Assessing the contribution of living arrangements to aggregate trends in entry into parenthood for three European countries between the 1970s and 2000s

Jorik Vergauwen, University of Antwerp, jorik.vergauwen@uantwerpen.be
David de Wachter, University of Antwerp, david.dewachter@uantwerpen.be
Karel Neels, University of Antwerp, karel.neels@uantwerpen.be

Abstract

The Second Demographic Transition theory predicted that from the 1970s onwards, changes in western European nuptiality and fertility patterns are associated with cultural shifts. The empirical support for cultural explanations of fertility is, however, limited and childbearing decisions are increasingly related to structural factors such as educational expansion and economic conditions. Nevertheless, authors have suggested that value orientations, i.e. post-materialism, indirectly affect fertility timing since less family-oriented women may reject traditional family building institutions such as marriage. These women, showing (at least temporary) lower fertility intentions, may opt more frequently for flexible and non-marital living arrangements. This study therefore examines whether cultural changes affect the transition to parenthood via changing living arrangements. Using data from the Harmonized Histories, we assess to what extent partnership behaviour – e.g. postponed union formation, increasing unmarried cohabitation and separation – can explain trends in synthetic parity progression ratios for first births in three European countries between the 1970s and 2000s. The analysis first takes information on education (i.e. enrolment and attainment) and economic context (i.e. macro-level indicators of economic cycles) into account to control for structural determinants of first birth trends. The results show that changes in living arrangements are not instrumental in explaining aggregate trends in entry into parenthood for all countries. Predominantly for Norway empirical evidence is found for the contribution of living arrangements to $SPPR_1$ time-series. Indicators of economic context, however, account more substantially for changing first birth trends in Hungary.

Keywords: union formation – parenthood – Second Demographic Transition – fertility – cohabitation

1 Introduction

During the last decades first births have been substantially postponed in Europe. The mean ages of first-time motherhood in northwestern European countries such as Norway and the United Kingdom have risen from respectively 23.5 and 24.7 years in 1975 to 27.7 and 29.9 years in 2005 (Eurostat 2015; HFD 2015). In central and eastern Europe (CEE) deferred parenthood came to the fore later. In Hungary the mean age of motherhood varied between 23 and 22 years in the period 1960-1990. Only from the 1990 onwards, a strong increase has started. In 2005 the mean age reached 26.6 years (HFD 2015).

In both northwestern Europe and CEE countries, postponement of parenthood coincides with unprecedented changes regarding partnership behaviours (Sobotka and Toulemon 2008). According to the theory of the Second Demographic Transition (SDT), changes in fertility and nuptiality behaviours are both related to cultural shifts (Lesthaeghe and Surkyn 1988; Van de Kaa 1996, 2001). The SDT highlights the importance of the rise of post-materialist values like self-realization with respect to partnership and family formation. Individual-level evidence shows that household types are significantly related to such value orientations (Lesthaeghe and Surkyn 2002; Surkyn and Lesthaeghe 2004). Concerning fertility, SDT values are positively associated to higher mean ages of first parenthood at an aggregate level (Van de Kaa 2002; Sobotka 2008). Studies assessing the relation between SDT values and fertility at the individual level find, however, limited support for a direct link (Van de Kaa 2001). The assumption that both the rise of alternative living arrangements and delayed parenthood have been similarly associated to ideational changes has therefore been contested (Lesthaeghe 2010). Rather, it is suggested that individuals with post-materialist values opt more frequently for flexible and low commitment living arrangements (e.g. singlehood or unmarried cohabitation) and delay family-building institutions such as marriage (and hence parenthood) (Van de Kaa 2001; Mulder 2003). In this respect, lower fertility in cohabitation has to be understood as a selection effect. This implies an indirect impact of post-materialism, via partnership behaviour, on fertility timing. At the same time, numerous studies have shown that fertility timing is more directly related to structural factors such as prolonged trajectories in education and economic context (Lesthaeghe 2010; Sobotka et al. 2011; Ní Bhrolcháin and Beaujouan 2012).

While it is suggested that first childbearing decisions are responsive to structural factors, this study aims to examine the association between union formation and the entry into parenthood in three European countries (Hungary, Norway and the United Kingdom). To this end, the analysis – using retrospective data from the Harmonized Histories – first takes information on education (i.e. enrolment and attainment) and economic context (i.e. macro-level indicators of economic cycles) into account. Subsequently, the empirical relevance of changing living arrangements in accounting for aggregate-level trends of entry into parenthood between the 1970s and 2000s is investigated. Hence, the contribution of partnership behaviour, controlling for structural factors, in first birth trends sheds more light on the cultural determinants of fertility. The inclusion of the controls for structural factors also avoids endogenous conclusions because such factors are suggested to affect fertility timing via partnership formation (Sobotka et al. 2011). A large body of literature indicates that rising education and economic insecurities, besides cultural determinants, relate directly to union formation as well (Becker 1981; Oppenheimer 1988; Mills et al. 2005).

In addition, several studies have shown that particularly unmarried cohabitations are progressively considered as childbearing settings in most European countries (Heuveline and Timberlake 2004; Perelli-Harris et al. 2012). In line with the SDT and disadvantage theories (Raley 2001; Mclanahan 2004), cohabitation is suggested to become an alternative for marriage, rather than a living arrangement which attracts low committed couples. As a result, the analysis also considers the role of shifting birth risks within different living arrangements with respect to the fertility trends.

The remainder of this article is subdivided as follows. First, the theoretical section discusses the appearance of new family behaviours in western European and CEE countries. Subsequently, theoretical considerations on the link between partnership and fertility behaviours are addressed. Section 3 briefly articulates the main research question. In section 4 the data and methods are considered, whereas section 5 presents the results of the analyses. Finally, the discussion and conclusion sections discuss the most important findings.

2 Theory and previous findings

2.1 New family behaviours in western European and CEE countries

This contribution considers the role changing union formation with respect to family formation. Three countries are considered: Hungary, Norway and the UK. Because several studies have suggested a different diffusion of new family behaviours in these countries, this section briefly reviews how the emergence of new demographic patterns relates to their societal background. First, changed nuptiality and fertility patterns are discussed for northwestern countries (i.e. Norway and the UK) and subsequently CEE countries are considered (i.e. Hungary).

From the 1970s onwards, nuptiality and fertility patterns have changed considerably throughout northwestern Europe. In Scandinavian countries such new family behaviours started somewhat earlier (Noack 2001). Regarding partnering behaviour, marriage intensities have decreased strongly for men and women in their early twenties, as young adults live in the parental home for increasingly longer periods of time, more frequently experience spells of living as singles and this for extended periods, and show a higher prevalence of premarital cohabitation or even looser partnership forms such as LAT (living apart together) than before (Sobotka and Toulemon 2008). In addition, divorce rates have increased during the last decades while remarriage among divorced persons has declined in favour of post-marital cohabitation (Kiernan 2001; Galezewska et al. 2013). With respect to fertility, postponement of parenthood has become an important feature of reproductive behaviour since the early 1970s. Also, a higher risk of childbearing in stable consensual unions is observed as non-marital childbearing has gradually become accepted (Kiernan 2001, 2004a; Perelli-Harris et al. 2012). These new family behaviours emerging northwestern European are often considered to constitute a so-called Second Demographic Transition (SDT). Apart from pattern description, the concept of SDT links these new family behaviours to broader cultural changes which reflect the emergence of higher-order needs such as demands for larger individual autonomy and self-determination (Lesthaeghe and Van de Kaa 1986; Van de Kaa 1996; Surkyn and Lesthaeghe 2004; Lesthaeghe 2010). The theory of the SDT thus considers new family behaviours in western Europe to result from the growing emphasis on higher-order needs and post-materialist values occurring with the post-war economic prosperity (Lesthaeghe and Surkyn 1988).

Several CEE countries have witnessed similar changes in family behaviours after 1990. Notwithstanding that some of these behavioural features were appearing well before 1990 (e.g. pre-marital cohabitation) (Vishnevsky 1996; Spéder 2005; Katus et al. 2008; J. M. Hoem et al. 2009), the most characteristic trends (such as postponement of first births and marriage, the rise in cohabitation and non-marital fertility, etc.) have accelerated since the fall of communism. In many CEE countries changing childbearing behaviour resulted in the emergence of lowest-low fertility (period TFR below 1.3) (Kohler et al. 2002). In the literature the debate on the correlates of the rapid demographic changes in CEE countries contrasts economic restructuring with cultural shifts (Sobotka 2008; Zakharov 2008; Thornton and Philipov 2009; Gerber and Berman 2010; Lesthaeghe 2010; Perelli-Harris and Gerber 2011). The emphasis on economic factors in explaining the emergence of new family behaviours arises from the observation that particularly disadvantaged groups were pioneering such behaviours during the social and economic turbulence following 1990. Particularly the rise in

alternative living arrangements and non-marital childbearing are often attributed to the least educated groups as they were most affected by a context of increasing income disparities, privatization of the housing sector, and a higher need for labour market flexibility (Mills and Blossfeld 2005; Sobotka 2008; Perelli-Harris and Gerber 2011; Potârcă et al. 2013). Also for young adults in (higher) education, however, investments in human capital, and thus a prolonged education, pay off in times of economic adversity (Kohler et al. 2002). Hence, for highly educated young adults economic circumstances entailed postponement of partnership formation and parenthood. In addition to these economic explanations, however, several authors have also shown that younger birth cohorts have increasingly adopted western, post-materialist views on lifestyle and the family (Lesthaeghe and Surkyn 2002; Sobotka et al. 2003; Stankuniene and Jasilioniene 2008; Thornton and Philipov 2009). During the economic recovery of several former communist countries (by the end of the 1990s) no return to earlier nuptaility and fertility patterns was observed (Lesthaeghe 2010).

2.2 Fertility and nuptiality: links and correlates

Apart from the association with changing nuptiality patterns, the SDT relates fertility changes with cultural factors as ideational shifts have fostered an inclination towards later childbearing and smaller families. In recent work on the SDT, however, Lesthaeghe (2010) acknowledges the role of 'mechanical' or 'structural' factors as determinants of childbearing behaviour, rather than the idea that childbearing is merely culturally motivated. The effects of such structural determinants on fertility have been addressed in detail: the expansion of female labour market participation (Becker 1981, 1993), increasing educational enrolment (Ní Bhrolcháin and Beaujouan 2012), rising educational attainment (Liefbroer and Corijn 1999; Lappegård and Ronsen 2005), policy contexts (Mills et al. 2011; Gauthier 2007), and both macro- (Adsera 2005; Neels et al. 2013) and micro-level economic insecurities (Kravdal 2002; B. Hoem 2000; Bernardi et al. 2008). Studies at the aggregate level show that the diffusion of cohabitation is, in line with the SDT theory, strongly connected with liberal values and secularization (Lesthaeghe and Neels 2002). This leads to contrasting spatial patterns between nuptiality and fertility trends since childbearing behaviours are found more responsive to structural determinants such as increasing education, rising female labour force participation, as well as labour market conditions and economic context (Neels 2006; Lesthaeghe and Neidert 2006). In a similar vein, the timing of emerging new living arrangements and the onset of fertility postponement is frequently subject to variation in southern European countries (e.g. Spain or Italy) (Lesthaeghe 2010). In fact, the spread of unmarried cohabitation and non-marital fertility lags 20 years behind the start of strong delays in childbearing in these countries.

Micro-level evidence additionally shows that the association between value orientations and new family behaviours is stronger with respect to living arrangements than with respect to fertility (Van de Kaa 2001; Lesthaeghe 2010). This research argues that postponement of parenthood may run indirectly via choosing for living arrangements not directed towards parenthood (e.g. prolonged singlehood). Findings by Van de Kaa (2001) point out that women with a post-materialist value orientation postpone family formation more frequently and realize lower completed fertility. Nevertheless, the analysis shows that the reduced probability of parenthood among post-materialist women does not stem from significant variation in the number of children wanted or considered ideal by degree of post-materialism. Particularly at the onset of SDT, in a normative context with strong preferences for marriage and the bourgeois family ideal, highly educated women (with higher earning potentials) may have frequently rejected traditional family trajectories. For this group, the opportunity costs of marriage, with its associated gender asymmetry in domestic and paid work, and parenthood are high (Becker 1981, 1993; Liefbroer and Corijn 1999). As a result, they did not necessarily alter their number of children ultimately wanted, but show higher preferences for autonomy and,

accordingly, retain open life strategies through alternative living arrangements and later parenthood. Especially unmarried cohabitation is, hence, considered as more gender egalitarian in terms of the division of domestic work (Shelton and John 1993; Batalova and Cohen 2002; Baxter 2005). It may be regarded as a testing ground for marriage and family formation since it provides the advantages of co-residence with a partner, without the requirements of strong commitments (Clarkberg et al. 1995). In accordance, studies have shown that cohabitors without marriage plans are prone to higher separation risks (Andersson and Philipov 2002; Wiik et al. 2009). The spread of these fragile and experimental living arrangements (i.e. 'trial marriages' or at best 'preludes to marriage') may result in postponement of childbearing because the readiness for strong family commitments (such as marriage or parenting) is delayed and the amount of spells of single living grows (due to a high frequency of separation). Also, an increased prevalence of prolonged staying at the parental home or singlehood afterwards (or LAT-relationships) might yield a deferring impact on the timing of entry into parenthood (Sobotka and Toulemon 2008).

A second reasoning relates economic constraints to postponed first childbearing, indirectly, via delayed union formation (Sobotka et al. 2011; Vergauwen and Neels 2013; De Lange et al. 2014). Deteriorating economic conditions are shown to affect young workers' career prospects as they frequently enter the labour market in uncertain employment positions and regular unemployment (Gangl 2002; Wolbers 2007). Literature suggests that unfavourable labour market conditions put off marriage significantly because singles in unstable job careers are unattractive marriage partners who temporarily have insufficient economic resources as well as uncertain career perspectives (Oppenheimer 1988).

2.3 Early adulthood living arrangements and parenthood

Previous sections discussed how new family behaviours emerged in different European regions and how family formation may have been affected via changing partnership behaviours. As a result, this section reviews the prevalence of new living arrangements and how these are associated with parenthood in the three countries this paper addresses.

Living at the parental home and singlehood

Union formation is strongly related to the entry into parenthood (Baizán et al. 2003), as the large majority of births takes place within a union (Prinz 1995; Kiernan 1999; Mulder 2003). Two situations of being out of any union type before parenthood are considered: living at the parental home and living single (with or without any previous partnership experience). Generally, living alone, separated or with parents occurs with low risks to enter parenthood.

The timing of leaving the parental home is highly variable in Europe (Billari et al. 2001; Corijn and Klijzing 2001). Also, the extent to which home leaving is connected with union formation is subject to considerable variation between European countries (Holdsworth 2000; Billari 2004). This suggests that in some countries, individuals are likely to replace living at the parental home for starting living together with a partner. In other countries, however, individuals frequently live a considerable time as a single before partnership formation. Northwestern European countries show early home leaving patterns. In Scandinavian countries, such as Norway, men and women tend to leave the parental home at an early age since allowances targeting residential autonomy among young adults are generously provided (Aassve et al. 2002). For the UK, early home-leaving pattern are often attributed to the educational system. Young adults enrolled in higher education tend to study away from their parents (Holdsworth 2000; Aassve et al. 2002). The limited overlap between leaving the parental home and union formation in these countries suggests that rising ages at marriage are not only explained by delayed parental home leaving and the popularity of pre-marital cohabitation, but also by increased

entrance in 'non-familial' living arrangements (singlehood without a partner or shared living with non-relatives) after parental home living (Heath 2009; Mulder 2009).

In CEE countries, however, the ages of home leaving are generally higher but the region is characterized by considerable between-country variation (Andersson and Philipov 2002; Sobotka and Toulemon 2008). Before as well as after the fall of communism housing prices and shortages have been an important obstacle for young adults wanting to leave the parental home (Sobotka et al. 2008; Stropnik and Šircelj 2008). Also a rapid expansion of higher education in the post-communist era has contributed to a later timing of leaving the parental home. Entering a partnership more frequently overlaps with parental home leaving in CEE (Billari et al. 2001).

Unmarried cohabitation and marriage

Although partnership formation is frequently related to parenthood, the literature distinguishes between the choice for unmarried cohabitation and marriage (Perelli-Harris et al. 2012). In previous studies, marriage has often been regarded as the dominant childbearing setting. Nevertheless, the substantial increase in childbearing within consensual unions is identified as a key characteristic of European family behaviour during the last decades (Le Goff 2002; Heuveline and Timberlake 2004; Kiernan 2004a). This suggests that the selection of women with lower fertility intentions in cohabitation has been decreasing with the higher prevalence of cohabitation. The choice for living together without being married is hence becoming largely accepted and general, rather than an innovative rejection of traditional norms or an expression of self-determinance.

In northwestern European countries, the majority of partnerships currently start as unmarried cohabitations since direct marriages have declined dramatically between the 1970s and 2000s (Prioux 2006). In CEE countries cohabitation has been overtaking direct marriage at a much slower pace (Zakharov 2008). The meaning of cohabitation for childbearing is nevertheless subject to heterogeneity in most European countries. The expectations of cohabiting partners about the nature of their liaison diverge (Murphy 2000). However, a general trend towards a weaker tie between marriage and parenthood in favour of an increasing link between consensual unions and childbearing has been established (Raley 2001; Heuveline and Timberlake 2004; Perelli-Harris et al. 2012). Some authors have argued that countries ultimately progress to a stage where cohabitation becomes indistinguishable from marriage. Cohabitation then develops into an equivalent childbearing setting (Kiernan 2004b). Nevertheless, marriage is often not shunned but postponed to later life course stages. Most of the parents still marry at some point before or after giving birth (Perelli-Harris et al. 2012). Marriage is hence viewed as a more permanent living arrangement with higher commitment and a more elaborated legal framework (Wiik et al. 2009; Perelli-Harris et al. 2014). In CEE countries childbearing within cohabitation is less common. The history and recent rise of cohabitation and non-marital fertility, especially in Hungary, have frequently been attributed to social disadvantage (Spéder 2005). For couples with a lower socio-economic position, marriage is often not feasible and unmarried cohabitation serves a second best option (Perelli-Harris and Gerber 2011).

3 Research questions

This paper addresses the association between living arrangements and entry into parenthood. This gives rise to the following main research question: *To what extent can living arrangements explain trends in the transition to parenthood between 1975 and 2005 in different European countries?* The analysis takes into account the role of education and economic context because the literature indicates that fertility as well as nuptiality trends are responsive to such structural factors. Given the controls for economic variables, this analysis aims to shed light on the impact of cultural determinants with regard to fertility timing. Strands of research show that choices for particular living arrangements are directly

related to value orientations (i.e. post-materialism). Union formation is therefore hypothesized to affect the transition to parenthood because less family-oriented individuals opt for more flexible living arrangements (e.g. singlehood) (Van de Kaa 2001; Mulder 2003).

Because of rising non-marital birth rates in many European countries throughout the last decades (Kiernan 2001), it is expected that some of these living arrangements have become increasingly viewed as an appropriate setting to start family formation. For instance, some authors predict the eventual emergence of cohabitation as an alternative of marriage (Prinz 1995; Kiernan 2004b). This implies that consensual unions gradually develop into accepted childbearing and –rearing settings. As a result, unmarried cohabitation is becoming less selective and we examine whether changing childbearing risks within living arrangements relate to trends in the transition to parenthood.

The analysis considers three European countries: Hungary, Norway and the UK. This variation allows us to compare the associations between living arrangements and entry into parenthood over different country settings. Because of the variability in timing (i.e. 1970s vs. 1990s in Norway and Hungary resp.) and the diverging contexts (i.e. the SDT in northwestern Europe and economic turbulences in CEE) of the emergence of new family behaviours, substantial differences are expected.

4 Data and methods

To answer our research questions the analyses use data from the Harmonized Histories on childbearing and partnership histories of women in three European countries that provide the required data for the period of consideration: Norway (N=4,531 for period 1980-2003), the UK (N=4,164 for period 1974-2004) and Hungary (N=2,849 for period 1975-1998). The Harmonized Histories[1] is a standardized comparative database of reproductive and union histories constructed from different surveys in several European countries (Perelli-Harris et al. 2010). For two out of three countries data are drawn from the Generations and Gender Survey (GGS). For the UK the Harmonized Histories includes data from the British Household Panel Survey (BHPS). The GGS and BHPS provide time-varying information on education (attainment and enrolment), transitions between living arrangements (including timing, type, and duration), and timing of entry into parenthood. The analysis compares observed and fitted parity (both calculated from survey data) progression ratios for first births ($SPPR_1$)[2] between the 1970s and 2000s to examine the empirical relevance of living arrangements with regard to first birth trends (cfr. research question). To this end, a sequence of discrete-time event history models predict age-specific birth hazards from which $SPPR_1$ time-series are calculated. Each model distinguishes between more precise definitions of living arrangements to evaluate the specific empirical contribution of different household types.

The retrospective design of the surveys raises questions on the accuracy of the collected event histories, such as first childbearing, since several sources of bias have been documented in the literature (Blossfeld and Rohwer 2002; Blossfeld et al. 2007; Vergauwen et al. 2015). As a result, when times-series for $SPPR_1$ were available from vital statistics, the quality of survey data was assessed for the available Harmonized Histories countries by comparing the survey and population trends[3][4]. Also, the use of different types of survey weights were tested to improve the representation of the observed trends with reference to the population trends.

[1] www.nonmarital.org

[2] The synthetic parity progression ratio reflects the proportion of women with a certain number of children (e.g. between age 15 and 49) in a given year proceeding to have an additional child in the same year. Hence, $SPPR_1$ expresses the proportion of childless women (15-49) that become parent in a given year (Hinde 1998).

[3] As a result, France and Bulgaria are left out of the analysis.

[4] Mean absolute deviations (MADs) between the retrospective survey estimates and vital statistics were used to evaluate the data quality.

Modelling strategy, dependent, and independent variables

From the Harmonized Histories observed trends in $SPPR_1$ are reconstructed between 1970s and 2000s for women aged 15-49 years. Because the retrospective calculation of the $SPPR_1$ requires observing women between these ages, the actual observation period varies somewhat between countries, depending on the survey year in each country and the age range included in the sample. For countries where the retrospectively calculated $SPPR_1$s approximate the vital statistics well, discrete-time hazard models of first births were subsequently estimated. For the analysis, childless 15 year old women are observed until a first birth event or their 49th birthday, at which point their observation is censored (or the year of the survey if childless women are younger at interview time). The estimated hazards from these models, in turn, allow to calculate fitted $SPPR_1$s, reflecting the effect of included covariates on trends in $SPPR_1$ over the period considered. To evaluate the contribution of living arrangements to aggregate-level trends in the transition to parenthood, following sequence of models was estimated:

Model 1. This model only includes a cubic effect of age as the baseline hazard function.

Model 2a. The second model (A) first expands model 1 by including information on education: a time-varying indicator of enrolment, time-constant educational attainment[5] (interacted with age to allow varying age schedules by educational level) and a quadratic specification of time-constant age at graduation.

Model 2b. Model 2b introduces macro-level indicators on the economic conditions of a country. Sobotka and colleagues (2011) suggest that indicators like unemployment rates reflect the pathways through which economic cycles affect fertility. For CEE countries long-term time-series on unemployment are unavailable. As regards Hungary, however, available data on consumer prices are found to have a negative effect on childbearing. Rising consumer prices, entailing lower consumption capabilities, are therefore suggested to capture evolutions in purchasing power and economic uncertainty (Aassve et al. 2006). To test the consistency of using unemployment rates for western European countries and the consumer price index (CPI)[6] for CEE countries, cross-correlations of differentiated unemployment and CPI series are analysed for Norway and the UK. The results indicate positive correlations when CPI is lagged by approximately 1-2 years[7].

The analyses in this contribution combine individual-level data from the Harmonized Histories with macro-level information on harmonized unemployment rates (lagged by 1 year) from the OECD (2011) (for Norway and the UK) and CPI (lagged by 2 years) provided by the World Bank (2015) (for Hungary). Given that previous studies suggested age differentials in the effect of economic adversity on first birth hazards, the economic indicators are interacted with 5-year age groups (Neels et al. 2013; Wood et al. 2015).

Model 3. Model 3 uses the covariates already included in model 2 and additionally includes a time-varying indicator (lagged by 1 year) on whether women are living in a union or not. For both categories a cubic specification of duration since entry into the living arrangement (not in union or in union) is introduced as well. This allows first birth risks to vary by time spent in a living arrangement.

Model 4. This model is similar to model 3 but for women who are not in a union a distinction is now made between i) women who are living in the parental home or living as singles before entering a co-residential union ('single before union'), and ii) separated or divorced women who are living as

[5] Based on the International Standardized Classification of Education (ISCED 1997): low is ISCED 1 & 2, medium is ISCED 3 & 4, and high is ISCED 5 & 6.

[6] CPI reflects changes in the cost of the average consumer of acquiring a basket of goods and services that may be fixed or changed yearly (2010 = 100).

[7] Results available upon request.

singles ('separated singles') (both lagged by 1 year) [8]. Durations (cubic specifications) since singlehood and separation are also included.

Model 5. The fifth model is similar to model 4 but further distinguishes between cohabitation and marriage for women who are in a union. For both living arrangements separated (cubic) duration variables are specified as well.

Models 6-9. In subsequent models we extend model 5 by allowing the effects of living arrangements on first births to vary over period. In each of the consecutive models 6-9 an additional living arrangement (and the duration since entry of the living arrangement) is interacted with a period indicator (a dichotomous variable indicating pre- and post-1990)[9]. As a result, in model 9 all four (single, separated, cohabiting, and married) living arrangements are interacted with calendar time. Because the effect slopes of the different living arrangements are more flexible, we can take into account increased or decreased childbearing within a particular living arrangement (rather than assuming similar childbearing risks between the 1970s and 2005).

In sum, *Models 1-2* (including age, education and variables on economic context) are the baseline models, *Models 3-5* (introducing living arrangements) examine the impact of different living arrangements, and *Models 6-9* (interacting living arrangements with calendar time) verify whether first birth risks in certain living arrangements vary by calendar time. To assess the contribution of living arrangements we first compare the nested models (1-5) based on the deviance statistics (-2*LogLikelihood) and the Akaike Information Criteria (AIC). A significant improvement between consecutive models suggests that the inclusion of additional covariates (i.e. alternative specifications of living arrangements) contributes substantially to the explanation of variation in first birth hazards. Model diagnostics further indicate whether allowing variations in the effects of living arrangements on first birth hazards by calendar time improve the model fits (Models 6-9). For each of the models, we use the fitted birth hazards to calculate the expected $SPPR_1$ under the model between 1975 and 2005. To assess the fit between the observed and expected series (both calculated from survey data), we calculate the mean absolute deviation (MAD) between the observed and expected $SPPR_1$s under the different models in each year [10].

5 Results

The results section presents the outcomes of the analyses for the three different countries, and is partitioned into three sections accordingly. For each country the discussion of the results focuses on the model criteria and MAD between the observed and expected $SPPR_1$ series. The graphical representation of the averaged observed, fitted, and population $SPPR_1$ time-series are included in appendix (Figure 1-A3).

5.1 Norway

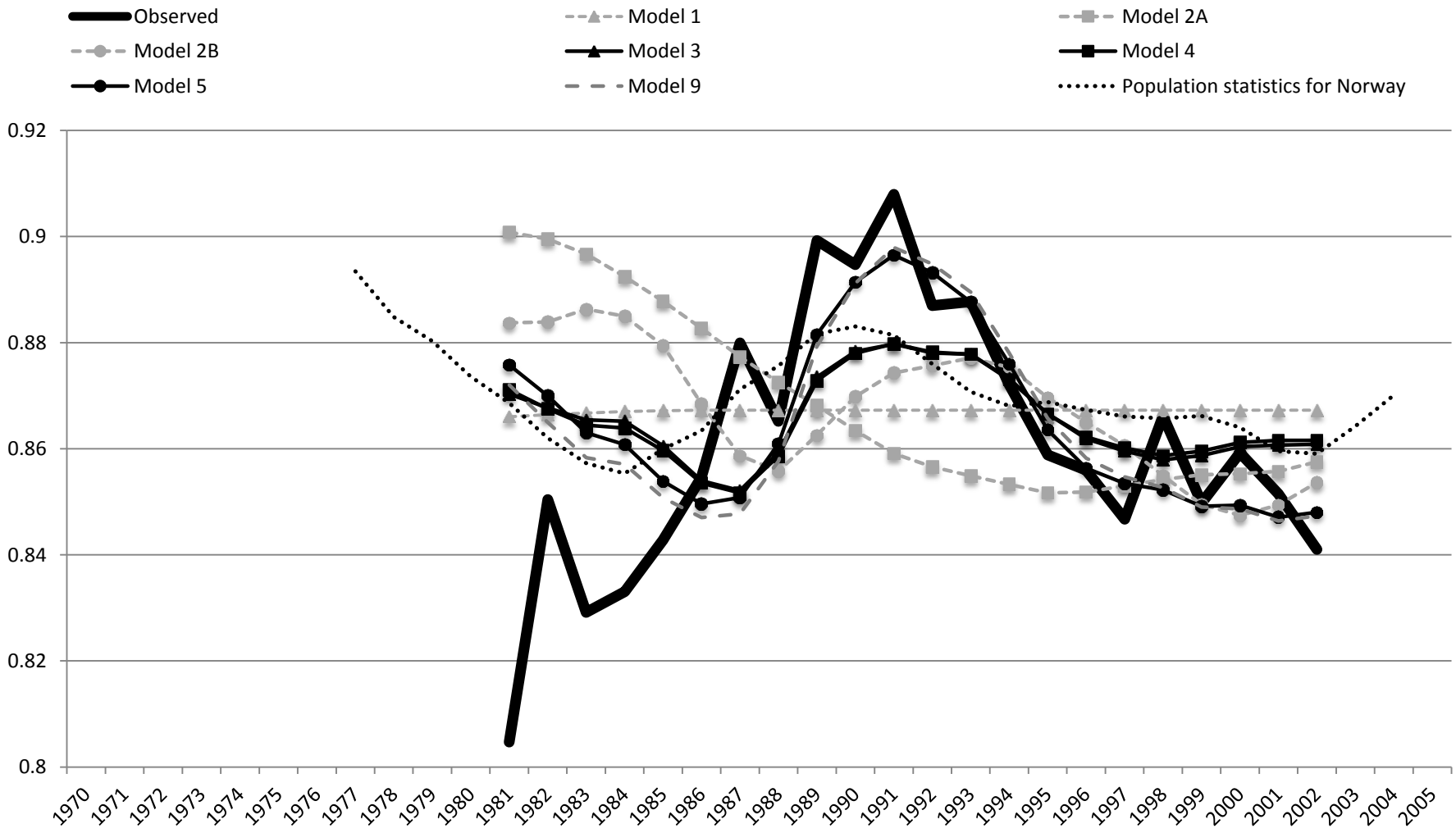
Table 1 displays the model criteria together with the MAD for the different models. Figure 1 provides a graphical representation of the fitted $SPPR_1$s per model. In addition, it shows the observed Harmonized Histories and population $SPPR_1$ time-series. The figure suggests an increase in $SPPR_1$s starting from the mid-1980s, which peaks at the beginning of the 1990s, and decreases afterwards. This peak represents a shortly interrupted decline in period first birth rates in Norway

[8] Women living at the parental home and women who live as singles are included in the same category as the when women left the parental home is not available in some countries.

[9] Calendar time is in all countries considered as a dichotomy (1970s-1989 and 1990-2000s) to retain a substantial number of events per time period in modelling the interaction effects.

[10] Given that the observed and fitted time-series are subject to short-term fluctuations because of sampling variation by observation year, three-year moving averages are calculated to smooth these series.

Figure 1. Observed and fitted averaged trends of synthetic parity progression ratios for first births ($SPPR_1$), Norway (1980-2003)



Source: Harmonized Histories, calculations by authors; population trends of $SPPR_1$s for Norway drawn from the Human Fertility Database

(Andersson 2002). The fitted $SPPR_1$ values derived from model 1 (including age) and model 2a (including age and education) provide a relatively poor approximation of the observed SPPR1 time-series (with the mean absolute deviation between the observed and the fitted SPPR1-series being 0.021 and 0.028 respectively). Figure 1 shows that model 1 underestimates the 1990s peak in $SPPR_1$s. Model 2a reflects increasing education by a gradual decline of $SPPR_1$s. This yields an additional underestimation of the observed trend. Neither of these models is capable of explaining the increase of $SPPR_1$ throughout the 1980s up to 1990, nor the subsequent decline of $SPPR_1$s throughout the 1990s. Model 2b, however, including interaction terms between unemployment rates and age groups ($p < 0.050$), accounts for somewhat lower fertility trends up to the mid-1980s and afterwards starts to capture the peak at the beginning of the 1990s. This is related to decreasing unemployment during the late 1980s and increasing unemployment levels afterwards. The strongest reduction in MAD occurs after 1990 (Table 2) (29.81%).

Table 1. Deviance statistics, model fit comparisons, AIC, and mean absolute deviations (between fitted and observed time-series for Models 1-9), Norway, 1980-2003

Model	**Deviance**	**df**	**Δ Dev.**	**p**	**AIC**	**MAD**
Model 1 (baseline age)	17268.54	4			17276.55	0.0207
Model 2a (M1 + education)	16769.67	13	498.87	0.000	16795.68	0.0276
*Model 2b (M2A + UR*age)*	16755.51	20	14.16	0.048	16795.51	0.0225
Model 3 (M2B + union/not union)	14721.60	27	2033.91	0.000	14775.61	0.0167
Model 4 (M3 + single/separated single)	14709.87	31	11.73	0.019	14771.88	0.0168
Model 5 (M4 + cohabitation/marriage)	14252.91	35	456.96	0.000	14322.91	0.0133
*Model 6 (M5 + singles*period)*	14239.69	39	13.22	0.010	14317.70	0.0137
*Model 7 (M6 + separated single*period)*	14238.48	43	1.22	0.875	14324.48	0.0137
*Model 8 (M7 + cohabitation*period)*	14236.77	47	1.71	0.789	14330.77	0.0134
*Model 9 (M8 + marriage*period)*	14234.51	51	2.26	0.688	14234.52	0.0133

Source: Harmonized Histories, calculations by authors

Table 2. Mean absolute deviation between observed and fitted SPPR1-series and proportional reduction in MAD across models, Norway, 1980-2003

			1980-1989		**1990-2003**	
Model	**MAD**	**P.R. %**	**MAD**	**P.R. %**	**MAD**	**P.R. %**
Model 1 (baseline age)	0.0207		0.0259		0.0171	
Model 2a (M1 + education)	0.0276	+33.68	0.0429	+66.01	0.0170	-0.20
*Model 2b (M2A + UR*age)*	0.0225	-24.88	0.0377	-20.17	0.0120	-29.81
Model 3 (M2 + union/not union)	0.0167	-28.00	0.0255	-47.38	0.0106	-7.68
Model 4 (M3 + single/separated single)	0.0168	+0.67	0.0254	-0.13	0.0109	1.50
Model 5 (M4 + cohabitation/marriage)	0.0133	-17.24	0.0244	-3.99	0.0056	-31.12
*Model 6 (M5 + singles*period)*	0.0137	+2.17	0.0241	-1.21	0.0066	5.71
*Model 7 (M6 + separated single*period)*	0.0137	-0.28	0.0241	-0.06	0.0065	-0.51
*Model 8 (M7 + cohabitation*period)*	0.0134	-1.49	0.0238	-1.05	0.0061	-1.96
*Model 9 (M8 + marriage*period)*	0.0133	-0.25	0.0234	-1.65	0.0063	1.21
Cumulative P.R. structural factors (M2A-2B) (%)		+8.81		+45.84		-30.01
Cumulative P.R. living arrangements (M3-9) (%)		-44.43		-55.47		-32.85
Cumulative P.R. total (%)		-35.62		-9.63		-62.86

Source: Harmonized Histories, calculations by authors

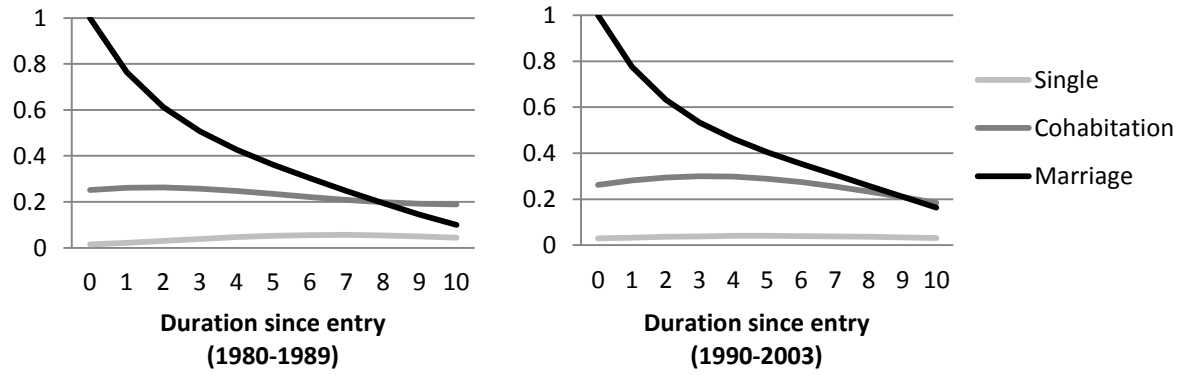
Model 3 introduces living arrangements, distinguishing whether women were in a union in the preceding year or not. This model brings a substantial improvement, both in terms of model fit ($p < 0.001$) and in terms of the mean absolute deviation between observed and fitted $SPPR_1$ series. Compared to model 2b, including union status reduces the mean absolute deviation by 28 per cent (Table 2). The strongest reduction in MAD (47.38%) occurs before 1990 as living arrangements

correct for the considerable overestimations of model 2b during the 1980s. This points in the direction of more women being out of a union, reflected in lower first birth risks (cfr. Figure 2, presenting the fitted birth risks per living arrangement in function of duration since entry of the living arrangement). Model 4 (additionally distinguishing never in union versus separated) and Model 5 (additionally distinguishing marriage versus unmarried cohabitation) show further improvements in model fit ($p < 0.001$). Particularly the distinction between cohabitation and marriage yields a more accurate approximation between the fitted and the observed trend. This is predominantly observed for the post-1990 period (31.12 per cent reduction in terms of MAD) (Table 2). Figure 1 shows that the fitted $SPPR_1$s approximate the peak in the observed trend closer. Figure 1 shows the highest first birth risks for married women for both time periods. This leads to the conclusion that a short-term upsurge in marriages at the beginning of the 1990s relates to higher fertility trends. The very close approximations of fitted $SPPR_1$s derived from model 5 with respect to fertility declines during the late 1990s and early 2000s (cfr. Figure 1), however, are suggested to be related to increasing cohabitation in the post-1990 period (cfr. Figure A1, showing the distributions of living arrangements before parenthood).

The models (6-9) that allow the living arrangement effects to vary over calendar time suggest that only for single women the hazard of having a first child changed significantly ($p < 0.010$) (Table 1). Figure 1 shows that singles have some lower birth risks in the post-1990 period. Table 1 further indicates that model 6 is considered as the best fitting model (lowest AIC-value). All in all, the MADs display very limited empirical evidence for better approximations due to changing first birth hazards (cfr. Table 2).

In sum, the results for Norway show that structural factors together with living arrangements are capable of explaining the observed first birth trends well. Between 1980 and 2003, the fitted $SPPR_1$s of model 9 provide a 35.62 per cent closer fit compared to model 1 (including age only). Before 1990, this is principally the result of taking into account economic context (decreasing unemployment levels between 1983 and 1987) and singlehood (explains lower fertility during the first part of the 1980s). After 1990, unemployment rates (increasing unemployment in the 1990s) together with distinguishing between marriage and cohabitation causes substantial contributions in explaining $SPPR_1$s. The latter is related to an upsurge of marriages around 1990 and more unmarried cohabitation afterwards. The models approach the observed trends best after 1990 (MAD is 0.0063, equivalent to a total reduction of 62.86 per cent).

Figure 2. Relative first birth risks in different living arrangements by duration since entry for Norway (1980-2003)



Source: Harmonized Histories, calculations by authors

5.2 The United Kingdom

Figure 3 presents both the observed survey and population $SPPR_1$ time-series (provided by the ONS UK). This figure points out that the BHPS data underestimate first birth rates substantially between 1980 and 1986. In the late 1990s, in contrast, BHPS-based estimates are overestimated compared to vital statistics. Hence, some caution is required when interpreting the mean absolute deviations between the fitted and the observed BHPS time-series.

Table 3 demonstrates that the fitted $SPPR_1$ series derived from model 1 (including age) and model 2a (additionally including education) approach the observed $SPPR_1$s poorly, with MADs of 0.0314 and 0,0300 respectively. According to Figure 3, both models give fairly constant $SPPR_1$s throughout the observation period of 1974-2004. The fitted series for model 2a reflect slowly declining $SPPR_1$s a consequence of increased education. Including unemployment rates (model 2b) significantly ($p < 0.001$) improves the model fit, but yields limited decreases in terms of MAD. For the entire period of observation, the MAD only reduces with 2.32% compared to model 2a (Table 4).

Distinguishing whether or not women were in a union in the preceding year (model 3) significantly ($p < 0.001$) improves model fit (Table 3). Nevertheless, the fitted $SPPR_1$s derived from model 3 show marginally better approximations of the observed $SPPR_1$ series. Hence, introducing timing of union formation predicts the observed trend not substantially better. Model 4, additionally

Table 3. Deviance statistics, model fit comparisons, AIC, and mean absolute deviations (between fitted and observed time-series for Models 1-9), the UK, 1974-2004

Model	**Deviance**	**df**	**Δ Dev.**	**p**	**AIC**	**MAD**
Model 1 (baseline age)	15743.54	4			15751.54	0.0314
Model 2a (M1 + education)	15339.33	13	404.20	0.000	15365.34	0.0300
*Model 2b (M2A + UR*age)*	15301.39	20	37.94	0.000	15341.40	0.0292
Model 3 (M2B + union/not union)	13765.73	27	1535.67	0.000	13819.73	0.0290
Model 4 (M3 + single/separated single)	13669.28	31	96.44	0.000	13731.29	0.0291
Model 5 (M4 + cohabitation/marriage)	13340.13	35	329.15	0.000	13410.13	0.0373
*Model 6 (M5 + singles*period)*	13319.01	39	21.12	0.000	13397.02	0.0331
*Model 7 (M6 + separated single*period)*	13308.34	43	10.68	0.030	13394.34	0.0310
*Model 8 (M7 + cohabitation*period)*	13298.32	47	10.02	0.040	13392.32	0.0296
*Model 9 (M8 + marriage*period)*	13290.86	51	7.46	0.114	13392.86	0.0288

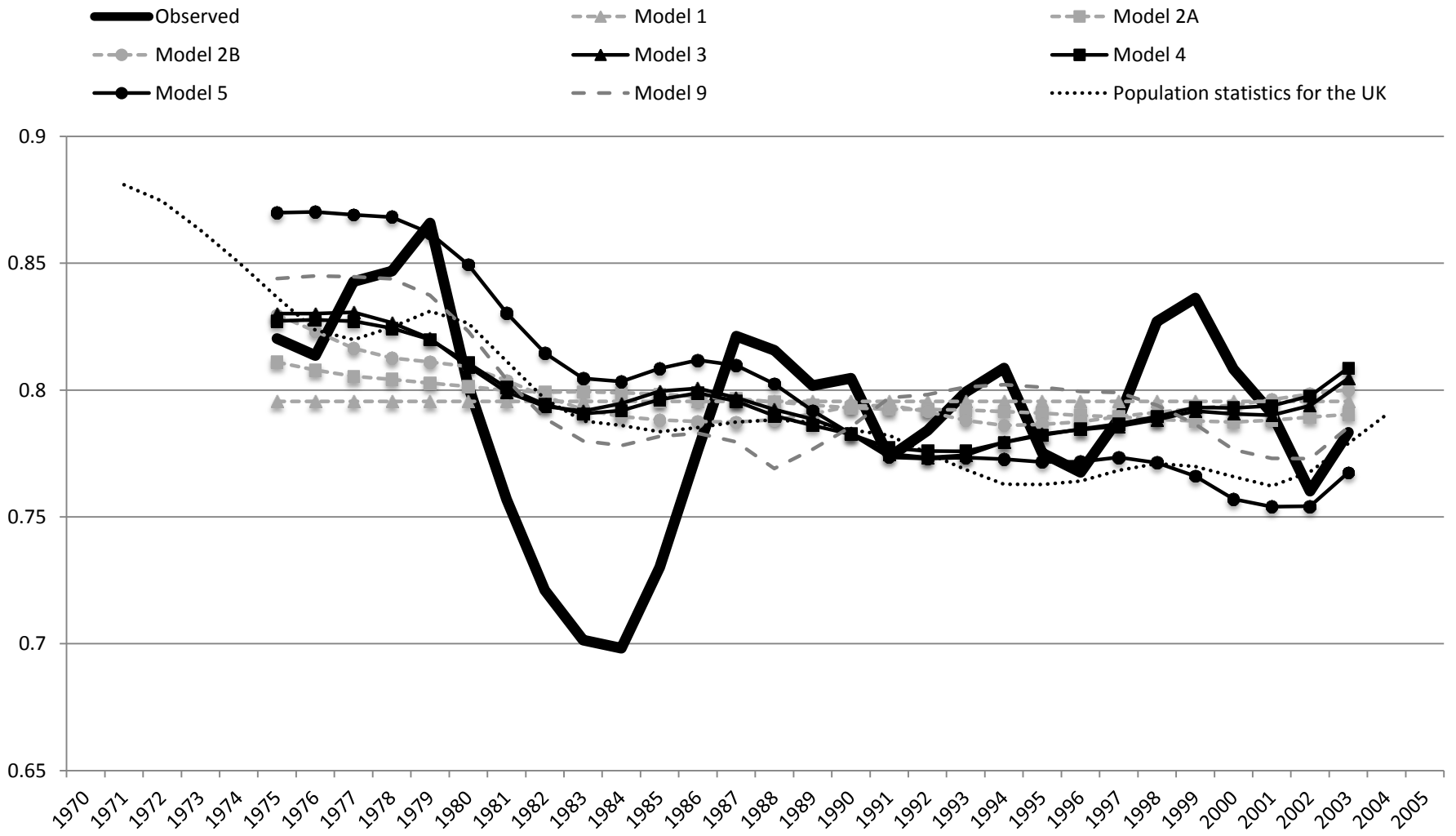
Source: Harmonized Histories, calculations by authors

Table 4. Mean absolute deviation between observed and fitted SPPR1-series and proportional reduction in MAD across models, UK, 1974-2004

			1974-1989		**1990-2004**	
Model	**MAD**	**P.R. %**	**MAD**	**P.R. %**	**MAD**	**P.R. %**
Model 1 (baseline age)	0.0314		0.0439		0.0180	
Model 2a (M1 + education)	0.0300	-4.58	0.0413	-5.90	0.0178	-1.12
*Model 2b (M2A + UR*age)*	0.0292	-2.32	0.0393	-4.69	0.0185	3.89
Model 3 (M2B + union/not union)	0.0290	-0.91	0.0379	-3.19	0.0194	5.05
Model 4 (M3 + single/separated single)	0.0291	+0.52	0.0380	+0.27	0.0196	1.19
Model 5 (M4 + cohabitation/marriage)	0.0373	+26.20	0.0486	+24.24	0.0252	31.36
*Model 6 (M5 + singles*period)*	0.0331	-13.62	0.0462	-5.65	0.0200	-29.28
*Model 7 (M6 + separated single*period)*	0.0310	-6.68	0.0415	-10.70	0.0197	-1.36
*Model 8 (M7 + cohabitation*period)*	0.0296	-4.48	0.0390	-5.72	0.0195	-1.23
*Model 9 (M8 + marriage*period)*	0.0288	-2.37	0.0370	-4.41	0.0200	2.97
Cumulative P.R. structural factors (M2A-2B) (%)		-6.90		-10.60		+2.76
Cumulative P.R. living arrangements (M3-9) (%)		-1.33		-5.16		+8.69
Cumulative P.R. total (%)		-8.23		-15.76		+11.45

Source: Harmonized Histories, calculations by authors

Figure 3. Observed and fitted averaged trends of synthetic parity progression ratios for first births ($SPPR_1$), the UK (1974-2004)



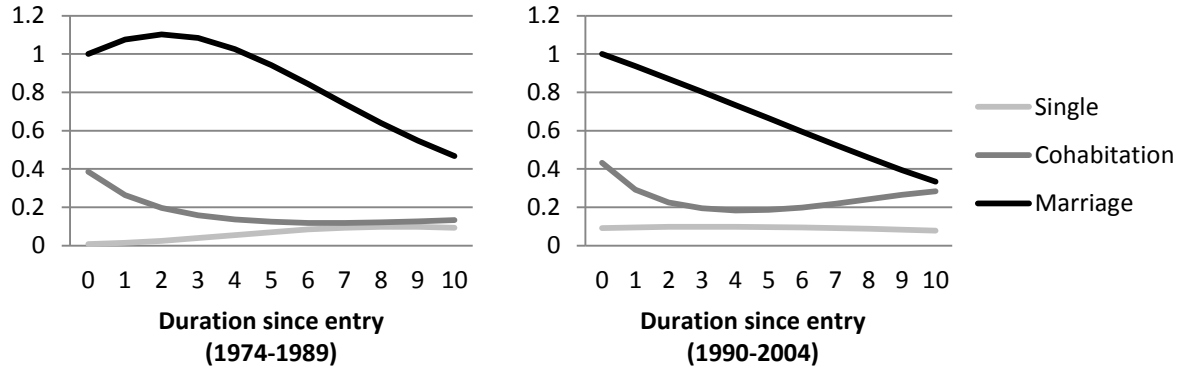
Source: Harmonized Histories, calculations by authors; we acknowledge the work of Oliver Dormon to provide population trends of $SPPR_1$s for the UK

distinguishing between singlehood and separated singles, yields a statistically significant improvement in model fit ($p < 0.001$), but fitting the $SPPR_1$s derived from model 4 implies a limited difference with respect to the approximation of the observed time-series (Table 4). Subsequently, model 5 distinguishes between cohabitation and marriage. This leads to a statistically significant better model fit, but a worse approximation of fitted time-series (Table 4). Between 1974 and 1989, time-series derived from model 5 indicate a greater overestimation (Figure 3) because of the limited prevalence of cohabitation (Figure A2). Figure 4 suggests substantially higher childbearing risks in marriage. Between 1990 and 2004, the observed $SPPR_1$s are more underestimated. Hence, increased cohabitation entails a decreasing effect on the fitted $SPPR_1$ series.

For women outside the context of a partnership, Table 3 shows that adding interaction terms between period and living arrangements yields significantly (model 6: $p < 0.001$; model 7: $p < 0.050$) better model fits. Allowing interaction between period and cohabitation also improves the model (model 8: $p < 0.050$). According to Figure 4, this results from increased childbearing within both singlehood and cohabitation. The period interactions with marriage entail less substantial model fit improvements ($p > 0.100$). AIC-values indicate that model 8 shows the best fit (Table 3). Models 6-9 affect the MADs between observed and fitted $SPPR_1$ series considerably. As a consequence of period-specific effects of living arrangements on first birth hazards, the fitted $SPPR_1$s derived from models 6 to 9 approximate the observed $SPPR_1$ series closer. For the pre-1990 period, the observed $SPPR_1$ trends are less overestimated, whereas these are less underestimated for the post-1990 period. Childbearing has thus recently become more common in non-marital living arrangements. The results suggest the empirical relevance of shifting birth risks within different living arrangements for aggregate trends of entry into parenthood for the period 1974-1989.

For the UK we conclude that the fitted $SPPR_1$s derived from the models account poorly for the observed $SPPR_1$ series. With regard to the entire period (1974-2004), the total proportional reduction in terms of MAD is limited to 8.23 per cent. Structural factors entail fairly small differences in MAD. Concerning the contribution of living arrangements to trends of fertility, the role of shifting childbearing within non-marital living arrangements stands out.

Figure 4. Relative first birth risks in different living arrangements by duration since entry for the UK (1974-2004)

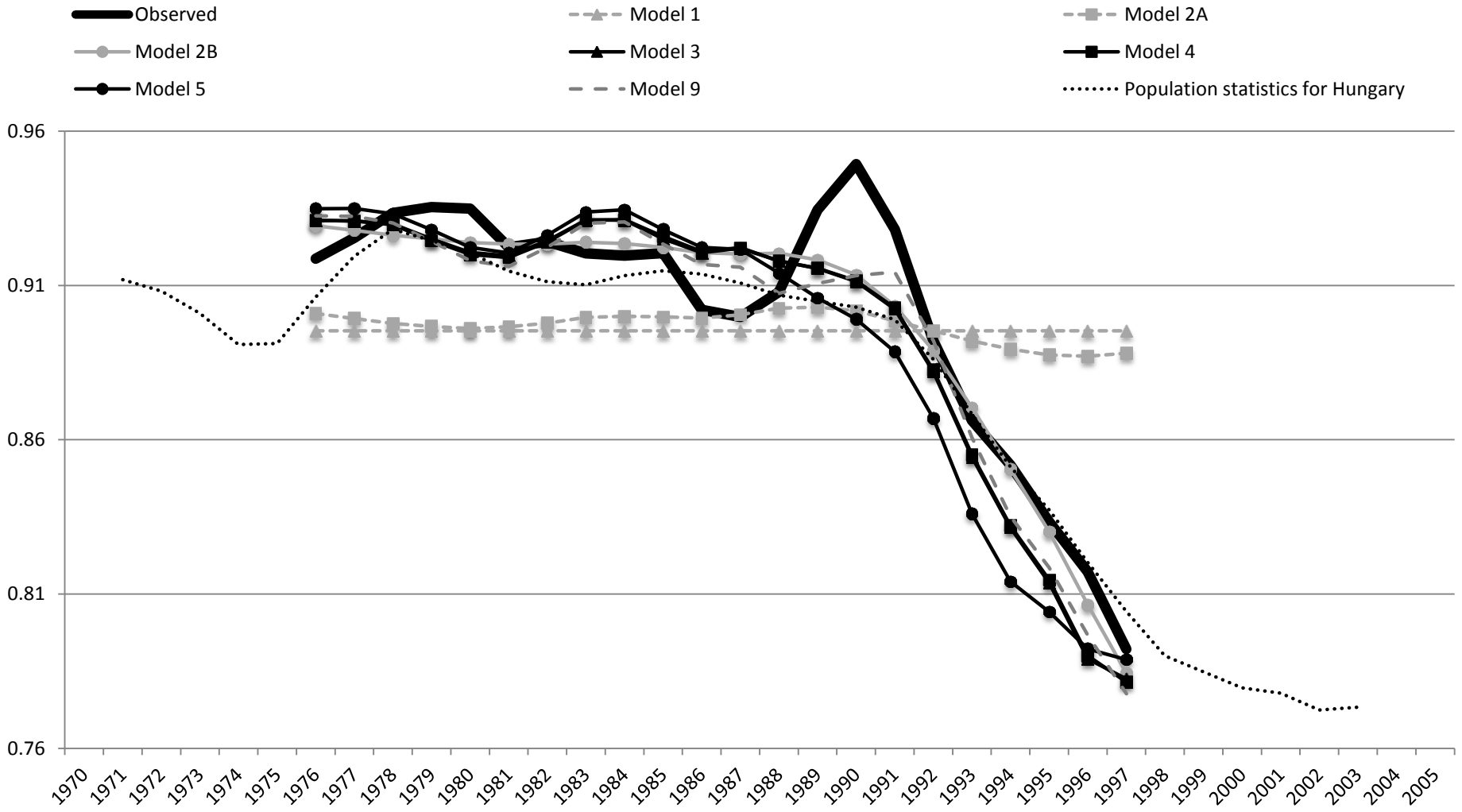


Source: Harmonized Histories, calculations by authors

5.3 Hungary

Figure 5, displaying the observed survey and population $SPPR_1$ time-series, suggests that the observed survey estimates accurately represent the Hungarian population $SPPR_1$s. Only a peak between 1989 and 1991 in the observed $SPPR_1$ time-series implies a clear overestimation of the population indicators. This short-term overestimation inflates the MADs for the period 1990-1998 in particular (MAD is 0.0261 and 0.0507 for Model 1 for periods 1975-1989 and 1990-1998 respectively).

Figure 5. Observed and fitted averaged trends of synthetic parity progression ratios for first births ($SPPR_1$), Hungary (1975-2004)



Source: Harmonized Histories, calculations by authors, population trends of $SPPR_1$s for Hungary drawn from the Human Fertility Database

Table 5 shows that the fitted $SPPR_1$ time-series derived from model 2a (including age and education) approach the observed $SPPR_1$s better than model 1 (including age only). As a consequence of taking education into account, the MAD reduces with 12.52 per cent for the entire observation period (1975-1998) (Table 6). Figure 5 attributes this better approximation to higher fitted $SPPR_1$ time-series during the 1970s and 1980s. After 1990, the fitted $SPPR_1$s tend to decrease slowly as a result of post-communist educational expansion. Model 2b additionally introduces CPI as an indicator of economic context. In terms of deviance statistics, accounting for CPI improves the model significantly ($p < 0.001$) (Table 5). Furthermore, fitted $SPPR_1$ time-series derived from model 2b contribute strongly to the approximation of the observed $SPPR_1$ time-series, with a proportional reduction of 60.04 per cent in terms of MAD for the entire observation period (Table 6). During the 1970s and 1980s, model 2b accounts for the high $SPPR_1$s (cfr. Figure 5). This is most likely related to the stable economic context during communism with a fairly low and constant CPI. From the 1990s onwards, however, CPI shows staggering increases (with peaks of more than 6% per year) because of economic turbulences in the transition to a capitalist economy. Figure 5 suggests that this is strongly reflected in the fitted $SPPR_1$s for the 1990s. According to Table 6, model 2b accounts for the declines in fertility (proportional reduction in MAD is 67.20 per cent).

Model 3 introduces union formation, distinguishing whether women were in a union in the preceding year or not. This model brings a substantial improvement, in terms of model fit ($p < 0.001$), but not in approaching the observed $SPPR_1$ series. Compared to model 2b, including living arrangements increases the MAD by 12.73 per cent for the observation period. This rise principally results from the underestimation of the observed $SPPR_1$ trend during the 1990s. Later union formation (cfr. Figure A3, increased singlehood before union formation for period 1990-1998) entails lower fitted $SPPR_1$s. Model 4 (additionally distinguishing never in union versus separated) and Model 5 (additionally distinguishing marriage versus unmarried cohabitation) show further improvements in model fit ($p < 0.001$) (Table 5). Distinguishing marriage and cohabitation yields a less accurate approximation between the fitted and the observed $SPPR_1$ trends for the post-1990 period (19.79 per cent increase in terms of MAD according to Table 6). Figure 5 demonstrates that the stronger deviations are associated with further underestimations. Because of increasing cohabitation, showing lower first birth rates compared to marriage (cfr. Figure 6), fitted $SPPR_1$ time-series are further depressed.

Table 5 indicates that the inclusion of interaction terms between period and living arrangements yields weak model fit improvements for models 6-8 (lowest AIC-value is observed for model 5). The model that allows variation of first birth risks within marriage, however, suggests significant ($p < 0.050$) differences between the pre- and post-1990 period. Figure 6 suggests increasing birth risks in marriage for the post-1990 period. The corresponding decrease in terms of MAD (proportional reduction of 32.83 per cent for the 1990s) implies that fitting these interaction effects partly offsets the underestimations of the fitted $SPPR_1$ time-series derived from model and 5.

Overall, the results for Hungary point out that education and particularly the economic context have largely shaped trends in the transition to parenthood. Of the total proportional reduction in terms of MAD (66.16 per cent), structural factors account for the closer approximation of the observed $SPPR_1$ series altogether. Before the 1990s, the analysis suggests that stable and high fertility rates occur with a stable economic context, while the empirical contribution of living arrangements is limited. After the fall of communism, depressed fertility rates are strongly related to the turbulent economic context with strong increases in CPI. Later union formation and increased cohabitation contribute to fertility trends as these account for underestimations of the observed $SPPR_1$s during the 1990s (resulting in higher MADs).

Table 5. Deviance statistics, model fit comparisons, AIC, and mean absolute deviations (between fitted and observed time-series for Models 1-9), Hungary, 1975-1998

Model	Deviance	df	Δ Dev.	p	AIC	MAD
Model 1 (baseline age)	14684.50	4			14692.50	0.0350
Model 2a (M1 + education)	14034.33	13	650.17	0.000	14060.33	0.0307
*Model 2b (M2A + CPI*age)*	13868.91	20	165.42	0.000	13906.91	0.0096
Model 3 (M2B + union/not union)	11016.92	27	2851.99	0.000	11068.92	0.0141
Model 4 (M3 + single/separated single)	10987.55	31	29.37	0.000	11047.55	0.0141
Model 5 (M4 + cohabitation/marriage)	10759.36	35	228.19	0.000	10827.36	0.0183
*Model 6 (M5 + separated single*period)*	10753.80	39	5.56	0.235	10829.81	0.0194
*Model 7 (M6 + separated*period)*	10752.85	43	0.95	0.917	10836.85	0.0192
*Model 8 (M7 + cohabitation*period)*	10747.92	47	4.94	0.294	10839.92	0.0193
*Model 9 (M8 + marriage*period)*	10737.08	51	10.83	0.029	10837.09	0.0119

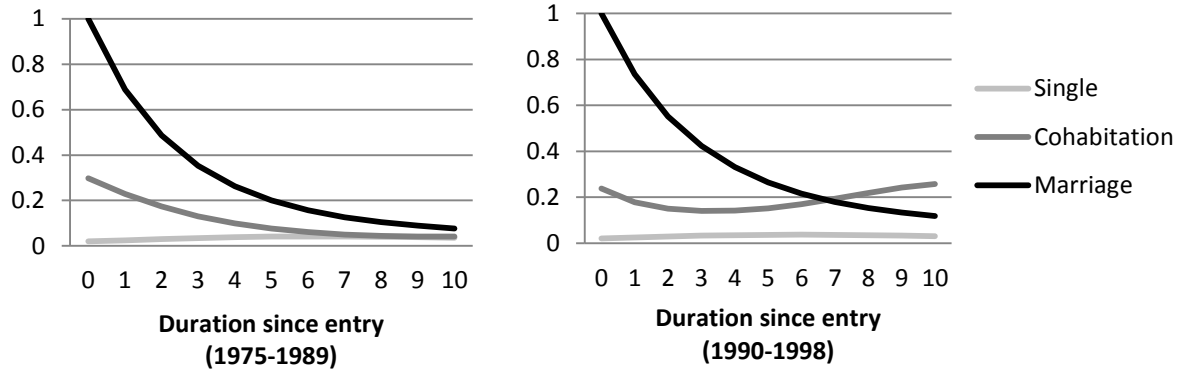
Source: Harmonized Histories, calculations by authors

Table 6. Mean absolute deviation between observed and fitted SPPR1-series and proportional reduction in MAD across models, Hungary, 1975-1998

			1975-1989		1990-1998	
Model	**MAD**	**P.R. %**	**MAD**	**P.R. %**	**MAD**	**P.R. %**
Model 1 (baseline age)	0.0350		0.0261		0.0507	
Model 2a (M1 + education)	0.0307	-12.52	0.0222	-14.92	0.0455	-10.37
*Model 2b (M2A + CPI*age)*	0.0096	-60.04	0.0086	-52.09	0.0114	-67.20
Model 3 (M2 + union/not union)	0.0141	+12.73	0.0104	+6.95	0.0205	+17.93
Model 4 (M3 + single/separated single)	0.0141	-0.07	0.0106	+0.84	0.0200	-0.89
Model 5 (M4 + cohabitation/marriage)	0.0183	+12.19	0.0116	+3.74	0.0301	+19.79
*Model 6 (M5 + singles*period)*	0.0194	+2.94	0.0119	+1.20	0.0323	+4.52
*Model 7 (M6 + separated single*period)*	0.0192	-0.56	0.0119	-0.16	0.0319	-0.91
*Model 8 (M7 + cohabitation*period)*	0.0193	+0.35	0.0121	+0.71	0.0319	+0.02
*Model 9 (M8 + marriage*period)*	0.0119	-21.18	0.0099	-8.24	0.0152	-32.83
Cumulative P.R. structural factors (M2A-2B) (%)		-72.52		-67.01		-77.57
Cumulative P.R. living arrangements (M3-9) (%)		+6.40		+5.05		+7.62
Cumulative P.R. total (%)		-66.16		-61.96		-69.94

Source: Harmonized Histories, calculations by authors

Figure 6. Relative birth risks in different living arrangements by duration since entry for Hungary (1975-1998)



Source: Harmonized Histories, calculations by authors

6 Discussion

This contribution aims to assess the impact of changes in partnership formation on entry into parenthood. The comparison between multivariate models that use different typologies of living arrangements provides an indication of which changes have been particularly important with respect to first birth rates. Distinguishing between different living arrangements (and duration within those living arrangements) results, controlling for structural factors education and economic context, in significant model improvements for all three countries (i.e. Hungary, Norway and the UK), suggesting that first birth hazards differ substantially between living arrangements. The extent to which the changes in living arrangements are instrumental in explaining aggregate trends in entry into parenthood, however, varies considerably over the different countries.

With respect to Norway (1980-2003), different specifications of living arrangements contribute substantially to first birth trends. In the 1980s, timing of union formation is suggested to account for decreasing fertility rates. As a consequence of women with later partnership formation schedules, first births tend to be postponed. Looking at singles, the differentiation between singlehood before partnership and living separated however contributes little to the explanation of the $SPPR_1$ trends. During the 1990s, distinguishing whether women are married or in an unmarried cohabitation entails more accurate (lower) $SPPR_1$s. Together with the lower childbearing risks in cohabitation, this suggests that the increasing prevalence of unmarried cohabitation accounts for decreasing first birth trends. Hence, to some extent, selection of partners with lower family aspirations into longer singlehood and cohabitation plausibly affects childbearing (Clarkberg et al. 1995). These women are likely to reject traditional family-trajectories and show, at least temporary, lower fertility intentions. Alternatively, adaptation may be a relevant explanation as well. Individuals in cohabitation or singlehood may learn to appreciate their freedom and independence in such living arrangements. Hence, their family-oriented aspirations diminish and result in later or lower fertility preferences (Waite et al. 1986; Axinn and Barber 1997; Mulder 2003). Further, the analysis for Norway shows a remarkable result with regard to a peak in fertility trends around 1990. Here, distinguishing between cohabitation and marriage accounts for higher $SPPR_1$s, suggesting a short-term increase in marriages leading to childbearing. In addition, the controls for structural factors indicate that addressing the economic context shows empirical relevance as well. Declining and rising unemployment in respectively the second part of the 1980s and early 1990s tends to capture (inversely) the lower and higher fertility rates of Norway between 1980 and 2003 partially. This points in the direction of a strong connection between economic cycles and fertility (Sobotka et al. 2011). Young women entering the labour market are likely to postpone motherhood because of uncertain employment prospects under adverse economic conditions (Neels et al. 2013).

The results for the UK (1974-2004), displaying a lower quality of data on the first birth indicator, perform weaker in explaining aggregate trends in the transition to parenthood. Neither structural factors, nor living arrangements are capable to account for the $SPPR_1$ trends substantially. An important finding, however, is that modelling changing first birth risks in different living arrangements over time yields significant differences in terms of fit. The results demonstrate that after 1990, childbearing risks are relatively higher in singlehood (both for singles before partnership formation and separated singles) and unmarried cohabitation. This indicates increasingly converging childbearing risks within different living arrangements. As a consequence, partnership behaviours are suggested to show a diminishing relevance in explaining first birth trends.

Finally, the analysis examines whether the effects of living arrangements are meaningful regarding aggregate fertility trends in Hungary. Net of the controls for education and economic context, however, living arrangements show marginal relevance. Predominantly CPI accounts for higher first birth rates between 1975 and 1990 and depressed fertility after 1990. This finding

corresponds with literature relating post-1989 economic uncertainty in former communist countries to childbearing patterns (Aassve et al. 2006; Frejka 2008; Kotowska et al. 2008). Most likely, this result points in the direction of other policy and labour market characteristics. In this respect, Frejka (2008) advocates that principally the replacement of state socialist regimes by market economies together with new democratic institutions of governance relate to these childbearing patterns. Whereas the communist regime created conditions of job security, low-cost housing, etc., the post-communist period was characterized by job insecurity, increasing incentives to acquire a good more education, expensive housing, a wider availability of career opportunities, consumer goods, etc. The pathways through which first birth trends are affected in CEE countries could, hence, be more complex than merely looking at economic crisis. As earlier suggested, the net contributions of living arrangements are more limited. In fact, for the post-1990 period, fitted $SPPR_1$s derived from the models including delayed union formation and increased unmarried cohabitation underestimate the observed trends. This points, to a certain degree, at the selection of women with lower short-term fertility intentions into non-marital living arrangements after 1990.

All in all, we find limited empirical support for strong and independent contributions of living arrangements to fertility trends. Only in Norway the inclusion of living arrangements tends to account for fertility rates. Hence, we conclude that selective entry into living arrangements to some extent relates to lowering $SPPR_1$ time-series through the 1980s and 1990s in Norway. Most results, however, show that first birth rates are responsive to structural factors, especially with respect to Hungary. The findings further point out that cultural and economic explanations of fertility trends are not mutually exclusive (Lesthaeghe and Surkyn 2002). The dominance of the one over the other is, most likely, subject to variation over time. A looser connection between partnership behaviours and first birth trends is nevertheless to be expected as the acceptance of childbearing in non-marital living arrangements increases.

Limitations

Obviously some limitations of this study must be noted. First, the retrospective data used for the analysis do not shed light on the family aspirations and attitudes that respondents have throughout the transition to parenthood. Therefore, the role of such orientations in the interrelationship between living arrangements and entry into parenthood cannot be addressed (Mulder 2003). This could allow us to verify whether the link between living arrangements is entirely attributed to value orientations (and not to, for instance, considerations about the legal framework of non-marital childbearing). As it currently stands, the same goes for information on individual labour market positions. In the GGS such data is only available for a limited set of countries (and a smaller part of respondents). Additional drawbacks of the retrospective survey data are that survey-based estimates often do not correspond closely to vital statistics over the period considered. Frequently, the calculation of survey-based fertility indicators yields unstable patterns due to low number of respondents. The use of population-register or census data that provide representative full partnership and childbearing histories would hence be more appropriate to carry out the analyses more accurately.

8 Acknowledgements

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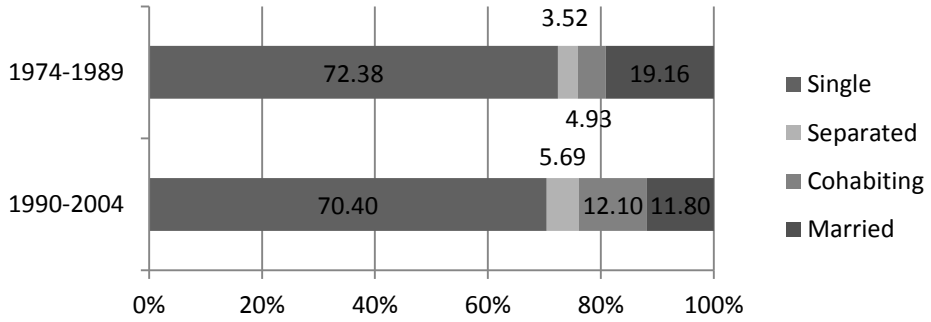
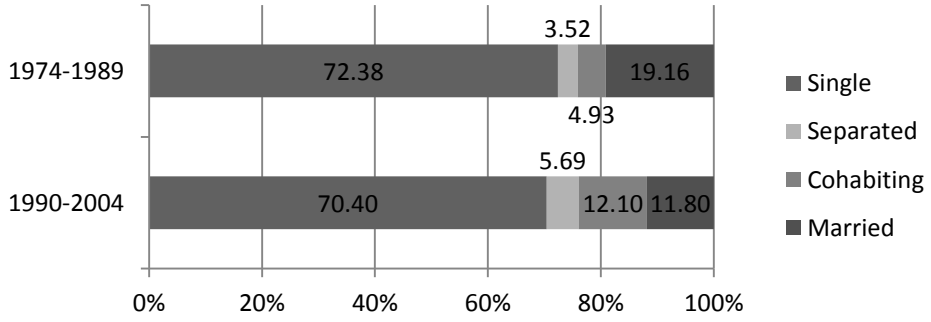
9 Appendix

Figure A1. Distributions of time spent in living arrangements before the entry into parenthood for Norway (1980-2003)



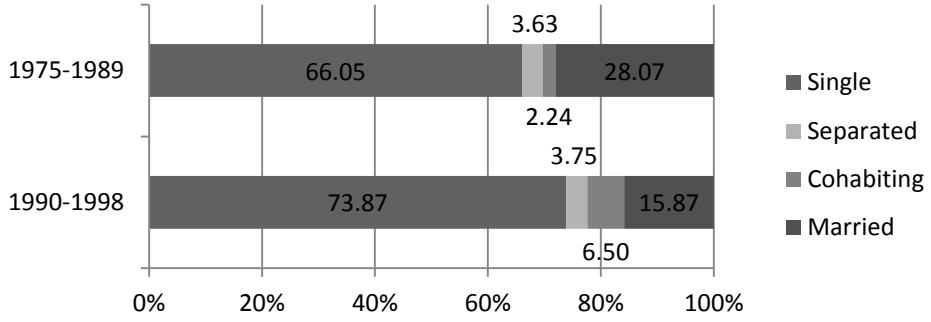
Source: Harmonized Histories, calculations by authors

Figure A2. Distributions of time spent in living arrangements before the entry into parenthood for the UK (1974-2004)



Source: Harmonized Histories, calculations by authors

Figure A3. Distributions of time spent in living arrangements before the entry into parenthood for Hungary (1975-1998)



Source: Harmonized Histories, calculations by authors

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