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Abstract: This study investigates the conditions under which delayed parenthood emerges. We combined micro and macro-data to explore the timing of parenthood for women who entered adulthood during the 1990s and 2000s over a wide range of 19 post-socialist countries. Postponement was associated with higher educational attainment, but the educational composition of the population accounted for little variation in the average timing of parenthood among countries. Postponement was also associated with a more positive economic environment and accounting for the economic context absorbed over half of the variation among countries. The strength of the economy's influence varied across educational levels, but a poorer economic context was consistently linked to earlier parenthood across all educational levels. We interpret this finding as evidence that postponement does not become widespread when there is little reason to expect improved financial circumstances. The postponing influence of economic performance also appeared to wane when women entered their late 20s and early 30s, which may be evidence of age norms or deadlines.

1. Introduction

The study of delayed parenthood has generated an entire body of research in demography, economics and sociology in the two latest decades. Postponement appears to be a remarkably pervasive pattern across Europe and in a variety of other contexts (Frejka & Sardon 2006). The idea that postponement is an inevitable development has been strengthened by the emergence of delayed parenthood in formerly state socialist countries, which had maintained a young age at first birth when postponement was already well underway in other parts of Europe (Lesthaeghe 2010). However, postponement is not yet universal in countries that made the transition from state socialism, and there have been substantial differences across these countries in how rapidly postponement has developed and progressed (Sobotka 2003). This diversity implies that there are certain conditions under which women and men delay parenthood, as well as offers an opportunity to observe these conditions. We explore this potential in the present paper.

The main arguments to explain the postponement of parenthood were developed on evidence from countries that have long experienced economic stability and growth, which vary dramatically from the recent contexts of many post-socialist countries. Given this difference, we pay particular attention to how economic performance following regime change influenced the postponement of parenthood. We find that postponement has not been as likely to occur under poor economic conditions, that this finding is consistent across educational levels within a country, but that the influence of economic context disappears at older ages.

This study contributes to the literature on the determinants of postponement in several specific ways. Cross-national analyses of the timing of first birth using individual-level data are rare and a comparative strategy offers unique information from what we can learn through a single population's change over time. For example, Nicoletti and Tanturri (2008) found that differences in women's educational and employment characteristics explained differences in conception rates between Southern Europe and other European countries at certain ages. Of the few studies that have assessed the timing of parenthood in Central and Eastern Europe (CEE) comparatively, most have relied on aggregate data (Billingsley 2010; Frejka & Sardon 2006; Frejka & Sobotka 2008) and were unable to observe person-specific conditions related to postponement. Differences in the average timing of first births may be due to compositional differences, particularly individuals' educational level. But country-specific propensities toward

parenthood may reflect the cultural context and family-friendly policies (Nicoletti & Tanturri 2008), for example, and explain variation in postponement across countries.

Besides contributing a longitudinal and comparative analysis based on individual-level data for a large number of countries, we also use macro-level data and multilevel models to separately address the role of factors that are specific to countries and individuals. This study is based on a new harmonized data set (Changing Life Course Regimes in Eastern Europe (CLICR[1])), which includes nineteen post-socialist countries. We focus exclusively on the "transition generation" (defined as cohorts born 1973 or later), who entered adulthood as these countries were making the transition from state socialism and/or establishing political independence. Included in the data set are countries in both CEE[2] and the Commonwealth of Independent States (CIS)[3]. Despite sharing a common critical juncture, which is a useful starting point for isolating relevant determinants (Neyer & Andersson 2008), these countries provide a diverse range of economic and social contexts as well as population composition, which we exploit to understand why delayed parenthood is evident in some post-socialist countries and not (yet) in others. This contextual diversity allows not only for better statistical estimates of contextual-level conditions on birth timing, but is theoretically useful for understanding the relevance of arguments that explain the shift toward later childbearing.

To date, most research on the timing of parenthood in post-socialist countries has covered only a small group of countries (e.g., Bulgaria, Czech R., Hungary, Poland, Romania, Russia, and Slovenia), most of which have experienced substantial postponement. Kohler et al. (2002), for example, drew conclusions from a sample of post-socialist countries in which the majority experienced relatively short economic crises. A wider range of transition countries may provide a different perspective.

[1] The Changing Life Course Regimes (CLiCR) data is compiled and provided by The Stockholm Centre on Health of Societies in Transition (SCOHOST) at Södertörn University and the data was harmonized by Aija Duntava. Additional financial support came from the Swedish Research Council (Vetenskapsrådet) via the Linnaeus Center for Social Policy and Family Dynamics in Europe (SPaDE), grant registration number 349-2007-8701.
[2] The CEE countries included in the data are Albania, Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovenia.
[3] The CIS countries included in the data are Armenia, Azerbaijan, Georgia (withdrew from CIS in 2009), Kazakhstan, Kyrgyz Republic, Moldova, Russia, Ukraine (unofficially CIS), and Uzbekistan.

2. Theoretical perspectives and literature

We concentrate our theoretical discussion primarily on how economic context is related to the timing of parenthood, but mention other potentially relevant arguments as well. Briefly, one prominent explanation for delayed childbearing is a change in values, which can occur through educational attainment, as well as through a societal shift toward "more existential and expressive needs" (Lesthaeghe 2010: 218). Ní Brolcháin and Beaujouan (2012) have demonstrated in the case of Britain and France that postponement is rather a more direct consequence of educational expansion: by prolonging the period of study during which individuals are much less likely to start a family, the age at entering parenthood naturally increases. But they also found that the period between the completion of education and entry into parenthood also lengthened, particularly for highly educated women, which is understood on the basis of economic argumentation.

2.1 Economic arguments

Much of this discussion stems from arguments that relate the timing of parenthood to economic conditions via a rational consideration of costs (Becker 1981; Hotz et al. 1997). In a short-term perspective, we expect women to avoid childbearing when their income is high because leaving the labor force then entails greater cost (the indirect or opportunity cost effect). At the macro level, a robust economic environment entails higher opportunity costs of childbearing, which would encourage postponement according to this perspective, whereas a lagging economic environment reduces opportunity costs and would lessen the incentive for women to postpone motherhood. This classical argument explains a counter-cyclical relationship between fertility and the economy. In contrast, a pro-cyclical relationship would emerge if a thriving economy elevates incomes and leads to a positive income (direct) effect, in which the costs of childbearing are more adequately met and opportunity costs are offset. Considering the weight of direct vs. indirect costs of childbearing in different contexts, Sobotka et al. (2011) argue that contracting household budgets due to lower wages or fewer employment opportunities may increase the importance of an income effect (direct costs) relative to opportunity costs (indirect costs).

Evidence is mixed on the question of whether the timing of parenthood is pro or counter-cyclical. Butz and Ward's (1979) classic study on the US and Ermisch's (1980) on the UK showed that family formation was suppressed during prosperous times. In the post-socialist

setting, there is also evidence of a positive relationship between age at first birth and economic performance (counter-cyclical relationship)[4]. Plotting real wage growth against changes in the mean age at first birth between 1989 and 1999 for 14 post-socialist countries, Sobotka (2003) observed that less wage growth was associated with less postponement. Also using aggregate data, Billingsley (2010) observed that an increase in GDP from one year to the next was related to more postponement from 1990 to 2003 in 15 post-socialist countries. Using individual-level data, Aasve et al. (2006) likewise found in the case of Hungary that GDP was positively related to postponement and that this relationship remained when controlling for period effects. But the opposite relationship has also been found within certain country contexts (e.g., Aasve & Altankhuyag 2002 for Mongolia; Santow & Bracher 2001 for Sweden; Martin 2004 for Australia) and other country comparisons: Focusing on economic recessions across developed countries since the Depression, Sobotka et al. (2011) believe the balance of evidence points to the finding that better economic conditions encourage higher fertility and that the timing of childbearing is particularly sensitive. In 22 OECD countries, Orsal and Goldstein (2010) found that fertility increases when economic conditions are good and that this finding extended to both tempo and quantum.

The relationship may vary as well within countries depending on individuals' characteristics. According to the economic perspective, women with high educational attainment face a higher loss of income (opportunity costs) when they leave the labor force and forego earnings to have a child, which is why they are particularly likely to postponement parenthood. Highly educated women are known to face higher wage penalties when they leave the labor force early in their career (e.g. Wetzels 2001), and in contexts where women generally re-enter the labor force after giving birth, there is a strong incentive to establish earning power beforehand (Gustafsson et al. 2002). In addition, we may assume that individuals who invest in their human capital have distinct career plans and may initially be more focused on this aspect of life than on family formation (Bratti 2003; Gustafsson 2001). This selectivity may not always exist, however, as prolonged education may also be an alternative to entering the labor force when the economy is poor and jobs are scarce (Shanahan et al. 1997). Nevertheless, highly educated women have been found to respond as we would expect; they were more likely to postpone parenthood when

[4] In the case of entering parenthood, a pro-cyclical relationship indicates less postponement during times of economic growth, whereas a counter-cyclical relationship indicates greater postponement.

they were worried about finances (Kreyenfeld 2010), unemployed (Kreyenfeld & Andersson 2014) or when temporary contracts were on the rise (Adsera 2011), whereas women with low attainment were more likely to enter parenthood (except in the case of unemployment in the latter cross-national study). In our country sample, educational expansion has been linked to postponement (e.g., Kantarova 2004) and there is some evidence that women facing economic uncertainty or a lack of opportunities may also respond differently by educational level (Russia, e.g., Kohler & Kohler 2000).

More long-term considerations may also play a role in how economic conditions influence the timing of parenthood. According to the income maximisation and consumption-smoothing framework (Gustafsson 2001; Happel et al. 1984; Hotz et al. 1997), individuals take into account their projected financial situation as well as income expectations. In particular, they may consider how men's earnings will develop over the life course and choose the moment when his earnings are highest to start a family in order to offset the costs of losing her earnings. This perspective implies that if there is no reason to believe earnings will increase, then there is no reason to postpone parenthood. Related to the diversity of contexts in this study, it may be that if the economic climate is poor enough that increased earnings are not expected in the near future, there is no reason to postpone (e.g., Perelli-Harris 2005; 68), whereas a growing economy may offer grounds to expect future increases in earnings and encourage postponement.

Keeping future expectations in mind, a pro-cyclical relationship between economic conditions and the timing of parenthood (less postponement alongside economic growth) may also appear because long-term commitments, such as childbearing, may be avoided when individuals experience work-related uncertainty (Bernardi et al. 2008). Being able to estimate the costs and benefits of childbearing is important and difficult to do when there are uncertainties in the economic situation (Kohler et al. 2002; Nicoletti & Tanturri 2008). Across Europe, many life course events of women and men are influenced by the uncertainties they currently face (Mills & Blossfeld 2005), including unemployment and insecure employment conditions. Some findings support the idea that men and women postpone parenthood when faced with uncertainty in northern, western and southern Europe (Adsera 2004; 2011; Blossfeld et al. 2005; Kreyenfeld 2010; Andersson 2000), although unemployed women have sometimes been shown to be more likely to have a child than those in paid work (e.g. Kohler & Kohler 2002; Inanc 2015).

2.2 Attitudes and values perspectives

Accompanying economic growth and the rise of post-materialism in old European democracies has been a change in values that led to the Second Demographic Transition (SDT) (Lesthaeghe & van de Kaa 1986; Lesthaeghe 2010). New opportunities and expendable income have led young men and women to explore individualistic interests, leisure activities, and self-expression, which are desires that compete with family formation and lead to the postponement of childbearing (Sobotka 2011). This shift has generally been initiated by the highest social strata in a context and higher education has aided the transmission of values promoting self-actualization. Because this process is argued to begin once financial security has been achieved at a societal level, it may be more likely to develop in well-functioning economies, where men and women are less consumed by concerns over stable income and prospects for advancement.

Hoffman and Hoffman (1973) proposed instead that having children satisfied distinct psychological needs of parents. Other scholars later situated these needs within the social realm (Thomson forthcoming) and argued that social relationships and resources can be secured through children (Schoen et al. 1997). Nauck (2007) classified many potential values of children into two main components, physical well-being and social esteem, and argues that cross-national differences in fertility behavior can be partially explained by the degree to which children grant parents access to these goods. Socioeconomic variation within and across countries seems to play a role, where the emotional value of children is higher in urbanized societies that do not depend on children for economic survival and the physical well-being value is higher in more rural societies that do (Thomson forthcoming). Worth noting, Nauck (2007) found that fertility decisions in general appear to be automatic and spontaneous until a disruption such as rapid social change incites the rational calculations assumed in both the economic and value theories of fertility.

Friedman et al. (1994) contributed to the value of children literature by arguing that family formation can create meaning in one's life when other stimulating pathways are not available (see also McDonald 2000). Rather than perceiving an increased likelihood of parenthood during difficult economic times (at the individual or societal level) as a reaction to a reduction of opportunity costs, this behavior could therefore be interpreted as one that orients an individual within society and conveys the status, relationships and resources that accompanies parenthood.

Finally, age norms or age deadlines related to the best time to become a parent may play a significant role in determining when individuals enter parenthood and explain variation across cultural contexts (Marini 1984; Settersten & Haegestad 1996). These norms have been found to influence fertility behavior in Ukraine, Slovakia and Poland (Perelli-Harris 2005; Potančoková 2009; Mynarska 2010). In the latter context, economic considerations became less important as women grew older and neared an age where physiological concerns became more relevant (as early as 25 in Ukraine: Perelli-Harris 2005). We might, therefore, expect that age deadlines play a role on their own as well as moderate the role economic conditions play across countries, depending on how prevalent or rigid they are within a country.

3. The Post-Socialist Context

Before the 1990s, the state socialist countries in this study were characterized by early and universal childbearing, which was supported by pro-natalist policies (particularly those implemented during the 1980s in the Soviet Union (Sobotka 2011)). After regime change, the transition generation (1973+ birth cohorts) brought dramatic fertility decline, and no country has re-achieved pre-transition fertility rates. The median age at entering parenthood for women of the 1960-64 birth cohorts spanned around 22 to 24 (See Table 1), which corresponded to the timing of parenthood for the 1940 cohorts in Western Europe (Frejka & Sardon 2006) and was a narrow range for such a diverse group of countries (e.g., both Slovenia and Uzbekistan had the same median age). The median age at parenthood of the 1975 cohort, in contrast, spanned 21 in Uzbekistan and Kyrgyzstan to 28 in Hungary[5] and this large difference emerged after regime change. Countries are ordered in Table 1 according to the change in median age at first birth from the 1960 to 1975 cohort. Eight countries (including Slovenia) experienced a delay in entering parenthood of over one year, six experienced less than half a year increase in median age, whereas five countries have not seen an increase in median age at first birth over these cohorts.

[5] Note: The median age at parenthood could not be estimated for Slovenia for this cohort because 50% of this cohort had not entered parenthood at the time of the survey, which means Slovenia likely has the highest median age of all the countries.

Table 1. Median age at entering parenthood for specific birth cohorts of women

	1960-64	1970-74	1975-79	Youngest-oldest cohort
Slovenia	22.4	24.2	n/a	n/a
Hungary	22.4	24.3	28.1	5.7
Czech R.	21.8	22.6	25.7	3.9
Estonia	22.4	22.8	25.4	3.0
Bulgaria	21.9	22.6	24.1	2.2
Poland	23.1	24.1	25.1	2.0
Romania	23.0	23.5	24.5	1.5
Latvia	22.8	22.9	24.2	1.4
Russian F.	22.4	21.5	22.8	0.4
Kazakhstan	22.6	21.8	23.0	0.4
Moldova	22.0	21.5	22.4	0.4
Armenia	22.0	20.8	22.1	0.1
Lithuania	24.0	24.0	24.1	0.1
Georgia	23.3	22.0	23.4	0.1
Ukraine	22.3	21.7	22.1	-0.2
Kyrgyzstan	22.0	21.0	21.3	-0.7
Uzbekistan	22.1	21.3	21.3	-0.8
Albania	23.7	22.9	22.8	-0.9
Azerbaijan	24.0	22.6	22.8	-1.2

Source: authors' estimates from CLiCR data

At the dawn of economic transition, and before the dramatic decline in fertility rates across all these countries (1990), seven countries had a TFR lower than two children per woman (Bulgaria, Czech R., Hungary, Romania, Russia, Slovenia and Ukraine) (Transmonee 2012), five countries had fertility levels around the replacement rate (Estonia, Georgia, Latvia, Lithuania, and Poland), five countries were nearing the completion of their fertility transition (Albania, Armenia, Azerbaijan, Kazakhstan and Moldova) and the final two had advanced less in their fertility transition (TFR of 3.6 and 5.1 for Kyrgyz R. and Uzbekistan, respectively). These latter seven countries experienced either a decline, no growth or very minor growth in their median age at childbearing after transition began. Despite being at different stages in the fertility transition, the share of individuals in these countries enrolled in higher education was not so different in the early 1990s (Table 2: 8-20% in the seven countries still completing the fertility transition and 10-30% in the remaining countries). Rather, the main difference involved economic development: all countries had a larger economy than the latter seven in 1990, with the exception of Georgia.

By the year 2000 (not shown in table), 12 of the 19 countries had still not recovered from their difficult economic transitions and had a GDP lower or roughly the same as in 1990. The seven countries that had achieved growth by this time were Albania, Poland, Estonia, Bulgaria, Slovenia, Hungary, and Czech Republic. By 2010, only Moldova had still not experienced growth, although the growth was minor (<30%) in Georgia, Kyrgyz Republic and Ukraine. Educational expansion was widespread throughout most countries and this was noticeable already by 2000. By 2005, most countries had experienced an increase of at least 10 percentage points in higher education enrolment; the exceptions were Armenia and Azerbaijan with a lesser increase and Uzbekistan with a decline in enrollment. As evident (Table 2), some countries have experienced educational expansion and strong economic growth (e.g., Estonia), whereas others have experienced economic growth with little educational expansion (e.g., Albania), educational expansion and poor economic performance (e.g., Ukraine), or both little educational expansion and poor economic performance (e.g., Moldova). In contrast to this variation, little difference appears in how female labor force participation evolved after the transition began. Roughly half of women over age 15 participated in the labor market before transition was well underway and by 2005, participation had generally declined (only Azerbaijan, Kazakhstan, Slovenia and Uzbekistan saw some increase). This pattern does not appear to correlate with educational expansion or economic performance.

Table 2. Education, labor market and economic performance descriptive statistics

	Real GDP per capita (a)		Higher education enrolments (b)			Female labor force participation rate (c)	
	1990	**2010**	**1990**	**2005**		**1990**	**2005**
Albania	2,824	8,817	7.8	21.7		53.2	48.3
Armenia	2,120	5,463	20.1	26.7		60	52
Azerbaijan	3,433	9,943	12.6	13.1		54	59.6
Bulgaria	5,411	13,780	26.0	40.1		54.9	44.6
Czech R.	11,183	25,283	17.2	47.3		51.6	50.6
Estonia	7,268	20,615	24.1	65.5		63	53.3
Georgia	4,103	5,073	20.9	39.6	(d)	55.1	55.4
Hungary	8,758	20,029	12.1	61.2		46.2	42.9
Kazakhstan	5,119	12,174	18.7	44.7		62.4	64.6
Kyrgyz R.	1,809	2,273	12.9	37.2		58.4	54.1
Latvia	7,809	16,312	24.9	72.5		62.6	50.9
Lithuania	9,326	18,184	31.5	74.9	(d)	59.4	51
Moldova	3,313	3,110	15.7	29.7		61.1	46.9
Poland	5,461	19,783	17.0	56.4		55.2	47.5
Romania	5,194	14,287	9.7	43.7		51.6	48
Russia	8,008	19,840	24.6	47.2		59.6	56.2
Slovenia	11,473	27,063	22.9	83.2		47.8	52.8
Ukraine	5,822	6,721	21.7	48.1		56.1	52
Uzbekistan	1,446	3,114	15.2	8.4		46.2	47.5

a) PPP in USD, World Health Organization's Health for All Database
b) Gross ratios, per cent of population aged 19-24, TransMonee database
c) % of female population ages 15+, World Bank data
d) numbers refer to 2004

4. Data and Method

The Changing Life Course Regimes (CLiCR) data was constructed by harmonizing variables from life course histories collected in four publicly available data sources: Demographic and Health Surveys (DHS), Family and Fertility Surveys (FFS), Generations and Gender Surveys (GGS) and the Life in Transition Survey (LiTS). The LiTS data was administered in 2006 to all 19 countries and collects retrospective information only since 1989. Limiting the birth cohorts in this sample to those born 1973 or later ensures that all respondents were no older than 16 in 1989 and, therefore, left truncated information is not an issue for the LiTS data. The other three

surveys offer full fertility histories, were administered in various years, and do not cover all 19 countries individually. Each country is represented by respondents from LiTS and one of the other three surveys.[6] See Appendix A for details about surveys, years and the sample for each country, as well as Duntava & Billingsley (2013) for more information on this data source. The sample of this study includes 38607 women.

We observe all women from the month they turn 16 until nine months before their first child was born (to capture the moment of conception) or they were interviewed. We estimate discrete-time multilevel hazard analyses (Barber et al. 2000); each observation represents a person/month and the value of variables can change on a monthly basis. The multilevel aspect is represented with a random intercept, which corrects standard errors from bias caused by non-independence of observations within countries, allows the constant to vary across the countries, and provides information about variance at the country level. The first level in the model estimates the individual-level determinants (respondents' characteristics) of a first conception, whereas the second level accounts for intra-country correlation and fits the country-level correlates. Time-constant characteristics that are shared within the Level 2 group (country) but are not observed in the model (such as national cultures) are reflected in the country-specific random intercept (Rabe-Hesketh & Skrondal 2012). We pay particular attention to how the baseline intercept and the spread in intercepts alters depending on whether the model adjusts for composition and economic context. In other words, we estimate the country-specific average propensity of first birth timing and variation across countries in the average first conception rate, separating how much is due to individual level characteristics and how much is due to contextual indicators. Hazard-odds ratios represent within- and between-country correlations and can be interpreted as the average influence of an independent variable as it changes across individuals and between countries. We do not use sample weights in our analyses because they were not provided in all surveys, nor were population weights used in the regression models to avoid distorted standard errors and because we are mainly interested in the differences across countries. We test many specifications of the multilevel model to observe whether the influence of key individual-level characteristics varies across countries (random coefficient models) or vary according to contextual factors (cross-level interactions).

[6] Poland is the only exception and is represented by three surveys.

All variables in our models are time-varying. Age of the respondent is categorized into five-year age groups: 16-20, 21-25, 26-30, 31-35. Only the Polish GGS collected data late enough (2010) to allow us to observe women born 1973 or later after they turned 35 and the number of these women who had not entered parenthood by the time of the survey were too few to comprise a category. We include dummies to capture whether or not a respondent was still studying and their educational level if they were finished. Educational levels are categorized as follows: "secondary or lower" includes those who completed and did not complete secondary school; "post-secondary" includes those who completed post-secondary education as well as those who attended a higher educational institution for less than three years; "higher education" includes those who completed university education at the first or second (graduate) level, as well as those who completed 3 or more years of education at a university. See Appendix B for a more detailed presentation of the education variable. Unfortunately, we cannot control for urban/rural residence; while we know where respondents lived at the time of the survey, we do not have migration histories to know where they lived before they entered parenthood. The omission of this variable is potentially problematic (in terms of understanding differences between countries) if a country's residential pattern is not picked up in the random intercept; the random intercept should adequately deal with increased urbanization if no dramatic fluctuations occurred. We also do not control for partnership status of the respondent because it is not available in all surveys over time and because the process of marrying or moving in with a partner is endogenous to the process of family formation (Baizán et al. 2003; Lillard 1993).

The economic context is represented with real (logged) GDP, which is taken from the Health for All Database (WHO) and is expressed in purchasing power parity in US dollars, per capita. GDP is measured annually, so the value of this variable changes across countries and years (378 country/years). The first year of data available for all countries is 1990; therefore, the analysis covers the time range 1990-2006/2009. As is customary in multilevel modeling, the values of this variable are centered on its mean to aid in interpretation. Because this indicator is time-varying, the hazard-odds ratio can be interpreted as the average effect of variation across and within countries for the entire time period. Descriptive statistics of all variables are presented in Table 3.

Table 3. Descriptive statistics of the variables used in regression analyses

Individual-level variables (38607 women)	% women	% person-months	N (person-months)	
Dependent variable: Entered parenthood				
0=no	51		2393943	
1=yes	49		17815	
Age				
16-20		70	1688993	
21-25		24	578597	
26-30		6	132867	
31-35		1	11301	
Education				
In education		54	1308683	
Low/secondary		33	789540	
Post-secondary		4	96640	
Higher		7	161780	
Unknown		2	55115	
Country-level variable (378 country/years)	Mean	SD	Minimum	Maximum
Real GDP per capita, PPP$ (uncentered)	7574.5	5928.7	997.9	29117.4

5. Results

First, we estimated the baseline hazard by fitting a model with only the time-varying covariate of age and a random intercept. Table 4 presents the findings for Model 1 in the first column of results. On average, the peak in first conceptions occurred in the 21-25 year old age group and the odds of conception was 12% lower in the 26-30 year old group, 28% lower in the 31-35 year old group, and 47% lower in the youngest age group (16-20). The likelihood ratio test indicated that variation at the country level was not 0 and that a multilevel model was necessary to properly estimate first conception odds across these countries. The standard deviation around the mean country intercept was 0.32, which we consider the baseline difference between countries.

When accounting for periods of educational enrolment and attainment levels (Model 2), the shape of the baseline hazard changed somewhat: the difference between the youngest age groups decreased and conception odds for 16-20 year old women was only 25% lower. The difference grew between the 21-25 age group and older age groups: the odds ratio was 22% lower for the 26-30 age group and 40% lower for the oldest women in the sample (age 31-35).

Relative to the secondary and lower educated group, being enrolled in education had a 67% lower odds of conception. A clear negative educational gradient appeared for those who had completed their education, in which women with post-secondary education had a 17% lower conception odds and women with higher education had a 26% lower conception odds than women who had attained secondary or a lower level.

Model 3 in Table 4 includes the time-varying contextual variable real GDP (logged). Again the baseline hazard shape changed somewhat: the overall differences between age groups were minimized the most in this model. The influence of economic performance was statistically significant and negative for the odds of first conception. A 172% increase in GDP (one unit increase in log GDP) corresponded to a 34% lower odds ratio of first conception. When we standardized by the economic performance of each country in each year, the standard deviation around the mean constant decreased to 0.24 and we found a reduction in the overall variance among countries of 55%. Nevertheless, the likelihood-ratio test indicated that multilevel modeling is still necessary and significant differences in the overall propensity toward the timing of parenthood across these countries persisted.

Table 4. First conception odds, discrete multilevel hazard model

	Model1			Model 2			Model 3		
	Relative risk		S.E.	Relative risk		S.E.	Relative risk		S.E.
Age									
16-20	0.53	***	0.01	0.75	***	0.01	0.72	***	0.01
21-25	1		.	1			1		
26-30	0.88	***	0.03	0.78	***	0.02	0.84	***	0.03
31-35	0.72	**	0.08	0.60	***	0.01	0.71	***	0.08
Education									
In education				0.33	***	0.01	0.34	***	0.01
Low/secondary				1			1		
Post-secondary				0.83	***	0.03	0.85	***	0.03
Higher				0.74	***	0.02	0.76	***	0.02
Real GDP (logged)							0.66	***	0.02
Fixed constant	0.011			0.015			0.015		
# of person/months	2449434			2449434			2449434		
# of countries	19			19			19		
S.D. around country random intercept	0.32			0.32			0.25		
Log Likelihood	-105424.2			-103401.6			-103277.0		
AIC	210858.4			206821.2			206574.1		
BIC	210921.9			206935.6			206701.2		

Statistical significance: * =5%, ** =1%, ***=0.1%

Next, we estimated a random coefficient model to observe whether the effect of age varies across countries, as we would expect with countries at various stages of postponement included (controlling for age, education and economic context). In previous models, we assumed the effect of age to be the same across all countries and a random coefficient model allows us to relax that assumption. We tried different specifications of the random slope for age and grouping 26-35 year olds into one age group provided the best model fit. The AIC/BIC scores indicated that including a random coefficient for this age group improved the fit of the model in comparison to no random coefficient (Table 5, Model 1) although it did not alter the spread of country level intercepts. The standard deviation around the mean effect of being in the 26-35 age group was 0.42.

In Model 2, we estimated a random coefficient model for the effect of being highly educated. According to the educational expansion argument, this is the educational group for which we should see the most postponement of childbearing. The standard deviation across countries in the effect of being highly educated in this model is estimated to be 0.21 (around a fixed effect of high education with a log odds of -0.25). Again, the spread around the mean country intercept did not diminish and in this case, the AIC/BIC scores did not indicate that this is a better model fit than the random coefficient model for the effect of age.

Another way of addressing variation in the effect of age, which appears to be important according to the random coefficient model, is to implement cross-level interactions with contextual level information. We implemented an interaction between (log)GDP and age (Model 3) to observe whether the economic context influences first conception timing differently depending on the age of women, which may explain variation in the effect of age across countries. This specification improved the fit of the model over a model without an interaction and was a better fit than the random coefficient for age. Finally, we tested whether the effect of educational level varied according to economic context, while including a random coefficient for age—as we now know that the effect of age must be allowed to vary. This model (Model 4) provided the best fit (although was slightly worse for reducing the spread of random intercepts). We can conclude that 1) between-country variation is minimized the most when we allow the effect of age to vary according to economic performance, and 2) the average first birth odds across women and countries was best explained when we allowed the effect of economic context to vary by educational level and age effects to vary across countries.

Table 5. Model descriptives with alternative specifications, first conception discrete multilevel hazard models

	M1: Random coefficient model (age 26-35)	M2: Random coefficient model (high education)	M3: GDP/age interaction with no random coefficient	M4: GDP/ education interaction with random coefficient (age 26-35)
S.D. of country level random coefficient (high education)		0.21		
S.D. of country level random coefficient (age 25-35)	0.42			0.36
S.D. of country level random intercept	0.25	0.25	0.25	0.26
AIC	206423	206514	206406	206198
BIC	206575	206667	206558	206401
Number of observations	2449434	2449434	2449434	2449434

The results of the two interactions are presented in Table 6, where we interpret the hazard-odds ratios instead of the marginal effects (Buis 2010). The effect of GDP in Model 1 is specific to women with secondary or less education, which means that a 172% increase in GDP corresponds to a 29% lower odds ratio of entering parenthood for the lowest educated women. The difference between how economic performance influences first birth hazard-odds for the lowest and highest educated women was not statistically different. However, the same increase in economic improvement corresponds to a 40% lower odds ratio of conception for women with post-secondary education (or a 15% lower odds than that for the lowest educated women). In other words, there is some variation by education in how much women postpone in a better performing economy, but the effect is consistently negative. In contrast, the negative effect of economic performance on first birth conception is non-existent for the oldest women in the sample (26-35). The strongest effect exists for the 16-20 year olds (40% lower birth odds with a 172% increase in GDP) and this is closely followed by the effect for the 21-25 year olds (29% lower odds).

Table 6. Interaction effects of education and GDP, first conception hazard-odds

		Model1		Model 2	
		Relative risk		Relative risk	
Age					
	16-20	0.71	***	0.67	***
	21-25	1		1	
	26-30	0.78	*	0.76	***
	31-35	0.56	***	0.54	***
Education					
	In education	0.3	***	0.34	***
	Low/secondary	1		1	
	Post-secondary	0.81	***	0.83	***
	Higher	0.73	***	0.75	***
Real GDP (logged)		0.71	***	0.6	
Interaction of GDP and education					
	GDP x in educ	0.72	***		
	GDP x low/secondary	1			
	GDP x post-secondary	0.85	***		
	GDP x Higher	1.02			
Interaction of GDP and age					
	GDP x 16-20			1	
	GDP x 21-25			1.19	***
	GDP x 26-35			1.7	***
Fixed constant		0.015		0.015	
# of person/months		2449434		2449434	

In the next figures, we plot the differences between countries in their average first conception propensity in order from highest to lowest, which can be interpreted as earlier to later timing of parenthood. Empirical Bayes estimates are presented in Figure 1 for the intercepts of the baseline model (including age only) as well as intercepts that were standardized by education. When we include women's educational enrolment/attainment, the spread of random intercepts did not change. Worth noting, however, is that several countries changed their rank order after standardizing by educational levels. In particular, Albania had a propensity very close to the average when educational levels were not taken into account, whereas Albanian women rank third in postponement if we take into account their lower educational levels. On the other hand, Lithuanian women appear to have a much earlier propensity to enter parenthood if we take into account educational composition. These two countries experienced the greatest change when propensities were standardized for educational composition, and Azerbaijan, Estonia, Latvia and

Poland also experienced significant changes. If we focus only on the differences net of educational composition, six distinct groups appear in the average timing of parenthood: four countries are significantly far from the mean first conception propensity and may be considered outliers to the main group (Slovenia, Hungary, Kyrgyz R., and Uzbekistan). Among the remaining countries, Albania, Romania, Czech R., and Bulgaria stand out as having late childbearing given their educational composition, whereas Kazakhstan, Moldova, Ukraine and Russia stand out as having early childbearing. The seven remaining countries have first conception propensities very close to the mean (less than 0.1 difference).

Figure 1. Empirical Bayes estimates of country-specific intercepts, baseline and adjusted for education

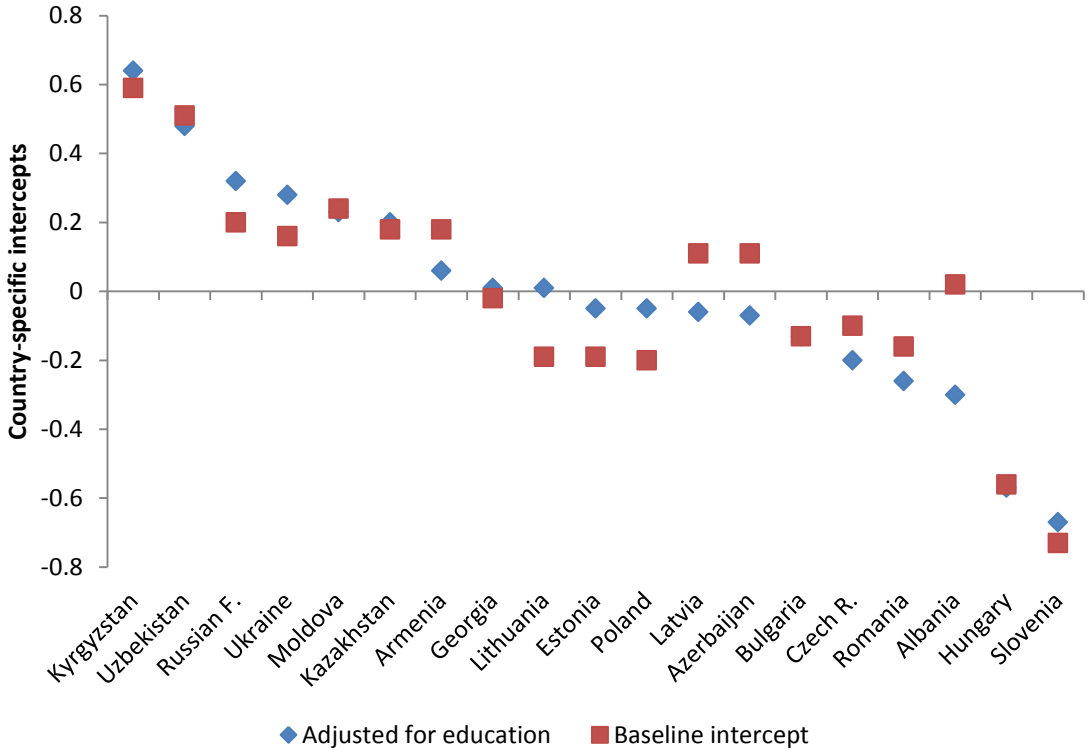
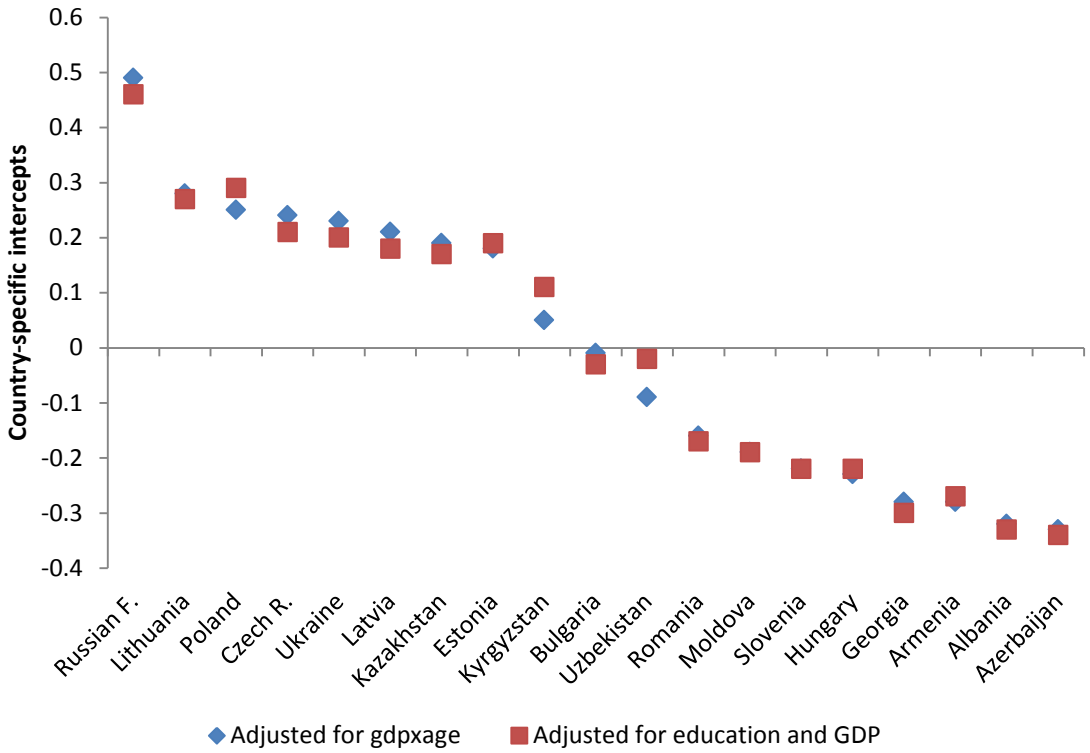


Figure 2 plots the intercepts from the models in which average propensities are 1) standardized for economic performance and 2) in which the effect of age is allowed to vary according to economic performance, which both absorbed the most variation among countries and improved the model fit. Countries are ordered according to the intercepts from the latter interaction model. The spread of intercepts shows a marked reduction from previous intercepts

(see Figure 1) and is similar in the two specifications displayed in this figure. A main finding is that the countries that previously seemed to be outliers (Slovenia, Hungary, Uzbekistan and Kyrgyz R.) have been pulled toward the mean and no longer stand out as having unusually high or low intercepts. This means that the differences in timing between these countries and others can be well understood by the influence of economic context. Another finding is that a new outlier has emerged: Russia has been pushed toward the margin and shows a remarkably high intercept (early age at parenthood) given its economic performance. Estonia also stands out: Observing its intercepts in Figures 1 and 2, Estonia usually has a later than average timing of parenthood, but once we adjust for economic context and how it influences women at different ages, the timing of parenthood became earlier than average.

Figure 2. Empirical Bayes estimates of country-specific intercepts with multiple standardizations



A few additional analyses were conducted to assess the sensitivity of these findings. First, it may be that the impact of GDP reflects a time trend, whereby postponement became more widespread or advanced within a country over time and GDP mostly grew after the initial economic crises. It may also be that part of the negative relationship between a prospering

economy and the timing of first birth is due to the early years of economic transition in the post-Soviet countries in which there was a continued decline in age at first birth at the same time the economic context worsened. Year dummies were included in a model to check whether it absorbs the relationship between economic context and first conception timing. We only estimated the model for the 1999+ years to avoid structural zeros (only in these years are there observations in all age groups). The negative effect of GDP persists when controlling for year-specific patterns in this more narrow time period. Second, it may also be that the results are driven by the poorest countries who experienced little or no postponement over this time period. We first excluded Kyrgyz Republic and Uzbekistan and then excluded Albania, Armenia, Azerbaijan, Kazakhstan, and Moldova as well: the negative influence of GDP persisted. Finally, we estimated the models using change in GDP instead of GDP(logged) to focus more on within-country differences rather than between-country differences. The main finding regarding the role of economic context was again unaltered, which is to be expected given that the estimated results refer to average changes across observations (including years) and countries.

6. Conclusions

This study investigated the conditions under which delayed parenthood emerges. Few studies have tried to explain variation across countries in the average age at entering parenthood, despite large and persistent differences in countries according to when and how much postponement has occurred. This is the first study to explore differences in the timing of parenthood using micro and macro data across a wide range of countries. This specific group of countries experienced a historical departure from institutional conditions that supported a universal pattern of early childbearing. By focusing on cohorts of women born 1973 and later (the transition generation) in this set of countries, we observed the cohorts that initiated a trend of divergence in the timing of parenthood both from recent cohorts and from the homogenous pattern that characterized the socialist countries before transition. Yet this group of countries is characterized by diversity along a few theoretically relevant dimensions. The composition of the transition generation substantially varied in their educational attainment across these countries. Following the onset of transition, economic developments diverged dramatically and how this may have influenced the development of postponement was a key interest in this study.

First, the finding that women of the transition generation in different countries now act sufficiently different from each other to generate significant variation in country averages is striking. We seem to have witnessed a transformation in demographic patterns similar to what Watkins (1990) identified, in which processes of nation-building and national market integration increase differences across borders. This process is visible even as postponement within a country entails more variation in the timing of birth within borders, which decreases the correlation in the timing of parenthood within a country.

Second, we found a predictable overall effect of education on the timing of first conceptions: a clear, negative educational gradient. If differences in educational expansion explained the uneven development of postponement across these countries, we would expect differences in average first conception propensities to diminish when accounting for the educational composition of the sample within a country. Compositional adjustment, in contrast, did little to reduce country-level variance. We can, however, observe distinct groups of countries after adjusting for education. These groups imply that there may be clusters of countries within which variance is negligible, but this cannot be formally tested with multilevel modelling due to the loss in observations at the second level.

Third, the influence of economic performance on postponement is clear: a relatively positive economic environment appears to be a required condition for the development of postponement. This single contextual factor explained over half of the variation between countries in the average timing of parenthood. Our findings tell us how much postponement corresponds to a 172% increase in GDP. This is just about the growth in GDP experienced by Romania from 1990 to 2010, which was accompanied by an increase in the median age at first birth of 1.5 years. This difference in GDP also corresponds to the difference between Georgia and Romania in 2010, which had a 1.1 year difference in median age at first birth (for the 1975-79 birth cohort), or the difference between Romania and Czech Republic in 2000, which had a 1.2 year difference (for the 1975-79 birth cohort). Of course, these differences need to be considered in light of educational composition as well. GDP is a crude measure of women's opportunities in a more productive and well-functioning economy, but the relationship was robust and confirms findings from macro-data analyses (Billingsley 2010; Sobotka 2003) and for Hungary (Aasve et al. 2006). Nevertheless, this study provides only a rough indication of how

economic context matters to postponement and further research should explore more specific components of economic performance.

Fourth, we found that the negative influence of economic context did not vary by women's educational attainment, although the strength of the relationship did. Because opportunity costs are higher in prosperous times and highly educated women face the highest opportunity costs, a more productive economy may have particularly led to postponement for women with high education. This argument was not supported in our findings; we found no significant difference in the effect of economic context between the highest and lowest educated women. Instead, women with a middle level of education (completed secondary and post-secondary education or tertiary education of less than three years in addition) postponed the most in better economic contexts. Nevertheless, the difference among the education levels was not great, similar to findings in Russia related to second births (Billingsley 2011). In other words, women of all educational levels seem not to postpone parenthood in poor economic conditions. If we interpret this finding in terms of the income maximization or consumption-smoothing framework (Gustafsson 2001; Happel et al. 1984; Hotz et al. 1997), a poor economic context provides little incentive to wait for increased earnings before entering parenthood (see also Perelli-Harris 2005). Alternatively, or in conjunction, parenthood may be a strategy to obtain social and personal standing that is less accessible through work in a poorly performing economy (Hoffman & Hoffman 1973; Friedman et al. 1994) and particularly in a time of social change (Nauck 2007).

A final finding in this study was that the differential intensities of entering parenthood by age across countries largely reflect how the economic context influences women differently by age. A more positive economic environment suppresses first conceptions most in the youngest age group, similarly in the 21-25 year old age group, but not at all for the 26-35 year olds. Essentially, once women reach a certain age, they enter parenthood regardless of the economic context. This may reflect influential age norms (Marini 1984; Settersten & Haegestad 1996) and supports Mynarska's (2010) finding that physiological concern over postponement becomes more important than financial security once women reach a certain age.

We began this study as a quest to understand the development of postponement in general and whether the findings of our study may be applicable to other contexts is worth considering. The counter-cyclical relationship we observe between economic context and the onset of

postponement may be unique to post-socialist countries (Sobotka et al. 2011). Certainly, the development of postponement in post-socialist countries has generally been slower or quicker than usual, depending on which country considered. Kohler et al. (2002: 664) argued that socioeconomic changes "erode the early-fertility equilibrium", in particular increased economic uncertainty in early adulthood and increased returns to human capital investment. Using a broader range of post-socialist countries in our study, and excluding non-transitional European countries, our findings offer nuance to this argument. It was the combined effect of educational expansion and a generally positive economic environment that appeared to encourage postponement, rather than economic uncertainty. However, it may be that the uncertainty discussed in the literature requires a certain level of economic performance and opportunities to materialize. In other words, individuals may be quite certain their labor market options or wage growth will continue to be low in a poor economy, whereas some modicum of opportunity (or expectations of opportunities) may generate feelings of uncertainty about future possibilities. Kohler et al. (2002) also argued that the conditions that encourage the onset of postponement may not necessarily be required for parenthood to be further delayed. It may be that the timing of parenthood in the countries we studied will become pro-cyclical and uncertainty may deter parenthood once economic stability or a certain level of wealth has been achieved and parenthood has been delayed to a certain age or is already widespread within a country.

Ní Brolcháin and Beaujouan (2012) list no less than 12 distinct arguments that have been made to explain the postponement of parenthood. We have focused rather narrowly on only a few that can be measured with our data. It is worth exploring whether any potential explanations correlate with poor economic context, both as a way of identifying the mechanisms through which the economic context influences childbearing and as factors that may generate a spurious relationship between economic development and postponement.

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References

Aassve, A. & Altankhuyag, G. 2002. Changing patterns of marriage and fertility behaviour in a time of social and economic change: Evidence from Mongolia. *Studies in Family Planning*, 33(2):165-172.

Aassve, A., Billari, F.C., & Spéder, Z. 2006. Societal transition, policy changes and family formation: Evidence from Hungary. *European Journal of Population*, 22(2): 127–152.

Adsera, A. 2004. Changing fertility rates in developed countries: The impact of labour market institutions. *Journal of Population Economics, 17*(1): 1–27.

Adsera, A. 2011. The interplay of employment uncertainty and education in explaining second births in Europe. *Demographic Research, 25*(16): 513-544.

Andersson, G. 2000. The impact of labour-force participation on childbearing behavior: Pro-cyclical fertility in Sweden during the 1980s and the 1990s. *European Journal of Population, 16*(4): 293-333.

Baizán, P., A. Aassve, & F.C. Billari. 2003. Cohabitation, marriage, and first birth: The inter-relationship of family formation events in Spain. *European Journal of Population, 19*:147–69.

Barber, J.S., Murphy, S., Axinn, W., & Maples, J. 2000. Discrete-time multilevel hazard analysis. *Sociological Methodology*, 30: 201-235.

Becker, G. 1981. *A treatise on the Family*. Cambridge, MA: Harvard University Press.

Bernardi, L., Klärner, A., & von der Lippe, H. 2008. Job insecurity and the timing of parenthood: A comparison between Eastern and Western Germany. *European Journal of Population, 24(*3): 287-313.

Billingsley, S. 2010. The post-communist fertility puzzle. *Population Research and Policy Review, 29*(2): 193-231.

Billingsley, S. 2011. Economic crisis and recovery: Changes in second birth rates within occupational classes and educational groups. *Demographic Research, 24*(16): 375-406.

Blossfeld, H.-P., Mills, M., Klijzing, E. & Kurz, K. (Eds.) 2005. *Globalization, Uncertainty, and Youth in Society*. New York: Routledge.

Bratti, M. 2003. Labour force participation and marital fertility of Italian women: The role of education. *Journal of Population Economics, 16*(3): 525-554.

Buis, M. 2010. Interpretation of interactions in nonlinear models. *The Stata Journal, 10*(2): 305-308.

Butz, W. & Ward, M. 1979. The emergence of countercyclical *U.S.* fertility. *American Economic Review 69*(3): 318-328.

Duntava, A., & Billingsley, S. 2013. Changing Life Course Regimes (CLiCR) Data: Harmonization Manual. *Social Policy and Family Dynamics in Europe Working Paper* 2013:12.

Ermisch, J. 1980. Time Costs, Aspirations and the Effect of Economic Growth on German Fertility. *Oxford Bulletin of Economics and Statistics, 43*:125–143

Frejka, T. & Sardon, J.P. 2006. First birth trends in developed countries: Persisting parenthood postponement. *Demographic Research, 15*(6): 147–180.

Frejka, T. & Sobotka, T. 2008. Fertility in Europe: diverse, delayed and below replacement. *Demographic Research, 19:* 15–46

Friedman, D., Hechter, M. & Kanazawa, S. 1994. A theory of the value of children. *Demography, 31*: 375–104.

Gustafsson, S. S. 2001. Optimal age at motherhood. Theoretical and empirical considerations on postponement of maternity in Europe. *Journal of Population Economics*, 14: 225–247.

Gustafsson, S., E. Kenjoh, & C. Wetzels. 2002. The role of education on postponement of maternity in Britain, Germany, the Netherlands and Sweden. In E. Ruspini and A. Dale (eds.), *The Gender Dimension of Social Change. The Contribution of Dynamic Research to the Study of Women's Life Courses* (pp. 55-79). Bristol: Policy Press.

Happel, S.K., Hill, J.K., & Low, S.A. 1984. An economic analysis of the timing of childbirth. *Population Studies, 38*: 299-311.

Hoffman, L.W., &Hoffman, M.L. 1973. The value of children to parents. In J.T. Fawcett (Ed.), *Psychological Perspectives on Population*. Basic Books: New York.

Hotz, V. J., Klerman, J. A., & Willis, R. 1997. The economics of fertility in developed countries. In M. R. Rosenzweig & O. Stark (Eds.), *Handbook of Population and Family Economics* (pp. 275–347). Amsterdam: Elsevier Science B.V.

Inanc, H. 2015. Unemployment and the timing of parenthood: Implications of partnership status and partner's employment. *Demographic Research, 32*: 219-250.

Kantorová, V. 2004. Education and entry into motherhood: The Czech Republic during the state socialism and the transition period (1970-1997). *Demographic Research, Special Collection 3*(10): 245-274.

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.

Kohler, H.P., & Kohler, I. 2002. Fertility decline in Russia in the early and mid 1990s: The role of economic uncertainty and labour market crises. *European Journal of Population, 18:* 233-262.

Kreyenfeld, M. 2010. Uncertainties in female employment careers and the postponement of parenthood in Germany. *European Sociological Review, 26*(3): 351-366.

Kreyenfeld, M., & Andersson, A. 2014.Socioeconomic differences in the unemployment and fertility nexus: Evidence from Denmark and Germany. *Advances in Life Course Research 21*: 59-73.

Lesthaeghe, R. 2010. The unfolding story of the Second Demographic Transition. *Population and Development Review, 36*(2): 211-251.

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

Lillard, L.A. 1993. Simultaneous equations for hazards: Marriage durations and fertility timing. *Journal of Econometrics,* 56: 198–217.

Marini, M.M. 1984. Age and sequencing norms in the transition to adulthood. *Social Forces, 63*(1): 229-244.

Martin, J. 2004. *The ultimate vote of confidence': Fertility rates and economic conditions in Australia, 1976–2000*. *Australian Social Policy 2002–2003* (pp. 31–54). Canberra: Commonwealth of Australia.

McDonald, P. 2000. Gender equity in theories of fertility transition. *Population and Development Review, 26:* 427–439.

Mills, M., & Blossfeld, H-P. 2005. Globalization, uncertainty and the early life course: A theoretical framework. In H-P Blossfeld, E. Klijzing, M. Mills, and K. Kurz (eds.) *Globalization, uncertainty and youth in society* (pp. 1–24). London/New York: Routledge Advances in Sociology Series.

Mynarska, M. 2010. Deadline for parenthood: Fertility postponement and age norms in Poland. *European Journal of Population*, 26: 51-373.

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*: 615-629.

Neyer, G., & Andersson, G. 2008. Consequences of family policies on childbearing behavior: Effects or artifacts? *Population and Development Review, 34:* 699–724.

Ní Brolcháin, M., & Beaujouan, E. 2012. Fertility postponement is largely due to rising educational enrolment. *Population Studies, 66*(3): 311-327.

Nicoletti C., &Tanturri M.L. 2008. Differences in delaying motherhood across European countries: Empirical evidence from the ECHP, *European Journal of Population, 24*(2): 157-183.

Örsal, D.D.K. & Goldstein, J. 2010. The increasing importance of economic conditions on fertility. Rostock: Max Planck Institute for Demographic Research (MPIDR Working Paper; WP 2010-014).

Perelli-Harris, B. 2005. The path to lowest-low fertility in Ukraine. *Population Studies, 59*: 55-70.

Potančoková, M. 2009. Postponement of childbearing in Slovakia: The role of age norms on entry into motherhood. *Romanian Journal of Population Studies* III(1): 131–155.

Rabe-Hesketh, S., & Skrondal, A. (2012). *Multilevel and longitudinal modeling using Stata* (3rd ed.). College Station, TX: Stata Press.

Santow, G., & Bracher, M. 2001. Deferment of the first birth and fluctuating fertility in Sweden. *European Journal of Population, 17*: 343-363.

Schoen, R., Kim, Y.J., Nathanson, C.A., Fields, J., & Astone, N.M. 1997. Why do Americans want children? *Population and Development Review, 23*: 333–358.

Settersten, R.A., & Haegestad, G.O. 1996. What's the latest? Cultural age deadlines for family transitions. *The Gerontologist*, 35(2): 178-188.

Shanahan, M., Elder, G., & Miech, R. 1997. History and Agency in Men's Lives: Pathways to Achievement in Cohort Perspective. *Sociology of Education, 70*(1): 54-67.

Sobotka, T. 2003. Re-emerging diversity: Rapid fertility changes in Central and Eastern Europe after the collapse of the communist regimes. *Population-E, 58*(4-5): 451-486.

Sobotka, T. 2011. Fertility in Central and Eastern Europe after 1989: Collapse and gradual recovery. *Historical Social Research* 36: 246-296.

Sobotka, T., Skirrbek, V., & Philipov, D. 2011. Economic recession and fertility in the developed world. *Population Development and Review, 37*(2): 267-306.

Thomson, Elizabeth. Forthcoming. Value of Children. In James D. Wright (ed.), International Encyclopedia of the Social and Behavioral Sciences, Second Edition. Oxford: Elsevier Ltd.

TransMonEE 2012 Database, UNICEF Regional Office for CEE/CIS.

UNECE Statistical Database (www.unece.org/stats/data/).

United Nations. 2005. Generations & Gender Programme: Survey Instruments. New York and Geneva: UN, 2005

Watkins, S.C. 1990. From local to national communities: The transformation of demographic regimes in Western Europe 1987-1960. *Population and Development Review, 16*(2): 241-272.

Wetzels, C. 2001. *Squeezing birth into working life: Household panel data analysis comparing Germany, Great Britain, Sweden and the Netherlands*. Aldershot: Ashgate.

Appendix A. Survey and sample description for each country included in CLiCR

		DHS	FFS	GGS	LiT	Total # of women
1	Albania	2008			2006	3914
2	Armenia	2005			2006	3187
3	Azerbaijan	2006			2006	4353
4	Bulgaria			2004	2006	2142
5	Czech Republic		1997		2006	584
6	Estonia			2004	2006	1041
7	Georgia			2006	2006	1573
8	Hungary			2004	2006	1734
9	Kazakhstan	1999			2006	1542
10	Kyrgyzstan	1997			2006	1213
11	Latvia		1995		2006	451
12	Lithuania			2006	2006	1405
13	Moldova	2005			2006	3575
14	Poland		1991	2010	2006	3690
15	Romania			2005	2006	1123
16	Russia			2004	2006	1604
17	Slovenia		1995		2006	472
18	Ukraine	2007			2006	3570
19	Uzbekistan	1996			2006	1434

Appendix B. Classification of a three-level educational attainment variable

	Secondary or lower	Post secondary	High
GGS	Has not studied ISCED 0 - pre-primary ISCED 1 - primary lev ISCED 2 - lower secon ISCED 3 - upper secon	ISCED 4 - Post second	ISCED 5 -first stage ISCED 6 - second stag
LiTS	No degree/No educatio Compulsory school edu Secondary education	Professional, vocatio	Higher professional Post graduate degree
FFS	ISCED 0 - Preceding f ISCED 1 - First level ISCED 2 - Second leve ISCED 3 - Second leve	ISCED 4 - Third level	ISCED 5 - Third level ISCED 6 - Third level
DHS	No education Incomplete primary Complete primary Incomplete secondary Complete secondary	Less than 3 years higher education	3 or more years higher education