUTS-2 code is missing for all individuals (the Netherlands, Portugal, and Slovenia). Furthermore, the code is missing for about the half the individuals in Sweden. In this case, we use national unemployment rates as proxies in order to keep all countries in the analysis.

variables are called 'level-2 variables' and are national averages of variables which are likely to influence the birth of a second child.

Three aggregated indicators are used as macro institutional variables. These indicators are chosen since they represent the three main options for public policies to help parents (and especially mothers) to reconcile work and family life, namely leave schemes, childcare coverage and cash transfers to families (Thévenon, 2011). Table C in the appendix gives a descriptive overview of these three variables by countries. The three indicators used in this study are defined as follows:

- The maximum duration for which a mother can be on leave, with employment protection, as calculated by the OECD Family Data Base (indicator PF2.1.). This gives a relative measure of women's employment protection when they become pregnant and give birth.

- Childcare coverage represents the proportion of children under age 3 who are enrolled in formal care sevices, either home- or centre-based, as provided by the OECD Family Data Base for the year 2007. These data are obtained by the aggregation of micro-level data from EU-SILC (cross-section), and refer to not only to public and publicly subsidized but also to private formal childcare. Figure A in the appendix provides a descriptive overview of this policy measure for a selected group of countries. Since there is no comparative data available on childcare supply, we use this indicator as a global measure of the total cross-national differences in formal childcare capacities.

- Total cash benefits a couple family with 2 children will receive over the 3 years after the birth of a second child. This total is estimated as the sum of cash leave and family benefits, plus the fiscal reduction the household will get in comparison to the tax burden born by a childless household with same earnings. Each partner is assumed to receive the average earnings. This indicator is expressed in % of the net income for a family with no child (data computed from the OECD Family Support Calculator[14]).

Note that these indicators do not necessarily reflect what households will effectively get after the birth of a second child, but they aim to capture what households can expect on average; and we assume that partners will make their fertility decision on this basis. Said differently, we expect these indicators to capture cross-national differences in the opportunities household get to combine employment and fertility.

When we test the effect of our three macro variables, the equation of the intercept becomes:

$$\beta_{oj} = \gamma_{00} + \gamma_{01} childcare\_coverage + \gamma_{02} max\_leave + \gamma_{03} cash\_transfers + u_{0j} \qquad (5)$$

Introducing macro-variables allows the global influence of some contextual features to be grasped simultaneously with individual effects.The significanceof coefficients, as well as level-2 covariances, are compared in order to choose the most meaningful models.

Finally, in a last step, if samples are large enough, multi-level models can be useful to test if the effect of some individual variables differs across countries and to test the effect of contextual variables on some particular socio-demographic groups. This is done by making random some individual variables and by introducing some institutional level-2 variables in their equation (as for the intercept). We also introduce interaction terms between micro variables (stable employment for instance here) and macro variables (policy variables) in the model. This last step thus consists in allowing not only the intercept of the model

[14] http://www.oecd.org/els/soc/oecdfamilydatabasethefamilysupportcalculator.htm#calculator

but also the slope for some individual variables to be random and to possibly explain them with macro-level variables. In this last step, equations of the coefficients of crossed individual variables become random and can be explained by some macro-variables just as the intercept. For example, the coefficient of the variable 'stable employment' would be:

$$\beta_{1j} = \gamma_{10} + \gamma_{11} childcare\_coverage + u_{1j} \quad (6)$$

4. Individual determinants of the probability of having a second child

4.1. An average positive effect of stable female employment on the probability of having a second child within European countries

Table 2 presents the probit estimation coefficients (regressions with robust standard errors) of a woman's probability of having a second child as a function of her observed activity status during three months before potential conception. The first model (column 1) analyses the effect of stable employment against all other possible situations, while the other models distinguish in more detail between all possible alternative activity situations (columns 2 and 3). The first model in Table 2 shows a significantly positive effect of stable employment for women deciding in favour of a second child, after controlling for the existence of a partner, marital status, age, age and sex of the first child, country and year fixed effects, and 'second observation' fixed effects.

This implies that within countries, women in stable employment have a higher probability of a second child than women who are not in stable employment. Women in stable employment are those who are full-time, part-time, or self-employed during the three months before potential conception. Those women have a higher probability of second childbirth in comparison to those who are inactive, unemployed, students, in military service, retired or who experience any change in their activity status during the observed three months.

Converting the probit coefficients into probabilities leads to the following quantification of estimation results for women whose characteristics correspond to the reference category (in other words, women who are partnered and married, aged 25 to 34 and having a first child that is male and aged one or two (Austria, year 2003)): Women without stable employment have a 26.7% probability of having a second child within our observed period, while women with stable employment have a 28.6% probability of second childbirth. What is more, women with no partner and, to a lesser extent, unmarried women have a lower probability of having a second child than married women. Compared to women aged 25-34, women aged 35-45 have a lower probability of having a second child during the observed period. The effect of the first child's sex is insignificant. Women whose first child is aged zero or aged three-plus have a lower probability of deciding in favour of a second child than women with a first child aged one or two. Children of rank one aged zero are born in the observed year, i.e., in the year previous to potential second childbirth. This does not necessarily exclude second childbirth in the following year, but affects women's activity status in the observed year. When dropping women with a first child born in the observed year, we obtain a higher and more significant estimated coefficient for 'stable employment' (estimation results available upon request).

Model 2 gives more detailed information for the group of women who are not in stable employment. Unemployed women and students have a significantly lower probability of having a second child in comparison to women in employment (inactive women have a significantly lower probability of having a second child only when we drop women with a first child born in the observed year). Unemployed women have a 24.6% probability of having a second child, while the probability is 28.1% for employed women.

[Insert table 2 here]

For the very small minority of women with unstable activity status during the observed three-month period, we see that women finding a job during this period have an even higher probability of having a second child in the following year when compared to those in stable employment over the same period. Even though women in unemployment over the observed period have a lower probability of having a second child, we find that job loss actually has a positive impact. This paradox might be partly explained by the fact that, within this very small group who lost their jobs during the three observed months some of the women may have already anticipated a second childbirth, whereas others may take advantage of the opportunity to procreate.

Model 3 shows that, in comparison to women in stable full-time employment, women in stable part-time employment do not have a significantly different probability of having a second child. At the same time, the difference in the probability of second childbirth between full-time employed and unemployed women (28.5% against 24.7%) is significant. Model 3 suggests that inactive women also have a significantly lower probability of having a second child in comparison to women in stable full-time employment (26.8% against 28.5 %).

4.2. An even higher probability of having a second child for dual-earner couples

Regressions presented in Table 3 control the results for partner activity status.

Model 4 in Table 3 shows that stable employment is important for the decision to have a second child even when controlling for partner's activity status. In addition, we see that women with a partner who is not in stable employment have a significantly lower probability of having a second child in comparison to women with a partner in stable employment.

Models 5 and 6 give information about the interaction effect that a woman's and her partner's activity statuses have on second childbirth.

Model 5 shows that, for women without a partner in stable employment, being in stable employment themselves is actually insignificant for having a second child (estimated coefficient: -0.04). However, the effect of stable employment is significantly positive for women who have a stably employed partner (having a stably employed partner is the case for the large majority of observed women). For this group, the estimated coefficient of stable employment is -0.04+0.0.0784= + 0.04, with a joint confidence level of 99% (p-value of 0.0052 presented in the last rows of the table). For our reference category, women with a stably employed partner thus have a 29.09% probability of having a second child when they are themselves stably employed, but only a 26.6% probability when they are themselves not in stable employment.

The effect of having a partner in stable employment is important for second childbirth, and even more important for women who are themselves in stable employment (0.0784+0.113= 0.1914). Women in stable employment have a 29.09% probability of having a second child when their partner is in stable employment, but only a 22.9% probability when their partner is not. When neither partner is in stable employment, the probability of childbirth is 24.1%.

[Insert table 3 here]

Model 6 actually shows that for women with a partner in stable employment, being unemployed as well as being inactive significantly decreases the probability of having a second child in comparison to being in stable employment (estimated coefficient of stable unemployment for women with a stably employed partner: 0.0842-0.256= - 0.1718, at a joint confidence level of 99.9%; estimated coefficient of stable inactivity for women with a stably employed partner: 0.069-0.128= -0.059, at a joint confidence level of 90%). This leads to the finding that women with a stably employed partner have a 29.09% probability of second childbirth when in stable employment, against 23.1% when unemployed and 26.6% when inactive.

It thus seems that dual activity favours family enlargement from one to two children more so than heterogenous employment patterns among partners. For women, having a partner who is stably employed is a fundamental determinant for having a second child, but at the same time their own successful labour market integration after first childbirth also favours second childbirth. We find that stable employment is less important for women whose partners are not in stable employment, and this suggests that having a partner in stable employment is a crucial determinant for having a second child. Once this condition is fulfilled, stable employment for women increases the chance of family enlargement: couples in which the man and woman are in stable employment have a higher probability of having a second child when compared to couples in which the man but not the woman is in stable employment. The finding that dual activity favours the birth of a second child might be linked to income. Model 7 shows that couples whose joint labour income reaches the third income decile have the highest probability of second childbirth when compared to lower income groups[15]. Due to strong multicollinearity between a woman's and her partner's labour market participation and their joint labour income, we do not estimate the impact of activity status on childbirth by conditioning on household labour income.

Our results so far suggest that stable employment for both the woman and her partner are likely to generate a secure economic situation that facilitates deciding in favour of a second child. Dual earner couples have a higher probability of second childbirth than couples with only one earner. We know now that women's integration into the labour market after first childbirth favours the birth of a second child, especially for women with active partners, but does this impact also vary with women's education? In addition, even though our results focus on within-country variations, the impact of women's activity status on second childbirth might differ between European countries.

4.3. Effects of stable employment differentiated by education levels and country groups

Table four shows regression results conditioned on women's education and on country context. A country-by-country analysis is not possible, as the number of observations would be too small for each group. We therefore distinguish between four different regions and two different fertility regimes.

Model 8 in Table 4 shows that stable employment becomes insignificant when controlling for education, suggesting collinearity between educational levels and women's probability of being in stable employment. We thus restrain from including simultaneously education and activity status as exogenous variables in the following probit models 9 to 11. Tertiary education has a significantly positive impact on the probability of second childbirth, just as it also has a strong positive impact on the likelihood of being in stable employment (as will be shown by the IV estimates presented in section 4.4.).

[15] Model 7 combines single and partnered women. Household labour income represents the sum of the woman's and her partner's (if she has one) labour income. Estimation results based on a sample of only couples (available upon request) confirm that the highest income tercile has the highest probability of second childbirth. This means that the results of Model 7 are not driven by single mothers being overrepresented in the zero and low income group.

The influence of stable employment differentiated by women's level of education is reported in Model 9. By including interaction terms between employment and education, we find that the impact of stable employment on second childbirth is highly heterogenous between different education groups. The impact of stable employment on second childbirth is insignificant for middle and low-educated women (estimated coefficient -0.0128 for middle-educated and -0.0128-0.0479 for low-educated women), but we find a significantly positive impact for high-educated women (-0.0128+0.152). It seems that for highly educated women, receiving a return on their educational investment after the birth of a first child is important for family enlargement. The difference in the probability of second childbirth between employed and non-employed women among the low-educated is insignificant, as is the difference among middle-educated women. Being in stable employment is thus a substantial determinant for second childbirth among high-educated women, but it does not necessarily facilitate second childbirth for lower educated women.

How can this difference be explained? Controlling for country context might help shed light on this issue. Model 10 replaces country dummies for regional dummies and includes interactions between stable employment and regions. It shows that women's stable employment plays a significantly positive role in Southern European countries (Portugal, Spain, Italy, Greece, Cyprus), which is the reference category. The estimated coefficient is even higher in Northern European countries[16], which are Finland, Sweden, Norway, Denmark, Iceland, Estonia, Lithuania and Latvia (0.088+0.0514).

Stable employment is insignificant for second childbirth in Eastern Europe (Poland, Hungary, Czech Republic, Bulgaria, Slovenia and Slovakia) as well as in Continental countries (France, Luxembourg, Belgium, Austria, Netherlands and Ireland). Note, however, that when comparing women's stable *part*-time employment to all other activity statuses including full-time employment, we find it has a significantly positive impact on the probability of second childbirth in Continental countries. As shown in Table A in the appendix, women's part-time employment is relatively high in these countries (estimation results available upon request). In Eastern Europe, stable employment becomes significant at the 10% level only after we drop women with a first child aged zero.[17]

Finally, Model 11 shows the impact of women's stable employment as differentiated by country affiliation to a high- or low-fertility regime, as suggested by Figure 3. We see that in high-fertility countries (Iceland, Ireland, France, Belgium, Denmark, Finland, Norway, Sweden, Netherlands, Luxembourg), the estimated coefficient of stable employment is significantly positive (0.0825). In low-fertility countries (Estonia, Lithuania, Bulgaria, Latvia, Portugal, Hungary, Slovakia, Italy, Portugal, Austria, Spain, Czech Republic, Slovenia, Greece, Cyprus), the estimated coefficient is also positive, but smaller (0.0825-0.0398= + 0.0873) and less significant (13% level, but significant at the 1% level once we drop women with a first child aged zero). In high-fertility countries, employed women have a 38% probability of second childbirth against 34.9% for women who are not employed (having any other activity status). In low-fertility countries, the probabilities amount to 25.1% vs. 23.7%.

[Insert table 4 here]

It thus seems that the impact of women's activity status on second childbirth is sensitive to the country context. In high-fertility countries, being in stable employment favours second childbirth for women much more than in low-fertility countries. Beyond this, further regressions (available upon

[16] Grouping together Finland, Sweden, Norway, Denmark, Iceland, Estonia, Lithuania and Latvia is necessary in order to obtain a sufficiently large number of observations per regional group.

[17] We further find that stable employment becomes significant when replacing country dummies for regional dummies in Model 8. Regressions by country group reveal that stable employment is significantly and positively correlated with second childbirth for highly educated women in Northern and Southern European countries (results available upon request).

request) show that in high fertility countries, low-educated women who are employed have a higher probability of second childbirth when compared to low-educated women without employment. The impact of employment on childbirth is thus positive for all education groups in high fertility countries, whereas the impact is strongest for low-educated women. In contrast, in low fertility countries, low-educated women who are employed are more likely to decide against second childbirth than those who are not employed, while the impact of employment is positive for high-educated women.

In these countries, women's low probability of having a second child might be explained by institutional barriers to family enlargement, and these barriers might exist especially for low-educated women who are active in the labour market. In most low-fertility countries (especially in Slovenia, Slovakia, Lithuania and Latvia), the large majority of women work full-time after the birth of a first child (see Table B in the appendix). These women (in particular, those who are low-educated and mostly in the low income group) might decide against a second child, as they fear it may lead to an important income reduction afterwards. This income reduction would be caused by a reduction in or cessation of work in the absence of institutional support for combining work and family life. In other low-fertility countries like Poland, Hungary, the Czech Republic, Bulgaria, Portugal or Austria, another large part of the women are inactive after first childbirth. The lower educated ones in particular might face budget constraints and/or fear that the birth of a second child will further decrease their chances of a successful (re)integration into the labour market. In high-fertility countries, most women work either full-time or part-time after their first childbirth; and successful labour market integration after the first childbirth facilitates family enlargement for all education categories.

4.4. Robustness check: results of estimations using instrumental variables that control for endogeneity

Results from estimations using instrumental variables to account for the endogeneity of employment are reported in table D in the appendix.. The table shows results for both employment and fertility, estimated simultaneously. Different estimation procedures were used: bi-probit (Models 12, 13, 14), IV-2SLS (Model 15) and IV-probit (Model 16). The IV-2SLS and IV-probit approaches do not assume a probit function when estimating the first-stage employment equations. They also allow running standard tests to check the validity of our instruments when, in addition to regional unemployment, education is omitted in the fertility equation (Models 12 and 13) and thus considered as an instrumental variable.

As explained in Section 3.3, an instrumental variable is introduced in our models in order to tackle endogeneity problems. Regional unemployment rates are thus introduced as exogenous variables in the equation of stable employment. All models show that regional unemployment is highly significant and negatively correlated with stable employment.

To check the validity of instruments, we test the absence of correlation between the birth of a second child and the regional unemployment rate, after controlling for other covariates. To do so, we run probit models 1 and 4 by replacing, among the exogenous variables, individual information on the activity status with regional unemployment rates (results available upon request): the impact of regional unemployment is not significant; therefore, our hypothesis appears to be confirmed regarding no direct correlation between the birth of a second child and the regional unemployment rate. Thus, regional unemployment rates emerge as a relevant instrument for individual information on stable employment.

Model 12 uses the same independent variables in both equations as in the simple probit Model 1, namely age, basic partner information (existing partner, married or not), the age of the first child, a dummy indicating if the first child is female, 'second event' fixed-effects (as defined in Section 3.3), country fixed effects and year fixed effects. Model 13 uses the same independent variables as the simple probit Model 4: compared to Model 12, we introduce information on the partner's labour market situation.

Given the importance of education in explaining stable employment, we also introduce the level of woman's education in the first equation. However, considering the multicollinearity problem between education and stable employment in explaining fertility, which emerges in Model 8, we test one model where education is introduced only in the stable employment-equation (Model 12) against another model where education is also introduced as a covariate in the second equation (fertility equation, Model 14).

In Models 12 and 13, we observe a positive effect of stable employment on the probability of having a second child. These models thus confirm the results of our simple probit models. In Model 14, where education level is also introduced as a covariate in both equations, stable employment has a positive but non-significant effect on the probability of a second birth. The effect of stable employment on the probability of having a second child is thus significantly positive for all women, whatever their level of education (i.e., when we do not further control for educational attainment), but this effect reduces in size and turns out to be no longer significant when education is added as a regressor, since there is quite a strong correlation between the two variables (as suggested when comparing Model 4 and Model 8). Furthermore, since we saw that the effect of stable employment varies with education, it is strongest for highly educated women (Model 9).[18]

In our models, stable employment is the endogenous variable in the first equation, which is why we do not interact this variable with other covariates in the second equation. However, we can observe the correlation between the residuals of both equations. In all models, the correlation between the residuals of both equations (measured by athrho) is negative; thus, we assume that the effect of stable employment on the birth of a second child may have been underestimated in the simple probit models. There may have been some common unobserved determinants having an opposite impact on employment stability and on the birth of a second child. In parallel, the coefficients of stable employment are higher in the IV-probit models in comparison to the simple probit models. This may reflect a higher effect of stable employment once we correct for endogeneity through an instrumental variable.

The estimation of a biprobit model assumes that the outcomes in the two equations are related to women's characteristics with a non-linear function that is approximated by a probit function. However, there is no guarantee that the conditional expectation function of the first-stage equation follows a probit function, nor that the residuals from the first step are uncorrelated with the predicted outcome. For this reason, we also run two-stage least squares and probit models with IV variables to treat the possible endogeneity of employment status (Models 15 and 16) – in which case the first stage equation assumes a linear function with an OLS estimation, which is guaranteed to produce first-stage residuals that are uncorrelated with fitted values and covariates. This also allows us to further test the validity of our instruments. In particular, we test whether educational attainment can be used as an instrument of employment status together with regional unemployment rates, as it appears to be when education is included as a regressor in the first stage equation but not as a covariate in the fertility equation. Not surprisingly, a J (Hansen) test indicates that not all our instruments are exogenous. This prevents us from considering education as an instrumental variable. In addition, the error terms of the two equations appear to be not correlated in both the IV-2SLS and the IV-probit models, which suggests, first, that the employment status can be considered with limited risk as an exogenous factor; and, second, that results from the simple probit estimation are thus consistent.

[18] Not only does the impact of stable employment on fertility differ with education, but also the impact of regional unemployment on the probability of being in stable employment. Regressions with marginal effects in the first equation (available upon request) indicate that the impact of regional unemployment on the probability of being in stable employment for women having one child is significantly negative for all education groups, but the impact is more negative for low-educated than for middle-educated, while the impact is the least detrimental for highly educated women.

In all, our IV estimations treating potential endogeneity of employment, do not provide strong evidence that the results obtained with our simple probit models suffer from important bias. They suggest that this endogeneity issue was quite successfully prevented by the way in which we compiled our data in order to observe women's and their partners' employment situation *before* child conception. Furthermore, a biprobit model may impose too stringent conditions for estimating the first-step equation, as women without stable employment may actually be in so many different work-related situations (see Models 2 and 3) that working status cannot be accurately modelled as a probit function of observable characteristics. For all these reasons, we do not find enough reasons to reject the results obtained with the simple probit approach

4.5. Results of the multi-level analysis

Table 5 shows the estimation results for five different models:

- model 17 only includes individual variables and a random intercept;
- models 18 includes individual variables, the random intercept and the three main policy variables at once (models where each policy variable is introduced one by one have also been tested and brings the same results);
- models 19 to 21 include interactions between micro and macro variables (one model for each policy variable).

In our first multilevel model including individual variables and a random intercept, we can witness that the variance of the intercept is highly significant. This indicates that the macro-level matters. Consequently, model 18 aims at highlighting the reasons for these differences across countries by introducing some macro variables in the intercept equation. Note that these models are only based on 24 (or sometimes 21 countries), as the OECD Family Data Base does not provide any policy measures for Cyprus and not on cash transfers for Bulgaria, Latvia and Lithuania.

[Insert table 5 here]

Our multilevel models show two main results. Firstly, women's stable employment is confirmed to have a positive impact on the probability of having a second child when controlled for some institutional country characteristics. Secondly, the policy variable that displays a significant and positive effect on 2nd child birth is childcare coverage. No significant effect is found concerning the length of leave schemes and total cash transfers (family benefits, leave benefits and income tax rebates)[19].

The positive effect of childcare and the relative inefficiency of leave duration and cash transfers (model 18) for encouraging 2nd child birth shows that reconciliation issues play a crucial role in explaining fertility in European countries. The possibility to combine work and family through childcare appears as a key determinant for the decision in favour of a child whereas the opportunity to stop working for a relatively long period does not seem to have such a positive effect. Thuis finding is consistent with those by Luci-Greulich and Thévenon (2013) who found a positive influence of the

[19] Three other models (not presented here) have been run where the three different policy variables are introduced separately in the intercept equation. The results are similar (non significant effect of leave schemes and cash transfers and a significant, positivie effect of the same magnitude for childcare coverage).

development of childcare facilities on fertility trends in OECD countries over the two decades preceding the great recession.

Two kinds of explanations may be suggested for the finding of an insignificant coefficient of cash transfers. Either households may not take these transfers into account when deciding to have a second child, because they are unable to anticipate the cash transfers they will get in this case. Or is the indicator used here inaccurate because the average case to which it refers fails to reflect the herogeneity of cash transfers that exists within countries and on which households base their fertility decision.

Finally, a few models have been tested where interaction terms are introduced between the macro and micro level (models 19 to 21 in table 5). More precisely, we test the differentiated effect of our three policy variables on the probability of 2nd child birth according to women being in stable employment or not. In other words, the effect of some policies may be more or less pronounced for women according to their activity status. This model also tells us how the positive individual effect of being in stable employment may be reinforced or reduced by some public policies implemented at the macro (country) level. Models 19, 20 and 21 test this hypothesis respectively for the three policy options considered here: childcare coverage, maximum length of leave and total cash transfers.

In model 19, the interaction term between the individual variable *'stable employment'* and the macro-level variable *'childcare coverage'* displays a positive and significant coefficient, showing that the positive effect of stable employment on the probability of having a second child is reinforced by childcare development. This positive interaction also means that the positive effect of childcare development on second child birth is reinforced for women in stable employment. Thus, being in stable employment (at the individual level) and the development of formal childcare (at the macro level) both have a positive impact on the probability of having a second child and this is even more true when these two features are combined. This new result confirms the key role of childcare development in promoting simultaneously a high level of female employment and higher fertility.

In model 20, the effect of the policy variable *'maximum length of leave'* stays insignificant to explain the overall differences of the probability of having a second child across countries. However, the negative interaction coefficient suggests that long leave schemes reduce to some extent the positive effect of stable employment on 2nd child birth, even though the effect of stable employment stays significant.

Finally, model 21 tests the same hypothesis for our last policy variable, namely *'total cash transfers over three years after childbirth'*. We should, however, recall here that our sample in this model is limited due to the smaller number of countries for which this aggregated indicator is available (21 countries) and that the ability of the indicator do not capture within-country variations in cash transfers across households. This last model displays similar results compared to model 20: while the overall effect of this policy is not significant, cash transfers seem to reduce slightly the positive effect of stable employment on fertility – which is consistent with the fact that transfers provide income alternatives to earnings

To conclude, public policies seem to have differentiated effects on women's fertility according to their activity status. If childcare development tends to reinforce the positive effect of stable employment on women's decision to have a second child, the maximum duration of leave schemes and total cash transfers conversely seem to slightly reduce this positive effect. These results might reflect partly the reluctance of some women in stable employment to give birth to a second child when the only way to do it is to take a leave that would keep them away from the labour market for a long time and thus to depend on cash transfers. Moreover, the positive interaction between childcare development at the country level and stable employment at the individual level suggests that reconciliation issues are at the core of women's fertility choices. This positive effect reflects the fact that countries where childcare structures are well developed tend to succeed in combining an integration of women into the labour market with higher probabilities of second child birth.

5. Conclusion

As fertility levels below the replacement level have important negative consequences on the macroeconomic equilibrium of a country, it is essential to identify the reasons behind low fertility in many developed countries. Most research on that topic focuses on the macro-determinants of low fertility, and few studies have dug deeper into the microeconomic reasons behind individual fertility behaviour while also maintaining a large-scale comparative perspective. Our study thus proposes a differentiated analysis of fertility determinants at the microeconomic level for a set of 25 European countries, and it does so by using the longitudinal survey data of the EU-Survey of Income and Living Conditions (2003-2011).

A recent macro-study found that a re-increase in total fertility rates is likely to occur when female employment rates increase in developed countries (Luci-Greulich and Thévenon, 2014). The present study shows that this logic also holds at the individual level by revealing that, within European countries, being in stable employment positions significantly increases women's probability of second childbirth.

With the focus on second childbirth, this finding certainly does not allow for direct interference with aggregate fertility levels. However, our analysis shows that a parent's decision for or against a child of rank two is most crucial in explaining fertility differences between countries: almost 40% of the difference in completed fertility rates between low- and high-fertility countries in Europe emerge due to fewer children of rank two in low fertility countries.

Against the background of a convergence of fertility intentions of two children per couple in most European countries (Testa 2012; Sobotka and Beaujouan, 2014), our results suggest that fertility below the replacement level is a result of a barrier to second childbirth (most women have only one child at the end of their childbearing period) rather than a result of polarized fertility behaviour (one group of women stays childless while the other group of women has mostly two children).

To identify potential barriers to second childbirth, we observe women's situations in the labour market during a certain period before the potential conception of a second child in order to test their impact on the probability of second childbirth, while at the same time controlling for various other individual and couple characteristics. We find that, on average within European countries, women in stable employment are more likely to decide in favour of a second child when compared to unemployed and even inactive women. Successful job market integration after the birth of a first child thus seems to facilitate women's decisions to have a second child.

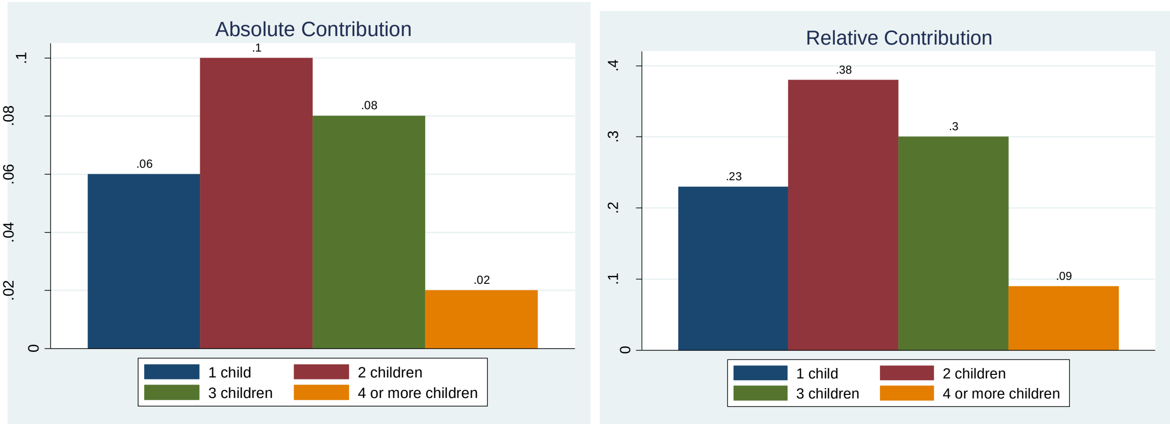
The importance of being in stable employment for deciding in favour of a second child is found to be reinforced for educated women and for those who have a partner who is himself in stable employment. For women without a partner or with a partner who is not in stable employment, their own activity status seems to be less important for having a second child, as having a partner in stable employment is found to be crucial for the decision to have another child. Once this condition is fulfilled, women who are themselves in stable employment are more likely to decide in favour of a second child when compared to those who are not integrated into the labour market.

However, we also find that being in stable employment favours second childbirth more in high-fertility countries than it does in low-fertility countries. In low fertility countries, being active in the labour market emerges even as a barrier to second childbirth for women who are low-educated. This result might be explained by work-life balance conflicts in low-fertility countries. Using multilevel models to highlight this issue, we find that the development of childcare at the country level seems to increase the individual probability for women of having a second child, whereas other types of institutional support such as leave schemes or lump-sum cash transfers do not seem to have such a positive effect. Moreover, we show that the positive effect of stable employment for women is reinforced by childcare coverage. This result underlines that the combination of widespread childcare coverage and opportunities for women on the labour market are *together* positively related to family enlargement in Europe. It also suggests that the provision of childcare services provides an incentive to have a second child that is more effective than the provision of a long period of employment-protected leave entitlements, especially for women in 'stable' employment'..

This work needs to be extended in several directions. To substantiate conclusions about the impact of female employment on aggregate levels of fertility, it is necessary to integrate other child ranks in the analysis. The macro-economic framework also merits to be expanded, for example by considering labour market institutions and their interplay with economic fluctuations. This seems particularly important in view of the recent economic crisis. Finally, and in relation with this point, efforts to accurately trace individual stability of employment seem to be fruitful research investments.

6. Figures and Tables

Figure 1: Absolute and relative contribution children of rank *n* to the gap in approximate completed fertility of 0.26 children between high- and low-fertility countries



Data source: EU-SILC CS 2011, women aged 38 to 44

Figure 2: Compilation of data on 2nd childbirth using the EU-SILC longitudinal dataset

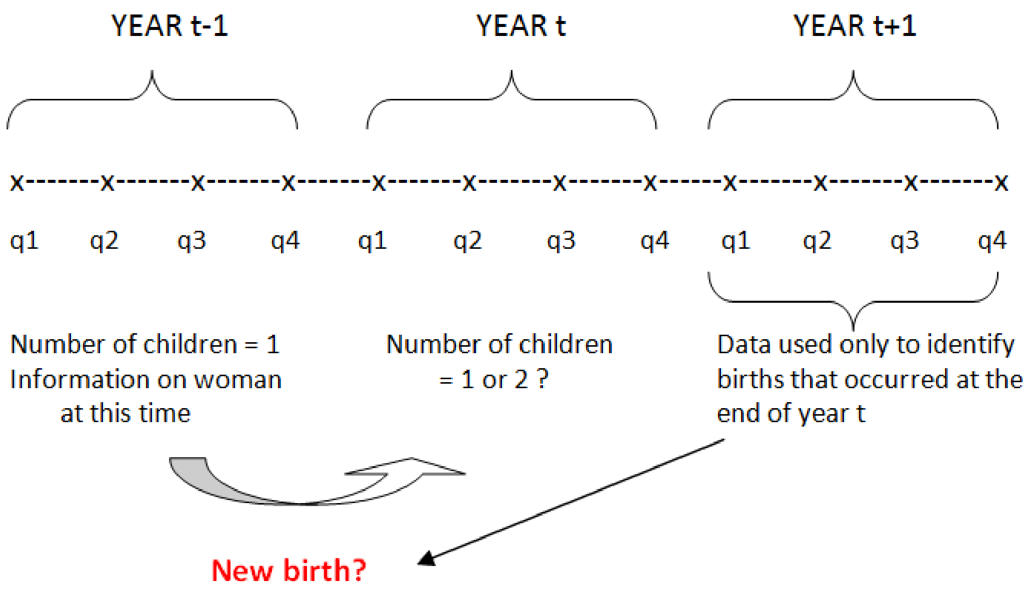
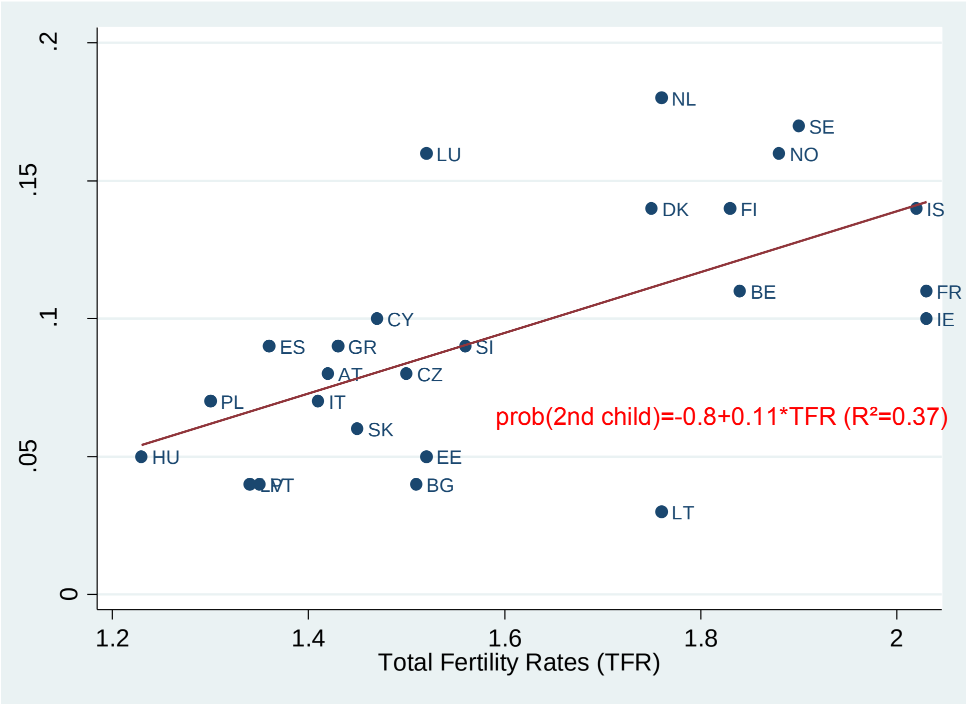


Figure 3: Probabilities of 2nd childbirth against period total fertility rates



Data sources:
Probabilities: EU-SILC LT 2003-2011, women aged 15-45 who already have one child
Period TFR: World Bank World Development Indicators (2011)

Table 1 : Descriptive overview of the exogenous variables

		No 2nd child birth	2nd child birth	Significance of difference
Stability in the labour market	*Stable full-time employment*	0,55	0,46	***
	Stable part-time employment	0,13	0,19	***
	Stable unemployment	0,08	0,07	**
	Stable inactivity	0,18	0,23	***
	Stable student	0,02	0,02	
	Stable military	0,001	0,003	
	Stable retirement	0,005	0,002	*
	Unstable: found job	0,01	0,02	*
	Unstable: lost job	0,009	0,012	
	Unstable: full-time to part-time	0,0009	0,0012	
	Unstable: part-time to full-time	0,002	0,002	
	Unstable: other	0,003	0,005	
Partner information	*Partner in stable employment (ft and pt)*	0,69	0,86	***
	Partner not in stable employment	0,08	0,06	*
	No partner	0,23	0,08	***
	Partner and married	0,62	0,68	***
	Partner but not married	0,15	0,24	***
Both in stable employment (ft and pt)		0,48	0,58	
Household wage income	*Zero household wage income*	0,07	0,04	***
	Low household wage income	0,32	0,26	***
	Medium household wage income	0,31	0,34	**
	High household wage income	0,31	0,36	***
Woman's educational attainment	*Low education*	0,21	0,16	***
	Medium education	0,53	0,44	***
	High education	0,26	0,40	***
Woman's age	*15-24*	0,07	0,10	***
	25-34	0,39	0,71	***
	35-45	0,54	0,18	***
Age of first child	*0*	0,11	0,06	***
	1-2	0,18	0,49	***
	3-6	0,21	0,33	***
	7+	0,50	0,12	***
First child is female		0,49	0,49	

Note: * p<0.05, ** p<0.01, *** p<0.001
Data source: EU-SILC LT 2003-2011, women aged 15-45 who already have one child.

Table 2: The impact of women's employment status on the probability of second childbirth

	Model 1	Model 2	Model 3
Woman's employment status:			
Stable employment	0.0575*	*Ref.*	/
(ft & pt, employed and self-employed)	(2.41)		
Stable full-time employment	/	/	*Ref.*
(employed and self-employed)			
Stable part-time employment	/	/	-0.0316
(employed and self-employed)			(-0.96)
Stable unemployment	/	-0.107*	-0.114**
		(-2.47)	(-2.59)
Stable inactivity	/	-0.0423	-0.0502+
		(-1.51)	(-1.71)
Stable student	/	-0.292***	-0.300***
		(-3.86)	(-3.94)
Stable retirement	/	-0.148	-0.155
		(-0.67)	(-0.69)
Stable military service	/	0.0576	0.0515
		(0.24)	(0.21)
Unstable: found job	/	0.181+	0.174+
		(1.86)	(1.78)
Unstable: lost job	/	0.198+	0.191+
		(1.82)	(1.76)
Unstable: from full-time to part-time	/	0.0933	0.0854
		(0.25)	(0.23)
Unstable: from part-time to full time	/	-0.0523	-0.0605
		(-0.16)	(-0.19)
Unstable: other change in activity status	/	0.134	0.126
		(0.84)	(0.79)
Partner information:			
No partner	-0.475***	-0.469***	-0.470***
	(-13.07)	(-12.87)	(-12.90)
Partner and married	*Ref.*	*Ref.*	*Ref.*
Partner but not married	-0.0638*	-0.0628*	-0.0627*
	(-2.19)	(-2.15)	(-2.15)
Woman's age:			
15-24	0.0307	0.0455	0.0474
	(0.79)	(1.17)	(1.22)
25-34	*Ref.*	*Ref.*	*Ref.*
35-45	-0.569***	-0.570***	-0.570***
	(-19.20)	(-19.23)	(-19.24)
Age of first child:			
0	-0.864***	-0.866***	-0.870***
	(-20.75)	(-20.66)	(-20.59)
1-2	*Ref.*	*Ref.*	*Ref.*
3-6	-0.156***	-0.153***	-0.154***
	(-5.89)	(-5.78)	(-5.80)
7+	-0.779***	-0.777***	-0.778***
	(-22.27)	(-22.19)	(-22.22)
First child is female	-0.00309	-0.00271	-0.00260
	(-0.15)	(-0.13)	(-0.12)
Year fixed effects	*yes*	*yes*	*yes*
Country fixed effects	*yes*	*yes*	*yes*
"Second event" fixed effects	*yes*	*yes*	*yes*
Intercept	-0.622***	-0.579***	-0.568***
	(-6.00)	(-5.60)	(-5.46)
Number of observations		35401	
Number of events		2972	
Pseudo R^2	0.171	0.172	0.172

Sample: women aged 15-45 with one child.
Estimation: estimated coefficients, probit models with robust std errors. + p<0.1, * p<0.05, ** p<0.01, *** p<0.001.
'stable': no change in activity status during three months before potential conception
'unstable': change in activity status during three months before potential conception

Table 3: The impact of women's employment status on the probability of second childbirth by partner status

	Model 4	Model 5	Model 6	Model 7
Woman's employment status:				
Stable employment	0.0510*	-0.0400	*Ref.*	/
(ft & pt, employed and self-employed)	(2.13)	(-0.76)		
Stable unemployment	/	/	0.0852	/
			(1.09)	
Stable inactivity	/	/	0.0690	/
			(1.11)	
Stable student	/	/	-0.276***	/
			(-3.63)	
Stable retirement	/	/	-0.123	/
			(-0.55)	
Stable military service	/	/	0.100	/
			(0.41)	
Unstable: found job	/	/	0.193*	/
			(1.98)	
Unstable: lost job	/	/	0.216*	/
			(1.99)	
Unstable: from full-time to part-time	/	/	0.0842	/
			(0.22)	
Unstable: from part-time to full time	/	/	-0.0481	/
			(-0.15)	
Unstable: other change in activity status	/	/	0.145	/
			(0.90)	
Partner and household information:				
Partner in stable employment	*Ref.*	0.0784	0.204***	/
		(1.50)	(4.19)	
Partner not in stable employment	-0.138**	*Ref.*	*Ref.*	/
	(-3.26)			
No partner	-0.487***	-0.340***	-0.332***	-0.426***
	(-13.34)	(-6.32)	(-6.16)	(-9.84)
Partner but not married	-0.0590*	-0.0592*	-0.0589*	-0.0620*
	(-2.02)	(-2.03)	(-2.01)	(-2.07)
Zero joint labour income	/	/	/	-0.0129
				(-0.21)
Low joint labour income (tercile 1)	/	/	/	-0.0220
				(-0.72)
Middle joint labour income (tercile 2)	/	/	/	*Ref.*
High joint labour income (tercile 3)	/	/	/	0.110***
				(4.02)
Interaction terms:				
stable employment with stable employed partner	/	0.113*	/	/
		(1.98)		
stable unempl. with stable employed partner	/	/	-0.256**	/
			(-2.77)	
stable inactive with stable employed partner	/	/	-0.128+	/
			(-1.90)	
Woman's age:				
15-24	0.0369	0.0314	0.0471	0.0496
	(0.95)	(0.81)	(1.21)	(1.23)
25-34	*Ref.*	*Ref.*	*Ref.*	*Ref.*
35-45	-0.569***	-0.569***	-0.570***	-0.589***
	(-19.20)	(-19.17)	(-19.19)	(-18.76)
Age of first child:				
0	-0.864***	-0.865***	-0.869***	-0.882***
	(-20.75)	(-20.77)	(-20.69)	(-20.42)
1-2	*Ref.*	*Ref.*	*Ref.*	*Ref.*
3-6	-0.155***	-0.155***	-0.153***	-0.168***
	(-5.86)	(-5.86)	(-5.76)	(-6.07)
7+	-0.775***	-0.775***	-0.773***	-0.777***
	(-22.15)	(-22.13)	(-22.06)	(-21.45)
First child is female	-0.00286	-0.00280	-0.00228	0.00837
	(-0.13)	(-0.13)	(-0.11)	(0.37)
Year fixed effects	*yes*	*yes*	*yes*	*yes*
Country fixed effects	*yes*	*yes*	*yes*	*yes*
"Second event" fixed effects	*yes*	*yes*	*yes*	*yes*
Intercept	-0.611***	-0.703***	-0.768***	-0.526***
	(-5.89)	(-6.21)	(-6.82)	(-4.31)
Number of observations		35401		31928
Number of events		2972		2733
Pseudo R^2	0.172	0.172	0.173	0.175
Test of joint significance:				
p (employed if partner employed)[1]		0.0052		
p (partner employed if employed)		0.0001		
p (unemployed if partner employed)			0.0009	
p (inactive if partner employed)			0.0517	

1 : test H_0: (βstable employment + βinteraction: stable employment and stable employed partner)=0
Sample: women aged 15-45 with one child.
Estimation: estimated coefficients, probit models with robust std errors. + p<0.1, * p<0.05, ** p<0.01, *** p<0.001.
'stable': no change in activity status during three months before potential conception
'unstable': change in activity status during three months before potential conception

Table 4: The impact of women's employment status on the probability of second childbirth by education and country group

	Model 8	Model 9	Model 10	Model 11
Woman's activity status and education:				
Stable employment	0.0187	-0.0128	0.0880*	0.0825*
(ft & pt, employed and self-employed)	(0.76)	(-0.38)	(2.09)	(2.04)
Low education	-0.000696	0.0161	/	/
	(-0.02)	(0.36)		
Middle education (upper and post secondary)	*Ref.*	*Ref.*	/	/
High education (tertiary)	0.203***	0.0866+	/	/
	(8.06)	(1.77)		
Partner information:				
Partner in stable employment	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Partner not in stable employment	-0.123**	-0.126**	-0.158***	-0.157***
	(-2.90)	(-2.97)	(-3.80)	(-3.76)
No partner	-0.474***	-0.476***	-0.505***	-0.495***
	(-12.99)	(-13.03)	(-14.05)	(-13.90)
Partner but not married	-0.0493+	-0.0505+	0.00872	-0.0373
	(-1.68)	(-1.72)	(0.32)	(-1.35)
Interaction terms:				
Stable employed and low educated	/	-0.0479	/	/
		(-0.78)		
Stable employed and high educated	/	0.152**	/	/
		(2.73)		
Stable employment in Northern countries	/	/	0.0514	/
			(0.81)	
Stable employment in Eastern countries	/	/	-0.0406	/
			(-0.68)	
Stable employment in Continental countries	/	/	-0.0407	/
			(-0.62)	
Stable employment in low fertility countries	/	/	/	-0.0398
				(-0.82)
Woman's age:				
15-24	0.101*	0.0893*	-0.0296	-0.0141
	(2.52)	(2.23)	(-0.78)	(-0.37)
25-34	*Ref.*	*Ref.*	*Ref.*	*Ref.*
35-45	-0.587***	-0.589***	-0.525***	-0.526***
	(-19.80)	(-19.81)	(-18.26)	(-18.27)
Age of first child:				
0	-0.874***	-0.877***	-0.840***	-0.848***
	(-20.91)	(-20.92)	(-20.40)	(-20.44)
1-2	*Ref.*	*Ref.*	*Ref.*	*Ref.*
3-6	-0.126***	-0.128***	-0.195***	-0.177***
	(-4.71)	(-4.78)	(-7.44)	(-6.73)
7+	-0.717***	-0.717***	-0.862***	-0.831***
	(-20.00)	(-20.00)	(-24.85)	(-24.01)
First child is female	-0.00433	-0.00389	0.00497	0.00126
	(-0.20)	(-0.18)	(0.24)	(0.06)
Year fixed effects	*yes*	*yes*	*yes*	*yes*
Country fixed effects	*yes*	*yes*	*region fe*	*low fert. fe*
Northern	/	/	0.0936	/
			(1.76)	
Eastern	/	/	-0.0474	/
			(-1.00)	
Continental	/	/	0.264***	/
			(4.81)	
Low fertility countries	/	/	/	-0.327***
				(7.92)
"Second event" fixed effects	*yes*	*yes*	*yes*	*yes*
Intercept	-0.658***	-0.633***	-0.624***	-0.388***
	(-6.32)	(-6.02)	(-7.45)	(-4.57)
Number of observations	35401			
Number of events	2972			
Pseudo R²	0.1749	0.175	0.158	0.163
Test of joint significance:				
p (employed in Northern countries)			0.0039	
p (employed in Eastern countries)			0.2749	
p (employed in Continental countries)			0.3494	
p (employed in low fertility countries)				0.1340
p (employed and low educated)		0.2483		
p (employed and high edcuated)		0.0025		

Sample: women aged 15-45 with one child.
Estimation: estimated coefficients, probit models with robust std errors. + p<0.1, * p<0.05, ** p<0.01, *** p<0.001.
'stable': no change in activity status during three months before potential conception
'unstable': change in activity status during three months before potential conception

Table 5: The impact of women's employment status on the probability of second childbirth by family-policy setting

	Model 17	Model 18	Model 19	Model 20	Model 21
Individual variables					
Activity status					
Stable employment *(ft & pt, employed and self-employed)*	0.101+ (0.0579)	0.086+ (0.0463)	0.096+ (0.0570)	0.121* (0.0498)	0.090+ (0.0583)
Partner information					
Partner in stable employment	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Partner not in stable employment	-0.252** (0.0807)	-0.336*** (0.0861)	-0.254** (0.0831)	-0.245** (0.0776)	-0.326*** (0.0822)
No partner	-0.779*** (0.0883)	-0.727*** (0.1100)	-0.791*** (0.0916)	-0.772*** (0.0817)	-0.715*** (0.1034)
Partner but not married	-0.132*** (0.0306)	-0.145** (0.0548)	-0.139*** (0.0304)	-0.131*** (0.0299)	-0.131** (0.0542)
Age					
15-24	0.059 (0.0687)	0.072 (0.0745)	0.074 (0.0731)	0.069 (0.0667)	0.074 (0.0709)
25-34	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
35-45	-1.087*** (0.0830)	-1.089*** (0.0572)	-1.101*** (0.0833)	-1.082*** (0.0762)	-1.076*** (0.0544)
Age of first child					
0	-1.673*** (0.1125)	-1.691*** (0.0845)	-1.668*** (0.1098)	-1.648*** (0.1088)	-1.645*** (0.0808)
1-2	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
3-6	-0.256* (0.1064)	-0.243*** (0.0484)	-0.242* (0.1062)	-0.244* (0.1027)	-0.221*** (0.0471)
7+	-1.597*** (0.1518)	-1.664*** (0.0731)	-1.580*** (0.1548)	-1.547*** (0.1422)	-1.596*** (0.0686)
First child is female	0.001 (0.0280)	0.005 (0.0413)	0.003 (0.0287)	0.003 (0.0268)	0.007 (0.0395)
Year fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*
"Second event" fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*
Intercept	-2.887*** (0.0832)	-2.826*** (0.0781)	-2.942*** (0.0703)	-2.877*** (0.0751)	-2.785*** (0.1000)
Contextual variables					
Childcare coverage		0.018** (0.005)	0.020*** (0.003)		
Maximum length of leave		0.001 (0.0016)		-0.002 (0.0014)	
Unemployment rate					
Total cash (3 years)		0.001 (0.0063)			-0.011 (0.0073)

Table 5 (continued):

Cross-level effects					
*Stable employment*cccov*			0.007* (0.0031)		
*Stable employment*maxleave*				-0.002** (0.0008)	
*Stable employment*totcash3*					-0.012** (0.0041)
Random effects					
Variance of the intercept	0.27586***	0.10416***	0.13273***	0.27300***	0.18786***
Variance of the *Stable employment* variable			0.03717*	0.03261*	0.02225+
Number of observations	34691	31300	34691	34691	31300
Number of countries	24	21	24	24	21

Sample: women aged 15-45 with one child.
Estimation: estimated coefficients, logit models with robust std errors. + p<0.1, * p<0.05, ** p<0.01, *** p<0.001
'stable': no change in activity status during three months before potential conception

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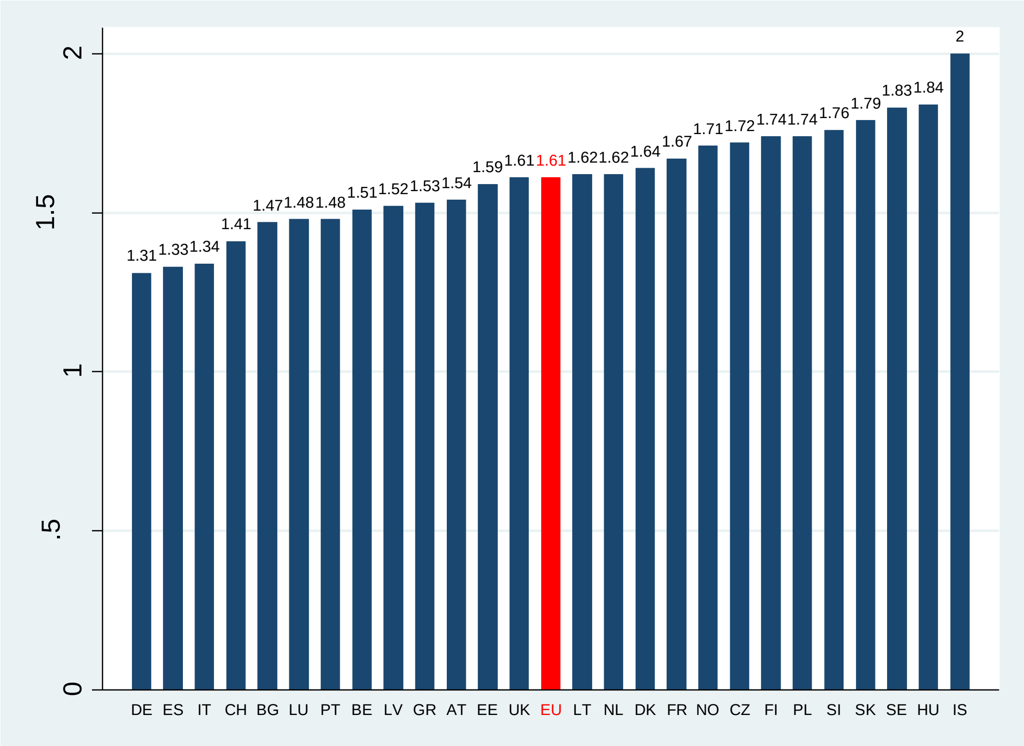
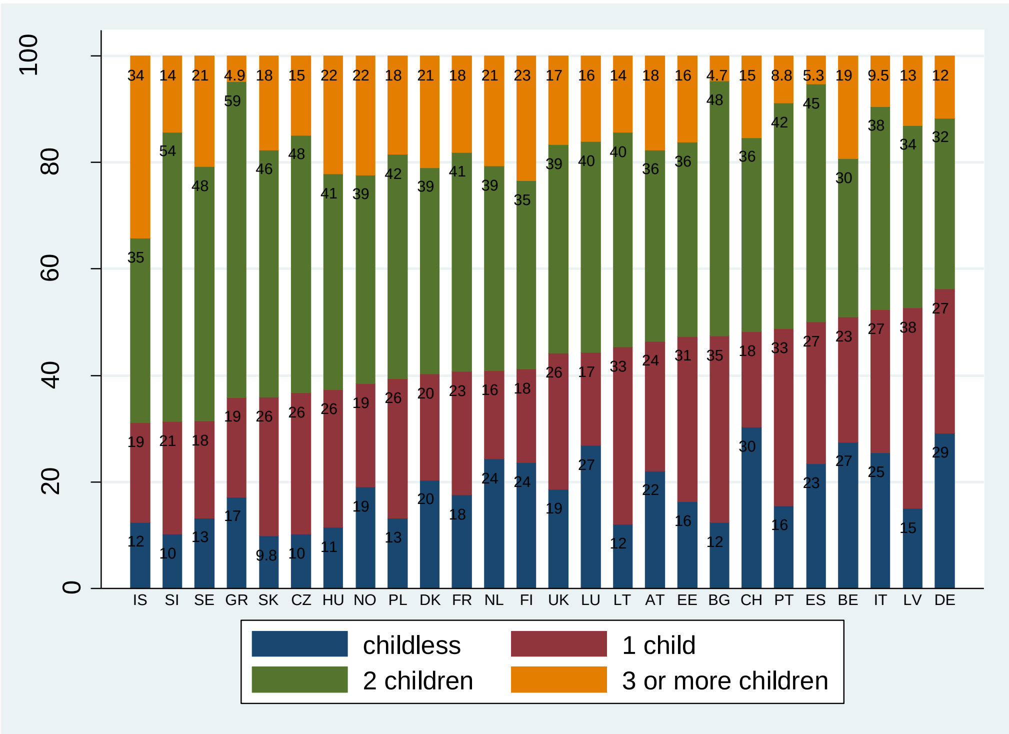
8. Appendix

Figure A: Approximate completed fertility rates in European countries



Data source: EU-SILC CS 2011, women aged 38 to 44

Figure B: The Proportion of women having 0/1/2/3/4+ children



Data source: EU-SILC CS 2011, women aged 38 to 44

Figure C: Absolute contribution of the over/underrepresentation of children of rank *n* to the gap in completed fertility between each country and the European average (1.61 children per woman)

Data source: EU-SILC CS 2011, women aged 38 to 44

Reading note: For example in Austria, women have (in absolute terms) 0.07 fewer children than the EU average (approximate completed fertility rates: 1.54 in Austria vs. 1.61 in the EU). This number is represented by the sum of the bars (-0.07). The blue bar illustrates that fewer children of rank one explain -0.035 children; fewer children of rank two explain explain -0.035 children and fewer children of rank four explain -0.01 children. The gap is reduced by 0.01 children, as in Austria, there are more children of rank 3 in comparison to the EU mean.

Table A: Descriptive overview of the endogenous dummy variable '2nd childbirth'

	Time period (year before childbirth)	Number of observations	Proportion of events '2nd childbirth'
Austria	2004-2009	1368	0,08
Belgium	2004-2009	1081	0,11
Bulgaria	2006-2009	1085	0,04
Cyprus	2005-2009	518	0,10
Czech Republic	2005-2009	2102	0,08
Denmark	2003-2009	934	0,14
Estonia	2004-2009	1575	0,05
Spain	2004-2009	3333	0,09
Finland	2004-2009	1085	0,14
France	2004-2008	1415	0,11
Greece	2003-2008	1309	0,09
Hungary	2005-2009	1946	0,05
Ireland	2004-2007	273	0,10
Iceland	2004-2009	548	0,14
Italy	2004-2009	4865	0,07
Lithuania	2005-2009	1020	0,03
Luxembourg	2003-2009	951	0,16
Latvia	2005-2009	1393	0,04
Netherlands	2005-2009	1424	0,18
Norway	2003-2009	655	0,16
Poland	2005-2009	3572	0,07
Portugal	2004-2009	825	0,04
Sweden	2004-2008	955	0,17
Slovenia	2005-2009	1691	0,09
Slovakia	2005-2008	806	0,06
Total	**2003-2009**	**36729**	**0,09**

Data source: EU-SILC LT 2003-2011, women aged 15-45 who already have one child

Table B: Women's activity status and partner situation by country

	Women's activity status					Partner situation		
Country	Stable full-time employment	Stable part-time employment	Stable unemploy-ment	Stable inactivity	Other categories	Partner in stable employment	Partner not in stable employment	No partner
AT	32%	33%	5%	25%	5%	65%	7%	28%
BE	45%	28%	10%	13%	4%	71%	7%	22%
BG	65%	3%	12%	17%	4%	67%	12%	21%
CY	63%	9%	7%	18%	4%	79%	4%	17%
CZ	60%	3%	5%	28%	4%	68%	3%	29%
DK	66%	14%	4%	6%	10%	79%	8%	14%
EE	63%	4%	4%	21%	8%	57%	8%	35%
ES	48%	16%	14%	18%	4%	73%	8%	19%
FI	59%	8%	6%	21%	6%	74%	12%	14%
FR	57%	22%	8%	8%	5%	72%	6%	22%
GR	49%	7%	10%	31%	2%	82%	8%	10%
HU	57%	3%	6%	27%	6%	63%	11%	26%
IE	41%	27%	1%	26%	6%	64%	6%	30%
IS	52%	18%	2%	12%	16%	66%	10%	25%
IT	43%	17%	9%	27%	3%	77%	7%	16%
LT	76%	4%	5%	11%	4%	58%	11%	31%
LU	46%	23%	7%	16%	8%	75%	8%	17%
LV	68%	3%	8%	15%	5%	52%	6%	42%
NL	14%	66%	1%	16%	3%	82%	4%	14%
NO	70%	11%	4%	6%	9%	70%	7%	23%
PL	59%	6%	12%	18%	5%	67%	9%	24%
PT	72%	5%	7%	12%	3%	66%	8%	26%
SE	56%	23%	4%	9%	7%	80%	7%	13%
SI	79%	2%	8%	5%	6%	71%	6%	23%
SK	73%	2%	9%	13%	4%	73%	4%	23%
Average	**57%**	**14%**	**7%**	**17%**	**6%**	**70%**	**7%**	**23%**

Data source: EU-SILC LT 2003-2009, women aged 15-45 who already have one child.

Table C: Country-level policy variables used in multilevel models

	Childcare coverage (%)	Maximum length of leave (weeks)	Total cash transfers (conditioned earnings percentage)
Austria	10,94	112	34,62
Belgium	45,03	27	20,81
Bulgaria	14,63	63	.
Czech Republic	2,63	164	40,51
Denmark	65,66	50	21,94
Estonia	17,02	180	44,59
Spain	39,31	162	16,69
Finland	24,99	156	37,71
France	42	159	30,82
Greece	14,16	28	5,33
Hungary	9,03	108	65,49
Ireland	29,03	62	17,46
Iceland	56,33	26	12,54
Italy	25,76	47	22,92
Lithuania	26,87	125	.
Luxembourg	38,39	40	34,04
Latvia	15,64	19	.
Netherlands	54,94	29	11,5
Norway	47,33	57	30,81
Poland	9,06	174	16
Portugal	32,52	29	14,43
Sweden	46,66	84	24,86
Slovenia	35,88	52	31,77
Slovakia	3	156	30,32

Data source: OECD Family Data Base (2011) – variables observed for the year 2007

Table D: The impact of women's employment status on the probability of second childbirth, robustness checks (Bi-Probit, IV-2SLS and IV-Probit regression results)

	Bi-Probit			IV-2SLS	IV-Probit
	Model 12	Model 13	Model 14	Model 15	Model 16
Dependent variable = Stable Employment					
Education					
Low education	-0.5248***	-0.5101***	-0.5354***	-0.1788***	-0.184***
	(0.020)	(0.020)	(0.020)	(0.006)	(0.00684)
Medium education	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
High education	0.4567***	0.4504***	0.4458***	0.1258***	0.128***
	(0.019)	(0.019)	(0.019)	(0.005)	(0.00521)
Age					
15-24	-0.6023***	-0.5951***	-0.6031***	-0.2242***	-0.227***
	(0.031)	(0.031)	(0.031)	(0.010)	(0.0103)
25-34	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
35-45	0.1043***	0.1082***	0.1041***	0.0326***	0.0315***
	(0.019)	(0.019)	(0.019)	(0.005)	(0.00582)
Partner information					
Partner in stable employment	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Partner not in stable employment		-0.3001***		-0.099***	
		(0.028)		(0.009)	
No partner	0.0475*	0.0153	0.0470*	0.002	0.0130**
	(0.019)	(0.019)	(0.019)	(0.005)	(0.00570)
Partner but not married	0.0612**	0.0742***	0.0614**	0.0239***	0.0201***
	(0.022)	(0.023)	(0.023)	(0.006)	(0.00676)
Age of first child					
0	0.3381***	0.3389***	0.3384***	0.1167***	0.117***
	(0.028)	(0.028)	(0.028)	(0,009)	(0.00918)
1-2	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
3-6	0.4548***	0.4539***	0.4546***	0.1520***	0.153***
	(0.023)	(0.023)	(0.023)	(0,007)	(0.00757)
7+	0.7454***	0.7510***	0.7437***	0.243***	0.243***
	(0.024)	(0.024)	(0.024)	(0.007)	(0.00777)
First child is female	-0.0166	-0.0158	-0.0165	-0.0041	-0.00438
	(0.015)	(0.015)	(0.015)	(0.004)	(0.00452)
Regional unemployment rate	-0.0423***	-0.0402***	-0.0427***	-0.0139***	-0.0146***
	(0.003)	(0.003)	(0.003)	(0.000)	(0.000892)
Year fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*
Country fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*
"Second event" fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*
Intercept	0.1283	0.1357+	0.1386+	0.5691***	0.567***
	(0.082)	(0.082)	(0.082)	(0.0254)	(0.0255)

Table D: (continued)

Dependent variable = Birth of a second child					
Stable employment	0.6480***	0.6457***	0.2915	0.0465	0.376
(ft & pt. employed and self-employed)	(0.090)	(0.095)	(0.273)	(0.0370)	(0.279)
Education					
Low education	/	/	0.0461	0.00628	0.0607
			(0.062)	(00.00767)	(00.0617)
Medium education	/	/	*Ref.*	*Ref.*	*Ref.*
High education	/	/	0.1641**	0.0253***	0.157***
			(0.052)	(0.00596)	(0.0469)
Partner information					
Partner in stable employment	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Partner not in stable employment		-0.0438		-0.0104	
		(0.044)		(0.00655)	
No partner	-0.4515***	-0.4537***	-0.4631***	-0.0473***	-0.462***
	(0.036)	(0.036)	(0.036)	(0.00280)	(0.0364)
Partner but not married	-0.0693*	-0.0684*	-0.0596*	-0.00902*	-0.0609**
	(0.028)	(0.028)	(0.030)	(0.00502)	(0.0294)
Age					
15-24	0.2234***	0.2255***	0.1555*	0.0138	0.177**
	(0.047)	(0.047)	(0.070)	(0.0109)	(0.0734)
25-34	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
35-45	-0.5806***	-0.5812***	-0.5931***	-0.0771***	-0.593***
	(0.029)	(0.029)	(0.029)	(0.00396)	(0.0294)
Age of first child					
0	-0.9074***	-0.9076***	-0.8986***	-0.163***	-0.905***
	(0.041)	(0.041)	(0.046)	(0.00760)	(0.0451)
1-2	*Ref.*	*Ref.*	*Ref.*	*Ref.*	*Ref.*
3-6	-0.2225***	-0.2223***	-0.1657***	-0.0557***	-0.177***
	(0.028)	(0.028)	(0.049)	(0.00827)	(0.0480)
7+	-0.8594***	-0.8586***	-0.7805***	-0.120***	-0.796***
	(0.035)	(0.035)	(0.069)	(0.0107)	(0.0658)
First child is female	-0.0017	-0.0016	-0.0033	0.000146	-0.00311
	(0.021)	(0.021)	(0.021)	(0.00281)	(0.0212)
Year fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*
Country fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*
"Second event" fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*
Intercept	-0.9087***	-0.9043***	-0.7950***	0.205***	-0.838***
	(0.108)	(0.109)	(0.162)	(0.0255)	(0.165)
Athrho	-0.4040***	-0.4050***	-0.1644		-0.152
	(0.066)	(0.070)	(0.170)		(0.122)
Number of observations	35401				
Number of events	2972				

Sample: women aged 15-45 with one child.
Estimation: estimated coefficients, probit models with robust std errors. + p<0.1, * p<0.05, ** p<0.01, *** p<0.001.
'stable employment': full-time and part-time employed and self-employed during three months before potential conception