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CHILDBEARING AND MACRO-ECONOMIC TRENDS IN ESTONIA IN THE XX CENTURY

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Introduction

Great changes have taken place in European societies during the 20^{th} century. In the demographic arena, the modern pattern of reproduction gained ground as a result of the demographic transition. The average number of children born to a woman during her lifetime was substantially reduced, leading to many instances of sub-replacement level fertility in the 1920s and 30s. Interrupted by a post-war baby boom, the trend towards low fertility resumed in the late 1960s, and spread to all major areas of the continent by the 1990s. During the same period, economic development in many countries was driven by continuing industrialisation, technological advancement and an increase in the standard of living. Whereas several downturns due to world wars and the Great Depression occurred in the first half of the century, the second half of the century witnessed sustained economic growth for most European market economies. Economic performance was less pronounced in the state socialist countries of Central and Eastern Europe; the century closed amid economic stagnation and a change of societal regime. The parallel evolution of demographic and economic processes has led to questions about their possible inter-relationship. This article presents an account of childbearing trends and economic development in Estonia over the course of the 20^{th} century.

The availability of data related to Estonian demographic and economic development is quite different. In general, Estonian demographic trends have been relatively well documented and analysed. There are some gaps in the statistical series, for instance, those pertaining to the period from World War II until the first post-war census in 1959. Estimates for these years are provided in this article. However, evidence of the economic development in Estonia is much more scarce. Internationally comparable macro-economic indicators have been readily available only since 1990. For the inter-war period, the gross domestic product and rates of economic growth estimated by Jaak Valge (2003) have been used in this article. Such calculations for the state socialist period are hampered by differences in statistical and accounting systems. This article presents new national GDP series for Estonia during the state socialist period based on a series of measures of physical output.

The main focus of this article is on describing trends in childbearing and macro-economic performance; however, we also pose the question of whether the latter might have exerted an influence on the former. In theoretical discussions, demographic and economic trends have been connected at the macro level. For instance, the "economic crisis hypothesis" posits a link between temporary economic hardship and a change in the level of fertility (Lesthaeghe and Van de Kaa 1986). Another macro-level theory relates the size of a cohort, and the economic opportunities available to it, to the childbearing decisions of that cohort (Easterlin 1975). In the Estonian context, the economic crisis theory is arguably more pertinent, as the country has gone through profound economic restructuring at least twice in the second half of the 20^{th} century. The second theory is probably less relevant in the case of Estonia, because the concept of the market responding to changes in cohort size is not applicable to the state socialist period.

Concentrating on macro-economic development was necessitated by the relative absence of knowledge about Estonia's economic performance until the 1990s. This lack of context has been troublesome not only for studies of population processes, but also for other studies that relate to economic development and the well-being of the population. In this article, we estimate the economic performance of Estonia since the 1920s, but its impact on the country's fertility trends is much more difficult to gauge. We make some suggestions about the relationship between economic and fertility trends, but testing the validity of this relationship is beyond the scope of this article.

The article is structured as follows: fertility trends are described in the first section, especially those for the period following World War II. The section includes a discussion of general fertility levels, parity-specific fertility, and the timing and family context of childbearing. Cohort measures and the progression to different parities are presented, as well as a description of the fertility intentions of the younger cohorts. Economic trends are outlined in the second section and, as in the section on fertility, the main focus is on the poorly researched state socialist time period in Estonia. The availability of data for estimating Estonian macro-economic development during the 20^{th} century and the methods used in formulating the estimate are described. A new national income time series (which we propose as a subject for further refinement in the future) is presented. Both sections include a brief comparison of Estonia with other countries and regions of Europe. The article concludes with a discussion of the possible inter-connections between macroeconomic trends and fertility levels in Estonia.

1 Childbearing trends and patterns

1.1 Until the end of the Second World War

Research in historical demography has shown that the transition towards the modern demographic regime started relatively early in Estonia.

The first symptoms of a change in traditional reproductive behaviour emerged in the 18^{th} century. These symptoms pertain to the spread of a new marriage pattern, characterised by high age at first marriage (particularly for females) and a high proportion of people who would never marry. According to John Hajnal, who was the first to identify the new nuptiality pattern, the late-marriage/low prevalence pattern was characterised by the mean age at first marriage above 23, and usually above 24 years for females, the proportion of single women around age 50 amounted to 10% or above (Hajnal 1965). With regard to geography, according to Hajnal an approximate dividing line of the west European marriage pattern runs from St. Petersburg at the Baltic Sea to Trieste at the Mediterranean. The areas west of this line shared the late-marriage/low prevalence pattern whereas the populations on the eastern side were characterised by earlier marriage and lower proportions remaining single, termed as the east European pattern.

The family reconstitution studies based on parish registers from Estland and Livland by Heldur Palli indicate a gradual increase in male and female mean age at marriage throughout the 18^{th} century. In the Otepää parish the female mean age at first marriage rose from 22.1 years in 1725–49, and 22.8 years in 1750–74 to 24.2 years in 1775–99 (Palli 1988). An even greater increase was observed in the male mean age at first marriage, from 23.2 in 1725–49 to 27.1 years in 1775–99. Estimates for the Karuse parish in the last quarter of the 18^{th} century were 27.0 for males and 24.4 for females (Palli 1984). There is some evidence that the pattern of late marriage became established in Estonia even earlier. Drawing on the reconstituted parish records from Rõuge in 1661–1696, Palli has proposed that the mean age at first marriage could have been 23-24 among females (Palli 1973; 1996). This conjecture would extend the emergence of the West European marriage pattern in Estonia back to the late 17^{th} century. In this light, the somewhat earlier marriage in the first half of the 18^{th} century may be interpreted as a response to favourable economic conditions, particularly to the availability of farmland, after the devastation of the Great Northern War.

The spread of west European marriage pattern in Estonia is also reflected in the results of June Sklar (1974) who elaborated the eastern boundary of the European marriage pattern around the turn of 20^{th} century. According to Sklar, the percentage of those remaining single at age 40–49 was at the level 12-13%, and the singulate mean age of marriage for women was between 26.3–26.6 years in Estland and Livland gubernias. Comparative indices for Denmark and Finland fall into the same range, in Sweden and Norway the pattern appears only slightly more pronounced. Thus, leaving aside Ingria, which was inhabited by Finno-Ugrians but re-populated after the establishment of St.Petersburg, the Baltic countries and Finland formed north-eastern boundary of the west European marriage pattern.

Although the introduction of a new marriage pattern itself is not regarded as a transition to a modern demographic regime, it is generally agreed that the west European marriage pattern paved the way towards a subsequent more radical move, the switch to controlled marital fertility. This relation may seem surprising since the transition to the new marriage reduced general fertility to relatively low levels and thus eased the pressures within marriage. In Ansley Coale's interpretation (Coale 1992), this suggests that social norms that lead to a high mean age at marriage are more conducive to the initiation of voluntary control of marital fertility than are the norms that promote early marriage. In a broader framework, attention has also been drawn to the positive impact of the west European marriage on socio-economic modernisation, family relations and the status of women (Hajnal 1965; 1982). These features, Hajnal argues, fostered individual responsibility, self-reliance beyond the support of one's family of origin, and economic behaviour, which must have differed fundamentally from joint household populations. It has been hypothesised that the mere presence of a large number of adult women not involved in childbearing and -rearing activities must have been a considerable advantage to contemporary economies.

The series of crude birth rate (CBR) allows to follow the dynamics of fertility since the late 18th century (Katus 1990). This simple measure reveals that fertility level started to decrease in Estonia in the first half of the 19th century. At the beginning of the 1800s, CBR increased to over 40 per 1000, but then with some fluctuations declined to around 35 per 1000 in the 1840s. It can be assumed that the main factor causing the early decrease in the 19th century was the strengthening of the west European marriage pattern. Judging from the dynamics of the CBR, the rapid and irreversible decline in fertility level started in the late 1860s and by the 1880s crude fertility rate had dropped below 30 per 1000.

The patterns of fertility transition in the second half of the 19th century have been comprehensively documented and analysed in the framework of the Princeton European fertility study (Coale and Watkins 1986). Measuring fertility with a set of specially developed indices – overall fertility index, marital fertility index, non-marital fertility index and nuptility index, comparing fertility levels to those observed among the Hutterites – the study documented and analysed the trajectory of secular fertility decline in most countries of Europe at the provincial level (altogether more than 600 territorial units of analysis). In the framework of the project, special case studies were prepared for many countries. The main results of the project pertaining to Estland and Livland gubernias (1870 and 1897) are available from the study on Russian Empire (Coale *et al.* 1979). Using the methodology of Princeton project, similar indices with more refined territorial breakdown have been calculated for Estonia (at the county level) as well as for other Baltic countries (Katus 1991; 1994).

The Princeton fertility indices have proved to be very useful in highlighting the trajectory of demographic transition in comparative perspective. The analyses by Kalev Katus (1994; 1997a) indicate that in the late 19th century, Estonia clearly belonged to the group of forerunners with respect to fertility decline in Europe. In the 1880s, only France and Ireland had overall fertility index noticeably lower than Estonia. With regard to marital fertility, France and Hungary featured a lower level. Thus, only France – the well-known pioneer of fertility transition in Europe – had both overall and marital fertility index lower than in Estonia. Among the neighbouring countries Sweden bore the closest resemblance to Estonia, although Swedish marital fertility remained a little higher. This evidence suggests that in the 1880s the spread of parity-specific fertility limitation was well in progress in Estonia.

The more or less continuous decline of fertility persisted in Estonia until the interwar period. In the late 1920s, for the first time in peacetime conditions fertility dropped below replacement. In the demographic history, the latter event is frequently regarded as a dividing line which marks the completion of fertility transition and the beginning of the post-transitional stage of demographic development. In comparative perspective, Estonia crossed this threshold in the same period as other forerunners of fertility transition in Europe. Among the neighbouring countries, sub-replacement fertility emerged somewhat earlier (in the early 1920s) in Sweden and somewhat later (in the early 1930s) in Latvia. Finland, Lithuania and Russia fertility experienced below replacement for the first time several decades later.

The lowest level of fertility was reached in 1934, according to the estimates of Katus the total fertility rate was 1.83 children per woman in that year (Katus and

Puur 2006). This was followed by a gradual recovery that returned to 2.02 children per woman in 1938. The data on the number of live births by age of mother, that would allow the computation of total fertility rates are not available for Estonia in 1939–1945. Judging from the number of registered live births, however, a slight increase in fertility rates continued until 1942.[1] Considering a sharp decrease in the population between the beginning of 1939 and the census 1.12.1941 – altogether more than 116 thousand persons or 10.2%, caused by the departure of the German minority in 1939–1941, deportations and political arrests in 1940–1941, the evacuation to the Soviet Union and first casualties of war 1941, – the relative stability in the number of births meant the rise in fertility rates. According to the unpublished estimates by Katus, the period TFR amounted to 2.11 in 1942.

For the following war-years 1943–1945, statistical accounts on the number of births are available only for the first half of 1943. In January–June, 7984 live births were reported (Reichskommissar für das Ostland 1944). A recent study drawing on the civil registration archive showed a sharp decrease in the number of births that bottomed in 1944 – the number of birth records[2] stored in the archive is as follows: 1943 - 15904, 1944 - 10843 and 1945 - 16134 (Katus *et al.* 2004). The study also revealed that for 1944 the number of archival records plausibly understates the actual number of births by ca 15%. The absence of archival records stems from a temporary discontinuation of registration activities in many local governments in 1944, and the loss of documentation caused by military operations.

1.2 Trends and patterns in the postwar period

Compared to the interwar decades, the account of fertility trends in Estonia during the late 1940s and 1950s is hampered by the availability and reliability of the existing demographic data.

Starting from the late 1944, the system of statistics and civil registration were moulded to the Soviet model. The national statistical institution was replaced by a subordinate branch office charged with the implementation of instructions from central authorities in Moscow. Similarly to other areas of administration, extensive changes were made in the staff, and from 1944 onwards only a few statisticians remained in service who had worked earlier in the Central Bureau of Statistics (CBS).

Regarding the organisation of civil registration, the Family Code of the Russian Federation was enforced in Estonia.[3] It set forth the same provisions about the reporting and recording of vital events that had been developed in the Soviet Union in the 1920s and 1930s. According to the latter, the vital registration forms were compiled in two identical copies. On a monthly basis, county registration offices collected the forms and transmitted the second copies to the central civil registration office in Tallinn. The first copy of the record was retained in the county civil registration archive. Before being stored in the central archive at the Ministry of Interior, the second copies of the forms were sent to the Statistical Office for centralised data processing. The processing was based on a programme of standard tabulations, defined by central statistical authorities (for a concise overview of the tabulations produced for Estonia, see Katus and Puur 2003).[4] Due to censorship

[1] The time series compiled from different sources provide the following account: 1938 - 18453 live births, 1939 - 18,475, 1940 - 18,407, 1941 - 19,574, 1942 - 19,226.

[2] These number refer to total number of births, including stillbirths.

[3] For the first time, the Family code of the Russian Federation was enforced in 1941. During the German occupation of 1941–1944, however, the civil registration operated according to the principles established before 1940.

[4] When comparing the content of registration forms and tabulations, it becomes evident that several characteristics are not systematically represented. For example, educational attainment,

imposed on statistical information in the Soviet Union, only strongly aggregated data could be published openly. The unpublished primary tabulations, therefore, represent the source of most appropriate and complete information available on vital statistics.

As in the CBS, the Sovietisation implied a drastic change in the staff of local registrars – the above mentioned study of archival records shows that already in 1941, some 87.5% of the registrars were new in their job (Katus *et al.* 2004). Fortunately, the analysis revealed no major deterioration in the completeness and quality of registration of vital events. It should be noted that this is quite different from the experience of the Russian Federation, Ukraine and Belorussia, where severe underreporting of birth and deaths persisted well into the 1950s (Andreev *et al.* 1998).

Against the backdrop of fairly complete registration of vital events, the problems of data reliability pertain to the stock of population. Unlike other countries that sustained heavy human losses in the Second World War, the Soviet Union opted not to conduct a census shortly after the war that would provide a comprehensive and trustworthy account of the population. In the Soviet Union, the first census was taken only in 1959. Such a major delay cannot be explained by economic difficulties or other "objective" reasons. Publications that have appeared in Russia since the turn of the 1990s relate the postponement to serious problems the Soviet regime experienced with the 1937 population census.[5]

In the situation where the census was out-ruled, statisticians had to resort on other means to estimate the size and structure of population, including the processing of electoral lists in 1946, 1947, 1948, 1950 and 1954, and the local registers kept in rural municipalities (e.g. Puur and Uuet 2010, Tepp 1995). A comprehensive and critical analysis of the population estimates for the late 1940s and 1950s, involving the different data sources is yet to be undertaken. Therefore the evidence pertaining to years preceding the 1959 census may be subject to some adjustment in the future. At the same time, however, the scale of these possible adjustments is not expected to affect the overall trajectory of demographic trends. For the intercensal periods 1959-1970, 1970-1979 and 1979-1989, the analysis draws on the age structures harmonised by the Estonian Interuniversity Population Research Centre in the early 1990s (EKDK 1994a;b).[6] For the years since 1990, the estimates come from the Statistical Office of Estonia.

The following sub-sections address four major aspects of childbearing – the level, order-specific fertility, timing of childbearing and age pattern of fertility, and marital status of mother at childbearing. Each subsection examines the trends in the postwar period and places Estonia, in the context of concurrent developments in other parts of Europe.

1.2.1 Dynamics of fertility level

Table 1.1 outlines the dynamics of population number and basic measures of fertility level in Estonia prior to the 1959 census. The rapid increase in the population – by that time more than 300 thousand persons or 37% of the 1945 number – primarily

economic activity and social class are tabulated only for a few years. Even ethnicity for births is not available for the entire period but starts from the late 1950s. Limitations also relate to the detail of scales used in tabulations; for instance, five-year age groups were often used instead of single-year.

[5] The 1937 census revealed a marked discrepancy between the unrealistic population numbers announced by Stalin at the 17th congress of the CPSU and the true figures revealed by the enumeration (Vzesojuznaja 2007). To cover up the story, the 1937 census was declared a failure. In 1939, a new census gave "correct" results.

[6] These harmonised age structures are also used by Statistical Office and available from their website at http://www.stat.ee.

reflects the large-scale immigration to Estonia that started already in the late 1944 and was particularly intensive in the late 1940s and the 1950s.

Although fertility increased in the postwar decades, the increase appears relatively modest and is of short duration. The number of births and the crude birth rate peaked in 1947; the delayed response evidently reflected the fact that demobilisation was not immediate at the end of the war but was spread over several year. Following the peak, from 1948 the fertility rate turned to slow but persistent decline and by the late 1950s it returned to the level observed in the end of the 1930s. Overall, the CBR for the years 1945–1958 is 19.3 per 1000 that does not markedly exceed the average level observed in Estonia during the interwar period 1920–1939 (17.7 per 1000). Low intensity of childbearing is corroborated by the series of total fertility rates which reached replacement level in the early 1950s but did not noticeably exceed it.[7]

Table 1.1: Population number and basic fertility indicators, Estonia 1945–1958.

	Population January 1st	Live births	Crude Birth Rate (per 1000)	Total Fertility Rate
1945	856,269	14,968	17.5	-
1946	850,293	19,408	21.5	-
1947	957,144	22,721	22.9	-
1948	1,023,392	21,777	21.2	-
1949	1,029,222	21,770	21.3	-
1950	1,012,687	20,279	20.0	2.23
1951	1,019,689	20,730	20.1	2.22
1952	1,040,442	21,111	20.2	2.22
1953	1,051,152	20,146	18.4	2.11
1954	1,133,540	20,909	18.4	2.16
1955	1,142,210	20,786	18.2	2.12
1956	1,147,138	19,160	16.6	1.99
1957	1,158,582	19,509	16.8	1.95
1958	1,168,811	19,598	16.6	1.94

Sources: Estonian Statistical Office, unpublished tabulations; Katus 1997; own calculations.

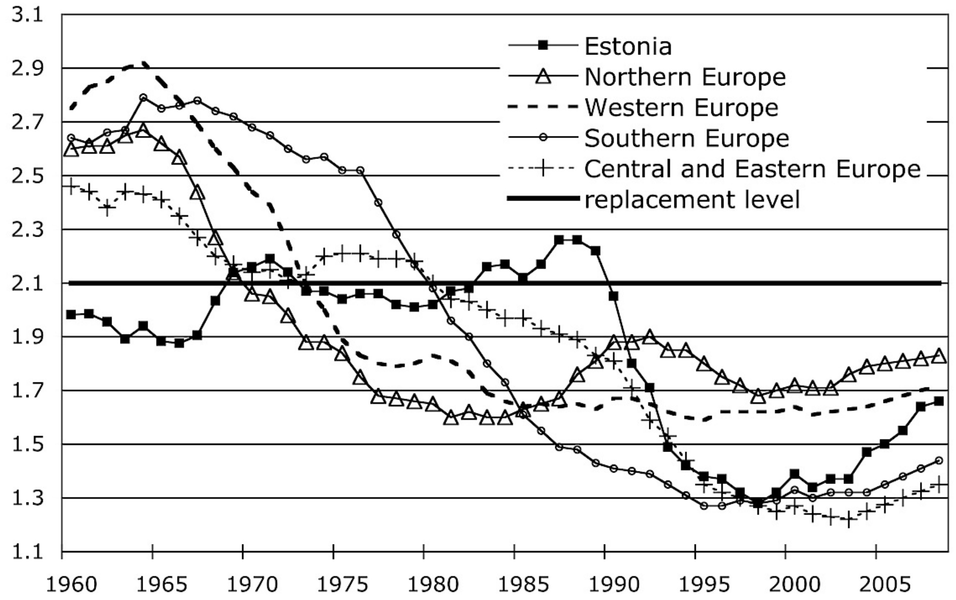
The relatively small difference between the prewar and postwar fertility levels catches eye particularly in the light of massive immigration inflow that brought large numbers of young people in the prime childbearing age to Estonia in these years. Unfortunately, the birth statistics for the early postwar years does not allow for distinction between children born to native population (mainly Estonians) and the immigrants (mainly non-Estonians) who had arrived in Estonia in the aftermath of the war.

Although the ethnicity of parents was included on registration forms, the characteristic was included in statistical processing only from 1958. In that year, slightly less than 65.8% or 12,903 children were born to Estonian mothers, 34.2% or 6,695 children were born to non-Estonian mothers respectively. However, the evidence from the 1953–1954 birth records, computerised by the Estonian Interuniversity Population Research Centre, shows that despite somewhat higher proportion of Estonians among the total population in these earlier years, the proportion of births to Estonian mothers was even lower (60.7%) in 1953–1954 (Katus *et al.* 2004). In absolute numbers, the size of the cohorts of Estonians born in the early 1950s did not exceed 12,5 thousands. The fact that only 8-9 years since the onset of postwar immigration, almost 2/5 of children were born to non-Estonians highlights the intensity of immigration in the early postwar years.[8] On the other hand, these results

[7]The series of TFRs presented in Table 1.1 is based on age structures derived from the 1959 census by the method of reverse projection.

[8]It has been estimated that after the annexation of Petserimaa and trans-Narva areas to the

Figure 1.1: Total fertility rate. Estonia and major European regions 1960–2008.



Source: Council of Europe (2006), Eurostat (2010); own calculations.

indicate persistently low levels of childbearing among the native population 8-9 years after the end of the Second World War. It seems quite plausible that in the height of Sovietisation, fertility of Estonians was lower than in the war years (perhaps with the exception of 1944).

From 1960 onwards, the dynamics of childbearing is presented by means of total fertility rate (Figure 1.1). The data reveal that period fertility continued to be below replacement in Estonia until the late 1960s. As discussed in the following sections, the observed level – the average value of the TFR around 1.95 – appears modest in particular against the background of ongoing shift towards earlier childbearing that was well in progress during the 1960s, pushes the period measures upwards. The figure also places fertility development in Estonia into European context, by comparing it to the trends in major regions of the continent. To allow for a concise comparison of large amounts of information, the data are summarised as unweighted means for four distinctive geographical regions – Northern, Western, Southern and Central Europe. The definition of these regions applied in the article follows a delineation, which has been often used in demographic studies to outline the patterns of fertility and family development in Europe (Sobotka 2004, Van de Kaa 1999).[9]

The comparison draws attention to the fact highlighted in earlier studies that Estonia experienced no baby boom in the aftermath of the Second World (Ka-

Russian Federation in the late 1944, ethnic Estonians consisted ca 97% of the civilian population in Estonia (Katus *et al.* 2000).

[9]Northern Europe represents Denmark, Finland, Norway and Sweden. Western Europe is used to denote Ireland, Austria, Belgium, France, Germany (West Germany prior to reunification), Ireland, Luxembourg, the Netherlands, Switzerland and the United Kingdom. Southern Europe encompasses Greece, Italy, Portugal and Spain. Central Europe refers to Bulgaria, the Czech Republic, East Germany (until reunification), Hungary, Poland, the Slovak Republic and Slovenia. The CIS and Balkan countries were left out of the comparison primarily for the reason of limited data availability. Comparative data are drawn from international demographic collections (Council of Europe 2006, Eurostat 2010).

tus 1997b). The absence of postwar baby-boom was an exceptional feature among the forerunners of fertility transition. Almost all such countries – in Figure 1.1 represented by Northern and Western Europe – having experienced fertility below replacement during the 1920s–1930s, witnessed a post-war baby-boom. Fertility increases lasted for nearly two decades, up to the middle of the 1960s. Fertility increases were quite considerable and in several countries fertility levels approached three children per woman (Calot and Sardon 1997, Festy 1984). Also, the countries that had not experienced under-replacement fertility before the Second World War featured (still) relatively high fertility during that period. Estonian fertility, on the contrary, remained below replacement. From the late 1940s through the mid-1960s, the native populations of Estonia and Latvia had plausibly the lowest fertility in the world (Frejka and Sardon 2004).

In the late 1960s a new wave of changes in demographic patterns, termed as the Second Demographic Transition by Ron Lesthaeghe and Dirk van de Kaa (Lesthaeghe and Van de Kaa 1986), set in. It started in Western and Northern Europe after the mid-1960s, gradually spreading to other parts of the continent in the following decades. Among multiple changes in demographic processes, brought together in the concept of the second demographic transition, fertility decrease was substantial in most, if not all countries. Unlike the general trend in the major regions of Europe, Estonian (and Latvian) period fertility increased rather than decreased in the late 1960s. In the 1970s and 1980s, fertility in Estonia was close to replacement, being somewhat higher compared to the earlier postwar as well as the interwar decades. As a result of these trends, in the late 1980s fertility in Estonia turned out higher than in any major region of the continent. In these years, the total fertility rate amounted to 2.2–2.3 children per woman.

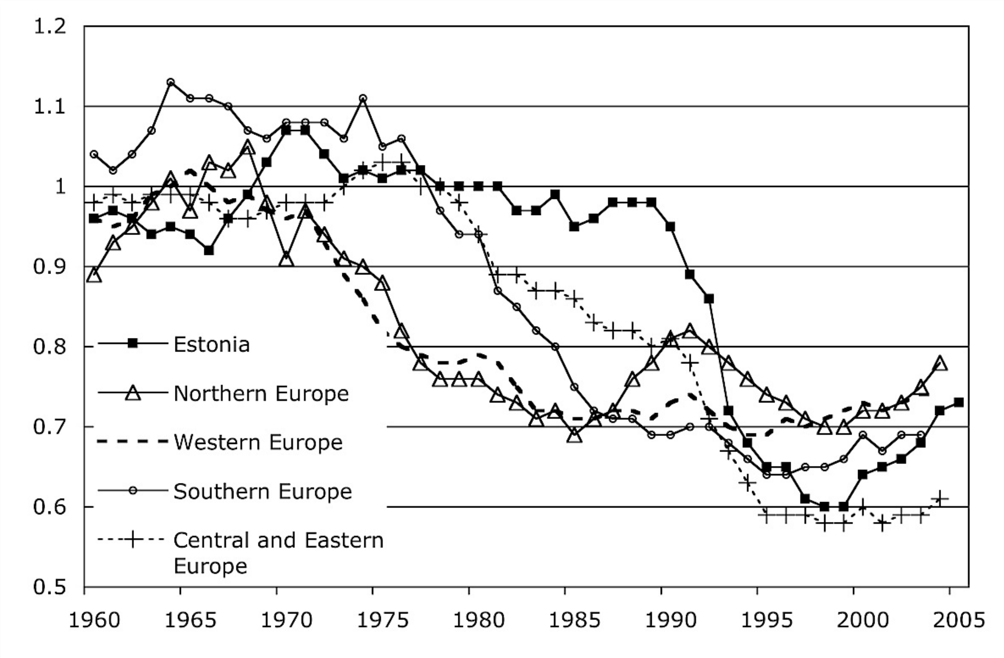
The onset of a third stage in the postwar Estonian fertility trend coincides with the beginning of societal transition. As elsewhere in central and eastern Europe, the 1990s witnessed a steep downturn in fertility level. In about a decade, a more than twofold reduction in the number of births occurred in Estonia, from a maximum of 25,086 in 1987 to a mere 12,167 in 1998. The decline in the number of births was strengthened by the partial return of the postwar immigrants during the early 1990s.[10] The period total fertility rate dropped from 2.26 in 1987–1988 to 1.28 in 1998, amounting to a reduction by nearly one child per woman in a matter of a decade.[11] Against the backdrop of the general experience of the CEE region, the decline appears more pronounced in Estonia. However, it should be noted that it was the high fertility level in the later stages of state socialism rather than the low level attained in the 1990s that swells the scale of Estonia fertility decline in a comparative perspective. From the methodological point of view, this underscores the salience of a longer view for putting the rapid shifts in demographic patterns into perspective.

After reaching its lowest point in 1998, period fertility in Estonia began to gradually increase at the beginning of the 21st century. In 1998–2003, the recovery of fertility rates was slow and intermittent – a rise at the turn of Millennium was followed by a setback, and in 2002–2003, the period TFR was slightly lower than in 2000. A persistent rise started in 2004, and in a matter of 3–4 years the total fertility rate reached 1.66 children per woman (2008). Plausibly reflecting the influence of global economic recession, the upward trend was broken in 2009 (period TFR 1.63). Against the background of rapidly rising unemployment and the growth in economic uncertainty, however, the observed decline in fertility rate seem fairly limited: in

[10]Between the 1989 and 2000 population censuses, the net migration of non-Estonians amounts to -144 thousands, 23.8% of their number in January 1989.

[11]In the 1990s, demographers coined a new term – the lowest-low fertility – to denote the levels below 1.3 children per woman. Very low fertility is defined in terms of TFR between 1.3–1.5.

Figure 1.2: First order total fertility rate. Estonia and major European regions 1960–2005.



Source: Council of Europe (2006), Eurostat (2010); own calculations.

2009 the TFR was 1.63 children per woman.[12]

In comparative perspective, Estonia has witnessed a vigorous recovery of fertility rates. Since 2005, the country has featured the highest period TFR among the CEE countries, closing much of the gap in fertility levels with the west European countries.

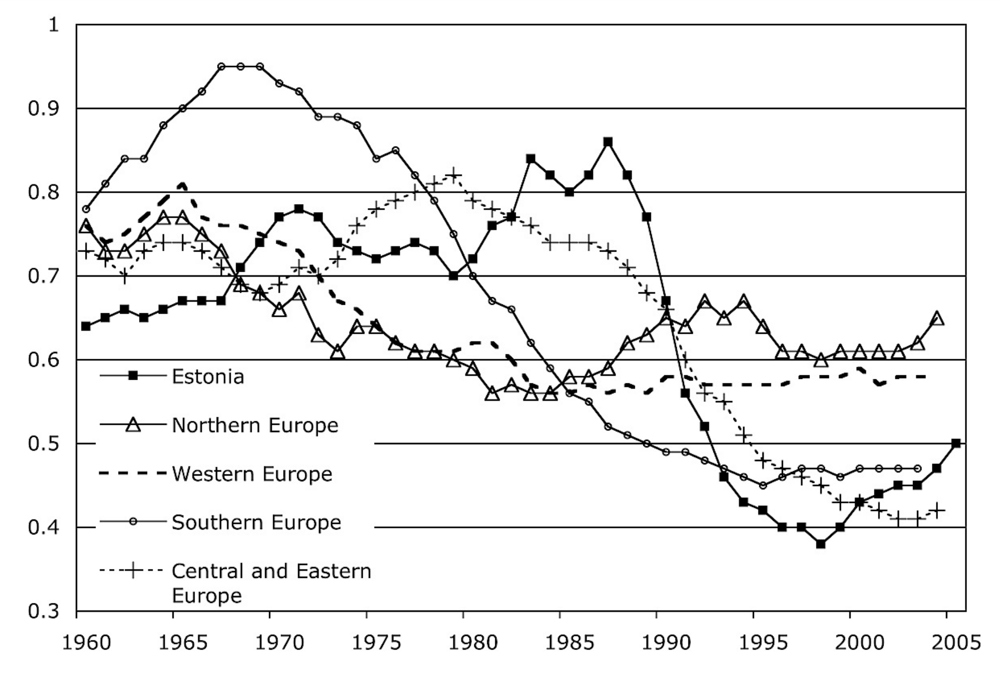
1.2.2 Order-specific fertility rates

Childbearing constitutes a sequential process whereby women move from one stage to the next. At the beginning of the reproductive career, childless women enter motherhood. In the following stage, some first-time mothers go on to have a second child, then some women with two children opt for a third child, etc. Behavioural changes at successive stages of family growth exert a major influence on the overall fertility level. This holds true for the transition from pre-modern high to modern low fertility in which course the prevailing large family model was gradually replaced by the small family model. But similarly, the examination of order- or parity-specific fertility rates[13] – separately for first births, second births, and third births combined with all higher-order births – contributes to the understanding of shifts in fertility level in the post-transitional stage of demographic development, described in the previous section. Since order- and age-specific data for the late 1940s and 1950s are difficult to obtain for all countries included in the analysis, the observation starts from 1960.

[12]According to Statistical Office electronic database available at www.stat.ee. Accessed 21.07.2010.

[13]Order-specific fertility rates are calculated as a sum of age-specific fertility rates for a given birth order (parity). Order-specific fertility rates over different parities sum up to the total fertility rate.

Figure 1.3: Second order total fertility rate. Estonia and major European regions 1960–2005.



Source: Council of Europe (2006), Eurostat (2010); own calculations.

Leaving aside some fluctuations in the late 1960s and early 1970s, the data reveal fairly high levels of first-order total fertility rate in Estonia (Figure 1.2). This suggests the strong majority of people were having at least one child, and consequently, a rather low level of childlessness. In several years, the TFR1 exceeded 1.0 that appears neither realistic nor possible in the cohort perspective. The reasons forcing the first-order total fertility rate above the "normal" range are twofold. As in many other countries, the unrealistically high levels of TFR1 relate to the shift towards earlier childbearing that was well in progress in Estonia in the 1960s and 1970s. However, this explanation alone is insufficient as the unrealistically high level persists even after converting the period fertility rates to cohort data. It is assumed that an additional effect may derive from a very high migration turnover in Estonia during the period of Soviet rule: it has been estimated that in 1947–1991 the sum of migration in- and outflows exceeded the total population of Estonia more than twofold (Sakkeus 1991). This implies that a considerable proportion of young immigrants who had arrived in Estonia, left one time or another. If they gave birth to children (most frequently to the first child) in the meantime, the birth remained in the registers of Estonia although the child and their parents had left the country. In particular, the described pattern of chain migration relates to the families of the Soviet army officers who were rotated to a new place of service in every 3-5 years.[14]

For the 1990s, the data reveal an extensive decrease in the first-order total fertility rate: TFR1 dropped from about 1.0, close to which it had stayed for a long period, to the level of ca 0.60. From the demographic point of view, just like the high levels observed prior to societal transition, the low levels reached in its aftermath

[14] A recent study drawing on archival birth records revealed that in the 1950s, close to 30% of children born to non-Estonian parents had father engaged in military occupation (Katus *et al.* 2004). The size of the latter group is sufficiently large to introduce the described bias in the national data.

are not realistic. In face value, the latter implies that 35–40% of women will remain childless. As it will be shown in the sections to follow, the observed decline in the TFR1 largely stems from the shifts in the age-pattern of childbearing.

In comparative perspective, the stability of first-order total fertility rate in Estonia up to the 1990s made a significant contribution to repositioning of the country vis-à-vis major regions of Europe. In earlier decades, the first-order fertility in Estonia was comparable to other parts of Europe, but from the 1970s onwards one region after another dropped below the Estonian level, and consequently, in the 1980s Estonia emerged as a country with one of the highest first-order fertility rates in the continent. Owing to the latter, the decline in TFR1 in the early 1990s appeared sharper than in any major region of Europe. The figure also shows that against the high rate in the late 1980s, the decline brought Estonia closer to the patterns observed in other parts of the continent.

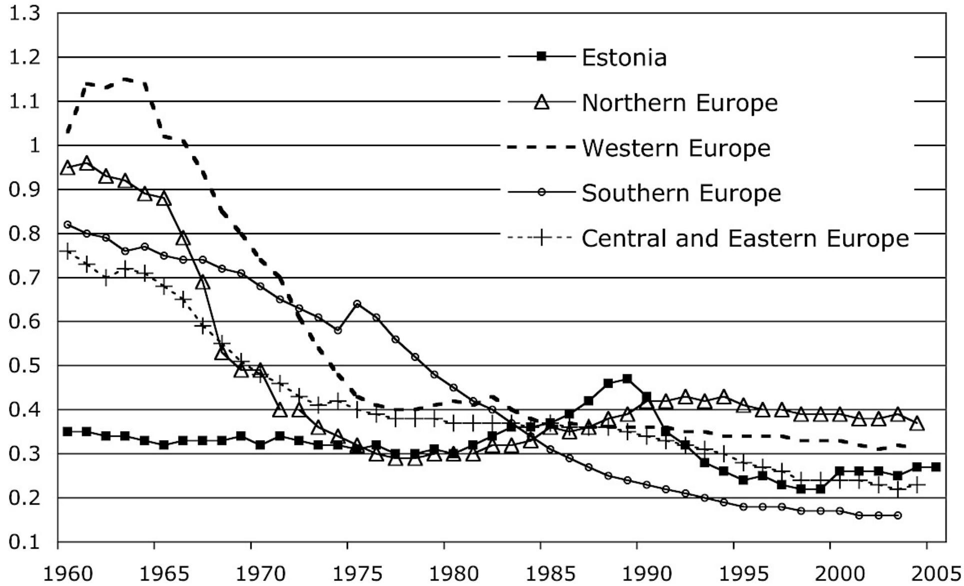
Turning to second-order fertility, despite marked fluctuations the TFR2 contributed strongly to the increase in total fertility rate (Figure 1.3). The rise in the late 1960s completed an approximately 40-year period of persistent below-replacement fertility among the native population. A further increase in the 1980s brought the second-order total fertility rate to the level above 0.80. This suggests that about four fifths of women did not stop family formation after first birth but proceeded to have a second child. In the 1990s, the decline of the second-order total fertility rate was particularly intensive and exceeded the decrease observed for the first parity. Compared to the 1980s, TFR2 decreased about two times, from 0.8 to around 0.4.

In the European context, the second-order total fertility rate has driven repositioning of Estonia in terms of fertility level vis-à-vis major regions of the continent: until the late 1960s Estonia featured a comparatively low TFR2, then gradually moved to the top-ranking position by the early 1980s, stayed at this position throughout the 1980s, and dropped to the bottom once again by the mid-1990s. Since the late 1990s, both the second- and first-order total fertility rates have recovered significantly, contributing to the overall rise in fertility level in Estonia.

Compared to lower parities, the changes in third- and higher order total fertility rate exhibit a more stable trajectory (Figure 1.4). During two decades, from 1960 to the early 1980s, TFR3+ fluctuated in a fairly narrow margin between 0.30 and 0.35. In fact, the decrease in TFR3+ observed in the early 1960s could be regarded as a tail end of a long downward trend in the frequency of higher order births that goes back to the times of demographic transition. Compared to TFR2, there is no rise in the third and higher order total fertility in the late 1960s and early 1970s. A clear upward shift in TFR3+ starts in 1982–83, culminating in 1988–1989 at the levels 0.46–0.47. Similar to lower parities, the 1990s witness a decrease in third and higher order fertility. Although the fall from the peak of the late 1980s is indeed sharp, the drop below the levels characteristic of the mid-1960s or the late 1970s is fairly limited (less than 0.1 children per woman).

In comparative perspective, third and higher order births emerge as a main factor contributing to Estonia's low fertility in the 1950s and 1960s. In the early 1960s, for instance, the Estonian TFR3+ was more than nearly three times lower than that in Western Europe (region with the highest level at that time). Like for first and second births, Estonia changed its lowest position for third births for the highest in the 1980s but with regard to TFR3+ the top ranking position was held for a very short period – only a few years in the late 1980s. On the other hand, it is important to note that unlike for 2nd births, the decrease of the 1990s never brought the indicator back to the lowest levels in the European context. In Southern Europe, the TFR3+ has been systematically lower compared to the Baltic region since the late 1980s, and in the 2000s also the Central and Eastern Europe has featured a slightly lower level of 3+ order fertility.

Figure 1.4: Third and higher order total fertility rate. Estonia and major European regions 1960–2005.



Source: Council of Europe 2006; Eurostat 2010; own calculations.

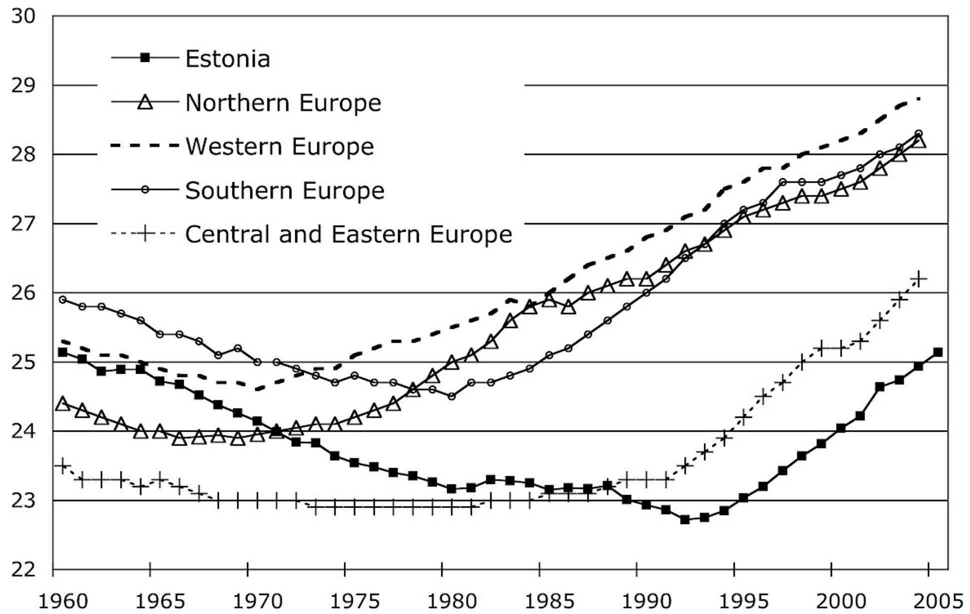
1.2.3 Timing of childbearing

A salient feature of the change in fertility patterns in the 1990s relates to the timing of childbearing. The age at which women enter parenthood has lasting implications on their life course and interplay with other careers. From the viewpoint of fertility trends, the shifts towards earlier or later childbearing have significant consequences on period fertility level.

Figure 1.5 summarises the long-term trend in the timing of childbearing in terms of the mean age of women at first birth. As elsewhere in the areas west of Hajnal line, the decades following the Second World War introduced a clear break in demographic patterns that had prevailed for about two centuries. With respect to timing, the disappearance of the European marriage pattern entailed a marked shift towards younger ages in all reproductive events, including sexual initiation, union formation and childbearing. Figure 1.5 suggests that in comparative perspective Estonia featured a relatively late entry into motherhood in the early 1960s. At that period, Estonian women entered motherhood at the same age as their counterparts in Western Europe but later than in Northern Europe. This implies a change compared to the situation around the turn of the century when Estonian women tended to have children somewhat earlier than in the Nordic countries (Sklar 1974).

Comparatively late motherhood observed in Estonia and other Baltic countries in the early postwar decades may be hypothesised to share a common root – the war and societal discontinuity in its aftermath – with the absence of baby boom noted in the previous section. Among others, this conjecture is supported by the cohort data from the 2000 census of Estonia that indicate a temporary reversal of the rejuvenation of motherhood. Among native population, the shift towards earlier motherhood temporarily stopped in the 1917 birth cohort and moved upwards until the 1925 birth cohort. Moreover, it was not until women born in 1929 that the

Figure 1.5: Mean age of mother at first birth. Estonia and major European regions 1960–2005.



Source: Council of Europe 2006; Eurostat 2010; own calculations.

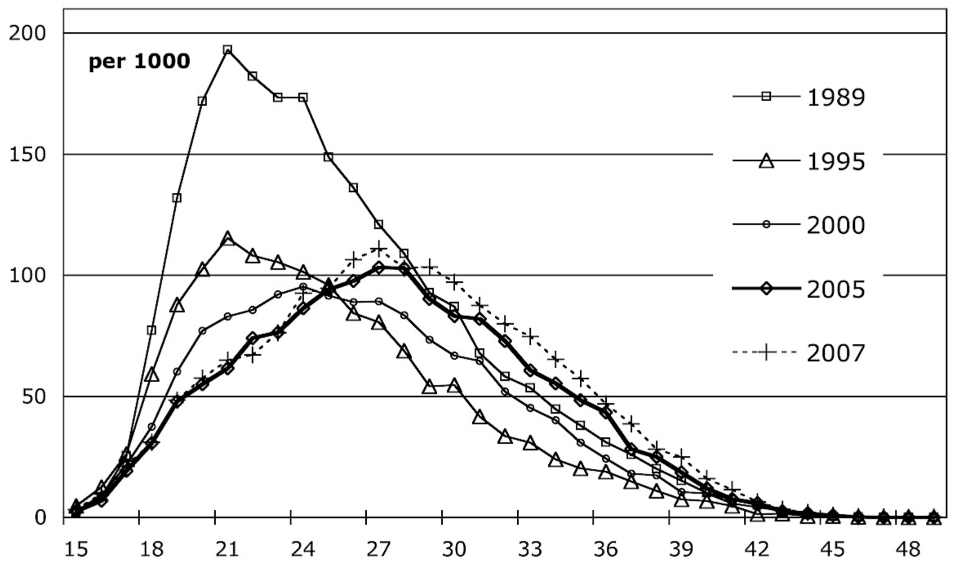
mean age at first birth dropped below the level achieved by the 1917 cohort.[15] In a comparative perspective it seems quite plausible that the observed discontinuity accounts for the higher age at childbearing among Estonian women in the 1950s and 1960s, compared to their counterparts in Northern Europe.

Another, an even more pronounced peculiarity came to the fore in the late 1960s and 1970s: unlike in most other countries that had experienced the European marriage pattern, in Estonia the trend towards earlier entry into motherhood did not reverse but persisted noticeably longer. It was not until the 1980s that the decline in the age at first (as well as subsequent) birth finally came to a halt. In a comparative perspective, the turnaround of the trend and the return of postponement in the West – starting from Northern Europe in the late 1960s, followed by Western Europe in the early 1970s and Southern Europe around 1980 – led to a rapidly growing divergence in the timing of childbearing between Estonia and the above mentioned regions of Europe. From another angle, prolonged advancement of childbearing in Estonia implied an increasing similarity with the pattern that prevailed in Central and Eastern Europe in that period. In the early 1990s, the scale of divergence in the timing of fertility, along with related features, led some scholars to conceptualise the situation as the appearance of a new "East-West" divide in fertility and family behaviour (e.g. Monnier and Rychtarchikova 1992, Roussel 1994). Apart from the historical delineation along the Hajnal line, the new cleavage was thought to follow the boundaries that separated state socialist regimes from the rest of Europe.

Among the factors that upheld early family formation and childbearing until the "meltdown" of the Iron Curtain, researchers have pointed to various institutional mechanisms, in particular the system of housing allocation (Frejka and Sardon 2004, Ni Brolchain 1993). In the state socialist system, new dwellings were distributed ac-

[15] Considering mean age at first birth around 26-27 years in these birth cohorts, the disturbance relates to calendar period 1944–1956.

Figure 1.6: Age pattern of childbearing. Estonia 1955–2009.



Source: Eesti Statistika (2010); own calculations.

cording to administrative rules: typically, in order to become eligible for a dwelling, a couple was expected to have housing conditions (in particular per capita floor space) below a certain minimum standard. In such context, the birth of a child helped young couples to increase their chances to move up in the housing queue. The persistence of these mechanisms until the turn of the 1990s helps to understand why the turn to postponement of childbearing emerged so late in Estonia.

The data presented in Figure 1.5 reveal that the turning point in the trend of mean age at first birth was reached in 1992–1993. Before the mid-1990s, the mean age at first birth turned to a steady increase that has persisted until today. The shift towards later childbearing gained considerable momentum, pushing the mean age at first upwards about 0.25 years per annum. According to the latest statistics, in 2009 mean age at first birth amounted to 26.1 years – a pattern that was seen in Estonia last time in the late 1940s (Eesti Statistika 2010). However, as revealed by the comparison with major regions of Europe, there is still a strong potential for further postponement of childbearing in Estonia. The extrapolation of recent trends shows that it will likely take additional 10–15 years to reach the levels currently exhibited by the forerunners of the "postponement transition".

An additional account of the ongoing transformation in the timing of childbearing is presented by means of age curves for 1989–2008 (Figure 1.6). Up to the early 1990s, the data indeed show a very youthful pattern of childbearing in Estonia. On the eve of societal transition, childbearing had become strongly concentrated into young adulthood, with more than two fifths of all children born between age 20 and 24. Consistent with the observation based on total fertility rates, there was no clear-cut postponement during the first half of the 1990s but rather a fertility prevailing in almost all ages. The only exception were women in age group 15–19 who demonstrated a moderate rise in fertility rates up to 1990–1991 (not shown in the figure). The referred increase in teenage motherhood represents a tail end in the long-term rise in teenage childbearing, pointing out some non-synchronism in switching to new behavioural patterns.

The transformation of age pattern between 1995 and 2000 leaves no doubt about the switch to postponement although the decrease of fertility rates among younger women was not yet offset by the increase in older groups in that period. This new situation emerges from the comparison of the 2000 and 2005 curves – the rise of childbearing after age 25 has fully compensated for the concurrent reduction in younger ages. Also, among Estonian women aged 30 and older, the age-specific fertility rates from 2005 clearly exceed those observed in the late 1980s. From another angle, the progress of fertility postponement is highlighted by the changing contribution of women in different age groups to overall fertility level. Since 2000, women aged 25–29 outperform the 20–24-age group in terms of the contribution to total fertility rate. Starting from 2005, also the 30–34-year-olds feature a greater input to total fertility than the 20–24-age group. The comparison of the age curves data for the very recent years conforms the view that the shift towards further postponement of childbearing is well in progress and yet far from the saturation point.

1.2.4 Tempo-effects in fertility measures

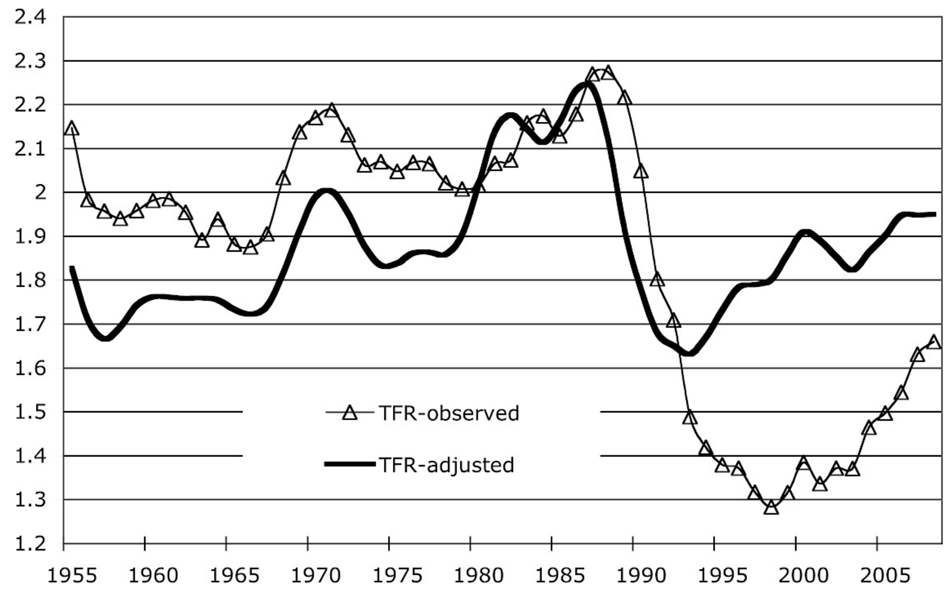
It is a well-known demographic fact that in the situation where the age-specific fertility schedules are moving toward older age, this shift tends to depress the observed number of birth and all the period fertility measures to a lower level than it would reach in the absence of such shift. The parallelism of the postponement and decrease in fertility rates raises a question to what extent the fall in the period TFR, discussed in the previous sections, may be driven by the changes in the age pattern of childbearing and to what extent it reflects a "real" reduction in the quantum of fertility.

To address the issue, we apply the adjustment method proposed by John Bongaarts and Griffith Feeney (Bongaarts and Feeney 1998). A typical interpretation of the adjusted TFR is that it is period indicator that would be observed in the absence of changes in the timing of childbearing. Although more sophisticated methods of period fertility adjustment have been developed later (e.g. Kohler and Ortega 2002, Philipov and Kohler 2001), lack of age- and order-specific exposure data yet prevents the application these more advanced techniques in case of Estonia. To overcome the relatively large fluctuations resulting from the sensitivity of tempo-adjusted measures, this contribution presents values that are smoothed over a period of three successive years (Figure 1.7).

A brief glance at the figure is enough to show that the tempo-adjusted TFR provides much less dramatic account of the decline in fertility levels in the 1990s than its non-adjusted counterpart. The comparison of tempo-adjusted and non-adjusted measures reveals two distinct stages in the dynamics of fertility in Estonia since the turn of the 1990s. The first, a fairly short period – from 1988–1989 to 1992 – was dominated by a sharp decrease in fertility level. In that period, the adjusted total fertility rate was lower than the observed total fertility rate. Such configuration derives from the fact that mean age at childbearing still shifted towards a younger age in Estonia in these years.

In 1993, the fertility postponement emerges as a factor shaping the observed fertility levels in Estonia. This claim is supported by the dynamics of the tempo-adjusted TFR that reaches a bottom and rises above the observed total fertility rate. The further decrease of the observed fertility rates to lowest-low level in the late 1990s seems to be mainly driven by the vigorous postponement of motherhood. The effect of fertility postponement on fertility measures is visualised by the gap between the observed and tempo-adjusted measures. On average, sine 1993 the shift towards later childbearing has pushed the observed period TFR downwards by ca 0.4 children per woman. This implies that the timing effect accounts for about half of the decline in fertility rates that occurred in Estonia after the turn of the 1990s.

Figure 1.7: Observed and tempo-adjusted total fertility rate. Estonia 1955–2007.



Source: Eesti Statistika (2010); own calculations.

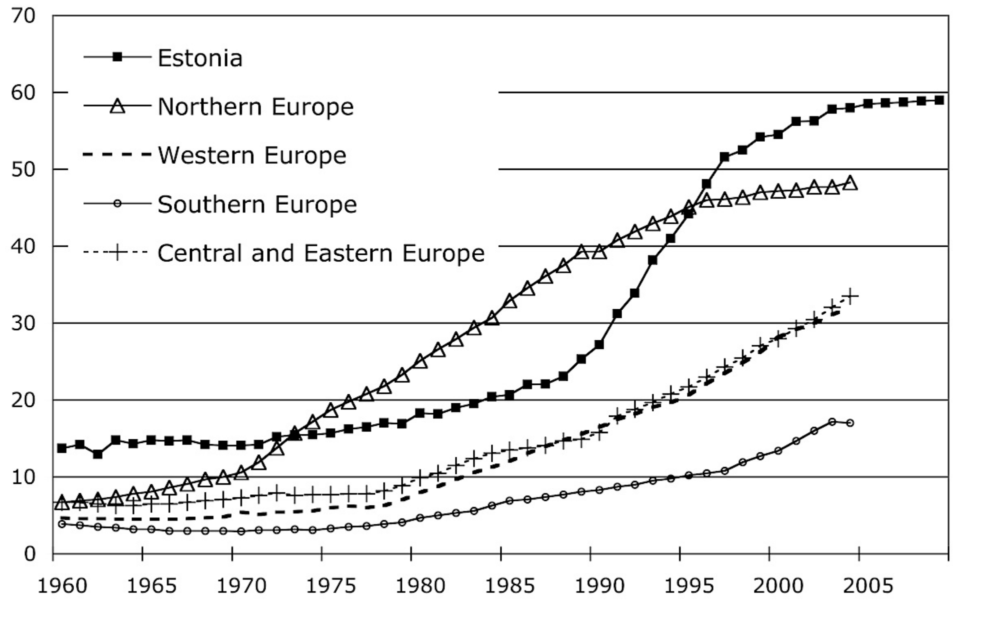
To this end it should be noted that the tempo-adjusted measures do not provide a straightforward prediction of the level to which fertility will return once the postponement approaches its completion in Estonia, plausibly after the mid-2020s. The main reason for such reservation stems from the uncertainty related to fertility recuperation in the cohorts who are currently postponing their childbearing towards ever higher ages. The recuperation depends on the extent to which women in their early and mid-20s will have the births, foregone in early stages of reproductive career, at a later age. But as anything in the future, the completeness of such recuperation should not be taken for granted. Drawing on the evidence from the survey data, this issue is elaborated in the following sections.

1.2.5 Spread of non-marital childbearing

Another salient feature of contemporary fertility patterns pertains to the family context of childbearing. Marriage as an institution has been transformed significantly in the course of demographic transition, but the ordering of events in family formation – first marriage and after some time the first birth – did not change considerably up to the decades following the baby boom era. The post-transitional period has witnessed a remarkable shift away from the traditional unity of reproduction and marriage that until recently used to be the only socially accepted context for childbearing.

In the present section, non-marital childbearing is analysed by means of general proportion of children born out of wedlock. Figure 1.8 draws attention to the spectacular growth in the proportion of children born to unwed mothers in Estonia since the beginning of the 1990s. The shift towards increased non-marital childbearing appears particularly strong in comparative perspective, against the background of major regions of Europe. In particular, as the upward slope of the curve strengthened around the turn of the 1990s, in a matter of just 5–6 years Estonia closed the gap with the Nordic countries which are known as the European forerunners in this

Figure 1.8: Proportion of non-marital births. Estonia and major regions of Europe 1960–2009.



Source: Council of Europe 2006; Eurostat 2010.

regard. Since 1996, in terms of the proportion of non-marital births Estonia exceeds the average of the Nordic countries.

The exploration of longer trends shows that in Estonia the relatively high incidence of births to unwed women is definitely not a new phenomenon that came into being during the societal transformation of the 1990s. In the postwar decades, until the end of 1960s, Estonia surpassed all major regions of Europe with respect to the proportion of children born to unmarried mothers. The proportion of non-marital births was particularly high (up to 22–23%) in the late 1940 and early 1950s, Katus relates such exceptionally high incidence of non-marital to the effects of societal discontinuity. The return to more "normal" conditions after Stalin's death implied a gradual decrease in the prevalence of non-marital birth to the level of 14–15% in the 1960s. To this point it is interesting to note that even in its lowest point, the average proportion of non-marital births in Estonia persistently exceeded that in Western, Central and Eastern Europe, let alone the countries of Southern Europe. As regards the spread of non-marital childbearing in individual countries across Europe, in the 1960s Estonia ranked second in Europe, following Iceland (Council of Europe 2006).

The temporary plateau was followed by a new upward trend in the 1970s that gained momentum in the following decade. In the late 1980s, slightly more than a quarter of children were born to unmarried women in Estonia. Since 1997 non-marital births have outnumbered marital births, since 2003 births to unwed mothers have constituted 58–59% of all births in Estonia. With such a proportion, the country again ranks second in Europe, and again next to Iceland (Eurostat 2010). It is interesting to note that together with Norway and Sweden, only in the referred four countries non-marital births currently constitute a majority among all births. Evidently, these populations have come rather close to a saturation point after which hardly any further increase can be expected.

The evidence from demographic survey has revealed that the observed rise stems primarily from the increase in childbearing among cohabiting couples who have become less inclined to convert their partnership into marriage upon the arrival of a child (Puur *et al.* 2009b). In a broader framework, the dynamics of non-marital childbearing corroborates the evidence from previous studies that the shift towards family patterns characteristic of the Second Demographic Transition can be traced back several decades in Estonia (Katus *et al.* 2002; 2008b). Among the native population, the shift from (direct) marriage to cohabitation as a prevailing mode of union formation started well before the fall of the Soviet regime and followed a trajectory rather similar to the Nordic countries.

1.2.6 Completed cohort fertility

Cohort data have the advantage of reflecting the lifetime developments that are free from the distortions introduced into period measures by the changes in the tempo of childbearing. At the same time, definite conclusions about lifetime fertility can be drawn only for the generations who have reached the end of their reproductive life span. To provide an account of the trends in completed cohort fertility, the present section draws from different sources of demographic information.

Figure 1.9 draws on the 1989 and 2000 population census and presents the dynamics of the cohort total fertility rate (number of ever-born children) starting from generations born at the beginning of the 20th century who were in the prime childbearing during the interwar period.[16] This extends the timeframe of the analysis backwards and places the childbearing trends in a longer perspective. In Estonia, like in other contemporary low-fertility countries, childbearing is almost completed by about age 40. Therefore, from another end the census data allow to draw conclusions about completed fertility for generations born until the late 1960s. The evidence for childbearing patterns in younger generations should be sought from other sources, discussed below.

The census data are presented for the native population of Estonia, leaving aside immigrants, who have settled in the country after the Second World War. Such an analytic strategy is required because of the distinct demographic patterns among the native and foreign-origin populations that mirror the divergent paths of long-term population development in Estonia, on the one hand, and the regions of the Russian Federation and other parts of the former Soviet Union, on the other hand. Historically, the latter areas did not share the experience of the west European marriage pattern and featured a noticeably later timing of demographic transition (Coale 1994, Coale *et al.* 1979, Katus 1994). Although these facts relate to a rather distant past, analyses have shown that systematic differences between the native and foreign origin populations persist (Katus *et al.* 2002; 2000). The relative size of the foreign-origin population, accounting at present for nearly 30 per cent of the total population,[17] meaning that the total population is an aggregate of two rather divergent elements. The demographic patterns can be understood better through focusing on each subpopulation separately, whenever the data allow.[18]

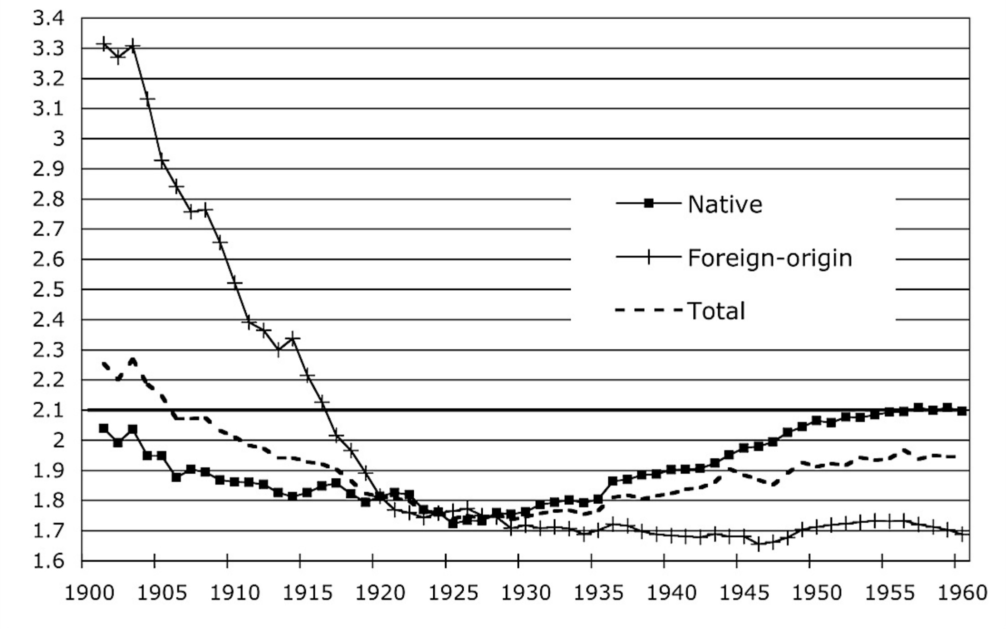
The evidence drawn from the censuses corroborate the main findings of earlier analyses of cohort fertility and the position among the European forerunners of fertility transition (Katus 1997b; 2000). Among the native population, completed

[16] The data for generations born before 1935 are derived from the 1989 census, the data for other generations come from the 2000 census. The combination of two censuses was preferable since it reduces the bias caused by selective survival of women in older generations. The examination of the data quality of the two censuses reveals that the 2000 census may slightly overestimate the level of cohort fertility (ca 0.05 children in the merging point of the two data series).

[17] According to estimates based on the 2000 census, foreign-origin population accounted for 29.7 per cent of the total population, with the first generation constituting 15.8 and the second and succeeding generations 13.9 per cent (Puur and Rahnu 2008).

[18] The demographic patterns among the foreign-origin population are systematically discussed elsewhere (Katus *et al.* 2000; 2003).

Figure 1.9: Completed cohort fertility. Estonia, birth cohorts 1900–1960.



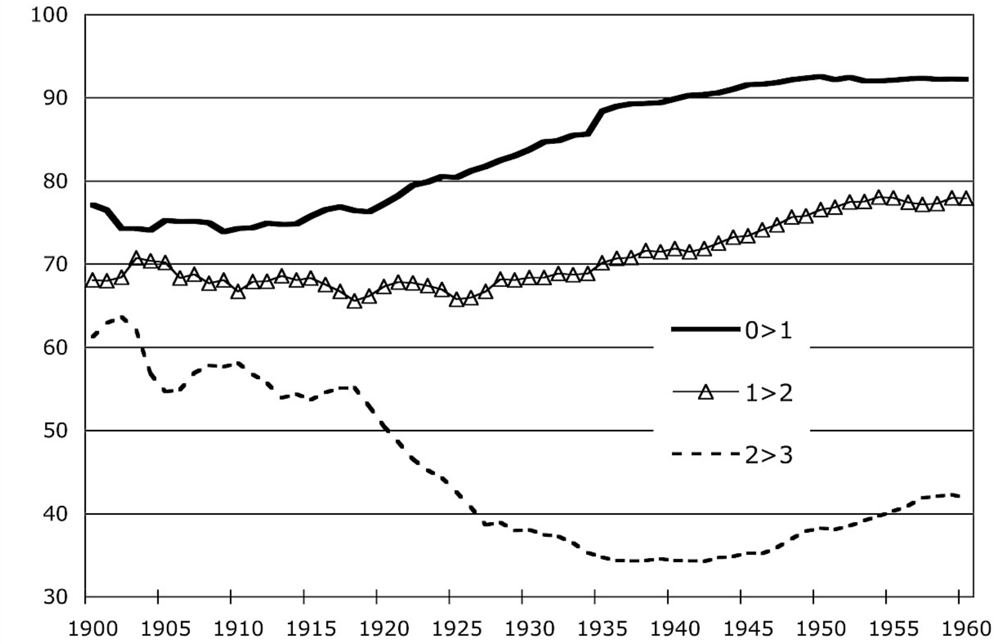
Source: Census 1989 and 2000; own calculations.

cohort fertility had fallen below replacement in the cohorts of native women born at the turn of the 20th century. The decrease observed in a few oldest generations evidently represents a tail end of the transition from uncontrolled high to controlled low fertility that commenced in the middle of the 19th century. In generations born in the late 1910s, the decline showed signs of stabilisation at the level 1.80–1.85 children per woman. This was followed by a further decrease that took fertility down to 1.72–1.75 children among women born in the late 1920s. The prime childbearing years (roughly age 20-35) of these generations fell into the period 1945–1965, i.e. childbearing patterns in these birth cohorts have made a decisive contribution to low period fertility and the absence of baby boom discussed in the earlier sections. In other trendsetter countries of the fertility transition, these generations carried the baby boom and brought fertility substantially above replacement up to the middle of the 1960s.[19]

From the birth cohorts of the late 1920s, a gradual increase in completed cohort fertility began in Estonia. The upward trend continued for about three decades and took fertility back to replacement level (ca 2.1 children per woman) among woman born in the 1950s and early 1960s. Overall, the increase appears quite pronounced, and as revealed in Figure 1.9, these generations featured the highest number of children since the birth cohorts of the late 1890s. Return to replacement-level fertility to a large extent underlies the rise in period fertility rates observed during the 1980s and Estonia's high position in international comparisons in that period. On the other hand, however, it should be underlined that the rise in fertility levels among the native population of Estonia was not limited to a few cohorts with perhaps specific experience but was driven by a large number of successive generations born between the early 1930s and early 1960s.

[19] Among the forerunners of fertility transition, neighbouring Latvia also missed the baby boom (Frejka and Sardon 2004).

Figure 1.10: Cohort parity progression ratios. Estonia, native population, birth cohorts 1900–1960.



Source: Census 1989 and 2000; own calculations.

1.2.7 Parity progression ratios and ultimate family size

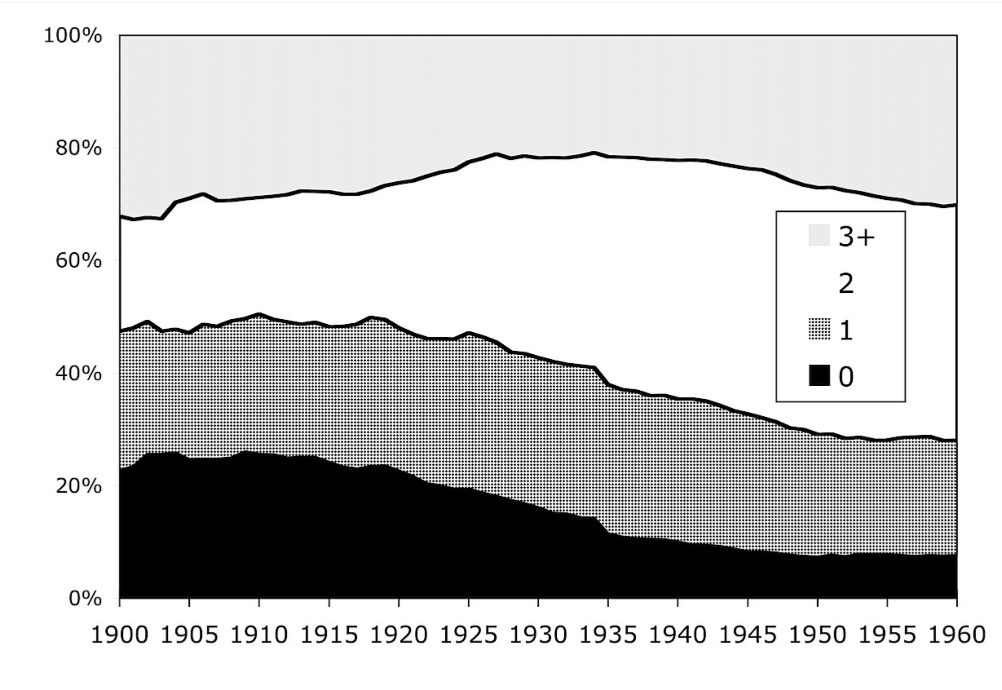
An additional insight into childbearing patterns in cohort perspective can be obtained from parity progression ratios, these measures illuminate the propensity of women to progress from one parity to the next. To offer a parallel to the account of order-specific fertility discussed in the previous sections, parity progression ratios are analysed for transitions from childlessness to having a first child, from the first to a second child, and from the second to a third and higher order (Figure 1.10). The examination of the probabilities of these moves yields an understanding of demographic mechanisms driving the shifts in completed fertility and ultimate family size distribution of the generations.

In general, the parity progression ratios disclose several rather extensive shifts in the pattern of childbearing which have partly cancelled out each other. To start with parity 0, the propensity to have a first child has increased considerably since generations born before the First World War. The percentage of childless women decreased about three times, from a maximum of 25–26 per cent in these oldest cohorts to a minimum of 7–8 per cent in the cohorts born in the 1950s. The observed rise in the 0>1 parity progression ratio reflects the disappearance of the west European marriage pattern (Hajnal 1965). The dynamics of the PPR 0>1 suggests that a shift away from the historical pattern of family formation and childbearing started in generations who reached adulthood in the 1930s in Estonia. From another angle, the data also reveal that neither the Second World War nor the societal discontinuity in the 1940s and 1950s disrupted the secular decline in childlessness.

The propensity to move from the first to a second child changed relatively little among women born between 1900 and the early 1930s. In these generations, between 66–71% continued from first to second birth, with a slightly lower propensity in the cohorts born in the 1920s. This was followed by a rise that took the PPR 1>2 close to 80% women born in the 1950s.

An opposite shift is characteristic of the transition from a second to third birth. Despite fluctuations caused from a limited number observations, the census data reveal a marked decrease in the propensity of women to proceed to a third birth among older generations. This evidently represents a tail end of a more prolonged downward trend that reflects the spread of parity-specific family limitation and started around the mid-19th century in Estonia. In the birth cohorts of early 1900s, the secular decrease in the progression to higher parities was not yet complete as more than 60% of two-child mothers went on to have a third child. In generations of the early 1920s, the proportion dropped below 50%, the decrease accelerated among women born in the early and mid-1920s. Finally, the downward trend came to a halt among the cohorts born in the late 1940s and early 1950s, at the level of 34-35%. Thus the analysis confirms the evidence obtained from order-specific fertility rates that the absence of the postwar baby boom and low fertility in comparative perspective results from the accelerated decrease in the propensity to have large families rather than from a tendency to forego childbearing. In the following generations the probability of having a third child turned to moderate increase. Like the progression to a second birth, the 2>3 parity progression ratios peaked among women born around the turn of the 1960s. In these generations, more than two-fifths (41–42%) of women with two children went on to have a third child.

Figure 1.11: Parity distribution. Estonia, native population, birth cohorts 1900–1960.



Source: Census 1989 and 2000; own calculations

To sum up, the examination of parity progression ratios allows us to conclude that the upward trend in completed fertility that began in the birth cohorts of the late 1920s and continued until the birth cohorts of the early 1960s resulted from the cumulation of several concurrent shifts in parity progression. On the one hand, these cohorts experienced a marked decrease in the proportion of childless women; in fact, the onset of the decrease in childlessness can be traced back to generations born in the 1910s. Further, there was an increase in the relative number of women with one child who went on to have a second child from birth cohorts of the late 1920s. From the latter generations onward, the effect of rising PPR 0>1 and PPR 1>2 exceeded the impact of decreasing progression to higher parities and turned completed fertility to rise. In terms of calendar periods, the referred turning point seems to have occurred sometime in the late 1950s. At a later stage, in the birth cohorts of the late 1940s and early 1960s, the upward trend in completed fertility was driven by the rise in PPR 1>2 and PPR 2>3. In these generations, the childlessness had reached a level – the lowest observed in Estonia since at least the mid-18th century – from which a further decline is hardly imaginable.

The described shifts in parity progression ratios determine the ultimate family size of generations (Figure 1.11). The cohorts born until the 1920s feature a relatively similar proportion of women with 0, 1, 2, and 3+ children, and it was still the most common for women in these generations to have large families with three or more children. It implies that below replacement fertility in these cohorts embedded a remarkable diversity in reproductive outcomes. A fairly high proportion of women with large number of children was offset by an almost equally high proportion of childless women: in fact, in the birth cohort of the 1900s and the 1910s childless women ranked second among our four family size categories. In a broader framework, the observed diversity again draws attention to the salient role of the west European marriage pattern in bringing about the sub-replacement fertility early in the interwar decades. This observations holds for Estonia but can be extended to other forerunners of fertility transition.

Figure 1.11 pinpoints a noticeable acceleration of shifts in parity distribution in generations born around 1920. These shifts led to the consolidation of the two-child family model in Estonia. In the cohorts born at the turn of the 20th century, women with two children accounted for only 20% of the generation. In the birth cohorts of the late 1940s and early 1950s, the corresponding percentage reached 43–44%. In generations born between the mid-1940s and early 1960s, 3+ children emerged as the second most common family model (up to 30%), followed by a one-child family (down to 20%). Childlessness indeed had become rather infrequent in these generations.

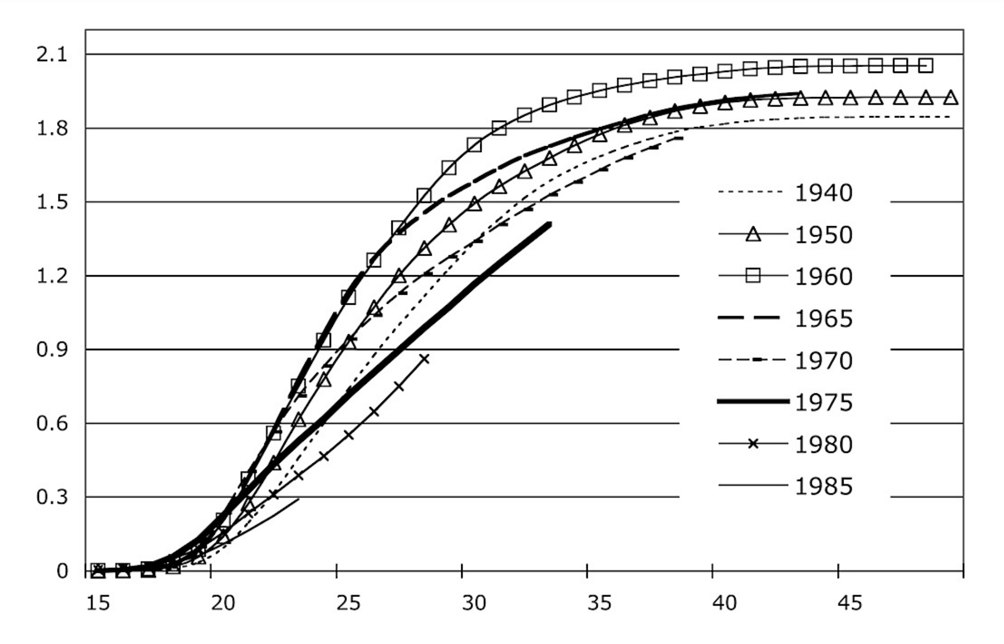
1.2.8 Cohorts completing childbearing in the late 20th and early 21st century

In the previous section, the data from the 1989 and 2000 censuses was used to provide an account of completed fertility and parity distribution in the cohorts born until the turn of the 1960s. Given the pattern of relatively early childbearing that prevailed in Estonia in the 1970s and 1980s, women in these generations formed their families largely before the onset societal transition.

To get an idea of the change of childbearing patterns in the following generations, we have used age-specific fertility rates reported in vital statistics since the early 1950s and on that basis constructed the profiles of age-cumulative fertility rates for the cohorts born between 1940 and 1985. Although these cohorts have reached different stages in their reproductive careers by the time the analysis was performed, the applied method renders the cumulative number of children comparable at specific ages, and permits us to draw some tentative conclusions before the process of childbearing is complete for the younger generations. It should be noted that unlike the census data, age-cumulative fertility rates presented in Figure 1.12 pertain to the total population of Estonia, including the postwar immigrants and their descendants. For differences in the reference population and analytical approach, the evidence presented in the present and the previous section are not identical but the match between two sources of information is rather good. Due to systematically lower fertility among the foreign-origin population in cohorts born in the late 1920s and later, the estimates for the total population are shifted downwards by 0.1–0.2 children.[20]

For generations that have completed childbearing, the data corroborates the findings reported in the previous section. Following the low point in the birth cohorts of the late 1920s, completed fertility increased in Estonia until generations born around the turn of 1960s, reaching the replacement level among the native population and somewhat less for the total population (2.05). In the following generations completed fertility starts to decrease but the decline appears less dramatic than suggested by sharp fall in period fertility rates discussed in the earlier sections. Thus, the 1965 birth cohort ends up with ca 1.95 children, i.e. about 0.1 children less than the top-ranking 1960 cohort. The comparison of the curves of the 1960 and 1965 cohorts reveals that the deficit of births in the 1965 cohort emerges after the mid-point of childbearing career, around age 27. In terms of the calendar time, this coincides rather well with the beginning of the most turbulent phase of societal transformation in Estonia: women born in 1965 turned 27th birthday in 1992.

Figure 1.12: Age-cumulative fertility rate. Estonia, native population, birth cohorts 1940–1985.



Source: Vital statistics 1950–2008; own calculations.

The 1970 cohort can be followed up until age 38, by that age women belonging to this generation had 1.76 children on average. It is interesting to note that for the 1970 cohort, the shift in childbearing clearly points to the influence of transforming societal context. Until age 22, the age-cumulative number of children 1970 cohort is closely similar to that in the 1960 and 1965 cohorts. The difference from preceding generations starts to emerge from age 23, i.e. from the calendar year 1993. Assuming that after age 38, the 1970 generation will feature the rates of childbearing similar to the 1965 cohort, it will likely end up with ca 1.85 children per woman. This appears

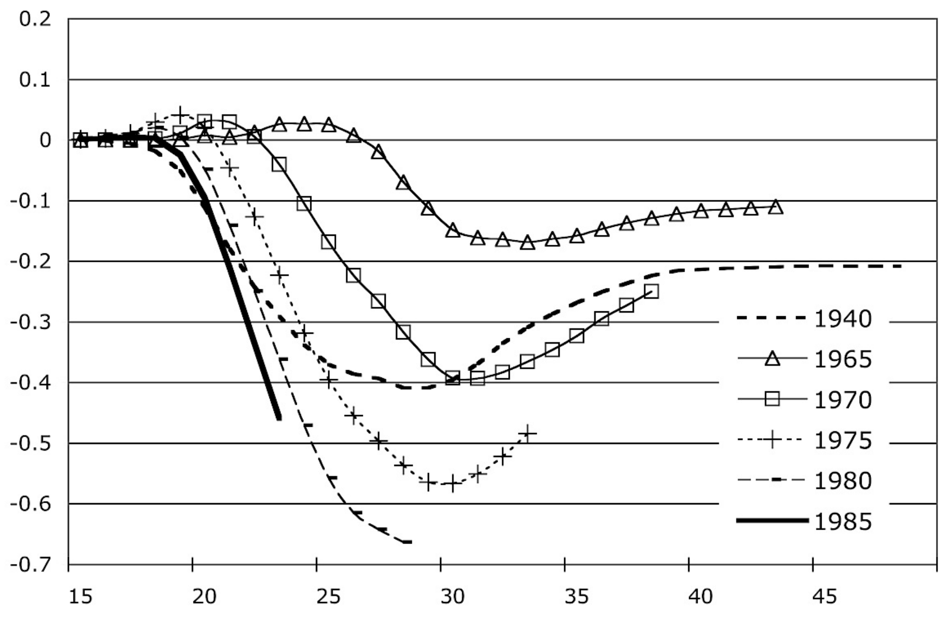
[20]For the 1940 generation, the cohort TFR constructed from vital statistics was 1.84 children per woman. A comparable measure derived from the 2000 census was 1.82 (native 1.90, foreign-origin 1.68). For the 1950 birth cohort, the vital statistics yielded a CTFR 1.92 children per woman, the census gave 1.91 (native 2.07, foreign-origin 1.71).

ca 0.2 children or 10% less than the 1960 generation; a similar level of completed fertility was attained by the 1940 birth cohort.

The three younger cohorts in Figure 1.12 have from the onset developed their reproductive careers in the transformed societal context. Women in the 1975 generation turned 15 in 1990, women born in 1980 turned 15 in 1995 and those in the 1985 cohort reached their 15th birthday at the turn of the Millennium. Compared to their predecessors, these cohorts are characterised by a pronounced shift towards later childbearing that has not yet reached a saturation point and pushes age-cumulative fertility measures strongly downwards. By the time of our analysis, women born in 1975 were 33 and had on average 1.41 children. Women in the 1980 birth cohort had reached their 28th birthday, with 0.86 children on average.

The most prominent demographic mechanism determining the levels of completed fertility in these generations has been the extent to which childbearing postponement is counterbalanced by birth recuperation. 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 reproductive career, cohort fertility is bound to decline. The rate of cohort fertility decline will thus depend on the degree to which delayed fertility is eventually recuperated. Figure 1.13 casts some additional light on the interplay between fertility postponement and recuperation in the cohorts born since 1960. The figure presents a change in the age-cumulative fertility rates, with the 1960 generation used as a benchmark.

Figure 1.13: Change in cumulative fertility rate. Estonia, native population, birth cohorts 1960–1985.



Source: Vital statistics 1950–2008; own calculations.

In the 1965 cohort, the pattern is dominated by the decrease in the quantum of childbearing, although the signs of recuperation are also visible. In fact, until age 25–26, the fertility of women born in 1965 appears even higher than that of the previous cohort. Compared to the 1960 generation, however, starting from the age 27 a deficit of birth occurs. The difference in the cumulative number of births with the 1960 cohort reaches a maximum between age 30 and 35. At that point the deficit amounts to -0.17 children. However, at later stages of reproductive career, the gap described starts to narrow, indicating a "catching up" with the 1960 cohort.

In the following cohorts, the postponement is well in progress, although at very early stages, women born in 1970 and 1975 demonstrate a marginally higher fertility than their counterparts in the 1960 generation. Among women born in the 1970, the deficit of births increases until age 30–31, reaching -0,40 children per woman. By age 38, however, these women make up nearly half of the deficit and it seems quite realistic to assume that the ultimate decline in completed fertility does not exceed 0.2 children in the 1970 cohort. In the 1975 cohort, a more pronounced postponement leads to a greater deficit (more than -0.55) but at the same time, recuperation starts earlier and seems more vigorous. Due to the latter fact women born in the mid-1970s may come quite close to the 1970 cohort in terms of completed fertility. From the life course perspective, the postponement observed implies a "flattening" of the fertility schedules, bringing an end to the strong concentration of childbearing into a few age groups. In other words, the childbearing patterns are becoming more heterogeneous, reflecting an increasing diversity in behavioural strategies among the population.

For the two youngest generations – women born in 1980 and 1985 –, the censoring before the turning point from postponement to recuperation leaves the extent of the forthcoming fertility recuperation to a matter of guess. Nonetheless, to cast some light on future fertility trends in these generations, the following section explores childbearing intentions drawing on the evidence from the 2004/2005 Estonian GGS.[21]

1.2.9 Childbearing intentions and fertility prospects in the younger generations

Figure 1.14 presents the number of intended children for the female respondents who belonged to reproductive age groups at the time of data collection (native population).[22] The number of children expected is not directly comparable between the cohorts at different stages of their family careers – young women in their early 20s are usually still childless or have just entered motherhood while older women in their late 30s and early 40s are often not inclined to have more children. In order to overcome this shortcoming, the number of children expected in the future and those already born are combined. This manner of presentation also allows for a convenient comparison with the evidence presented in previous sections on generations that have their reproductive careers completed.

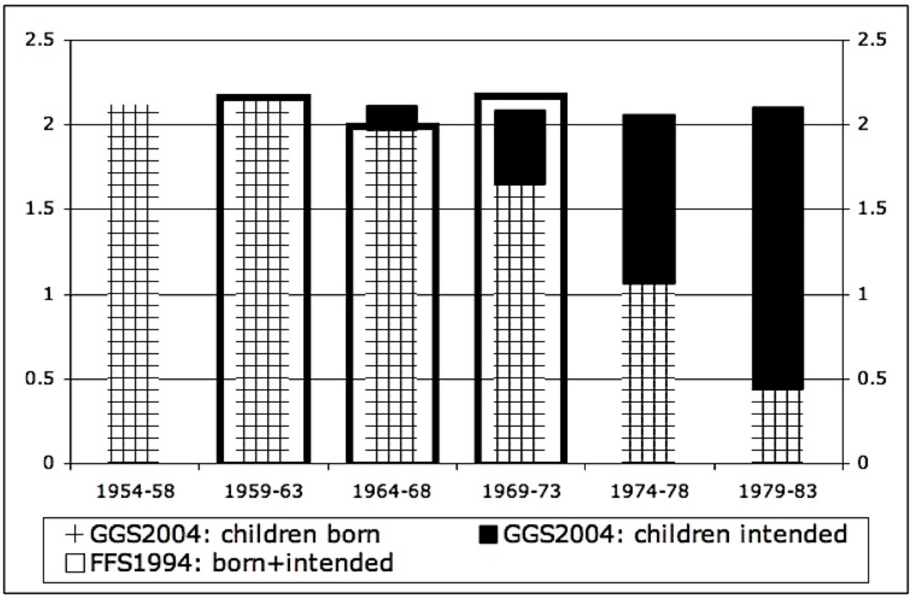
By the time of the survey in 2004–2005, women born in the late 1950s and early 1960s had basically finished childbearing, and the number of ultimately expected children is almost entirely determined by the children already born. In the younger generations, this number consists of two components with an increasing contribution of the number of children expected in the future. It should however be noted that only in the youngest cohort of 1979–1983 does the number of children expected in the

[21]Estonian GGS is a national survey in the framework of the Generations and Gender Program, coordinated by United Nations Economic Commission for Europe (UNECE 2005). The target population of the survey covered men and women born in 1924–1983 (Katus *et al.* 2008a, Puur *et al.* 2009a).

[22]In the Estonian GGS, the respondents in reproductive age were asked whether they intended to have a(nother) child in the future. Alongside the definite answers "yes, certainly" and "no, certainly not", the questionnaire included two intermediate categories, "yes, probably" and "no, probably not". If the answer to the first question was not definitely negative, the respondents were asked about the number of (additional) children they expected to have and the age at which the first/next child was expected. In the present section, the operationalisation of childbearing intentions follows a conservative approach. Responses concerning prospective childbearing were taken into account only if the respondent gave a definite positive answer ("yes, certainly") to the question about the intention to have (more) children. If the respondent was uncertain about her/his intentions or answered negatively, the information about intended childbearing was ignored.

future exceed the number of children already born. The highest number of children ultimately expected can be found in the 1959–1963 birth cohort, in which this figure amounts to 2.2 children. In younger cohorts, this number is declining somewhat but remains above the level of two children per woman. On average, women born in 1974–1978 expect to have 2.04 children, while their counterparts in the 1979–1983 birth cohort expressed a preference towards an even somewhat higher number.

Figure 1.14: Childbearing intentions. Estonia, native population, birth cohorts 1954–1983.



Source: Estonian FFS and GGS; own calculations.

Of course, such relatively high levels of intended fertility should be regarded with reservation since numerous studies have documented a tendency of desired fertility often substantially exceeding the observed and achieved fertility in post-transitional settings. Nonetheless, as the number of expected children is anchored to the specific life situation of an individual, it may be considered more realistic than the ideal family size, the latter reflecting primarily a normative context in which fertility intentions are formed and expressed (Hagewen and Morgan 2005).

A further insight into childbearing plans can be obtained from the examination of the intended parity. The data, not shown here in detail, indicate that in the youngest GGS generations, only a small fraction of women (5-6 per cent) look forward to remaining permanently childless. This percentage, which appears quite close to the levels actually observed among women born in the 1940s and 1950s, reveals the persistence of fairly strong norms against childlessness in Estonia. By the same token, the preference towards the one-child model remains at the levels characteristic of previous generations (slightly below 20 per cent). On the other hand, the two-child family model seems to be gaining somewhat greater popularity among the younger generations. Thus, in the 1969-1983 birth cohorts, 51-57 percent of women mentioned the two-child "target", compared to 40-47 per cent among women born in the 1950s and 1960s. The rise in the prevalence of the two-child model occurs at the expense of those women who prefer larger families. In the 1974-1978 and 1979-1983 birth cohorts, 23 and 20,5 per cent of women expect to have three or more children respectively.[23] For the sake of comparison, in the 1959–1963 cohort the actual share

[23] In the calculation of intended parity distribution, we have rounded the answers "one or two

of women with three or more children accounted for 31.5 per cent.

All in all, these findings suggest a noticeable continuity of fertility intentions in Estonia.[24] Although the expectations reported in the survey are to a certain extent too optimistic to turn into reality, the observed intentions do not reveal any significant shift towards a greater acceptance of childlessness or a rising preference for one-child families in the younger generations. Although Estonia does not have long data series on fertility intentions, a comparison with the evidence from Fertility and Family Surveys (FFS) program conducted in the mid-1990s provides evidence about the relative stability of childbearing intentions over the past decade.

Alongside the GGS results, for the 1959–1963, 1964–1968 and 1969–1973 birth cohorts Figure 1.14 presents the average number of intended children (already born plus expected) as they were reported in the FFS 10 years earlier. The data reveal that the two older cohorts out of the three have achieved their reproductive targets with great accuracy. In 1994, women born in 1959–1963 intended to have on average 2.16 children. By the time of the GGS, the average number of children in the same cohort had reached 2.15. In the FFS, women in the 1964-1968 cohort stated an intention to have 1.99 children on average, in 2004–05 their achieved parity amounted to 1.97.[25]

Compared to previous generations, the 1969–73 cohort demonstrates a different pattern. The comparison of the GGS and FFS reveals a certain decrease in the intended number of children, from 2.17 in 1994 to 2.09 in 2004–2005. This reduction of family size intentions can be given different interpretations. On the one hand, it can be regarded as adjustment of intentions in response to various constraints encountered in the course of life. On the other hand, it could also be seen as a part of an emerging shift towards smaller family preferences (Goldstein *et al.* 2003). Also, at the time of the interview in 2004–05, the 1969–1973 birth cohort was relatively far from their reproductive target (2.17) stated in 1994 (their average parity achieved was 1.65).

One obvious reason behind the latter discrepancy relates to the fact that women born in 1969–1973 had not yet completed their family formation. By the time of the GGS, the older members of the cohort had turned 35–36 while younger ones were still 30–31 years old. This translates into an average age of 33, at which the expectation for additional children is well justified. By analogy, women in the 1959–1963 cohort, who had reached the same point in the course of their lives 10 years earlier, at the time of the FFS added on average 0.20 births to the later stages of their childbearing careers. A similar increment would take the completed fertility of the 1969–1973 cohort to a level around 1.85.[26] In light of progressive fertility postponement however, the increment expected at the later stages of their reproductive careers could be slightly greater than 0.2 births.

children", "two or three children", etc downwards. This conservative approach to rounding is partly responsible for the decrease in the proportion of women intending to have large families. In the calculation of the average number of expected children, no rounding was applied ("one or two children" was interpreted as 1.5 children, "two or three children" as 2.5 children, etc).

[24] A similar conclusion can be drawn from the ideal number of children representing norms endorsing fertility decisions (Katus *et al.* 2008a).

[25] It is interesting to note that this corroborates quite closely with the results of Quesnel-Vallée and Morgan (2003) who showed that the US 1959–60 cohorts realised their childbearing intentions almost exactly.

[26] This figure corroborates the estimate drawn from age-cumulative fertility rates in the previous section. Also, it coincides with the tempo-adjusted total fertility rate calculated for the total population of Estonia (Frejka and Sobotka 2008).

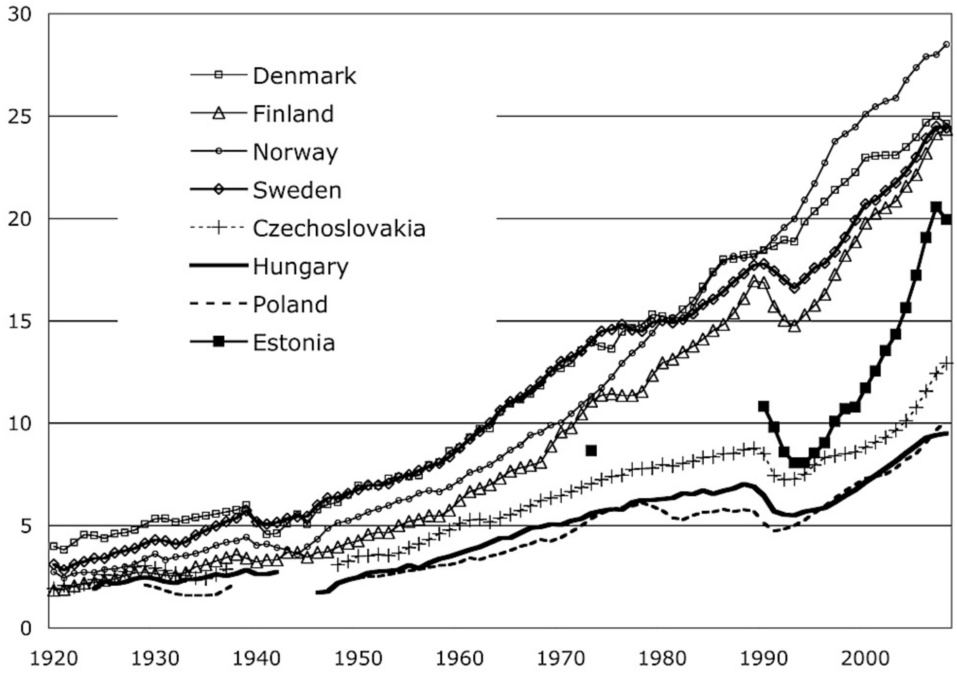
2 Macro-economic trends in Estonia

Contemporary economic development is commonly expressed in terms of gross domestic product (GDP) per capita. The GDP is calculated according to the international System of National Accounts (SNA), which is "a conceptual framework that sets the international statistical standard for the measurement of the market economy", as described by the United Nations (UN 1993). In historical perspective, application of the SNA framework has been somewhat difficult due to the limited availability of data needed for such calculations. Several countries have nevertheless been able to establish relatively long series of national accounts (e.g. Krantz 1988). Another issue concerns the international comparability of national data. Scholarly interest in international comparisons has largely been influenced by the work of Colin Clark since the inter-war period (Maddison 2004). One of Clark's major contributions was the development of a methodology for international comparison of economies by means of an "international unit". After the Second World War, several large research projects were carried out to improve the comparability of economic performance between different countries. In 1968, the International Comparison Project (ICP) was initiated to facilitate international comparisons; the Geary-Khamis method of purchasing power adjustment was developed for this purpose (Kravis *et al.* 1978; 1982). This work has been undertaken and the GDP time-series since 1950 has been periodically updated and published as the *Penn World Table* (Heston *et al.* August 2009, Summers and Heston 1991).

The first comprehensive estimates of the economic development of Estonia were produced by Dresden Bank in 1930. These estimates were later used and made internationally comparable by Colin Clark (1938). Clark estimated the national income of European countries according to his international units, which were related to the value of the US dollar in 1925–34. According to Clark, Estonia's per capita national income was at that time approximately half of that of Sweden and Germany, similar to that of Poland and Hungary, and a little lower than that of Finland. After the Second World War, the national income during the inter-war period was estimated by Paul Bairoch, who treated the Baltic States as one unit (Bairoch 1976). According to his calculations, the Baltic States' national income per capita in 1938 was about 500 US$ (in 1960 prices), which was much lower than Finland's (913), Denmark's (1045), Sweden's (1097), and Norway's (1298), similar to Italy's (551), and higher than Spain's (337), Portugal's (351), Hungary's (451), and Poland's (372). Bairoch had reservations about the reliability of some of his figures, however, including those for the Baltic States. A more recent effort to estimate Estonian macro-economic figures for the inter-war period was made by Jaak Valge, who provided estimates of economic growth for the period 1923–38 (Valge 2003).

Estonia appears in the macro-economic statistics of the USSR for the post-Second World War period; these statistics pose serious comparability problems. Scholars developing international macro-economic measures had difficulty including the data from the USSR in their calculations of PPPs and comparisons of GDP. Calculations using a standard methodology were not feasible for the USSR and the bloc of state socialist countries. The state socialist economy was a system characterised by centrally controlled prices, labour and production (e.g. Kornai 1992). Prices were, for instance, differentiated for consumer and producer goods, the former being relatively high and the latter relatively low. Measurement of economic performance, i.e. accounting, was based on the material product system (MPS), rather than the SNA. These practices rendered the macro-economic statistics of the state socialist countries incomparable to market economies. Nonetheless, numerous studies were conducted in the Western world to gain insight into the performance of state socialist economies (e.g. Alton 1962; 1963, Alton and Korbonski 1965, Marer 1985).

Figure 2.1: GDP per capita in Estonia and some European countries. 1990 Geary-Khamis $.



Source: A.Maddison. Statistics on World Population, GDP and Per Capita GDP, 1-2008 AD. http://www.ggdc.net/maddison/; Maddison (2007).

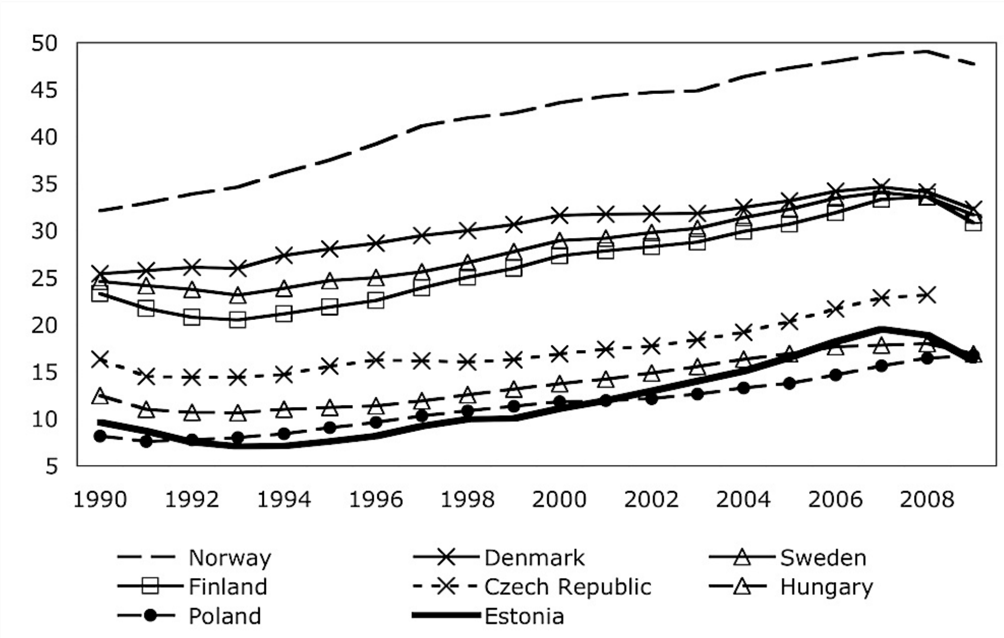
Western scholarly investigation of the economic growth of the USSR was initiated by Abram Bergson, under the aegis of the RAND corporation and the CIA. Arguably the best known estimates of economic growth in the USSR were produced by the CIA; these attracted both criticism (e.g. Moskoff 1981) and praise (e.g. Maddison 1998). The CIA methodology centred around physical volume indicators weighted by adjusted factor cost to reduce the price system bias. The results revealed that the economy of the USSR grew at the fastest rate in the 1950s–1960s (Maddison 1998). The CIA estimates conform with the general consensus about the stagnation of the economy of the USSR in the 1970s and 1980s.

Comparing international GDP proved to be a more difficult problem to solve. To illustrate the complexity of the issue, Angus Maddison, who reconstructed GDP per capita series for a large number of countries, was able to offer an estimate for just one year (1973) of the period 1945–1989 for the USSR and its constituent republics.[27] The comparative position of Estonia in 1973 and post-1990 according to Maddison's estimates is shown in Figure 2.1. Maddison's 1973 estimate suggests that GDP per capita in the USSR was higher than in Hungary and Poland, but lower than in Czechoslovakia. Maddison's estimate for Estonia in 1973 and 1990, however, surpasses even that of Czechoslovakia (Maddison 2006), which is probably indicative of overestimation.[28] It is difficult to believe that Estonia's GDP per capita

[27] Maddison used the Geary-Khamis international dollar as a unit of measure, which is equal to purchasing power of the US$ in 1990. According to Maddison, the USSR GDP per capita in 1973 was 6,059 international dollars, but he noted that there was considerable variation within the USSR, e.g. Estonia 8,657, Latvia 7,846, Lithuania 7,593, Russia 6,582, Belarus 5,233, and Ukraine 4,924 international dollars.

[28] It is difficult to ascertain Maddison's methodology for arriving at these estimates and it has

Figure 2.2: GDP per capita 1990–2009. Estonia and some European countries. Thousand 2005 US$, PPP-adjusted.



Source: UNECE (2010).

in 1973, let alone in the 1990s, exceeded that of Czechoslovakia, or the combined Czech Republic and Slovakia after 1990.

Figure 2.2 plots GDP per capita for selected developed market economies and former state socialist countries post-1990, based on United Nations Economic Commission for Europe estimates. It shows that in the 1990s, Estonia's GDP per capita was the lowest almost every year. The average GDP per capita difference in 1990–2000 compared to the other countries (as a percentage of the Estonian figure) is: Finland 267%, Sweden 293%, Norway 438%, Denmark 326%, Czech Republic 181%, Hungary 136%, and Poland 108%. On average, the other countries exceed the GDP of Estonia by 150 percentage points. These proportions vary significantly from Maddison's estimates. We are unable to explain why Maddison's figures for Estonia are so high. In the next section, we will attempt to create a new GDP estimate for Estonia that covers most of the 20th century, by piecing together the available statistical evidence.

2.1 Estimates of Estonian economic development

2.1.1 Prior to the First World War

It has been claimed that on the eve of the First World War, the population of Western and Northern Europe consumed approximately 27.6% of the world's national income, but accounted for only 11.5% of its total population. Eastern and Southern Europe, on the other hand, comprised 8.2% of the world's population and consumed 8.5% of its total income. The income/population ratio for the Russian Empire was even lower (Aldcroft 1994). Thus, despite efforts at modernisation, czarist Russia was still a less developed country than many European states.

received some criticism. See Clark (2009).

Estonia was considered to be one of the more developed regions of the czarist empire at the beginning of the 20^{th} century, although industrialisation had begun only at the end of the 19^{th} century and was spreading slowly. The tempo of industrialisation in Estonia accelerated before the First World War and, as a result, the province of Estland ranked 4th for industrial output per capita in the Russian Empire in 1908, followed by Livland (Varvzar 1912). Indirect estimates have shown that Estonia's national income in 1913 was at the level of Finland's (Aldcroft 1997), but comprehensive statistical data on Estonia for this period is missing.

The path of industrialisation in Estonia up until the First World War contained some serious pitfalls for sustainable economic growth. The industries were largely dependent on imported raw materials, and their goods were produced for the czarist empire's domestic market, which was highly protected from the world market. Market protection guaranteed quick industrial development – Estonian industrial production increased from 20.8 million roubles in 1890 to 38 million in 1900. There were approximately 21.6 thousand industrial workers in 1900 (Pihlamägi 1999). Industrialisation was heavily influenced by war preparations, which consisted of building ports, shipyards and military installations. In 1917, about one half of all industrial workers were involved in the metals industry; approximately 40% of capital stock had been invested in the machinery and metals industries, which mainly served the empire's needs (Karma 1963, Normak 1923, Pihlamägi 1999).

Whereas industrialisation was promoted by the czarist empire, agriculture remained relatively undeveloped. Indentured service had been abolished by regulations in 1816 and 1819, but the limitations of the old regime continued throughout the 19^{th} century. Farms began to be privatised in the second half of the 19^{th} century, but on the eve of WWI, only 40% of land was owned by peasants. The rest was owned and rented by approximately 1200 estate holders, thus precluding a large part of peasantry from owning land (Nõu 1955, Rosenberg 1998). The agricultural market, like the industrial, was tied to czarist Russia.

2.1.2 The inter-war period

The GDP calculations made by Jaak Valge (2003) use a simplified production approach to estimate economic growth in the primary, secondary, and tertiary sectors. We will briefly outline the problems he encountered and the methods he used to overcome them.

The original agricultural production statistics included only the annual net yield of private farms larger than 1 hectare. Therefore, in order to obtain information about the entire agricultural sector, some components had to be added, such as the yield of small and state-owned farms, farmers' secondary income, income from fishing or hunting, and agricultural capital depreciation. Some of these missing elements, such as state-owned farm production, farmers' secondary income, and income from fishing, were estimated on the basis of the 1929 agricultural census (Riigi Statistika Keskbüroo 1930). Survey data from farmers' budgets (from the ledgers of farms included in the continuous survey) were used to estimate the depreciation of agricultural capital stock, i.e. construction projects carried out on farms. Income from hunting was estimated indirectly.

The secondary sector posed several problems, because the inter-war annual statistics only dealt with large industry (enterprises with more than 20 employees). However, the 1937 economic census (Riigi Statistika Keskbüroo 1939a;c) recorded the production of all manufacturing and industrial enterprises. Large industry, as defined above, but excluding construction and manufacturing, represented about 81% of all industrial production in 1937. The 1937 economic census made it possible to include small industry and manufacturing production. The output of the construction sector was calculated on the basis of J.Janusson's 1928–1929 construction volume estimates (Janusson 1932), annual cement consumption, and large industry production dynamics.[29]

Table 2.1: Estonian GDP and GDP per capita in 1929 constant prices, 1923–1938.

	GDP million kroons	Population million	GDP per capita kroons	GDP per capita 1929=100
1923	408	1.11	368	81
1924	496	1.11	446	98
1925	499	1.12	446	98
1926	552	1.12	492	108
1927	504	1.12	450	99
1928	495	1.11	446	98
1929	510	1.12	455	100
1930	551	1.11	497	109
1931	517	1.12	462	101
1932	492	1.12	440	97
1933	528	1.12	472	104
1934	559	1.12	499	110
1935	603	1.13	533	117
1936	612	1.13	542	119
1937	640	1.13	567	124
1938	654	1.13	578	127

Source: Klesment (2008a), Valge (2003).

The statistician J.Janusson (1932) estimated the dimensions of the tertiary sector (transport, commerce, social services etc.) for 1928–30. Additional data pertaining to commerce and transport can be derived from the 1937 economic census (Riigi Statistika Keskbüroo 1939b). Due to the lack of detailed data, the size of the tertiary sector was estimated on the basis of demographic data. Information on the life events of individuals gleaned from the population censuses of 1922 and 1934 and vital statistics (births, deaths, marriages), was used to estimate the size of the tertiary sector (Valge 2003).

Indirect taxes were added to the three sectoral series, in order to produce time series at current producers' prices. The series was then converted to fixed prices by means of a deflator. The first option was to use the consumer price index. The second option applies the change in sectoral wholesale prices as a deflator (Klesment 2008a). Whereas different deflators produced variations in sectoral output, the change in the annual growth rate for the entire period was not substantially affected. The results of these calculations are presented in table 2.1.

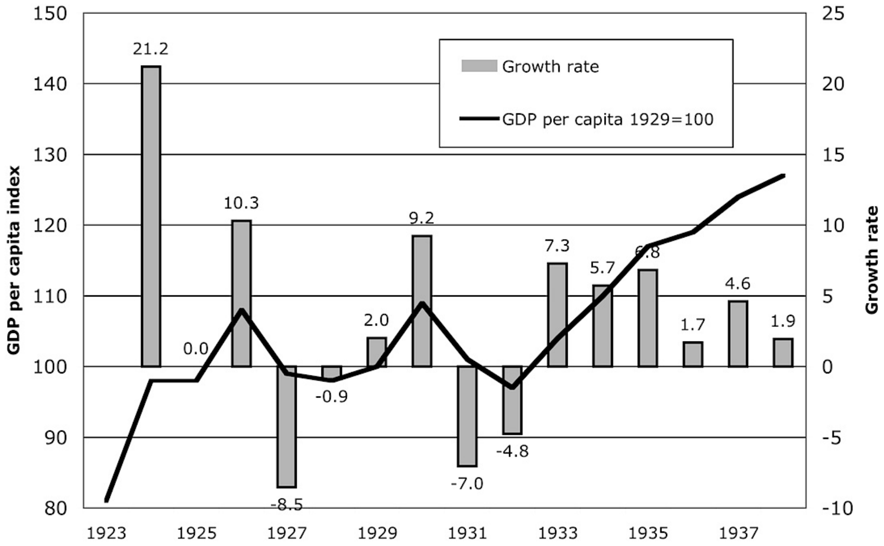
The results point to uneven economic development in the 1920s. Years of high growth alternate with those of zero or negative growth. Predictably, the years 1931–32, when the Great Depression reached Estonia, are characterised by negative growth. Since 1933, however, there has been a reasonably stable positive trend (Figure 2.3).

In addition to determining the growth dynamics, we were also interested in comparing Estonia to other European countries during that period. This was a difficult exercise, because calculating the purchasing power of the *kroon* compared to other currencies would have required a large amount of detailed data. J.Valge has accepted the estimate made by C. Clark, who deduced that the Estonian GDP per capita in 1925–34 was 341 international dollars, while that of Finland was 380 international dollars. Assuming that Clark's margin of error was not significant, the Estonian GDP would be approximately 90% of the Finnish national income. Since the average Finnish national income in international units is known for that period,

[29] It is assumed that construction correlates with industrial production to a large extent, and its deviation from the industrial index can be tracked by cement consumption.

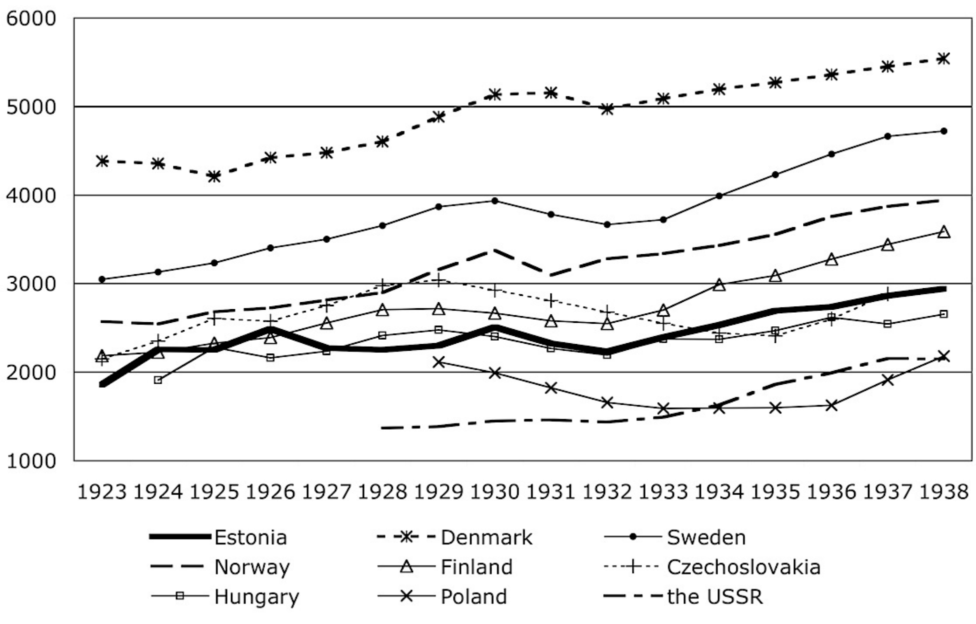
one is able to make a rough estimate of the Estonian level (Valge 2003). It must be emphasized, however, that such results should be viewed with discretion, since they rely on the validity of Clark's estimates.

Figure 2.3: Estonian GDP per capita index and annual growth 1923–1938.



Source: Klesment (2008a), Valge (2003).

Figure 2.4: GDP per capita 1923–1938. Estonia and some European countries. 1990 Geary-Khamis $.



Source: Maddison (2006), Valge (2003).

Figure 2.4 indicates that Estonia's economic performance during the inter-war period was relatively close to Hungary's and Czechoslovakia's, lagged somewhat behind Finland's, and was considerably behind Denmark's and Sweden's, but ahead of that of Poland and the USSR. The average difference between Estonia's output per capita and that of the other countries during this period was: Denmark 209%, Norway 135%, Sweden 162%, Czechoslovakia 115%, Finland 113%, and Hungary 93%. The figures for Poland were 75% and for the USSR 69%, but the time-series for these countries are shorter. Although these calculations are only rough estimates, there is less than a 1.5-fold difference between Estonia's per capita output and that of the other countries, with the exception of Denmark. The average difference is 28 percentage points in favour of the other countries, excluding the USSR. As we mentioned at the beginning of this section, Estonia's position relative to the other countries deteriorated considerably between the inter-war period and the 1990s. The widening of the gap between Estonia's economic performance and that of the other countries from 28 to 150 percentage points can be viewed as the economic price of the 1940–1990 regime (see also Kukk 2005).

2.1.3 The state socialist period

The problems associated with the Soviet national accounting system (MPS) are well known and difficult to overcome by methods of monetary conversion. Therefore, this study took a different approach and drew evidence from physical volume indicators, which are more objective and easier to compare over time and between countries. To facilitate the GDP estimation process, long-term (1920–2000) time-series of agricultural and industrial production and selected services were constructed, using published statistical materials for the inter-war and contemporary periods, as well as unpublished archival sources from the state socialist period. The time series were critically evaluated and harmonised to the extent possible; the results of this trend reconstruction were published by Klesment and Valge (2007). That publication also delineates the organisation of economic statistics in Estonia during the inter-war, Soviet and contemporary periods.

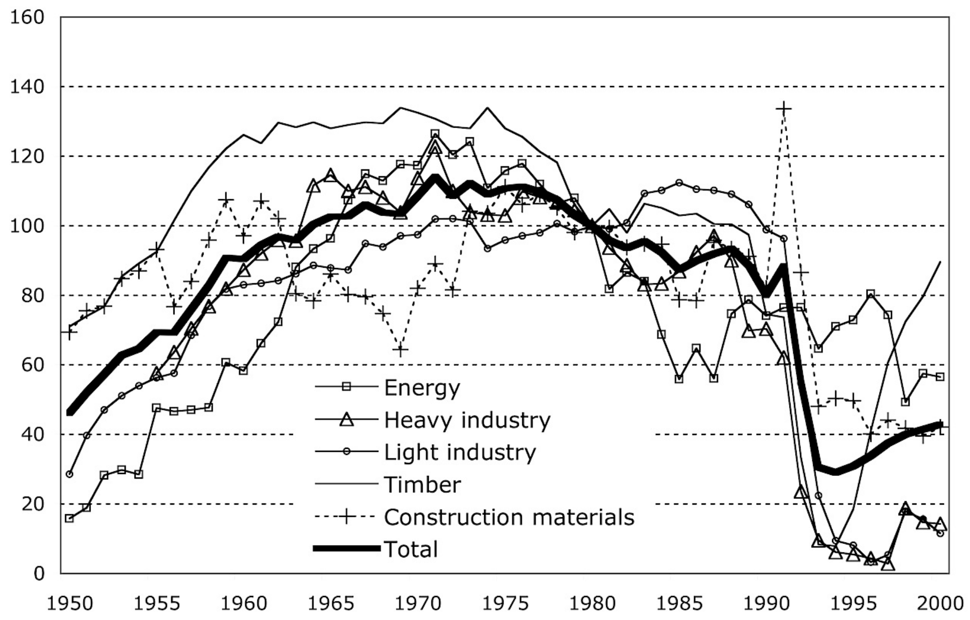
Production volume time-series serve as a basis for estimating growth, but they entail making some assumptions. First, it must be assumed that the structure of the economy does not change substantially (that the share of industrial and agricultural production in the economy is not displaced by services, for instance). Another assumption is that a change in the volume of a group of "key products" of a sector of the economy reflects a change in the output of the entire sector. Because of the extensive profile of the economy of the USSR, we were reasonably confident that time-series agricultural and industrial production would provide fairly accurate indications of overall economic growth. Therefore, we constructed indices of production for the main sectors of the economy (agriculture, industry, construction and transport) for the state socialist period in Estonia. We focused mainly on the state socialist period until 1980, because a better series is available as of that time and was used in this study.

One of the important issues connected with the use of physical volume data is the aggregation of single product series into sectoral series. Agricultural production was aggregated by calculating the per capita energy content of different products (grain, potatoes, milk, and meat) as described by Klesment (2008b). Industry was divided into five sub-sectors – energy (oil shale, shale oil, peat, peat briquette, gas, electricity), heavy industry (pig iron, steel, electric motors, power transformers), light industry (cotton cloth, linen cloth, woollen cloth, cotton yarn), timber (lumber, veneer, paper, cardboard, cellulose), and the production of construction materials (bricks, cement, lime, window glass, roof tiles). An index was calculated for each key product; the sectoral index was then computed as a geometric average[30] of the individual key product indices. An example of the industrial sub-sector

[30] An arithmetic average would have overstated the contribution of a single volatile key product.

indices, summarised as an arithmetic average, is given in Figure 2.5. The industrial indices reflect the major changes in the Estonian economy, e.g. forced industrialisation after the Second World War and the marginalization of several industrial sectors after the fall of the state socialist regime in the 1990s. Because of the major structural changes, the industrial index is of little use for comparing the inter-war or contemporary periods to the state socialist period.

Figure 2.5: Indices of industrial production and unweighted total. 1980 = 100.



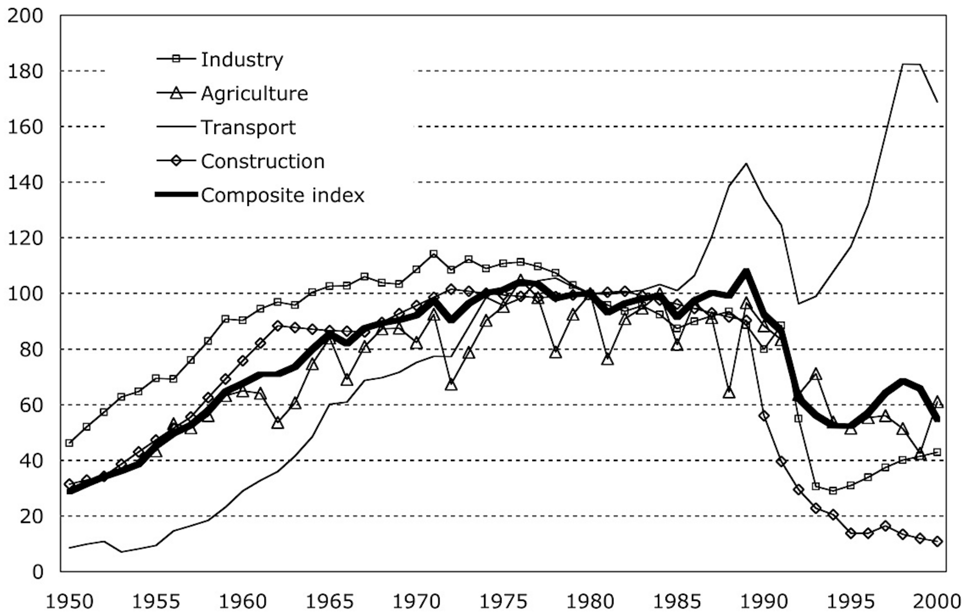
Source: Klesment and Valge (2007).

Like the industrial index, the sectoral transportation index was calculated on the basis of key products (transport of freight by road, rail, and sea). The construction index was based on the number of square metres in new buildings (in 5-year period averages). Because all the key product series were calculated per capita, the sectoral indices are standardised by the size of the population.

The four sectoral indices were aggregated into a composite index, shown in Figure 2.6. Bearing in mind that each sector had a different share of the economy, weights were used to calculate the composite index. Each sector's share of the national income for each year from 1955 to 1980 was used as a weight to calculate the composite index. The shares were obtained from official statistics (ENSV SKV 1981) and extrapolated to cover the 1950s. These shares ranged from 47–53% for industry, 17–27% for agriculture, 7.2–9% for construction, and 4–5% for transport during this period.

Together, the four sectors accounted for approximately 85% of national income, and the other sectors that are not included in these calculations (commerce, marketing, procurement, etc.) comprised the other 15% (ENSV SKV 1981). Components of the non-material sphere, such as education, social services and culture were not included in national income in the Soviet statistics. Consequently, it is likely that the composite index in Figure 2.6 is biased upwards in the earlier decades as compared to the 1970s–1980s, because of the omission of the non-material sphere and some sectors of the material sphere (which most likely increased their share of the total economy during the state socialist period). Another caveat exists with regard to the 1950s – there is no reliable agricultural production data until 1955, so the pre-1955 index is less reliable than that of the later period.

Figure 2.6: Production indices by sector and weighted composite index. 1980 = 100.



Source: Klesment and Valge (2007).

The derived composite index can be taken as a rough estimate of economic growth during the state socialist period. The approach described above is not the only possible use of physical volume data. An alternative method involving physical indicators is to compare similar economies and to calculate the effect of physical volume changes on the GDP of an economy for which the GDP is known, and then to apply the coefficients to an economy for which the GDP is not known.[31] It would have been complicated to find appropriate "benchmark" countries with a similar economic structure to that of Estonia, but with internationally comparable macroeconomic statistics, so we did not explore this option further and instead used the derived composite index for the following calculations.

Applying a composite index of economic growth to estimate GDP requires a benchmark. Fortunately, for the period since 1990, internationally comparable and purchasing power parity-adjusted GDP estimates are available from the United Nations Economic Commission for Europe (UNECE).[32] These are arguably the best figures that have ever been produced for Estonia, in terms of international comparability. As the data includes the year 1990, which marks the end of the state socialist period, we have the required benchmark to develop estimates of GDP for the state socialist period.

Before discussing the use of the calculated composite index further, we want to introduce another source of information. When Estonia regained its independence in 1991, its Statistics Office recalculated the country's national income for the 1980s.[33] However, this data was never used, which probably implies that it was

[31] Cited in Harrison (1994).

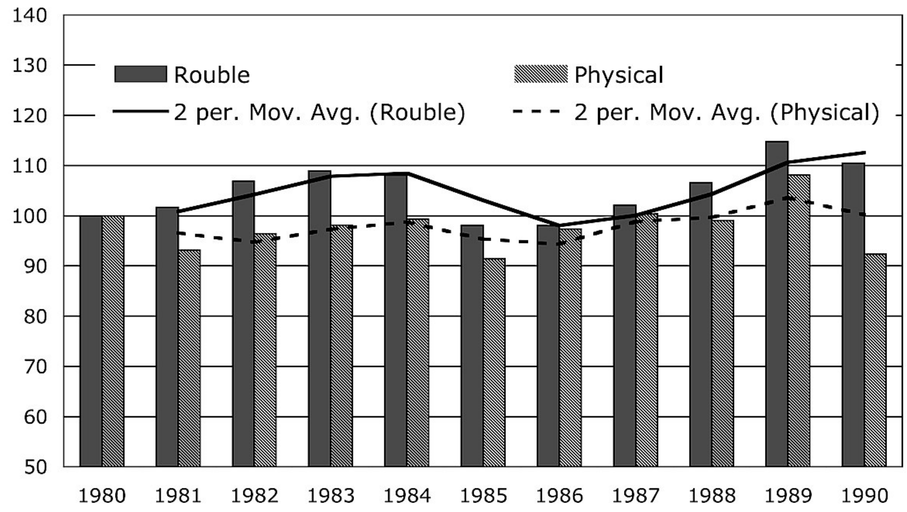
[32] Available at http://w3.unece.org/pxweb/DATABASE/STAT/Economics.stat.asp

[33] The Statistics Office used methods described in the United Nations' document F.20 "Comparison of the system of National Accounts (SNA) and the system of Balances of the national economy

incompatible with national accounts for the 1990s. Although the method recommended by the UN minimised the differences between the MPS and SNA forms of accounting, there was no method of currency conversion but the official and commercial rouble/US$ exchange rates (0.6 and 1.6 rouble per US$ respectively). It was important for the purposes of this paper to convert the 1980–1990 MPS series into SNA series, including adjusting them for inflation. We therefore obtained a GDP index in constant rouble prices from the Statistics Office recalculations, which includes both the material and non-material spheres.

This makes the two index series for 1980–1990 – the physical volume indicators and the rouble index calculated by the Statistics Office – comparable. Both indices are displayed in Figure 2.7.

Figure 2.7: Per capita physical and rouble output 1980–1990. 1980 = 100.

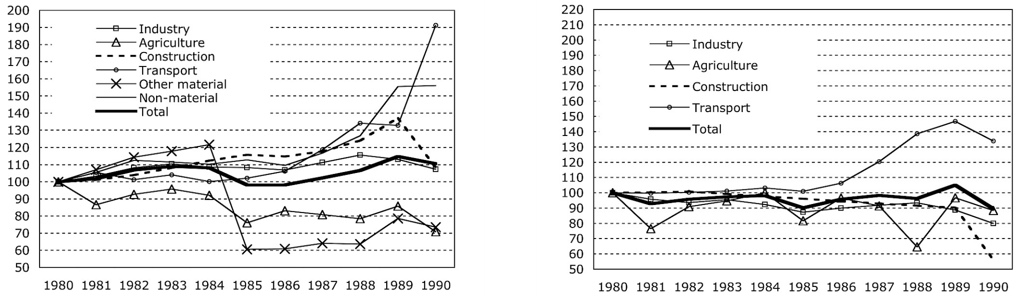


Source: Eesti Statistika (1992), Klesment and Valge (2007), own calculations.

There is a noticeable difference in the indices – the rouble index indicates higher economic growth than the index based on physical volume data. This can be explained partly by the increased share of the non-material sphere, and also by the changing composition of sector output due to the diversification of industry. According to Eesti Statistika (1992) calculations, the share of the material sector fell from 81% to 74% in the 1980s. Therefore, an increasing proportion of non-material output does not appear in the physical volume index. If the rouble index and physical volume index are both partitioned into sectoral indices, as shown side by side in Figure 2.8, considerable differences between the rouble and physical volume indices for industry and construction are revealed. On the other hand, the agriculture and transport indices are relatively similar. It is obviously preferable to use the rouble index for the 1980s, because of the omission of the non-material sphere from the physical volume index. The physical volume index is probably more reliable for the earlier decades of the state socialist period, due to the smaller share of non-material output and less diverse industrial production.

(MPS)" to convert data from the material product system to the system of national accounts. The resulting series are adjusted for inflation and include all sectors of economy. See Eesti Statistika (1992).

Figure 2.8: Sectoral per capita rouble and physical output 1980–1990. 1980 = 100.



(a) Rouble index 1980=100 (b) Physical output index 1980=100

Source: Eesti Statistika (1992), Klesment and Valge (2007), own calculations.

2.2 A new national income series

We have already described the aggregate macro-economic series that are available for 20th century Estonia, and will now discuss how we attempted to integrate these series using the GDP per capita (in 2005 US$) series by UNECE, which places Estonia into an international context for 1990–2008. We assumed that the UNECE series was the best available estimate of Estonian GDP per capita in 1990. In order to simplify further comparisons, the UNECE series was converted from 2005 US$ to 1990 US$ by means of changes in the consumer price index.[34]

Backward extrapolation was the next step. The 1980–1990 rouble index was linked to the UNECE 1990–2008 series, which produced an estimate of 1980–2008 GDP per capita in 1990 US$. This series was further extended from 1980 to 1950 using the physical volume composite index described above. Details of the calculations are shown in Table 2.2. The results are illustrated in Figure 2.9 (1950 to 2008) and Figure 2.10 (for the state socialist period only).

To validate our results, we compared the growth rate estimates for Estonia with earlier estimates for the USSR. According to V.Kudrov, the USSR's rate of annual economic growth in 1950–1978 was 7.7% (on the basis of net material product and gross output); the CIA estimates for the same period were 4.4% (Maddison 1998). Our newly calculated series for Estonia revealed an annual compound growth rate of 4.4% in 1950–1978, which is very close to the CIA estimate. Broken down into shorter periods, Estonia's annual compound growth rate is 8.5% in the 1950s, 2.9% in the 1960s, 0.8% in the 1970s, and 1.4% in the 1980s.

Kudrov's figures show 2.4% annual growth for 1978–1990, whereas the CIA estimates point to a 1.2% annual growth rate over the same period. The new Estonian series indicate a 0.9% annual growth rate for 1978–1990. If the year 1990, in which there was significant negative growth, is excluded, the annual growth rate would be approximately 1.3% for 1978–1989.

On the basis of annual growth rates, the Estonian economy during the state socialist period seems to have developed rapidly in the 1950s and 1960s. Considering the setbacks caused by the war and Sovietisation, centralised industrialisation and the rapid increase in agricultural production in the 1950s–1960s, the high growth rates seem quite realistic. At the same time, the output data is least reliable for the early 1950s; therefore, the 1950s level of income per capita might need to be revised after time series for that period are improved. There is probable cause to be sceptical of the extremely high rate of growth in 1954–1955 (17%); as mentioned

[34] Source: http://www.measuringworth.com/ppowerus/.

Table 2.2: Estimation of the new GDP per capita series 1950–1989.

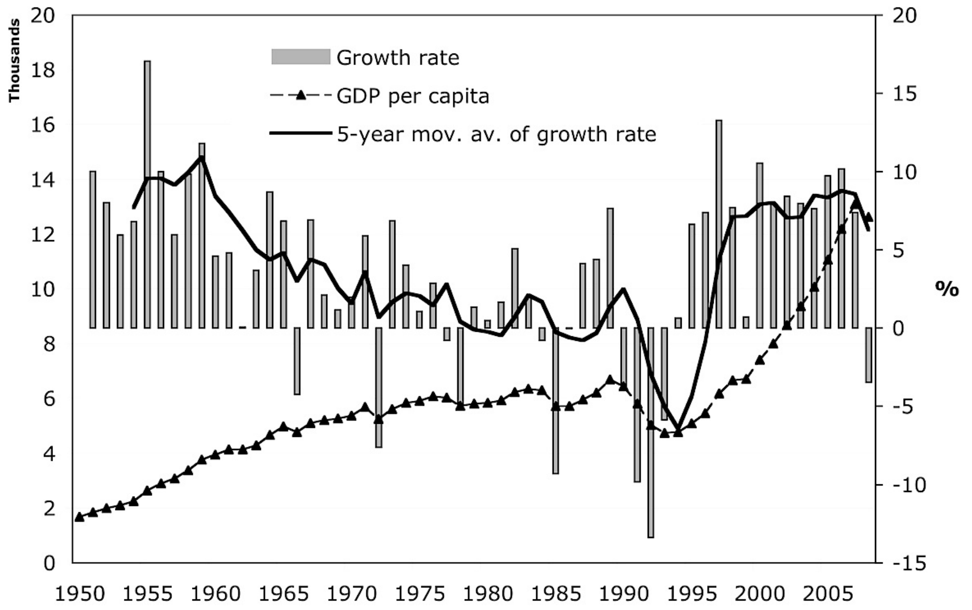
	UNECE series 1990 US$	Rouble index 1990=100	Rouble index 1980=100	Composite physical 1980=100	New series 1990 US$	Growth rate %
1950				28.7	1,676	–
1951				31.6	1,844	10
1952				34.1	1,991	8
1953				36.2	2,110	5.9
1954				38.6	2,253	6.8
1955				45.2	2,637	17.1
1956				49.7	2,901	10
1957				52.7	3,074	6
1958				57.9	3,377	9.8
1959				64.7	3,775	11.8
1960				67.7	3,949	4.6
1961				70.9	4,139	4.8
1962				71.0	4,141	0.1
1963				73.6	4,294	3.7
1964				80.0	4,668	8.7
1965				85.5	4,986	6.8
1966				81.9	4,775	-4.2
1967				87.5	5,106	6.9
1968				89.4	5,213	2.1
1969				90.4	5,273	1.1
1970				92.2	5,377	2
1971				97.6	5,694	5.9
1972				90.2	5,260	-7.6
1973				96.4	5,621	6.9
1974				100.2	5,848	4
1975				101.3	5,909	1.1
1976				104.2	6,079	2.9
1977				103.4	6,031	-0.8
1978				98.2	5,729	-5
1979				99.5	5,806	1.3
1980		90.5	**100**	**100**	5,834	0.5
1981		92.0	101.7	93.1	5,931	1.7
1982		96.7	106.8	96.4	6,232	5.1
1983		98.6	108.9	98.1	6,355	2
1984		97.9	108.1	99.3	6,305	-0.8
1985		88.8	98.0	91.4	5,719	-9.3
1986		88.7	98.0	97.3	5,718	0
1987		92.4	102.1	100.4	5,955	4.1
1988		96.5	106.6	99.0	6,216	4.4
1989		103.8	114.7	108.1	6,692	7.6
1990	**6,444**	**100**	110.5	92.3	6,444	-3.7
1991	5,810			86.5	5,810	-9.8
1992	5,033			62.3	5,033	-13.4
1993	4,739			56.2	4,739	-5.8
1994	4,769			52.5	4,769	0.6
1995	5,084			52.3	5,084	6.6
1996	5,460			57.1	5,460	7.4
1997	6,184			64.3	6,184	13.3
1998	6,661			68.6	6,661	7.7
1999	6,708			65.8	6,708	0.7
2000	7,415			54.7	7,415	10.5
2001	8,002				8,002	7.9
2002	8,674				8,674	8.4
2003	9,365				9,365	8
2004	10,079				10,079	7.6
2005	11,059				11,059	9.7
2006	12,185				12,185	10.2
2007	13,086				13,086	7.4
2008	12,632				12,632	-3.5

Sources: UNECE (2010); Valge (2003); Eesti Statistika (1992); Klesment and Valge (2007), own calculations.

above, there are no reliable agricultural series for the state socialist period prior to 1955.

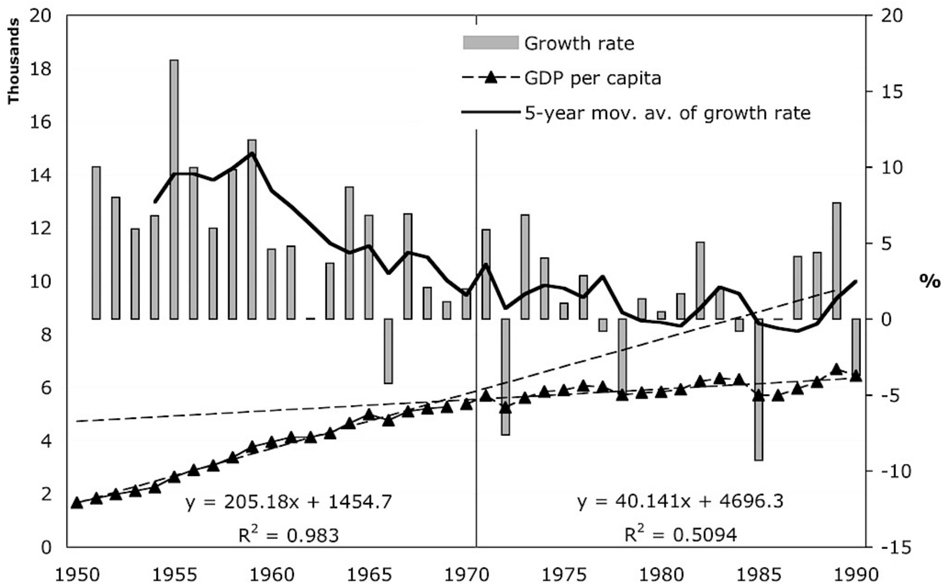
Although economic growth decelerated in the later decades in the USSR in general, some questions arise about the intermittent years of negative growth in the 1960s and 1970s. By our calculations, these are attributable to agricultural failures, such as those of 1965–66, 1971–72, and 1977–78, when the output of grain and potatoes fell considerably compared to the previous year. It is interesting that

Figure 2.9: GDP per capita in thousand 1990 US$ and annual growth in Estonia, 1950–2008.



Source: Table 2.2.

Figure 2.10: GDP per capita in thousand 1990 US$ and annual growth in Estonia, 1950–1990.



Source: Table 2.2.
Note: trend lines are for the period 1950–1969 and 1970–1990.

many industrial indices also contain slumps in 1971–71, so the negative growth might not only be due to poor agricultural production. There is also a sharp decline in 1984–85, which lowered the rouble index by 10 percentage points. Both agriculture and industry declined in that year, but the main cause has not yet been identified.[35]

The Estonian data supports the premise of periods of growth and stagnation in the economy of the USSR. Dividing the state socialist period into halves at 1970 produces markedly different growth trends for the two periods, as shown in Figure 2.10. The years prior to 1970 exhibit relatively vigorous increases throughout the two decades, but the pattern of growth in the second half of the Soviet period remains more or less flat and justifies the application of the term "stagnation", which has been widely used to characterise the economy of the USSR in the 1970s and 1980s.

The 1990s ushered in a massive restructuring of the economy, which resulted in negative growth for 4 years and more than a 25% decline in per capita output by 1994 as compared to the 1990 level. The contraction of the country's economy was even greater than the per capita drop, because the population decreased at the same time due to considerable return migration of Soviet era immigrants after re-establishment of the country's independence. Positive economic growth resumed in 1995.

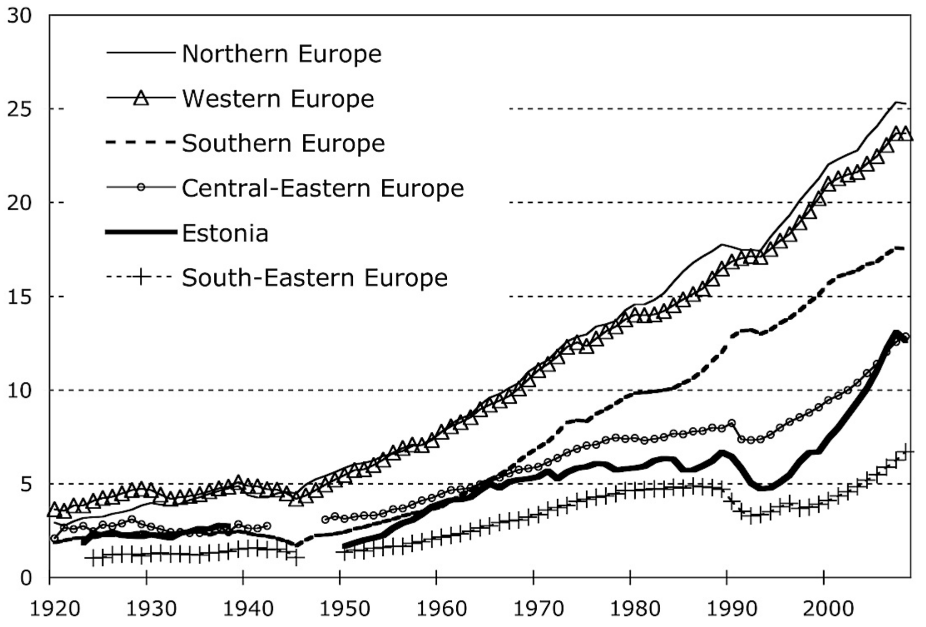
2.3 Estonian economic development in international perspective

The data that showed Estonia's position in the inter-war period relative to the post-1990 period disclosed a major setback in the level of the country's economic development following the Second World War. This deterioration is partly attributable to damage and slow recovery from the war. Although gaps in the physical volume data did not allow the reconstruction of the volume index to be extended to the 1940s, the estimated per capita GDP in the early 1950s was still below the level attained towards the end of the inter-war period. Analysis suggests that despite high rates of economic growth – judging from the composite volume index, annual growth rates in the 1950s and 1960s reached 9–10% – pre-war levels of per capita GDP were not achieved in Estonia until the late 1950s. However, bearing in mind the nature of economic development in the USSR, which strongly favoured the military and heavy industries, it seems likely that in terms of the standard of living, GDP parity with the late inter-war period was reached only in the 1960s.

The setback caused by WWII and its aftermath is substantiated by the international comparisons presented in Figure 2.11. The results show that in the early 1950s, the per capita GDP in Estonia had fallen below the levels observed in all the major regions of Europe, except the South-Eastern. Relatively strong economic growth, which is probably parallel to that of the USSR at that time (Allen 2001), continued until the 1960s, at which time Estonia closed the gap with Central-Eastern and Southern Europe. However, the analysis indicated that the convergence in per capita GDP levels was short-lived. In the 1970s and 1980s, a marked deceleration occurred and negative annual growth rates recurred in Estonia. During that period, the disparity between the levels of economic development in Estonia and the CEE countries reappeared. In addition, a pronounced contrast with Southern Europe became visible, which in a broader perspective reveals the difference in economic performance between centrally planned and market economies in Europe. Our estimates also suggest that Maddison's estimate for Estonia in the 1970s was unrealistically high and should be adjusted downwards.

[35] There was a steep decline in the so-called "other material production sector", which lowered the rouble index substantially. We have not yet determined whether this was caused by the closing of a production unit or a change in the system of measurement.

Figure 2.11: GDP per capita in thousand 1990 US$. Estonia and major European regions, 1920–2008.



Source: Tabel 2.2; A.Maddison. Statistics on World Population, GDP and Per Capita GDP, 1-2008 AD. http://www.ggdc.net/maddison/. Author's calculations.
Note: 1990-2008 are PPP-adjusted UNECE figures. The regions are defined as follows: Northern Europe – Denmark, Finland, Norway, Sweden; Western Europe – Austria, Belgium, France, Germany, Netherlands, Switzerland, United Kingdom, Ireland; Southern Europe – Greece, Italy, Portugal, Spain; Central-Eastern Europe – Czech Republic, Hungary, Poland; South-Eastern Europe – Bulgaria, Romania, Albania, Yugoslavia until 1989.

The trajectory of per capita GDP since 1990 in Estonia confirms the efficiency of economic reforms conducted since the beginning of the 1990s. Despite the steep decline in per capita GDP at the early stage of transition, the recovery has proven to be vigorous and the GDP has risen more rapidly than in most countries of the former Eastern bloc. As a result, Estonia has closed the gap – for the second time since the end of the Second World War – with the countries of Central and Eastern Europe. It is assumed that the long-range trajectory of Estonia's per capita GDP revealed by this analysis offers not only a fairly accurate description of the country's economic performance but is also evidence of changes in the standard of living, and places Estonia in a broader comparative perspective.

3 Discussion

This article describes two major 20th century processes in Estonia. The first – childbearing trends – has been relatively well researched and a summary of these results produces a sufficiently serviceable overview of fertility development. The second – economic development in the 20th century – has been under-researched and indirect measures are necessary to place Estonia's development in international perspective. As shown in the article, a combination of different time series can be useful for this type of exercise. However, the derived GDP per capita series should be seen as a first attempt at such calculations.

By providing a new estimated national income series, this paper has taken a step closer to the possible integration of fertility trends and economic development into one analysis. A few features of the derived data should be pointed out. Starting from the decades of low fertility that immediately followed WWII, the estimates of economic development developed during the study do indeed indicate a substantial setback in per capita GDP in Estonia in the aftermath of that war. Although our estimates did not extend to the late 1940s, a crude interpolation, based on the experience of countries for which continuous data is available, is enough to reveal the severity of the decline that inevitably produced a sharp downturn in the standard of living. This evidence thus lends some support to the hypothesis that temporary economic hardships influence fertility trends.

However, in the case of Estonia, the hardships extended beyond economic factors and involved other societal changes, such as political repression, the Stalinist deportations, etc., which may collectively be termed Sovietisation. Although evidence about the effects of Sovietisation is difficult to find and measure, it is a plausible correlate with Estonia's low fertility in the early post-war decades. Such an inference is in line with an earlier viewpoint expressed by Frejka and Sardon (2004) who, in their comprehensive account of childbearing trends in low-fertility countries, pointed out that "post-war fertility developments in the Baltic countries have to [be] viewed in light of the political developments, namely the Soviet occupation and the extremely violent reorganisation /.../ of the society."

It is important to note that despite the plausible contribution of the economic downturn to the lack of a baby boom in Estonia, its role should not be overstated. It is very difficult in hindsight to disentangle the influence of economic changes from that of the direct human costs of repression and uncertainty. In comparative perspective, the effect of an economic downturn on fertility levels should also be visible in other state socialist countries (CEE states or countries of South-Eastern Europe) following WWII. The latter, however, exhibit considerably higher fertility levels than Estonia during the post-WWII years, although their level of economic development at that time is more similar to Estonia's than to that of western or northern European countries. Perhaps it was the economic downturn combined with the non-economic elements of Sovietisation that precipitated the low fertility in Estonia in the decades immediately following WWII.

It has been shown in this article that Estonian fertility rose from one of the lowest to one of the highest in Europe from the 1950s to 1980s. Unlike the absence of a baby boom, the study revealed no economic underpinnings for the rise in childbearing that brought Estonian fertility rates close to the replacement level during the 1970s and 1980s. The evidence drawn from reconstructed macro-economic trends corroborates the assumption that the latter decades of state socialism were a period of slackening growth in Estonia. In comparative perspective, the country's economic performance lagged behind concurrent developments in other countries, including not only advanced market economies but also, to a certain extent, the former socialist countries of Central Europe.

The inability to directly associate higher fertility levels in the 1970s and 1980s with specific developments in the economic domain does not necessarily imply that the idea of some economic correlates, operating in the background of the demographic trends of that period, must be completely abandoned. In our view, the higher fertility observed in the 1970s and 1980s may be regarded in the context of a gradual "normalisation" of the standard of living after the turmoil of Sovietisation and the hardship it entailed. A plausible, albeit imperfect, trajectory of this normalisation is visible in the series of national GDP estimates developed as part of the framework of this study. In essence, this series exhibits a reasonable similarity to the cohort fertility rate dynamics of the same period. Among the native population, these figures dropped to the lowest point (ca 1.8 children per woman) in the generations born in the mid-1920s, followed by a gradual increase over the next 30 years.

According to this interpretation, both peculiarities of the post-war childbearing trend in Estonia – comparatively low levels until the late 1960s and the ensuing rise – may be related to Sovietisation. In the immediate post-war decade, this process operated through direct negative influences, ranging from a marked decline in the standard of living to overt political repression. Such influences lessened around the mid-1950s; however, the legacy of the early post-war years plausibly survived as a new benchmark against which social and economic dynamics began to be evaluated.

Finally, a few thoughts on post-socialist development can be shared. The early phase of transition in Estonia witnessed a pronounced deterioration of the country's economic performance and a parallel decline in fertility rates. This lends some support to the economic crisis hypothesis; however, the connection should not be overestimated. In particular, the study highlighted the salient contribution of the "postponement transition" that began in Estonia shortly after the beginning of the 1990s and markedly accelerated the fertility decrease according to annually reported measures. In the mid- and late 1990s, this phenomenon was driven exclusively by the shift towards later childbearing; the tempo-adjusted TFR never dropped below 1.6 children in Estonia. In interpreting these developments, we share the view that relates the onset of the fertility postponement transition in Central and Eastern Europe to the removal of mechanisms that upheld the pattern of comparatively early family formation in the state socialist setting. As noted by Sobotka (2004), the societal transformation noticeably increased economic uncertainty but it also expanded the possibilities for self-development, including enrolling in advanced education and building a career. In such a context, the postponement of childbearing can be seen as a rational response to a profoundly transformed structure of opportunities and constraints (Kohler *et al.* 2006).

The marked improvement in the country's macro-economic performance since the mid-1990s, coupled with a gradual recovery of fertility levels, was observed in this study. The recovery was initially restricted to tempo-adjusted measures but the rise subsequently became apparent according to non-adjusted fertility indicators as well. Can these developments be explained by vigorous economic growth and the ensuing improvement in the standard of living? A positive contribution from economic trends seems plausible and in accord with conventional wisdom. However, economic growth cannot provide the complete explanation. This becomes evident when Estonia is compared to other countries. As revealed in the study, despite the continuing prevalence of postponement of childbearing, Estonia has persistently exhibited the highest period TFRs of all the countries of Central and Eastern Europe since 2005. In the Eastern European context, neither Estonia's economic performance nor standard of living fully justify the country's high fertility ranking.

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