"The Proper Age for Parenthood" and Second Birth Rates in Europe

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Abstract

Fertility differences in Europe are largely due to disparities in parity progression after the first child. Postponement is recuperated to a larger extent in countries with relatively high fertility, less in countries with very low fertility. Explanations have referred to social policy and socioeconomic context. We argue that cultural factors also need to be taken into account and investigate the relationship between age norms and second birth rates in 23 European countries. Using the third round of the European Social Survey we analyze if ideas about the ‘proper’ age for parenthood interact with actual ages at first birth in influencing second birth transitions. Our findings indicate that in regions with older ideal ages for parenthood the second birth rate is depressed for women with young ages at first birth, and vice versa. This effect, however, is strongly reduced and remains only marginally significant after controlling for an interaction between regional GDP and age at first birth. This indicates that rich regions exhibit weaker postponement effects, and that this relationship largely absorbs the effect of age norms. We also find that the negative effect of high age at first birth on the second birth rates attenuates with educational attainment.

Introduction

European men and women now tend to have their first child at a later age than the generation of their parents. This postponement of parenthood has played a crucial role in the emergence of (very) low fertility during the past decades in Europe (Billari and Kohler, 2004; Sobotka, 2004; Prskawetz, Mamolo and Engelhardt, 2010). Postponement has a direct negative effect on the yearly number of births and, hence, on period total fertility. This pure timing effect has been coming to an end since the beginning of the 21st century, resulting in a recovery of period total fertility rates (Goldstein et al., 2009). Yet, in addition to the pure timing effect on period fertility,

later childbearing also affects the number of children eventually born per cohort, because people who have their first child at a later age tend to have a smaller final family size, on average. Demographers have found that this effect of fertility timing on fertility quantum differs by country and social group: in some countries and groups, a later age at childbearing is to a large extent recuperated by a higher subsequent rate of childbearing; in other countries and groups, this is much less the case. In the first case, with high recuperation, total fertility is relatively high; in the second condition, total fertility is relatively low (Billari and Kohler, 2004; Van Bavel and Róžańska-Putek, 2010).

Therefore, second birth rates have become of central interest for European cross-country fertility differences: in countries with relatively high fertility, first birth postponement is to a large extent recuperated at higher ages with fast progression to a second child (like in Sweden or France). This is less the case in countries with very low fertility, where people more often end up with one only child (like in Spain and many post-communist countries). Levels of childlessness have been increasing, but they have not been a major driving force behind very low fertility levels, except in the German speaking countries (Sobotka, 2008). Thus, focusing on the transition to second births and understanding factors that are linked to the likelihood of catching up with the second birth after initial postponement of the first birth is crucial for understanding low European fertility rates (Brodman, Esping-Andersen and Guell, 2007; Van Bavel and Róžańska-Putek, 2010).

In the effect of the timing of the first birth on subsequent fertility, both the biological feature of age and the sociological meaning of age play a role. The biological aspect refers to the limited time window of female fecundity: if a woman has her first child later in life, fewer years

remain before reaching the biological limits of fertility.¹ This time squeeze effect (Kreyenfeld, 2002) implies that fewer births will take place due to declining female fecundity with increasing biological age, thus reducing quantum permanently for cohorts that postpone childbearing. The cross-country variation in the postponement effect suggests, however, that social and cultural factors also play a role in timing-quantum interactions. Indeed, earlier research has found that the postponement effect on second birth rates differs not only by social group (e.g. education) but also by country or geographic region: in some social groups and countries, a higher age at first birth strongly depresses second birth rates, in other groups and countries, the postponement effect is much more limited (Kreyenfeld, 2002; Gerster et al., 2007; Van Bavel and Róžańska-Putek, 2010). This variation indicates that the sociological meaning of age also plays an important role in explaining the effect of the timing of first births on second births.

Age norms are argued to fulfil important functions in structuring the life course, providing guidance to individuals in maneuvering their lives through the institutions of society (Settersten, 1997; Heckenhausen, 1999; Liefbroer and Billari, 2010). They can be both enabling and restrictive: they help individuals to find their way, providing a frame which helps individuals to “psychologically manage their life courses” without being overburdened in making their decisions, and to ensure that life course patterns remain predictable; at the same time they may also force individuals to abide by the mainstream pattern (Settersten and Mayer, 1997; Heckhausen, 1999).

A recent study provided evidence for European countries that “social age deadlines for childbearing” exist, alongside biological ones. The same study also reported a positive correlation on the country level between later deadlines and fertility rates at high ages (Billari et

¹ Following conventional demographic terminology, *fecundity* refers to the capacity to produce a live child, while *fertility* refers to reproductive performance rather than capacity, indicating how many live births actually occurred. *Fecundability* refers to the probability of conceiving per menstrual cycle (<http://www.demopaedia.org/>).

al. 2011). However, the influence of such cultural ideas about the proper timing of parenthood on actual, individual level fertility behaviour has not yet been investigated empirically on a European-wide scale. This paper aims to fill that gap in the literature.

Using the third round of the European Social Survey, this paper investigates whether cultural ideas about “the proper age for parenthood” affect a key issue in the current European demographic landscape, namely the effect of fertility timing on fertility quantum. More specifically, we investigate whether age norms affect the extent to which the postponement of parenthood depresses individual level second birth rates (and, hence, final family sizes). We focus on women since the link between age and fertility is strongest for them and because there are indications that the “social age deadlines” for childbearing are stricter for women than for men (Billari et al. 2011). We use reported ideal ages for the transition to motherhood as an indicator for the normative age to have a first child in 23 European countries. Our results suggest that regional age norms may indeed play a role in the relation between the timing and quantum of fertility, but we cannot rule out that the relations found are due to differences in regional wealth.

Ideal age at first birth and second birth rates: hypothesis

Cultures include normative ideas about the proper age for parenthood, the sequencing of life course events, and parity outcomes at given ages. Sociologists working in the field of demography argue that these normative beliefs effectively influence childbearing behaviour (Rindfuss and Bumpass, 1976; Blossfeld and Huinink, 1991, Settersten and Hagestad, 1996; Liefbroer and Billari, 2010). For example, the fact that a family size of two children has been and remains the modal family size in most European countries for many years, is usually explained

with reference to the a norm, i.e. the two-child family norm (Testa & Grilli 2006). This norm entails that if people make the transition to parenthood, they are normatively expected to have at least a second child. But this expectation does not necessarily hold to the same extent in all circumstances.

In this study, we hypothesize that the effect of the age at first birth on the transition to a second child depends on cultural ideas about the “proper age” for parenthood. More specifically, we expect depressed second birth rates for people who live in a region with a low expected age for parenthood but who themselves have a high age at first childbearing. Conversely, we expect low second birth rates for individuals who were young at their first birth but who live in regions with relatively old age norms for the transition to parenthood. The former expectation could still be explained by biological processes because fecundability is expected to be reduced with older age. It would, however, run against a pure catching up effect because catching up would imply that women who make a late transition to motherhood in a region with a low expected age at first birth try harder subsequently to make up for lost time for childbearing.

The second expectation, i.e. lower second birth rates for women having their first child early where the expected age is high, if confirmed by the data, runs against a purely biological mechanism and would imply that a social mechanism would be at work.

We expect that regions with a low expected age at motherhood will be regions close to the historical Hajnal line, or even be east of that line. The Hajnal line refers to a virtual stripe running roughly from St. Petersburg in Russia to Trieste in North-East Italy. East of that line, family formation has been relatively early at least since the Early Modern period. West of that line, family formation has traditionally been relatively late (Hajnal 1982). In Eastern European

countries, a high age at first birth runs against the norm. Our hypothesis implies that this will be associated with lower second birth rates when the first child has been postponed.

There are diverse sociological reasons for expecting an effect of cultural ideas about the proper age for parenthood on second birth rates. First, in societies with a young normative age at first childbearing, women who have their first child late might feel too old to have a second baby and therefore refrain from doing so, even if they are physiologically still capable to have a second child. In those societies, the increasing health risks for mother and child associated with pregnancies at later ages may be highlighted more than in societies with older normatively expected ages at first birth, thus discouraging women from having (additional) children later in life (Rindfuss and Bumpass, 1976; Billari et al. 2011). East European countries which traditionally exhibit young ages at first birth might fit this description. For example, a qualitative study in Poland (Mynarska, 2010) finds that respondents perceive a social pressure for having children early, ideally in their mid 20s. Age 30 is an often mentioned deadline for the transition to parenthood. Mynarska notes that many of her respondents associate this age limit with biological factors, which underscores Rindfuss and Bumpass' (1976) argument that the perception of unrealistically young age limits for fecundity might be one aspect of a young age norm for the transition to parenthood and subsequently play a role in refraining from late (second) childbearing.

Second, in societies with young age norms for first births, couples willing to progress to a second parity after a late first birth might face mild forms of social isolation. Their age peers might have grown up children already, and they might fear lacking social support and feeling socially displaced in case they had another child later in life (Rindfuss and Bumpass, 1976). A growing body of literature indicates that both fertility intentions and actual behaviour are

influenced by an individual's peer group. Social networks affect fertility through various channels, including social pressure and social learning (Bernardi 2003; Rossier & Bernardi 2009; Diaz et al. 2011). As such, these social networks are major carriers of normative ideas about reproductive behaviour, including ideas about the "proper age" for parenthood. These may have very concrete implications for young parents. For example, young women with unplanned pregnancies who decide to keep the child might encounter a more supportive environment in societies with a young age norm, and be subsequently more likely to settle down, welcome their role as a parent, and ultimately expand their family further. Conversely, in regions where the normative age at first birth is older, a young woman who gives birth to an unplanned child might feel more displaced, too young to settle down, less supported and comfortable with her role as a parent, and thus more reluctant to have a subsequent child.

Third, in societies with later normative ages at childbearing, a specific emphasis on female economic independence and educational attainment might exist (Blossfeld and Huinink, 1991: 163; Billari 2004), which would be in line with the classic explanation for late family formation in North-West Europe given by Hajnal (1982). Here, women who have their first child early might feel social pressure to become more independent in terms of finishing their education, starting a career, and being economically independent before having additional children (see Billari 2004 for an extensive review of the issues involved). They might therefore delay and possibly forgo a second child. They might, furthermore, be perceived by others as too young to be a responsible parent, feel less respected and supported in their role as a parent and hence less encouraged to have a second child. They could also, if most parents with children of the same age as their own are older than themselves, feel relatively young or too young to have another child soon. This could trigger postponement and eventually lead to forgoing the second

child, for example because they perceive the age gap to the first child as too large after a certain time has passed.

There are still other scenarios that could link a deviation between the actual and the normative age at first birth to a depressed second birth rate. A young age at marriage has consistently been linked to higher divorce risks (Teachman, 2002). If young mothers are hence more likely to separate from their partner after the first birth, they could also be less likely to proceed to parity two, unless they find new partners and have a second child with them. Conversely, the absence of a stable partnership can be the reason for a late first birth. If a woman is more likely to have a first child with an uncommitted partner once she comes closer to the end of her fertile life span, she might be less likely to have a second birth. In our analysis, in order to minimize the role played by instable relationships and focus on the role of age norms, we will only include women who are living with a partner and who never experienced a divorce.

Data and methods

We use data from the third round of the European Social Survey (ESS3), with field work carried out in 2006 and 2007. In order to study parity progression from the first to the second child, we selected only respondents who were living with a partner at the time of the survey, when the female partner was between ages 15 and 45, who never experienced a divorce and who already had at least one child. This selection yielded a sample of 6186 respondents from 23 countries (see Table 1). Both male and female respondents were included, since the survey includes enough information about the partner of respondents to derive the age at first childbirth and the level of education for the female partner, also when the respondent was a male.

ESS3 asked three questions that are relevant for normative ideas about the timing of motherhood (Billari et al., 2005): 1) “Before what age would you say a woman is generally too young to become a mother?”; 2) “In your opinion, what is the ideal age for a girl or woman to become a mother?”; and 3) “After what age would you say a woman is generally too old to consider having any more children?”. Figure 1 depicts the country specific average ages for each question, along with the median ages at first childbearing actually observed among the female respondents in the European Social Survey, as estimated from the Kaplan-Meier Survivor function.

In all countries, respondents tend to say that motherhood should be avoided before age 18. There is very little cross-country variability, with the mean minimal age at motherhood between 18 and 20 years in almost all cases (with Ireland as the only, but mild exception). There is more cross-country variance in the ages at which women are considered too old for further childbearing, but in almost all countries, the mean lies between 40 and 45 years - Hungary being the only, again mild, exception. This maximal age at parenthood lies close to the biological age limit, when female fecundability is decreasing very rapidly. We see no interpretable pattern in the minimum and maximum acceptable ages at motherhood.

[Figure 1 about here]

Most of the variance is in the ideal ages at motherhood, and it correlates strongly with the cross-country variance in actual ages at first motherhood (Pearson correlation coefficient is 0.82). In this case, there is a clear pattern: countries that lie more to the east of Europe, i.e. close to the Hajnal line, tend to have lower ideal (and actual) ages at motherhood; countries in Western

Europe tend to have higher ideal (and actual) ages at motherhood. In almost all post-communist countries, the ideal age at first childbearing is 24 years at most - Hungary is the only exception. The highest ideal ages are reported in Ireland, the Netherlands, Spain, and Switzerland. The Kaplan-Meier estimates for the actual median age at first birth tend to be higher than the ideal ages. This is particularly the case in the countries that have high ideal and actual ages at first childbearing.

Hence, the minimal and maximal acceptable ages at motherhood show limited variation (especially the minimum limit) and they are relatively close to the age limits for fertility analysis conventionally used in demography (age 15 and 45 or 49, respectively). They are also relatively close to the "biological" age constraints of female reproduction while they do not show a well-known cultural-historical pattern. In contrast, the cross-country differences in ideal ages do show a pattern that is related to well-known differences in reproductive behaviour with long standing, historical roots. We will therefore use the scores for ideal age at motherhood as the indicator for the age norm, i.e. the "proper" age for parenthood. As should be expected from an effective social norm, the normative age closely correlates with the actual age at first motherhood.

Map 1 shows the ideal age to become a mother on the sub-national level of NUTS1 regions. NUTS is the standard nomenclature for the coding of regions employed by Eurostat, the EU statistical office; NUTS1 is the highest regional level beneath the country level (Róžańska-Puteket al., 2009). Most of the variance is on the country rather than the regional level, with one important exception: consistent with the historical pattern pointed out by Hajnal, the Eastern German regions have clearly lower ideal ages at motherhood than the Western German regions. We will therefore employ this indicator on the NUTS1 level.

[Map 1 about here]

Our hypothesis is that the effect of the actual age at first birth on the subsequent second birth rate depends on the cultural ideal age at parenthood. We test this hypothesis using multilevel event history analysis. We fit discrete time, logistic hazard models for the time until the occurrence of the second birth, or until the time of the interview if no second child was born before that. Starting time $t=0$ corresponds to the year of birth of the first child, and since we only have information about children's year of birth, we work on a yearly time scale. Equation (1) gives the setup of the model used to test our hypothesis:

$$\text{logit}(h_{ijk}(t)) = \beta_0 + \beta_1 t + \beta_2 t^2 + \beta_3 f_{ijk} + \beta_4 a_{jk} + \beta_5 f_{ijk} a_{jk} + r_{jk} + c_k \quad (1)$$

with h_{ijk} representing the second birth hazard rate for individual i in region j of country k ; t is the number of years elapsed since the birth of the first child. The hazard rate is modelled as a second order polynomial function of t , since we know that it first rises during the first four to five years after the first birth and then goes down again (Van Bavel and Róžańska-Putek, 2010). The variable f_{ijk} , represents the actual age at first childbearing on the individual level, while a_{jk} is the ideal age for motherhood in region j of country k . Regional and country level random effects are represented by r_{jk} and c_k , respectively. All parameters are estimated using the Laplace approximation method for fitting generalized linear mixed models, which has the advantage over other methods that it yields more reliable log-likelihoods that can be used for hypothesis testing (Snijders & Bosker, 1999: 218-220).

In order to avoid direct endogeneity of ideal ages at motherhood a_{jk} on the one hand and actual age at first birth f_{ijk} and transition to second birth h_{ijk} on the other hand, our analysis uses estimates of regional age norms as judged by surveyed individuals who were older than 45 years (and excluded from the analysis of second birth rates). Ages at first childbearing and second birth transitions are measured for individuals who were below age 45 at the time of survey. With this strategy, we assure that our measure of cultural ideal age does not directly reflect the individual-level behaviour we are modelling. For each country, Table 1 gives descriptive statistics for the regional ideal ages. The regional estimates are based on a sample of almost 265 respondents aged 46 and more per region, on average (column ‘Average # 45+ per region’). For big countries with many regions, like France, Great Britain and especially Germany, the number of informants per region is more limited. However, the estimates are all pretty stable and fall within a narrow range within each country. As explained above, the largest regional heterogeneity is found in Germany, which corresponds basically to an east-west divide. The Pearson correlation coefficients for the association between regional ideal age and regional average age at actual first childbearing is 0.50; the correlation with the individual level actual age at first childbearing is 0.32 (in both cases estimating actual childbearing from the respondents in our analytical sample).

Crucial for our hypothesis testing is the interaction between the actual age at first childbearing f_{ijk} and the regional ideal age at motherhood a_{jk} . Our hypothesis implies that the regression parameter for the corresponding multiplicative term is positive (β_5 in equation (1)). The rationale for this is as follows. We know *a priori* that the effect of actual age at first childbearing on the second birth rate (β_3) is negative: if women have their first child at a later age, their second birth rate will be lower. Our hypothesis implies that the strength of this age effect depends on cultural beliefs about the proper age for parenthood: in regions where people

are culturally expected to have their first child at a young age, the negative effect of the actual age at first childbearing will be strong; in regions where people are expected to have their first child at a relatively high age, the negative age effect will be weaker. In our model, the weakening of the negative age effect with increasing ideal age at motherhood is indexed by β_5 : the more positive this parameter, the weaker the negative effect of the actual age at first childbearing on the second birth rate with increasing ideal age at motherhood.

Our empirical estimations start with a baseline model that includes, apart from the year and age at first birth, the woman's educational attainment and marital status (married versus cohabiting) as individual level covariates, and the regional GDP and ideal age at first birth as regional level controls. The measurement of educational attainment is based on the ISCED classification (UNESCO 2003), simplified to three categories: low (ISCED 0-2), medium (3-4), and high education (5-6). Since we know that the effect of educational attainment on second birth rates strongly differs by country (Van Bavel and Róžańska-Putek, 2010), we include random slopes on the country level for that factor, in addition to the random intercepts on both the country and the regional level.

Previous studies have indicated that regional economic performance can affect fertility trends (for example Adsera 2011, Billingsley 2010). We therefore include a variable for regional GDP per capita, measured in purchasing power standards in 2004 for the NUTS1 regions, because regional wealth differs widely among the regions included in our models (see Table 1 for descriptive statistics). In the literature, the strength and direction of the effect of GDP on fertility trends has been inconsistent and depending on the sample, time period, and region, and little is known about parity specific effects (Sobotka et al. 2011). Hence, instead of having an a priori hypothesis about the effect of GDP on the second birth rate, we include it with the purpose

to control for regional wealth disparities. Finally, the main effect of the regional ideal age for the transition to parenthood is included in the baseline model, but expected to have no effect in itself on second birth transitions.

In the second model, we test our hypothesis by adding the crucial interaction effect of the regional age norms with the actual individual women's ages at first birth. Also, since we know that higher educated women are expected to have their first child at a higher age than lower educated women, the second model includes additional interactions between the indicators for educational attainment and actual age at first birth. We expect the negative effect of actual age at first birth on second birth rates to be weaker for the more highly educated.

The third and final model includes an additional interaction between GDP and actual age at first birth. We add this interaction, because regional GDP and the ideal ages at motherhood are positively correlated (Pearson $r=0.53$). We therefore need to control for the possibility that a potentially significant interaction of ideal and actual age at first birth may be spurious and actually hinge on an interactive effect of regional wealth and actual ages at first birth on second birth transitions.

Results

Table 3 presents the parameter estimates for the three fitted models. Baseline model I confirms that, overall, there has been a trend towards lower second birth rates: the calendar year at first birth (centred around its median, i.e. 1996) has a significant negative effect. The two parameters for years elapsed since the first birth imply the expected shape of the hazard function: it first rises for five years before going down towards zero again. The effect of actual age at first

childbearing on the second birth rate is negative all the way through, but, in line with earlier findings, the negative effect gains in strength with rising age. This gain in strength was modelled by including a second order polynomial for this covariate. Furthermore, being married rather than cohabitating, is associated with higher second birth rates: overall, across all the countries included, the odds ratio for having a second child rather than not during a given year past the first birth is 53% higher for married than for unmarried couples, all else equal ($\exp(0.424) = 1.53$). The woman's level of education has no statistically significant effect on the second birth rate - recall that this is a conditional rate, i.e. only people with at least one child are selected. Yet, this fixed effect is a cross-national average, while we suspect from previous research that there is strong international heterogeneity about this, with negative effects in some countries cancelling out positive effects in other countries (Van Bavel and Róžańska-Putek, 2010).

Analysis of the country level random effects indeed reveals that there are important country differences. First, countries differ in the overall level of parity progression. The standard deviation of the random intercept for country is estimated at 0.23 on the logit scale, which is statistically significant according to the likelihood ratio test ($p < 0.048$). Second, the level of education has heterogeneous effects on second birth rates: in some countries, a higher level of education is associated with higher second birth rates, in other countries it is associated with lower ones. Again, the likelihood ratio test indicates that the random slopes for level of education significantly improve the fit of the baseline model ($p < 0.001$). On the regional level, GDP per capita is positively associated with second birth rates. The regional level random intercept is also statistically significant ($p < 0.010$).

[Table 3 about here]

In Model II, the regional ideal age for motherhood (centred around its median of 24 years) is interacted with the individual woman's actual age at first childbirth (centred around age 25) in order to test our hypothesis that the effect of the actual age at first childbearing depends on cultural norms about the proper timing of motherhood. This cross-level interaction is statistically significant ($p < 0.001$). In order to allow for a non-linear interaction, we also included the product with actual age at first birth squared in other models (not shown), but this term was statistically not significant and dropping it yielded equivalent results.

The estimated interaction effect is in line with our hypothesis: the higher the ideal age at motherhood, the higher the second birth rate after a late first childbirth. Conversely, the lower the ideal age at motherhood, the higher the second birth rate after an early first childbirth. This is implied by the positive sign of the effect of the product term. In order to enable an intuitive interpretation of the interaction, figure 2 plots predicted second birth hazard rates at year 2 after the birth of the first child. The horizontal axis represents different actual ages at which a woman may have had her first child. The vertical axis represents the second birth rate predicted by model II. The different lines refer to predicted values for women who live in regions with different ideal ages at motherhood, ranging from 22 (typical for Eastern European countries) to 27 (about the ideal age observed in the Netherlands, Spain, and Switzerland). If the regional ideal age for motherhood is 22, model II predicts the highest second birth rates when the first child was born in the woman's late teens or early twenties. Second birth rates are very low in these countries when the first child was born around age 30 or later. In contrast, if the regional ideal age is 27, second birth rates are higher when the first child was actually born around age 30 or

later than when the first child was born when the mother was in her twenties. This finding clearly is at odds with a purely biological effect of the timing of first childbirth on second birth rates.

[Figure 2 about here]

Model II also includes the interaction between the age at first birth and the level of education. Given the fact that more highly educated people are expected to give birth to their first child at a later age than people with a lower level of education, we expect that the negative effect of postponement of motherhood on second birth rates is lower for the more highly educated and need to control for this situation. Model II confirms this expectation: the positive regression parameters for the interaction terms for medium as well as highly educated (as compared to low educated) women counterbalance at least to some extent the declining second birth rates with increasing age at first birth.

Models I and II include regional GDP as a control variable. Model III introduces an interaction of actual ages at first birth and regional GDP, in order to test whether the significance of the interaction of actual and ideal ages may be due to regional differences in wealth that interact with actual ages at first birth in affecting second birth rates, since regional GDP and ideal ages at motherhood are positively correlated. It turns out that this interaction term of regional GDP and actual ages at first birth is statistically significant: the richer a region, the weaker the negative effect of an actual late first birth on the second birth rate. At the same time, it indeed strongly weakens the interaction between regional ideal age and individual actual age: the estimated parameter is more than halved (from 0.022 in model II to only 0.009 in model III) and is no longer statistically significant at the 5% level in model III. It remains marginally

significant at the 10% level, hence is not totally explained away by the interaction of GDP and actual age at first birth.

Conclusion

The major trend in reproductive behaviour in Europe during the past decades has been the postponement of parenthood: people tend to have their first child at considerably older ages today than the generation of their parents. On average, the postponement has led to lower total fertility, and this effect of fertility timing on fertility quantum is called the postponement effect. The standard explanation for the negative postponement effect has been biological: female fecundity decreases with age, and decreases rapidly above age 35, so when a woman has her first child at a higher age, fewer years are left.

Yet, this biological mechanism is only a limited part of the story. Earlier studies have shown that the postponement effect strongly differs by country and that it depends on socio-economic and contextual factors (Köppen, 2006; Van Bavel and Rozanska-Putek, 2010).

This paper has argued that an important contextual factor has been neglected in research so far, i.e. normative beliefs about the "proper age for parenthood". Our main hypothesis is that different regions of Europe have different normative beliefs about what constitutes a "proper age for parenthood" and that these beliefs have an influence on the postponement effect: if people have their first birth at an age in line with the regional age norm, their second birth rate may be expected to be higher; if the age at first childbirth deviates from the norm, the second birth rate may be expected to be depressed.

Although this paper presented evidence that second birth rates are indeed associated with regional ideas about the proper age for parenthood, we are not in a position to confirm our

hypothesis without reservation. Our analysis first showed that the postponement effect is indeed associated with regional ideal ages at parenthood: second birth rates tend to be much more depressed after an actual late first birth when the ideal age is low. Conversely, we also found that second birth rates are higher at higher ages when the ideal age at motherhood is high – a finding that cannot be explained by a physiological mechanism. However, when we introduced a control in our model for the interaction between regional GDP and actual age at first birth, the interaction with the regional ideal age was reduced by more than half of its original strength, and it turned statistically insignificant on the conventional 5% level.

Our results have shown not only that a high GDP is associated with higher second birth rates per se, but also that rich regions exhibit weaker postponement effects. This effect is highly significant, even though cultural beliefs about the ‘proper’ age for parenthood and its interaction with actual ages at first birth are controlled for in the model. Post hoc, we can think of at least two possible reasons for this finding. One is that child care facilities tend to be more widely available in richer countries. For women with an established career, who tend to have a late first childbirth, child care availability implies that a second child entails lower opportunity costs (cf. Mills et al. 2011). Their peers with a late birth in poorer regions, with low childcare availability, may be more reluctant to have a second child. This explanation is in line with the findings about second birth rates in Denmark and Spain (Brodmann et al. 2007). A second possible explanation is that assisted reproduction techniques (ART) may be more widely available and affordable in rich regions. As a result, couples with a late first birth who experience troubles to conceive a second child might be more likely to eventually have their second child thanks to ART in regions that are relatively wealthy. This explanation would be consistent with the finding by Billari et al.

(2011) that late social age deadlines for childbearing are positively associated with the prevalence of ART on the country level.

In conclusion, regional ideas about the ‘proper’ age for parenthood seem to play only a marginal role in explaining the heterogeneity of how the postponement of motherhood relates to the second birth rate across Europe. Instead, regional differences in GDP appear to be of more central importance. Further research, however, is necessary to reveal the mechanisms behind this association, and those mechanisms may themselves hinge on cultural beliefs, e.g. on attitudes toward working mothers.

It remains to be seen whether beliefs about what constitutes a proper age for parenthood will remain persistent or whether they will follow suit with the increased actual ages at first birth. Since it is especially the higher educated who are now postponing parenthood in traditionally early-motherhood countries, we speculate that the age norms will change in the coming years. Given the weaker postponement effect for the highly educated, and given the fact that the share of women in the population at the reproductive ages with a high level of education is increasing, we expect that the negative postponement effect will weaken and that we will be seeing more catching up at later ages. Yearly total fertility rates are already increasing in European countries that formerly exhibited very low fertility (Goldstein, Sobotka and Jasilioniene, 2009). Our hypothesis is that upward shifting age norms may play a role in this process by weakening the postponement effect for women with lower educational attainment.

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Tables, Figures, and Map

Table 1. Descriptive statistics of the regional level variables used in the analysis

Country	Code	N	# regions	Ideal age at first childbearing				Average # 45+ per region	GDP/Capita			
				Mean*	Min*	Max*	SD*		Mean*	Min*	Max*	SD*
Austria	AT	328	3	25.1	24.4	25.4	0.6	181.6	26800	23400	29200	3027
Belgium	BE	288	3	25.4	24.9	26.1	0.6	139.0	32200	18800	51900	17426
Bulgaria	BG	214	2	23.8	23.7	23.8	0.1	191.6	7350	6100	8600	1768
Cyprus	CY	156	1	25.8	25.8	25.8	/	252.5	19600	19600	19600	/
Denmark	DK	223	1	25.0	25.0	25.0	/	417.0	27200	27200	27200	/
Estonia	EE	197	1	22.9	22.9	22.9	/	420.0	12400	12400	12400	/
Finland	FI	265	1	23.5	23.5	23.5	/	539.0	28750	25100	32400	/
France	FR	362	8	25.3	25.1	25.7	0.2	61.4	22033	14100	36800	6098
Germany	DE	348	16	24.5	23.3	26.3	0.9	47.3	24506	17300	43000	7175
Great Britain	GB	270	12	24.2	23.2	25.1	0.6	51.0	25333	20300	43400	6120
Hungary	HU	191	3	24.7	24.2	25.2	0.5	138.3	14400	9200	21600	6437
Ireland	IE	266	1	26.1	26.1	26.1	/	377.4	30700	30700	30700	/
Latvia	LV	234	1	23.2	23.2	23.2	/	426.0	9900	9900	9900	/
Netherlands	NL	290	4	26.1	25.4	26.4	0.5	122.8	26825	23500	30800	3058
Norway	NO	258	1	24.7	24.7	24.7	/	415.0	35600	35600	35600	/
Poland	PL	325	6	23.3	22.8	24.0	0.4	68.0	10833	7900	14500	2156
Portugal	PT	306	1	24.1	24.1	24.1	/	632.0	16767	14100	20100	3055
Romania	RO	295	4	23.3	22.9	24.0	0.5	139.0	7425	5800	9500	1533
Slovakia	SK	326	1	23.6	23.6	23.6	/	364.0	12400	12400	12400	/
Slovenia	SI	220	1	23.8	23.8	23.8	/	379.0	18700	18700	18700	/
Spain	ES	294	7	26.0	24.9	26.6	0.6	61.9	21757	17100	28700	4441
Sweden	SE	265	3	25.2	25.1	25.5	0.3	156.3	26667	24100	30900	3694
Switzerland	CH	265	1	26.5	26.5	26.5	/	509.8	29300	29300	29300	/
Overall:												
Total N women		6186	82					264.8	21786			

* Mean, minimum, maximum and standard deviation of regional level estimates per country.

Table 2. Descriptive statistics of individual level variables used in the analysis (N=6185)

Variable	%	Mean	SD
<i>Dependent variable</i>			
Percentage with observed second birth	65.1		
Average age at observed second birth		28.50	4.47
Average interval between first and second birth (years)		3.42	2.28
<i>Explanatory variables</i>			
Year of first childbirth		1997.18	5.91
Age at first childbirth		25.65	4.63
Married			
- Yes	85.1		
- No	14.9		
Level of education			
- Low	23.6		
- Medium	46.5		
- High	29.1		
- Unknown	0.7		

Table 3. Discrete time logistic hazard models of transition from first to second birth

	Model I			Model II			Model III		
	b	se	p	b	se	p	b	se	p
FIXED EFFECTS									
Intercept	-3.753	0.149	<0.001	-3.870	0.151	<0.001	-3.793	0.153	<0.001
Year of birth first child - 1996	-0.027	0.004	<0.001	-0.028	0.004	<0.001	-0.028	0.004	<0.001
Years elapsed since first birth	0.740	0.022	<0.001	0.744	0.022	<0.001	0.745	0.022	<0.001
Years elapsed... squared	-0.073	0.002	<0.001	-0.073	0.002	<0.001	-0.073	0.002	<0.001
Age at first childbirth - 25	-0.009	0.005	0.074	-0.060	0.010	<0.001	-0.117	0.016	<0.001
Age at first childbirth - 25 squared	-0.001	0.001	0.043	-0.003	0.001	<0.001	-0.004	0.001	<0.001
Married (ref.=unmarried)	0.424	0.059	<0.001	0.406	0.059	<0.001	0.397	0.059	<0.001
Level of education (ref.= low)									
- medium educated	-0.077	0.076	0.307	-0.006	0.063	0.923	0.001	0.056	0.980
- highly educated	0.028	0.098	0.776	0.083	0.082	0.316	0.101	0.068	0.142
Regional GDP/capita 2004 (/1000)	0.019	0.006	<0.001	0.021	0.006	0.001	0.016	0.007	0.014
Regional ideal age at motherhood - 24	0.001	0.055	0.981	0.012	0.056	0.832	0.019	0.058	0.741
<i>Interactions: actual age at 1st childbearing...</i>									
× Regional Ideal age				0.022	0.004	<0.001	0.009	0.005	0.084
× Medium educated				0.045	0.011	<0.001	0.045	0.011	<0.001
× Highly educated				0.054	0.013	<0.001	0.051	0.013	<0.001
× GDP/capita (/1000)							0.003	0.001	<0.001
RANDOM EFFECTS									
	st.dev.	p		st.dev.	p		st.dev.	p	
Nuts1 region intercept	0.162	0.010°		0.179	0.001°		0.178	0.005°	
Country intercept	0.233	0.048°		0.211	0.061°		0.217	0.095°	
Country slope for medium educated	0.272	<0.001°		0.172	0.051°		0.124	0.197°	
Country slope for highly educated	0.381	<0.001°		0.270	0.040°		0.171	0.223°	
Deviance (-2LL)	23217	<0.001		23175	<0.001		23162	<0.001	
Number of person years	33177			33177			33177		
N countries	23			23			23		
N regions	82			82			82		

° LLR test with two random slope components deleted from the restricted model

Note: actual age at first childbirth is always centered around age 25, the regional ideal is centered around its median (age 24)

Figure 1. Ideal age to become a mother, Kaplan-Meier estimate of actual median age at first motherhood, minimal age for motherhood, and maximal age for further childbearing

Figure 2. Discrete time second birth hazard rate in year 2 after the transition to motherhood, by regional ideal age at becoming a mother and by actual age at first birth*

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* predicted hazard rates for married women of medium education, in a country with a GDP per capita of 20.000 PPS Euros; predicted off of model II.

Map 1. Ideal age to become a mother according to ESS3 respondents, by NUTS1 region