Fertility intentions and their timing: theory and evidence from Bulgaria and Hungary

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1. Introduction

As of the beginning of the 90-s the countries in Central and Eastern Europe experienced a drastic fall in fertility. The total fertility rate (TFR) dropped down to 1.3 - 1.5 in all these countries towards the end of the decade. This fall was accompanied by a rapid rise in the mean age at childbearing by birth order, thus indicating a trend of pronounced postponement of births. Philipov and Kohler (2001), Sobotka (2003a, 2003b), Philipov and Dorbritz (2003) provide overviews of these demographic trends, including discussions of tempo and quantum components of fertility.

Demographers explain these changes in fertility based on the two fundamental theoretical approaches: the economic one and the ideational changes one (Kotowska and Jozwiak 2003). The transition period was accompanied by a rapid rise in income inequality, relative deprivation, unemployment, as well as by a rise in educational enrolment, diversification of labor markets and spread of new professions, freedom of entrepreneurship. Rapid and intensive economic changes increased direct and indirect costs of children. Economic uncertainty had its effect as well (Bhaumik, Ranjan). In addition, prolonged education had a significant effect on postponement of births (Kohler et al. 2002).

Proponents of the theoretical approach based on ideational shifts suggest that the overthrow of the totalitarian regime eased the infusion of new values, characteristic for a democratic society. They cause demographic changes known as the second demographic transition (van de Kaa 1987; for CEE countries see for example United Nations 2002, where cohabitation is considered; Kotowska 2000, where Poland is considered; and several papers in the volume edited by Kotowska and Jozwiak 2003). Kohler et al. (2002) emphasize also the significance of changing social norms and describe a mechanism through which they exercise an effect on the demographic behavior in an increasing part of the population.

These theoretical approaches provide valuable information about the demographic change in the region. Yet they have been usually applied in a conventional way, without an explicit reflection of the specifics of societal change in the region. Their application can be supplemented by considering the effect of uncertainty and anomie, as well as of social capital (Philipov 2003). Uncertainty in all spheres of one's life rises where societal

changes are abrupt and unexpected. Under the prevalence of uncertainty about the way society develops and about the future of the self, one would prefer to postpone or reject crucial life events such as the birth of a child. Anomie rises during the period when old norms and values disappear and are gradually replaced by new ones. Under the state of anomie people lose orientation in drawing plans about life course events. Thus the effect of uncertainty is enforced. Where anomie prevails the restrictive power of norms is relaxed and spread of new behavior is eased. Hence accelerated postponement of childbearing, childlessness or rejection of births of order higher than one can diffuse quicker. In addition, disorientation and uncertainty worsen the psychological well-being and give rise to depression. The latter may decrease the value of children and thus enforce decisions to postpone or reject births.

During the swift societal transition diverse social and state institutions needed drastic changes and adaptation to the new conditions of life. Welfare-related institutions, in particular, were often weak in their social support. Thus persons with high social network-based social capital were able to relax problems related to uncertainty and economic pressure.

The present study aims to an empirical justification of these theoretical argumentations whose empirical support is scarce. For this purpose use is made of micro-level survey data for Bulgaria and Hungary. Both countries went through the transition at a different pace: towards the beginning of the 21st Century the social and economic situation in Hungary improved considerably as compared to the first couple of years after the transition, while in Bulgaria the advance was relatively modest. The surveys we use were carried out in 2001 in Hungary and 2002 in Bulgaria. We use a twofold study of fertility intentions: first we check whether they are positive for having a birth, and where they are positive we study the timing of the intended birth (within the next two years versus later). Thus we examine diverse theoretical approaches both with respect to the level of intended births as well as to their timing. This approach is analogous to a study of quantum and tempo components of fertility.

We study fertility intentions using theories that apply to fertility, i.e. to the behavior rather than to the intention. Thus we assume that both behavior and intentions are the result of a planned choice (or rational decision-making). Indeed, positive intentions may remain unrealized, as has often been noted in the demographic literature. However, under the assumption of a planned choice, the divergence between intentions and behavior can be due to changes in intentions that have occurred after they have been once measured. This change, or "revision of intentions", as termed by Morgan (2003), is a result of changes in at least some of the determinants.

Our study of "quantum" and "tempo" of fertility intentions faces two major problems. The first one is that it requires a theoretical framework that explicitly delineates a timing of a birth from the intention to have a birth, where causalities are discussed. At the macro-level such a theoretical framework has been discussed (Kohler et al. 2002). At the micro-level timing of fertility is considered in dynamic economic theories and life-cycle studies, where the decision for having a birth is period-specific. We take a different perspective. We look into two aspects of this decision: have a birth or not, and if yes, then when. Another problem that we face is the use of an adequate model. This problem is a consequence of the first one: model construction is expected to follow a

certain theoretical framework. Our study contributes to these two topics, at least where very low fertility in countries in rapid societal transition is considered.

Section 2 suggests a short introduction to the social, economic, and demographic situation in Bulgaria and Hungary. Section 3 discusses relevant theories. The next three sections discuss data and methods, choice and description of variables, and model results. The Appendix supplements these sections with a presentation of additional models and model results. The final section presents a general discussion.

2. Bulgaria and Hungary - recent economic, social, and demographic trends

In this chapter we briefly recall some major characteristics of the transition from a totalitarian to a democratic social order that are expected to exert an influence on demographic events. We also present a brief overview of fertility trends in the two countries.

Table 1 gives several social and economic indicators observed in 2001 as related to the start of the transition (1989 for GDP and 1990 for educational enrolment and unemployment). In Hungary the GDP dropped during the first years of the transition down to 80% from its level in 1989; the latter was achieved only in 2000. In Bulgaria, the drop in the GDP was even more pronounced. In 1997 it dropped down to nearly 60% of the 1989 level, and reaching the latter is still a matter of the future. Even though the GDP is a gross indicator, these drastic falls indicate considerable economic hardships experienced by the population that will naturally have an impact on the demographic trends. The per capita purchasing power (ppp) equity reveals a considerably lower income in 2001 in Bulgaria as compared to Hungary, although the two countries had an around equal standard of living before the start of the transition.

Table 1: Bulgaria and Hungary - GDP, number of students, unemployment

|	Real GDP (1989=100)	per capita PPP in US$	Number in tertiary education per 10,000 inhabitants		Unemployment rate (% to labour force)	
	2001	2001	1990	2000/01	1990	2001
Hungary	108	?	99	330	1.9	5.9
Bulgaria	73	6200	216	305	1.5	19,4

GDP=gross domestic product; PPP=purchasing power equity

Economically and socially, the transition period was one of rising unemployment, impoverishment and enrichment, restructuring in production and markets, rise in new markets and professions, rise in new educational areas. In Hungary, unemployment was kept at a relatively low level under the circumstances of a rapidly changing economy, adapting to western markets. Its maximum was observed in 1993 at the level of 11.7%, and since then it marked a gradual decrease. In Bulgaria, unemployment did not decrease below 10% during the 90-s, and its maximum was observed namely in the last year, 2001. A decrease down to 15% was observed though towards the end of 2003.

Precipitating changes in educational enrolment have had a major impact on demographic behavior. Table 1 illustrates a pronounced rise in tertiary enrolment in both

countries. It more than tripled in Hungary, and the rise in Bulgaria was also sizeable. The rise is a result of significant changes in the educational sector. Restructuring of labor markets brought about an increased demand of skills and knowledge in new professions that were undermined by the totalitarian regime. The corresponding supply could arise through a market-driven increase and restructuring in educational enrolment. In addition, both countries witnessed a significant rise in private education and in the costs of education. Evidently, the proportion of the population involved in education increased. Since major demographic events usually take place after the end of education, it was not unexpected that fertility decreased through a postponement effect (Kohler et al. 2002; see also Billari and Philipov 2004, for a discussion on the end of education and entry into a first union in CEE countries).

Figure 1 below informs about the changes in fertility during the 90-s. Each graph in the figure exhibits the mean age of childbearing plotted to the right axis, and the observed as well as the adjusted TFR for all births and for the first-order births. The adjustment was done with the use of the Bongaarts-Feeney formula (Bongaarts and Feeney 1998).
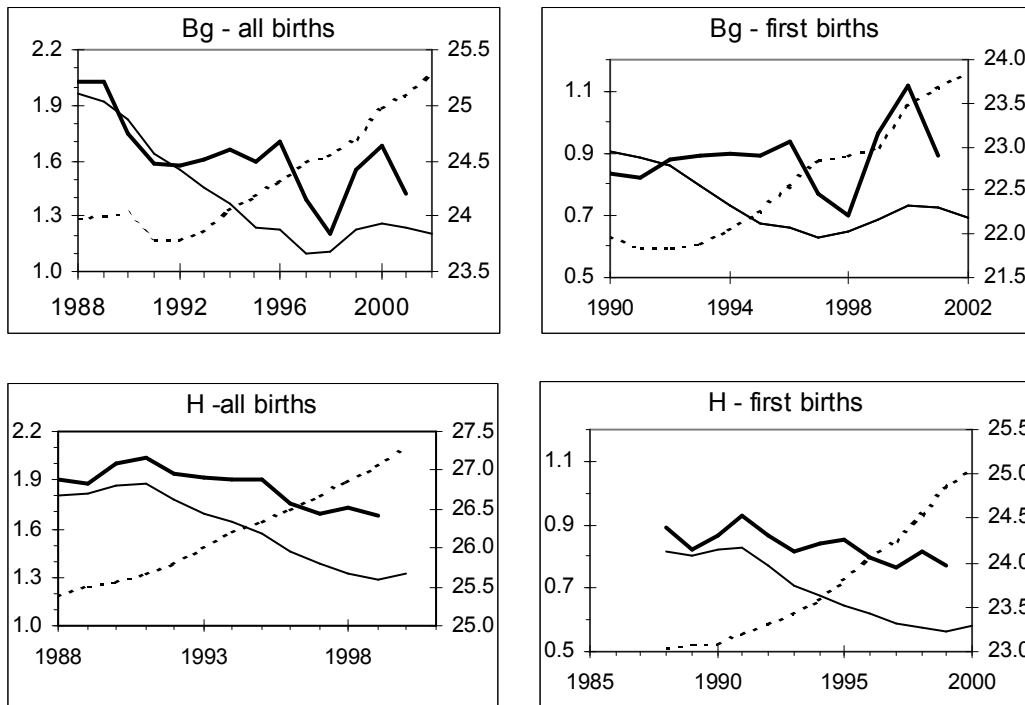
Figure 1: Observed and adjusted TFR for all births and for first-order births, and the corresponding mean ages: Bulgaria (BG) and Hungary (H).
(The dotted lines plot the mean ages to the right axis; the continuous lines plot the TFRs to the left axis; the thick lines plot the adjusted TFR, the thin lines plot the observed TFR)

The TFR in 1988 presents approximately the fertility level that prevailed before the start of the transition. During the 90-s it dropped drastically. In Bulgaria the drop was from around 2.0 down to 1.1 in 1997, while in Hungary it was not as steep: from 1.8 down to the minimum of 1.3 reached two years later. The drop in the TFR is due both to quantum and tempo components. The latter is indicated clearly by the increase in the

mean age at childbearing (the trend represented by the overall mean age at childbearing is observed also by separate birth orders, as can be seen from the right graphs in the figure). The adjusted for tempo-effect TFR was estimated using the Bongaarts-Feeney (BF) formula (Bongaarts and Feeney 1998). It reveals different patterns of quantum change in the two countries.

In Bulgaria the quantum experienced a sudden fall with the start of the transition, from 2.0 in 1990 to 1.6 in 1992. Till 1996 it remained at around this level. The drastic drop observed in 1997 and 1998 links to the outburst of a hyperinflation in the end of 1996 and in 1997, measured at levels of nearly two thousand percent monthly in the beginning of 1997. The hyperinflation was accompanied by diverse extreme economic difficulties and political changes. Evidently this period of unrest urged people to postpone births, as indicated by the subsequent rise in the quantum for a couple of years. In Hungary, the quantum remained relatively close to replacement level in the first half of the decade, and marked a gradual decrease during the second half of the 90-s.

Trends in the first-order TFRs (TFR(1)) are of interest as they inform about changes in voluntary childbearing. The adjusted TFR(1) is close to around 0.9 in Bulgaria, except for the years of the hyperinflation. A value of 0.9 can be interpreted as indicating a nearly universal childbearing (90% of the women will ever have at least one child) and hence very low level of voluntary childlessness. Its rise to a meaningless level above 1.0 in 2000 is due to the inaccuracy of the BF formula when the mean age at birth of a first child changes suddenly. The latter increased from 23.0 in 1999 up to 23.5 in the year 2000. A more precise estimation of the tempo effect, due to Kohler and Ortega (2002) would yield meaningful values, but the trends they would describe can be expected to be the same.

In Hungary the adjusted TFR(1) drops gradually from the level of 0.9 to 0.75. The 90-s have led to the gradual augmentation in voluntary childlessness in this country.

Although order-specific mean ages increased they remain very low in both countries. Births appear early in life, and stop early in life. By age 30 some 85 to 90% of the completed fertility is already realized, and by age 35 this share is nearly 100%.

This brief review indicates that Bulgaria and Hungary experienced many common features during the transition period. In both countries the societal change started suddenly and have the same direction. Differences are due mainly to the slower pace of change in Bulgaria. Where fertility is considered, in both countries postponement of births and its consequent tempo effect is a significant component of fertility behavior. Its structural change and study is as necessary as the study of quantum fertility changes. A major difference between the two countries is the rise in voluntary childlessness in Hungary that is not observed in Bulgaria, insofar as indicated by the tempo and quantum components of the TFR.

3. Theoretical discussion

- *Fertility intentions and the theoretical approach adopted in this paper*
In this paper we analyze fertility intentions and not fertility because of the cross-sectional character of the available survey data. They contain valuable information that is relevant towards the time of interview only and hence cannot be related to past births.

Like in fertility, we consider the construction of intentions as the result of a reasoned decision-making.

Fertility intentions have widely been studied in demography, mainly for the purpose of checking whether they can be used for the prediction of future fertility. We have a different aim: through the analysis of fertility intentions we want to understand better the childbearing decisions. Studies have shown that a certain share of fertility intentions remain unrealized. Such a result can agree with the assumption that both intentions and childbearing are the outcome of a decision process. Inevitably some time elapses between a positive intention and its realization. During this period some factors that underlie the construction of a positive intention may have changed, and as a result a person may change the intention itself, by either rejecting the birth or postponing it. Analogously negative intentions can later turn positive. Morgan (2003) refers to these changes as "revised" intentions.[12]

Fertility intentions may happen to be optimistic (Weinstein 1980), particularly so among young adults who may underestimate the significance of restrictive factors on childbearing, or overestimate their ability to control them. This inference cannot be directly transferred to the case of Bulgaria and Hungary. As it is described below the dynamics and strength of the transition caused rise in anomie, disorientation, and uncertainty. One might even suspect that optimism could have been replaced by pessimism. A longitudinal survey of marriages contracted in 1990 and 1991 in Hungary is very informative on this issue (Kamaras and Szukics 2003). It showed that the 1991 family plans for the intended number of children have turned optimistic 10 years later, in 2001: while in 1991 women desired 2.16 children on average, in 2001 their desires rose to 2.26 controlling for realized births.

We raise the key topic of studying two components of fertility intentions. One component relates to the intention to ever have (other) children or not, and the other component associates with the timing of an intended birth. Both components we regard in their simplest form: the first one refers to ever having a (another) child, and timing can be measured as "sooner" or "later". These two components are similar to quantum and tempo components of fertility. We term them level and timing of intentions.

The task is to understand the effect of causal factors on the two components. For this purpose we need relevant theories. Under the validity of the assumption about reasoned decision-making it can be accepted that theories on fertility are relevant for the

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[1] A detailed analysis of the composite relationship between fertility intentions and their ultimate realization as actual births may benefit from the use of social-psychological theories. The theory of *reasoned action* (see Ajzen 1991 for a review) gains interest among demographers. According to this theory intentions are constructed on the basis of perceived attitudes, subjective norms, and perceived control, all three related to the event of interest. Behavior is the result of intentions. Adding the impact of perceived control on behavior extends the theory of reasoned action to a theory of *planned behavior* (Ajzen 1991). The theory is not specified with respect to timing of the intended event and therefore we feel restricted for its use in our study. It has been applied in the Bulgarian survey but its use is a subject of a different analysis. Here, instead of perceived, we use actual attitudes and control. For example, personal or household income can be considered as an actual restriction, i.e. control, over the construction of a positive intention for a birth. Where norms are considered we make use of several variables related to culture. We also use variables describing personal traits.

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study of fertility intentions, and theories on quantum and tempo of fertility are relevant to the analyses of levels and timing of fertility intentions.

In this paper we reflect on the application of the economic theory on fertility as well as of theoretical approaches that focus on ideational shifts, uncertainty, and social capital. We need their specification separately for the tempo and quantum components of fertility. The demographic literature does not suggest a rigorous specification of theories on tempo and quantum fertility components, with the exception of the pioneering paper of Kohler et al. (2002) that considers the topic at the macro level. In this paper we do not take up the ambitious task to develop such a theory at the micro level. We only formulate the issue and address it from the point of view of existing theoretical positions, in the context of the two countries, at the micro level, and in the contents of fertility intentions and intended timing of births.

The formulation of our theoretical issue can benefit fro a parallel with the economic theory on fertility. In the classic comparative statics approach (see for example Becker 1990) direct and indirect income effects have an impact on the choice of a *lifetime* number of children in one's utility function, while in a dynamic setting the choice for having a child is restricted within a period of time. Dynamic microeconomic fertility models study a sequence of periods in which individuals make their choices to have a child or not (see Arroyo and Zhang 1997, and Hotz et al. 1997 for a review). Thus they include the timing of a birth. Our approach to understanding fertility intentions is similar to the dynamic setting, except that fertility intentions are delineated into their two components. In this way we are able to distinguish causal effects on the decision to ever have a child from those to have a child within a certain period of time. Our approach is analogous to the delineation of "movers" and "stayers" in the study of migration (Blumen, Kogan, and McCarty 1956). Stayers are individuals for whom the probability of migrating is zero; this probability is non-zero for the movers.

- Economic changes

In the context of Bulgaria and Hungary economic theories must be applied to reflect drastic dynamic changes in income, labor markets, unemployment, education, under significant uncertainty.

Consider first the direct income effect. Economic theory predicts that rising prices and relative fall in income would increase direct costs of children. We would expect this effect to have been considerable, more so for Bulgaria as compared to Hungary, and it could well have been a significant reason for the drop in fertility in the beginning of the 90-s when income severely decreased. Inversely, rise in (net) income can be expected to lead to a decline in the costs of children and therefore endorse higher fertility. Income did increase in the two countries during the last few years, but no significant rise in fertility has been observed. A positive income effect can be expected where the rise in income is perceived as long-standing because the birth of a child is an irreversible event and so are the related costs for childrearing. The dynamics of the transition does not leave much ground for a sound certainty in the level of income for long periods of time. Hence rise in income can be expected to be of low significance for childbearing.

In addition, we need to consider that a birth of a child leads to a drop in income per household member. Where income is close to subsistence level therefore, a birth may

lead to an impoverishment in the family (Galor and Weil 2000). We expect then a negative effect on the level of fertility intentions for households with very low income.

Theory predicts an increase in indirect costs of children in the case of rising income (rising opportunity costs). In times of uncertainty, where an income increase cannot be perceived as long-standing, it can be expected that opportunity costs will be amplified. Therefore rational decision-makers will be expected to postpone births. Where drop in income takes place, opportunity costs can be expected to decrease; at levels of income close to subsistence this positive indirect effect is offset by the negative direct effect.

It can be generalized that rising income will be expected to have a minor direct effect on fertility intentions, and the resulting indirect effect will cause desires to postpone a planned birth. Levels of low income indicate rejection of a birth.

Note should be taken that family and child allowances as well as other safety net and welfare policies for families with children support particularly people with low incomes, although their support is moderate in both countries.

Consider now unemployment of women. It can have a diverse effect on childbearing. On one side, opportunity costs are low and where the income of the spouse (or household income) is sufficient, the family may go towards having a child. On the other side, unemployed women may prefer to go back to work, either in order to make a contribution to the insufficient household income, or to search for an opportunity for self-realization through labor. In these cases unemployed females may prefer to postpone a birth. In both countries female labor-force participation rates are high and it is likely for a woman to work rather than stay at home as a housewife. Therefore the second effect can be regarded as more likely.

Economic uncertainty had its contribution to the drop in fertility as well. Ranjan (1999) suggests a general model, and Bhaumik (2002) finds that uncertainty is among the key factors that have contributed to the drastic fall in fertility in Eastern Germany in the first half of the 90-s.

Although we discuss micro-level issues it is instructive to describe the impact of macro-level changes in the labor market and in the educational system on fertility. Spéder (2002) presents an analysis for Hungary. The radical restructuring in the labor market in terms of demand for new professions and skills, unavailable or unnecessary in a planned economy, as well as the abolishment of the planned educational system, brought about the rise in educational enrolment particularly in the tertiary sector (table 1). Life course events usually line in an order of first completing the education and then having a child. In cases where a birth comes before the completion of education, it can be the reason for a dropout from education. Billari and Philipov (2004) found the same interrelationship between entry into first union and end of education in Central and Eastern European countries. Hence, at the macro-level, the increase in the number of students in the tertiary educational sector has caused a significant part of the decrease in fertility and the increase in its mean age. In addition, some students need to work in order to support their study. This leads to a prolongation of education with a consequent additional postponement of births.

Education has an effect on fertility also beyond timing of life-course events. Educational attainment is indicative of the economic and social status of a person;

education is the main constituent of human capital. There are no detailed studies on the effect of these aspects of education on tempo and quantum of fertility in CEE countries.

- Ideational shifts
This theoretical approach rests on the understanding that the overthrow of the totalitarian regime eased the infusion of new values characteristic for a democratic society. Value changes cause demographic changes known in the demographic literature as the second demographic transition (discussions for CEE countries can be found in Kotowska and Jozwiak 2003), United Nations 2002). Some key modern values that are discussed in the context of the second demographic transition were observed in Bulgaria and Hungary before the start of the transition. Such are for example the rise in female autonomy linked to high female labor-force participation rates, as well as secularization. Female autonomy has risen as a result of the high female labor force participation forced by the planning system in a totalitarian regime, and the necessity in the family for a higher income in conditions of wage-leveling, while in Western countries autonomy rose along with the entry into the labor market, if not earlier. It can be speculated that ideational changes had a certain ground yet before the start of the transition. Other key modern values may have been established during the transition, such as rise in individualization and tolerance to new forms of behavior. Prevalence of the latter and other modern values was impossible before the start of the transition because of the very nature of a totalitarian regime. Modern values have an impact on fertility insofar as values of self-fulfillment, self-realization, values related to gender equality, etc., make women postpone or reject crucial life events such as childbearing.

- Preferences between work and family
Women's preferences between a working career and child-care in the family have been extensively studied in demography as a primary factor on fertility. Hakim (2003) suggests the preference theory as central for the understanding and predicting fertility change. It is reasonable to expect their importance in the formation of fertility intentions in our two countries, where the dilemma between work and family has been long standing. Hakim (2003) links preferences to the larger framework of ideational change. Women may prefer work to family because they want to achieve self-autonomy, and self-realization in society through participation in labor. In Bulgaria and Hungary preferences can link though to the economic situation of the people for diverse reasons: to get above the subsistence level of living, to maintain a temporarily higher income, or to achieve more possibilities for consuming in swiftly expanding consumer markets.

- Anomie, uncertainty, disorientation
Theories that underlie the impact of economic and ideational changes on fertility in CEE countries have been found useful by a number of researchers. Nevertheless the explanations they provide are insufficient. One would expect that under the validity of the economic theory economic indicators should correlate to demographic behavior; for example poorer people are expected to have lower fertility. No sound proofs have been found so far about similar causalities. Where ideational shifts are considered we need to now more about the mechanism that has lead to the abolishment of deeply rooted values

and norms prevalent during the totalitarian regime, and has lead to their immediate replacement by new ones, those typical for a modern democratic society.

The application of the economic and ideational approaches to the explanation of the fertility fall in both countries, and in Central and Eastern Europe in general, can successfully be supplemented by considering the effect of uncertainty and social anomie (Philipov, 2003). Uncertainty, not necessarily only the economic one, rises where dynamics of societal changes are abrupt and unexpected. Under the prevalence of uncertainty about the way society develops and about the future of the self, one would prefer to postpone or even reject crucial life events such as the birth of a child. Social anomie rises during the period when old norms and values disappear and are gradually replaced by new ones. Under the state of anomie people lose orientation in drawing plans about life events. Thus the effect of uncertainty is enforced. Where anomie prevails the restrictive power of norms is relaxed and hence spread of new behavior is eased. Hence postponement of childbearing, childlessness or rejection of births of order higher than one can diffuse quicker. In addition, disorientation and uncertainty worsen the psychological well-being and give rise to depression. The latter may decrease the value of children and therefore enforce decisions to postpone or reject births.

The impact of anomie on fertility decisions has not been studied in detail. An indication about its significance is provided by the scale for measurement of anomie in surveys suggested by Srole (1956), where one of the questions is "*Do you agree with the statement: It is hardly fair to bring children into this world with the way things look for the future*?".

Anomie has been studied in CEE countries. Arts, Hermkens, and Van Wijck (1995) viewed disorderliness in these countries in the light of the theory of anomie. Genov (1998) studied the impact of anomie on quality of life in Bulgaria. Using survey results he found high levels of reported uncertainty, anxiety, and fears. He classified the latter as telling an anomic situation. Anomie has frequently been studied in Hungary yet before the start of the transition (Andorka 1994). A series of surveys have included batteries for the study of anomie. Spéder et al. (1999) and Andorka (1994) discuss that anomie is existent in the Hungarian society and show that it exercises a sizeable impact on quality of life.

- Social capital

The dynamics of the transition period makes it more difficult for the state and other relevant institutions to provide effective support for people in need. People may rely therefore on additional support that may arrive from relatives and friends. This kind of support refers to social networks-based social capital. The latter, in the context of the present discussion, can be defined as the ability to raise resources out of one's social network. The more the resources, the higher the support and therefore the better can be the economic situation of the person. In order that such a resource could be available the person must maintain the corresponding connections and provide support to relatives and friends in necessity. Thus social capital relates to trust and reciprocity. In general, social capital may ease the economic situation or decrease uncertainty, but its effect comes through social relations and not through economic action; therefore its effect on fertility does not relate to economic theory. Philipov (2003) discusses the impact of social capital

on fertility intentions in Bulgaria and Russia; Buehler and Philipov (unpublished manuscript) provide a detailed theoretical discussion.

The theoretical approaches we discuss here apparently interact with each other. A high level of social-network based social capital may offset the impact of low income; low income may slow the pace of ideational change and cause negative psychological well-being, and the latter may decrease the social capital. Demographic research does not suggest a meta-theory that might explain inter-theoretical links.

4. Data and methods

- Data

We use data from two recent surveys. The survey in Bulgaria was carried out in 2002 with the purpose to study family formation and childbearing. The sample size included 10003 men and women aged 18-34 completed years, plus a small number of spouses beyond the upper age limit. In this analysis we use a sub-sample of 4775 females aged 18 to 34 completed years. The survey in Hungary was carried out in 2001 for the purpose to study family formation, having children, and preparation for retirement. The sample consisted of around 15000 men and women aged 18-75. Here we use a sub-sample of 2935 women aged 18 to 34 completed years. The age span was chosen to match the Bulgarian sample. We focus on intended births of first and second order only. Fertility at these orders is nearly completed at the age of 35 in both countries, as was mentioned in section 2.

- Measurement of fertility intentions

We analyze fertility intentions for having a first or a second child. In both surveys use is made of two key questions, specified in each survey as follows (specifications for pregnant women and by order of births are skipped). In the Bulgarian survey the first question is "*Do you intend to have a child during the next two years*?". Respondents who gave a negative answer were additionally asked: "*Do you intend ever to have any children*?". In the Hungarian survey the first question is: "*Would you like to have any (more) children*?", and the second one is "*At what age would you like to have your (next) child*?".

This information makes possible to study intentions to have or not to have a child as well as the timing of an intended child: within the next two years or later. The latter intention is of particular interest because it allows for the study of factors that influence the decision for timing a birth *given* a positive intention to have a child. In our case timing is measured in two periods: within two years as of the time at interview, or later.

- Model structure

We need a model structure that encompasses the outcome of an intention to have or not to have a child, and the timing of a birth *conditional* on the outcome being positive. This topic has long been discussed in event-history models when difference is made between an occurrence of an event and its timing (a recent publication that addresses the subject is due to Bernardi, 2001). The approach is usually towards a use of a mixture model where one model delineates those individuals who will ever experience

the event of interest out of all individuals, and a second model (usually a survival model) explains the timing of the event of interest. Yamaguchi and Ferguson 1995, for example, used a mixture model to examine occurrence and timing of third and higher-order births for a study of stopping of fertility.

This modeling approach is relevant to the study of level and timing of fertility intentions. It is convenient to use two models: one for explaining intentions to have a birth or not, and another one which will contribute to an explanation of a timing of a birth provided the birth were desired. In the context of our discussion where timing is considered as "within 2 years or later", a convenient model is a nested logit (or probit). The diagram below presents in a schematic way the two levels of interest. At the upper level a logit model will inform on causalities towards having versus not having a child. At the lower level, the nested logit model will inform on the choice of the proper time for the birth, given that a birth were selected at the upper level.
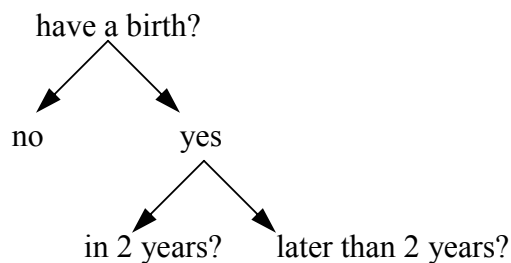
The application of the nested logit requires specified information for each one of the two levels. At the upper level the information should refer to a choice between the two alternatives: have or not have a baby. At the lower level the information should distinguish between the choice to have the baby within 2 years and have the baby later than two years. For example, the information on the lower level could be derived from questions that refer directly to the choice of having a birth within two years or later and asked to persons who are willing to ever have a baby. Our data do not dispose with this kind of information.

Another model structure rests on a selection procedure. A convenient model in this framework is the probit Heckman selection model. We applied it in the case of Bulgaria and found that it is very sensitive to the specification of the explanatory variables. Hence the choice of variables is of crucial significance for the validity of the model. This choice depends crucially on theories that delineate level from timing (or tempo and quantum) components if fertility intentions. Since such rigorous theories are not available we demonstrate the application of the Heckman model in an Appendix.

The restrictions for the application of these models forced us to resort to a simpler model framework. We used two pairs of logistic models for each country. One pair of models refers to the intentions to have a first child and its timing, and another pair for the corresponding intentions for a second child. The dependent variable in the first model in each pair is the intention to have versus not to have a child. In the second model it is the intention to have this child within 2 years versus later than two years (in brief, sooner or later).

5. Variables and descriptive analysis

The dependent variables were defined in the end of the previous section. Respondents who declared that are infertile are not included in the analysis. Table 2 informs about all variables for each one of the four models considered in this study. The column "Have a 1st child" gives the distribution of the respondents who have no children by their intention to ever have a child or remain childless. The number of women without children is 1536 in Bulgaria and 1506 in Hungary. The column "Timing of 1st birth" gives the data for respondents who declared they wish to ever have a first child (1464 women in Bulgaria and 1418 in Hungary); the column "Have a 2nd child" gives the distribution of the observations for respondents with one child who construct positive or negative intentions to have second one (1445 women in Bulgaria and 550 in Hungary), and the column "Timing of 2nd child" gives the distributions for those who intend to ever have a second child (900 and 407 correspondingly).

The data show that the number of women with one child is considerably higher in Bulgaria. This observation calls for an explanation. The women in the Bulgarian sample distribute by number of children as follows: 40% with no children, 36% with one child, 21% with two children, and 3% with 3 or more children. In Hungary the corresponding shares are 56%, 21%, and 17%. Apparently the transition to parity 1 is considerably higher in Bulgaria, while in Hungary it is the transition to parity 2 that is higher. Past fertility in Hungary reveals a higher share of childless women and a relatively higher share of women with two children.

We describe the explanatory variables in four groups: demographic, economic, cultural, ideational, and social capital.

Demographic variables: this group includes *age* and *union status*. The age groups are 18 to 24, 25 to 29, and 30 to 34 completed years of age. Union status includes two states: living with someone either married or like married, or not. The union status denoting living with someone does not distinguish between the type of union: official marriage or extra-marital cohabitation.

Cultural variables: *number of siblings* (none, one, two, three or more), and *religiousness* (religious versus non-religious). The number of siblings informs about the size of the family where the respondent has grown up. It can be expected that persons who have grown up in a larger family are likely to want a higher number of own children. Religiousness is self-reported. It is expected that religious persons will be pertaining to traditional family values and hence would like to have relatively higher number of children.

Economic and social variables. They include the following three variables:
- *Living conditions* (satisfied with dwelling): in the Hungarian survey the answer was a choice in a scale of 11 categories, and in the Bulgarian it was a choice of 4 categories. The Hungarian variable was used as continuous, and the Bulgarian was made dichotomous. Living conditions in both countries are characterized by a high demand that does not match with supply because of high prices. Thus for some people it can be an obstacle to having a larger family.

- *Education*: three levels in Bulgaria according to the achieved educational degree: below secondary, secondary completed (ap. 12 years in school, usually completed at age 18-19), and higher completed; a fourth level was added in Hungary, where the secondary degree was divided into vocational and secondary general.

- *Personal income*: in Hungary the question was asked about the exact amount of income, or about an interval scale for those who did not declare the exact amount. In Bulgaria the question ws formulated only in terms of intervals. The variable consists of 5 categories where 4 categories are defined using the distribution of labor income, and the fifth one comprises those who do not have labor income. In Hungary quartiles of the income distribution were used. In Bulgaria quartiles could not be estimated because 51% of the respondents declared income in one and the same interval whose middle is equal to 150 leva, monthly average received during the last three months before the survey. The distribution of the respondents was done in the following groups: 75 leva or less, 75 to 150 leva, 151 to 250 leva, and more than 250 leva. The category comprising persons with no income includes mainly those that do not work. At this age group most of them are unemployed or studying. Experiences with a separate variable for the state of studying showed no statistical significance.

- *Household income*: four categories, based on quartiles. It includes personal income. Household income per household member is equivalent income: the household overall income is divided by the number of household members raised to the power of 0.73, to take account of a more proper interpersonal distribution of income and fixed household costs.

Evidently personal income and household income are closely correlated ($r^2=0.42$). Experiments with the inclusion of only one of the two variables gave results that coincide with the inclusion of both variables where statistical significance only is considered. We keep both variables because personal income is more significant for the reflection of the effect of opportunity costs, while household income reflects better direct income effect.

Household income drops considerably for the households where women have one child as compared to those with no children. The average monthly household income per household member with childless female respondents in Bulgaria is 154 leva (1.5 leva==1$), while for women with one child it is 117 leva, i.e. a drop of nearly one third. In Hungary the (equivalent) household income in households where the female respondent has no children is ap. 60 thousand forints, and in the cases where the respondent has one child it is 42 thousand forints: a drop again with nearly one third. Evidently in both countries a child in the household brings about a considerable decrease in the household budget per household member: presumably a major economic obstacle for the construction of positive intentions for having another child.

Ideational variables (values, attitudes, preferences). Both surveys give extensive possibilities for experimenting with numerous ideational variables. The final choice was made on three variables. Other variables are mentioned below.

- *Parental obligations* to children. Respondents were asked whether they agree or disagree with a statement, formulated in the Hungarian survey as follows: "*Parents do have obligations but they don't have to sacrifice their aims for the children*", and the choice was between two categories: "agree" and "disagree". If the respondent was unable to make a choice, an additional alternative was given: "uncertain". In the Bulgarian

survey the formulation of the question was similar ("*Parents have a life of their own and should not be asked to sacrifice their own well-being for the sake of their children.*") and the number of categories was 5: "fully agree", "agree", "neither agree nor disagree", "disagree", and "fully disagree"; for the analyses the 5 categories were collapsed to 3.

- *Preference* between work and children. Like in the previous case, respondents were asked whether they agree or disagree with the question formulated in the Hungarian survey as "*Women with a good profession and a good job are right to consider work more important than having more children*", and the answers were like in the previous case. In the Bulgarian survey the question was formulated differently: "*If you have a child during the next two years, independently of whether you want one, will this child decrease your opportunities for professional career and/or higher education*?" the answer being one among the five categories listed above. Again the categories were collapsed from 5 to 3. Apparently this variable is designed differently in the two countries. The Hungarian one refers directly to the preference and is impersonal, while the Bulgarian one describes the personal approval or disproval whether a childrearing would impede the person's working career.

- *Disorientation*. Both surveys include several questions referable to disorientation, uncertainty, alienation, depression, loneliness, confidence in the future, trust in other people, and others related to psychological well-being. Nearly all variables constructed on the basis of these questions turned to be statistically significant. They were highly correlated and yielded much the same results; therefore it looked more reasonable to make a selection and use a small representative number of variables. The choice was made of three variables, named for short "disorientation". The questions were phrased in a similar way in the two surveys. Respondents were asked to agree or disagree with the following statements (as phrased in the Hungarian survey): (1) "*I have no influence over my everyday affairs*"; (2) "*Life is so complicated nowadays that most of the time I don't know what to do*"; (3) "*No one cares what happens to other people*". The answer in the Hungarian questionnaire was one among four categories" fully agree, agree, disagree, and fully disagree. A fifth one, "don't know" was used in cases where the respondent did not know how to answer. In the Bulgarian survey the categories were five: fully agree, agree, neither agree nor disagree, disagree, fully disagree. The three variables were highly correlated, powerfully significant and it made sense to factor them into one variable that was used in the analysis. This factor variable is continuous. Table 2 gives the observed data for the second of the three variables.

The Bulgarian survey included a question directly asking for uncertainty: "*What are your expectations about the life in your household during the next two years: (a) you will live much better; (b) you will live somewhat better; (c) you will live as now; (d) you will live somewhat worse; (e) you will live much worse?*" It was found of high significance but was excluded from the analysis because it did not have a direct counterpart in the Hungarian questionnaire. Its significance is by and large similar to the one discovered by the "disorientation" variable.

A variable that directly measures anomie was found insignificant ("*Do you agree with the statement: anyone who wants to achieve something is forced to break certain rules*?"). This is not surprising. As it was discussed in the theoretical part, social anomie provokes rise in uncertainty and disorientation. It is consequences of anomie that are expected to matter for the constructions of fertility intentions, if not anomie itself.

To some extent surprisingly the variable that describes desired quality of children was found insignificant. This variable was based on the question: "*Children can be educated on various things. From the list of categories please chose five.*" This is the formulation in the Hungarian survey; in the Bulgarian formulation reference was made to children's qualities that can be achieved in the family, and not education. The list in the Hungarian survey includes *obedience, independence, humanism, good manners, hard work, imagination, sense of duty, consistency, feeling of national belonging, unselfishness, diligence (persistence), thrift, patience, empathy, religious conviction*. The list in the Bulgarian survey was the same with small exceptions, and the five choices were ordered. The diverse patterns of children's qualities can be grouped as modern or traditional. Such a grouping namely turned out to be insignificant. Neither intentions to have a child or its timing were statistically linked to preference towards modern versus traditional values of children.

Another insignificant variable was the one that measures level of materialism and post-materialism, known as the Inglehart's question. This variable is of particular importance in the application of theories based on ideational changes. The question asked preferences of political aims, and the answer was a first and a second choice among the following four answers: (1) *Maintain order in the state*; (2) *To give people more say in the country's affairs*; (3) *To combat rising prices*; (4) *To ensure freedom of speech*. Respondents who chose (2) and (4) are said to be post-materialists; those that chose (1) and (3) are materialists, and the others are in an intermediate position.

In Bulgaria the women with no children distribute as 22.6% materialists, 73% intermediate, and 4.4% post-materialists, while women with 1 child distributed as 27.5% being materialists, 69.1% intermediate and 3.4% post-materialists. In Hungary the corresponding proportions are 36.7%, 56.5%, and 6.8% for women with no children, and 42.8%, 53.2% and 4.0% for women with one child. Two interesting observations can be made. First, the post-materialists are very few. As it is known materialism and post-materialism relate to lower and higher order needs as defined by Maslow (1956), in that satisfaction of lower needs gives rise to higher-order needs that reflect post-materialistic preferences. Very few people in both countries therefore can be taken as having jumped over the lower-order needs towards post-materialistic views on life. Second, the proportion of materialists is considerably higher among the women with one child as compared to those with no children, and the share of post-materialists is lower. Note that the measurement of the value follows the event of interest. Inversely, where fertility intentions are considered and the variable included as an explanatory one, it is very far from any statistical significance. These results indicate that the formulation of the value seems to follow the event of interest, namely a birth, and therefore if there is any correlation, it is in direction of the birth being a cause of changing the value from post-materialism or intermediate-post-materialism to materialism. Probably this is due to the decrease in the household budged per household member after the birth of a child, and the corresponding fall of higher-order to lower-order needs.

Social capital: this group includes one variable named "help". It is received by factoring two closely related variables: "help received from others" and "help given to others". They were measured differently in the two surveys.

In the Bulgarian survey each one of these variables is derived from two questions. Where the "help received" is considered the two questions are: "During the last two years, how many people gave you substantial, important help or support?", and "If you need substantial help and support, how many people can you ask for this?" The answer to each one of these questions is in terms of number of people. In the Hungarian survey the "help received" was derived from three questions: "*In the past year did you receive regular assistance in the form of money from a person <u>not living in your household</u> (parents, children, other relatives, someone not related)*?", "*Do you receive any regular help nowadays with household work from a person <u>not living in your household</u> (parents, children, other relatives, someone not related?*", and "*Do you regularly receive food (e.g. vegetables, meat) from someone <u>not living in your household</u> (parents, children, other relative, someone not related*?" The answer in the Hungarian survey was "*yes/no*", and "*if yes, from a parent, from a child, other relative, other person*". The variable for "help given" was received using similar questions with the direction of help reversed.

There are several important differences between the two countries: the period over which the transfer of help is considered (two years in Bulgaria and one year in Hungary, the origin or destination of help (in the Hungarian case members of the respondent's household are excluded), and in terms of measurement (number of persons in the Bulgarian and the type of persons in the Hungarian survey).

The exchange of help measures the availability of social capital, defined here as the amount of resources one can derive out of one's social network, i.e. we consider social network-related social capital. Resources can be of any kind: money, food, physical help, information, child care. In order that one should be able to get such help one should be ready to provide help to others. Hence exchange of help refers to trust that given or received help will later be returned, i.e. it is reciprocal. The higher the social capital, the higher the resources one may need in case of necessity. Therefore the easier it will be for women to get better oriented in life, overcome uncertainty or financial problems. Hence they will be less likely to reject or postpone a birth. Buehler and Philipov (2004) provide a more detailed theoretical discussion.

Table 2 presents the descriptive data. Intentions to have a first child are universal in the two countries: women that declared they do not want to have a child are less than 5% in Bulgaria and less than 6% in Hungary. In Bulgaria for example, the total initial sample of childless women consists of 1536 respondents; 1464 declared they intend to ever have a child, and the remaining 72 said they would never have a child. Postponement of the birth of an intended first child is higher in Hungary, where 22% will want the child within the next two years and the remaining 78% intend to have that child later than 2 years. In Bulgaria the corresponding shares are 41% and 59%. Where intentions for a second child are consider, the data indicate that quantum is higher in Bulgaria, while tempo is higher in Hungary. These fertility intentions indicate that the total fertility rates for the first and the second birth orders could be higher in Bulgaria during the next couple of years.

Among the explanatory variables it is informative to mention a few. The distribution of the respondents by number of siblings reveals a very high share of those who have grown up in a two-child family in Bulgaria. In this country the two-children family model has been more preponderant as compared to Hungary. The share of women

with a higher education is higher in Bulgaria. This observation agrees with table 1, where it is shown that the share of persons in the tertiary education sector in 1990 was more that twice as high in Bulgaria as compared to Hungary. Interestingly, the level of satisfaction with the dwelling is quite similar in the two countries.

Personal income is not comparable between the two countries, except for the first category which denotes not working women. This share is particularly high among mothers of one child. The same observation holds for household income.

Religiosity is slightly higher in Hungary. Interestingly, in both countries religiosity among those who desire a second child is higher as compared to those who do not wish a second child.

The modern value measured by the variable denoted in the table as "parents have a life of their own" is spread considerably wider in Hungary where acceptance of the value is considered. This share is larger in Hungary mainly on account of the group of respondents who neither accept nor reject this value. In both countries the share of women who pertain to the traditional value, i.e. disagreeing with the statement posed in the question, is about the same. In Bulgaria the share of those who accept the modern value is higher among women with one child as compared with those who have no children: an observation that puts some doubts that the answer to the question might reflect also parental difficulties experienced by respondents with one child.

In both countries the preferences between work and children are explicitly directed towards work among a little less than one third of the respondents with no children. Where respondents with one child are considered, we observe significant differences between the two countries: in Bulgaria it is higher than those with no children, and in Hungary it is lower. This difference is unlikely to be due to the different formulation of the questions. The observation in Bulgaria agrees with the one for the previous variable. A repeated preference to a "modern" value among women with one child in this country suggests that "modern" values are influenced by family size, while ideational changes theories would predict the inverse causality.

Disorientation is spread wider in Bulgaria. Some 60% of all respondents with no children in this country declared they cannot orient themselves in today's complicated life, while in Hungary this share is around 36%. Both shares rise among women with one child, 65% and 46% correspondingly.

The last variable we consider is exchange of help. The table informs only about the dichotomous values, although in the models use is made of the reported exact number of persons with whom help has been exchanged. The table values cannot be compared between the two countries because of the differences in the formulation of the questions. We can compare though the exchange of help experienced by women with no children and those with one child. In Hungary exchange of help is more intensive among women with one child, while in Bulgaria women with one child raise relatively less social capital. The topic on differences in the level of social capital among women with no children and women with one child needs a deliberate study that is outside the framework of our aims (Buehler and Philipov 2004, provide a discussion in the case of Bulgaria).

6. Model results

Tables 3a and 3b present the model results for the two countries. The base category of each variable is denoted by "*1*" in italics font. The p-values lower than 0.105 are placed in bold type for convenience of the reader. Several variables were created with the aggregation of two categories into one (described in the previous section). We experimented whether the use of the original categories would bring about other results and did not find such cases; inversely, the aggregation sometimes caused an increase in statistical significance.

We discuss the models one by one.

Intentions for having a first child. Age and preference to work are significant in both countries. Women aged 30 to 34 are much more likely to reject having a child in both countries; so are women who declare that work is more important than children. In Bulgaria the statistical significance of the latter is on the edge: the p-value of 0.105 can be taken as denoting rejection of the null hypothesis (namely that the odds parameter is not different from unity) because of the small number of women who declared that they do not want to have a child. In addition to these two variables, religiousness is significant in Hungary, and so is union status. The significance of the union status could be due to a personal preference towards not having an own family.

Voluntary childlessness therefore depends primarily on age and ideational factors such as preference between work and family as well as religiosity in Hungary. Preferences were discussed in the previous section as either being connected to aspirations towards self-autonomy and self-realization, or the consequence of the economic situation of the respondent. We can only conclude that preferences are significant for voluntary childlessness as they are, without interpreting them as a modern value or as a value resulting from the economic situation. Significance of religiosity in Hungary points to the importance of the process of secularization in this country; a process that is central to fertility theories based on ideational change.

Timing of the first birth. The number of statistically significant variables in this model is considerably larger. Significance of age is in the inverse direction as compared to the intention for the first child: in both countries the elder women are much more likely to want the baby in the next 2 years. Union status defines timing in a comprehensive way: those not in a union are much less likely to want a child within the next 2 years. Respondents with a higher number of siblings are also among those who are willing to have the child sooner rather than later.

In Bulgaria, women with lower education are more likely to want the child within two years as compared to women with a secondary school educational attainment. So are women with higher education. In Hungary the differences are insignificant, but it is worth noting that the odds for the women with higher education are considerably higher compared to those with secondary vocational.

Dissatisfaction with the dwelling makes women in Bulgaria postpone childbearing. In both countries women with no personal income are more likely to postpone the childbearing as compared to women with any level of personal income. Postponement is observed also among women with high income, although in Bulgaria the p-value for this odd ratio is too large; in this country it is the high household income that

matters in the same way. To generalize, opportunity costs due to higher personal income lead to a postponement of the first child.

The value related to "parents have a life of their own" has a diverse effect in the two countries. In Hungary respondents that pertain to this modern value are more willing to postpone the first birth, while in Bulgaria they are more willing to have it sooner. We recall the earlier discussion that the value in Bulgaria might be resultant from the economic situation of the respondent. This finding identifies a topic for further research, outside the frame of the present one.

Disorientation is not having any effect in both countries. Exchange of help is statistically significant: the more social capital is available to a woman, the more likely she is to time the birth sooner rather than later.

Intentions for having a second child. Here age and union status have the same affect as in the case of intentions for having a first child: elder women reject the birth, and in Hungary women who are not in a union. The number of siblings is effective only in Bulgaria.

Women with a higher education are more willing to have a second baby as compared to those with a secondary education. The dwelling conditions are unimportant, and so is personal income, which denotes opportunity costs. Income effect is insignificant in Hungary as indicated by both personal and household income, and in Bulgaria higher household income is a prerequisite for more likeliness for wanting a second child. Again, in the context of our comparison, economic conditions in Bulgaria matter while in Hungary they do not.

The remaining variables reveal interesting effects in both countries, observed in one and the same direction. Religiousness has gained in significance, in that religious persons are more likely to want another baby. The value about parents having a life of their own has no effect, but preferences between work and a birth are significant: those who agree that work is more important than children are less likely to want a second child. Decreasing disorientation leads to higher desires for a second child, as increasing exchange of help does.

Timing of the second child. Elder women are more likely not to postpone the birth of the second child, as are women in union. The same inference was made for the timing of the first child. Women with three or more siblings in Bulgaria are more likely to have the child earlier too.

Education has a different effect in the two countries. In Bulgaria women with education lower than secondary are willing to have the child earlier as compared to women with secondary or higher education. Evidently they are more likely to design plans for a life course with family formation events taking place at an earlier age; recall the low mean age at childbearing in Bulgaria discussed in section 2. In Hungary, women with higher education may want the have the child sooner as a result of the postponement to the end of the completion of the educational attainment. The high level of unemployment in Bulgaria may push women with higher education to start up a job immediately upon the completion of the education, and hence they are likely to postpone the childbearing.

Satisfaction with the dwelling in Hungary relates inversely to the timing of the second birth: women that are more satisfied with their living conditions are more likely to postpone the birth. This unexpected result was achieved using a variable on the size of the dwelling, measured in square meters.

Women without income in Bulgaria are likely to postpone the childbearing. This is not observed in Hungary. The low standard of living in Bulgaria might be the reason for the postponement, because unemployed women might be willing to first get job and have a child later.

Unlike in the case of the intentions to have or not to have a second child, the timing of this child is described differently by the ideational variables in the two countries, except for religiousness which does not have an effect on timing in both countries. Women in Bulgaria that agree that parents have a life of their own are tending to postpone the birth; this value does not have an effect on timing in Hungary. Preferences to work versus children are significant in both countries: women who agree that work is more important prefer also to postpone the birth. Disorientation in Bulgaria is insignificant, but in Hungary higher disorientation links to the preference of having the child sooner. A higher level of help exchange in Bulgaria relates to the preference to have the child within 2 years.

7. Discussion

The model results give valuable information about the way women construct their plans about having a first or a second child and for its timing. Inferences indicate that several variables often used in micro-level studies of fertility and fertility intentions have a differential impact on levels and timing of fertility intentions.

-Causalities for the intention to have or not to have a first or a second child.
In both countries, for both orders, we observe that age is a factor of primary significance. Elder women are less likely to have a positive intention. The only other variable that is as highly significant as age is preference to work versus children, in that work preference links to lower level of intentions for a birth.

Where intentions for a first child are considered, these two variables exhaust the list of significant variables in Bulgaria, and in Hungary they are supplemented by union status and religiousness. It is not strange that this list so short given the low share of women not wanting a child. While the effect of age is known in demography, it is important to stress the significance of work preferences where voluntary childlessness is considered. It is important also to note that ideational change related to secularization effects decisions for childlessness in Hungary, but not in Bulgaria.

Intentions to have a second child are, in addition to age and work preference, influenced in both countries by level of education, religiousness, disorientation, and exchange of help. In Bulgaria comes additionally the impact of household income and number of siblings.

Surprisingly economic theories, as represented by the two income variables and also by the living conditions, find support only where low household income in Bulgaria is considered. Its effect is due to the lower level of subsistence that could worsen considerably with one more household member. Ideational changes are supported by the

significance of religiousness, but not by other direct measures of values and attitudes. Work preferences are of primary significance; more research is necessary to understand better their impact on the level of fertility intentions, but the present surveys do not contain relevant data.

It is important to note the substantive value of the new theories we suggested, impact of social anomie and social capital. Social anomie brings about a rise in uncertainty and disorientation that forces people to reject second births. People that are able to raise social capital out of their social networks are more willing to have a second child.

-*Causalities for the timing of and intended birth.*

Three variables: age, union status, and work preferences are significant in both countries and both orders. The effect of age is directed *inversely* to the case of intentions to have a child: elder women are "in a hurry" to have the child sooner. People not in union postpone the desired birth, apparently wishing to have a child within a union. Work preferences make women not only less likely to want a child, but also to postpone the birth were a child desired. We can add to this list of variables the education variable which has preserved its significance, with the exception of the timing of the first birth in Hungary where the odd ratio though supports the inference without being statistically significant.

Most of the other variables are significant for the timing of a birth either only for some birth order, or for one of the countries. Their discussion would by and large repeat the one for the separate models given above. We present it here only in brief. Women with no income are likely to postpone the first birth in both countries. This is observed for the timing of the second child in Bulgaria. Women with high personal income are also likely to postpone the first birth, i.e. opportunity costs matter for the first birth only. Exchange of help is significant in Bulgaria only, probably due to the stronger influence of social networks in this country. Disorientation preserves significance for the timing of the second birth in Hungary. Unlike in the above case, religiousness is *not* among the variables that contribute to the understanding of timing. Inversely, several variables have gained significance only in the present case: satisfaction with dwelling, no income (unemployment), "Parents have a life of their own".

Economic theories gain significance where timing is considered, unlike in the case of the intention to have the child. So does the variable related to a modern value "parents have a life of their own".

***

We conclude that theories on fertility and fertility intentions need a restatement where tempo and quantum components are considered. In the context of the two countries we find that economic theories have an impact mainly on timing; work preferences have an overall, "universal", effect; ideational shifts have a mixed effect, with religiousness effecting the level of intensities but not timing of births, and the value of parental life effects timing. We find that social anomie which pooled disorientation and uncertainty, has contributed to lower desires for children, and social capital is pronounced for the "quantum" of intentions.

Where a comparison between the two countries is considered, we can conclude that ideational changes matter more in Hungary, while the economic situation of the

respondents is more important in Bulgaria. In both countries the effect of the transition exercised through social anomie on disorientation and uncertainty, as well as social capital, cannot be neglected.

Appendix: Using a selection model

In reality fertility intentions are not a binary variable. They can be very strong, very weak, or intermediate; in short the variable is continuous. Therefore the relation between the intentions variable y_i^* and a vector of explanatory variables x_i can be expressed for individual i as:

(A1) $\qquad y^* = x_i\beta + u_{1i}$ $\qquad$ where u_{1t} is normally distributed, N(0,1).

We do not observe y_i^*; we observe only its sign. That is, we observe a dual variable y_i. Equation (A1) with this dual variable turns into a probit equation:

(A2) $\qquad \Pr(y_i = 1) = \Pr(y_i^* > 0) = \Phi(x_i\beta)$

where Φ denotes the normal distribution function.

The problem with this specification is that y_i is not always observed. In the case of intentions to have a second child or not, for example, y_i is not observed for those women who already have a second child at the time of survey. These women might have had their second child based on the proper meaning of their characteristics, described by x_i. If we follow the corresponding model for Bulgaria in table 3a, we could see this applies to women with a higher number of siblings, with a higher education, religious, etc. If we disregard these women, the coefficients in the estimation of the probit model (A2) will be biased downwards. This is a selection bias. It can be controlled by the use of a selection equation:

(A3) $\qquad y_i^s = z_i\gamma + u_{2i}$ $\qquad$ where u_{2i} is N(0,1).

Here y_i^s is a binary variable equal to 1 if woman *i* does not have a second child.

The two sets of explanatory variables *x* and *z* must be different for the purposes of model identification. They can have common elements though. The error terms u_1 and u_2 may be correlated. If their correlation coefficient, say ρ, is different from zero, the usage of model (A2) by itself gives downward biased coefficients; statistical significance of some variables might be lost.

Thus in the case of intentions to have or not to have a second child, the equation which describes the intentions is given by (A2), and the selection equation is (A3). Since the selection refers to having two children, the explanatory variables must be estimated at the time of the second birth, and not at the time of survey. Instead of a probit one may use a hazard equation. Aasve et. al (2002) have applied a discrete hazard formulation for the selection equation in the study of leaving home.

Similar inferences are valid for timing of an intended second birth. Here the women who time their intended second birth are selected among all women who have one child. It is thus assumed that women who do not want to have a child may stay close in their decision-making to those who wish to postpone the birth. In this case the selection bias will be directed downwards.

The latter case can be extended to take account for the selection among women with two children. Then there will be three equations in all.

We made experiments with including a selection model for the level as well as for timing of intentions.

The model for the timing of intentions includes one probit model for the proper timing of the birth of a second child (model 1), and a selection equation for having versus not having a second child (model 2). Model 1 (timing) included the following variables: age, union status, education, satisfaction with dwelling, personal income, parental life, work preferences, exchange of help. Model 2, the selection equation (having a baby) included: age, number of siblings, education, household income, religiousness, disorientation, work preferences, exchange of help. The correlation between the two equations was $\rho=0.40$, but the p-value of the likelihood ratio test was 0.49, i.e. we cannot reject the hypothesis that ρ is different from zero. The two equations can be studied separately where this set of variables is considered. Experiments with other explanatory variables brought about the same conclusion.

The model for having a second child was run using cases where the second child was born within the last two years. The surveys do not include historical data on income, nor on any of the variables that measure attitudes. We cannot apply therefore a reasonable hazard model. The two models were specified as follows:

Model 1 (intentions for having versus not having a 2nd child): age, education, household income, religiousness, work preference, disorientation, exchange of help.

Model 2, selection (have versus not have two children): age, number of siblings, education.

The second equation includes variables whose value could be supposed unchanged during the last 2 years. Education might have changed but in such a case we can assume it is anticipatory.

The correlation here is $\rho = -0.8$, and the p-value=0.038. The odd ratios in model (1), were it used alone, are biased downwards. We can suspect that the statistical significance in our models for having a second child could increase were a selection approach used; fortunately this was not the case.

Table 2: Descriptive data for Bulgaria and Hungary, females aged 18-34 (*)

	Bulgaria				Hungary			
	Have a 1st child	Timing of 1st child	Have a 2nd child	Timing of 2nd child	Have a 1st child	Timing of 1st child	Have a 2nd child	Timing of 2nd child
Total number of observations	1536	1464	1445	900	1506	1418	550	407
Intentions:								
Have a child: no / Timing: later than 2 years	4.7	59.3	37.7	44.6	5.8	77.9	26.0	57.2
Have a child: yes / Timing: in 2 years	95.3	40.7	62.3	55.4	94.2	22.1	74.0	42.8
Age:								
18-24	63.7	63.8	32.3	36.7	66.0	66.8	20.4	20.9
25-29	26.1	26.5	38.3	41.4	25.9	25.7	46.7	49.4
30-34	10.2	9.7	29.4	21.9	8.1	7.5	32.9	29.7
Union status:								
In union	18.3	18.0	90.2	91.7	25.2	25.6	80.4	84.0
Not in union	81.7	82.0	9.8	8.3	74.8	74.4	19.6	16.0
Siblings: none	13.5	13.5	12.5	11.0	14.6	14.4	10.4	10.4
One	72.1	72.1	65.8	65.7	56.6	57.3	57.1	57.0
Two	10.0	10.0	14.4	14.9	20.9	20.5	19.7	19.8
Three or more	4.4	4.4	7.3	8.4	8.0	7.8	12.8	12.8
Educational level:								
Below secondary	10.2	10.2	16.7	16.8	11.9	11.4	15.6	15.7
Sec. Vocational	-	-	-	-	15.1	15.2	33.6	30.0
Secondary	60.0	59.7	55.4	55.1	57.2	57.6	37.6	38.8
Higher	29.7	30.1	28.0	28.2	15.8	15.9	13.1	15.5
Satisfied with dwelling:	75.0	75.0	68.4	68.8	76.5	77.3	69.5	71.8
Not satisfied:	25.0	25.0	31.6	31.2	23.5	22.7	30.5	28.2
Personal income:								
None (unemployed)	43.5	43.0	50.9	53.9	46.7	46.3	54.7	57.5
1st group	10.7	10.9	11.8	10.8	11.8	12.0	9.8	8.1
2nd group	29.8	29.7	25.3	24.1	13.6	13.5	11.5	10.1
3rd group	9.7	9.8	7.9	7.4	10.4	10.6	10.9	11.1
4th group	6.4	6.6	4.1	3.8	17.8	17.7	13.1	13.3
Household income:								
1st quartile	16.7	16.5	28.5	26.4	10.9	10.5	22.3	21.0
2nd quartile	21.4	21.1	25.5	27.0	17.6	17.5	31.6	30.6
3rd quartile	24.1	24.0	24.3	23.8	29.1	29.4	22.4	22.2
4th quartile	37.8	38.4	21.8	22.8	42.4	42.6	23.7	26.2
Religiosity:								
Religious person	63.1	63.1	62.2	65.1	67.5	68.8	67.7	72.0
Non-religious person	36.9	36.9	37.8	34.9	32.5	31.2	32.3	28.0
Parents have a life of their own:								
Agree	50.2	50.3	54.6	54.4	65.3	65.6	64.7	66.3
Neither agree nor disagree	26.1	25.7	24.6	24.0	13.0	12.5	11.5	10.6
Disagree	23.8	24.0	20.8	21.6	21.6	21.9	23.8	23.1

Work more important than having children:								
Agree	31.1	31.3	39.2	42.3	30.7	29.6	25.6	20.1
Neither agree nor disagree	12.7	12.6	13.5	12.7	16.9	16.9	13.3	13.8
Disagree	56.2	56.1	47.3	45.0	52.3	53.5	61.1	66.1
Disorientation:								
Certainly yes	15.1	15.3	18.3	19.0	10.2	10.0	16.0	13.0
Rather yes	43.8	43.5	44.7	44.0	25.3	26.3	30.7	30.5
Neither yes, nor not	19.5	19.6	21.0	21.3	-	-	-	-
Rather not	17.5	17.7	13.1	12.8	32.4	31.7	26.6	26.5
Certainly not	3.9	3.9	2.8	2.9	32.1	32.1	26.7	30.0
Help received:								
No	5.1	5.0	10.1	8.2	45.8	45.3	23.6	21.6
Yes	94.9	95.0	89.9	91.8	54.2	54.7	76.4	78.4
Help given:								
No	13.4	12.8	17.3	15.6	48.2	48.1	43.3	39.6
Yes	86.6	87.2	82.7	84.4	51.8	51.9	56.7	60.4

(*) Where the sum of the shares is not equal to 100.0, they do not include missing values, refusals, "don't know", or there is a rounding effect. Some variables are not fully compatible between the two countries; see explanations in the text.

BULGARIA	FIRST CHILD				SECOND CHILD			
	Intention		Timing		Intention		Timing	
	odds	p	odds	p	odds	p	odds	p
Age:								
18-24	3.01	**0**	0.62	**0.03**	3.51	**0**	0.35	**0**
25-29	3.31	**0**	1.26	0.29	2.58	**0**	0.53	**0**
30-34	*1*	-	*1*	-	*1*	**-**	*1*	-
In union:	*1*	-	*1*	-	*1*	**-**	*1*	-
Not in union:	(*)		0.21	**0**	0.76	0.16	0.45	**0**
Siblings:								
None	*1*	-	*1*	-	*1*	**-**	*1*	-
One	0.98	0.97	1.36	**0.10**	1.19	0.33	1.01	0.96
Two	0.85	0.75	1.52	**0.10**	1.53	**0.07**	0.79	0.40
Three or more	1.72	0.52	1.81	**0.09**	2.00	**0.02**	1.87	**0.09**
Education:								
Lower	1.29	0.58	1.64	**0.03**	0.77	0.15	1.56	**0.06**
Secondary	*1*	-	*1*	-	*1*	**-**	*1*	-
Higher	1.28	0.48	1.33	**0.06**	1.32	**0.06**	1.09	0.63
Satisfied with dwelling	*1*	-	*1*	-	*1*	**-**	*1*	-
Not satisfied	1.14	0.67	0.73	**0.03**	0.93	0.56	1.00	1.00
Personal income:								
None	0.77	0.43	0.53	**0**	1.21	0.22	0.71	**0.07**
1st group	1.54	0.42	1.02	0.91	0.90	0.62	1.46	0.18
2nd group	*1*	-	*1*	-	*1*	**-**	*1*	-
3rd group	0.91	0.85	0.71	0.12	0.88	0.60	1.21	0.55
4th group	3.41	0.25	0.68	0.16	0.95	0.86	1.06	0.90
Household income per member:								
1st quartile	*1*	-	*1*	-	*1*	**-**	*1*	-
2nd quartile	0.90	0.80	0.79	0.24	1.40	**0.04**	0.98	0.91
3rd quartile	1.14	0.75	0.74	0.14	1.35	**0.09**	0.79	0.29
4th quartile	1.46	0.38	0.60	**0.01**	1.76	**0.01**	0.94	0.81
Religious	*1*	-	*1*	-	*1*	**-**	*1*	-
Non-religious	1.07	0.80	0.91	0.45	0.68	**0**	0.98	0.89
Parents have a life of their own...:								
disagree	*1*	-	*1*	-	*1*	**-**	*1*	-
neither agree nor disagree	0.60	0.17	1.19	0.33	0.87	0.41	0.93	0.75
agree	0.95	0.90	1.47	**0.01**	1.02	0.88	0.73	**0.09**
Work more important than children:								
disagree	*1*	-	*1*	-	*1*	**-**	*1*	-
neither agree nor disagree	0.64	0.32	0.85	0.41	0.75	0.12	0.77	0.27
agree	0.60	**0.105**	0.60	**0**	0.69	**0**	0.63	**0**
Disorientation (decreasing)	1.08	0.69	0.95	0.37	1.20	**0.07**	0.99	0.90
Exchange of help (increasing)	1.54	0.15	1.23	**0.06**	1.35	**0.02**	1.64	**0**

(*) confounding variable

Table 3b: Model results (odds and p-values) for Hungary
(intentions: positive versus negative; timing: within 2 years versus later)

HUNGARY	FIRST CHILD				SECOND CHILD			
	Intention		Timing		Intention		Timing	
	odds	p	odds	p	odds	p	odds	p
Age: 18-24	3.63	**0**	0.09	**0**	2.27	**0.01**	0.27	**0**
25-29	2.14	**0.04**	0.39	**0.00**	2.20	**0.00**	0.50	**0.01**
30-34	*1*	-	*1*	-	*1*	**-**	*1*	-
In union:	*1*	-	*1*	-	*1*	**-**	*1*	-
Not in union:	0.58	**0.08**	0.20	**0**	0.48	**0.01**	0.21	**0.00**
Siblings:								
None	*1*	-	*1*	-	*1*	**-**	*1*	-
One	1.31	0.44	2.55	**0**	1.08	0.84	0.74	0.47
Two	1.07	0.86	3.21	**0**	1.19	0.69	0.95	0.91
Three or more	0.67	0.39	3.80	**0**	1.35	0.54	1.59	0.35
Education:								
Lower	0.56	0.20	0.99	0.97	1.37	0.36	0.93	0.84
Sec. Vocational	*1*	-	*1*	-	*1*	**-**	*1*	-
Secondary	0.91	0.81	0.99	0.96	1.47	0.17	0.92	0.77
Higher	1.13	0.80	1.39	0.25	2.62	**0.04**	2.17	**0.06**
Satisfied with dwelling (increasing):	0.99	0.93	0.98	0.64	1.01	0.85	0.91	**0.05**
Personal income:								
none	1.02	0.96	0.58	**0.03**	1.56	0.21	0.80	0.59
1st group	1.57	0.38	1.22	0.51	1.11	0.83	1.31	0.62
2nd group	*1*	-	*1*	-	*1*	**-**	*1*	-
3rd group	1.73	0.34	0.77	0.40	1.68	0.26	1.39	0.54
4th group	1.13	0.79	0.45	**0.01**	1.67	0.29	1.34	0.59
Household income per member:								
1st quartile	*1*	-	*1*	-	*1*	**-**	*1*	-
2nd quartile	1.20	0.68	1.16	0.63	0.97	0.91	0.88	0.71
3rd quartile	1.78	0.16	0.94	0.84	1.03	0.93	0.68	0.30
4th quartile	1.47	0.37	0.89	0.72	0.96	0.91	1.08	0.84
Religious	*1*	-	*1*	-	*1*	**-**	*1*	-
Non-religious	0.48	**0**	1.04	0.82	0.51	**0**	1.07	0.81
Parents have a life of their own...:								
disagree	*1*	-	*1*	-	*1*	**-**	*1*	-
neither agree nor disagree	0.56	0.12	1.04	0.87	1.07	0.85	0.90	0.82
agree	1.10	0.76	0.72	**0.08**	1.47	0.16	1.15	0.64
Work more important than children:								
disagree	*1*	-	*1*	-	*1*	**-**	*1*	-
neither agree nor disagree	0.85	0.63	0.61	**0.04**	0.95	0.88	0.79	0.51
agree	0.39	**0**	0.71	**0.07**	0.32	**0**	0.42	**0.01**
Disorientation (decreasing)	1.00	1.00	0.96	0.758	1.61	**0.01**	0.68	**0.02**
Exchange of help (increasing)	1.15	0.46	1.00	0.98	1.54	**0.02**	0.94	0.70

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