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PARIS SCHOOL OF ECONOMICS
ECOLE D'ECONOMIE DE PARIS

WORKING PAPER N° 2017 – 05

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Education, Labour, and the Demographic Consequences of Birth Postponement in Europe[1]

Hippolyte d'Albis[2], Angela Greulich[3], Gregory Ponthiere[4]

Abstract This paper questions the demographic consequences of birth postponement in Europe. Starting from the fact that there is no obvious link between the timing of first births and fertility levels in Europe, we deliver some indication that under certain circumstances, birth postponement involves the potential of facilitating rather than impedes starting a family. We apply a synthetic cohort approach and distinguish between different socio-economic determinants of the timing of first births by using the European Union Statistics on Income and Living Conditions (EU-SILC). Data is compiled specifically to reduce endogeneity and to eliminate structure effects. We find that the probability of becoming a mother is higher for those women who postpone first childbirth due to education and career investment in comparison to those who postpone due to unrealized labour market integration. Educated and economically active women certainly postpone first childbirth in comparison to women who are less educated and who are not working, but they end up with a higher probability of starting a family in comparison to women who are less educated and not working. The article contributes to the academic discussion of the circumstances that may lead birth postponement to result in higher fertility for younger cohorts in European countries.
Keywords: fertility, birth postponement, female education, female employment, family policies, Europe
JEL classification codes: J11, J13, J16, 011

[1] The data used in this study are from the European Commission, Eurostat, the European Union Statistics on Income and Living Conditions (EU-SILC), UNECE, the Human Fertility Database (HFD) and the World Bank World Development Indicators (WB WDI). The providers have no responsibility for the results and conclusions of the authors. This research received financial support from CEPREMAP within the framework of the project "Avoir un enfant plus tard". The paper has benefited greatly from comments by Daniel Cohen, Aurélien Dasré, Dominique Meurs, Claudia Senik, Anne Solaz, Olivier Thévenon and Laurent Toulemon.

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1. Introduction

The postponement of first childbirth has been occurring in most European countries for some decades now. In France, Portugal, Sweden, the Netherlands and Norway, for example, the mean age of women at first childbirth rose from 24/25 in 1970 to 28/29 in 2010. In most Eastern European countries, the increases have been even more drastic, for example from 23 to 28 in Hungary and the Czech Republic (Human Fertility Database, 2013). In public and media discussion, birth postponement is often rather glibly associated with the fact that more women are going to university and getting jobs, and that they consequently want fewer children. This article focuses on these correlations on the basis of survey data from the European Union Statistics on Income and Living Conditions (EU-SILC). The advantage of this survey is that it can be used to examine the interaction between demographic and socio-economic variables for a large number of European countries. This distinguishes our research from most previous studies, which until recently have generally focused on a single country.

The hitherto existing literature shows that investments in education lead to postponement of first births (Happel, Hill and Low 1984, Cigno and Ermisch 1989, Gustafsson 2001, Lappegard and Ronsen 2005). For older cohorts (cohorts born in the 1940s), birth postponement due to education and career investments has been found to decrease completed fertility, as shown by several country-specific studies, such as Schulz (1985) and Heckman and Walker (1990) for Sweden, Tasiran (1995) for Sweden and the USA, Ermisch and Ogawa (1994) for Japan, Merrigan and St-Pierre (1998), for Canada, or Joshi (1990) for Great Britain. For more recent cohorts (up to cohort 1965), the educational gradient of completed fertility is still found to be negative, albeit diminishing (for example Andersson et al., 2008, for the Nordic countries; Kravdal and Rindfuss 2008 for Norway; Neyer and Hoem 2008 for Sweden; Wood, Neels and Kil 2014 for progression to first birth in 14 European countries). For cohorts currently at childbearing age, the most recent studies covering more than one country find strong variations in the association between female education and birth hazards between European countries (for example Klesment et al. 2014, and d'Albis, Greulich and Gobbi 2017).

While the literature is unambiguous when it comes to the impact of education on the timing of childbirth, the impact of economic uncertainty on the timing of childbirth seems less clear. Some country-specific studies detect a counter-cyclical relation for certain periods (i.e. increasing child births in times of high unemployment), while effects of advanced child births on completed fertility are found to be negligible (for example Kravdal 1994 and 2002, for Norway; Hoem 2000 and Andersson 2000, for Sweden; Schmitt 2012 for Germany and the UK). However, for the rest of Europe, the majority of studies find that unemployment postpones childbirth and decreases completed fertility (Meron, Widmer and Shapiro 2002, and Pailhé and Solaz 2012, for France; Impens 1989, for Belgium; Frejka and Sardon 2006, Goldstein et al. 2013, Sobotka, Skirbekk and Philipov 2011, Wood, Vergauwen and Neels 2015, for Central, Southern and Eastern Europe).

The common feature of the cited literature is the finding that for women of cohorts 1965 and older, birth postponement, be it caused by education and career investments or by economic uncertainty, has led to higher childlessness and lower family size in Europe (see also Philipov and Kohler 2001; Kohler, Billari and Ortega 2002; Frejka and Sardon 2006; Sobotka 2003 and 2004).

This article delivers some indication that the picture will be less clear for women who are currently at childbearing age. By taking into account younger cohorts and a larger set of European countries, as well as by differentiating between socio-economic determinants of birth postponement, we find evidence that under certain circumstances, birth postponement can facilitate rather than impedes starting a family.

Based on a synthetic cohort approach, we find that the probability of becoming a mother is higher for those women who postpone first childbirth due to education and career investment in comparison to those who postpone due to unrealized labour market integration. Data is compiled specifically to reduce endogeneity and to eliminate structure effects. A division of European countries in regional groups suggests that in countries where public institutions facilitate parents' work-life balance, educated and economically active women certainly postpone first childbirth in comparison to women who are less educated and who are not working, but in the end they have a significantly higher probability of starting a family in comparison to women who are less educated and who are not working.

Therewith, our article contributes to the academic discussion of the circumstances that may lead birth postponement to result in higher fertility for younger cohorts in European countries (Sobotka et al. 2011).

The article is organized as follows: Section 2 illustrates some empirical facts about the link between birth postponement and fertility in Europe, section 3 presents the data and methodology, section 4 presents our results and section 5 concludes.

2. The relation between age at first childbirth and fertility

Cursory analysis of the relation between age at childbirth and fertility might bring the idea that the two variables are negatively correlated. In most European countries, since the 1970s and until the late 1990s, there has been a massive postponement of childbirth and at the same time a fall in total fertility rates as well as in completed cohort fertility.

However, a more recent snapshot of European countries gives a different picture of the relation between age at childbirth and fertility. Figure 1 plots for 30 European countries women's mean age at first childbirth (MA1B) against the Total Fertility Rate (TFR) observed in 2010 and shows that there is no obvious link between the variables. Those countries in which the mean age at first childbirth is highest do not necessarily display lower fertility rates.

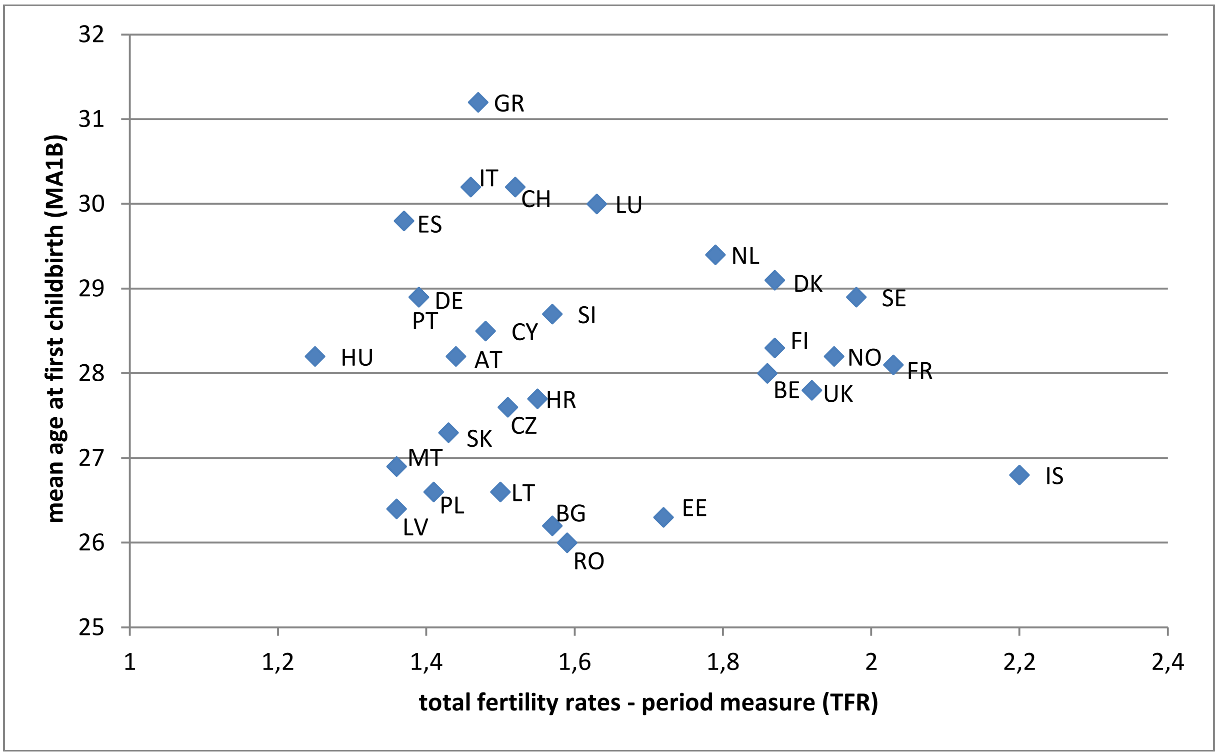

Figure 1: Mean age at first childbirth against total fertility rates, 30 European countries, 2010 (Data sources: World Bank WDI, UNECE)

AT-Austria, BE-Belgium, BG-Bulgaria, CH-Switzerland, CY-Cyprus, CZ-Czech Republic, DE-Germany, DK-Denmark, EE-Estonia, GR-Greece, ES-Spain, FI-Finland, FR-France, HR-Croatia, HU-Hungary, IS-Iceland, IT-Italy, LT-Lithuania, LU-Luxembourg, LV-Latvia, MT-Malta, NL-Netherlands, NO-Norway, PL-Poland, PT-Portugal, RO-Romania, SE-Sweden, SI-Slovenia, SK-Slovakia, UK-United Kingdom.

Clearly the use of a period indicator like the TFR may bias the analysis. For example, a rise in age at first childbirth may well reduce fertility among young women without necessarily increasing it among older women, the preceding cohorts not affected by birth postponement. That would involve a temporary lowering of the period TFR, which then returns to its initial level. Seen in this way, the lack of an obvious link in Figure 1 might be due to the effects of a gap in timing between countries that are not all at the same stage in terms of birth postponement. If some high-fertility countries began birth postponement earlier than others, they may well display higher period fertility levels simply because their birth postponement has come to an end, as compared with other countries where the postponement process began later.

Consequently, it is important to complement the use of period fertility indicators with indicators of completed fertility by cohort. We may formulate two hypotheses here. Birth postponement might simply be a time shift in births within each cohort of women, involving only a temporary reduction in the number of births, without leading to any reduction in the total number of births a women has experienced in the end of her childbearing period. In this case, the *tempo* effect associated with birth postponement would have no impact on the total number, the *quantum*, of births. Alternatively, birth postponement might lead not only to a reduction in the period number of births but also to a reduction in the mean completed fertility by cohort. In this second case, birth postponement would be part of a real reduction in the fertility rate: the *quantum* of births would indeed be affected by birth postponement.

In order to get an idea about the relation between the timing of fist childbirths and the quantum of fertility in Europe, we use data from the cross-sectional sample of EU-SILC (European Union Statistics on Income and Living Conditions), which allows us covering 30 European countries. Figure 2 plots, for each country, women's mean age at first childbirth against the average number of children per woman for the cohorts 1967 to 1973 (i.e. women aged 38 to 44 in 2011 (cross-sectional sample)[5]. Like Figure 1, Figure 2 shows that there is no obvious link correlation between women's mean age at first childbirth and the average number of children per woman[6].

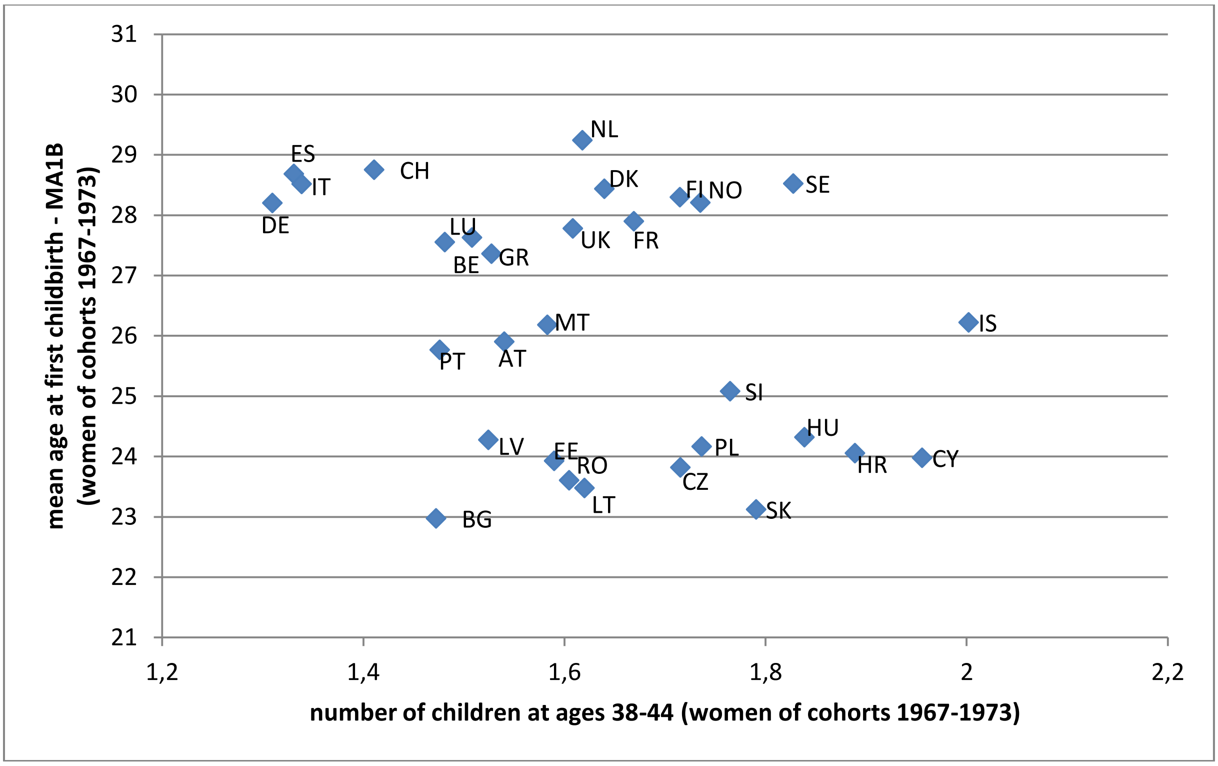

Figure 2: Mean age at first childbirth and average number of children at ages 38-44 (women of cohort 1967-1973)
30 European countries, 2011
(Data source : EU SILC CS 2011)

AT-Austria, BE-Belgium, BG-Bulgaria, CH-Switzerland, CY-Cyprus, CZ-Czech Republic, DE-Germany, DK-Denmark, EE-Estonia, GR-Greece, ES-Spain, FI-Finland, FR-France, HR-Croatia, HU-Hungary, IS-Iceland, IT-Italy, LT-Lithuania, LU-Luxembourg, LV-Latvia, MT-Malta, NL-Netherlands, NO-Norway, PL-Poland, PT-Portugal, RO-Romania, SE-Sweden, SI-Slovenia, SK-Slovakia, UK-United Kingdom.

[5] We aggregate several cohorts to obtain a sufficient number of observations per country and to smooth out cohort fluctuations, and we stop at age 44 to avoid a significant downward bias in the fertility measure. These data issues are discussed in more detail in section 3.

[6] The cohorts born from 1967 to 1973 are not representative of younger cohorts. To assess the robustness of the result, we also observe cohorts currently at childbearing age while using a fertility indicator which controls for tempo effects. For this purpose, we plot women's mean age at first childbirth (a period indicator measured in 2010, UNECE) against tempo-adjusted fertility rates (see Bongaarts and Feeney 1998; Sobotka 2004; Bongaarts and Sobotka 2012) for 2010 (Human Fertility Database). Here again, we find no obvious link between age at childbirth and tempo-adjusted fertility. Tempo-adjusted fertility rates are only available for fourteen European countries, which is why the data is not presented here (results available on request).

Figures 1 and 2 show both that countries in which women postpone childbirth are not necessarily the ones with lower (or higher) fertility levels. In fact, cross-country variations in the link between age at first childbirth and fertility are large between European countries. The low-fertility countries Italy and Spain show highest average ages at first childbirth, but other low-fertility countries like Poland and the Czech Republic have mean ages at first childbirth which figure among the lowest in Europe. Norway and Sweden have high fertility rates, coming hand in hand with relatively high mean ages at first childbirth. Finally, France, Belgium, Germany and the UK have similar mean ages at first childbirth, but differ in terms of fertility.

The absence of a clear pattern suggests that factors causing the cross-country variations in fertility level and childbearing age patterns are complex and context-based. Norms, institutions and policies that shape the national context differ among European countries. When discussing the link between institutional and societal context and European fertility patterns, the literature mostly distinguishes between four Welfare state types, which divide the countries more or less into four European regions: Nordic, Western European, Southern European as well as Central and Eastern European countries (Esping-Andersen 1990 and 1999, Gauthier 2002, Thévenon 2008, 2011 and 2015, OECD 2011).

Given the fact that each Welfare state is the outcome of a country-specific history, attempts to classify European countries into a small number of Welfare state types involve necessarily a significant simplification. The classification is even more difficult in the light of the numerous dimensions of the Welfare state (fiscal policies, pensions, unemployment insurance, health insurance, etc.). It is possible that, for some Welfare state dimensions, a country belongs to a particular group, whereas for another, distinct, dimension, the same country is closer to another group. Moreover, it is also possible that a given Welfare State group includes countries which differ in some important dimensions. Classifications of Welfare states are thus fragile, but these are nonetheless widely used, since these allow casting some light on important differences across countries in terms of public policy.

In particular, if one focuses on family policies, the distinction between the four types of Welfare states (which coincides with the four European regions mentioned above) can help us describing how different family policies are across countries.[7] The literature on comparative family policies shows that those four groups exhibit important differences in terms of family policies supporting the combination of work and family life, and in terms of the redistributive impact of those policies within and between households (see Thévenon 2011). Let us present briefly the main differences across the four Welfare state types in terms of family policy.

Although significant differences exist among their Welfare states, Nordic countries (Sweden, Finland, Iceland, Denmark and Norway) are, in comparison to other countries, characterized by a continuous strong support for the combination of work and family life and a promotion

[7] Note, here again, that separating family policies from other dimensions of the Welfare state, such as fiscal policies and pensions, constitutes itself a simplification. Indeed, the government's budget constraint imposes some relation between the generosity of the various policies (children allowances, pensions, etc.) and the level and progressivity of taxes. Moreover, the impact of a particular policy on, for instance, fertility (in quantum and tempo) may be affected not only by family policies, but, also, indirectly, by other policies, such as the taxation of labor earnings (see Pestieau and Ponthière 2013).

of gender equity in the workplace and the family. Coverage of public childcare is high in comparison to the other European countries, especially for young children aged 0 to 2. Parental leave is an independent and non-transferable right for both parents and is paid as percentage of the salary. In addition, partners are taxed on an individual basis.

In contrast, Southern European countries (Spain, Italy, Portugal, Greece), have more limited assistance for dual-earner families. As shown in Gauthier (1996) and Bettio and Plantenga (2004), those countries are characterized by institutional and normative climates that hinder rather than encourage mothers to work, as male-breadwinner couples are often considered as the best environment for childbearing. In addition, the labour market structure in those countries makes it more difficult for women to re-enter the labour market after a baby pause and/or to adapt working hours. Although the larger prevalence of the male-breadwinner model in those countries is not the only determinant of fertility and labor market participation choices, it contributes, nonetheless, to reduce the capacity of many mothers to combine childbearing with full time work, which can affect both the quantum and the tempo of births.

The male bread winner model is still also quite strong in several Western-European countries. Especially the German speaking ones, and to a lower extent also the Netherlands and Luxembourg, are characterized by attitudes that regard women as supplementary income providers, thus resulting in a male breadwinner and female part-time-career model. Dual-earner families with young children under age 3 find limited support, even though the countries have made some efforts recently to increase formal child care supply. Whereas such a limited support is obviously not the only factor affecting fertility and labor choices, the economic theory of fertility choices has, since Barro and Becker (1989), largely underlined that the time cost of children (in terms of foregone labor incomes) can significantly affect fertility choices. A corollary of this is that policies that facilitate the combination of childbearing and full time work (by relaxing time and budget constraints) can have a significant impact on fertility and labor supply decisions. In the absence of such policies, women who have a preference for combining a full-time career with family life may often resign in starting or enlarging a family. However, in other Western-European countries like France and Belgium, support for dual earners through formal childcare was expanded during the 1970s and 1980s and today, many mothers work in full-time jobs. The UK and Ireland also encourage maternal employment, but they are characterized by relatively expensive private childcare and a high reliance on informal childcare. The policy focus is rather on financial support for low income parents. What the Western-European countries have in common is a tradition of relatively generous lump-sum cash benefits, which in general still tend to be higher than in other European countries.

Finally, history also distinguishes the last group of European countries from the rest. During communism, countries in Central and Eastern Europe were characterized by an encouragement of maternal employment, due to high child care coverage for children of all ages and extensive leave arrangements. However, some of these countries also experienced repressive pro-natalist measures such as restrictions on family planning and abortion, especially in Romania and Bulgaria. After the fall of the Soviet Union, child care coverage and financial assistance to families decreased dramatically. Here again, this policy shift is not the only factor at work during the transition towards capitalism, and probably many other changes affected fertility choices (Frejka 2008). However, the drastic reduction in child care coverage and financial assistance, may, together with a more unstable labour market, have prevented many families from realizing their fertility intentions in post-communist countries. Today, several CEE countries such as Estonia, Latvia and Bulgaria provide relatively high child care coverage, while others (Hungary, Slovakia, the Czech Republic, Romania and Poland) have low levels of child care, similar to Germany and Austria, and support a more traditional division of household labour (Matysiak and Weziak-Bialowolska 2016).

The heterogeneity between European countries suggests that beside individual and household characteristics, it is also the institutional, normative and economic context which influences the link between timing and quantum of fertility. Depending on individuals as well as context, postponement of childbirth can happen by choice (due to education investments and/or career development, for example) or under constraint (due to economic uncertainty, for example). The resulting impact on completed fertility can be negative (limited time left for progression to higher-order births) or positive (easier progression due to lower economic constraints).

This article attempts to account for the multidimensionality in the relation between age at first childbirth and fertility. By covering a large set of European countries, we analyze in how far education and employment status is related to the timing of first childbirth, and in how far education and employment-related postponement of first childbirth influences quantum measures of fertility. We hereby take into account women who are currently at childbearing age, as well as women who are at the end of their childbearing period. In order to quantify the role of (policy and institutional) context-dependencies for the first-birth decision, we will also, as a first approximation, rely on the above mentioned classification of countries in terms of the four groups of Welfare state types.

3. Data and Methodology

To analyze the link between women's educational level and activity status, the timing of first childbirth and quantum measures of fertility, we mobilize data from the European Union Statistics on Income and Living Conditions (EU-SILC). This survey was created in 2003 as a replacement for the European Community Household Panel (ECHP) and now includes thirty-one European countries. The data contains cross-sectional samples as well as a rotational panel with a short follow-up period of 4 years for the majority of countries. The advantage of these data is the large number of European countries included and the comparability of the socio-economic variables.

We distinguish between women who are currently at childbearing age and women who are at the end of their childbearing period.

For cohorts who are currently at childbearing age, we apply a synthetic cohort approach. Based on a sample of women aged 15 to 45 years, we first calculate probabilities of having a first child by age. The probabilities of having a first child by age can then be used to calculate the intensity of the "first childbirth" phenomenon. To obtain intensity and mean age at first childbirth, we create a fictional cohort. The hypothesis is that women aged *x* at date *t* will display the same fertility behavior at *t+1* as women aged *x+1* at *t*. This hypothesis is certainly fragile where births are postponed for a long time and where cohorts vary considerably in behavior. However, compared to simple distribution calculations (distribution of age at first childbirth for each education group by taking into account only those women who have given birth), our calculations based on probabilities, which also take into account those women 'at risk' who have not given birth, eliminate structure effects. The intensity can be interpreted as the percentage of women who have at least one child by age. It is the inverse of a survival probability of childlessness by age. In contrast to Kaplan Meier or Cox analysis, we do not follow a real cohort, but observe women at different ages at a given moment. Results of our 'synthetic cohort approach' can thus be interpreted as the average number of children of birth order one that would be born to a woman by the time she ended childbearing if she were to pass through all her childbearing years conforming to the age-specific fertility rates of order one of the observed time period (which is similar to the interpretation of total fertility rates, but we only consider progression to birth order one).

When calculating the probabilities by age, we distinguish between education groups, as well as between women who are working and those who are not.

Concerning the variable measuring education, we use the UNESCO ISCED classification to distinguish between three levels (uniform categories across all countries): *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).

The aim is to analyze the impact of education on the probability of having a first child at a given age for a population at risk of having a first child. Note that calculating the probabilities of having a first child by age and educational level presents a number of difficulties. The main problem is simply that the educational level increases with age. Consequently, when one calculates the probability of having a first child at the age of 20, the denominator of the probability may well include women whose educational level at that stage is only average but who within a year or two will achieve a high level. This overestimation of the denominator leads to an underestimation of the probability of having a first child at the age of 20 for women with low and middle education. To avoid this underestimation, we apply a retrospective approach for ages 15 to 27. We therefore use the cross-sectional sample of year 2011, select women aged 28[8] and observe their education level as well as their number and age of children. Based on this information, we retrospectively calculate the probabilities of having had a first child by age for ages 15 to 27, differentiated by education groups. We stop the retrospective calculus at age 27, because this is the age by which most women have completed their education. This retrospective calculation enables us to subtract from the denominator all those women who will continue their studies, and thus to obtain unbiased probabilities of having a first child while still young for women of middle educational attainment. The retrospective approach also allows

[8] We chose women aged 28 at the time of the survey (and not 27) in order to be able to observe potential first childbirth during their entire 27th year of life.

eliminating the attrition-caused downward bias of observed first childbirths for young women in EU-SILC (see Greulich and Dasre 2017, for more details on this issue).

From age 28 on, probabilities of first childbirths by age and education are observed without the retrospective approach, i.e. we observe women aged 28 to 45 who are currently 'at risk' of first childbirth. In comparison to a complete retrospective approach for women aged 45+, observing younger cohorts allows focusing on women who are actually at childbearing age. We therefore mobilize the longitudinal EU-SILC database and observe, for childless women aged 28 to 45, the educational level in the year preceding the year of (potential) first childbirth. Years of potential childbirth are 2005 to 2010. The fact that we observe education before first childbirth reduces reverse causality to some extent, and therefore facilitates interpreting the observed link between education age at first childbirth as a causal impact of education on the timing of the first childbirth. However, it is possible that the level of education and age at first childbirth are chosen simultaneously, so that it remains difficult to identify the specific channel of causality.

Besides education, the second variable we examine as determinant for the timing and intensity of first childbirth is women's activity status. EU-SILC provides a harmonized measure of activity status for all countries, which corresponds to the self-defined economic status[9]. We distinguish between working women (working full-time or part-time, whether employed or self-employed) and those who are not working (mainly the economically inactive and the unemployed). As activity status is not time-constant, a retrospective approach for ages below 28 makes no sense. In order to avoid too great interference of education with activity status, we only include women aged 25+ in our analysis of the link between employment status and timing of first childbirth. We again mobilize the longitudinal database here in order to observe women's activity status before childbirth. As for education, this reduces, but cannot eliminate, the potential reverse causality bias due to the fact that the birth of a child affects the mother's activity status.

The EU-SILC data contains information about women's labour market status on a monthly basis, as well as about the quarter and year when their children are born. This enables us observing the activity status during a certain period before (potential) conception of a first child.

Figure A in the appendix illustrates how the necessary information is collected.

In order to obtain the information needed, individuals have to be observed over a period of at least three years (in the following called year *t-1*, year *t* and year *t+1*)[10]. Children born in

[9] This variable captures the person's own perception of their main activity and differs from the ILO concept to the extent that people's own perception of their *main* status can differ from strict definitions uses in the ILO definitions (for example people who consider themselves as students, homemakers or job searchers while working part-time).

[10] Around 40% of women are observed not only for three, but for four consecutive years. Women observed for four years who have not had a first child in year t are included twice in our data base (two person-years: two calendar-years of potential child birth). We refrain from observing a longer period of labour market status for these women in order to avoid distortions caused by heterogeneous measures. This procedure also allows us to increase the number of observations. Estimations of the probability of first childbirth are controlled for the number of person-years.

the third and the fourth quarters of each year are generally declared in the interview of the following year, as interviews usually take place during the first half of each year. Births that occur at the end of the year are thus not detectable immediately. Three consecutive waves of interviews are thus needed: Based on wave 3 (the interview that occurs during year *t+1*), we identify all first births that occur during the calendar year *t*. Year *t-1* serves to observe the mothers' labour market characteristics over a certain period before potential conception. This is possible as at the survey interview in year *t* (wave 2), individuals give information about their month-by-month activity status of year *t-1*.

For women who have a first child in year *t* (the test group), we observe their labour market status during the three months before conception, assuming that the pregnancy lasted 9 months. More precisely, for children born in quarter 1 in year *t*, we observe women's labour market status for January, February and March in year *t-1*. For children born in quarter 2 in year *t*, we observe women's labour market status for April, May and June in year t-1, and so on. For children born in quarters 2, 3 and 4, we could observe the labour market status over a longer time period than three months, but we use only the three-month information in order to avoid distortion in the measure of labour market status. For women without child birth in *t* (the control group), we arbitrarily chose a three month period during the year *t-1*. As our observation of labour market status is limited to a three-month period, it cannot be interpreted as an indicator of stability of employment.

In order to integrate a better quantum measure of fertility, we complete our analysis of the impact of education and employment on the timing and intensity of first childbirths by investigating the link between education and the number of children of women who are at the end of their childbearing period. For that purpose, we use the 2011 cross-sectional module of the EU-SILC survey. We chose women who are aged 38-44 at the time of the survey. Education is observed at the time of the survey, while their number of children is calculated retrospectively for ages 15 to 38/44. Grouping together cohorts 1967 to 1973 allows obtaining sufficient sample sizes for each age and education group.

We cannot assess the link between activity status and the number of children of women aged 38-44 based on a retrospective approach, like we did with education, because, unlike education which stays rather unchanged from a certain age on, activity status varies throughout a person's lifetime.

We do not observe women older than 44 because in EU-SILC, children are only observed if they are still living in the parental household. Consequently, any calculations of fertility at higher ages are likely to be subject to a downward bias. Furthermore, measurements of mean age at first childbirth are likely to have an upward bias, because some women's first children have already left the family home and consequently cannot be recorded as their "first child", which may artificially rise mean age at first childbirth as measured in the EU-SILC survey. For the group of women aged 38 to 44, Greulich and Dasre (2016) find that the average downward bias is less than 10% for most countries when compared to unbiased measures from the Human Fertility Database (HFD). The downward bias is likely to differ, however, by education. Lower educated women are found to have a slightly higher number of children outside the household, which are not observed in EU-SILC, which is why our results have to be interpreted with care.

To test the robustness of our results, we complete our statistical analysis with estimation models. The advantage of the latter is that it is possible to control for various factors, such as partner characteristics and year- as well as country-specific effects.

Our analysis covers 28 European countries. Germany and Switzerland are not covered, as EU-SILC does not provide longitudinal data for these countries.

Finally, we account for context-dependencies by distinguishing the countries into four regional groups (Nordic, Southern European, Western European, Central and Eastern European), which reflect different Welfare state settings, as discussed in section 2. As Germany and Switzerland are not included, the group of Western-European countries covers a rather homogenous set of countries with relatively high fertility rates in comparison to Southern European and Central and Eastern European countries. A country-by-country analysis of birth probabilities by age, education and activity status is not possible due to small sample size, especially for the longitudinal sample.

4. Results

4.1 Female Education, Birth Postponement and Fertility

Figure 3 shows the intensity of the "first childbirth" phenomenon by age for various educational levels. The curves show for each education group and age the percentage of women who have at least one child. These intensities increase with age. For the last age considered, 45, Figure 3 shows that the intensity is 71.6% for women with low education, 70.8% for those with middle education, and 81.0% for those with high education.

Figure 3 illustrates that higher education is associated with birth postponement. Low-educated women are more likely to have a child while they are young than women with middle and high education. Their "first childbirth" intensity is higher up to age 32. Conversely, women with high education have their first child later than other women, as seen in their lower intensity curve up to age 32. Mean age at first childbirth for the three educational categories is 27.0, 29.5 and 31.0. However, Figure 3 shows that although high-educated women on average have their first child later than those with middle or low education, they are still more likely to become mothers.

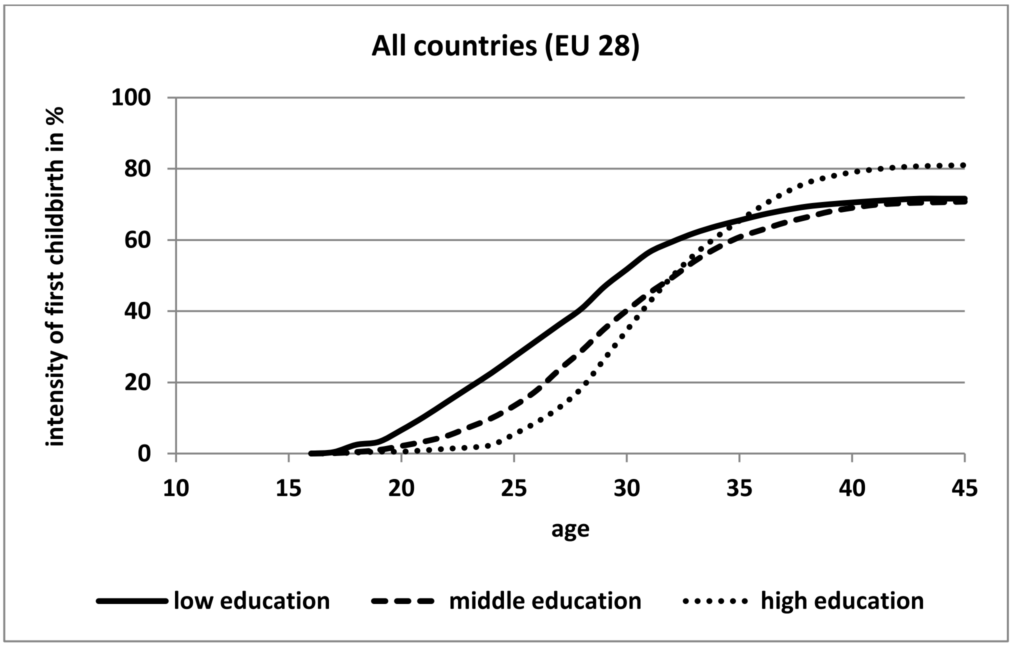

Figure 3: Intensity of women's first childbirth by women's age and education, weighted averages for 28 European countries (Data sources: EU SILC LT 2003-2011, CS 2011)

Low education: pre-primary, primary, lower secondary education
Middle education: (upper) secondary, post-secondary non tertiary education
High education: tertiary education

For ages 17 to 27: Education observed at age 28; probabilities of 1st childbirth for ages 17-27 calculated retrospectively (SILC CS 2011)
For ages 28+: Education observed at the wave preceding the year of potential conception of a first child (SILC LT 2003-2011)

Weighted average for 28 European countries:
Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

We now divide the 28 European countries into four regional groups. Figure 4 shows that in all regions, the intensity of "first childbirth" is higher for less educated women than for more educated women during the younger childbearing years. However, at higher ages, the two intensity curves cross. Hence, in all regions, the intensity of first childbirth is greater for more educated women at higher ages. The intensity of high educated women outnumbers the one of low educated women quite late in Central and Eastern European countries (around age 38), and the intensity at age 45 is not significantly higher than for the other two education groups. The overtaking is earliest and most drastic in Nordic countries, where high educated women have a much higher intensity of first childbirth at age 45 than low educated women (49.0% vs. 90.0%). Southern European and Western European countries represent intermediate groups, with the intensity of high educated women outnumbering those of low educated women around age 30. In these countries, middle educated women have the lowest intensity of first childbirth at age 45. Our calculations also reveal that for highly educated women, the mean age at first childbirth is highest in Southern European countries (33 years), followed by the Nordic and Western-European countries (31 years) and CEE countries (30 years).

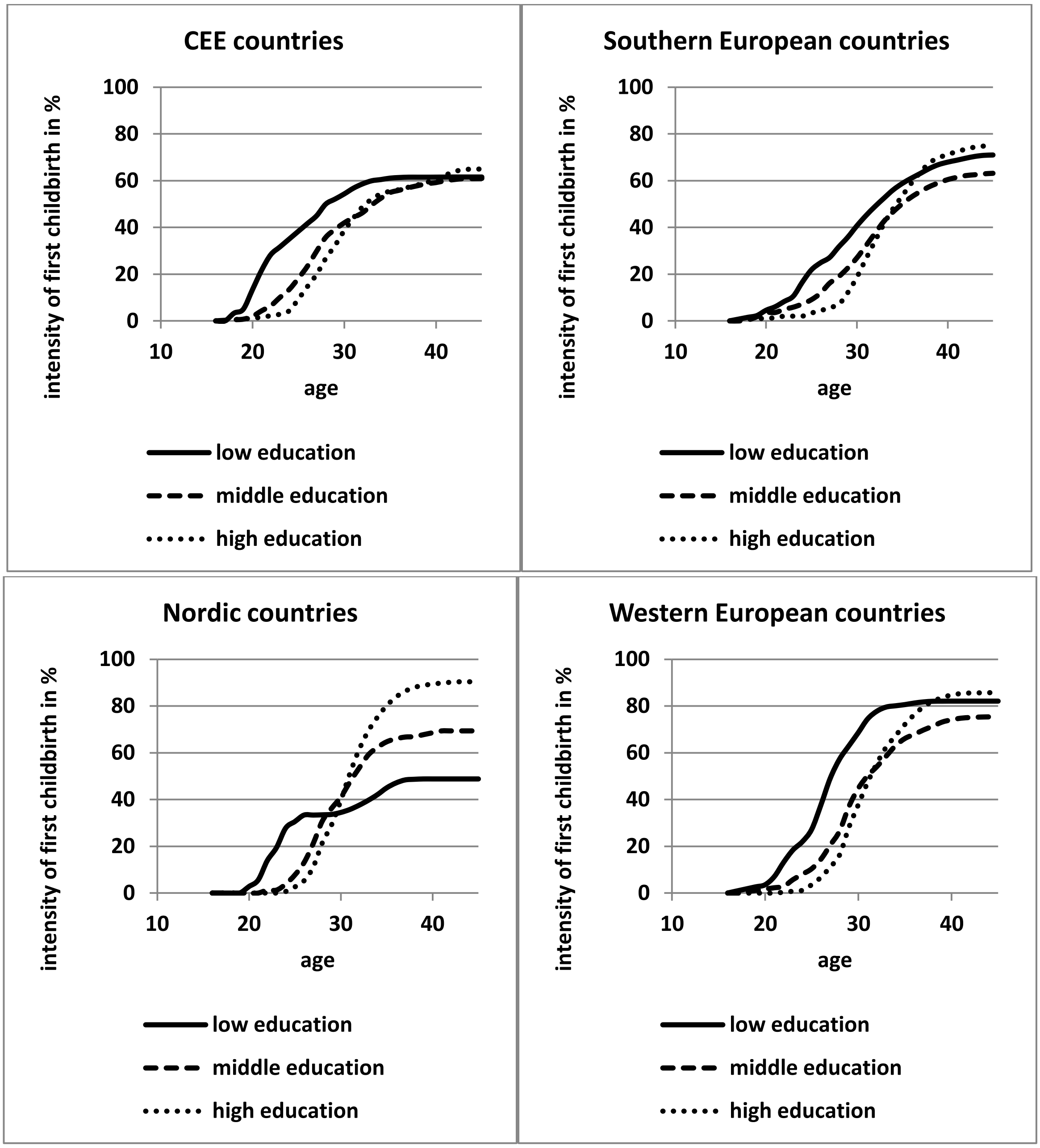

Figure 4: Intensity of women's first childbirth by age and education, weighted averages for European regions (Data sources: EU SILC LT 2003-2011, CS 2011)

Low education: pre-primary, primary, lower secondary education
Middle education: (upper) secondary, post-secondary non tertiary education
High education: tertiary education

For ages 17 to 27: Education observed at age 28; probabilities of 1st childbirth for ages 17-27 calculated retrospectively (SILC CS 2011)
For ages 28+: Education observed at the wave preceding the year of potential conception of a first child (SILC LT 2003-2011)

Central and Eastern European (CEE) countries:
Estonia, Latvia, Lithuania, Czech Republic, Slovakia, Hungary, Poland, Romania, Bulgaria, Slovenia
Southern European countries: Italy, Spain, Portugal, Greece, Cyprus, Malta
Nordic countries: Denmark, Finland, Norway, Sweden, Iceland
Western European countries: Austria, Belgium, France, Netherlands, Luxembourg, Ireland, United Kingdom

In all regions, we find thus the same stylized fact: more educated women wait longer before having their first child than less educated women; but ultimately, among women at the end of their childbearing years, highly educated women are more likely to have become mothers. At the same time, the regions differ in terms of the size of the gap in intensity between women of different education levels. In the Nordic countries, the gap between high- and low-education women is substantial. In Central and Eastern Europe, the gap is negligible, while intensities of all education groups are on a relatively low level. Consequently, educational level is a much greater marker for the probability of being childless at 45 in the Nordic countries in comparison to other European regions[11]. The fact that highly educated women are most likely to become mothers in Nordic countries might be linked to the fact that in this region, public institutions facilitate more than in other regions maternal employment. Other labour market related issues such as job stability and income security might also be related to the regional differences illustrated in Figure 4.

It is naturally tempting to interpret the findings on first childbirth intensity as showing highly educated women catching up with the fertility of less educated women. However, the figures must not be seen in this way, because they are based on a cross-sectional sample including thirty cohorts, rather than a single cohort monitored over time. The figures show, nevertheless, a picture of current fertility behavior of those cohorts who are actually at childbearing age.

To properly analyze, for each region, the ability of the most educated women to catch up in fertility with the less educated, we have to focus on those cohorts which already have reached the end of their childbearing years. We thus examine fertility differences between education groups by focusing on women aged 38-44 in 2011, while calculating their number of children by age in a retrospective way. Figure 5 shows their average number of children by age, educational level and region.

Figure 5 illustrates first that in all regions, women with less education start to have children earlier than those with more education, while women with higher education postpone first childbirth. However, only in the Nordic countries, the number of children at ages 38/44 is higher for highly educated women in comparison to low educated women. For the other regions, highly educated women did not 'catch-up' the fertility level of lower educated women. Differences between education groups are this time most striking in CEE countries, where low educated women have relatively high fertility levels, but fertility of highly educated women stays at quite low levels. In Southern European countries, in contrast, fertility levels are rather low for all education groups, while highly educated women have nevertheless the lowest fertility levels.

[11] Note that the proportion of highly educated women is highest in the Nordic countries, followed by Western European and CEE countries, while the proportion is lowest in Southern European countries (women aged 28, EU-SILC CS, 2011). Women's distribution over education in Nordic countries: 65% (high), 31% (middle), 4% (low); in Western European countries: 59% (high), 35% (middle), 6% (low); in CEE countries: 51% (high), 43% (middle), 6% (low); in Southern European countries: 41%(high), 40% (middle), 19% (low).

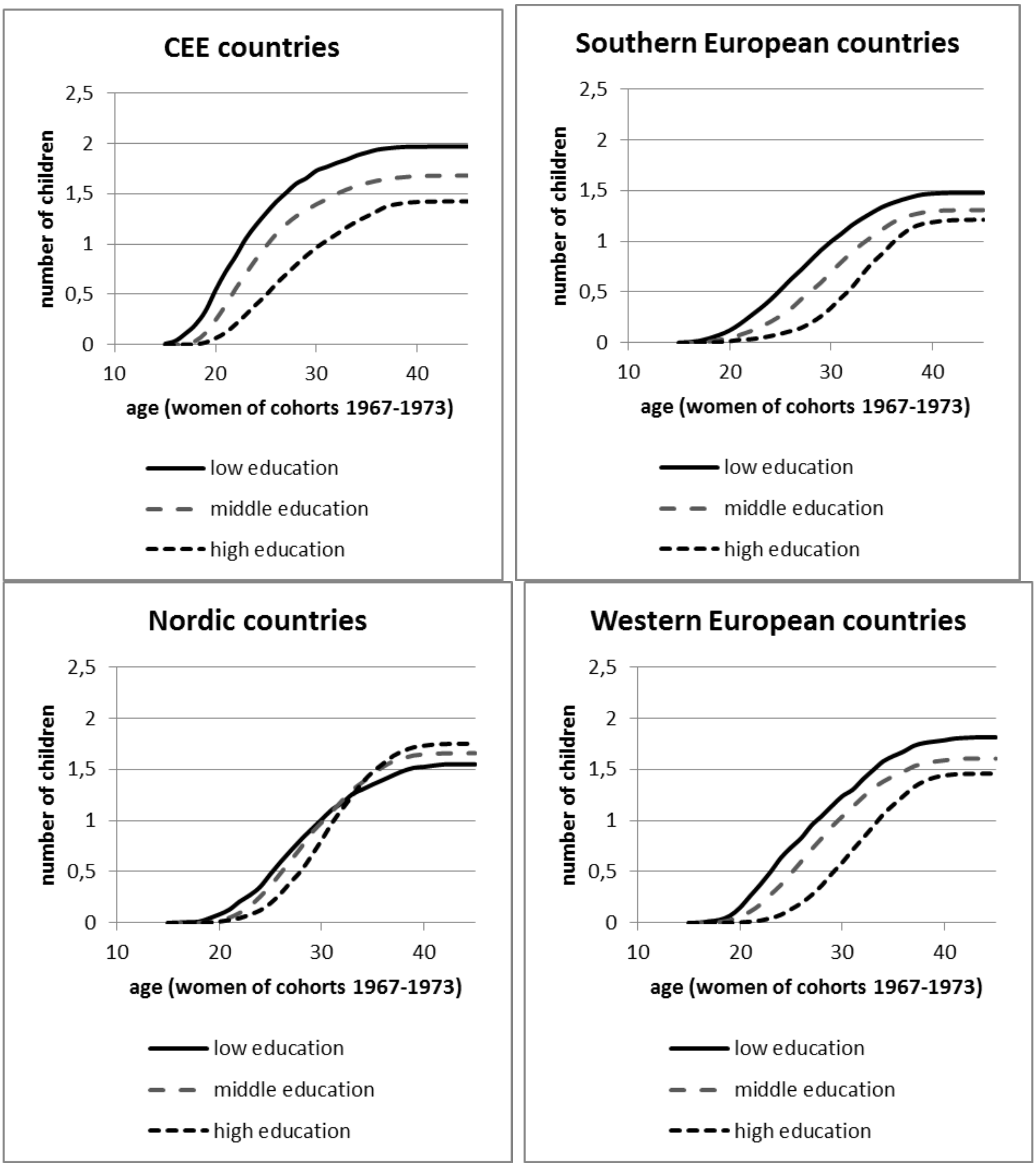

Figure 5: Number of children by age and education, for women of cohorts 1967-1973, weighted averages for European regions, (Data Source : EU SILC CS 2011)

Low education: pre-primary, primary, lower secondary education
Middle education: (upper) secondary, post-secondary non tertiary education
High education: tertiary education
Education observed at age 38 (cohort 1973) to 44 (cohort 1967) in 2011

Central and Eastern European (CEE) countries:
Estonia, Latvia, Lithuania, Czech Republic, Slovakia, Hungary, Poland, Romania, Bulgaria, Slovenia
Southern European countries: Italy, Spain, Portugal, Greece, Cyprus, Malta
Nordic countries: Denmark, Finland, Norway, Sweden, Iceland
Western European countries: Austria, Belgium, France, Netherlands, Luxembourg, Ireland, United Kingdom

These findings suggest that difficulties for highly educated women to catch-up in terms of fertility play an important role for explaining differences in average fertility between the four regions (1.70 children in CEE countries, 1.40 children in Southern European countries, 1.74 children in Nordic countries and 1.51 children in Western European countries for women aged 38 to 44 in 2011). It seems that these difficulties are strongest in CEE countries and weakest in Nordic countries. Differences in the institutional support to combine work and family life may be considered to explain this regional heterogeneity, but other economic and social factors may also be crucial. For example, in CEE countries, economic uncertainty during the transition period in the 1990s may have led especially highly educated women of these cohorts to postpone first childbirth, while the insufficient economic recovery in the later years made it impossible for them to 'catch-up' (Frejka 2008).

When comparing Figure 5 to Figure 4, an important question emerges: How can it be explained that Figure 4 suggests a fertility 'catch-up' of highly educated women in all regions, while Figure 5 reveals a catch-up only in one region? First of all, the two figures are based on different cohorts. It is possible that the potential 'catch-up' in fertility will be higher for cohorts who are currently at childbearing age. Second, Figure 4 only considers births of order one, while the data presented in Figure 5 includes all birth orders. It is possible that low educated women currently have a higher probability of staying childless, but once they have a first child, they are more likely to have children of higher orders in comparison to highly educated women. For cohorts 1967 to 1973, the proportion of childless women is higher for highly educated women in comparison to low educated women. However, it is possible that for younger cohorts, completed fertility will be more unevenly distributed among less educated women: while a significant proportion stays childless, those who do have children might have on average more than one child.

To empirically estimate if and in how far the impact of the timing of first childbirth on the final number of children differs between education groups, we run a linear regression with country-fixed effects and robust standard errors based on our 28 European countries. We estimate the number of children for partnered women aged 38 to 44 with at least one child as a function of the woman's age at first childbirth, while controlling for the women's and her partner's education. We distinguish between women having had their first child before or later than age 26, which is the mean age of first childbirth in our sample. Marginal effects are represented by the interaction terms.

Table 1 shows that within European countries, having a first child at age 26 or later significantly reduces the final number of children for middle educated women (estimated coefficient -0.485). For low educated women, having a first child at age 26 or later is even more negatively correlated with the number of children at age 38/44 (estimated impact: -0.485-0.173=-0.658). For high educated women, the impact of postponement of first childbirth to ages later than 25 on the number of children at age 38/44 is still significantly negative, but to a lesser extent in comparison to the other education groups (estimated impact: -0.485+0.101=-0.384; p-value for the test of joint significance 0.00).

Table 1: Number of children for partnered women (cohorts 1967-1973) with at least 1 child 28 European countries, 2011 Linear regression with country fixed effects and robust standard errors

Covariates	estimated coeff.	p-value	t-stat.
Woman's education:			
Low education (primary, lower secondary)	0.160***	0.000	5.52
Middle education (upper and post-secondary)	*Ref.*	/	/
High education (tertiary)	-0.0390	0.151	-1.44
Partner education:			
Low education (primary, lower secondary)	0.0864***	0.000	4.22
Middle education (upper and post-secondary)	*Ref.*	/	/
High education (tertiary)	0.129***	0.000	7.70
Age at first childbirth (A1CB)			
≥ 26	-0.485***	0.000	-26.27
< 26	-		
Interaction terms:			
A1CB ≥ 26 and low educated	-0.173***	0.000	-5.01
A1CB ≥ 26 and high educated	0.101**	0.001	3.21
Intercept	2.166***	0.000	61.04
Test of joint significance:			
p(A1CB ≥ 26 and low educated)	0.0000		
p(A1CB ≥ 26 and high educated)	0.0000		
Country-fixed effects	*yes*		
Number of observations	19099		
Number of countries	28		
R^2	0.11		

* p<0.05, ** p<0.01, *** p<0.001

Low education: pre-primary, primary, lower secondary education
Middle education: (upper) secondary, post-secondary non tertiary education
High education: tertiary education
Education observed at age 38 (cohort 1973) to 44 (cohort 1967) in 2011

28 European countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

Data Source: EU SILC CS 2011

The regressions also show that among women who have had their first child before age 26, low educated women have the highest number of children at age 38/44 in comparison to middle and high educated ones, but there is no significant difference between middle and high educated women. Among women who have had their first child later that age 25, high educated women have a significantly higher number of children at age 38/44 than middle educated women (estimated coefficient: -0.039+0.101=0.062; p-value of joint significance 0.0005), while the difference between low and middle educated women gets insignificant.

The negative impact of child postponement on the number of children at age 38/44 is thus found to decrease with education within European countries. These findings may be interpreted as follows. Birth postponement is associated among educated women with an investment that pays off later, whereas among less educated women it may reveal other negative factors such as infertility, couple-related problems or financial constraints.

However, the regressions show that postponing births does reduce fertility for women of cohorts 1967-1973. This may not hold for younger cohorts. Figure 3 showed that educated women did postpone their first childbirth but had a higher intensity in becoming mothers. To analyze the effect of timing of births on the completed fertility of those cohorts that are now in their childbearing years, it is necessary to develop models for forecasting fertility by cohort and birth order, controlling for socio-economic characteristics such as education and activity status. This is an interesting avenue for research but exceeds the scope of this article.

4.2 Female Working Status, Birth Postponement and Fertility

Now we examine the effect of women's activity status on the timing and intensity of first childbirth. Therewith, this analysis is limited to actual childbearing behavior of women who are currently at childbearing age.

Figure 6 shows the intensity of first childbirth by age and activity status. At all ages, the intensity is higher for women who are working than for those who are not. The gap between the two curves is significant and remains wide until the end of the childbearing years. Note that the final intensity of first childbirth at age 45 is a conditional intensity, i.e. it only applies to the selected group of women who have *not* had a first child by age 25: Among women who have not had a first child by age 25, 73.0% of working women have one by the age of 45. However, only 57.5% of non-working women who have not had a first child by age 25 have one by age 45. Mean age at first childbirth is 31.0 for working women and 34.0 for the others. We do not include women under 25 in order to avoid too great interference of education with activity status. As the calculation of intensities starts at age 25 only, the final intensities at age 45 are naturally lower than those presented in Figure 3.

The finding that being economically active facilitates the arrival of a first child for women is consistent with other recent studies showing that couples' fertility choices depend not only on the father's activity status but also the mother's (Ahn and Mira 2002, Adsera 2004 and 2011, Sobotka, Skirbekk and Philipov 2011, Pailhe and Solaz 2012, Goldstein et al. 2013, Greulich, Thévenon and Guergoat-Larivière 2016). Not having a job emerges as an obstacle for mothers' fertility. Difficulties in entering the labour market are likely to delay or even prevent the start of a family, most likely because parents need a secure economic environment to start a family, which often can only be guaranteed if both partners have earnings.

When our country sample is divided into four regional groups (Figure B in the appendix), we find that in all regions, economically active women have their first child earlier and have a higher intensity of first childbirth over all ages. The difference in intensity between working women and those who are not working is greater in Western-European and Nordic countries and lowest in CEE countries. However, the intensities are higher for both groups in Nordic and Western European countries in comparison to CEE countries. Indeed, the intensities of first childbirth for non-working women in Nordic and Western-European countries are greater than the intensity for working women in CEE countries. Not having a job appears, therefore, to be a brake on fertility, especially in the Nordic and Western-European countries, while fertility is hampered also for working women in CEE countries. In Southern European countries, working women have a higher chance of becoming a mother than women who are excluded from the labour market, but in comparison to Nordic and Western Europe, it seems that working women also face barriers to becoming a mother in Southern Europe.

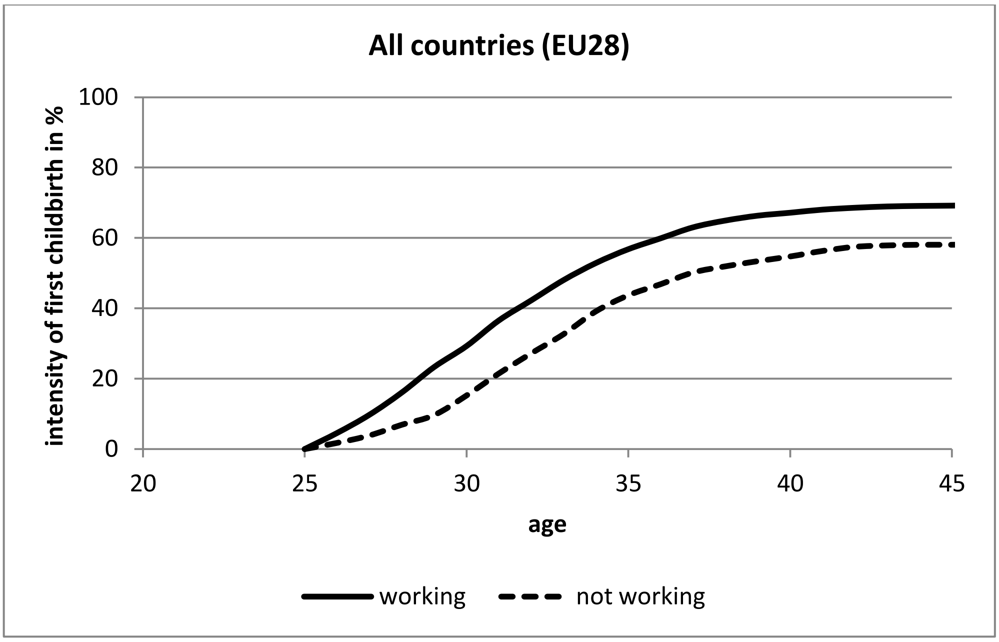

Figure 6: Intensity of women's first childbirth by age and activity status, weighted averages for 28 European countries (Source: EU SILC LT 2003-2011)

"working": Employed of self-employed (full-time or part-time) during the three months previous to potential conception of a first child
"not working": Inactive, unemployed, student, military service, early retirement, disability or any change in activity status during the three months preceding the potential conception of a first child
Weighted average for 28 European countries:
Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

4.3. The impact of activity status on the timing and intensity of first childbirth - differentiated by education

We now combine information on education and activity status to identify the effect of activity status while controlling for differences in education. Figure 7 shows the intensity of first childbirth by age and activity status, for low, middle and high educated women aged 25 to 45 (for 28 European countries). It is still important to limit this analysis to women aged 25+, so as to not erroneously include women who have not completed their education among those with less education. As in Figure 6, this age limit reduces the final intensities, as we do not observe first child births before age 25. As low educated women are more likely to have their first child before the age of 25 than high educated women, intensities at 45 risk being particularly underestimated for low educated women. Therefore, in Figure 7 (as well as in Table 2), only differences between working and not working women within each education category are interpretable, but not differences between education categories.

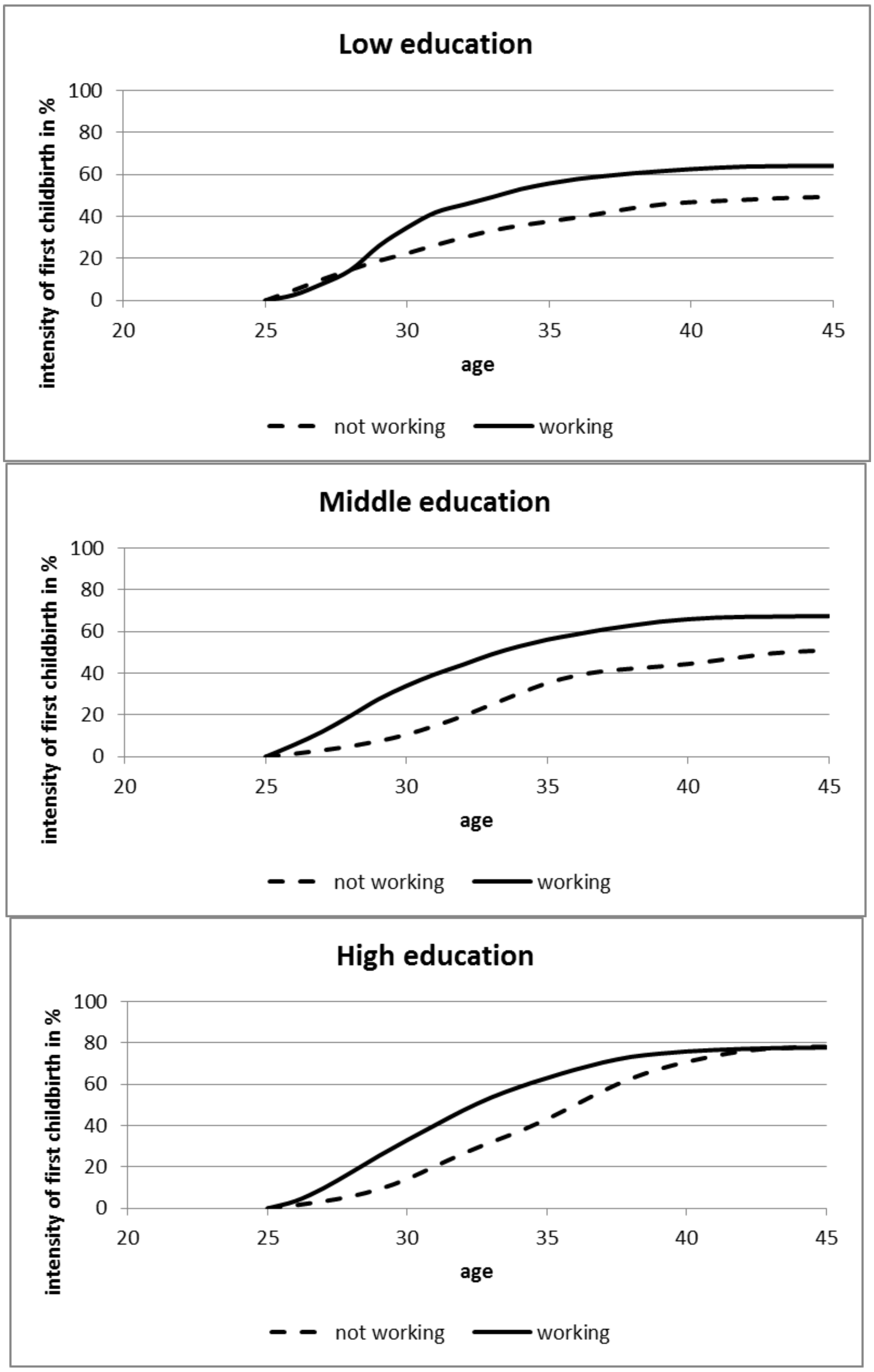

Figure 7: Intensity of first childbirth by age and activity status, for low, middle and high educated women, weighted averages for 28 European countries (Data Source: EU SILC LT 2003-2011)

"working": Employed of self-employed (full-time or part-time) during the three months previous to potential conception of a first child; "not working": Inactive, unemployed, student, military service, early retirement, disability or any change in activity status during the three months preceding the potential conception of a first child

Low education: pre-primary, primary, lower secondary education; Middle education: (upper) secondary , post-secondary non tertiary education; High education: tertiary education; Education observed at the wave preceding the year of potential conception of a first child

Weighted average for 28 European countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

Figure 7 shows that, whatever their education, working women have their first child earlier and have a higher probability of having at least one child. The difference between working and not-working women is particularly wide among those with middle education. For low-educated women, the gap is narrower, but does increase with age. For high-educated women, the reverse is the case: the gap is wide at the younger ages and then reduces.[12] Figure C in the appendix shows that for highly educated women, the gap between working and non-working women reduces with age especially in Southern European and Western European countries, but not in CEE and Nordic countries. Once again, we see that highly educated women have most difficulties to found a family in CEE countries in comparison to other European regions, and especially those who do not succeed in integrating into the labour market.

Figure 7 suggests that on average in Europe, working is particularly relevant for first childbirth for middle educated women. To see if this conclusion is valid when controlling for age, partner characteristics and year- as well as country-specific effects, we estimate women's probability of first child birth with a logit regression with robust standard errors. Table 2 shows the results. We see that among middle educated women, those who are working have a significantly higher probability of having a first child in comparison to those who are not (estimated coefficient: +0.342). Among low educated women however, there is no significant difference between those who are working and those who are not (estimated impact of stable employment: +0.342-0.269=0.073; test of joint significance: 0.6226). The difference is also insignificant for highly educated women (estimated impact of stable employment: +0.342-0.236=0.106; test of joint significance: 0.2691).

[12] Low educated and working: intensity (of first childbirth at age 45) 64.0%, MA1B (mean age of first childbirth) 30.6; low educated and not working: intensity 50.0%, MA1B 31.4. Middle educated and working: intensity 67.5%, MA1B 31.0; middle educated and not working: intensity 53.0%, MA1B 34.0. High educated and working: intensity 78.0%, MA1B 31.5; high educated and not working: intensity 78.0%, MA1B 34.0.

Table 2: Probability of first child birth for childless women aged 25-46
28 European countries, 2003-2011
Logit regression with country- and year-fixed effects and robust standard errors

Covariates	estimated coeff.	p-value	t-stat.
Woman's activity status:			
Working	0.342***	0.000	(3.67)
Not working	*Ref.*	/	/
Partner information:			
No cohabiting partner	-1.803***	0.000	(-20.04)
Partner working	0.468***	0.000	(5.33)
Partner not working	*Ref.*	/	/
Woman's education:			
Low education (primary, lower secondary)	0.138	0.347	(0.94)
Middle education (upper and post-secondary)	*Ref.*	/	/
High education (tertiary)	0.342**	0.004	(2.86)
Age	1.147***	0.000	(16.23)
Age²	-0.0186***	0.000	(-17.18)
Interaction terms:			
Working and low educated	-0.269	0.125	(-1.53)
Working and high educated	-0.236	0.071	(-1.80)
Intercept	-19.99***	0.000	(-17.33)
Test of joint significance:			
p(working and low educated)	0.6226		
p(working and high educated)	0.2691		
Country-fixed effects	*yes*		
Year-fixed effects	*yes*		
Number of observations	39692		
Number of countries	28		
R^2	0.1874		

* p<0.05, ** p<0.01, *** p<0.001

"working": Employed of self-employed (full-time or part-time) during the three months previous to potential conception of a first child; "not working": Inactive, unemployed, student, military service, early retirement, disability or any change in activity status during the three months preceding the potential conception of a first child

Low education: pre-primary, primary, lower secondary education; Middle education: (upper) secondary , post-secondary non tertiary education; High education: tertiary education; Education observed at the wave preceding the year of potential conception of a first child

28 European countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

Data Source: EU SILC LT 2003-2011

5. Conclusions

This article investigates the link between the timing of first childbirth and women's likelihood of becoming a mother. By mobilizing data from the EU-SILC, we show that educated and economically active women postpone first childbirth in comparison to women who are less educated and who are not working, but these women also have a higher probability of becoming a mother.

Factors behind birth postponement are distinct: Where birth postponement is associated with education and career investments, it appears to facilitate rather than hinder the formation of a family later in life. Birth postponement can, however, also be caused by difficulties in finding a job, in which case it decreases women's likelihood of becoming a mother.

Successful labour market integration, which is achieved especially by highly-educated women, facilitates starting a family. This is particularly the case in the Nordic countries, where educated and economically active women have a significantly higher probability of starting a family than those who are less educated and not working. By comparison, in Central and Eastern European countries, educated and economically active women also postpone first childbirth, but they do not end up with a higher (or lower) probability of becoming a mother. It rather seems that in countries of this region, women of all categories face barriers for starting a family.

The regional heterogeneity identified in this article suggests that region-specific, contextual factors are important determinants for the link between the timing of first births and birth intensities. In the Nordic countries, and to a lesser extent also in the Western European countries, institutional support for combining work and family life is quite important and labour markets are rather stable in comparison to most countries in Central, Eastern and Southern Europe. In this context, successful labour market integration for women emerges as a key factor for starting a family, even if it delays first childbirth. In Central and Eastern European countries, and to a lesser extent also in Southern European countries, it seems that being in employment does not necessarily facilitate women to have a child. Lower child care coverage, more rigid gender and family norms and unstable labour market conditions may be considered to explain this finding. For example, it is possible that women who have succeeded in integrating into the labour market in CEE and Southern European countries consider that child birth is associated with a high risk of losing the job, while those who do not work do not have the financial means to start a family. Consequently, both working and not working women have difficulties to start a family.

Our results deliver some indication that public policies, which enable and secure employment and which facilitate parents to combine work and family life, can have the potential to increase fertility despite birth postponement (as long as births postponement happens within the biological range of female fecundity). Recent studies show actually that these policies are an important determinant for an upturn in total fertility rates (Myrskilä et al. 2009; Thévenon and Gauthier 2011; Neyer, Lappegård and Vignoli 2013; Luci-Greulich and Thévenon, 2013, 2014; Arpino and Esping-Andersen 2015).

One thinkable way of extending this analysis is to forecast birth intensities of all orders by differentiating between education, activity status and institutional context. This would allow pursuing the hypothesis that under certain circumstances, birth postponement can be associated with higher fertility levels for those cohorts who are currently at childbearing age.

The EU-SILC is a unique data set which makes such an analysis possible. It provides a wide range of harmonized socio-economic measures for a large set of countries and it allows merging women with their partners. Yet, the EU-SILC is not conceived for demographic analysis, which implies that birth events risk being underreported, mainly because fertility is linked to attrition. However, Greulich and Dasre (2017) find that there are no significant socioeconomic differences in attrition in EU-SILC for the majority of countries. In addition, our retrospective approach allows circumventing the downward bias to some extent, as for women aged 15 to 27, we do not observe first births shortly after they occurred but we observe them with some time delay. For latter ages, the downward bias for first births is found to be much smaller. Finally, several important determinants of fertility, such as for example health, the quality of the partner relation as well as attitudes towards childbearing, are not observed in the EU-SILC. This points to the importance of enlarging the analysis to other data sources.

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Appendix

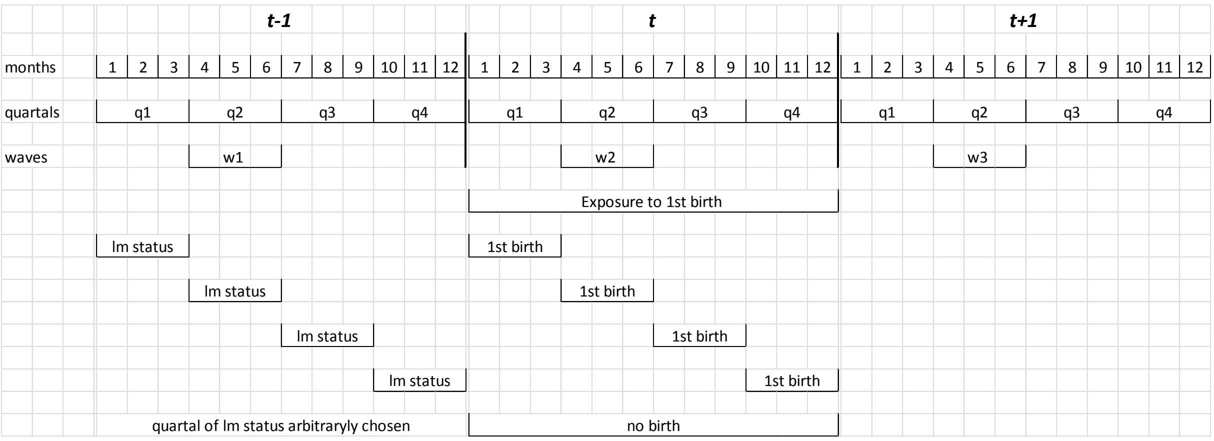

Figure A: Illustration of the construction of the data base