SIGNS OF A STABLE OR PROVISIONAL INCREASE IN FERTILITY? REFLECTIONS ON DEVELOPMENTS IN ESTONIA

ALLAN PUUR[1] AND MARTIN KLESMENT[2]

ABSTRACT: *Over the past decade, demographers have observed a recovery of fertility rates in most low and lowest-low fertility countries, unfortunately interrupted by the economic recession. In this article we examine trends in fertility in Estonia since the beginning of the 1990s. Estonia merits attention in the context of Eastern Europe because of its relatively strong recovery of fertility rates during the 2000s. Analysis draws on data from vital and survey statistics and employs descriptive methods. To estimate the impact of postponement on period fertility rates, the adjustment method developed by Bongaarts and Feeney is applied. The dynamics of tempo-adjusted measures challenges a popular view which contrasts low fertility characteristic of the post-socialist period with high fertility characteristic of the socialist period. In Estonia such a contrast can be observed only in the 1980s and 1990s when looking at tempo-adjusted fertility measures. With regard to cohort fertility, women born in 1970 will have an average of just over 1.85 children. In comparative perspective, strong recuperation of second (and third) births differentiates Estonia from countries exhibiting a weaker recovery of fertility rates. The authors conclude that the relatively strong recovery of fertility rates in Estonia in the 2000s is a result of a combination of factors, including family policies that reduced the opportunity costs of parenthood, economic growth that secured high levels of employment for the population and plausibly some elements of demographic path dependence.*

1 INTRODUCTION

Demographic transition theorists (Notestein 1953; Kirk 1996) expected the shift towards the modern demographic regime to result in a new equilibrium between low and relatively stable levels of mortality and fertility. However, developments did not occur exactly as forecast, and advanced countries have not yet witnessed this loss of dynamism in either process. Regarding mortality, developments have not conformed to predictions concerning stagnation of life expectancy. On the contrary, declines in mortality have continued at an unan-

[1] Leading Researcher, Estonian Institute for Population Studies, Tallinn University, email: puur@tlu.ee

[2] Senior Researcher, Estonian Institute for Population Studies, Tallinn University, email: klesment@tlu.ee

Demográfia, 2011. Vol. 54. No. 5. English Edition, 31–55.

ticipated pace even in countries with the highest life expectancies (Oeppen and Vaupel 2002; Vallin and Meslé 2009). Following the temporary respite of the post-war baby boom, European fertility resumed its decline and reached unprecedented low levels in the 1990s, particularly in Eastern and Southern parts of the continent. Kohler, Billari and Ortega (2002) coined the term "lowest-low fertility" for period TFR below 1.3 to describe these new lows. At the beginning of the twenty-first century, more than half of Europe's population lived in countries with period fertility close to or below that threshold.

Over the past decade, however, demographic statistics have documented a reversal of the trend and a recovery of fertility rates – unfortunately interrupted by the economic recession – in most low and lowest-low fertility countries. Period fertility has risen in countries of Eastern and Southern Europe; the only exceptions to this trend in Europe are German-speaking countries (Goldstein, Sobotka and Jasilioniene 2009). Although the concept of a self-reinforcing decline in fertility advanced by Lutz, Skribekk and Testa (2006) does not appear to have been realised, the levels to which fertility might gravitate in the future remains an open question.

Evidence suggests that there may not be a single answer to this question. There is a reasonable level of consensus among researchers about the diversity of sub-replacement fertility regimes in contemporary Europe (e.g. Frejka and Sardon 2004; Frejka and Sobotka 2008). Generally speaking, period fertility rates moderately below replacement level are maintained in most areas of Northern and Western Europe. On the other hand, period fertility considerably below replacement is characteristic of Eastern and Southern Europe, as well as German-speaking countries. In a number of countries in these regions low period fertility persists even after the trend towards later childbearing is taken into account. There are also indications of rather low completed fertility in generations born after the mid-1960s, and in several countries young people are increasingly expressing a preference for a sub-replacement family size (Goldstein, Lutz and Testa 2003; Testa 2007). This implies that the observed fertility differentials might not be short term, but may persist for a longer period, and that the affected countries may face accelerated demographic ageing and population decline.

The diversification of fertility regimes is included in the concept of the Second Demographic Transition (SDT), which has gradually evolved into an overarching theoretical framework for the study of contemporary demographic change. According to Lesthaeghe and van de Kaa (1986), the SDT constitutes a major transformation in demographic patterns, with shifts in childbearing, partnership formation and dissolution, and living arrangements at its core. The premise of the transition implies that these shifts are universal but they emerge gradually, with "leaders" and "laggers" across different countries and subgroups of the population. After the mid-1960s, new behavioural patterns first came to the fore in Northern and Western Europe, but during the following

decades they spread to other parts of the continent, thus lending support to the universality of transformation and diffusion mechanisms involved in it.

In Eastern Europe, the full-scale emergence of the SDT's features followed the demise of state socialist regimes at the turn of the 1990s. Witnessing the precipitous drop in marriage and fertility rates on the one hand, and the mounting difficulties of economic transition on the other, contemporaneous observers tended to make a direct connection between them and attribute the former to the latter (e.g. UNECE 1999, 2000). The actual course of demographic trends, however, offers limited support for this explanation. Since the mid-1990s, most Eastern European economies have experienced a marked recovery, but there has been no return to earlier patterns of childbearing and family formation. Although certain aspects of the SDT are continuously under debate (Perelli-Harris 2008; Perelli-Harris and Gerber 2011), the existence of the phenomenon in the region can hardly be denied.

With regard to fertility, the theory of the Second Demographic Transition, as formulated by its main developers, conceptualised three interrelated changes in behavioural patterns. First, the SDT was expected to bring about extensive postponement of parenthood, facilitated by the widespread use of modern contraception, enabling young adults to pursue other goals in life.[3] Second, as a result of spreading cohabitation and increased instability of unions, the SDT was expected to lead to a marked disconnection of childbearing from registered marriage and a rise in the proportion of non-marital births. Finally, the transition was expected to lead to a long phase of sub-replacement fertility, which in period perspective is fuelled by postponement of childbearing. It is important to note that in its original formulation, the SDT theory did not make a distinction between fertility levels close to and markedly below replacement level (van de Kaa 1987; Lesthaeghe 1995). This shortcoming, obviously resulting from the limited account of childbearing trends in the 'model countries' of the SDT, left the door open to the simplistic interpretation that the SDT will inevitably lead to (very) low fertility and resultant criticism of this interpretation (Coleman 2004).

This shortcoming has been remedied in a recent update of the theory, which recognises the emergence of multiple variants of the SDT, rooted in contextual differences and varying historical experiences (Lesthaeghe 2010). Hence, the SDT should not be regarded as a script with a single scenario, but rather as a general story line which leaves room for a variety of sub-plots, each anchored in empirical evidence. The presence of "diverse faces of the SDT" has been recognised not only with regard to major regions of Europe but also within them. Eastern Europe, which has seen the development of increasing diversity across countries since the 1990s, is an important case in point (Katus 2003; Sobotka 2003, 2008).

[3] To underline the universality, irreversibility and salience of later childbearing, Kohler, Billari and Ortega (2002) coined the term "postponement transition" to denote it.

In terms of research, recognition of diversity valorises studies of country-specific developments, their underlying factors and societal impacts. In this article we describe fertility trends in Estonia since the beginning of the 1990s. In the context of Eastern Europe, Estonia merits attention because of its relatively strong recovery of fertility rates during the 2000s. In the concluding section, we discuss factors that may have contributed to this.

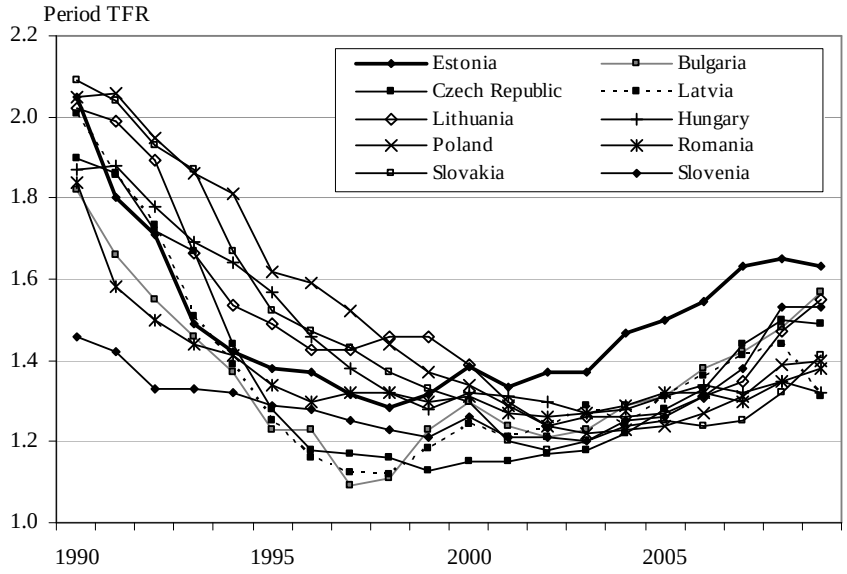
2 FERTILITY TRENDS IN ESTONIA SINCE 1990

Changes in Period Fertility

Trends in the total fertility rate (TFR) – the most commonly used indicator – reveal three distinct period fertility phases in Estonia over the past two decades (Figure I). As elsewhere in Central and Eastern Europe, the beginning of the 1990s witnessed a steep downturn in period fertility rates in Estonia. Following a peak in 1987–1988, when the TFR temporarily reached 2.26 children per woman, the first signs of a decline started to emerge in 1989–1990. By the time Estonia regained its independence in 1991, the total fertility rate had fallen to 1.8. A steep decline continued until 1994, during which time the TFR dropped below 1.5 children per woman, the threshold commonly used to define very low fertility. After 1994, the decline began to decelerate, and period fertility reached its lowest level (1.28) in 1998.

Rapid decline was followed by a period during which the fertility rate remained close to its lowest level. The rate of 1.4 children per woman defines the nine-year period from 1995 to 2003, when the TFR fluctuated within a relatively narrow margin of between 1.28 and 1.39. The first signs of recovery of the fertility rate emerged in 1999–2000, but its ascent was interrupted after the turn of the millennium, and by 2002–2003, the period TFR was lower than in 2000.

A more persistent recovery began in 2004, and the total fertility rate reached 1.66 children per woman in 2008. In comparative perspective, Estonia has experienced a relatively strong recovery of fertility rates. Since the 2000s, the country has experienced the highest period TFR among Central and Eastern European EU member states, and partially closed the gap in fertility levels with Northern and Western Europe. The upward trend in fertility rates was interrupted in 2009, as a result of the economic recession. However, despite a marked increase in unemployment and economic uncertainty, the decline in fertility rates seems relatively limited. In 2009 the TFR was 1.63 children per woman, and by 2010 it had actually increased to 1.64. Monthly data on the number of births indicate that there will likely be a reduction in 2011, plausibly close to the levels observed in 2006.



Source: Council of Europe 2006; Eurostat 2011.

Figure I
Period Total Fertility Rate
Estonia and other Eastern European EU member states, 1990–2009

Timing of Childbearing and Tempo Effects

The fertility rate dynamics discussed in the previous section may be somewhat misleading. The low and very low levels of the period TFR since 1990 are closely associated with postponement of parenthood to later ages, something that has become a universal feature of contemporary fertility patterns (Kohler, Billari and Ortega 2002; Sobotka 2004a). Fertility postponement negatively affects all the usual fertility indicators because some of the births that would have occurred in a given period are deferred. This phenomenon, termed the "tempo effect", is proportional to the pace at which the average age at childbearing increases: when fertility postponement occurs rapidly, the period fertility measures are significantly depressed. Therefore, it is important to take into account the temporal trajectory of fertility postponement in order to understand changes in contemporary fertility levels.

Figure II shows changes in the timing of childbearing by providing women's age at first birth. To put recent and contemporary developments in the context of longer-term trends, the figure presents mean age at first birth since the 1960s, and

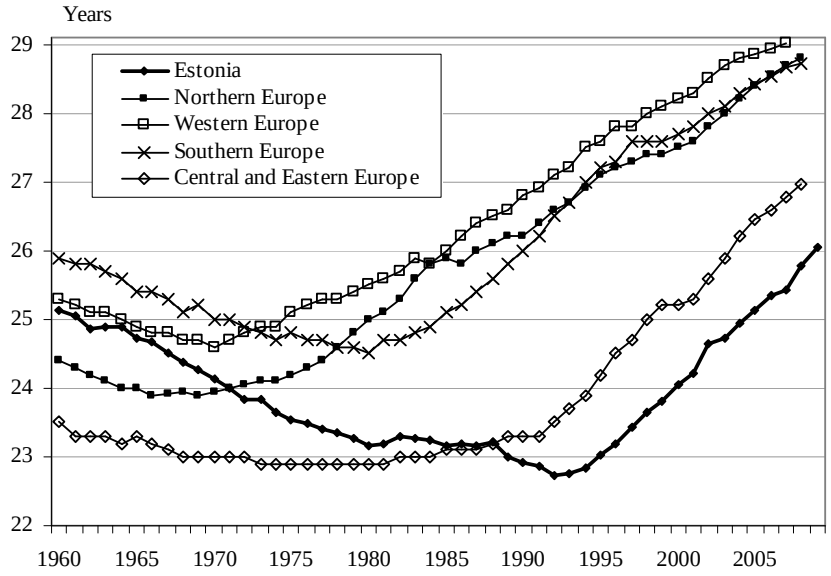
compares Estonia with four major regions of Europe. Over that timeframe two contrasting shifts in the timing of parenthood can be clearly distinguished.

In the areas west of the Hajnal line, populations experienced a shift towards younger ages in reproductive events, including union formation and childbearing until the mid-1960s.[4] The data reveal that Estonia shared that same trend during that period. In the early 1960s, Estonian women entered motherhood at the same age – slightly above 25 – as their counterparts in Western Europe.

Unlike in most other countries characterised by the Western European marriage pattern in the past, the trend towards earlier entry into motherhood did not reverse in the late 1960s or 1970s, but persisted noticeably longer in Estonia. It was not until the 1980s that the decline in age of parenthood finally came to a halt, when age at first birth stabilised at around 23 years. As shown in the figure, divergent trends led to a growing disparity in the timing of childbearing between Estonia and the countries of Northern, Western and Southern Europe. At the same time, the trend converged with the pattern that prevailed in most countries of Central and Eastern Europe. Researchers have identified various institutional mechanisms among the factors that supported early childbearing until the fall of the Iron Curtain, including housing allocation and limited opportunities for self-realisation beyond the family, etc. (Ni Brolchain 1993; Sobotka 2004a). The persistence of these mechanisms explains why the shift to delayed childbearing did not occur before the collapse of the socialist regime.

Figure II shows that the turning point in the timing of childbearing in Estonia occurred in 1991. As of 1992 the mean age at first birth began to increase; postponement of parenthood accelerated in 1994 and still persists. Since 1994, age at first birth has increased 0.2 years per annum in Estonia; by 2010, it had reached 26.3 years. An extrapolation of past trends suggests that it will likely take about 15 years more for the country to reach the mean age of parenthood that currently characterises the forerunners of the "postponement transition", i.e. the countries in which the trend towards later childbearing started in the 1970s. Although a shift towards further postponement may continue after reaching that level, the period of rapid change in the timing of childbearing will evidently come to a close around the mid-2020s in Estonia.

[4] John Hajnal (1965) identified two historical marriage patterns in Europe. He distinguished the Western European marriage pattern, characterised by high age at first marriage (at least 23 years for females) and a high proportion of people who would never marry (at least ten per cent). With regard to geography, Hajnal described the approximate boundary of the Western European marriage pattern as running from St. Petersburg on the Baltic Sea to Trieste at the Mediterranean. The areas West of this line shared the late/low prevalence marriage pattern whereas the populations on the Eastern side were characterised by earlier marriage and lower proportions remaining single.



Source: Authors' calculations based on data from the Council of Europe 2006; Eurostat 2011.

Note: Northern Europe = DK, FI, NO, SE; Western Europe = AT, BE, CH, FR, GE, IE, LU, NL, UK; Southern Europe = GR, ES, IT, PT; Central and Eastern Europe = BG, CZ, GE-E, HU, PL, RO, SK.

Figure II
Mean age of mother at first birth
Estonia and major regions of Europe, 1960–2009

To estimate the impact of postponement on period fertility rates, we applied the adjustment method developed by Bongaarts and Feeney (1998). The rationale behind this approach considers the conventional total fertility rate to consist of a quantum and a tempo component. The quantum component is defined as the TFR that would have been observed in the absence of changes in the timing of childbearing; the tempo component equals the distortion that occurs due to shifts towards earlier or later childbearing. In this analytical framework, the tempo-adjusted TFR is interpreted as the hypothetical level of fertility within a given period in the absence of shifts towards later or earlier childbearing (Bon-

gaarts 2002).[5] The difference between the tempo-adjusted and the conventional measure is regarded as an estimate of the tempo effect.

The approach required Bongaarts and Feeney to make some simplified assumptions about changes in the patterns of childbearing. According to the central assumption, the shape of the age schedule of fertility at each birth order is expected to remain constant during the period for which the TFR is measured. Substantively, this implies that women belonging to different birth cohorts are all assumed to respond in the same way to period influences. Following first publication, the assumptions underlying the method have been widely discussed in the demographic literature. Critics of the method have argued that this assumption is unrealistic and have questioned its actual usefulness (e.g. van Imhoff and Keilman 2000; van Imhoff 2001; Smallwood 2002). Proponents have admitted that the invariance of fertility schedules does not hold absolute, but have contended that annual changes in order-specific fertility schedules are typically small, and the assumption of invariant shape provides a reasonably good approximation of reality (Bongaarts and Feeney 2000).[6] A recent study that compared various methods of adjusting the observed period fertility rates supports this view, concluding that the TFR adjusted by the Bongaarts-Feeney method remains an acceptable alternative for estimating period fertility quantum (Bongaarts and Sobotka 2012). An additional limitation of the method lies in the rather large volatility of the adjusted measures, which show considerably larger year-to-year fluctuations than conventional TFRs.[7]

Despite these methodological shortcomings, the tempo-adjusted measures have proven their usefulness as an addition to the demographer's analytical toolbox. With careful interpretation of the results, tempo-adjusted measures have been instrumental in arriving at a more realistic account of the levels and trends of fertility in low-fertility countries (e.g. Sobotka 2004b; Goldstein, Sobotka and Jasilioniene 2009). Although more sophisticated methods of period fertility adjustment have been developed (Kohler and Philipov 2001; Kohler and Ortega 2002), lack of annual data on age- and order-specific exposure prevents their application in many countries, including Estonia.

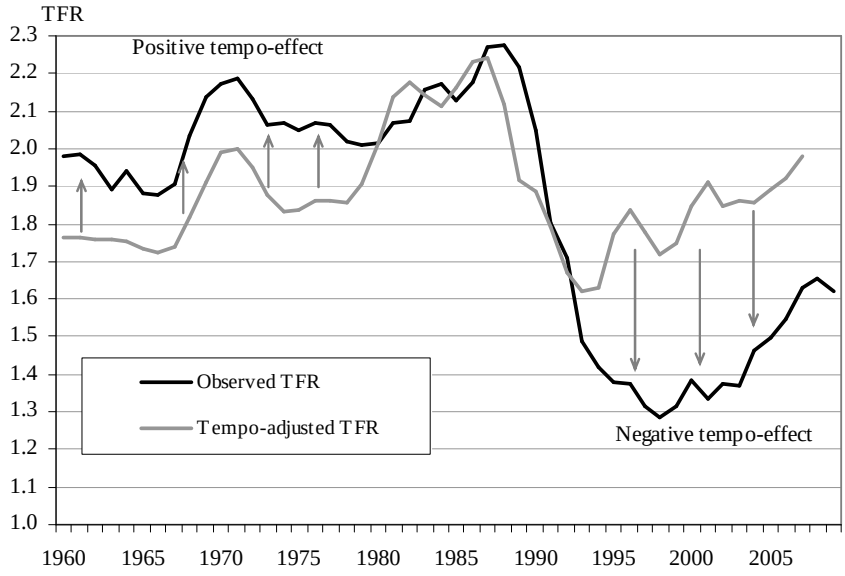
Figure III shows trends in the tempo-adjusted and conventional TFRs for Estonia. A comparison of the two measures reveals that the rapid decrease in

[5] The adjusted total fertility rate is computed as a sum of order-specific fertility rates, which take order-specific changes in the mean age as an adjustment factor (Bongaarts and Feeney 1998).

[6] This view was supported by sensitivity analysis undertaken by Zeng and Land (2001). They concluded that the Bongaarts-Feeney method is generally robust in producing reasonable estimates, except in abnormal conditions when fertility changes suddenly and from one year to the next (e.g. in wars, famines, etc.).

[7] To overcome this limitation, the tempo-adjusted measures should be aggregated over several years and their short-term variations interpreted with caution. The tempo-adjusted TFRs presented in this article are smoothed with a three-year moving average.

the quantum of fertility was concentrated in a fairly short period at the beginning of the societal transition – from 1988 to 1992. During these years, both the tempo-adjusted and conventional fertility rates declined and the mean age of childbearing reached its nadir. A new phase in fertility dynamics began to take shape in 1993, when the trends of the two measures started to diverge. The tempo-adjusted TFR stopped declining and, demonstrating the fluctuations characteristic of the measure, embarked on a slow upward trend. The conventional TFR, on the other hand, continued to decrease for another six years until it reached its lowest point in 1998. The divergence between the two measures suggests that from 1993 onwards, the decline in fertility rates was wholly driven by postponement of parenthood in Estonia. The difference between the conventional and tempo-adjusted TFRs peaked around the year 2000, when the observed fertility rate was close to its nadir. From 1995 to 2003, the difference between the two measures amounted on average to 0.47.



Source: Authors' calculations.

Figure III
Observed and tempo-adjusted total fertility rates
Estonia, 1960–2009

During the post-2004 recovery of fertility rates, Estonia experienced a parallel increase in tempo-adjusted and conventional fertility rates, which suggests a recovery in the quantum of childbearing. Although difference between the two

measures has lessened somewhat, the effect of fertility postponement remains significant (the average difference between the tempo-adjusted and the conventional TFR was 0.38 in 2004–2008). To place contemporary and recent developments in perspective, the time series in Figure III are extended back to the 1960s. The data reveal that in the 1960s and 1970s a shift towards earlier childbearing brought about a positive tempo effect, which inflated the observed period fertility rates in Estonia. To some extent, the situation resembles that of Northern and Western European countries in the 1950s and the early 1960s, when the high fertility of the Baby Boom era was partly driven by advancement of childbearing to younger ages. With regard to Estonia, Figure III also reveals that once shifts in the timing of childbearing are taken into account, contemporary levels of fertility do not appear significantly lower than they did in the 1960s or the 1970s.

Unless these results are due to artefacts in the measurement of tempo-adjusted TFRs, consideration of changes in the timing of childbearing gives the post-transitional fertility trend in Estonia a more nuanced look. In particular, the dynamics of tempo-adjusted measures seems to challenge a popular but simplistic view, which contrasts the "low" fertility characteristic of the post-socialist period with the "high" fertility of the socialist period. Judging from the tempo-adjusted fertility measures, in Estonia such a contrast can be observed only for the 1980s and 1990s. For other periods, the comparison may lead to different results. For instance, in 1960–1979 the average tempo-adjusted TFR was 1.84, whereas in 1995–2009 it amounted to 1.87.[8]

The tempo-adjusted TFR in Estonia has exceeded 1.9 in recent years. This is an encouraging development in the context of low fertility, but it must be noted that tempo-adjusted measures do not provide a straightforward prediction of the level to which fertility will eventually return once postponement has run its course. In an explanation of their method, Bongaarts and Feeney (2000, 560) stress that "neither the conventional nor the adjusted TFR attempts to estimate the completed fertility of any actual birth cohort, nor do they attempt any prediction of future fertility".[9] Uncertainty relates to the recuperation of fertility in younger generations of women, who are currently postponing their childbearing

[8] The average observed TFR was 2.02 in 1960–1979 and 1.44 in 1995–2009.

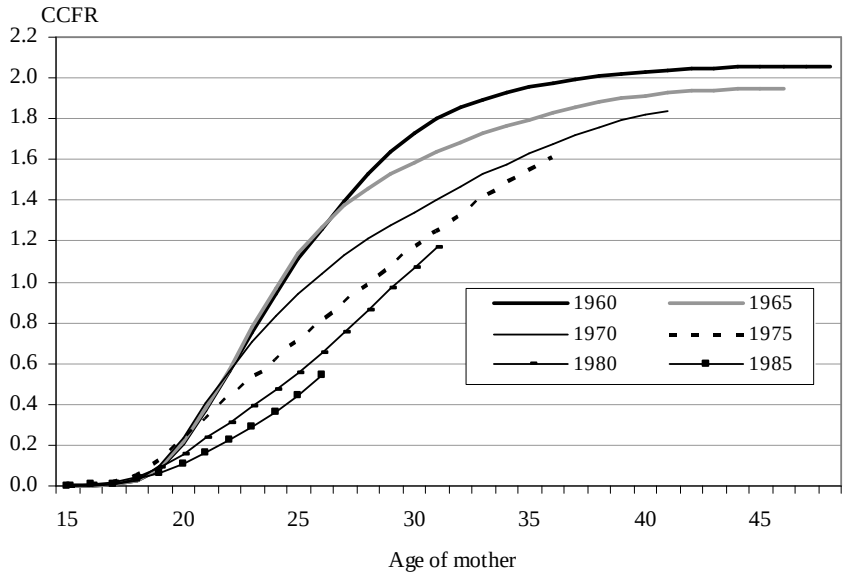
[9] Despite these reservations, Bongaarts and Feeney (1998) performed an aggregate test of their adjustment formula against the fertility of US cohorts born from 1904 to 1941. The test consisted of comparing completed fertility rates of true cohorts with an average of the adjusted period TFRs over the years during which the true cohorts were in their childbearing years. The observed completed fertility rates turned out to be very close to the corresponding weighted averages of adjusted TFRs. The latter showed much better agreement with completed cohort fertility than the weighted averages of the conventional TFRs. Sobotka (2004b) reported a similar result based on Dutch data: with the cycles of booms and busts levelling off, the adjusted TFRs came very close to the completed cohort fertility in the long-term perspective.

to older ages. To cast light on this issue, we need to examine fertility changes from a cohort perspective.

Changes in Cohort Fertility

Previous analyses (Katus 1997, 2000) have demonstrated that low cohort fertility in Estonia is not a phenomenon that emerged during the societal transformation of the 1990s. Among the native population, fertility fell below replacement level in the cohorts born at turn of the twentieth century. The low fertility of these generations represented the end of a transition to controlled fertility that commenced in Estonia in the mid-nineteenth century. Judging from the census data, the decline halted at the level of 1.80–1.85 children per woman in the generations born in the 1910s. A further decrease, which brought completed fertility down to 1.72–1.75 children, occurred among women born in the 1920s. The prime childbearing years of these generations fell in the 1940s and 1950s during which time Estonia experienced one of the lowest fertility rates in the world (Frejka and Sardon 2004). Evidently, the Second World War and, in particular, a forceful rearrangement of the entire societal organisation in its aftermath, left a severe imprint on the lives of these generations. A recovery in completed fertility began with the cohorts born around 1930. The upward trend continued for 25–30 years and saw fertility return to replacement levels among women born in the 1950s and early 1960s.

To illustrate the change in cohort fertility among the younger generations, we provide age-cumulative fertility rates for the cohorts born between 1960 and 1985 (Figure IV). The 1960 birth cohort exemplifies the high fertility characteristic of the 1980s: women of this generation completed their reproductive careers with an average of 2.05 children. Fertility began to decrease in the following birth cohorts, but on a scale which was clearly less pronounced than the rapid fall in the period fertility indicators. Women in the 1965 cohort will likely complete their childbearing with an average of 1.95 children, i.e. 0.1 less than the top-ranking 1960 cohort. The 1970 cohort can be followed up until age 40, by which time women of this generation had given birth to 1.84 children. It seems likely that by the end of their childbearing careers, women born in 1970 will have an average of slightly more than 1.85 children – 0.2 less than the 1960 generation.



Source: Authors' calculations.

Figure IV
Cumulative cohort fertility rates
Estonia, female birth cohorts 1960–1985

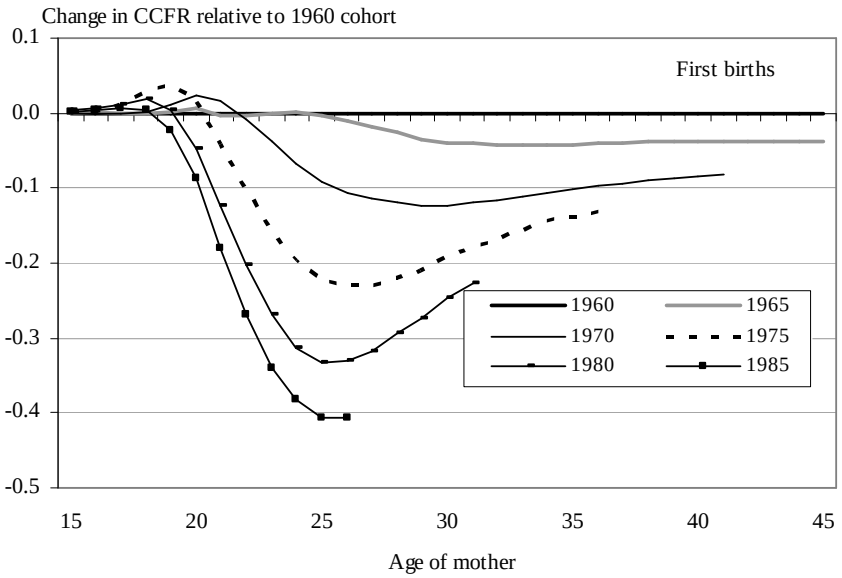
The reproductive careers of the three younger generations presented in the figure have taken place wholly in a transformed societal context. Women in the 1975 generation turned 18 in 1993, women born in 1980 turned 18 in 1998 and those in the 1985 cohort reached their eighteenth birthday in 2002. Compared to their counterparts in preceding cohorts, women in these generations have exhibited a pronounced shift towards delayed childbearing, which has pushed cumulative fertility rates downwards in the earlier stages of their reproductive years. The main factor determining completed fertility in these generations is the extent to which postponement is counterbalanced by a recuperation of births at older ages. If the amount of childbearing that was presumably postponed by a cohort early in its reproductive period is fully recuperated when these women are older, cohort fertility remains stable. Alternatively, if only a portion of the postponed births is recuperated later in a reproductive career, cohort fertility is bound to decline.

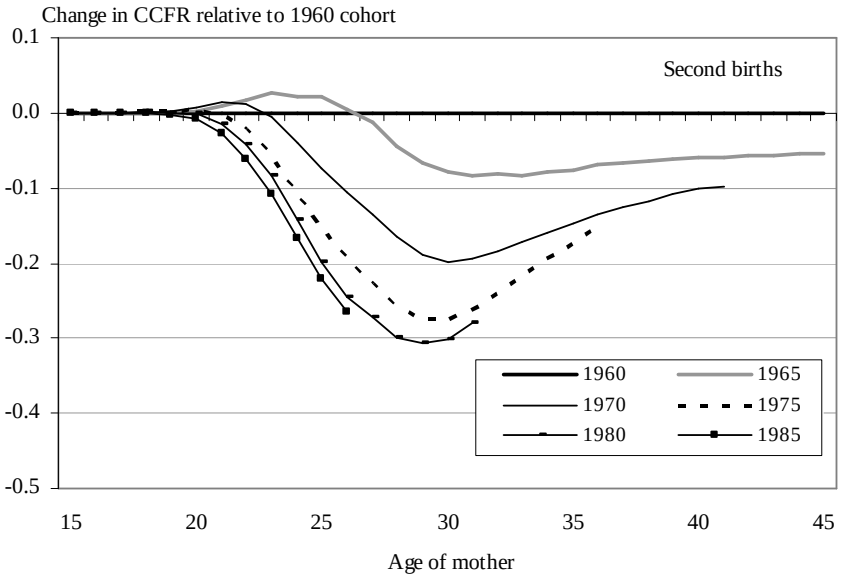
Figure V sheds some additional light on the balance between fertility postponement and recuperation, again with the 1960 birth cohort as a benchmark. Trends in first and second births are examined separately, in order to provide clearer insights than investigation of all births combined. We do not report the

results in detail for third and higher-order births, since the additional knowledge obtained would be limited because of the relatively small proportion of these births; in Estonia, third and higher-order births have constituted about one-fifth of the total number of births in recent years.

The data show that a decrease in the quantum of childbearing sets the pattern among women of the 1965 cohort. The deficit of births, relative to women born in 1960, occurred after age 25–26. Until then, the fertility of women born in 1965 was even higher than that of the previous cohort. For first births there are no signs of recuperation among the women of the 1965 cohort: between the ages of 25–30 the deficit increased to -0.04 children, and remained unchanged until the last years of the reproductive period. For second births, signs of weak recuperation can be discerned: after reaching a maximum (-0.08 children) between ages 30–35, the gap diminished slightly at higher ages.

In the following generations postponement gained momentum, although women born in 1970 and 1975 maintained slightly higher fertility rates at very young ages than their counterparts in the reference generation. Among the 1970 cohort, which can be followed up until age 40, the first-birth deficit expanded steadily until age 28, followed by stabilisation at the level of -0.12 children. After age 33, the deficit began to decrease, and by age 40 it was reduced to -0.08 children. Interestingly, the cycle of postponement and recuperation appears more pronounced for second births. The gap relative to the 1960 cohort increased to -0.20 children at age 30, but then decreased to -0.10 by age 40. For third and higher-order births (not reported in Figure V), the recuperation was almost complete with the deficit decreasing from 0.08 children at age 32 to 0.02 children at the end of observation period. Due to relatively strong recuperation at higher parities, women in the 1970 cohort made up almost half of the total deficit of births relative to the reference generation.





Source: Authors' calculations.

Figure V
Cumulative cohort fertility rates
Estonia, female birth cohorts 1960–1985

Postponement among the 1975 birth cohort has led to an even greater deficit during the earlier part of women's reproductive years. The recuperation, however, begins at a younger age and becomes more vigorous. The deficit reached its maximum at age 26–27 at the level of -0.23 children, and was reduced to -0.13 by age 35. For second births, the gap increased until age 29 (-0.28 children), but by age 35 it had diminished to -0.15 children. If the rate of recuperation is sustained, women born in the mid-1970s might approach or equal the levels of the 1970 cohort, which would imply no further decline in completed fertility. In comparative perspective, a strong recuperation of second (and third) births seems to differentiate Estonia from the countries exhibiting a weaker recovery in fertility rates (Frejka and Sobotka 2008; Frejka 2008).

Women in the 1980 and 1985 birth cohorts postpone even further, but as they are still in their early- or mid-reproductive years the extent of fertility recuperation remains unknown. In order to cast additional light on the prospective fertility levels of these generations, we examine childbearing intentions based on evidence from the Estonian Generations and Gender Survey (GGS) in the following section.

Childbearing Intentions

Figure VI shows the number of children expected and born to native women in the 1964–1983 birth cohorts. By the time of the survey in 2004–2005, women born in the 1960s had finished childbearing and the number of children already born largely determines the future size of their families. Among younger generations, the number of expected children makes an increasing contribution. The women of the 1964–1968 birth cohort had an average of 2.1 children. The number appears to be somewhat lower among the younger generations, but it nevertheless exceeds two children per woman. Women born in 1974–1978 reportedly expect to have 2.04 children; their counterparts in the 1979–1983 birth cohort expressed a preference for a slightly higher number.[10]

Such relatively high levels of intended fertility should be regarded with reservations, since numerous studies have documented a tendency for desired fertility to substantially exceed the levels ultimately achieved in modern settings. Nonetheless, as the number of expected children is connected to the specific life situation of an individual, it may be considered more realistic than

[10] In the Estonian GGS, respondents of reproductive age were asked whether they intended to have an(other) child in the future. In addition to the responses "yes, certainly" and "no, certainly not", the questionnaire included two intermediate categories: "yes, probably" and "no, probably not". Responses concerning prospective childbearing were included in Figure VI only if the respondent had selected "yes, certainly".

ideal family size, which primarily reflects a normative context in which fertility intentions are formed and expressed (Hagewen and Morgan 2005).

Source: Estonian Generations and Gender Survey.

Figure VI
Number of children born and expected
Estonia, native population, female birth cohorts 1964–1983

Further insight into anticipated childbearing can be obtained from an examination of the intended parity. The data (not shown here in detail) indicate that among the youngest GGS generations only a small fraction of women (six per cent) expect to remain permanently childless. This percentage, which is not markedly lower than the actual levels seen among women born in the 1940s and 1950s, reveals the persistence of fairly strong norms against childlessness in Estonia. The one-child preference also remains at levels characteristic of previous generations (slightly below 20 per cent). On the other hand, the two-child model has gained greater popularity among younger generations, at the expense of women who prefer larger families. Among the 1974–1978 and 1979–1983 birth cohorts, 23 and 21 per cent of women respectively expect to have three or more children. The actual proportion of women with three or more children in the 1959–1963 cohort is 32 per cent.

A comparison with evidence from the Estonian Fertility and Family Survey conducted in the mid-1990s suggests relative stability of childbearing intentions over the past decade (Puur, Sakkeus and Põldma 2009). Although the expectations reported in the surveys are a little too optimistic, the data do not reveal any significant shift towards a greater acceptance of childlessness or

preference for one-child families among the generations currently of prime reproductive age in Estonia.

3 PLAUSIBLE CORRELATES OF THE RECOVERY IN FERTILITY RATES

The evidence presented above corroborates the view that the shift towards delayed childbearing played a salient role in reducing fertility to very low levels in the 1990s. In the 2000s, however, only a relatively minor part of the recovery in fertility rates seems to have occurred as a result of a diminishing tempo effect. Estonia is still far from completing the "postponement transition", and the increasing age of childbearing may be expected to depress period fertility measures for another 10–15 years. The evidence drawn from cohort measures indicates that completed fertility will likely reach 1.85 among generations born in the 1970s. This does represent a decline compared with the birth cohorts of the 1950s and early 1960s, but it is on a par with generations born earlier in the twentieth century. In comparative perspective, Estonia had the highest fertility rates among Central and Eastern European EU member states in the 2000s.

In a recent study based on tempo- and parity-adjusted total fertility rates, Bongaarts and Sobotka (2012) show that decreasing tempo distortions play a considerably more prominent role in the recent increase of period fertility than previous estimates using less sophisticated tempo-adjusted measures. According to them, in "most European countries there was little or no increase in the level of (quantum) of fertility between the late 1990s and 2008, while most of the observed TFR rise [...] can be attributed to diminishing pace of the postponement of childbearing". Among the countries considered by Bongaarts and Sobotka, Estonia exhibited the highest proportion of the TFR increase that was not attributable to decreasing tempo distortion.

We assume that several contextual factors may have contributed to the relatively strong recovery of fertility rates in Estonia. Research into family policies has drawn attention to the role of institutional arrangements, such as publicly-funded and easily-accessible childcare, parental leave and labour market flexibility, which are seen to facilitate reconciliation of work and family life (Engelhardt and Prskawetz 2004; Rindfuss et al. 2010; Thévenon 2011). In Estonia, several positive developments can be observed in this regard. In the early 1990s it was feared that arrangements developed during the state socialist period to support the reconciliation of employment and parenthood would be seriously curtailed as a result of the societal transition. These concerns were partially realised when enrolment in public childcare decreased, particularly for very young children (0–2 years old). However, after reaching their lowest point in 1993, childcare enrolment rates started to recover and, before the end of the

century, exceeded the levels attained in the late 1980s. The gradual increase continued during most of the 2000s; in 2010, 70 per cent of two-year-olds, 86 per cent of three-year-olds and 90 per cent of four to five-year-olds attended public childcare (ESA 2012). Typically, children attend childcare institutions on a full-time basis (35–40 hours per week). With regard to childcare enrolment of children under the age of three – the age group in which the variation of enrolment rates is largest – Estonia ranks at the top (first or second to Slovenia, depending on year) among the former state socialist countries (UNECE 2012).

Parental leave, with guaranteed return to previous employment, was extended to three years in 1989, but the amount of income compensation remained low until the programme was thoroughly revised in 2004. New provisions included benefits equalling 100 per cent of income earned during the year preceding childbirth; the maximum amount is three times the average salary. In 2006 the duration of payment was extended from 11 to 14 months following childbirth, and in 2008 to 18 months. After the first 70 days, which are reserved for the mother, parents can share parental leave. Although the uptake of paternal leave is rising, it is still limited[11]. Following the model of the Nordic countries, as of 2008, the parents of more than one child can retain their level of benefits without returning to the labour market between births, if the interval does not exceed 30 months. As a result of these revisions, the Estonian parental leave scheme is currently among the most generous of the OECD countries (OECD 2012).

Progress with regard to labour market flexibility appears mixed in Estonia. On the one hand, compared to the early 1990s the share of part-time work in total female employment has more than doubled. In 2010, 14.5 per cent of women worked part-time in Estonia; among the EU countries of Eastern Europe this was the second highest percentage next to Slovenia (Eurostat 2012). In addition, the number of employees who reported the possibility of taking days off for family reasons or to alter the starting and ending times of the working day increased after the mid-2000s (ESA 2012). On the other hand, despite this increase, the prevalence of part-time work remains low compared to the levels typically observed in the countries of Northern and Western Europe. As a combined outcome of the relatively high labour force participation rates and low prevalence of part-time work, Estonian women maintain particularly strong attachment to the labour market. On the eve of the current economic recession, their full-time equivalent employment rate (64.1 per cent, 2007) was the highest of all the EU member states (European Commission 2009). In part, the observed high employment rates may conceal a lack of choice, as nearly 20 per cent of mothers (aged 20–49, with at least one child under the age of 14) in full-time work and about ten per cent of fathers would

[11] In 2004, fathers constituted one per cent of benefit recipients. By early 2010, the proportion had increased to 6.5 per cent, decreasing somewhat in 2010–2011.

prefer to work less and dedicate more time to their children (Roosalu 2012). Although the majority of parents are satisfied with their current work and family arrangements, up to 20 per cent cannot achieve the preferred balance.

It has been assumed that the availability of a generous parental leave programme and public childcare have facilitated the strong recovery of fertility rates in Estonia in the 2000s (Goldstein, Sobotka and Jasilioniene 2009). Additional evidence in support of this assertion was found in a recent study of educational differentials in childbearing (Klesment and Puur 2010). An analysis of GGS data demonstrated the consistent positive and statistically significant effect of high educational attainment on intensity of second births in Estonia, before as well as after the societal transition of the 1990s. This finding suggests that there are contextual factors that have more than compensated for the higher opportunity costs of childbearing among women with tertiary education. The salience of the positive association between education and childbearing is underscored by the fact that the fertility increase experienced in Estonia since the early 2000s has been driven exclusively by highly educated women. In 2000–2009, the number of births among mothers with higher education increased 2.8 times, whereas the number of births to mothers with low or medium education decreased by nine per cent (ESA 2012). Although the change is partially attributable to the rising proportion of highly educated women, there has been a noticeable increase in fertility among the latter group. There are reports that modification of the parental leave programme (retaining the previous levels of benefits if the next child is born within 30 months) has resulted in the compression of birth intervals similar to "speed premium" effects observed earlier in Nordic countries (Võrk, Karru and Tiit 2009).

Favourable macro-economic development should also be included among the plausible correlates of the recovery in fertility rates. The importance of economic conditions in increasing TFR has been demonstrated by numerous studies (e.g. Kravdal 2002; Sobotka, Skribekk and Philipov 2011). Estonian economic reforms resulted in a steep decline in per capita GDP during the early stage of transition. However, the recovery of macro-economic indicators later became pronounced, and GDP levels have risen more rapidly than in many other former socialist countries since the mid-1990s (Klesment 2010). It is estimated that in 2001 per capita GDP returned to the 1990 level, and in 2007 it exceeded that benchmark by 63 per cent. Just prior to the current economic recession, the country's per capita gross national product was 68 per cent of the EU average, ranking fourth amongst Eastern European EU member states (UNECE 2012). Favourable macro-economic trends in the 2000s were paralleled by the increase in employment, decrease of unemployment, and a general rise in living standards of the population; all these developments may be regarded as conducive to higher fertility.

Although the factors discussed above are relevant, they may not completely account for the childbearing pattern observed in Estonia. This can be demonstrated by comparing Estonia with other Central and Eastern European countries that had similar institutional frameworks in the 1970s and 1980s. As revealed by analyses of differential fertility, none of these countries exhibited a persistent positive educational gradient for second births during that period (Oláh 2003; Koytcheva 2006; Rieck 2006; Muresan 2007; Perelli-Harris 2008; Billingsley 2011). Therefore, additional correlates should be sought from commonalities between Estonia and countries that display a positive relationship between higher education and second (and third) births.

In this context, Estonia is notable for its advanced position with regard to the spread of new types of families, and the extensive disconnection of childbearing from marriage. Estonia has been amongst the leading nations in Europe since the beginning of the 2000s with respect to the proportion of extra-marital births.[12] In a broader framework, it seems conceivable that this ranking and the country's comparatively high fertility are not accidental, as during the past decade or more, higher fertility has tended to accompany the decline of marriage and an increasing diversity of living arrangements in Europe. Lesthaeghe and Surkyn (2002) envisaged a similar scenario for the countries of Central and Eastern Europe. They posited that "those countries with the faster rate of transition in household structures will be the first to move to fertility recuperation [...] and hence to be the first to recover to more acceptable levels of sub-replacement fertility". The evidence for Estonia suggests that their hypothesis is valid.

This brings us to the idea of the continuity or path dependence of demographic development, which may manifest itself over long periods of time, notwithstanding intervening changes in socio-economic regimes. If the disconnection of childbearing from marriage and the spread of new types of families are hallmarks of the Second Demographic Transition (SDT), then Estonia, with its contemporary pattern of family formation and childbearing, qualifies for inclusion amongst its forerunners. In support of this argument, recent analyses on union formation have shown that the shift towards new types of family formation in Estonia began in the 1960s, the same period during which the SDT emerged in the countries of Northern and Western Europe (Katus et al. 2007; Puur, Sakkeus and Põldma 2009). In Estonia, however, these novel behavioural patterns were suppressed by the state socialist environment, and could only fully manifest themselves in the 1990s. This would explain how it was possible for Estonia to catch up so quickly with the forerunners of the SDT in this regard. In the longer-term historical perspective, the concept of path dependence

[12] In recent years, the proportion of non-marital births has exceeded 59 per cent, ranking second in Europe after Iceland. In 2009, the figure for the native population reached 66 per cent. The overwhelming majority of non-marital births are to cohabiting couples.

takes into account asynchronism between countries in the transition to a modern demographic regime and parity-specific family limitation, which started in the nineteenth century (Coale 1994; Coale and Watkins 1986). Viewed in this light, the comparatively high fertility levels of recent years, and the positive effect of high educational attainment on the incidence of second births, could represent characteristics of the fertility regime that are commonly associated with the countries of Northern and Western Europe.

To conclude, we are inclined to think that the relatively strong recovery of fertility rates in Estonia in the 2000s resulted from the combined effect of several factors, including family policies that have reduced the opportunity costs of parenthood, economic growth that has secured high levels of employment for the population, and the country's relatively advanced position in respect to the Second Demographic Transition. These interpretations are in part speculative and need to be further researched, but current evidence leads us to conclude that lowest-low fertility is unlikely to recur on a large scale. Nevertheless, low fertility remains a challenge to the long-term sustainability of economies and welfare systems of many European countries, particularly in Southern and Eastern parts of the continent. An important key to finding solutions is an improved understanding of cross-country differentials in fertility levels, which have increased rather than decreased since the late 1990s. In this context, in-depth studies of patterns of childbearing in the countries experiencing strong recovery of fertility rates may offer valuable insights.

ACKNOWLEDGEMENTS

This article has been prepared within the framework of Research Theme 0130018s11, and has benefitted from the support of the Estonian Science Foundation (grant no. 8904). Comments from the two anonymous reviewers are greatly appreciated.

REFERENCES

Billingsley, S. 2011. Economic Crisis and Recovery: Changes in Second Birth Rates within Occupational Classes and Educational Groups. *Demographic Research* 24(16), 375–406.

Bongaarts, J. 2002. The End of Fertility Transition in the Developed World. *Population and Development Review* 28(3), 419–443.

Bongaarts, J. and Feeney, G. 1998. On the Quantum and Tempo of Fertility. *Population and Development Review* 24(2), 271–291.

Bongaarts, J. and Feeney, G. 2000. On the Quantum and Tempo of Fertility: Reply. *Population and Development Review* 26(3), 560–564.

Bongaarts, J. and Sobotka, T. 2012. A Demographic Explanation for the Rise in European Fertility. *Population and Development Review* 38(1), 83–120.

Coale. A. 1994. Nuptiality and Fertility in USSR Republics and Neighboring Populations. In Lutz, W., Scherbov, S. and Volkov, A. (eds.): *Demographic Trends and Patterns in the Soviet Union before 1991*. London, New York, Routledge, 3–17.

Coale, A. and Watkins, S. (eds.): 1986. *Fertility Decline in Europe*: *The Revised Proceedings of a Conference on the Princeton European Fertility Project.* Princeton, Princeton University Press.

Coleman, D. 2004. Why We Don't Have to Believe Without Doubting in the 'Second Demographic Transition': Some Agnostic Comments. *Vienna Yearbook of Population Research 2004*, 11–24.

Council of Europe 2006. *Recent Demographic Developments in Europe 2005.* Strasbourg, Council of Europe Publishing.

Englehardt, H. and Prskawetz, A. 2004. On the Changing Correlation between Fertility and Female Employment over Time and Space. *European Journal of Population* 20(1), 35–62.

ESA 2012. *Statistics Estonia. Statistical Database*. Available: http://pub.stat.ee/px-web.2001/dialog/statfile1.asp. Accessed: 18.03.2012.

European Commission 2009. *Employment in Europe 2009*. Luxembourg, Office for Official Publications of the European Communities.

Eurostat 2012. *Statistics Database*. Available: http://epp.eurostat.ec.europa.eu. Accessed: 20.03.2012.

Frejka, T. 2008. Parity Distribution and Completed Family Size in Europe: Incipient Decline of the Two-Child Family Model? *Demographic Research SC7: Childbearing Trends and Policies in Europe* 19, 47–72.

Frejka, T. and Sardon, J-P. (eds.): 2004. *Childbearing Trends and Prospects in Low Fertility Countries: A Cohort Analysis*. Dordrecht, Kluwer Academic Publishers.

Frejka, T. and Sobotka, T. 2008. Fertility in Europe: Diverse, Delayed and Below Replacement. *Demographic Research SC7: Childbearing Trends and Policies in Europe* 19(3), 15–46.

Goldstein, J., Lutz, W. and Testa, M. R 2003. The Emergence of Sub-Replacement Fertility Ideals in Europe. *Population Research and Policy Review* 22(1–2), 479–496.

Goldstein, J. R., Sobotka, T. and Jasilioniene, A. 2009. The End of "Lowest-Low" Fertility? *Population and Development Review* 35(4), 663–699.

Hagewen, K. J. and Morgan, S. P. 2005. Intended and Ideal Family Size in the United States, 1970–2002. *Population and Development Review* 31(3), 507–527.

Hajnal, J. 1965. European Marriage Patterns in Perspective. In Glass, D. V. and Eversley, D. E. (eds.): *Population in History: Essays in Historical Demography.* London, Edward Arnold, 101–143.

Katus, K. 1997. Long-Term Fertility Development in Baltoscandia. *Yearbook of Population Research in Finland* 34, 18–35.

Katus, K. 2000. General Patterns of Post-Transitional Fertility in Estonia. *Trames* 4(3), 213–230.

Katus, K. 2003. Post-Transitional Fertility Development: New Perspectives Introduced by Central and East European Nations. In Jozwiak, J. and Kotowska, I. E. (eds.):

Population of Central and Eastern Europe: Challenges and Opportunities. Warsaw, Statistical Publishing Establishment, 117–138.

Katus, K., Puur, A., Põldma, A. and Sakkeus, L. 2007. First Union Formation in Estonia, Latvia and Lithuania: Patterns across Countries and Genders. *Demographic Research* 17, 247–300.

Kirk, D. 1996. Demographic Transition Theory. *Population Studies* 50(3), 361–387.

Klesment, M. 2010. *Fertility Development in Estonia during the Second Half of the 20th Century: The Economic Context and its Implications*. Dissertations in Social Sciences No. 46. Tallinn, Tallinn University.

Klesment, M. and Puur, A. 2010. Effects of Education on Second Births before and after Societal Transition: Evidence from the Estonian GGS. *Demographic Research* 22, 891–932.

Kohler, H. and Philipov, D. 2001. Variance Effects in the Bongaarts-Feeney Formula. *Demography* 38(1), 1–16.

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

Kohler, H. and Ortega, J. 2002. Tempo-Adjusted Period Parity Progression Measures, Fertility Postponement and Completed Cohort Fertility. *Demographic Research* 6, 92–144.

Koytcheva, E. 2006. *Socio-Demographic Differences of Fertility and Union Formation in Bulgaria before and after the Start of the Societal Transition*. Ph.D. Dissertation. Rostock, University of Rostock.

Kravdal, Ø. 2002. The Impact of Individual and Aggregate Unemployment on Fertility in Norway. *Demographic Research* 6(10), 263–294.

Lesthaeghe, R. 1995. The Second Demographic Transition in Western Countries: An Interpretation. In Mason, K. and Jensen, A.-M. (eds.): *Gender and Family Change in Industrialised Countries*. Oxford, Clarendon Press, 17–62.

Lesthaeghe, R. 2010. The Unfolding Story of the Second Demographic Transition. *Population and Development Review* 36(2), 211–251.

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

Lesthaeghe, R. and Surkyn, J. 2002. New Forms of Household-Formation in Central and Eastern Europe: Are They Related to Newly Emerging Value Orientations. *Economic Survey of Europe*. Geneva, United Nations Economic Commission for Europe, 197–216.

Lutz, W., Skribekk, V. and Testa, M. R. 2006. The Low-Fertility Trap Hypothesis: Forces That May Lead to Further Postponement and Fewer Births in Europe. *Vienna Yearbook of Population Research 2006*, 167–192.

Muresan, C. 2007. *Educational Attainment and Second Births in Romania*. Rostock, Max Planck Institute for Demographic Research. (MPIDR WP 2007–028).

Ni Brolchain, M. 1993. East-West Marriage Contrasts, Old and New. In Blum, A. and Rallu, J. (eds.): *European Population II. Demographic Dynamics*. Paris, John Libbey Eurotext, 461–479.

Notestein, F. 1953. The Economics of Population and Food Supplies: Economic Problems of Population Change. In *Proceedings of the Eighth International Conference of Agricultural Economists*. Oxford, Oxford University Press, 13–31.

OECD 2012. *OECD Family Database*. Available: http://www.oecd.org/social/family/database. Accessed 4.04.2012.

Oeppen, J. and Vaupel, J. W. 2002. Broken Limits to Life Expectancy. *Science* 296(10), 1029–1031.

Oláh, L. Sz. 2003. Gendering Fertility: Second Births in Sweden and Hungary. *Population Research and Policy Review* 22, 171–200.

Perelli-Harris, B. 2008. Family Formation in Post-Soviet Ukraine: Changing Effects of Education in a Period of Rapid Social Change. *Social Forces* 87(2), 1–28.

Perelli-Harris, B. and Gerber, T. P. 2011. Non-Marital Childbearing in Russia: Second Demographic Transition or Pattern of Disadvantage. *Demography* 48(2), 317–342.

Puur, A., Sakkeus, L. and Põldma, A. 2009. Change and Continuity in Partnership and Childbearing Patterns: Early Evidence from the Estonian GGS. In Stankuniene, V. and Jasilionis, D. (eds.): *The Baltic Countries: Population, Family and Family Policy*. Vilnius, Institute for Social Research, 127–152.

Rieck, D. 2006. *Transition to Second Birth: The Case of Russia*. Rostock, Max Planck Institute for Demographic Research. (MPIDR WP 2006–036).

Rindfuss, R. R., Guilkey, D. K., Morgan, P. S. and Kravdal, Ø. 2010. Child-Care Availability and Fertility in Norway. *Population and Development Review* 36(4), 725–748.

Roosalu, T. 2012. *Taking Care of Children and Work in Estonian Society: Running out of Post-Socialist Time?* Dissertations in Social Sciences No. 58. Tallinn, Tallinn University.

Smallwood, S. 2002. The Effect of Changes in Timing of Childbearing on Measuring Fertility in England and Wales. *Population Trends* 109, 36–45.

Sobotka, T. 2003. Re-Emerging Diversity: Rapid Fertility Changes in Central and Eastern Europe after the Collapse of the Communist Regimes. *Population. English Selection* 58(4–5), 451–485.

Sobotka, T. 2004a. *Postponement of Childbearing and Low Fertility in Europe*. Groeningen, Dutch University Press.

Sobotka, T. 2004b. Is Lowest-Low Fertility in Europe Explained by the Postponement of Childbearing? *Population and Development Review* 30(2), 195–220.

Sobotka, T. 2008. The Diverse Faces of the Second Demographic Transition in Europe. *Demographic Research* 19, 171–224.

Sobotka, T., Skirbekk, V. and Philipov, D. 2011. Economic Recession and Fertility in the Developed World. *Population and Development Review* 37(2), 267–306.

Testa, M. R. 2007. Childbearing Preferences and Family Issues in Europe: Evidence from the Eurobarometer 2006 Survey. *Vienna Yearbook of Population Research 2007*, 357–379.

Thévenon, O. 2011. Family Policies in OECD Countries: A Comparative Analysis. *Population and Development Review* 37(1), 57–87.

UNECE 1999. Fertility Decline in Transition Economies, 1982–1997: Political, Economic and Social Factors. *Economic Survey for Europe*, 1. New York and Geneva, United Nations Economic Commission for Europe, 181–194.

UNECE 2000. Fertility Decline in Transition Economies, 1989–1998: Economic and Social Factors Revisited. *Economic Survey for Europe*, 1. New York and Geneva, United Nations Economic Commission for Europe, 189–207.

UNECE 2012. *UNECE Statistical Database*. Available: http://w3.unece.org/pxweb/dialog/. Accessed: 20.03.2012.

Vallin, J. and Meslé F. 2009. The Segmented Trend Line of Highest Life Expectancies. *Population and Development Review* 35(1), 159–187.

Van Imhoff, E. 2001. On the Impossibility of Inferring Cohort Fertility Measures from Period Fertility Measures. *Demographic Research* 5, 23–64.

Van Imhoff, E. and Keilman, N. 2000. On the Tempo and Quantum of Fertility: Comment. *Population and Development Review* 26(3), 549–553.

Van de Kaa, D. J. 1987. Europe's Second Demographic Transition. *Population Bulletin* 42(1), 1-59.

Võrk, A., Karru, M. and Tiit, E.-M. 2009. *Vanemahüvitis: kasutamine ning mõjud tööturu- ja sündimuskäitumisele 2004–2007* [Parental Leave Benefit: Take-up and Impact on Labour Market and Fertility Behaviour 2004–2007]. Tallinn, Praxis.

Zeng, Y. and Land, K. 2001. A Sensitivity Analysis of the Bongaarts-Feeney Method for Adjusting Bias in Observed Period Total Fertility Rates. *Demography* 38(1), 17–28.