# Fertility and happiness in the XXI century: institutions, preferences, and their interactions

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# Background

As low – and sometimes even very low – fertility has become commonplace in virtually all developed countries, traditional socioeconomic theories concerning reproductive behavior (Hirschman, 1994) have become inadequate in the explanation of the cross-sectional and temporal variation in fertility the most developed countries (Morgan & Taylor, 2006). For example, the United States has repeatedly been characterized as an "outlier", with a TFR near replacement level that is difficult to reconcile with existing theoretical frameworks (Caldwell & Schindlmayr, 2003). On the other end of the spectrum, fertility in Italy and Spain has reversed significantly since attaining lowest-low fertility with TFR levels below 1.3 in the mid to late 1990s (Billari, 2008; Kohler, Billari, & Ortega, 2002, Myrskylä et al., 2009). This reversal is only partially accounted for by declines in the pace of fertility postponement (Caltabiano, 2008), and Myrskylä et al. (2009) argue that it is part of a broader trend in which very high levels of human development – as measured by the human development index (HDI) – contribute to increases in fertility rates in the most advanced societies.

The two leading theoretical framework explaining contemporary fertility trends in the rich world, with numerous variations, are the economic theory based on Becker's seminal work (see e.g. Becker, 1960; Becker, 1981) and the "Second Demographic Transition" (SDT) framework proposed by Lesthaeghe and van de Kaa (Lesthaeghe, 1995; Lesthaeghe & van de Kaa, 1986; van de Kaa, 1987). In the economic theory framework, individuals or couples maximize life-cycle well-being and by considering the quantum and quality of children in the context of various other possible allocations of scarce resources such as time and money. According to the "cultural perspective" in the SDT framework, self-fulfillment is the main goal of life, and childbearing is predicted to occupy an increasingly less central role in the life of individuals and couples. As such, childbearing and marriage are often postponed until other goals in life – such as completing education and establishing oneself in the labor-market are fulfilled. A third, re-emerging area, related to both the mentioned approaches is the "value of children" approach (Friedman, Hechter, & Kanazawa, 1994; Hoffman & Hoffman, 1973; Hoffman & Manis, 1979; Nauck, 2007; Nauck & Klaus, 2007).

Working within both theoretical frameworks, many authors have also emphasized the role of institutions in shaping individuals' and couples' reproductive choices (Brewster & Rindfuss, 2000; DiPrete, Morgan, Engelhardt, & Pacalova, 2003; McDonald, 2000). Welfare support for families and for the ability to combine work and family, in particular, has been pinpointed as an explanation for fertility choices among the most developed societies. Family policies, for instance, affect individual's and couples' fertility decisions in different ways in different times and places (Neyer & Andersson, 2008).

However, in our opinion none of the two perspectives, taken separately, can explain why people still have kids in contemporary advanced societies, nor why in some societies fertility is indeed increasing. In fact, we can agree with the claim by Caldwell and Schindlmayr (2003) that theories of below-replacement fertility need to find the "commonality" providing a general enough explanation.

In this paper, we develop a macro-micro theory of fertility in contemporary advanced societies and we present a first empirical test based on comparative data. We start from the hypothesis that, given a general baseline preference to become parents, which may be biologically rooted, the predicted (increase in) happiness explains substantially fertility behaviors in an era with highly effective contraception.

In line with the "cultural" approach and with the economic theories of fertility mentioned earlier, we argue that, nowadays, individuals have children only as long as this is compatible with their self-fulfillment (happiness). However, what counts in decisions is the predicted increase, and this is shaped by the institutional environment individuals live in. Our theoretical framework is therefore based on Kahneman's and Tversky's "prospect theory" framework (Kahneman & Tversky, 1979) and on social-psychological theories of decision-making such as the Theory of Planned Behavior (Ajzen, 1991), and it incorporates recent behavioral economic and psychological findings about the determinants of subjective well-being, and how predicted changes in subjective well-being determine decisions within a life-cycle framework.

Our hypothesis is completed by the idea that expected happiness increase related to childbearing is likely be shaped by the institutional context that individuals encounter during this decision-making process. In this sense we complement the approach described in the previous paragraph with fertility theories emphasizing the role of institutions. For example, family-friendly policies, but also pro-family discourse or the prospects for parenting-related happiness as compared to other kinds of happiness are institutionally-driven. These institutions affect the expected happiness from childbearing, and therefore they affect fertility. We argue that this macro-micro theory of fertility accounts for some general differences among the developed world, answering to the call of Caldwell and Schindlmayr (2003) for a common framework in the explanation of below-replacement fertility.

The remainder of this paper is structured as follows. In the next section, we discuss our theoretical framework, as embedded in the relevant literature, and derive general and empirical research hypotheses. Then, we discuss the data and methods we use. Results are subsequently presented, before a discussion and some concluding remarks.

# Theoretical framework: a macro-micro theory of fertility decision-making

Our theoretical framework is based on behavioral fertility theories fertility choices at the micro-level, as well as cultural and institutional fertility theories at the macro-level. A joint consideration of macro- and micro-factor leads to general hypotheses that have testable predictions. We now discuss this framework more in detail, moving from the relevant literature to our hypotheses.

## *Predicted happiness from childbearing*

Economic theories of fertility are based on the idea that childbearing is the outcome of utility maximization by individuals or couples (Becker, 1960, 1981; Becker & Barro, 1988). Basically, parents have children wither because increase the utility of their parents (directly as "consumption goods" or indirectly as parents care about their offspring's utility), or because children are expected to care about their parents at a later stage, e.g. an "old-age" security motive (Billari & Galasso, 2008; Boldrin & Jones, 2002). The common point is the assumption that individuals maximize (subject to constraints) their future expected utility, which is latent and for which only the behavioral consequences are observed.

The idea of "value of children" emphasizes the multidimensional returns from having children. Various strands of literature point to this idea. For instance, it has been embedded in a subjective expected utility

approach (Beach, Campbell, & Townes, 1979). In the most recent version, this approach is based on the idea that children provide value through a 'social production function' that has as general aims physical well-being and social approval (Lindenberg, 1986, 1991). Social structure is assumed to interact with the individual value of children in fertility decisions (Friedman, et al., 1994; Hoffman & Hoffman, 1973; Hoffman & Manis, 1979; Nauck, 2007; Nauck & Klaus, 2007). Within the value of children approach, having a child is seen as the start of a new social relationship (or, better, a set of social relationships) that have a structural value for an individual (Bühler, 2008).

The importance of happiness has been underlined by few scholars concerned with fertility scholars. In a recent critical review and agenda Hobcraft noticed that research on the links between subjective well-being and demographic choices (and especially childbearing) has been much more scarce than it could have been given its potential importance (Hobcraft, 2006). In the new literature on happiness and well-being, the idea is that *decision utility* is "inferred from choices and applied to explain choices" (Kahneman & Riis, 2005). Rayo and Becker (2007) argue that individual choices can be seen in an evolutionary perspective, by assuming that individuals maximize a current happiness level. Evolution selects happiness functions with the highest fitness.

The relatively limited emphasis on happiness in the explanation of fertility is surprising, given that researchers usually stress the central relevance of self-realization in contemporary fertility choices. van de Kaa, for instance, states that nowadays fertility is a "derivative", i.e. "in reflexive modern societies fertility is the outcome of a process of selfquestioning and self-confrontation by prospective parents. The woman will, in a way that befits her character and circumstances, typically ask herself: 'Will my life, and the relationship with my partner, be enriched if I interrupt contraception and use my basic right to have a child, or an additional child now?' The man will, in his own way, ponder essentially the same issue. If their answers are positive, the pair will do everything humanly possible to have that (additional) child." (van de Kaa, 2004, p. 77). To paraphrase Ariès, today "the days of the child-king are over" and the existence of a child is linked to plans for the future for which the child is not an "essential variable" (Ariès, 1980).

A recent review of the (small) economic literature on subjective wellbeing states that "The evidence with regard to the well-being effects of having children is mixed and differs across measure and country" (Dolan, Peasgood, & White, 2008, p. 107). This might be due to the difficulty of taking into account potential unobserved factors that affect the number of children and that are likely to bias the effect of the number of children on happiness. For instance, an analysis of data from the German Socio-Economic Panel found that the number of children was coeteris paribus negatively and significantly associated with current happiness, but there was no significant effect once individual-level fixed effects were taken into account (Ferrer-i-Carbonell & Frijters, 2004). Moreover, the relationship between number of children and happiness is likely to be non-linear, i.e. parity-specific, a circumstance that is hardly taken into account in several past studies.

The most relevant study is the analysis of a unique dataset of monozygotic twins, in which Kohler et al. (2005) showed that in Denmark becoming a parent (especially, of a boy for fathers) has a positive impact on happiness. However, the authors did not find significant effects on happiness of higher-order births. This finding is in contrast with the "set-point" theory postulating that key life events such as births do not

significantly influence happiness. While for individuals who are already parents the links between increased (or decreased) happiness might be linked to their own previous experience, the mechanism through which these perceptions are form might be through "vicarious" parenthood. As Morgan and King (2001, p. 6) argue "since some of the feelings/experiences of parenthood can be experienced vicariously – albeit in diluted form, via observation and through interaction with others' children – such experiences/observations could provide motivation for persons to have their own children".

We therefore formulate our first, general hypothesis.

**H1**: *parity- and time-specific predicted happiness from childbearing is the key driver of fertility decisions in contemporary low fertility societies*

In H1, we assume that when making fertility decisions, individuals compare their situation now (*experienced happiness*) with the hypothetical situation that they will experience when having a(nother) child in a relevant time frame (*predicted happiness*). This could also be defined "predicted utility", defined as "a decision maker's anticipation of the hedonic quality of a future experience" (Kahneman & Snell, 1992). When the difference between predicted happiness and expected happiness is positive, individuals will prefer to have a(nother) child to not having a(nother) child. Constraints might prevent them from actually carrying their choice, although such constraints are anticipated in the predicted happiness change.

Note that predicted happiness might not necessarily be a good forecast of the actual happiness experienced after the decision has been taken. Research on affective forecasting has shown that individuals systematically mispredict the amount of happiness (or displeasure) that future events would bring (Wilson & Gilbert, 2005). A possible bias can be due to unrealistic optimism (Liefbroer, Gerritsen, & de Jong Gierveld, 1994; Weinstein, 1980). On the contrary, individuals might underestimate their ability to adapt to circumstances they seemed to dislike earlier (Loewenstein & Schkade, 1999). Moreover, individuals might have a "projection bias" as they exaggerate the extent to which their future tastes will resemble their current ones. Projection bias can also be applied to scarcely reversible decisions like purchasing a durable good, where there is an inherent asymmetry: "A decision not to buy is reversible, so if the person does not buy today when she should, she can still buy in the future. But a decision to buy is irreversible, so if she buys today when she should not, she cannot unbuy in the future. With multiple buying opportunities, a person is prone not to buy when she should only in the unlikely event that she has a particularly low valuation on every buying opportunity, whereas she is prone to buy when she should not in the quite likely event that she has a particularly high valuation on at least one buying opportunity. Hence, projection bias represents a source of "impulse purchases" wherein people overbuy durable goods in response to transitory desire for that good." (Loewenstein, O'Donoghue, & Rabin, 2003, p. 1228). A consequence of prediction bias could be that individuals might tend to stick with their current choice (e.g. continuous contraception, or lack of it), producing a *status quo bias* (Kahneman, Knetsch, & Thaler, 1991; Samuelson & Zeckhauser, 1988).

For these reasons, there is no reason to think that predicted happiness is not systematically biased of future experienced happiness. Even more than the purchase of durable goods (for which some mechanisms such as a period of trial have often been designer), having a child is now an irreversible choice. Therefore, the prediction of a potential increase (or decrease) in happiness around the time of

decision-making is more important than the actual increase (or decrease) in happiness experienced when bearing a child. We can assume that individual gather information, directly or indirectly, from other individuals on what potential effect could a child have on their happiness. Predicted happiness can derive from a learning process where members of the social network are seen as example (Kohler, 2001). What is relevant is the definition of the situation. According to the "Thomas theorem", "if [individuals] define situations as real, they are real in their consequences" (Merton, 1995; Thomas & Thomas, 1928, p. 572)—therefore we expect that the perception that happiness will increase (or decrease) because a child is born will have consequences on fertility decision making. Systematic bias will not allow to actually maximize happiness, but implies specific choices depending on predicted happiness.

From the general hypothesis H1 we derive three empirical hypotheses.

**H1a**: *in a low fertility context predicted happiness from having a(nother) child diminishes with parity*

In the literature on the emergence of lowest-low fertility levels, a common factor is the decrease of the probability of progressing to higher order parities (Billari & Kohler, 2004; Dalla Zuanna, 2001; Kohler, et al., 2002). Although there might be signs of an increase in chosen childlessness (for a review, see Agrillo & Nelini, 2008), there is even stronger evidence that a lower progression to second and especially third parity is the key factor. In general, we expect predicted happiness to be linked to actual choice as long as factors like parity are concerned—knowing that childbearing can be thought as a sequential decision process with parity- and time-specific framing (Miller, 1995; Miller & Pasta, 1994). Given a general preference to become parents (Foster, 2000), we expect a *positive* forecasted happiness for childless individuals. With subsequent births, we expect this positive forecasted happiness to diminish and potentially reverse. A reversal already observable on individuals who have one child would be compatible with the findings on experienced happiness of Kohler et al. (2005), although as we noted earlier forecasting bias might be important in this case.

**H1b**: *the age profile of predicted happiness mimicks the age profile of fertility*

Traditionally, demographers have emphasized the role of age in shaping fertility choices. Age has been the standard variable through which data are filtered, and a non-monotonic first increasing and then decreasing propensity to have a birth is probably the most important empirical regularity of research on childbearing. As we expect measures of predicted happiness to be related to actual behavior, we expect the age profile of predicted happiness to mimick the age profile of fertility.

## *Contextual factors affecting predicted happiness from childbearing*

In the literature on happiness there is a growing interest in the effect of institutions on subjective well-being. A usual assumption is that given the stability of institutions, cross-sectional analyses studying the effect of institutions on happiness are appropriate (Bruno S. Frey, 2008; Bruno S. Frey & Stutzer, 2000). We develop on this perspective by addressing first the direct effect of institutional (and cultural) factors on predicted happiness from childbearing, then the potential micro-macro interaction between the macro-level factors and individual conditions.

The literature on the effect of institutions on fertility converges on the idea that a key factor in shaping fertility levels is the institutional response towards the conciliation between the role of mother and the

role of worker for women (Kohler, et al., 2002; McDonald, 2000; Rindfuss, Guzzo, & Morgan, 2003). We here argue that such institutional response, and in general the status of institutions, influence fertility choices through predicted happiness. A key factor is the institutional setting favoring female labor force participation and its compatibility with family responsibilities. The availability of childcare, flexibility of labor market regulation and working hours, protection for working mothers are included in this broad 'institutional' umbrella. The emergence and diffusion of these institutions is usually seen as the key to the positive cross-country relationship between fertility and female labor force participation that is visible since at least the 1990s in OECD countries (Brewster & Rindfuss, 2000). A second macro-level factor is more cultural. Macro-level obstacles towards the compatibility between work and family commitments might also be linked with the existence of social norms proscribing mothers with young children to work (Algan & Cahuc, 2007). The number of individuals who agree that a preschool child suffers if the mother works has been considered a good indicator for this cultural climate (Rindfuss, Brewster, & Kavee, 1996; Thornton, 1989). The variation of this indicator is surprisingly high, for instance, among European countries (Hantrais, Philipov, & Billari, 2006).

Our macro-level hypothesis is as follows.

**H2:** *predicted happiness is positively related to institutional and cultural factors that favor fertility, and in particular the compatibility between the role of mother and female worker*

More specifically, we hypothesize that the macro-level effect is additional with respect to individual-level factors influencing predicted happiness. Consistently with our preceding discussion, there are reasons to think that this effect might also be parity-specific, given the relevance of having already experienced parenthood, including its compatibility or incompatibility side A recent study on the relationship between personality traits and childbearing shows that individuals with high emotionality as a personality trait are more vulnerable to distress after the birth of a child and therefore could benefit from social and economic support (Jokela, Kivimäki, Elovainio, & Keltikangas-Järvinen, 2009).

We should not expect macro-level and micro-level factors affecting predicted happiness from childbearing to be purely additive, but interacting. The crucial importance of this interaction has been noted when considering fertility behavior (Billari, 2004; McDonald, 2000) and family policies (Neyer & Andersson, 2008). For instance, when studying the institutional and cultural factors affecting the (direct and indirect) costs of children, it has been noted that: "the impact of each of these costs in a society depends both on that country's particular mix of policies and institutional characteristics and also on the distribution of values in that society" (DiPrete, et al., 2003, p. 445). We expect that being a working mother (or the partner of a working mother) in an environment that is difficult and/or unfriendly to working mother shapes predicted happiness. Therefore, we cast a micro-macro interaction hypothesis.

**H3:** *predicted happiness for working women is positively related to institutional and cultural factors that favor fertility, and in particular the compatibility between the role of mother and female worker*

## *Predicted happiness, intentions and behavior from childbearing*

The idea (H1) that predicted happiness is a key driver in fertility decisions implies that we should observe a link between predicted happiness and subsequent fertility behavior. This implies that 1) predicted

happiness should be positively related with parity-progression intentions; 2) predicted happiness should be positively related with actual parity-progression. It is worth here to note once again that even if predicted happiness is systematically biased as a predictor of actual happiness, the consequences on fertility will still be there. Therefore, we hypothesize that:

**H4**: *predicted happiness is correlated with parity- and time-specific fertility intentions, and behavior*

# Data and methods

Some of the theoretical ideas discussed in the preceding section call for new approaches and types of data for the study of fertility decisions—we shall come back to this issue in the discussion section. We here focus on empirical tests of the main hypotheses discussed earlier with an existing dataset that provides, with some unavoidable approximation, information at the macro- and micro-level including predicted happiness from childbearing and its determinants. We use data from the Generations and Gender Survey (GGS). GGS is a comparative cross-country and individual-level survey effort (Vikat, et al., 2007) with data, at the moment of the preparation of this manuscript, available for six countries (Bulgaria, France, Georgia, Germany, Hungary, and Russia). In all these countries surveys have taken place between 2004 and 2006. (Sample design guidelines and survey documentation are found in UNECE & UNFPA (2002)). GGS targets a representative sample of the adult population (aged 18 and over) collecting data about a broad range of subject, including retrospective reconstructions of event histories, current assessment of the situation, values and attitudes, and prospective evaluations.

## *Predicted happiness from childbearing*

A measure of predicted happiness from childbearing is included in the "Fertility" section of the Wave 1 GGS standard questionnaire. In this section, a series of questions concerning intentions, attitudes, norms and perceived behavioral control is addressed to respondents who had sexual intercourse and are aged below 50. These questions are parity-specific and time-specific, as they concern the next birth within an interval of three years, assuming a sequential decision-making model of fertility in which evaluations are related to a specific time frame (Vikat, et al., 2007).

We therefore use the answer to the question "Now, suppose that during the next 3 years you were to have a/another child. I would like you to tell me what effect you think this would have on various aspects of your life. Please choose your answers from the card." We focus on item "*f" (the joy and satisfaction you get from life).* Possible answers are "much better" (=1), "better" (=2), "neither better nor worse" (=3), "worse" (=4), "much worse" (=5), not applicable. This question is included in a larger battery of attitudes towards childbearing. In order to translate this question to express predicted happiness from childbearing, we recode the question as 3 minus the actual answers. Our analyses, therefore, are based on predicted happiness from childbearing ranging from -2 ("much worse") to +2("much better"), with 0 being "neither better nor worse". In most analyses we will deal with this answer as cardinal, but robustness checks will be carried to assess the robustness of key findings to an ordinal treatment of this variable. For a total of 11,609 men and 14,305 women data in the six countries here considered data on predicted happiness from childbearing are available.

## *Explanatory variables*

Consistently with our theoretical background, explanatory factors are located either at the micro-level (individual or household) or at the macro-level. All analyses are conducted separately by gender.

*Individual-level* explanatory factors include basic demographics such as age (in completed years), parity (number of current children), as well as educational level (recoded as high when it is high school or above), employment status (a dichotomous variable indicating whether the respondent is employed or not) and partnership status (a dichotomous variable indicating whether the respondents lives with a marital or non-marital partner). The economic situation of respondents is studied by considering her or his subjective assessments of income as an answer to the question "A household may have different sources of income and more than one household member may contribute to it. Thinking of your household's total monthly income, is your household able to make ends meet …." (answers from 1 "with great difficulty" to 6 "very easily"). As we are interested in cultural factors affecting predicted happiness we use individual answers to the common attitude question "A pre-school child is likely to suffer if his/her mother works" (answers from 1 "strongly agree" to 5 "strongly disagree") (Algan & Cahuc, 2007; Rindfuss, et al., 1996; Thornton, 1989)—we use reverse coding of this variable so that a higher score indicates a more favorable attitude to working mothers with pre-school children. Basic descriptive statistics for the relevant individual-level variables for men and women are given in Table 1.

**[ Table 1 about here ]**

Our theoretical framework also relates *macro-level* explanatory factors. For this reason, we build a series of variables at the regional level, i.e. the lowest possible geographical unit available for GGS data. All countries are divided in administrative regions (with the exception of Hungary)—there is a total number of 110 regions. More specifically, Bulgaria is divided in 28 regions, France in 22, Georgia in 11, Germany in 15, Russia in 32 regions. We build institutional and cultural indicators for each region, and use these indicators in analyses for which the whole set of countries are lumped together. To control for the economic situation we build a regional unemployment index from the data (the share of males aged 18-50 who report being unemployed). As a proxy of *institutional factors* favoring the combination of work and motherhood, we use the regional share or women aged 18-45 who are mothers and work (or are in parental leave from work). This variable is highly correlated at the regional level with general employment status of women (rho=0.9650), the share of mothers receiving external childcare (rho=0.6894). (We also explored factor analyses in which these variables contribute to a single factor). To study *cultural factors* at the regional level, we aggregate answers to the question discussed earlier on mothers with pre-school children to generate a "climate for working mothers with pre-school children" variable. We report some descriptive statistics for these regional variables in Table 2. These statistics indicate also some potential measurement error (e.g. a region with zero male unemployment) due to the calculation within the survey—this could go against finding significant effects and therefore all results concerning the effect of regional-level variables are likely to be conservative.

**[ Table 2 about here ]**

## *Methods*

To explore the data and to provide answers to H1a we use simple descriptive statistics derived from the survey, by gender and country. In order to estimate the age profile of predicted happiness and therefore discuss H1b we regress predicted happiness on age using a cubic B-spline with nodes at ages 25 and 35. For H1c we focus on behavioral intentions only, as longitudinal data from the GGS including behavior are not yet available.

For what concerns explanatory accounts of predicted happiness with macro- and micro-level variables, we estimate a series of multilevel statistical predicted happiness equations which can be described in general as follows:

$$(1)\quad H_{ijk} = \beta_0 + \beta_1 \cdot X_{ijk} + \beta_2 \cdot X_{jk} + \gamma_k + \delta_{jk} + \varepsilon_{ijk}$$

In (1), $H_{ijk}$ represents the predicted happiness from childbearing for the individual $i$ in the region $j$ of country $k$. $\beta_0$ is an intercept, $\beta_1$ is a vector of parameters related to a set of individual-level variables $X_{ijk}$, $\beta_2$ is a vector of parameters related to a set of regional-level variables $X_{jk}$. When we are interested in within-country variation, $\gamma_k$ is used as fixed country effect, while $\delta_{jk}$ and $\varepsilon_{ijk}$ are normally-distributed residuals respectively at the regional and individual level, with zero mean and standard deviations equal to $\sigma_\delta$ and $\sigma_e$ respectively. Model estimation is carried using maximum likelihood as implemented in Stata. We use the linear model (1) in order to be able to separate the macro- and micro-level variability and to interpret findings in a straightforward way. The general robustness of estimating happiness equation using linear models (therefore implicitly assuming cardinality) versus ordered models has been discussed in the literature (Ferrer-i-Carbonell & Frijters, 2004). Frey and Stutzer (2000) estimate a happiness equation with micro- and macro-level factors obtaining similar results with an ordered probit and ordinary least squares estimation. However, in robustness checks (not available here) we estimated (1) as an ordered probit model with fixed effects—with findings basically unchanged.

# Results

## *Predicted happiness by parity and age*

First, we address the key empirical corollaries of H1. H1a is concerned with the relationship between forecasted happiness from childbearing and parity. In Figure 1 we report average forecasted happiness by country, gender and parity. In  e. H1a and H1b. In almost all cases (up to parity two), forecasted happiness is positive, with values up to around 1 (which indicates that respondents forecast their happiness would be better if they have a(nother) child within the next three years). All estimates are significantly positive according to a t-test, except Bulgaria (men, 2 children; women, 2 children), Germany (men, 2 children; women, 2 children), Russia (women, 2 children). We observe is a general decline with parity. However, for France and Georgia, the highest fertility countries in our set of countries, forecasted happiness declines clearly only at parity 2. Figure 1 is therefore consistent with H1a. In general, cross-country differences are following a simple link between forecasted happiness and actual fertility (Billari, 2009).

**[ Figure 1 about here ]**

H1b concerns the age-predicted happiness profiles. We expect such profiles to correspond to the well-known shape of the fertility-age relationships, first increasing with age and then decreasing. To isolate the role of age we focus only on childless men and women, and spline regression is used to smooth the data. Figure 2 displays, by gender and country, the results. The consistency with H1b is mixed. In most cases the pattern is as expected, although for some samples the profile is bimodal, with a second mode after age 35—this might indicate a selection effect, with the forecasted happiness of involuntary childless or fertility postponers, who are increasingly more likely to have children close to age 40 (Billari, Kohler, Andersson, & Lundström, 2007).

**[ Figure 2 about here ]**

## *Macro and micro determinants of predicted happiness*

First, we test whether predicted happiness from childbearing can be explained by both individual- and regional-level factors. Table 3 presents the estimates of a series of multilevel linear regression models in which the residual variance is decomposed between the two levels. Models are estimated separately by parity (including an all-parity model) and by gender. In all cases there is a significant contribution to the variance at both levels, with a prevalence of individual-level factors. The contribution of regional-level factors (the so-called "intra-class correlation" coefficient of multilevel statistical models) ranges from about 7% for women all parities to almost 14% for men with one child. As a rule of thumb therefore about one tenth of the total variance in predicted happiness is attributable to regional-level factors, while nine tenths are attributable to individual-level factors.

**[ Table 3 about here ]**

In Table 4 we present a series of models which include observed individual-level and regional-level factors (while still allowing for unobserved residual factors at both levels). We here focus on the key variables representing institutional and cultural effect affecting work-family compatibility. In Table 4A, for men, we can see that being employed has a general positive effect on predicted happiness (net of income evaluation), which decreases with parity, while thinking that it is OK for a pre-school child if mother works has a negative effect (associated with higher parity). A regional climate that is favorable to working mothers with preschool children is affecting negatively predicted happiness (only for childless men), while economic problems (as measured by men's unemployment) and work-motherhood compatibility (as measured by the share of working mothers) affect negatively predicted happiness for fathers of two children.

The results of the same set of models are shown in Table 4B for women. Here the effect of being employed is also positive for childless women, while the individual-level attitude that preschool children do not suffer if mother works affects negatively predicted happiness at all parities. The regional-level effects are particularly interesting: a pro-compatibility culture influences predicted happiness negatively for childless women, but then switches to a positive effect for parity one and two. The effect of maternal employment and the economic situation are similar to the ones found for men.

Our findings are generally not in line with H2, in that the share of working women does not trigger higher predicted happiness (actually, the opposite is true when we look at parity two). However, the role of

regional culture as expressed by the average attitude towards the compatibility of maternal employment and pre-school children has a J-shaped effect, with a negative effect for childless men and women, and a significantly positive effect for women with children. The actual experience of a cultural climate for mothers seems to affect their predicted happiness in the direction we would expect from H2.

**[ Table 4 about here ]**

Macro-micro interactions are inserted in a subsequent series of models (Table 5). Here we basically test H3, i.e. whether cultural and institutional factors are affecting predicted happiness for working women. Models for men are estimated as benchmarks. In Table 5B we find a general positive effect of being employed as the share of employed mothers rises (decreasing with parity): this is in line with H3. Also in line with H3 is the general positive interaction between being employed and a favorable climate for compatibility, although this effect is clear and significant only for childless women. For men, these interactions are not significant at the 5% levels.

Results of cross-level models are therefore in line with the idea that cultural and institutional factors shape the predicted happiness from childbearing for women who are actually experiencing compatibility tensions.

**[ Table 5 about here ]**

### *Robustness tests*

We test the robustness of the latter results by building models in which within-country variation is taken into account by estimating country-level fixed effects (in this case Hungary does not contribute to regional variation as it has is only one region in these data). First (Table 6) we replicate the model in Table 5 by adding these country-level fixed effects. The basic message does not change, although the significance of the interaction terms is somehow changed. Second (Table 7) we estimate an ordered probit model to test whether results hold when the cardinality assumption on predicted happiness is relaxed. Also in this case results are stable.

**[ Table 6 and 7 about here ]**

### *Predicted happiness and behavioral intentions*

In Table 8 we show the results of a series of probit models in which the intention to have a(nother) child within the next three years (modeled as a dichotomous variable, yes or no) is a function of predicted happiness and the predictors of predicted happiness. Generally, results are consistent with H4, showing that an increase of a unit in the predicted happiness scale translates to a 30% higher probability of having the intention to have a(nother) child. Especially for women, this association weakens with higher parities.

**[ Table 8 about here ]**

## Concluding remarks and discussion

The analyses in this paper present the first systematic analyses of anticipated changes in subjective well-being in response to an anticipated birth in Bulgaria, France, Georgia, Germany, Hungary and Russia. The

analyses are based on data from the Generations and Gender Survey (GGS), a comparative survey conducted in several European countries. The key findings of our analyses include: First, in the low fertility context studied in this paper, predicted happiness from having a(nother) child is generally positive, but it diminishes with parity, with important differences across countries, following a pattern that approximately mirrors observed parity progression rations in these countries. Second, the anticipated changes in subjective well-being from a(nother) birth approximately follow the observed age-pattern of fertility in all countries, although several countries exhibit an increase in anticipated well-being improvements at advanced ages that is possibly due to selection. Fourth, our analyses show that several macro-level variables reflecting institutional contexts and local cultures are importantly related to the anticipated well-being changes from having a(nother) child, although the direction is not always as hypothesized. For example, a regional climate that is favorable to working mothers with preschool children is affecting negatively predicted happiness (only for childless men), while economic problems (as measured by men's unemployment) and work-motherhood compatibility (as measured by the share of working mothers) affect negatively predicted happiness for fathers of two children. For women, a pro-compatibility culture influences predicted happiness negatively for childless women, but then switches to a positive effect for parity one and two. The effect of maternal employment and the economic situation are similar to the ones found for men. Our findings are therefore not fully in line with H2, in that the share of working women does not trigger higher predicted happiness (actually, the opposite is true when we look at parity two). However, the role of regional culture as expressed by the average attitude towards the compatibility of maternal employment and pre-school children has a J-shaped effect, with a negative effect for childless men and women, and a significantly positive effect for women with children. The actual experience of a cultural climate for mothers seems to affect their predicted happiness in the direction we would expect from H2. Nevertheless, the results cross-level models are therefore in line with the idea that cultural and institutional factors shape the predicted happiness from childbearing for women who are actually experiencing compatibility tensions.

In interpreting the results of this study, it is important to keep in mind several caveats of our analyses. Foremost, our analyses do not necessarily causal relationships. At this point, our analyses are cross-sectional and are subject to important endogeneity concerns. For example, happier persons might be more likely to have children, and individual – and possibly also regional – employment patterns might be endogeneous. As longitudinal data from the GGS become available in future years, some of these concerns can possibly be addressed using prospective data.

References


Agrillo, C., & Nelini, C. (2008). Childfree by choice: a review. [Article]. *Journal of Cultural Geography, 25*, 347-363.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Algan, Y., & Cahuc, P. (2007). The Roots of Low European Employment: Family Culture? In J. A. Frankel & C. A. Pissarides (Eds.), *NBER International Seminar on Macroeconomics 2005*. Cambridge, MA: MIT Press.

Ariès, P. (1980). Two Successive Motivations for the Declining Birth Rate in the West. *Population and Development Review, 6*(4), 645-650.

Beach, L. R., Campbell, F. L., & Townes, B. D. (1979). Subjective expected utility and the prediction of birth-planning decisions. *Organizational Behavior and Human Performance, 24*(1), 18-28.

Becker, G. S. (1960). An Economic Analysis of Fertility. In G. S. Becker (Ed.), *Demographic and Economic Change in Developed Countries* (pp. 209-231). Princeton, NJ: Princeton University Press.

Becker, G. S. (1981). *A treatise on the family*. Cambridge, MS: Harvard University Press.

Becker, G. S., & Barro, R. J. (1988). A reformulation of the economic theory of fertility. *Quarterly Journal of Economics, 103*(1), 1-25.

Billari, F. C. (2004). Becoming an Adult in Europe: A Macro(/Micro)-Demographic Perspective. *Demographic Research, SC3*(2), 15-44.

Billari, F. C. (2008). Lowest-Low Fertility in Europe: Exploring the Causes and Finding some Surprises. *Japanese Journal of Population, 6*(1), 2-18.

Billari, F. C. (2009). The Happiness Commonality: Fertility Decision in Low-Fertility Settings. In UNECE (Ed.), *How Generations and Gender Shape Demographic Change* (pp. 7-38). New York and Geneva: United Nations.

Billari, F. C., & Galasso, V. (2008). *What explains fertility? Evidence from Italian pension reforms*. London: Centre for Economic Policy Research.

Billari, F. C., & Kohler, H.-P. (2004). Patterns of low and lowest-low fertility in Europe. *Population Studies, 58*(2), 161-176.

Billari, F. C., Kohler, H.-P., Andersson, G., & Lundström, H. (2007). Approaching the Limit: Long-Term Trends in Late and Very Late Fertility. *Population and Development Review, 33*(1), 149-170.

Boldrin, M. B. M., & Jones, L. E. (2002). Mortality, Fertility and Saving in a Malthusian Economy. *Review of Economic Dynamics, 5*, 775-814.

Bolle, F., & Kemp, S. (2009). Can We Compare Life Satisfaction Between Nationalities? Evaluating Actual and Imagined Situations. *Social Indicators Research, OnlineFirst*.

Brewster, K. L., & Rindfuss, R. R. (2000). Fertility and Women's Employment in Industrialized Nations. *Annual Review of Sociology, 26*, 271-296.

Bühler, C. (2008). On the structural value of children and its implication on intended fertility in Bulgaria. *Demographic Research, 18*(20), 569-610.

Caldwell, J. C., & Schindlmayr, T. (2003). Explanations of the Fertility Crisis in Modern Societies: A Search for Commonalities. *Population Studies, 57*(3), 241-263.

Caltabiano, M. (2008). Has the Fertility Decline Come to an End in the Different Regions of Italy? New Insights from a Cohort Approach. *Population (English version), 63*(1), 157-172.

Dalla Zuanna, G. (2001). The banquet of Aeolus: A familistic interpretation of Italy's lowest low fertility. *Demographic Research, 4*(5), 133-162.

DiPrete, T. A., Morgan, S. P., Engelhardt, H., & Pacalova, H. (2003). Do Cross-National Differences in the Costs of Children Generate Cross-National Differences in Fertility Rates? . *Population Research and Policy Review, 22*(5-6), 439-477.

Dolan, P., Peasgood, T., & White, M. (2008). Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of Economic Psychology, 29*(1), 94-122.

Ferrer-i-Carbonell, A., & Frijters, P. (2004). How Important is Methodology for the estimates of the determinants of Happiness?*. *The Economic Journal, 114*(497), 641-659.

Foster, C. (2000). The Limits to Low Fertility: A Biosocial Approach. *Population and Development Review, 26*(2), 209-234.

Frey, B. S. (2008). *Happiness. A Revolution in Economics*. Cambridge, MA: MIT Press.

Frey, B. S., & Stutzer, A. (2000). Happiness, Economy and Institutions. *The Economic Journal, 110*(466), 918-938.

Friedman, D., Hechter, M., & Kanazawa, S. (1994). A Theory of the Value of Children. *Demography, 31*(3), 375-401.

Hantrais, L., Philipov, D., & Billari, F. C. (2006). *Policy implications of changing family formation*. Strasbourg: Council of Europe Publishing.

Hirschman, C. (1994). Why fertility changes. *Annual Review of Sociology, 20*, 203-233.

Hobcraft, J. (2006). The ABC of demographic behaviour: How the interplays of alleles, brains, and contexts over the life course should shape research aimed at understanding population processes. *Population Studies, 60*(2), 153-187.

Hoffman, L. W., & Hoffman, M. L. (1973). The value of children to parents. In J. T. Fawcett (Ed.), *Psychological perspectives on population* (pp. 19-76). New York: Basic Books.

Hoffman, L. W., & Manis, J. D. (1979). The Value of Children in the United States: A New Approach to the Study of Fertility. *Journal of Marriage and the Family, 41*(3), 583-596.

Jokela, M., Kivimäki, M., Elovainio, M., & Keltikangas-Järvinen, L. (2009). Personality and Having Children: A Two-Way Relationship. *Journal of Personality and Social Psychology, 96*(1), 218-230.

Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1991). Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias. *Journal of Economic Perspectives, 5*(1), 193-206.

Kahneman, D., & Riis, J. (2005). Living, and thinking about it: two perspectives on life. In F. Huppert, N. Baylis & B. Keverne (Eds.), *The Science of Well-Being* (pp. 285-304). Oxford: Oxford University Press.

Kahneman, D., & Snell, J. (1992). Predicting Utility. In R. M. Hogarth (Ed.), *Insights in Decision Making: A Tribute to Hillel J. Einhorn* (pp. 295-310). Chicago, IL: University of Chicago Press.

Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision Under Risk. *Econometrica, 47*(2), 263-292.

Kohler, H.-P. (2001). *Fertility and Social Interaction. An Economic Perspective*. Oxford: Oxford University Press.

Kohler, H.-P., Behrman, J. R., & Skytthe, A. (2005). Partner + Children = Happiness? The Effects of Partnerships and Fertility on Well-Being. *Population and Development Review, 31*(3), 407-445.

Kohler, H.-P., Billari, F. C., & Ortega, J. A. (2002). The Emergence of Lowest-Low Fertility in Europe During the 1990s. *Population and Development Review, 28*(4), 641-680.

Lesthaeghe, R. (1995). The second demographic transition in Western countries: An interpretation. In K. Oppenheim Mason & A.-M. Jensen (Eds.), *Gender and Family Change in Industrialized Countries* (pp. 17-62). Oxford: Clarendon.

Lesthaeghe, R., & van de Kaa, D. (1986). Twee demografische transities? In R. Lesthaeghe & D. van de Kaa (Eds.), *Bevolking: Groei en Krimp* (pp. 9-24). Deventer: Van Loghum Slaterus.

Liefbroer, A. C., Gerritsen, L., & de Jong Gierveld, J. (1994). The Influence of Intentions and Life Course Factors on Union Formation Behavior of Young Adults. *Journal of Marriage and the Family, 56*(1), 193-203.

Lindenberg, S. (1986). The Paradox of Privatization in Consumption. In A. Diekmann & P. Mitter (Eds.), *Paradoxical Effects of Social Behavior. Essays in Honor of Anatol Rapoport* (pp. 297-310). Heidelberg-Wien: Physica Verlag.

Lindenberg, S. (1991). Social Approval, Fertility and Female Labour Market. In J. J. Siegers, J. de Jong Gierveld & E. van Imhoff (Eds.), *Female Labour Market Behaviour and Fertility* (pp. 32-60). Berlin: Springer.

Loewenstein, G., O'Donoghue, T., & Rabin, M. (2003). Projection Bias in Predicting Future Utility. *Quarterly Journal of Economics*, 1209-1248.

Loewenstein, G., & Schkade, D. (1999). Wouldn't It Be Nice? Predicting Future Feelings. In D. Kahneman, E. Diener & N. Schwarz (Eds.), *Well-Being: The Foundation of Hedonic Psychology* (pp. 85-105). New York: Russell Sage Foundation.

McDonald, P. (2000). Gender Equity in Theories of Fertility Transition. *Population and Development Review, 26*(3), 427-439.

Merton, R. K. (1995). The Thomas Theorem and The Matthew Effect. *Social Forces, 74*(2), 379-424.

Miller, W. B. (1995). Childbearing Motivation and its Measurement. *Journal of Biosocial Science, 27*, 473-487.

Miller, W. B., & Pasta, D. J. (1994). The Psychology of Child Timing: A Measurement Instrument and a Model. *Journal of Applied Social Psychology, 24*, 218-250.

Morgan, S. P., & King, R. B. (2001). Why Have Children in the 21st Century? Biological Predisposition, Social Coercion, Rational Choice. *European Journal of Population, 17*(1), 3-20.

Morgan, S. P., & Taylor, M. G. (2006). Low Fertility at the Turn of the Twenty-First Century. *Annual Review of Sociology, 32*, 375-399.

Nauck, B. (2007). Value of Children and the Framing of Fertility: Results from a Cross-cultural Comparative Survey in 10 Societies. *European Sociological Review, 23*(5), 615-629.

Nauck, B., & Klaus, D. (2007). The varying value of children. Empirical results from eleven societies in Asia, Africa and Europe. *Current Sociology, 55*(4), 487-503.

Neyer, G. R., & Andersson, G. (2008). Consequences of family policies on childbearing behavior: effects or artifacts? . *Population and Development Review, 34*(4), 699-724.

Rayo, L., & Becker, Gary S. (2007). Evolutionary Efficiency and Happiness. *Journal of Political Economy, 115*(2), 302-337.

Rindfuss, R. R., Brewster, K. L., & Kavee, A. L. (1996). Women, Work, and Children: Behavioral and Attitudinal Change in the United States. *Population and Development Review, 22*(3), 457-482.

Rindfuss, R. R., Guzzo, K. B., & Morgan, S. P. (2003). The changing institutional context of low fertility. *Population Research and Policy Review, 22*(5-6), 411-438.

Samuelson, W., & Zeckhauser, R. (1988). Status quo bias in decision making. *Journal of Risk and Uncertainty, 1*(1), 7-59.

Thomas, W. I., & Thomas, D. S. (1928). *The Child in America: Behavior Problems and Programs*. New York: Alfred A. Knopf.

Thornton, A. (1989). Changing Attitudes toward Family Issues in the United States. *Journal of Marriage and the Family, 51*(4), 873-893.

UNECE, & UNFPA (2002). *Generations and gender programme : survey instruments*. New York and Geneva: United Nations.

van de Kaa, D. J. (1987). Europe's Second Demographic Transition. *Population Bulletin, 42*(1).

van de Kaa, D. J. (2004). The true commonality: In reflexive modern societies fertility is a derivative. *Population Studies, 58*(1), 77-81.

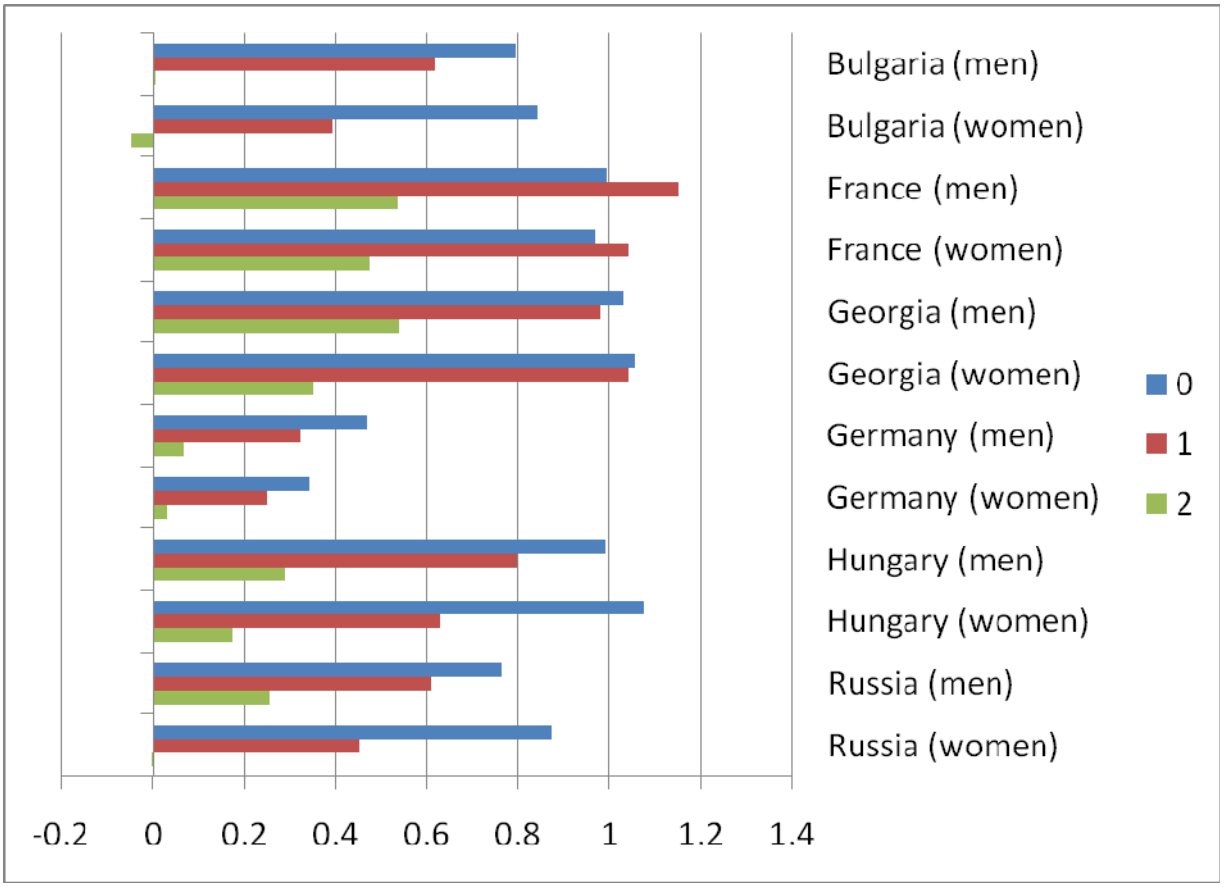
Vikat, A., Spéder, Z., Beets, G., Billari, F. C., Bühler, C., Desesquelles, A., et al. (2007). Generations and Gender Survey (GGS): Towards a better understanding of relationships and processes in the life course. *Demographic Research, 17*, 389-439.

Weinstein, N. D. (1980). Unrealistic Optimism About Future Life Events. *Journal of Personality and Social Psychology, 39*(5), 806-820.

Wilson, T. D., & Gilbert, D. T. (2005). Affective Forecasting. *Current Directions in Psychological Science, 14*(3), 131-134.

# Figures and tables

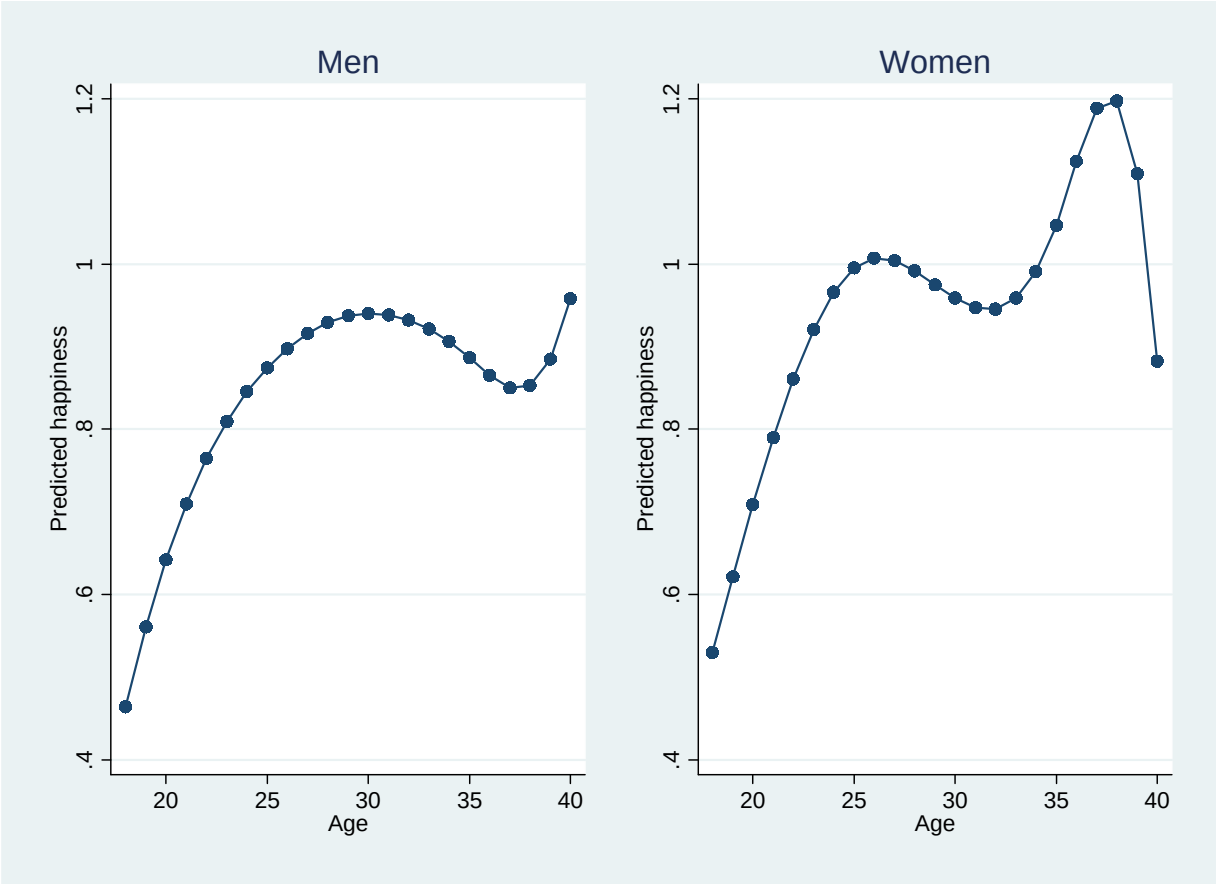
Figure 1. Predicted happiness: average predicted increase (if positive) or decrease (if negative) in happiness on having a(nother) child within the next three years among individuals aged 18-40 by parity and country. Own elaborations from GGS standard micro-data.



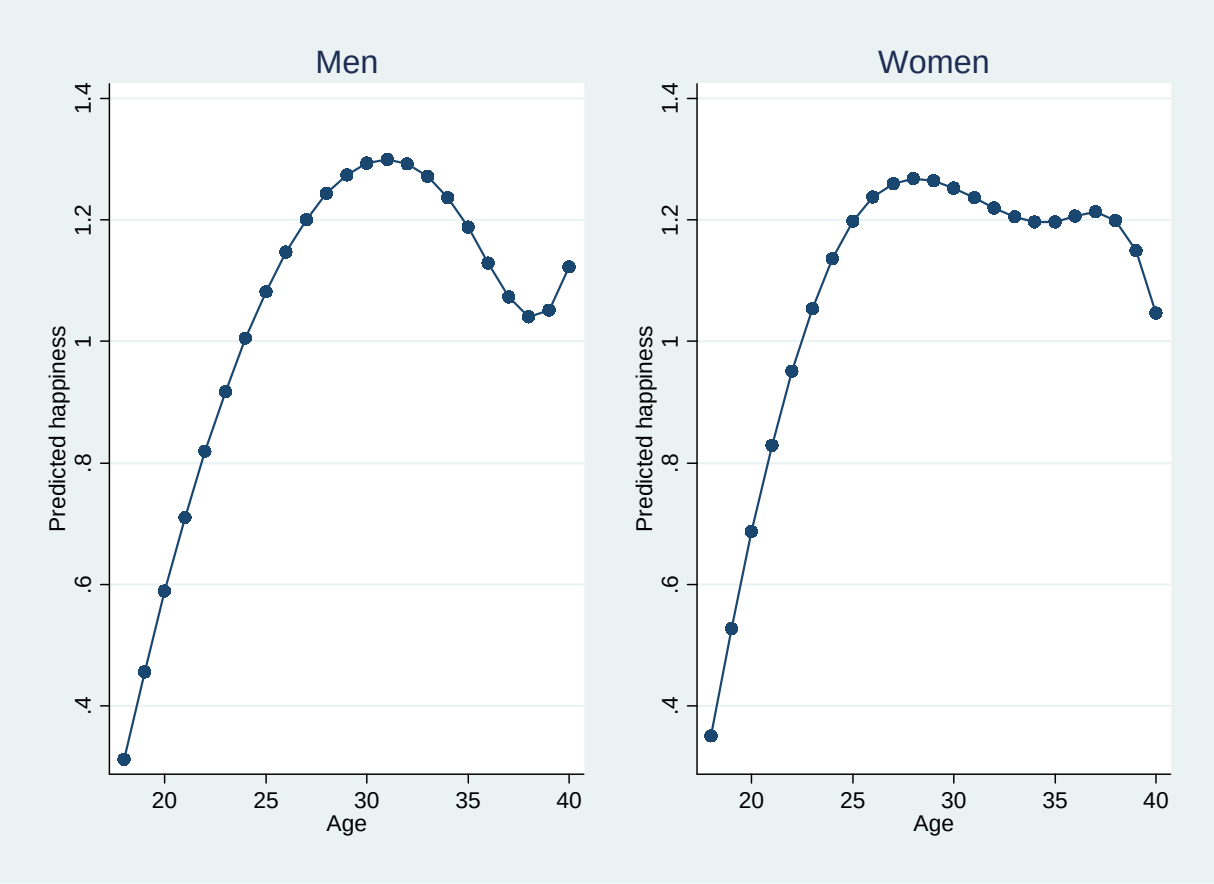

Note: all estimates are significantly positive according to a t-test, except Bulgaria (men, 2 children; women, 2 children), Germany (men, 2 children; women, 2 children), Russia (women, 2 children).

Figure 2. Predicted happiness from childbearing by age. Childless individuals. Cubic B-spline regression with nodes at age 25 and 35. Own elaborations from GGS standard micro-data.

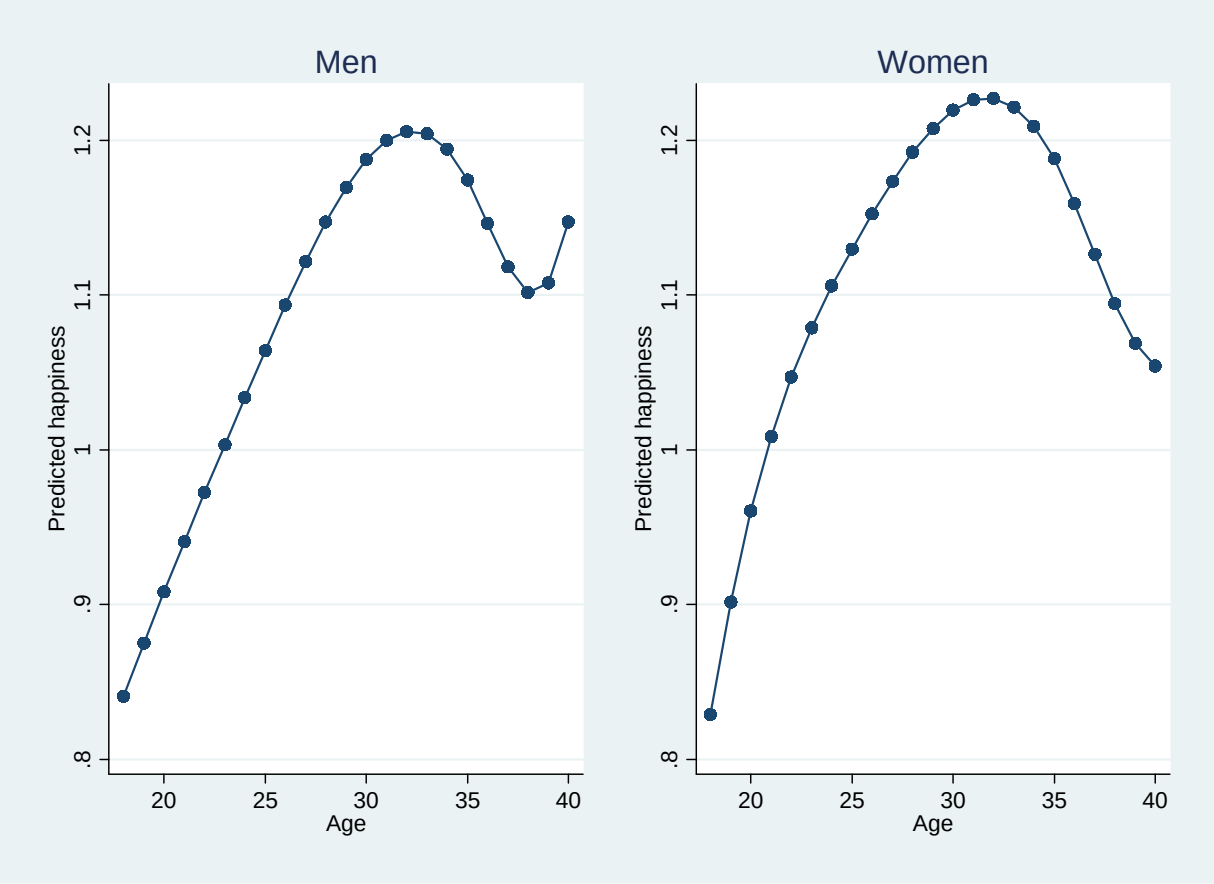
a. Bulgaria



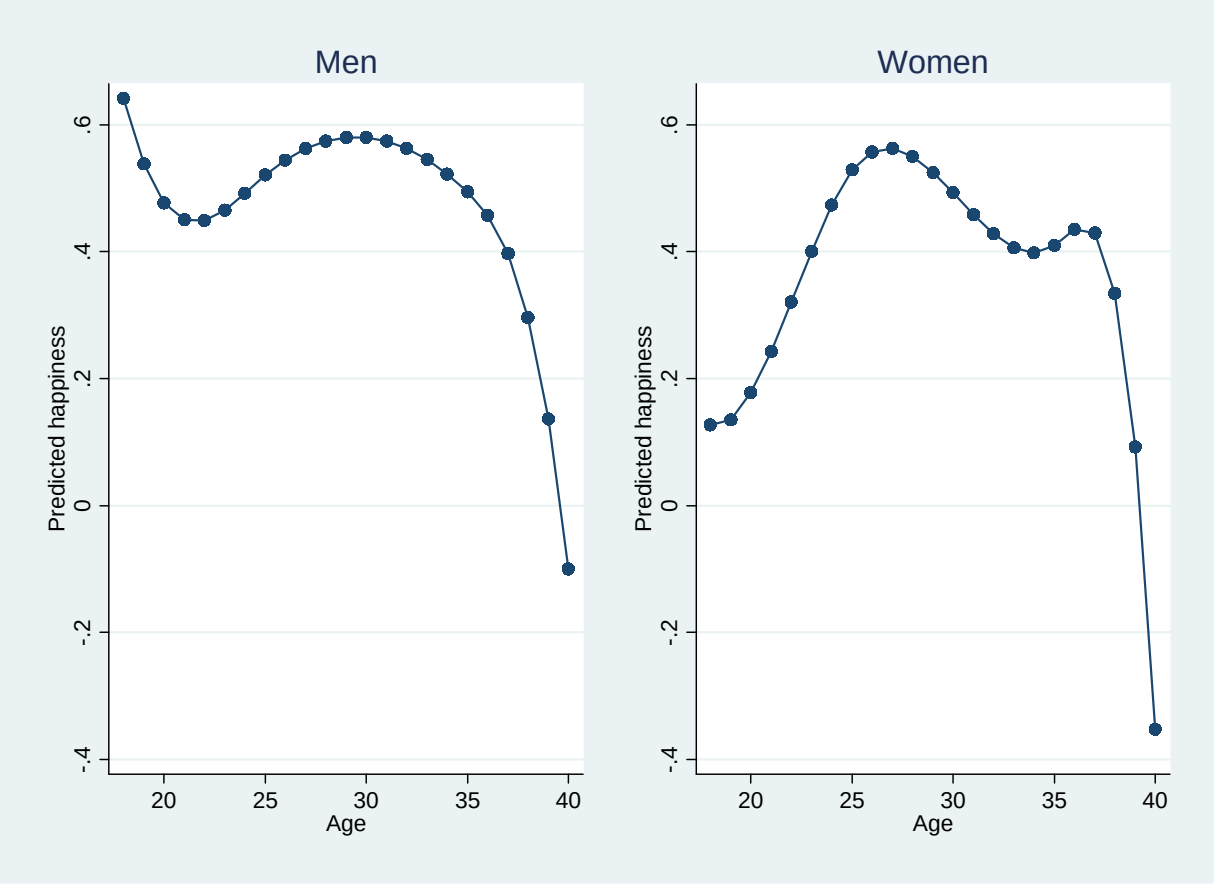
b. France



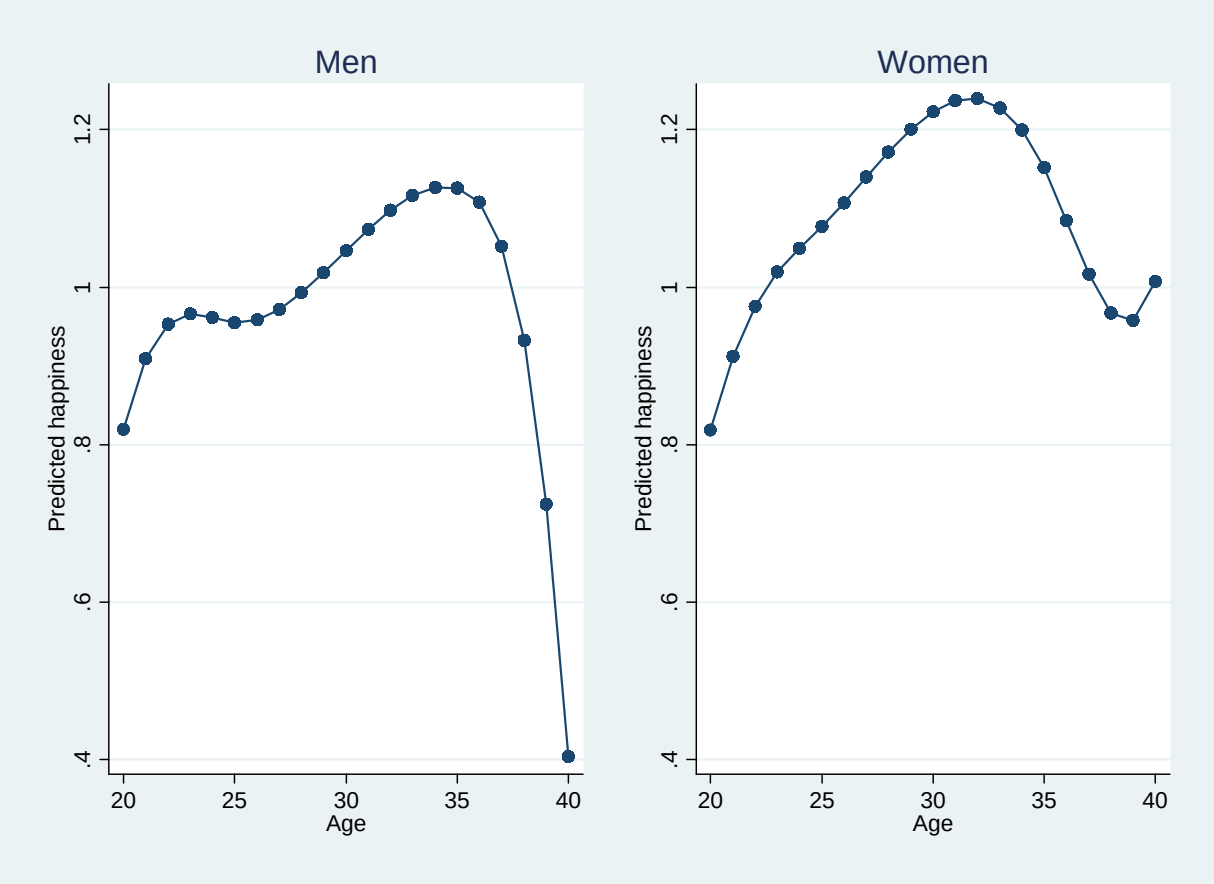
c. Georgia



d. Germany



e. Hungary



f. Russia

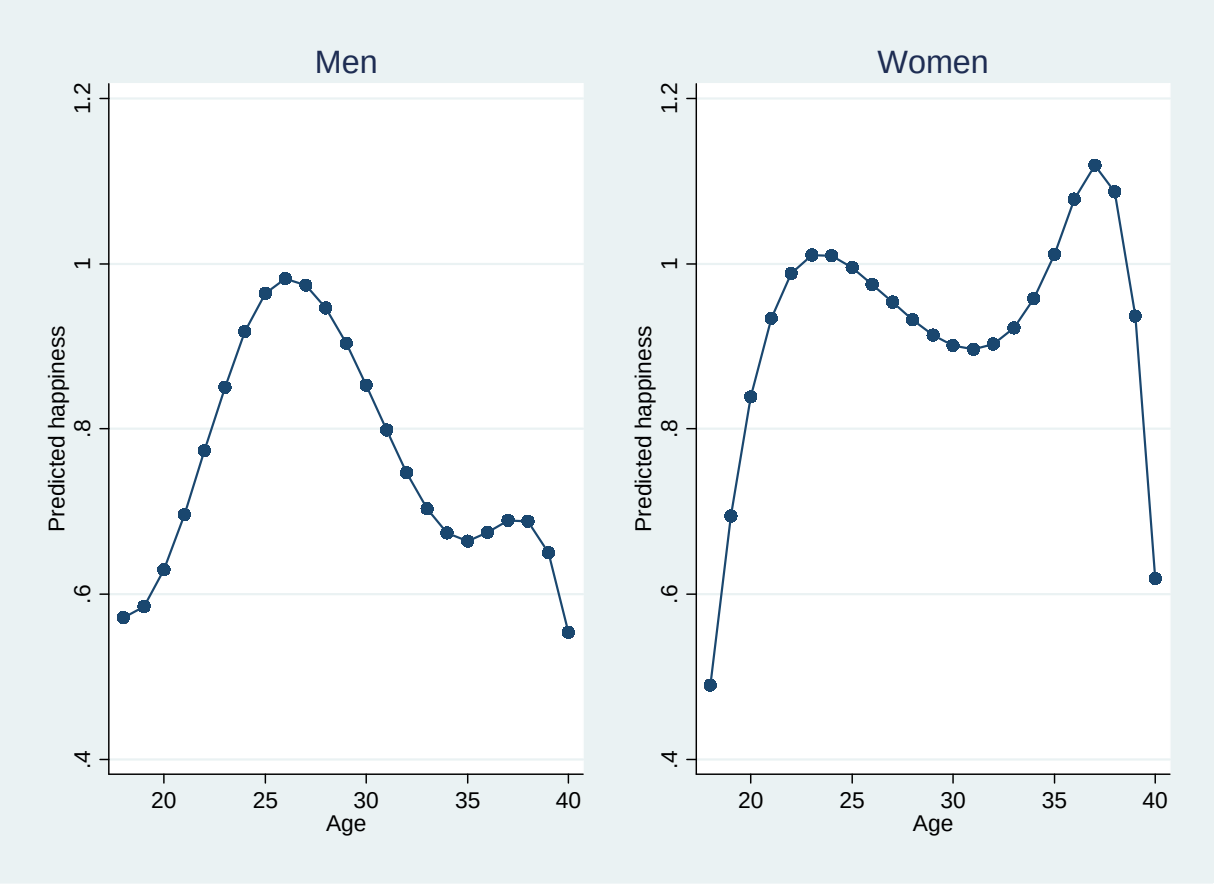


Table 1. Descriptive statistics for individual-level variables. Men and women aged 18-40.

| | Men (n=11,609) | | Women (n=14,305) | |
|---|---|---|---|---|
| | Mean | s.d. | Mean | s.d. |
| Predicted happiness | 0.570 | 0.816 | 0.495 | 0.911 |
| Age | 29.261 | 6.441 | 29.611 | 6.405 |
| One child | 19.3% | | 26.7% | |
| Two children | 18.9% | | 27.0% | |
| Three or more children | 6.6% | | 8.9% | |
| With partner | 49.7% | | 61.3% | |
| High education | 38.5% | | 48.3% | |
| Income evaluation | 2.900 | 1.200 | 2.874 | 1.193 |
| Employed | 69.4% | | 62.7% | |
| Preschool child OK if mother works | 2.369 | 1.142 | 2.437 | 1.212 |
| Bulgaria | 22.3% | | 23.9% | |
| France | 12.1% | | 13.7% | |
| Georgia | 15.8% | | 14.1% | |
| Germany | 12.8% | | 12.7% | |
| Hungary | 21.8% | | 19.2% | |
| Russia | 15.1% | | 16.5% | |

Table 2. Descriptive statistics for regional-level variables (computed using the whole sample). 110 regions (Hungary counts as a region).

| | Mean | s.d. | Min | Max |
|---|---|---|---|---|
| Preschool climate (regional) | 2.596 | 0.453 | 1.617 | 3.785 |
| Employed mothers (regional) | 67.7% | | 23.9% | 96.6% |
| Men unemployment (regional) | 14.1% | | 0 | 41.7% |

Table 3. Predicted happiness: multilevel (null) linear regression model for the decomposition of variance between individual-level and regional-level factors. Maximum likelihood estimates. Number of regions=110. Men and women aged 18-40.

A. Men

| | (1) All parities | (2) Childless | (3) One child | (4) Two children |
|---|---|---|---|---|
| Constant | 0.598*** | 0.769*** | 0.697*** | 0.235*** |
| | (0.0248) | (0.0288) | (0.0347) | (0.0342) |
| $\sigma_\delta$ | 0.238*** | 0.266*** | 0.293*** | 0.282*** |
| | (0.0189) | (0.0220) | (0.0305) | (0.0284) |
| $\sigma_e$ | 0.778*** | 0.741*** | 0.736*** | 0.738*** |
| | (0.00513) | (0.00659) | (0.0113) | (0.0114) |
| Observations | 11609 | 6415 | 2237 | 2189 |
| Intra-class correlation | 0.0856 | 0.1142 | 0.1368 | 0.1274 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

B. Women

| | (1) All parities | (2) Childless | (3) One child | (4) Two children |
|---|---|---|---|---|
| Constant | 0.456*** | 0.816*** | 0.525*** | 0.119*** |
| | (0.0250) | (0.0306) | (0.0322) | (0.0298) |
| $\sigma_\delta$ | 0.240*** | 0.272*** | 0.287*** | 0.253*** |
| | (0.0189) | (0.0242) | (0.0272) | (0.0255) |
| $\sigma_e$ | 0.880*** | 0.829*** | 0.798*** | 0.793*** |
| | (0.00522) | (0.00809) | (0.00927) | (0.00915) |
| Observations | 14305 | 5345 | 3826 | 3865 |
| Intra-class correlation | 0.0692 | 0.0971 | 0.1145 | 0.0924 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4. Predicted happiness: multilevel linear regression model with individual-level and regional-level explanatory variables. Maximum likelihood estimates. Number of regions=110. Men and women aged 18-40. Constants and variance estimates omitted.

A. Men

| | (1) All parities | (2) Childless | (3) One child | (4) Two children |
|---|---|---|---|---|
| Age | 0.100*** | 0.138*** | 0.0872** | -0.0445 |
| | (0.0117) | (0.0162) | (0.0365) | (0.0501) |
| Age squared | -0.00169*** | -0.00231*** | -0.00159*** | 0.000544 |
| | (0.000197) | (0.000285) | (0.000582) | (0.000756) |
| One child | -0.207*** | | | |
| | (0.0246) | | | |
| Two children | -0.653*** | | | |
| | (0.0272) | | | |
| Three or more children | -0.693*** | | | |
| | (0.0355) | | | |
| With partner | 0.246*** | 0.332*** | 0.170*** | 0.0900 |
| | (0.0214) | (0.0258) | (0.0466) | (0.0725) |
| High education | 0.0477*** | 0.0289 | 0.0491 | 0.213*** |
| | (0.0160) | (0.0213) | (0.0358) | (0.0357) |
| Income evaluation | 0.0365*** | 0.0303*** | 0.0490*** | 0.0238 |
| | (0.00684) | (0.00880) | (0.0155) | (0.0162) |
| Employed | 0.0690*** | 0.0549** | 0.0388 | 0.0167 |
| | (0.0176) | (0.0215) | (0.0460) | (0.0462) |
| Preschool child OK if mother works | -0.0173*** | -0.0135 | -0.0174 | -0.0293* |
| | (0.00666) | (0.00885) | (0.0147) | (0.0153) |
| Preschool climate (regional) | -0.0377 | -0.142** | 0.0473 | 0.0943 |
| | (0.0581) | (0.0650) | (0.0805) | (0.0703) |
| Employed mothers (regional) | -0.208 | 0.0138 | -0.370 | -0.585*** |
| | (0.192) | (0.212) | (0.255) | (0.203) |
| Men unemployment (regional) | -0.251 | 0.372 | -0.332 | -1.583*** |
| | (0.327) | (0.364) | (0.431) | (0.363) |
| Observations | 11523 | 6345 | 2230 | 2182 |

*** p<0.01, ** p<0.05, * p<0.1
Standard errors in parentheses

B. Women

| | (1) All parities | (2) Childless | (3) One child | (4) Two children |
|---|---|---|---|---|
| Age | 0.130*** | 0.164*** | 0.116*** | 0.0110 |
| | (0.0116) | (0.0205) | (0.0250) | (0.0332) |
| Age squared | -0.00225*** | -0.00274*** | -0.00225*** | -0.000345 |
| | (0.000192) | (0.000362) | (0.000409) | (0.000514) |
| One child | -0.376*** | | | |
| | (0.0216) | | | |
| Two children | -0.766*** | | | |
| | (0.0242) | | | |
| Three or more children | -0.865*** | | | |
| | (0.0316) | | | |
| With partner | 0.0700*** | 0.116*** | 0.0665** | 0.0337 |
| | (0.0180) | (0.0278) | (0.0312) | (0.0432) |
| High education | 0.0887*** | 0.0696** | 0.126*** | 0.0817*** |
| | (0.0157) | (0.0275) | (0.0281) | (0.0290) |
| Income evaluation | 0.0308*** | -0.00308 | 0.0471*** | 0.0499*** |
| | (0.00669) | (0.0108) | (0.0125) | (0.0130) |
| Employed | 0.0249 | 0.0737*** | -0.0220 | -0.0189 |
| | (0.0163) | (0.0269) | (0.0319) | (0.0310) |
| Preschool child OK if mother works | -0.0359*** | -0.0316*** | -0.0472*** | -0.0407*** |
| | (0.00642) | (0.0104) | (0.0120) | (0.0124) |
| Preschool climate (regional) | 0.0486 | -0.185*** | 0.212*** | 0.201*** |
| | (0.0507) | (0.0670) | (0.0691) | (0.0627) |
| Employed mothers (regional) | -0.256 | 0.0196 | -0.108 | -0.478** |
| | (0.169) | (0.218) | (0.229) | (0.192) |
| Men unemployment (regional) | -0.417 | 0.234 | -0.430 | -0.788** |
| | (0.285) | (0.379) | (0.379) | (0.325) |
| Observations | 14220 | 5295 | 3813 | 3850 |

*** p<0.01, ** p<0.05, * p<0.1
Standard errors in parentheses

Table 5. Predicted happiness: multilevel linear regression model with individual-level and regional-level explanatory variables, and individual-regional interaction effects. Maximum likelihood estimates. Number of regions=110. Men and women aged 18-40. Constants and variance estimates omitted.

A. Men

| | (1) All parities | (2) Childless | (3) One child | (4) Two children |
|---|---|---|---|---|
| Age | 0.101*** | 0.138*** | 0.0866** | -0.0469 |
| | (0.0117) | (0.0162) | (0.0365) | (0.0501) |
| Age squared | -0.00169*** | -0.00231*** | -0.00158*** | 0.000578 |
| | (0.000197) | (0.000285) | (0.000583) | (0.000756) |
| One child | -0.208*** | | | |
| | (0.0246) | | | |
| Two children | -0.653*** | | | |
| | (0.0272) | | | |
| Three or more children | -0.691*** | | | |
| | (0.0355) | | | |
| With partner | 0.244*** | 0.331*** | 0.171*** | 0.0910 |
| | (0.0214) | (0.0258) | (0.0466) | (0.0726) |
| High education | 0.0499*** | 0.0312 | 0.0493 | 0.216*** |
| | (0.0161) | (0.0215) | (0.0358) | (0.0358) |
| Income evaluation | 0.0369*** | 0.0306*** | 0.0488*** | 0.0230 |
| | (0.00684) | (0.00880) | (0.0155) | (0.0162) |
| Employed | 0.125 | 0.0526 | 0.323 | 0.0723 |
| | (0.0982) | (0.123) | (0.271) | (0.292) |
| Preschool child OK if mother works | -0.0172*** | -0.0135 | -0.0171 | -0.0288* |
| | (0.00666) | (0.00885) | (0.0147) | (0.0153) |
| Preschool climate (regional) | -0.00510 | -0.132* | 0.119 | 0.0326 |
| | (0.0615) | (0.0678) | (0.107) | (0.117) |
| Employed mothers (regional) | -0.267 | -0.0231 | -0.302 | -0.300 |
| | (0.201) | (0.220) | (0.317) | (0.275) |
| Men unemployment (regional) | -0.252 | 0.372 | -0.343 | -1.581*** |
| | (0.328) | (0.364) | (0.432) | (0.364) |
| Employed*Employed mothers(regional) | 0.0965 | 0.0730 | -0.0924 | -0.361 |
| | (0.0866) | (0.110) | (0.240) | (0.235) |
| Employed*Preschool climate(regional) | -0.0509* | -0.0198 | -0.0943 | 0.0714 |
| | (0.0309) | (0.0367) | (0.0913) | (0.108) |
| Observations | 11523 | 6345 | 2230 | 2182 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

B. Women

| | (1) All parities | (2) Childless | (3) One child | (4) Two children |
|---|---|---|---|---|
| Age | 0.128*** | 0.159*** | 0.116*** | 0.0118 |
| | (0.0116) | (0.0205) | (0.0250) | (0.0333) |
| Age squared | -0.00222*** | -0.00264*** | -0.00226*** | -0.000356 |
| | (0.000192) | (0.000362) | (0.000409) | (0.000514) |
| One child | -0.378*** | | | |
| | (0.0216) | | | |
| Two children | -0.766*** | | | |
| | (0.0242) | | | |
| Three or more children | -0.864*** | | | |
| | (0.0316) | | | |
| With partner | 0.0674*** | 0.111*** | 0.0648** | 0.0318 |
| | (0.0181) | (0.0278) | (0.0313) | (0.0432) |
| High education | 0.0905*** | 0.0773*** | 0.125*** | 0.0815*** |
| | (0.0157) | (0.0277) | (0.0281) | (0.0290) |
| Income evaluation | 0.0303*** | -0.00275 | 0.0479*** | 0.0497*** |
| | (0.00669) | (0.0108) | (0.0125) | (0.0130) |
| Employed | -0.352*** | -0.567*** | -0.0818 | -0.147 |
| | (0.0995) | (0.154) | (0.220) | (0.198) |
| Preschool child OK if mother works | -0.0365*** | -0.0315*** | -0.0475*** | -0.0410*** |
| | (0.00642) | (0.0104) | (0.0120) | (0.0125) |
| Preschool climate (regional) | 0.000437 | -0.245*** | 0.247*** | 0.188** |
| | (0.0531) | (0.0694) | (0.0830) | (0.0764) |
| Employed mothers (regional) | -0.360** | -0.135 | -0.228 | -0.544** |
| | (0.172) | (0.222) | (0.248) | (0.214) |
| Men unemployment (regional) | -0.385 | 0.288 | -0.394 | -0.773** |
| | (0.281) | (0.375) | (0.377) | (0.323) |
| Employed*Employed mothers(regional) | 0.239*** | 0.435*** | 0.223 | 0.119 |
| | (0.0914) | (0.143) | (0.195) | (0.175) |
| Employed*Preschool climate(regional) | 0.0895*** | 0.141*** | -0.0383 | 0.0216 |
| | (0.0294) | (0.0430) | (0.0657) | (0.0640) |
| Observations | 14220 | 5295 | 3813 | 3850 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6. Predicted happiness: multilevel linear regression model with individual-level and regional-level explanatory variables, and individual-regional interaction effects (within-country variation model using country fixed effects). Maximum likelihood estimates. Number of regions=110. Men and women aged 18-40. Constant omitted, France is the reference country.

A. Men

| | (1) All parities | (2) Childless | (3) One child | (4) Two children |
|---|---|---|---|---|
| Age | 0.0991*** | 0.139*** | 0.0747** | -0.0601 |
| | (0.0217) | (0.0183) | (0.0351) | (0.0626) |
| Age squared | -0.00166*** | -0.00231*** | -0.00139** | 0.000774 |
| | (0.000359) | (0.000315) | (0.000564) | (0.000943) |
| One child | -0.210*** | | | |
| | (0.0293) | | | |
| Two children | -0.658*** | | | |
| | (0.0367) | | | |
| Three or more children | -0.697*** | | | |
| | (0.0463) | | | |
| With partner | 0.242** | 0.330*** | 0.164* | 0.0630 |
| | (0.107) | (0.121) | (0.0826) | (0.0809) |
| High education | 0.0413** | 0.0224 | 0.00299 | 0.187*** |
| | (0.0176) | (0.0184) | (0.0342) | (0.0323) |
| Income evaluation | 0.0382*** | 0.0302*** | 0.0577*** | 0.0362** |
| | (0.00950) | (0.0106) | (0.0163) | (0.0158) |
| Employed | 0.150 | 0.0880 | 0.435** | 0.126 |
| | (0.0930) | (0.114) | (0.219) | (0.264) |
| Preschool child OK if mother works | -0.0189*** | -0.0173 | -0.0203 | -0.0302** |
| | (0.00708) | (0.0113) | (0.0138) | (0.0136) |
| Preschool climate (regional) | 0.367*** | 0.319** | 0.393** | 0.362** |
| | (0.113) | (0.129) | (0.152) | (0.155) |
| Employed mothers (regional) | -0.447*** | -0.299 | -0.367 | -0.238 |
| | (0.170) | (0.186) | (0.381) | (0.310) |
| Men unemployment (regional) | -0.890*** | -0.407 | -0.757** | -1.821*** |
| | (0.273) | (0.305) | (0.371) | (0.437) |
| Employed*Employed others(regional) | 0.0697 | 0.0243 | -0.114 | -0.388* |
| | (0.0784) | (0.0983) | (0.162) | (0.196) |
| Employed*Preschool limate(regional) | -0.0558* | -0.0222 | -0.136* | 0.0509 |
| | (0.0302) | (0.0418) | (0.0784) | (0.106) |
| Bulgaria | 0.0349 | 0.118 | -0.268** | 0.0483 |
| | (0.0749) | (0.0928) | (0.128) | (0.122) |
| Georgia | 0.273** | 0.329*** | -0.0374 | 0.341** |
| | (0.113) | (0.120) | (0.186) | (0.165) |
| Germany | -0.720*** | -0.721*** | -0.971*** | -0.502*** |
| | (0.0466) | (0.0462) | (0.0922) | (0.0846) |
| Hungary | -0.0905 | -0.259 | -0.154 | 0.292 |
| | (0.160) | (0.173) | (0.212) | (0.209) |
| Russia | -0.0585 | 0.0417 | -0.372*** | 0.0545 |
| | (0.0873) | (0.0908) | (0.118) | (0.129) |
| Observations | 11523 | 6345 | 2230 | 2182 |
| R-squared | 0.165 | 0.185 | 0.113 | 0.106 |

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses

B. Women

| | (1) All parities | (2) Childless | (3) One child | (4) Two children |
|---|---|---|---|---|
| Age | 0.129*** | 0.163*** | 0.118*** | 0.00789 |
| | (0.0142) | (0.0202) | (0.0227) | (0.0356) |
| Age squared | -0.00223*** | -0.00270*** | -0.00227*** | -0.000279 |
| | (0.000238) | (0.000358) | (0.000375) | (0.000553) |
| One child | -0.375*** | | | |
| | (0.0333) | | | |
| Two children | -0.766*** | | | |
| | (0.0385) | | | |
| Three or more children | -0.867*** | | | |
| | (0.0499) | | | |
| With partner | 0.0646*** | 0.104*** | 0.0634* | 0.0354 |
| | (0.0196) | (0.0290) | (0.0324) | (0.0511) |
| High education | 0.0815*** | 0.0567** | 0.0959*** | 0.0575** |
| | (0.0149) | (0.0232) | (0.0298) | (0.0279) |
| Income evaluation | 0.0344*** | 0.00405 | 0.0544*** | 0.0534*** |
| | (0.00788) | (0.0122) | (0.0106) | (0.0160) |
| Employed | -0.298** | -0.480** | 0.0806 | 0.0461 |
| | (0.137) | (0.195) | (0.180) | (0.269) |
| Preschool child OK if mother works | -0.0368*** | -0.0298** | -0.0465*** | -0.0391*** |
| | (0.00821) | (0.0119) | (0.0137) | (0.0121) |
| Preschool climate (regional) | 0.264* | 0.188 | 0.466*** | 0.279 |
| | (0.147) | (0.136) | (0.172) | (0.190) |
| Employed mothers (regional) | -0.516** | -0.494* | -0.325 | -0.277 |
| | (0.206) | (0.283) | (0.279) | (0.293) |
| Men unemployment (regional) | -0.714** | -0.410 | -0.546 | -0.619* |
| | (0.279) | (0.397) | (0.351) | (0.353) |
| Employed*Employed others(regional) | 0.185 | 0.348* | 0.0990 | -0.00977 |
| | (0.126) | (0.198) | (0.162) | (0.209) |
| Employed*Preschool limate(regional) | 0.0833** | 0.131*** | -0.0655 | -0.0250 |
| | (0.0337) | (0.0458) | (0.0512) | (0.0958) |
| Bulgaria | -0.0593 | 0.110 | -0.298** | -0.243** |
| | (0.0869) | (0.0993) | (0.116) | (0.117) |
| Georgia | 0.134 | 0.236* | 0.0116 | 0.0399 |
| | (0.131) | (0.131) | (0.178) | (0.153) |
| Germany | -0.593*** | -0.696*** | -0.797*** | -0.469*** |
| | (0.0432) | (0.0591) | (0.0723) | (0.0753) |
| Hungary | 0.211 | 0.264 | 0.0182 | 0.000989 |
| | (0.208) | (0.189) | (0.244) | (0.252) |
| Russia | -0.0855 | 0.101 | -0.292** | -0.268* |
| | (0.109) | (0.108) | (0.133) | (0.140) |
| Observations | 14220 | 5295 | 3813 | 3850 |
| R-squared | 0.189 | 0.112 | 0.110 | 0.064 |

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses

Table 7. Predicted happiness: ordered probit regression model with individual-level and regional-level explanatory variables, and individual-regional interaction effects (within-country variation model using country fixed effects). Standard errors corrected for clustering at the regional level. Number of regions=110. Men and women aged 18-40. Cut-off for categories omitted.

A. Men

| | (1) All parities | (2) Childless | (3) One child | (4) Two children |
|---|---|---|---|---|
| Age | 0.146*** | 0.205*** | 0.113** | -0.0882 |
| | (0.0279) | (0.0261) | (0.0520) | (0.0941) |
| Age squared | -0.00243*** | -0.00342*** | -0.00209** | 0.00113 |
| | (0.000458) | (0.000458) | (0.000836) | (0.00141) |
| One child | -0.313*** | | | |
| | (0.0427) | | | |
| Two children | -0.971*** | | | |
| | (0.0502) | | | |
| Three or more children | -1.024*** | | | |
| | (0.0554) | | | |
| With partner | 0.360** | 0.512** | 0.242* | 0.0996 |
| | (0.165) | (0.199) | (0.127) | (0.124) |
| High education | 0.0613** | 0.0357 | 0.00528 | 0.278*** |
| | (0.0239) | (0.0278) | (0.0504) | (0.0505) |
| Income evaluation | 0.0560*** | 0.0467*** | 0.0863*** | 0.0534** |
| | (0.0151) | (0.0172) | (0.0248) | (0.0234) |
| Employed | 0.228* | 0.169 | 0.695** | 0.150 |
| | (0.138) | (0.174) | (0.330) | (0.395) |
| Preschool child OK if mother works | -0.0287*** | -0.0272 | -0.0315 | -0.0458** |
| | (0.0104) | (0.0171) | (0.0208) | (0.0199) |
| Preschool climate (regional) | 0.531*** | 0.479*** | 0.595*** | 0.520** |
| | (0.159) | (0.185) | (0.221) | (0.222) |
| Employed mothers (regional) | -0.649*** | -0.435 | -0.549 | -0.353 |
| | (0.245) | (0.277) | (0.564) | (0.448) |
| Men unemployment (regional) | -1.296*** | -0.628 | -1.143** | -2.691*** |
| | (0.392) | (0.453) | (0.549) | (0.630) |
| Employed*Employed others(regional) | 0.0953 | 0.00893 | -0.197 | -0.545* |
| | (0.118) | (0.135) | (0.240) | (0.287) |
| Employed*Preschool limate(regional) | -0.0857* | -0.0427 | -0.216* | 0.0803 |
| | (0.0465) | (0.0606) | (0.117) | (0.160) |
| Bulgaria | 0.0392 | 0.170 | -0.431** | 0.0692 |
| | (0.107) | (0.142) | (0.190) | (0.176) |
| Georgia | 0.380** | 0.484*** | -0.0914 | 0.499** |
| | (0.161) | (0.182) | (0.276) | (0.240) |
| Germany | -1.074*** | -1.103*** | -1.483*** | -0.753*** |
| | (0.0698) | (0.0744) | (0.144) | (0.124) |
| Hungary | -0.168 | -0.433* | -0.263 | 0.411 |
| | (0.224) | (0.251) | (0.311) | (0.303) |
| Russia | -0.104 | 0.0465 | -0.585*** | 0.0675 |
| | (0.122) | (0.135) | (0.175) | (0.187) |
| Observations | 11523 | 6345 | 2230 | 2182 |
| R-squared | | | | |

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses

B. Women

| | (1) All parities | (2) Childless | (3) One child | (4) Two children |
|---|---|---|---|---|
| Age | 0.174*** | 0.207*** | 0.160*** | 0.01000 |
| | (0.0181) | (0.0259) | (0.0312) | (0.0480) |
| Age squared | -0.00299*** | -0.00343*** | -0.00308*** | -0.000372 |
| | (0.000301) | (0.000461) | (0.000517) | (0.000746) |
| One child | -0.514*** | | | |
| | (0.0481) | | | |
| Two children | -1.026*** | | | |
| | (0.0612) | | | |
| Three or more children | -1.149*** | | | |
| | (0.0628) | | | |
| With partner | 0.0801*** | 0.134*** | 0.0760* | 0.0333 |
| | (0.0255) | (0.0398) | (0.0427) | (0.0671) |
| High education | 0.108*** | 0.0694** | 0.134*** | 0.0812** |
| | (0.0207) | (0.0313) | (0.0409) | (0.0394) |
| Income evaluation | 0.0416*** | -0.000174 | 0.0733*** | 0.0717*** |
| | (0.0104) | (0.0158) | (0.0147) | (0.0202) |
| Employed | -0.411** | -0.632** | 0.0996 | 0.0384 |
| | (0.179) | (0.259) | (0.253) | (0.360) |
| Preschool child OK if mother works | -0.0497*** | -0.0421*** | -0.0649*** | -0.0537*** |
| | (0.0116) | (0.0159) | (0.0195) | (0.0168) |
| Preschool climate (regional) | 0.329* | 0.224 | 0.623*** | 0.359 |
| | (0.180) | (0.170) | (0.209) | (0.244) |
| Employed mothers (regional) | -0.680** | -0.632* | -0.467 | -0.359 |
| | (0.267) | (0.372) | (0.376) | (0.385) |
| Men unemployment (regional) | -0.927*** | -0.511 | -0.784* | -0.832* |
| | (0.358) | (0.513) | (0.463) | (0.477) |
| Employed*Employed others(regional) | 0.245 | 0.448* | 0.133 | -0.00575 |
| | (0.169) | (0.264) | (0.226) | (0.275) |
| Employed*Preschool limate(regional) | 0.117*** | 0.175*** | -0.0862 | -0.0269 |
| | (0.0442) | (0.0597) | (0.0702) | (0.129) |
| Bulgaria | -0.110 | 0.0812 | -0.446*** | -0.351** |
| | (0.109) | (0.128) | (0.153) | (0.155) |
| Georgia | 0.138 | 0.258 | -0.0402 | 0.0406 |
| | (0.162) | (0.168) | (0.231) | (0.200) |
| Germany | -0.818*** | -0.921*** | -1.144*** | -0.662*** |
| | (0.0565) | (0.0779) | (0.102) | (0.102) |
| Hungary | 0.225 | 0.279 | -0.0386 | -0.0413 |
| | (0.252) | (0.237) | (0.303) | (0.327) |
| Russia | -0.150 | 0.0698 | -0.452*** | -0.389** |
| | (0.134) | (0.137) | (0.170) | (0.184) |
| Observations | 14220 | 5295 | 3813 | 3850 |

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses

Table 8. Fertility intentions and happiness: marginal effects estimated from probit models for the intention to have a(nother) child within the next three years as a function of predicted happiness. Controls: same variables as in Table 7. Standard errors adjusted for regional clustering.

A. Men

| | (1) All parities | (2) Childless | (3) One child | (4) Two children |
|---|---|---|---|---|
| Predicted happiness | 0.326*** | 0.268*** | 0.296*** | 0.228*** |
| | (0.0142) | (0.0193) | (0.0223) | (0.0200) |
| Observations | 7541 | 3731 | 1668 | 1601 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

B. Women

| | (1) All parities | (2) Childless | (3) One child | (4) Two children |
|---|---|---|---|---|
| Predicted happiness | 0.300*** | 0.240*** | 0.350*** | 0.101*** |
| | (0.0110) | (0.0245) | (0.0170) | (0.0069) |
| Observations | 10667 | 4007 | 2822 | 2940 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1