Child-number and child-timing intentions in a micro-macro European framework

Maria Rita Testa

Maria Rita Testa is a Senior Scientist at the Vienna Institute of Demography, Austrian Academy of Sciences, maria.rita.testa@oeaw.ac.at.

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Head of the Research Group on Comparative European Demography: Dimiter Philipov

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Abstract

The aim of the study is a cross-national analysis of the predictors of child-number and child-timing intentions. Eurobarometer data from 29 European countries collected in 2006 are used to run proportional-odds multilevel models. The results show that cohabitation is a reason for postponing the decision to have a first child while divorce encourages a delay in the birth of a second child. Having a long-term perspective of what one's household situation will be during the next one or two years is positively associated with the child-number intentions as well as with the intention to have a child within the next three years.

At the contextual level the childbearing behaviour of the parents' generations positively influences the childbearing intentions of the children's generations. Such a relationship concerns only the quantum but not the timing of the intended fertility. Indeed, the countries with the highest mean age at the first birth of the parents' generations are those where individuals report the largest intended family size. Individuals living in contexts characterised by high GDP per capita tend to postpone the birth of a first child but anticipate the arrival of a second child.

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

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.

Nevertheless, individuals do not always realise their fertility goals and individual or aggregate intentions are often discrepant from individual or mean aggregate levels of fertility. The apparent inconsistency has been reconciled by Bongaarts (2001) in his conceptual model which accounts for differences between intentions and behaviour. In his model he includes three parameters that can augment completed fertility beyond the intended fertility: unwanted children, replacement of children who have died, additional children needed to satisfy strong gender preferences; and three parameters that can reduce fertility relative to original intentions: timing of fertility, sub-fecundity and in-fecundity, competition with other activities that may lead people to revise their intentions downwards. The last three factors are by far more common than the first three ones in the developed countries which explain why intended family size is usually larger than actual family size in these countries.

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 analysis will be run around the following research hypotheses:

1) Child-number and child-timing intentions are influenced by different individual factors;

2) The determinants of childbearing intentions, whether child-timing or child-number, are characterised by significant cross-regional and cross-national variations;

3) The childbearing behaviour of the parent's generations influences the child-number and child-timing intentions of the children's generations;

4) The economic situation of the country where individuals live affects their fertility choices.

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 BACKGROUNDS

Reproductive intentions have been conceptualised in different ways in the literature depending on the type of the available measure (Billari et al. 2009; Spéder and Kapitány 2009). Several distinguished concepts are: the intended family size or child-number intentions, the intentions to have a/another child within a given time period or child-timing intentions, the degree of certainty of the childbearing intentions, the couple childbearing intentions or the combination of the partners' fertility intentions. The most commonly used variables are those based on the child-number intentions concept, the intention for a certain number of children, or total fertility intentions. The variables conceptually underlies 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, a measure used with

the purpose of forecasting demographic behaviour (Van de Kaa 2001) though it has not yet overcome all the difficulties intrinsic in measuring fertility preferences.

The time-dependent intentions which are referred to a foreseeable future as well as the certainty of these intentions to have a/another child are considered a stronger predictor of future fertility behaviour as compared with child-number intentions (Westoff and Ryder 1977; Schoen et al. 1999; Rindfuss et al. 1988). Similarly, the probability of realising one's childbearing plans improves if there is agreement between the partners about their fertility intentions (Thomson 1997; Schoen et al. 1999).

Finding the most suitable concept of fertility intentions which comes closest to the subsequent actual reproductive behaviour is very challenging because even when a useful and well-defined measure of birth intentions is chosen its predictive power could be compromised by the fact that the stated plans change through time in response to changes in economic situation, partnership conditions (Heaton et al. 1999; Mitchell and Gray 2007; Reimondos et al. 2009), partner's preferences (Thomson 1997; Voas 2003), and other important factors. One major source of dynamic development of reproductive plans is parity transition: child-number intentions may change after the birth of a child when family plans are most likely to be reassessed (Udry 1983; Miller and Pasta 1995; Freedman et al. 1965 and 1980; Heiland et al. 2008). This might be particularly true for people who do not yet have children and cannot easily anticipate the experience of 'being parents' (McMahon 1995; Wolf 2002).

The complexity in the relationship between reproductive intentions and behaviour is due to the fact that they influence each other reciprocally as in an interaction process: intentions influence the actual number of children and actual childbearing in turn influences intentions.

Such a relationship has been proved to be at work also with a generational lag.Previous analysis (Testa and Grilli 2006) based on the 2001 Eurobarometer survey showed that the actual fertility of the parents/old generations indeed influences the ideal fertility of the children/young generations living in the same regions. This finding lent additional support to the hypothesis stated in an earlier study (Goldstein and Testa 2003) that changing fertility ideals lag behind the changes in actual reproductive behaviour, as originally argued by Lee (1980), and

interpreted it in an integrated micro-macro framework where the social context plays a major role. The literature mentioned above on changing ideals as a reflection of changing behaviour will be the starting point of the current paper where intentions, i.e., concrete childbearing plans, instead of ideals are considered.

The idea that more prolific parents correspond to more prolific children is not new in the literature (Murphy 1999). Moreover, it has been shown that this positive relationship has become stronger through time (Murphy and Wang 2001) and played a substantial role in keeping fertility higher than it would be in the absence of such a transmission (Murphy and Knudsen 2002).

More recently, several studies have evidenced that the intergenerational transmission of fertility also affects the timing of childbearing (Steenhof and Liefbroer 2008; Rijken and Liefbroer 2009) and may work not only at the individual level but also at a country level, as a cultural transmission from the origin country rather than from the origin family (Booth and Kee 2006). Economists have given emphasis to the contextual dimension of the relationship between parents' and children's fertility patterns by arguing that it is not only personal experience that matters, i.e. the number of siblings, but also the culture where people live as embodied in the mean actual number of children of the parents' generation in the country of ancestry (Fernandez and Fogli 2005). This is the same methodological choice as adopted in the current analysis which, while lacking information on the number of respondents' siblings, investigates the intergenerational transmission of fertility patterns by using the actual family size of the parent's generation living in the same region or country.

However, the cultural context where individuals grew up is not the only variable that could account for cross-country differences in child-number and child-timing intentions. Another important contextual variable that has recently been found as a relevant influential factor driving the individual's childbearing choices is the economic situation of the region or country.

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.

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 Respondents, regions and countries. Ages 20 – 39. EU-27 plus Turkey and Croatia.

Countries	Number of regions	Respondents in regions		
		Number of respondents	Minimum	Maximum
Austria	6	226	14	63
Belgium	3	201	31	117
Bulgaria	1	179	179	179
Croatia	1	213	213	213
Cyprus	1	51	51	51
Czech Republic	3	228	54	118
Denmark	4	175	15	92
Estonia	3	142	34	91
Finland	5	149	5	95
France	5	189	25	78
Germany East	3	115	22	52
Germany West	5	161	13	63
Great Britain	4	171	12	82
Greece	3	280	67	137
Hungary	3	166	42	63
Ireland	2	146	16	130
Italy	5	276	45	70
Latvia	3	179	38	90
Lithuania	3	173	34	77
Luxembourg	2	60	24	36
Malta	1	60	60	60

Table continued on the next page

Table 1 (continued)

Countries	Number of regions	Respondents in regions		
		Number of respondents	Minimum	Maximum
Netherlands	4	124	12	61
North Ireland	1	54	54	54
Portugal	4	153	6	61
Romania	1	226	226	226
Slovak Republic	3	220	57	104
Slovenia	3	263	47	149
Spain	7	201	15	65
Sweden	6	106	3	24
Turkey	1	219	219	219
	99	5291	3	219

Note: 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, *c2*,…, c_m,…,c_M, one can define $\gamma_{ij}^{(m)} = P(Y_{ij} \le c_m \mid u_j)$ and adopt the random intercept *proportional odds* model, which can be viewed as a set of linear models for the *M*-1 cumulative logits:

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

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, $\tau^{(1)} \le \tau^{(2)} \ldots \le \tau^{(M-1)}$, 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.

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.

Table 2 Child-number intentions by certainty of intentions and timing of the next child. EU-27 plus Turkey and Croatia. People aged 20-39.

	%	Timing of the next intended child [a] (%)	Certainty of child-number intentions [b] (%)
Childless respondents			
No child	15	-	-
1 child	15	16	24
2 children	51	58	58
3 or more children	19	26	18
Respondents with 1 child			
No child	33	-	-
1 child	47	62	74
2 children	17	31	21
3 or more children	3	7	5

Notes: a) Proportion of those answering 'definitely yes' to the child-timing question. b) Proportion of those reporting to be 'very sure' of being successful in having the number of children mentioned. c) Respondents who did not intend to have any child at all were not asked about their intentions to have a child in the next three years nor about the certainty of such an intention.

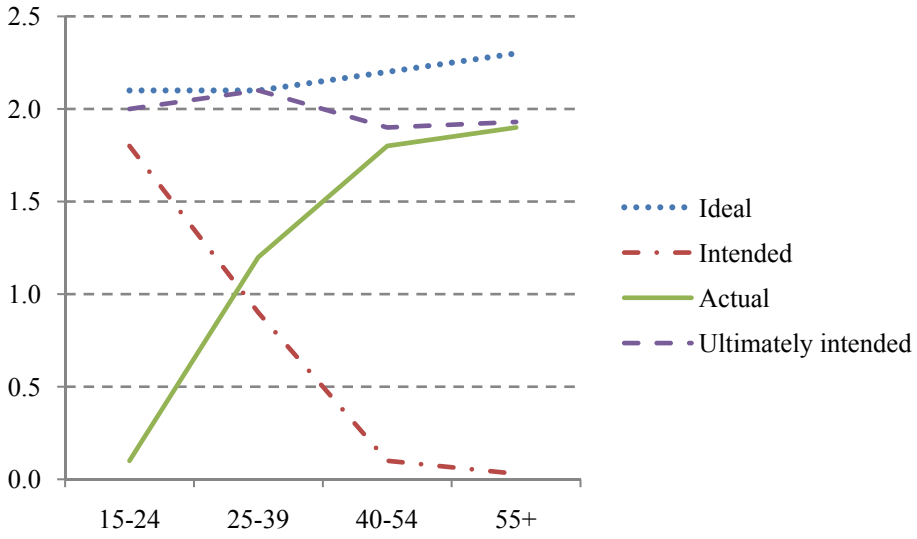
Table 3 Child-timing intentions by intended parity. EU-27 plus Turkey and Croatia. People aged 20-39.

	Intended number of children			
	1 child	2 children	3 or more children	All
Childless respondents				
Definitely not	21	22	20	22
Probably not	22	24	24	24
Probably yes	37	32	30	32
Definitely yes	21	22	26	22
Respondents with 1 child				
Definitely not	6	3	2	5
Probably not	10	9	4	9
Probably yes	45	35	26	41
Definitely yes	39	53	68	44

Note: Respondents who did not intend to have any child at all were not asked about their intentions to have a child in the next three years.

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 Ideal, intended and actual family size by age group. EU-27 plus Turkey and Croatia.



Note: a) The sum of actual number of children plus the intended number of children is the ultimately intended family size. b) The ideal family size is referred to the personal ideals as distinct to societal ideals.

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).

Figure 2 Effect of the mean number of children ever born among older generations on the younger generations' individual probability of a given intended family size. Childless respondents. EU-27 plus Turkey and Croatia. Year 2006

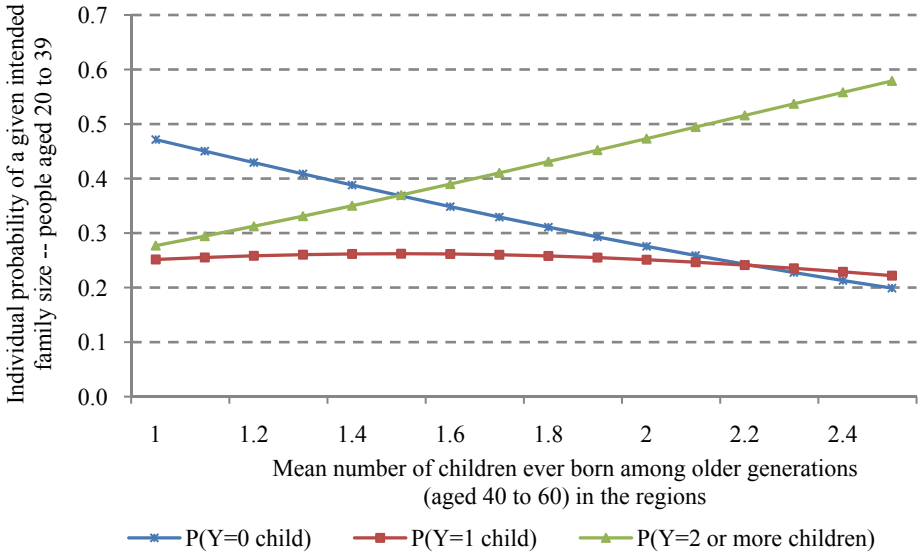


Figure 3 Effect of the mean age at the first child on the individual probability of intending a family with more than two children. Childless respondents. EU-27 plus Croatia and Turkey. Year 2006.

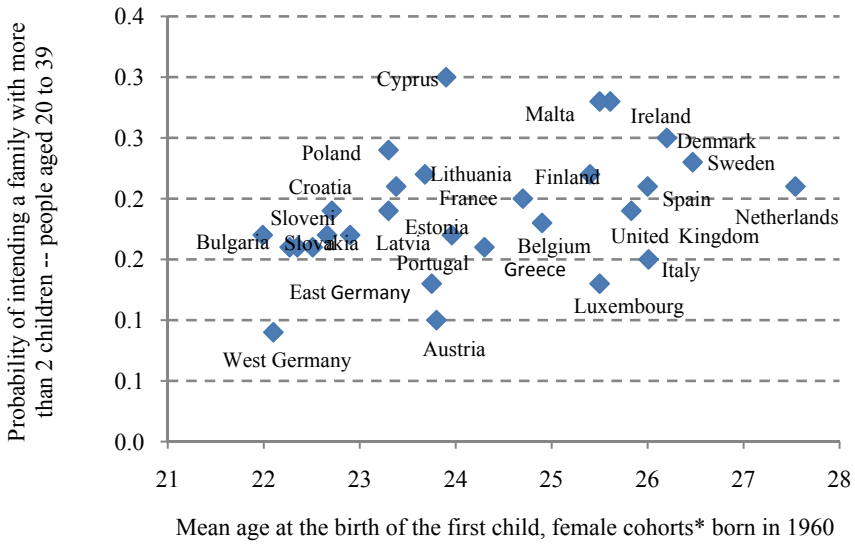


Table 5 Random intercept proportional odds model for the additional intended number of children. EU-27 plus Turkey and Croatia, Year 2006.

Individual-level covariates	Childless respondents		Respondents with 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	
School enrolment (Ref. not enrolled)				
Enrolled	0.52		1.13	**
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. being able to make plans up to six months)				
Long-term perspective	0.22	**	0.65	***
Religiousness (Ref. attending religious services less than once a month)				
Attending religious services at least once a month	0.51	***	0.50	***
Gender role attitudes (Ref. non equal)				
Equity in gender role	0.10		-0.06	
Age at first child (Ref. 26 years or older)				
Before age 26	-		-0.66	***
Regional-level covariates				
Mean actual number of children in the generation aged 40-59	0.91	*	0.95	*
Proportion of women becoming mothers before age 26 in the generation aged 40-59	1.18		0.10	
Regional-level variance	0.19	**	0.17	**
Country-level covariates				
Completed fertility of women born in 1960	-0.22		0.07	
Mean age at first child of women born in 1960	0.26	***	0.15	

Table continued on the next page

Table 5 (continued)

Individual-level covariates	Childless respondents		Respondents with one child	
Log-GDP per capita in 2006	-0.27		-0.32	
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	

Note: * p<0.05; ** p<0.01; *** p<0.001

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).

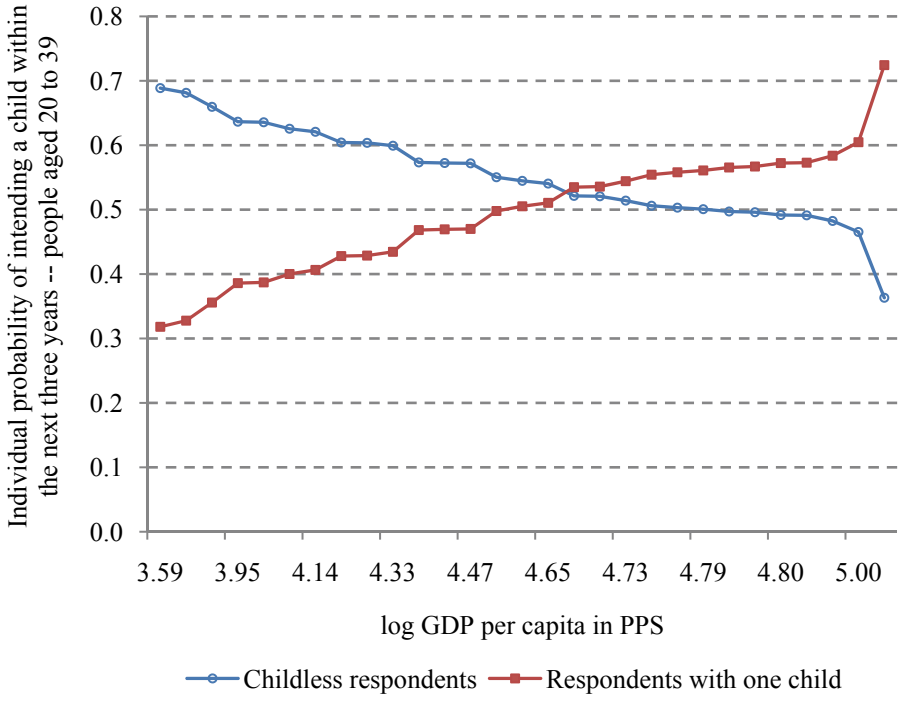
At country level, the GDP per capita significantly explains the difference across countries: Respondents living in countries with a higher GDP per capita tend to postpone their plan to start a family but anticipate the birth of a second child. The graph in Figure 4 shows that the likelihood to definitely 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 Random intercept proportional odds model for the intention to have a child within the next three years. EU-27 plus Turkey and Croatia. 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 school (Ref. not enrolled)				
Enrolled in the school	-0.93	***	-1.30	**
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. being able to make plans up to six months)				
Long-term perspective	0.28	***	0.40	**
Religiousness (Ref. attending religious services less than once a month)				
Attending religious services at least once a month	0.12		0.21	
Gender role attitudes (Ref. non equal)				
Equity in gender role	0.11		-0.09	
Intended number of children (Ref. less than two children)				
Two or more children	0.51	***	0.64	***
Age at first child (Ref. 26 years or later)				
Before age 26	-		0.09	
Country-level covariates				
Completed fertility of women born in 1960	-0.17		0.04	
Mean age at first child of women born in 1960	-0.03		0.05	
Log-GDP per capita in 2006	-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	

Note: * 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

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 cultural and economic factors.

I use the mean number of children ever born in the older generations and the completed fertility of the female cohorts born in 1960 to identify the neighbourhood's influence on the younger generations' childbearing plans. Similarly, I use the mean age at birth of first child of the old generations in the regions and in the countries to investigate the neighbourhood's influence on the younger generations' child-timing plans. In addition, I include the country 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 multilevel models provide results partly consistent with earlier studies (Axinn et al. 1994; Testa and Grilli 2006) which have shown that parents' fertility behaviour affects children's fertility preferences. However, such a relationship holds true only at the regional but not at the country level. Moreover, I could not find with the data at hand any empirical support for the intergenerational transmission of the timing of fertility which has been proved in some recent articles (Steenhof and Liefbroer 2008; Rijken and Liefbroer 2009). This may be due to the circumstance that the intergenerational transmission of fertility patterns could be investigated only at the country but not at the individual level since that the information on the number of siblings of the respondents is lacking in the Eurobarometer dataset.

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 a postponement of childbearing after the first birth.

In the attempt to build a link between macro-level background factors and micro-level variables that influence fertility I run a cross-national multilevel analysis of the determinants of childbearing intentions. The findings may help to give a new reading to the theories of fertility decision-making process.

These results are rich in implications for policy makers. First, the implementation of family-friendly policies may become more of a challenge in the future if preferences of smaller family sizes spread over Europe as a result of persistently low fertility. Second, the worsening of the economic performance of many countries may (temporarily) have negative repercussions on the fertility levels, especially in those countries characterised by a large prevalence of one-child families, by stimulating a substantial postponement of the decision to have a second child.

Acknowledgment

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Appendix

Table A.1 List of regions by country:

Countries	Regions	Frequencies
Austria	Tirol	14
	Carynthia	22
	Upper Austria	63
	Styria	33
	Lower Austria	42
	Vienna	52
Belgium	South	53
	Brussels	31
	North	117
Bulgaria		179
Croatia		213
Cyprus		51
Czech Republic	North	54
	Centre	56
	South	118
Denmark	Copenhagen area	32
	Sjaelland	36
	Fyn	15
	Jutland	92
Estonia	North	91
	Centre	34
	South	17
Finland	South	95
	Centre	35
	East	8
	West	6
	North	5
France	Center	33
	North	78
	East	27
	West	25
	South	26
East Germany	North	22
	Centre	52
	South	41
	Berlin area	17
West Germany	North	39
	West	63
	South	29
	Berlin area	13

Table continued on the next page

Table A.1 (continued)

Countries	Regions	Frequencies
Great Britain	North	43
	Centre	34
	South	82
	Scotland	12
	North Ireland	54
Greece	North	76
	Centre	67
	South	137
Hungary	North	61
	Centre	63
	South	42
Ireland	North	16
	South-Centre	130
Italy	North-West	70
	North-East	52
	Center	54
	South	55
	Islands	45
Latvia	North	90
	Centre	38
	South	51
Lithuania	North	62
	Centre	34
	South	77
Luxembourg	Luxembourg area	24
	Rest of the country	36
Malta		60
Netherlands	North	12
	East	27
	West	61
	South	24
Poland	North	38
	Centre	78
	South	69
Portugal	North	61
	Centre	31
	Lisboan area	55
	South	6
Romania		226
Slovak Republic	West	104
	Center	57
	South	59

Table continued on the next page

Table A.1(continued)

countries	Regions	Frequencies
Slovenia	North	67
	Centre	149
	South	47
Spain	North-West	15
	North-East	26
	Madrid area	29
	Centre	24
	East	65
	South	26
	Canary Islands	16
Sweden	South	9
	Centre	24
	North	3
	Göteborg	30
	Stockholm area	22
	Malmö area	18
Turkey		219