The socio-economic determinants of childbearing intentions: a macro-micro European analysis

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Abstract

In this paper I investigate the individual and country level socio-economic determinants of child-number and child-timing intentions in Europe. The analysis is based on the Eurobarometer survey conducted in 2006 which contained several questions on childbearing intentions. Two different sets of multi-level proportional-odds models are used with a response equals to the number of additionally intended children or to the timing of the next intended child. The results show that at the individual level child-number intentions are correlated with enduring characteristics of individuals, like religiosity and level of education while child-timing intentions are closely associated with more transient characteristics, like enrolment in education or non-marital status.

At the cluster level the proportion of high educated people in the country positively influences the child-number and the child-timing intentions independently on whether individuals are childless or have already one child. The Gross Domestic Product (GDP) per capita affects negatively the timing of the next intended child and positively the timing of the second intended child. The results partly support the positive relationship between Human Development Index and Total fertility Rate observed in the OECD countries by Myrskylä et al. (2009).

Keywords: *fertility decision-making, multilevel analysis, child-timing intentions, child-number intentions, proportional odds models*

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1. Introduction

Fertility intentions are among the strongest predictors of subsequent fertility and operate as key proximate variables in predicting fertility behaviour (Schoen et al. 1999; Ajzen 1991). Hence, they take a central role in understanding contemporary fertility trends.

One of the most common theoretical frameworks used by demographers to explain fertility decision-making is the theory of Planned Behaviour developed in the field of social psychology (Ajzen 1988 and 1991). According to it, intentions are seen as directly dependent on three components: (a) personal positive and negative attitudes towards the behaviour, i.e. having a child, (b) subjective norms, i.e., perceived social pressure towards engaging or not engaging in the behaviour; and (c) perceived behavioural control, i.e., ability to perform the behaviour which may depend, for example, on the availability of housing, income, or other different resources.

The theory has been adapted to the analysis of fertility decisions by several demographers (Schoen et al. 1999; Liefbroer 2005; Barber, 2001; Philipov et al. 2006; Billari et al. 2009). However, the role of macro-level contextual factors in the decision-making process has not been explicitly considered. Building a link between macro-level background factors and micro-level variables that influence fertility remains a major challenge in demographic research.

The current contribution examines the determinants of both child-quantum and child-timing intentions in a micro-macro framework with the aim to add new insights in the influence of macro level factors on the individual decision-making process.

The rest of the paper proceeds as follows: the next session outlines the theoretical backgrounds, next the data and the methods used in the analysis are described, eventually the results are presented and some of their implications and caveats are discussed in the final section.

2 Theoretical considerations

2.1 Definition of fertility intentions

Reproductive intentions begun to be studied in the mid-1950s on the basis of the idea that people's preferences have a predictive value and might tell us how many children people would eventually have (Philipov and Bernardi 2011). A considerable large body of literature has investigated the predictive power of fertility intentions as reported by respondents' answers in sample surveys (Westoff and Ryder 1977). A nice review of this literature is provided by Morgan (2001). Basically these studies consistently showed that fertility forecasts based on reproductive intentions are inaccurate and that intentions tend to over-estimate subsequent actual fertility. Nevertheless, birth intentions remained at the core of fertility research because they are closely linked to reproductive behaviour (Morgan 2001) and informative about directional trends (Goldstein, Lutz and Testa 2003). They have potential to explain differential childbearing across different countries and different subgroups within societies (Bongaarts 2001). After it became clear that intentions are not a suitable tools for predicting behaviour several efforts were made in order to improve the measurement of individual's fertility intentions. In the surveys conducted in the framework of the Generation and

Gender Programme measures corresponding to the different concepts of reproductive intentions are available: Intended family size or child-number intentions, intentions to have a(nother) child within a given time period or child-timing intentions, certainty of the childbearing intentions, couple's childbearing intentions. The most commonly used measures are the child-number and the child-timing intentions. Child-number intentions underlie the individual's demand for children (Lee and Bulatao 1983) a concept close to that of childbearing dispositions that are derived from the genetic makeup of individuals and that endure in them over time (Miller 1992). The variable is sometimes summed up to the number of children which individuals already have to compute the ultimately intended (or expected) family size (Van de Kaa 2001). The child-timing intentions are referred to a foreseeable future and are considered a stronger predictor of reproductive behaviour as compared with child-number intentions (Westoff and Ryder 1977; Schoen et al. 1999; Rindfuss et al. 1988).

2.2 The theory of fertility at macro-level

A variety of theories have been developed to explain low fertility. A nice review of them can be found in van de Kaa (1996) or in Morgan and Taylor (2006). In each of these theories a different approach has been proposed which gives particular emphasis to a different set of determinants. The socio-economic explanation of low fertility focuses on the direct and indirect opportunity costs of having children (**Becker 1981**). According to this approach the women's increased economic independence achieved through improved education and higher labour force participation reduces the gains from marriage based on the interdependence of the traditional gender division of labour in the family and increases the relative costs of childbearing. This is because of their foregone earnings while they take care for the children at home or reduce their work hours. A second group of theories gives emphasis to the gender systems and the gender inequality as a source of fertility differentials across countries which may explain the lowest-low fertility in Southern Mediterranean countries. McDonald (2000) suggests that very low fertility may be the result of a hiatus that has developed in some developed countries between high levels of gender equity in individual-oriented institutions and sustained gender inequity in family-oriented social institutions. If in recent years women have been given the same opportunities as men in education and to some extent in the labour market, this has not occurred within the family. The higher level of achieved education made the women more empowered in their decision-making both in relation to household labour and fertility because their high level of education allows them to question traditional roles (**Mc Donald 2006**). Another approach sees fertility postponement, which may ultimately results in foregone fertility as a rational response to the economic insecurity and increasing opportunity costs of childbearing for women (**Kohler et al. 2002; Mills et al. 2005**). Additional theories focus on shifts in ideology and investment in children often referred to in relation to the second demographic transition (**Lesthaeghe and van de Kaa 1986; van de Kaa 1987**). An important

Research hypotheses:

1) The GDP per capita positively influences childbearing intentions, the number of additionally intended children or the timing of the next intended child
2) The Gender Empowerment measure, as an indicator of gender equality in the country, positively influences childbearing intentions.
3) The start of postponement transition does positively influence childbearing intentions.

A recent paper by Myrskylä et al. (2009) points out a J-shaped relationship between the human development index and the total fertility rates. Since the human development index is a composite measure based on GDP per capita, life expectancy and school enrolment, it is not clear from their analysis which of these components initiates the fertility rebound. A subsequent study by Luci and Thévenon (2010) showed that fertility patterns take a U-shape along the process of economic development in the OECD countries over the last five decades and evidenced that GDP per capita has taken the biggest contribution in driving the fertility rebound. Following these recent results I aim to find out whether the economic performance of countries may have an influence not only on fertility patterns but also on individual's childbearing decision-making.

2.3 The theory of reproductive decision making at micro level

Research hypotheses:

1) Education negatively affects the timing of the first intended child
2) Perceived behavioural control positively influences childbearing intentions

3 Data

The empirical analysis is based on the Eurobarometer survey carried out in 2006 which contains 15 questions aimed at studying fertility-related behaviour. Beyond the 25 EU countries the two then-acceding countries, Bulgaria and Romania, and the two candidate countries, Croatia and Turkey, were encompassed for the first time in the 2006 round. The stratified sampling procedure assures nearly equal probability samples of about 1,000 respondents in each of the country. The sample size allows equally precise estimates for small and large countries as well as comparisons between sub-groups broken down by sex, age, education, marital status and so on. The survey used a single uniform questionnaire design, with particular attention being paid to equivalent question wording across languages. A broad descriptive analysis of the data may be found in a previous paper (Testa 2006).

The analytical sample includes 5291 men and women aged 20 to 39 who answered both questions on child-timing and child-number intentions. 3,560 childless respondents and 1,731 with one child were used in the analysis of child-number intentions, while 2,614 childless respondents and 1,088 with one child were used in the analysis of child-timing intentions. The non-response rate was around 12%. A missing answer may be symptomatic of certain fertility plans. However, I simply excluded from the analysis all individuals who did not report any intended family size in order to avoid relevant complications given the absence of auxiliary information on this item. The results obtained from the analysis run on the sub-set of valid responses are reliable under the standard 'missing at random assumption' (Little and Rubin 2002).

The hierarchical structure consists of 5291 individuals nested in 99 regions belonging to 31 countries, Germany is kept divided into West and East and the United Kingdom into Great Britain and Northern Ireland (Table 1). The models adopted here are formally based on two levels, namely: individuals and countries (referred to as 'clusters') for the analysis of child-timing intentions, and individuals and

regions (referred to as 'clusters') for child-number intentions. Owing to whether the regions or countries are chosen as a cluster the hierarchical structure is quite unbalanced. This is not a problem as it is efficiently handled by maximum-likelihood methods. In the case of regions the number of clusters and their sizes are sufficient to achieve high power and good accuracy of the asymptotic distributions of the estimators (Snijders and Bosker 1999; Maas and Hox 2004). In the case of countries the estimates are more unstable but still they allow a quite reliable inference.

[TABLE 1 ABOUT HERE]

The full distribution of respondents in the regions is given in the Appendix.

3.1 Dependent variables

The response variable used in the first round of the multivariate analysis is the intended number of children which is surveyed through the following item: "*How many children do you (still) intend to have*?" As response options a range from 0 to up to 6 children was listed in the questionnaire. The prospective item comes after the question about the number of children already had and is clearly devoted to pick up the births which respondents plan to have in their future reproductive career. No distinction is made between biological and adopted children in both these questions. The variable is codified in the analysis as an ordinal variable with four categories: 0, 1, 2, 3 or more children. Values greater than or equal to 3, in the light of their low frequency, are collapsed into a single category.

The response variable used in the second round of the multivariate analysis is the intention to have a child within a short-term period which is surveyed through the following item: "*Do you intend to have a(nother) child in the next three years?*" The question on child-timing intentions comes after the item on child-number intentions in the survey questionnaire and only those respondents who intend to have one or more children were asked about the timing for their next intended child. Response options to the child-timing question were: *definitely yes, probably yes, probably not, definitely not*. The variable is treated as an ordinal variable with four categories and 0 standing for definitely not.

3.2 Models

Random intercept ordinal proportional logistic models are used to estimate the predictors of child-timing and child-number intentions. The clustering of individuals in regions and in countries is considered as a phenomenon of interest rather than a mere disturbance (Snijders and Bosker 1999). Hence multilevel models are used in the attempt to represent the complex causal process underlying the behaviour of individuals living in a social context and allowing valid inferences on the relationships at the relevant hierarchical levels.

The multilevel analysis relies on the random intercept version of the proportional odds model for ordinal responses (e.g. Agresti, 2002). In the models presented below, Y_{ij} denotes the response

variable of individual *i* of cluster (i.e. region) *j* ($i = 1,\ldots,n_j,\ j = 1,\ldots,J$) and $\mathbf{x}_{ij}$ is the corresponding vector of covariates, including both individual-level and cluster-level variables. Moreover, u_j denotes the cluster-level error term, also called random effect. Throughout the analysis I make the standard assumptions on random effects, namely: (i) the random effects are independent and identically distributed following a normal distribution with zero mean and an unknown, estimable variance σ_u^2; (ii) the random effects are independent of the covariates.

If the response variable is ordinal, with categories $c_1, c_2, \ldots, c_m, \ldots, c_M$, one can define $\gamma_{ij}^{(m)} = P(Y_{ij} \leq c_m \mid u_j)$ and adopt the random intercept *proportional odds* model, which can be viewed as a set of linear models for the *M*-1 cumulative logits:

$$\log\left(\frac{\gamma_{ij}^{(m)}}{1-\gamma_{ij}^{(m)}}\right) = \tau^{(m)} - \left(\boldsymbol{\beta}'\mathbf{x}_{ij} + u_j\right) \qquad m = 1,\ldots,M-1, \qquad [1]$$

where $\boldsymbol{\beta}$ is the vector of regression coefficients and $\tau^{(m)}$ are the cutpoint parameters (also known as thresholds). The cutpoints must be ordered, $\tau^{(1)} \leq \tau^{(2)} \ldots \leq \tau^{(M-1)}$, and the overall intercept is omitted for identifiability reasons. The assumption that the vector of regression coefficients $\boldsymbol{\beta}$ is constant for all the *M*-1 cumulative logits, sometimes called the *parallel regression assumption*, leads to the *proportional odds* property, i.e. the ratio of the odds of two individuals does not depend on the category. The parallel regression assumption is very convenient for parsimony and interpretation, and can be checked using, for instance, the test developed by Brant (1990). The model could be extended to handle partial proportional odds (Peterson and Harrel, 1990; Williams 2006), but then the interpretation becomes somewhat tortuous. Since just a few covariates in each model violate such an assumption, and since they do so only slightly, I keep the proportional odds multilevel models.

All models are run separately on childless individuals and individuals with one child. Only the first two parities are considered because of insufficient sample sizes being available for the parities higher than one. As stated in the rational choice theories approach (Yamaguchi and Ferguson 1995) fertility intentions may change after each new birth and are not taken only once for the whole reproductive career. This is in line with the view of a conditional-sequential fertility decision-making process (Namboodiri 1972; Bulatao 1981). As pointed out in the demographic literature (Kravdal 2001), a problem arises from parity-specific analysis which is selection, i.e. the presence of unobservable variables that could be correlated with the probability of having a child in parity *n* as well as with the probability of intending a child of the next order, *n+1*. The consequence is a biased and inconsistent estimator. This problem is not tackled here for lack of adequate longitudinal retrospective information but the related issue is discussed in the concluding section.

In principle, three-level regression models which reflect the clustering of individuals in regions and countries could be developed. However, for the analysis of child-number intentions a third level of analysis made the estimates of the country level covariates extremely unstable, limiting reliable inference (Maas and Hox 2004). Hence, I decided to keep the two-level models with respondents nested in different regional areas and to correct the standard errors of the coefficients by taking into

account the correlation of regions in the same countries (Williams 2000). In the analysis of child-timing intentions the regional-level variance was not statistically significant and therefore I adopted a two-level model setting with individuals clustered in countries.

3.3 Independent variables

Individual-level covariates. Individual explanatory variables included in the models are: age, sex, school enrolment, level of education, marital status, employment status, household situation, attendance of religious services, gender attitudes in childrearing. All covariates are referred to the time of the interview. Unfortunately, the data do not carry any retrospective information concerning the previous history of respondents, which could allow us to estimate the role of biographical trajectories on the process of forming family size intentions in a dynamic framework.

Almost the same set of covariates is used in the models for the timing and quantum of intended fertility with the only exception of child-number intentions which are included as a dependent variable in the models for the intention to have a child within the next three years with the assumption that the total intended family size will be closely correlated with the timing of the next intended child.

The *age* of respondents is the only continuous covariate. It is centred on the rounded mean value of 30 years. All other covariates are categorical, so they are transformed into suitable dummy variables. Often some collapsing of the categories is needed: in such cases several alternative collapsing schemes are tried in the model selection process. In the following the covariates are described with the categorisation used in the final models.

Individuals with any missing values on the covariates are not excluded from the sample; instead, the missing value is first treated as a distinct category and then, as long as no relevant differences emerge, it is included in the baseline category.

The *marital status* is codified using four categories: single, married, cohabiting and separated. The last category includes also divorced persons, while the married respondents are grouped together with the remarried and the widowed ones.

The *employment status* has just two categories: employed respondents and people not in the labour market or unemployed. A more refined breakdown of the variable is not supported by the data.

The *household situation* reflects the respondents' perceived possibility to plan the future. The survey item aimed at capturing such a variable is addressed as follow: "*Which of the following statements best reflect your household situation?* " Response options were: (1) *You live from day to day*, (2) *you know what you will be doing in the next six months*, (3) y*ou have a long-term perspective of what your household will be during the next 1 or 2 years*.

Attendance of religious services is codified as a dummy equal to 1 if respondents go to church at least once a month, regardless of what religion they belong to, and 0 otherwise.

The *gender role attitudes* relates to the opinion about men's and women's roles in childrearing activities. The survey question used to capture such attitudes is phrased as follows: "*Here is a list of*

statements relating to the role of men and women when it comes to raising children. Please tell me to what extent you agree or disagree with each of them." The response options go from total agreement to total disagreement. The variable is codified as a dummy equal to 1 if respondents agree (whether totally or not) with the three statements: 'a working mother can establish a just as warm a relationship with her children as a mother who does not work', 'Both men and women should contribute to the household income', and 'Family life often suffers when men concentrate too much on their work', and disagree (totally or not) with the following three statements: 'A pre-school child is more likely to suffer if his/her mother works', 'All in all family life suffers when the woman has a full-time job' and 'Ideally, the woman should stay at home to look after the children while the man goes out to work'.

Regional-level covariates. Two regional-level explanatory variables are included in the models: the mean actual number of children of the generations aged 40-60 years and the proportion of women in the same age group who had their first child before their 26th birthday. The first covariate is computed considering both males and females, while the second one is calculated considering only the female respondents. Both these covariates are computed from the same Eurobarometer sample by taking the means for people aged 40-60. They should reflect the cultural context in which individuals aged 20-40 have grown up and have been socialised. The regional-level covariates are centred on the value of the southern region of the Czech Republic, which had the greatest number of respondents.

Country-level covariates. The country-level explanatory variables included in the models are: the cohort fertility rate of female generations born in 1960, age at birth of first child of the same female cohorts, and the Gross Domestic Product (GDP) in Purchasing Power Standards (PPS) as per 2006. The female cohorts born in 1960 are chosen for measuring the tempo and quantum of fertility because they could reasonably approximate the parents' generations of the respondents in our analytical sample who were born between 1967 and 1986. The information related to cohort fertility of women born in 1960 was taken from the Council of Europe (2005). For Cyprus the mean actual number of children in the generations aged 40-60 derived from the Eurobarometer dataset was used, since no available information was found on cohort fertility of women born in 1960. Mean age at birth of first child of the female birth cohorts born in 1960 was taken from Frejka and Sardon (2007). Whenever this information was unavailable, the period mean age at birth of first child in 1982 was used. The data were compiled by Tomas Sobotka from Council of Europe (2006), Eurostat database, Human Fertility Database and the data provided by the National Statistical Offices.

As the corresponding regional-level variables, both these covariates should reflect the cultural context in which individuals aged 20-40 grew up and were socialised. The country GDP per capita is referred to the year 2006 and provided by the Eurostat online statistics. The volume index of GDP per capita in Purchasing Power Standards (PPS) is expressed in relation to the European Union (EU-27) average set to equal 100. If the index of a country is higher than 100, this country's level of GDP per head is higher than the EU average and vice versa. Basic figures are expressed in PPS, i.e. a common currency that eliminates the differences in price levels between countries allowing meaningful volume comparisons of GDP between countries. This covariate should reflect the cross-country differences in socio-economic conditions at the time when the fertility intentions are reported by the respondents.

All country-level variables are centred on the figures for the Czech Republic which had the greatest number of respondents.

A number of other cultural, socio-economic and demographic factors that could account for cross-country differences in childbearing plans—such as unemployment rates, the gender empowerment measure (an indicator of the level of gender equity in the country) and the year of the onset of fertility postponement—were also included in a preliminary version of the models. However, they were not kept in the final estimation models since they were never statistically significant.

A description of all the variables used in the models is reported in Table 4.

[TABLE 4 ABOUT HERE]

4. Results

4.1 Descriptive analysis

The most frequently reported answer was 2 intended children for childless respondents and 1 additional intended child for respondents with one child, which supports the pervasive preference for a 2-child family. These two options also showed the highest proportion of certainty attached to childbearing plans as well as the highest proportion of people intending to have a child within the next three years (Table 2). This evidence supports the strong correlations between the different measures of fertility intentions.

The most frequently reported answer to the question on the intention to have a child within the next three years is 'probably yes' for childless individuals and 'definitely yes' for individuals with one child. The distributions differ according to the reported intended parity (Table 3). If all 'yes' options are considered, the share of the 'definitely yes' answers tends to increase with the size of the intended family, while the proportion of the 'probably yes' responses tends to decrease with the number of intended children.

[TABLES 2 AND 3 ABOUT HERE]

In Figure 1 I compare the intended number of children people already have with the personal ideal and the actual number of children by age. The average intended family size goes from 1.9 children in the youngest ages 15-24 down to no child in the older age groups. In contrast, the average actual family size goes from almost no child in the youngest ages up to almost 2 children in the oldest age group (Figure 1). The sum of the two measures, the ultimately intended or expected family size, which is shown in a dot line in the graph, always lies below the curve of the ideal family size. Respondents in the age group selected for the multivariate analysis have on average one child and intend to have, on average, an additional one.

[FIGURE 1 ABOUT HERE]

Ideals mainly reflect the normative context (Hagewen and Morgan 2005) and they are quite stable over an individual's life course. They can be considered as an upper bound of fertility, ideals usually being larger than desires, and desires larger than actual fertility (Van Peer 2002).

Intentions, as the key proximate determinant of fertility behaviour (Schoen et al. 1999), take into account constraints in childbearing that may be encountered in implementing the initial fertility desires and change quite a lot over an individual's life course by staying always lower than ideals.

4.2 Multivariate analysis

Child-number intentions. At the individual level, the additional intended number of children is positively correlated with the religiousness and the household situation of respondents: Those individuals who go to church mass at least once a month and know with some certainty what their household situation will be in the next one or two years tend to indicate a larger additionally intended family size. This holds true for both childless respondents and those with one child. Men tend to report a larger number of children while older people are more inclined to select smaller family sizes. Unexpectedly, a young age at birth of first child is also associated with a smaller additionally intended family size. It could well be that a selection process drives such results with those who become parents at earlier ages already selected in the higher parities (Table 5).

At the contextual level, individuals living in regions where the parents' generations had larger family sizes are more likely to declare a larger number of (additionally) intended children independently on whether they are childless or they have already a child at the time of the interview. The relationship is observed only at a regional but not at a country level. Indeed, the coefficient of completed fertility of a country's female birth cohorts born in 1960 is not statistically significant and becomes even negative in the case of childless individuals. The graph in Figure 2 shows how the predicted probabilities for the base individual depend on the mean actual number of children ever born among the older generations. Since in the last decades the total fertility has shown a decreasing trend the graph is better understood when read from right to left. The likelihood to prefer families with two or more children declines with the decrease of the mean actual number of children in the parents' generations living in the same regions. In contrast, the probability to plan to have no child increases with the decrease in average family sizes of the parents' generation. The choice to become a parent (one-child families) is not influenced by the contextual regional fertility patterns and is constant across the different levels of the mean actual family size of the parents' generations. At high levels of actual regional fertility (above two children) the probability to prefer large families (two or more children) is twice as high as the probability to intend to have a family with only one child or with no children at all. At very low levels of actual regional fertility (below 1.5 children) the preference for no child becomes more likely than the option for two children or more.

For the sub-sample of childless respondents a significant effect of the country covariate 'mean age at birth of first child' is also detected: those individuals living in countries where the mean age at the

birth of the first child was higher tend to report a larger additionally intended family size (Table 5). The graph given in Figure 3 shows that individuals living in countries with a higher mean age at birth of first child in the parents' generations are more likely to report preferences for family sizes larger than two children. This relationship, which seems to be counterintuitive, is in line with the positive association found between the mean intended family size and the second demographic transition index (Sobotka, 2008).

[TABLE 5, FIGURES 2 AND 3 ABOUT HERE]

Child-timing intentions. Single, cohabiting or divorced respondents are less likely to intend to have a child within the next three years than married persons. Similarly, being enrolled in the school tends to decrease the likelihood of planning a first child in this short period. On the contrary, individuals who have a long-term perspective of their household situation tend to be more certain about their intention to have a first or a second child during the next three years than people who cannot make any long-term plans for the future. The child-number intentions are positively correlated with the child-timing intentions: the more children respondents intend to have, the more likely it is that they want to have one within the next three years. Age is positively associated with the probability to intend a first but not a second child in the next three years. Childless men are more uncertain about their short-term first-birth intentions than women, but there is no a similar gender effect for the second child intentions (Table 6).

At country level, the GDP per capita significantly explains the difference across countries: Respondents living in countries with a higher GDP per capita tend to postpone their plan to start a family but anticipate the birth of a second child. The graph in Figure 4 shows that the likelihood to definitely intend to have a child within the next three years increases with the level of GDP per capita among childless respondents but decreases with the per-capita GDP among individuals with one child.

[TABLE 6 AND FIGURE 4 ABOUT HERE]

There is no empirical evidence of intergenerational transmission of timing of fertility: no significant effects were found for completed fertility and mean age at first child of the cohorts born in 1960. An alternative model specification which considers individuals clustered in regions and corrects the standard errors of the country coefficients for the correlation of regions in the same countries has shown a positive significant effect of the timing of first child on the intentions to have a first child within the next three years. Individuals living in regions with a higher proportion of old women who became parents before age 26 are more likely to intend to have a child in the next three years. A similar effect was not observed for second-birth intentions. I did not keep this model because the regional variance was not statistically significant in the sub-sample of respondents with one child.

5. Discussion and concluding remarks

In this analysis I use proportional odds random intercept models to investigate the factors that affect childbearing intentions in Europe. Both the quantum and the timing of intended fertility are considered. Individuals are assumed to be part of a complex system whose relations are defined in a contextual framework, and therefore personal individual preferences are explained by both micro-level variables and macro-level factors.

At the individual level, child-number intentions and child-timing intentions are characterised by different influential factors but have also some common determinants.

The plan to have a child within the next three years is more closely related to situational factors, as for example living in a cohabiting partnership or still being enrolled in school. Whereas the plan to have a specified family size is closely linked to more enduring background characteristics of people such as religiousness. There are, however, some common predictors of child-number and child-timing intentions, like the ability to foresee what one's household situation will be like in the next one or two years which tends to increase the intended family size as well as the certainty of a child intention in the next three years.

Once the individual-level demographic and socio-economic factors are controlled for, there is a significant regional-level or country-level variance left that could be usefully explained by contextual cultural and economic factors.

I include the country current GDP per capita to study the possibility of a positive influence of this indicator on childbearing intentions following the literature that sees GDP per capita to be responsible for the recent fertility rebound registered at a macro level (Luci and Thévenon 2010).

The analysis has some further caveats. First, cross-sectional data do not allow the investigation of the process of forming intended family size in a dynamic way in which the inter-relationship between the actual and the intended family size is examined by explicitly considering its bi-directional nature. I hope that good quality longitudinal data will become available in the future for as many countries as considered in the current study. Second, the contextual effects may be the results of selective migration (Nauck 1995). However, it is reasonable to assume that such an endogeneity is not that serious as the relationship between contextual fertility and personal childbearing preferences works through a generational lag. Next, the neighbourhood effects exerted by the older cohorts may be counterbalanced by that coming from the peers who usually help to spread out new demographic behaviours. The topic is extremely interesting but may not be investigated till new data become available. Eventually, the limited national sample sizes prevent any detailed analysis at national level.

Another important finding of the current study is that the country's GDP per capita is not relevant for the child-number intentions but is important in the decision to have a child in the short-term period: it delays the first child but anticipates the second child intention. Evidently, the positive influence of the economic development on ultimately family size does not pass through the child-number intentions but exclusively through the second child-timing intentions.

The findings may help to give a new reading to the theories of fertility decision-making process while bringing a bridge between macro-level background factors and micro-level variables that influence fertility decisions.

These results are rich in implications for policy makers. The worsening of the economic performance of many countries may (temporarily) have negative repercussions on the fertility levels by stimulating a substantial postponement of the decision to have a second child.

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References

Agresti, A. 2002. *Categorical Data Analysis. Second Edition*. New York: Wiley.

Ajzen, I. 1988. Attitudes, personality and behaviour. Milton Keynes: Open University Press.

Ajzen, I. 1991. The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50: 179-211.

Barber, J.S. 2001. Ideational influences on the transition to parenthood: Attitudes toward childbearing and competing alternatives. Social Psychology Quarterly 64(2): 101-127.

Billari, F.C., D. Philipov and M.R. Testa. 2009. Attitudes, norms, and perceived behavioural control: Explaining fertility intentions in Bulgaria. *European Journal of Population* 25(4): 439-465.

Bongaarts, J. (2001). Fertility and reproductive preferences in post-transitional societies. *Population and Development Review*. Supplement to vol.27: 260-281.

Booth, A.L., and H.J. Kee. 2006. Intergenerational transmission of fertility patterns in Britain. Institute for the Study of Labor*, Working Paper* 2437, Bonn.

Brant, R. 1990. Assessing proportionality in the proportional odds model for ordinal logistic regression *Biometrics*, 46(4):1171-1178.

Bulatao, R.A. 1981. Values and disvalues of children in successive childbearing decisions. *Demography* 18:1-25.

Council of Europe. 2005. Recent demographic development in Europe 2005. Council of Europe Publishing: Strasbourg Cedex.

Fernández, R., and A. Fogli. 2005. Fertility: The role of culture and family experience. *NBER Working Paper* 11569, Cambridge.

Freedman, R., L.C. Coombs and L. Bumpass. 1965. Stability and change in expectations about family size: A longitudinal study. *Demography* 2: 250-275.

Freedman, R., D.S. Freedman and A. D. Thornton. 1980. Changes in fertility expectations and preferences between 1962 and 1977: Their relation to final parity. *Demography* 17(4): 365-378.

Frejka, T., and J-P. Sardon. 2007. Cohort birth order, parity progression ratio and parity distribution trends in developed countries. Demographic Research16(11): 315-374.

Goldstein, J., W. Lutz, and M.R. Testa. 2003. The emergence of sub-replacement family size ideals in Europe. *Population Research and Policy Review* 22(1-2): 479-496.

Hagewen, K.J. and S.P. Morgan. 2005. Intended and ideal family size in the United States, 1970-2002. Population and Development Review 31(3): 507-527.

Heaton, T.B., C.K. Jacobson and K. Holland. 1999. Persistence and Change in decisions to remain childless*. Journal of Marriage and the Family*, 61: 531-539.

Heiland, F., A. Prskawetz and W.C. Sanderson. 2008. Are individuals' desired family size stable? Evidence form West German panel data. *European Journal of Population* 24(2): 129-156.

Kravdal, O. 2001. The high fertility of college educated women in Norway: an artefact of the separate modelling of each parity transition, *Demographic Research* 5.

Lee, Ronald. 1980. Aiming at moving target: period fertility and changing reproductive goals, *Population Studies*, 34, pp.205-226.

Lee, R.D., and R.A. Bulatao. 1983. The demand for children: A critical Essay. In: R.A. Bulatao and R.D. Lee (eds.) *Determinants of fertility in developing countries, Vol1: Supply and demand for children.* New York: Academic Press.

Liefbroer, A. 2005. The impact of perceived costs and rewards of childbearing on entry into parenthood: Evidence from a panel study. European Journal of Population 21(4): 367-391.

Little R.J. A., and D.B. Rubin. 2002. Statistical Analysis with Missing Data, II Edition, New York, Wiley.

Luci, A. and O. Thévenon. 2010. Does economic development drive the fertility rebound in OECD countries? Unpublished manuscript.

McMahon, Martha. 1995. *Engendering motherhood*. New York, Guilford Press.

Maas C.J.M. and J. J.Hox. 2004. Robustness issues in multilevel regression analysis. *Statistica Neerlandica*. 58(2): 127-137.

Miller, W.B. 1992. Personality traits and developmental experiences as antecedents of childbearing motivation. Demography 29(2): 265-285.

Miller, W. B., and D.J. Pasta. 1995. How does childbearing affect fertility motivations and desires? *Social Biology* 42(3-4): 185-198.

Mitchell, D., and E. Gray. 2007. Declining fertility: Intentions, attitudes and aspirations. *Journal of Sociology*. 43(1): 23-44.

Murphy, M. 1999. Is the relationship between parents and children really weak? *Social Biology* 46(1-2): 122-145.

Murphy, M., and D. Wang. 2001. Family-level continuities in childbearing in Low-fertility societies. *European Journal of Population* 17(1): 75-96.

Murphy, M., and L.B. Knudsen. 2002. The intergenerational transmission of fertility in contemporary Denmark: The effects of number of siblings (full and half), birth order, and whether male or female. *Population Studies* 56(3): 235-248.

Myrskylä, M., H.P. Kohler and F.C. Billari. 2009. Advances in development reverse fertility decline. *Nature* 460(6): 741-743.

Namboodiri, K. 1972. Some observations on the economic framework for fertility analysis. *Population Studies* 26(2): 185-206.

Nauck, B. 1995. Regionale Millieus von Familien in Deutschland nach der politischen Vereiningung. In: Nauck, Bernhard and Corinna Onnen-Isemann (eds.) Familie im Brennpunkt. Luchterhand, Neuwied: 91-121.

Peterson, B., and F.E. Harrel. (1990). Partial proportional odds models for ordinal response variables. *Applied Statistics* 39(2): 205-217.

Philipov, D., Z. Spéder and F.C. Billari. 2006. Soon, later, or ever? The impact of anomie and social capital on fertility intentions in Bulgaria (2002) and Hungary (2001). *Population Studies* 60 (3): 289-308.

Reimondos, A., E. Gray and A. Evans. 2009. Fertility desires and expectations: Stability and Changes over the life course. Poster presented at the Annual Meeting of the Population Association of America, Detroit, April 30-May 2.

Rijken, A.J., and A.C. Liefbroer. 2009. Influences of the family of origin on the timing and quantum of fertility in the Netherlands. *Population Studies* 63(1): 71-85.

Rindfuss, R.R., P.S. Morgan and G. Swicegood. 1988. *First births in America: changes in the timing of parenthood*, University of California Press, Berkeley and Los Angeles.

Sobotka, T. 2008. Does persistent low fertility threaten the future of European populations? In: Surkyn J., P. Deboosere, and J. Van Bavel (eds.). Demographic challenges for the 21st Century. A state of the art in demography. Brussels: Brussels University Press.

Schoen, R., N.M. Astone, Y.J. Kim and C. A. Nathanson 1999. Do fertility intentions affect fertility behaviours? *Journal of Marriage and the Family* 61(3): 790-799.

Snijders, T.A.B., and R.J. Bosker. 1999, *Multilevel Analysis. An Introduction to Basic and Advanced Multilevel Modeling,* London, Sage Publications.

Spéder, Z., and B. Kapitány. 2009. How are time-dependent childbearing intentions realized? Realization, postponement, abandonment, bringing forward. *European Journal of Population* 25(4): 503-523.

Steenhof, L., and A.C. Liefbroer. 2008. Intergenerational transmission of age at first birth in the Netherlands for birth cohorts born between 1935 and 1984: Evidence from municipal registers. Population Studies 62(1): 69-84.

Testa, M.R. 2006. Childbearing preferences and family issues in Europe, Eurobarometer 2006.

Testa, M.R., and L. Grilli. 2006. The influence of childbearing regional contexts on ideal family size in Europe. *Population-E* 61(1-2): 109-138.

Thomson, E. 1997. Couple childbearing desires, intentions, and births. *Demography* 34(3): 343-354.

Udry, J. R. 1983. Do couples make fertility plans one birth at a time? *Demography* 20: 117-128.

Van de Kaa, D.J. 2001. Postmodern fertility preferences: from changing value orientation to new behaviour, Global fertility transition, Supplement to *Population and Development Review*, Vol.27, pp.290-331.

Van Peer, C. 2002. Desired and achieved fertility. In: Klijzing Erik and Corijn Martine (eds.): *Dynamics of fertility and partnership in Europe: insights and lessons from comparative research*. Vol.2, United Nations, New York and Geneva, pp.117-141.

Voas, D. 2003. Conflicting preferences: A reason fertility tends to be too high or too low. *Population and Development Review*, 29: 627-646.

Williams, R.L. 2000. A note on robust variance estimation for cluster-correlated data. *Biometrics* 56: 645-646.

Williams, R. 2006. Generalized ordered logit/partial proportional odds models for ordinal dependent variables: *The Stata Journal* 61(1): 58-82.

Westoff, C., and N. Ryder. 1977. The predictive validity of reproductive intentions. Demography, 4: 431-453.

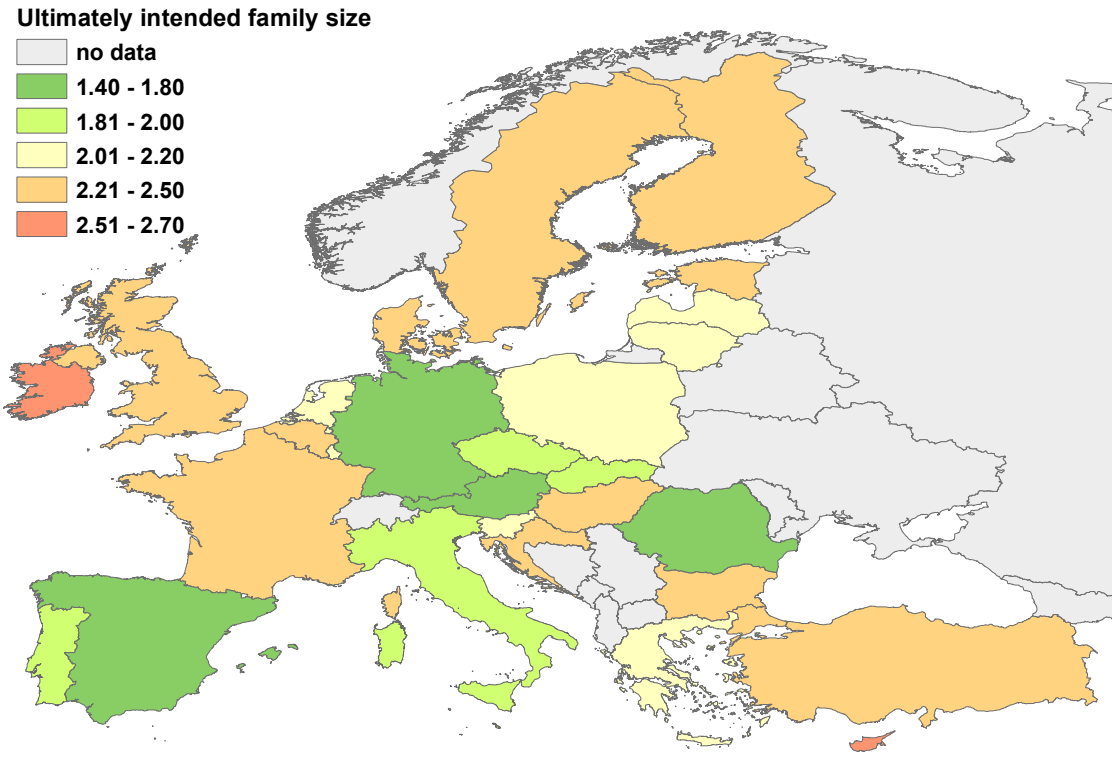
Wolf, Naomi 2002. Misconceptions: Truth, lies, and the unexpected on the journey to motherhood. New York, Doubleday.

Yamaguchi, K. and L.R. Ferguson. 1995. The stopping and spacing of childbirths and their birth-history predictors: rational-choice theory and event-history analysis, *American Sociological Review*, Vol.60, No.2, pp.272-298.

Table 4 Description of the individual-level, the regional-level and the country-level covariates in the sample (5291 individuals)

INDIVIDUAL-LEVEL COVARIATES	DESCRIPTION	MEAN	STD. DEV.	MIN	MAX
AGE (in years)		28	5.5	20	39
GENDER	1=male; 0=female	0.46	0.50	0	1
MARITAL STATUS					
Married	1=married; 0 otherwise	0.33	0.47	0	1
Cohabiting	1=cohabiting; 0 otherwise	0.21	0.41	0	1
Separated or divorced	1=dep. or div.; 0 otherwise	0.04	0.19	0	1
Single	1=single; 0 otherwise	0.42	0.49	0	1
EDUCATION					
Low level	1= low; 0 otherwise	0.07	0.25	0	1
Medium level	1=medium; 0 otherwise	0.44	0.50	0	1
High level	1=high; 0 otherwise	0.33	0.47	0	1
Enrolled	1=enrolled; 0 otherwise	0.16	0.36	0	1
EMPLOYMENT					
Employed	1= employed; 0 otherwise				
Not employed	1=unemployed or inactive; 0 otherwise	0.18	0.8	0	1
HOUSEHOLD SITUATION					
Having a long-term perspective of the situation	1=able to make a plan for the next 1 or 2 years; 0 otherwise	0.35	0.48	0	1
RELIGIOUSNESS					
Regular attendance of religious services	1= Attending religious services at least once a month; 0 otherwise	0.18	0.38	0	1
GENDER ATTITUDES					
Equal gender roles	1= equity in gender roles; 0 otherwise	0.16	0.37	0	1
AGE AT FIRST CHILD	1=before age 26; 0 otherwise	0.54	0.50	0	1
CHILD-NUMBER INTENTIONS	1=two or more children; 0 otherwise	0.17	0.38	0	1
REGIONAL-LEVEL COVARIATES					
MEAN NUMBER OF CHILDREN EVER BORN IN THE OLD GENERATIONS (40-59 YEARS)		1.82	0.19	0.9	2.35
PROPORTION OF WOMEN BECOMING A MOTHER BEFORE AGE 26 AMONG OLD GENERATIONS (40-59 YEARS)		0.54	0.13	0.17	0.76
COUNTRY-LEVEL COVARIATES					
COMPLETED FERTILITY OF WOMEN BORN IN 1960		2.01	0.40	1.59	3.76
AGE AT FIRST CHILD OF WOMEN BORN IN 1960		23.9	1.60	20.8	27.5
Log GDP PER CAPITA IN PPS IN 2006		4.41	0.41	3.60	5.61

Figure 1 Ultimately intended family size. Women and men aged 20-39 in 29 European countries.



Note: the ultimately intended family size corresponds to the sum of actual number of children plus the intended number of children.

Table 1 Mean ultimately intended family size, completed cohort fertility of women born in 1968 and Total Fertility Rates in the year 2006 by country.

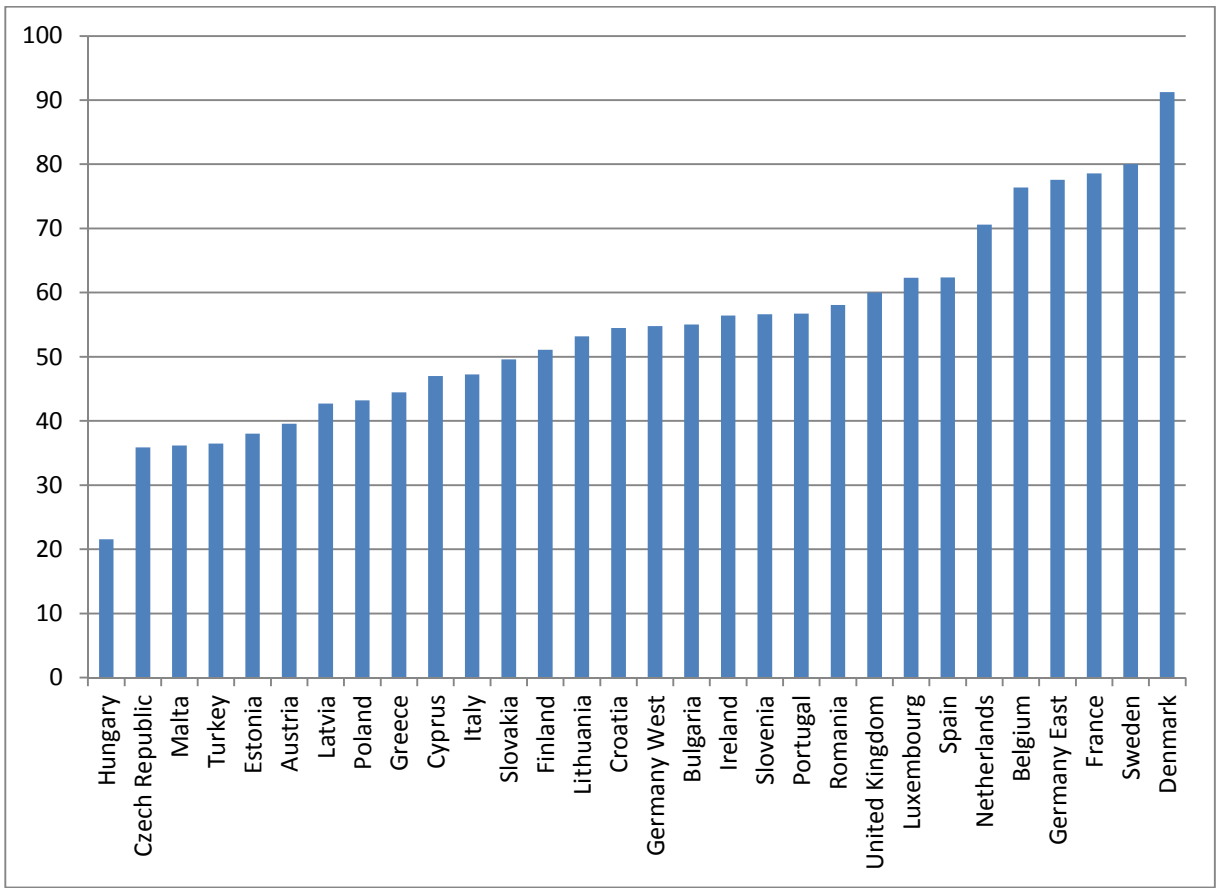
Countries	Ultimately intended family size	Completed fertility, women born in 1968	Total Fertility Rate Year 2006
Austria	1.44	1.62	1.41
Belgium	2.04	1.85	1.76
Bulgaria	2.12	1.83	1.38
Croatia	2.11	1.80	1.38
Cyprus	2.43	2.22	1.45
Czech Rep.	1.94	1.90	1.33
Denmark	2.21	1.97	1.85
Estonia	2.12	1.88	1.55
Finland	2.26	1.90	1.84
France	2.22	2.02	2.00
Germany	1.77	1.49	1.33
Greece	2.06	1.73	1.4
Hungary	2.14	1.92	1.34
Ireland	2.33	2.10	1.93
Italy	1.83	1.52	1.35
Latvia	2.03	1.80	1.35
Lithuania	2.00	1.81	1.31
Luxembourg	2.08	1.81	1.65
Malta	1.96	1.79	1.39
Netherlands	2.18	1.78	1.72
Poland	2.06	1.90	1.27
Portugal	1.96	1.75	1.36
Romania	1.7	1.72	1.32
Slovakia	1.87	2.00	1.24
Slovenia	2.09	1.8	1.31
Spain	1.76	1.53	1.38
Sweden	2.31	1.99	1.85
Turkey	2.09	2.92	2.21
United Kingdom	2.15	1.90	1.84

Sources: Ultimately intended expected family size is computed only on the female population aged 20-39 years taken from the 2006 EB; Completed cohort fertility is taken from the European Demographic Datasheet 2010; the Total Fertility Rate is taken from Council of Europe 2005.

Table 2 Perceived relevance of various factors in the decision on whether to have or not have a\another child. Percentage distribution of individuals aged 20-39 years by country

Countries	Factors relevant in childbearing decision-making (%)			
	Economic	Health	Partner	Institutions
Austria	89	82	66	70
Belgium	72	75	71	49
Bulgaria	96	91	84	80
Croatia	90	89	78	74
Cyprus	88	96	84	72
Czech Rep.	93	91	85	82
Denmark	54	74	81	57
Estonia	90	88	79	79
Finland	55	77	74	57
France	76	73	65	56
Germany	84	81	75	60
Greece	97	96	88	66
Hungary	93	90	82	68
Ireland	81	81	66	54
Italy	86	81	71	65
Latvia	94	91	76	86
Lithuania	92	86	83	80
Luxembourg	81	82	76	67
Malta	93	96	70	68
Netherlands	67	80	68	49
North Ireland	75	70	58	60
Poland	87	83	76	64
Portugal	86	83	72	72
Romania	94	92	81	78
Slovakia	94	92	82	60
Slovenia	87	90	79	68
Spain	83	79	69	67
Sweden	63	83	78	74
Turkey	93	89	79	87
United Kingdom	84	81	77	64

Figure 2 Equal gender roles in child rearing tasks. Percentage distribution of individuals aged 20-39 years who disagree about a polarized gender distribution of tasks by country.



Survey item: "*Ideally, the woman should stay at home to look after the children while the man goes out to work*". Percentages of individuals who disagree.

Table 1 Analytical sample: Respondents aged 20-39 years in 29 European countries.

COUNTRIES	Respondents in regions	
	Childless	With just one child
Austria	154	72
Belgium	149	52
Bulgaria	99	81
Croatia	144	69
Cyprus	38	14
Czech Republic	140	88
Denmark	132	43
Estonia	72	70
Finland	127	64
France	97	52
Germany East	190	87
Greece	229	51
Hungary	104	62
Ireland	97	50
Italy	220	56
Latvia	99	80
Lithuania	97	76
Luxembourg	44	16
Malta	46	14
Netherlands	91	33
North Ireland	124	62
Poland	96	58
Portugal	117	109
Romania	135	86
Slovak Republic	135	86
Slovenia	195	68
Spain	146	55
Sweden	80	26
Turkey	153	66
United Kinigdom	154	71
Total	3569	1731

Table 1 Mean intended number of children and share of individuals who intend to have a child in the next three years. Analytical samples of respondents childless and with just one child.

Countries	Childless		With one child	
	Quantum	Timing	Quantum	Timing
Austria	0.94	52	1.12	88
Belgium	1.79	51	1.63	91
Bulgaria	1.88	72	1.52	71
Croatia	2.09	55	1.25	83
Cyprus	2.26	50	1.46	85
Czech Rep.	1.62	54	1.13	87
Denmark	2.05	52	1.69	97
Estonia	1.83	69	1.27	82
France	1.98	68	1.53	94
Fuinland	1.97	54	1.37	95
Germany	1.46	40	1.24	84
Greece	2.03	41	1.21	92
Hungary	1.73	51	1.30	84
Ireland	1.84	38	1.69	91
Italy	1.66	56	1.39	85
Latvia	1.67	72	1.54	76
Lithuania	1.96	76	1.14	80
Luxembourg	1.52	61	1.13	88
Malta	1.57	41	1.50	50
Netherlands	1.58	54	1.44	84
Poland	1.94	61	1.15	73
Portugal	1.66	56	1.24	97
Romania	1.40	79	1.35	81
Slovakia	1.59	48	1.19	81
Slovenia	1.97	47	1.29	94
Spain	1.63	44	1.10	94
Sweden	2.06	53	1.24	100
Turkey	1.38	52	1.46	89
United Kingdom	1.70	54	1.61	86

Table 5 Random intercept proportional odds model for the additional intended number of children. 29 European countries. Year 2006.

Individual-level covariates	Childless respondents		Respondents with just one child	
Age 30	-0.14	***	-0.18	***
(Age – 30)^2	-0.01	***	-0.005	*
Gender (Ref. Female)				
Male	0.28	***	0.54	***
Marital status (Ref. Married)				
Single	-0.06		-0.25	
Cohabiting	0.09		0.06	
Separated or divorced	-0.38		-0.36	
Enrolment in education (Ref. not enrolled)				
Enrolled	0.52		1.13	**
Level of education (Ref. low level)				
Medium level	0.28		-0.08	
High level	0.61		0.43	
Employment status (Ref. Employed)				
Unemployed or inactive	0.08		0.06	
Household situation (Ref. Live day by day)				
Short-term perspective				
Long-term perspective	0.22	**	0.65	***
Attending religious service (Ref. Less than once a month)				
At least once a month	0.51	***	0.50	***
Attitudes towards gender role (Ref. Polarized division of tasks)				
Equality in gender roles	0.10		-0.06	
Duration from the birth of the last child (Ref. Less than four)				
Four or more years	-		-0.66	***
Country-level covariates				
Share of people with high education				
Onset of fertility postponement				
Gender Empowerment measure	0.26	***	0.15	
Log-GDP per capita	-0.27		-0.32	
Country level variance				
First cutpoint	-0.98	***	-0.81	**
Second cutpoint	0.09		1.81	***
Third cutpoint	2.77	***	4.02	***
Level-1 units	3560		1731	
Level-2 units	99		99	
Log-likelihood	-4021.8		-1722.2	

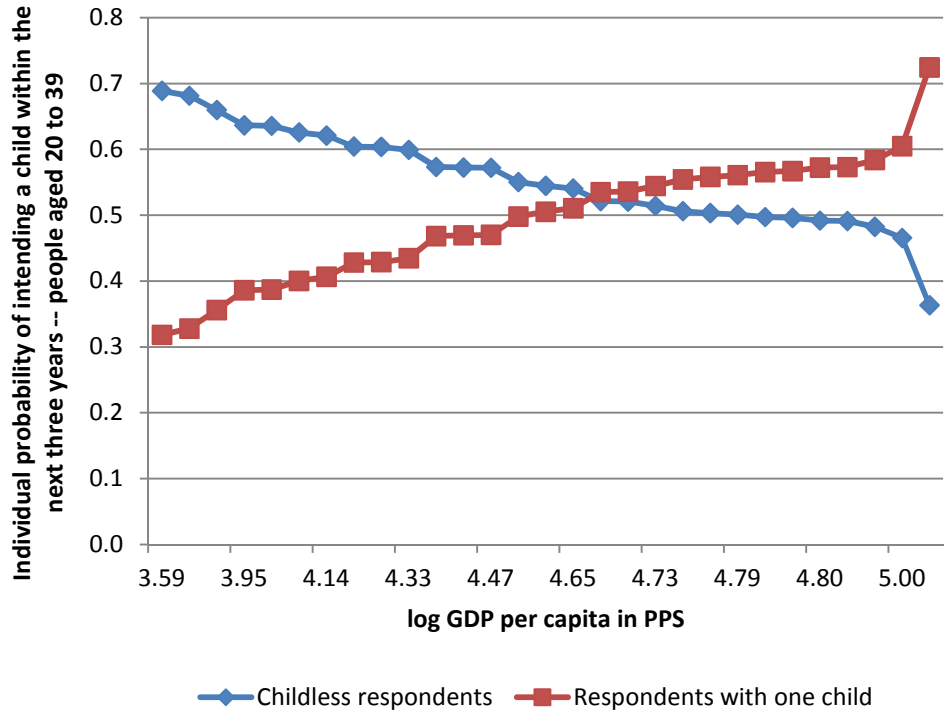
* p<0.05; ** p<0.01; *** p<0.001

Table 6 Random intercept proportional odds model for the intention to have a child within the next three years. 29 European countries. Year 2006.

Individual-level covariates	Childless respondents		Respondents with one child	
Age 30	0.10	***	0.01	
(Age – 30)^2	-0.01	***	-0.005	
Gender (Ref. female)				
Male	-0.54	***	-0.09	
Marital status (Ref. married)				
Single	-1.63	***	-1.41	***
Cohabiting	-0.73	***	-0.33	
Separated or divorced	-0.63		-1.23	***
Enrolment in education (Ref. not enrolled)				
Enrolled	-0.93	***	-1.30	**
Level of education (Ref. low level)				
Medium level	0.01		-0.42	
High level	-0.08		-0.32	
Employment status (Ref. employed)				
Unemployed or inactive	-0.08		0.13	
Household situation (Ref. Live day by day)				
Short-term perspective				
Long-term perspective	0.28	***	0.40	**
Attendance of religious services (Ref. less than once a month)				
At least once a month	0.12		0.21	
Gender role attitudes (Ref. non equal)				
Equity in gender role	0.11		-0.09	
Duration from the birth of the last child (Ref. Less than four)				
Four or more years	-		0.09	
Country-level covariates				
Share of people with high education				
Onset of fertility postponement	-0.17		0.04	
Gender empowerment measure	-0.03		0.05	
Log-GDP per capita	-0.68	**	0.86	**
Country-level variance	0.10	**	0.90	**
First cutpoint	-3.82	***	-3.30	***
Second cutpoint	-2.27	***	-2.14	***
Third cutpoint	-0.29		0.12	
Level-1 units	2614		1088	
Level-2 units	31		31	
Log-likelihood	-3010.9		-1125.2	

* p<0.05; ** p<0.01; *** p<0.001

Figure 4 Effect of GDP on the individual probability of intending a child within the next three years. EU-27 plus Turkey and Croatia. Year 2006.



Note. Probabilities computed for the base individual (all the individual covariates are set to the base category, while the regional-level covariates are set to the value of southern region of Czech Republic and the random effect is set to zero). Probabilities refer to the 'Definitely yes' response.