Socialisation and selectivity in migrant fertility.

The case of Russian migrants in Estonia.

Master thesis

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29.08.2011

Groningen, the Netherlands

Abstract

This study looks at the timing of first and second births among four groups: native Estonians, first and second generation immigrant Russians in Estonia, and the immigrants' origin country population – Russians in Russia.

Estonia provides an interesting case where immigration processes occurred slightly earlier than in other Western European countries, and the country has a relatively large foreign-origin population (a third of the total population).

The aim of the study is to test effects of migration on fertility. The hypotheses tested in this paper concern long-term demographic development – socialisation effect and selectivity of migrants

The Generations and Gender Survey data used in this paper provides an opportunity to analyse all four groups with comparable data from two countries. This also adds to the current research on the topic by using data, which includes life history approach. Cox regressions models of timing of first conception and time interval between first and second birth are conducted, including male and female respondents from each of the four groups, born between 1924 and 1983, living in urban areas. We control for characteristics such as sex, birth cohort, educational attainment, type of region of origin and timing of migration.

Findings of this analysis confirm the selectivity of first generation immigrant Russians compared to their origin country population – Russians in Russia. However, first generation immigrant Russians are even more different from the native Estonian population, thus the socialisation hypothesis is rejected. Also second generation immigrant Russians follow the same path as the first generation immigrant Russians.

Keywords: migrant fertility, socialisation, selectivity, Estonia, first generation, second generation

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1. INTRODUCTION

The topic of fertility, especially decreasing fertility rates, has been frequently discussed in Western or developed countries, in both academic literature (Frejka et al 2008), in the policy debate and the general media (Economist, 29 October 2009). Scholars have addressed (lowest) low and below replacement fertility from different perspectives (postponement effect by Sobotka (2008), influence of social networks on fertility decision-making by Balbo and Mills (2010), economic factors by Becker (1992)). Structural population changes and long-term below replacement fertility levels have led to concerns about ageing population structures and future burdens for sustainable development.

Estonia, like other developed countries, has been characterized by low-fertility and ageing trends. Estonian fertility reached below replacement fertility already in the 1920s (Katus et al 2002b). During the past two decades, period total fertility rate (TFR) has made a sharp downturn to 1,27, although it has recently shown some recovery (up to 1,64 children per woman, according to Statistics Estonia). The foreign-origin population in Estonia, the majority of which is of Russian origin, has even lower fertility levels than the native Estonian population (Katus et al 2002). Since the foreign-origin population comprises about one third of the total population (Statistics Estonia 2011), comparing the native and immigrant population may provide valuable insight into the characteristics of fertility patterns in Estonia.

Research on migrant fertility has focused primarily on first generation immigrants, usually comparing this population with the native population in the host country (Scott & Stanfors 2008; Coleman 1994; Sobotka 2008; Haug et al 2002). One of the exceptions is a special collection of The International Migration Review from January 2003, which addressed fertility of second generation immigrants in several countries worldwide. The data used to analyse this topic has predominately been cross-sectional, as pointed out by Kulu and Milewski (2007), and Andersson (2004). Cross-sectional data analysis represents family histories of a person by one single point in time (Blossfeld 2002), and thus neglects the previous life course that might have influenced the behaviour of the study participants at the time of the study. Event history data takes into account the change in different statuses over time as well as enables analysis of age and cohort effects (Blossfeld 2002, Mills 2000).

The current research aims to contribute to the literature on migrant fertility by analysing long-term development of migrant population in terms of their fertility behaviour, and by testing the theory of migration effects on fertility. This is done by using the Generations and Gender Survey (GGS) data, which is based on a life course approach and includes several life history modules (Vikat et al 2007, Puur et al 2008, EKDK 2008). Furthermore, the study incorporates data on first and second generation immigrants as well as the population of their origin country, in order to investigate the development of demographic behaviour over time (Katus et al 2005, Courbage 2007). Many scholars have stressed the importance of changes of behaviour patterns over time that need to be taken into account when studying immigrants and their fertility patterns in the residence

country (Scott and Stanfors 2008, Katus et al 2005, Courbage 2007).

The Estonian case allows for an analysis of both first and second generation immigrants that in many Western and Northern European countries is not yet possible, due to the later timing of mass immigration in these countries (e.g. Scott & Stanfors 2008, Andersson 2004, Milewski 2010, Puur et al 2009b).

The main objective of the present research is to compare four groups and find out whether first and second generation immigrant Russians show convergence with the native Estonian population, or have rather maintained their origin country behaviour. Thus, the study attempts to view the degree of possible demographic integration from the fertility perspective. The main research question is as follows: What are the fertility characteristics of first and second generation immigrant Russians in Estonia, in comparison with the native populations of Estonia and their fellows in Russia? More specifically, this research seeks answers to two questions:

1) Are first and second generation immigrant Russians more similar in their fertility behaviour to native Estonians or to native Russians?
2) Are second generation immigrant Russians more alike to Estonian native population in their fertility behaviour than first generation immigrant Russians?

In this study, foreign-origin and native population are defined as recommended in the framework of the study of European immigrants by the Council of Europe (Haug et al 2000, Compton & Courbage 2002). According to that all who have at least one parent and at least one grandparent born in the country of residence are defined as native population. The current study focuses among the foreign-origin population in Estonia on the most numerous group by ethnic origin – Russians. According to the census of Estonia from 2000, over 90% of immigrant population were of Slavic ethnic origin (Statistics Estonia 2011). Establishing among them structurally (including culturally, historically and linguistically) more homogeneous group might help to understand better the determinants of behaviour of immigrants. For comparison from Russia we have chosen a similarly homogeneous group and focus also on Russians by ethnic origin in Russia. The terms of immigrant and foreign-origin population are used interchangeably in this paper. The detailed operationalisation of the observation groups is further explained in the data and methods section. In the following section the overview of the history of formation of immigrant population in Estonia is given.

This study focuses in the analysis of fertility behaviour on the timing of first child conception and on the time interval from first to second birth. In connection to migration, timing of conception of the first child seems to be one of crucial points in determining the following fertility behaviour (Katus & Puur 2006). The appearance of the second child is, on one hand, significant in determining the fertility levels of a group as a whole and, on the other hand, helps further to understand the timing choices on an individual level. The four study groups are analysed by using Cox regression models. The sample and covariates are detailed in the data and methods section.

This paper is structured as follows: the next section describes the history of the formation

of immigrant population in Estonia. In the third section, the theoretical framework will be discussed, with an overview of previous studies. The data and methods chapter discusses the study population, the dataset, as well as the variables and methods used to analyse the data. The results are reported in the fifth section, followed by discussion.

2. THE HISTORY OF MIGRANT POPULATION IN ESTONIA

Migration processes in Estonia have had some similarities as well as a somewhat different background in comparison to the rest of Western and Northern European countries' experiences. The main difference comes from the fact that Estonia was incorporated into the Soviet Union immediately after the World War II and thus immigration started immediately after the war ended (Sakkeus 1994). Earlier timing of immigration to Estonia makes it an interesting case study since only few Western and Northern European countries have such a large proportion of first and second generation immigrants to test the theory of migration effect on fertility. The relatively later influx of immigrants to Western and Northern European countries has also been suggested as one of the reasons for lack of research in this field (Puur et al 2009b).

In addition to that, Soviet republics experienced forced migration (Puur et al 2009b), especially in the 1940s, mostly in the form of deportations. In the case of Baltic states, the largest deportation happened in 1949 when around 92000 people were deported to Siberia (Rahi 2003) which partly created good grounds for mass immigration, especially for Estonia.

Migration policies of the Soviet Union in general were centrally directed from all-union government level, which used highly regulated housing and labour market policies as main instruments for execution of migration policies. Soviet Union was characterized by a planned economy and especially by the preferential development of the industrial sector. Therefore the main focus was on the development of regions within the Soviet Union with either high mineral resources or where existing infrastructure had all the necessary prerequisites for economic activity (like Estonia and Latvia (Kõll & Valge 1998)). Migration policies of the Soviet Union can be regarded as labour force policies that created incentives to move, arranged from a central level. Housing was highly regulated, financed and managed by the Soviet state as well (Buckley et al 2011, Kährik 2006, Kulu 2003); the role of private market was restricted in that.

Migrants (as well as the 'nomenclature') received housing in a facilitating manner - they were favoured due to belonging to the labour force needed for economic development, and because housing was a deficit product (Kährik 2006). Especially construction and industry workers as well as government employees had easier access to new housing (Kährik 2006, Kulu 2003). As Kulu points out regarding the city of Tartu in Soviet Estonia: "An individual's employment sector strongly influenced access to housing" (Kulu 2003, p 908). Usually these labour migrants were granted a place to live immediately upon arrival (Kulu 2003). When a child was born to a young family, they could queue up to ask for a bigger living place (Katus & Puur 2006). Indirectly, fertility could be affected depending whether one lived in urban (where apartments dominate) or rural (bigger houses prevail) environment. In any case, the outcome of such distribution by the state was a creation of "asymmetrical allocation of social classes, occupational and ethnic groups in space" (Kährik 2006, p 24).

However, according to Puur et al (2009b), the characteristics of these migration processes and migrants are comparable to migration experiences in Western and Northern European countries. Similarly to European countries, foreign-origin population of Estonia had relatively distant demographic, cultural and geographical backgrounds, a young age structure, labour market mobility as the main type of migration, employment of foreign-origin population in specific areas and sectors, and low rates of intermarriage with the native population (Puur et al 2009b). Family-union purposes became relevant in later cohorts (Puur et al 2009a), similarly to countries such as Germany, the Netherlands or Sweden (Milewski 2010, Gaarssen & Nicolaas 2008, Andersson 2004).

During the Soviet Union, the countries incorporated into this entity, remained relatively autonomous, and in particular Estonia had all political and power structures of its own, similar to an independent country (like Ministry of Foreign Affairs among others) (Liimets 2008). Thus, the migration flows between countries (or at least Estonia) within Soviet Union cannot be regarded as internal migration.

Another feature that has to be taken into account when describing these migration flows, is the question why it affected the most Estonia and Latvia regarding the outcome of high proportion of foreign-origin population (25% in the 2000s) (Sakkeus 2010). Aside the political changes, the different timing of the onset of the demographic and mobility transitions of different countries and regions in the Soviet Union made Estonia and Latvia the receiving countries for immigrants after World War II. During the same period, other countries and regions of the Soviet Union reached the peak of emigration potential (Katus et al 2005). Additionally, Estonia's (as well as Latvia's) infrastructure was quite developed in the international context by the time it was incorporated to the Soviet Union (Kõll & Valge 1998), making it a favourable region for the Soviet Union's purposes of the expansive industrial development.

Therefore, during the post-war decade, immigration flows were the highest ever recorded in Estonia with a peak of 45000 migrants entering in 1955, decreasing only after the mid 1950-s (Sakkeus 1994). Another larger flow of immigration took place at the end of 1960s with a peak of 30000 migrants in 1970, when immigrants originating from further parts of eastern and southern Soviet Union entered the country (Sakkeus 1994). These flows were partly the outcome of the corresponding phases of demographic and mobility transitions of these nations (Katus et al 2002b).

By 1989, the foreign-born population of just the first generation comprised 26% (additional 10% was second generation) of the total Estonian population, thereby making Estonia with one of the biggest shares of immigrant population among European countries (Katus et al 2002a). Another interesting characteristic of immigration in Estonia was a very high turnover of migrants, which reached almost 3 million people between 1946-1991 (Katus et al 2002b). However, from these migrants entering the country, about seven out of eight immigrants left Estonia, indicating low immigrant adaptability and military-related movements (Katus et al 2005, Katus et al 2002a).

As concerns the migration after regaining independence in 1991, it has been estimated

that about 4% of current foreign-origin population in Estonia arrived after that period (Sakkeus 2007). 1990s were mostly described by return migration of foreign-origin population, estimated amount of repatriating non-Estonians to their homelands being around 155 000 (Tammaru & Kulu 2003).

With regard to the composition of immigrants, they were mostly of Slavic ethnicity (Katus et al 2002b). By 2000, 80% of foreign-origin population were of Russian origin (Statistics Estonia 2011). The age structure of foreign-origin population was relatively young compared to the native Estonian population (Katus & Puur 2006) as is common for every migrant group (Rogers et al 1978). According to the data of the census of 1959, when ageing of the migrants' population had already taken off as well, the difference in the median ages between native and foreign-origin population reached almost 8 years. Table 1 displays the different age structures of the respective populations, and the outcome by 2000 in terms of median ages and share of elderly population. The sharp ageing of immigrant population was caused by gradual stop of inflow of new immigrants, which was characteristic to the 1990s.

Table 1. Median age and share of elderly population among native and foreign-origin population in Estonia during census years of 1959-2000

	Native population		**Foreign-origin population**	
	Share of elderly (60+)	**Median age**	**Share of elderly (60+)**	**Median age**
1959	17.9	34.8	6.7	27.1
1970	20.8	36.1	8.1	30.4
1970	20.1	36.3	9.4	30.4
1989	19.1	35.1	13.2	32.9
2000	20.9	36.3	21.0	40.3

Source: Katus, K. & Puur, A. (2006) Eesti rahvastikuarengu raamat. Esimene väljaanne [Population development in Estonia. First Issue]. RU Series D, no.5, Tallinn, EKDK

By the educational structure, those who had remained in Estonia, display an equivalent educational level to that of the native Estonian population (Sakkeus 2007). However, despite their educational levels, they were often employed in fields that were better paid, but required less qualification (Puur & Sakkeus 1999) due to the Soviet specificity of preferring working class (e.g. wage differences were in favour of industrial and agricultural workers (Klesment & Sakkeus 2010)).

3. THEORETICAL BACKGROUND

Research on migrant fertility brings forward different hypotheses which are described in this section.

Short-term impacts of migration on fertility have been described by the *disruption* hypothesis (Andersson 2004, Milewski 2010) as well as by the hypothesis of *interrelation of life events* (Milewski 2010). The first hypothesis suggests that due to the stressful experience that migration entails, people who have recently migrated postpone childbearing in the period following migration. There is evidence of this effect for both internal as well as international migration (Milewski 2010). The second hypothesis suggests that some migrants may move for the purpose of family (re)union, and therefore it indicates a higher probability of earlier childbearing in comparison with the native or origin country population, shortly after their migration event. *Adaptation* hypothesis indicates a medium-term convergence of fertility levels, emphasising the role of the social context of the host country in influencing the fertility behaviour of migrants within some years of residency (Milewski 2010).

Long-term effects of the migration event on fertility have been characterised by two concepts. First, the *socialisation* hypothesis (Andersson 2004, Kulu & Milewski 2007, Milewski 2010) assumes that migrant fertility reflects the prevalent behavioural pattern in their adulthood, which is similar to the norms, behaviour and values that they have been exposed to during their childhood. If a first-generation migrant has been mainly influenced by the origin country context, (s)he will exhibit fertility behaviour that is similar to that population. However, in the case of a second-generation migrant a stronger influence of the host country norms, values and behaviour could be expected, and therefore they resemble the native population of the host country in their fertility behaviour.

The second explanation capturing the long-term effect of migration is called the *selectivity* hypothesis (Andersson 2004, Milewski 2010). According to this theory, migrants are a specific group of people who are initially differentiated from their origin country population even prior to migrating. Selectivity refers to migrants having different measured or unmeasured attributes (for instance, fertility) that distinguishes them from the origin population that they are from. From one side, they can carry characteristics which are more prevalent in the new destination population and therefore they can have higher probability of migrating to this destination than the origin country population (Milewski 2010). Alternatively, they can demonstrate even a third type of behaviour, but in any case distinct from the origin country population.

Previous research on migrant selectivity (Buckley et al 2011, Milewski 2010) has indicated that differences between immigrants and native population of the host country can be attributed to compositional factors, such as age, sex, education, region of origin, language, timing of migration. These can explain the advantages in health status (Buckley et al 2011) or the existence of fertility differentials (Milewski 2010) among certain

groups. As suggested by Milewski (2010), fertility differentials can be tested when compositional differences between the different groups are removed (by controlling for socio-demographic structure).

Studies on the fertility trends of immigrants in Estonia have on the aggregate level shown divergent patterns compared to native Estonians (Katus et al 2002a, Katus et al 2002b, Katus & Puur 2006). Immigrant population has followed the trend of fertility in Russia with higher fertility among older cohorts and decrease to below-replacement fertility in younger cohorts with levels remaining lower than in Estonia (Katus et al 2002b, Barkalov et al 1999). In general, childlessness has been less for immigrant population (Katus & Puur 2006), typical to that in the East of Hajnal line (Hajnal 1965). However, immigrant population has been described by much lower probability to have second children than native Estonians (Katus & Puur 2006, Klesment & Puur 2009). Russia has been described by relatively young ages in timing of first child (Kesseli 2008) and nowadays also less probability of having a second child (Barkalov et al 1999, Zakharov 2008).

Fertility differentials between the different population groups have been explained by the different timing of demographic transitions. The difference of the timing of the start of the First Demographic Transition (FDT) between Estonia and Russia has been reported to be one of the biggest in the world between two neighbouring countries – 50 years (Katus 1994, Vishnevski 2006) with Estonia entering the FDT in the middle of the 19th century (Katus et al 2002b) while Russia entered the transition in the beginning of the 20th century (Zakharov 2008).

Preliminary analysis on fertility differentials between native Estonians and foreign-origin population in Estonia (Klesment 2010) have shown no disruption effect for the total foreign-origin population (however without making a distinction between generations which might downplay the effect). There has been found evidence of socialisation of foreign-origin population to their origin country behaviour rather than to the host society in terms of fertility behaviour as well as cohabitation patterns (Klesment 2010, Rahnu 2011).

The current study has taken these theories and results into account in formulating hypotheses on the fertility behaviour of Russian migrants in Estonia. Since migration to Estonia started relatively early compared to other Western and Northern European countries, this paper uses the availability of cohort data to focus on the effects of migration on fertility.

Hypotheses regarding the first generation immigrant Russians

Previous studies (Katus et al 2002a, Katus et al 2002b, Katus & Puur 2006, Klesment 2010) have shown a relatively small degree of adaptation of immigrant population's fertility behaviour to that of the native Estonians' fertility. The same is assumed for immigrants of Russian ethnic origin. The reason for low adaptability of first generation immigrants may lie in the different socializing environment (Rahnu 2011). While growing up, first generation immigrant Russians were exposed to the values, norms and

behaviour of their origin country environment. Thus the first hypothesis is as follows *(H1): it is expected that the first generation immigrant Russians' fertility behaviour resembles that of their origin country population more than that of the native Estonian population.* In relation to first birth we expect immigrants to have first births relatively younger than native Estonians. As concerns the interval from first to second birth, we assume that it is longer for first generation as the delay in second births might be responsible for the lower levels of fertility rates in general.

Since the age structure of migrants in Estonia has been different from that of the native population of Estonia as well as their fellows in Russia, i.e. mainly young people entered Estonia at the time of migration, it is expected that age and other related structural differences (such as educational attainment) cause different fertility outcomes for the observed groups. The second hypothesis is as follows *(H2): it is expected that first generation immigrant Russians are a selective group and therefore they do not resemble the Russians in Russia with regard to their fertility behaviour.* For timing of first birth it is expected that the first generation immigrant Russians have higher age than Russians in Russia. It is expected that first generation immigrant Russians have shorter interval between first and second birth than Russians in Russia.

The first and second hypotheses are contradictory in nature and therefore one of the aims of this research is to understand which of the two hypotheses dominates for first generation immigrant Russians.

Hypothesis regarding the second generation immigrant Russians

As to the second generation immigrant Russians, since they have been born in Estonia it is assumed that the main socialisation of the second generation immigrant Russians has taken place in the environment of their residence country. Therefore the hypothesis for the second generation is as follows *(H3): the second generation immigrant Russians' fertility behaviour is closer to the native Estonian population than to the first generation immigrant Russians.* Regarding the timing of first child, it is expected that the second generation immigrant Russians are closer in this to the native Estonians rather than to the first generation group. In terms of the time interval between first and second birth, it is expected that the second generation immigrants have a shorter interval than first generation and are thus closer to native Estonians.

This paper focuses only on the long-term migration effects. Due to low intermarriage rates between foreign-origin and native population (Puur et al 2009b), the current paper will not test the hypothesis of interrelation of events as it is expected not to be that relevant in the Estonian case. Also, as previous studies have shown little disruption (e.g. Klesment 2010) as well as adaptation effect (e.g. Katus et al 2002a), these effects will not be tested here again.

4. DATA AND METHODOLOGY

4.1 Data

The data used for analysis is microdata collected within the framework of the Generations and Gender Survey (GGS) both in Estonia and Russia during 2004 and 2005. GGS is an international survey aimed at tracking factors influencing the changing demographic behaviour, intergenerational and partner relations in mostly developed countries (Vikat et al 2007). It combines prospective and retrospective approaches, and draws information from different areas of life. Therefore multidisciplinarity and incorporation of different life histories are important parts of the GGS, enabling the explanation of demographic events of individuals with different contexts (Vikat et al 2007).

This study includes both male and female respondents to control for sex and in order to have more cases for analysis. Further, the sample was selected according to those respondents born between 1924 and 1983 and who have reported urban settlement as the current type of settlement at the time of the interview (see table 2), i.e. 11341 respondents in total.

Table 2. Type of settlement of four observation grups

Group	Rural	Urban	Total
First generation immigrant Russians	21	712	733
Percentage	2,9%	97,1%	100%
Second generation immigrant Russians	25	695	720
Percentage	3,5%	96,5%	100%
Native Estonians	2183	3414	5597
Percentage	39%	61%	100%
Russians in Russia	2765	6520	9285
Percentage	29,8%	70,2%	100%
Total	4994	11341	16335
Percentage	30,6%	69,4%	100%

Socialisation assumes the impact of the surrounding environment, and it has been established that fertility is in general higher in rural areas (Katus et al 2002a). Keeping in mind that 97% of first generation immigrant Russians in Estonia have settled in urban areas and 97% of all second generation immigrant Russians have been born or have spent most of their childhood in urban areas (table 4), urban population has been selected for analysis as one of the suggested ways to diminish selectivity (Milewski 2010).

The definitions of native and foreign-origin populations in this study have been formulated not according to the legal definition of citizenship which has been indicated to be insufficient (Haug 2000), but rather based on the place of birth of migrants, their parents and grandparents.

An individual is considered as belonging to the native population of Estonia when at least one of the parents or at least one of the grandparents was born in Estonia (thus also including those who might have been born abroad, but have migrated back to Estonia at some point in their life; also descendents of mixed marriages are considered as native Estonians). Since most of the immigrants in Estonia are comprised of Slavic origin, especially of Russian origin (Statistics Estonia 2011), and partly due to the availability of comparable data in Russia, the immigrant group under observation in this paper includes only Russians – to diminish sructural effects which might originate from cultural heritage (Rahnu 2011). First-generation immigrant Russians are defined as people who were not born in Estonia and have a Russian ethnic affiliation (self-reported ethnicity). Second generation immigrant Russians are defined as people who have no parents and grandparents born in Estonia, but who themselves have been born in Estonia after 1945, and have a Russian ethnic affiliation. In addition, Russians in Russia (according to self-reported ethnic affiliation) are included as a fourth observation group to enable comparison with the immigrants' origin country demographic behaviour.

The first generation immigrant Russians include only these respondents who have conceived their first child after migration event to be able to test the effect of migration on fertility. First generation immigrant Russians who had their first birth before migrating to Estonia have not been included in the analysis (about 30% of the first generation were ommitted from analysis due to this reason). Also, first generation migrants who migrated between their first and second birth have not been included in the analysis in order to more fully test for socialisation effect.

There is no distinction made between migrants moving to Estonia before 1991 and after 1991 since the share of these migrants is very small – only 4% (Sakkeus 2007) as mentioned earlier.

In total, the sample size is 11341 cases, consisting of 712 first generation immigrant Russians, 695 second generation immigrant Russians, 3414 native Estonian population representatives, and 6520 Russians in Russia.

4.2 Methodology and Covariates

This paper focuses on the timing of first and second births. The independent variable for the timing of first birth is age of the respondent at conception of first child. This was calculated by subtracting 9 months from the age at first birth, in order to be able to distinguish these who have conceived their child after migration and gave birth to them also after migration to be able to test the effect of migration on fertility. The independent variable for the timing of second birth is the time interval in months between first and second birth.

Respondents were at risk of first birth from age 15 until the event occurred or until the interview took place. If respondents had not experienced birth by the time of interview, they were censored at their age, or if they were older than 45 at that time, they were censored at age 45. Respondents having their first child after age 45 were censored at age

45. Respondents were at risk of second birth from the moment of first birth until the event occurred or until the interview took place. Censoring in the analysis of second birth was done in the same way as in the analysis of first birth.

Descriptive statistics and Cox regression models are used to analyse the timing transitions to first and second births. Cox regression analysis is a survival analysis method (Hinde 1998) which estimates relative risks of timing for different groups. Advantages of Cox regression analysis (compared to logistic or linear regression models, for example) include handling of censored data, accommodation of both discreet and continuous variables as well as time-dependent covariates.

Timing to first and second births is analysed within four observation groups – native Estonians, first and second generation immigrant Russians in Estonia, and Russians in Russia in order to detect similarities and differences in the fertility behaviour between these groups. The groups have been defined as described in the previous section.

For testing the posed hypotheses, the following control variables have been included: sex, birth cohort, education level, enrollment in education, type of origin settlement and timing of migration.

Sex has been added to control for structural gender differences (also within observation groups) in the timing of first and second births. Birth cohorts have been defined in 10-year birth cohorts, born between years of 1924 and 1983. Firstly, this variable controls the impact of different cohorts on the timing of births. Secondly, this is used as a control for age structure.

Education level has been added as the main control for socio-economic differences. The variable has been defined as the highest attained level of education (according to international ISCED categorisation) at the time of the interview. Research (Klesment & Puur 2009) has indicated evidence of differences in fertility behaviour by different educational levels. Enrollment in education at the time of the interview has been added as a control for the effect of being in education on timing of births.

Although we look only at urban population, the type of region of origin can influence the behaviour in adulthood as well, as a way of socialisation effect. Therefore the type of region of origin has been added as one of the control variables indicating whether originating from rural or urban background has an impact on timing of births within each observation group.

Timing of migration has been computed for first generation immigrant Russians who have migrated to Estonia between the age of 18-25. The reason for including this age range lies behind the fact that this is usually the most active time of migrating in a person's life course (Rogers et al 1978) which also coincides with the most active childbearing period, and migration experience can thus have an effect on postponement of first birth (Milewski 2010). Therefore it is important to control for this experience in relation to the first generation immigrant Russians.

5. RESULTS
5.1 Descriptive analysis

1. Mean age of the respondent at the time of the interview

Age of the respondent in months at the time of the interview was included in descriptive analysis to have an understanding of the age structures of each population group (see figures 1-4). The first generation immigrant Russians show the oldest age structure, having a mean age of 56,03 years. The second generation immigrant Russians have the youngest age structure with 37,01 years as the mean age. Native Estonian population and Russians in Russia are just in between with mean ages of 47,4 years and 46,2 years, respectively.

Figure 1. Mean age, first generation

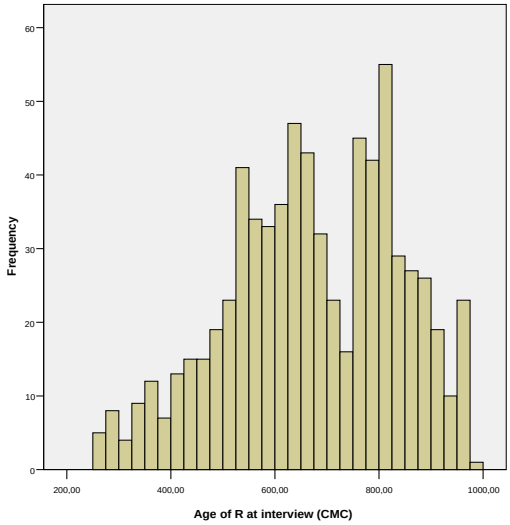


Figure 2. Mean age, second generation

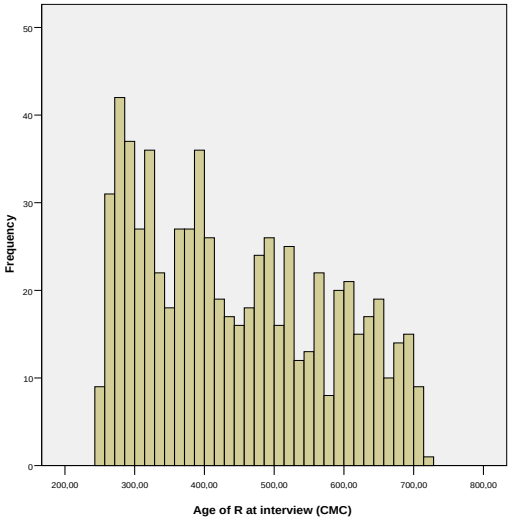


Figure 1. Mean age, native Estonians

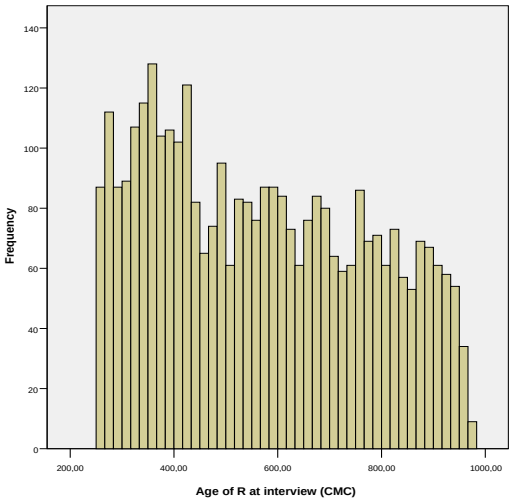
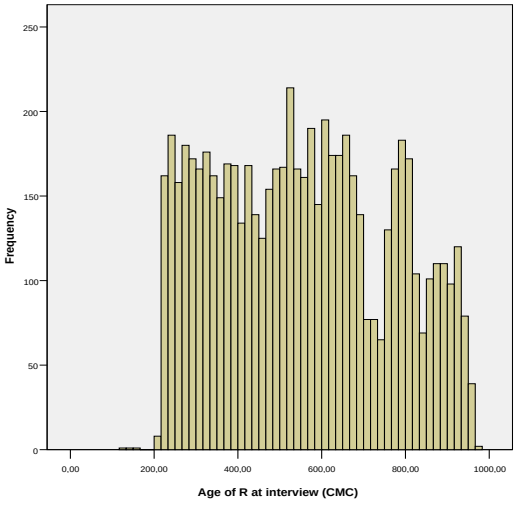


Figure 2. Mean age, Russians in Russia



2. Number of children

As seen from table 3, the first generation immigrant Russians have the highest share (86,7%) of these respondents who have had their first child by the time of interview or by age 45. Also, they have the largest share (53,1%) of these respondents who have had their second child by that time, mirroring partly also the age structure and higher probability of completed fertility among this group. Russians in Russia demonstrate the lowest share in having first (65%) as well as second child (29,7%), followed by the second generation immigrant Russians who have the youngest age structure among the observation group and thus have not yet completed their reproduction. For Russians in Russia these numbers also reflect high share of childless respondents (confirming similar results from previous research (Barkalov et al 1999). Native Estonians show the highest share (13,6%) of those respondents having three children, confirming also previous results of their higher probability to have higher order births than Russians in Russia as well as immigrant Russians in Estonia (Barkalov et al 1999, Katus & Puur 2006).

Table 3. Frequency of number of children per respondent

	First generation		Second generation		Native Estonians		Russians in Russia	
First birth has occurred	617	86,7%	480	69,1%	2629	77%	4237	65%
No first birth	95	13,3%	215	30,9%	785	23%	2283	35%
Total	712	100%	695	100%	3414	100%	6520	100%
Second birth has occurred	378	53,1%	227	32,7%	1714	50,2%	1938	29,7%
No second birth	334	46,9%	468	67,3%	1700	49,8%	4582	70,3%
Total	712	100%	695	100%	3414	100%	6520	100%
Third birth has occurred	47	6,6%	29	4,2%	466	13,6%	280	4,3%
No third birth	665	93,4%	666	95,8%	2948	86,4%	6240	95,7%
Total	712	100%	695	100%	3414	100%	6520	100%

3. Mean age of the respondent at first conception

Mean age of the respondent at first birth in months was calculated by subtracting 9 months to get the time of conception in order to include in the analysis only these respondents who were already pregnant by the time they migrated and thus test the effect of migration on fertility. Figures 5-8 present the frequencies for four groups. Second generation immigrant Russians have the youngest mean age at conception of first child – 22,8 years followed by Russians in Russia with 23,8 years. Mean age at conception of first child for native Estonian population is 24,2 years, and first generation immigrant Russians have the oldest mean age at conception at 24,4 years. However, it has to be taken into account here that due to having the youngest age structure, the second generation immigrant Russians have not completed their fertility careers yet, while most of the first generation immigrant Russians have.

Figure 5. Mean age at conception, first generation

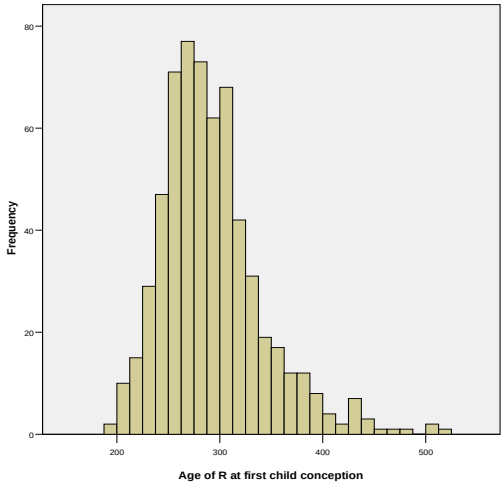


Figure 6. Mean age at conception, second generation

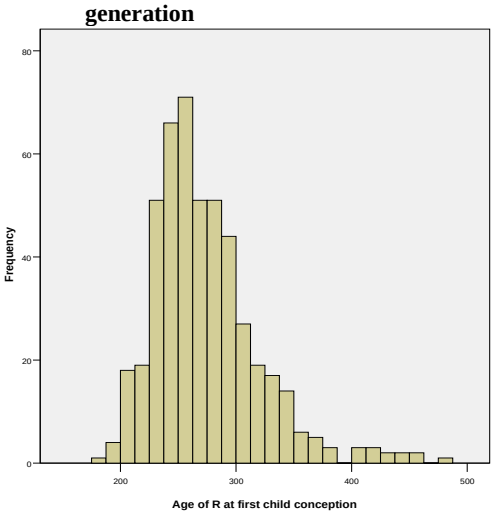


Figure 7. Mean age at conception, native Estonians

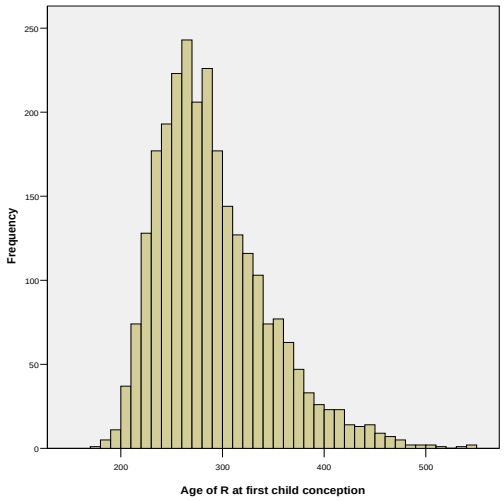
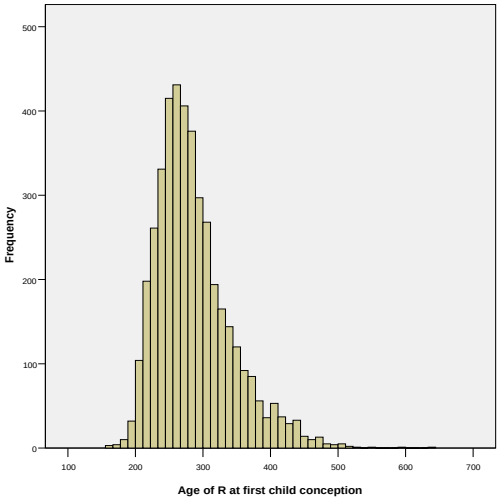
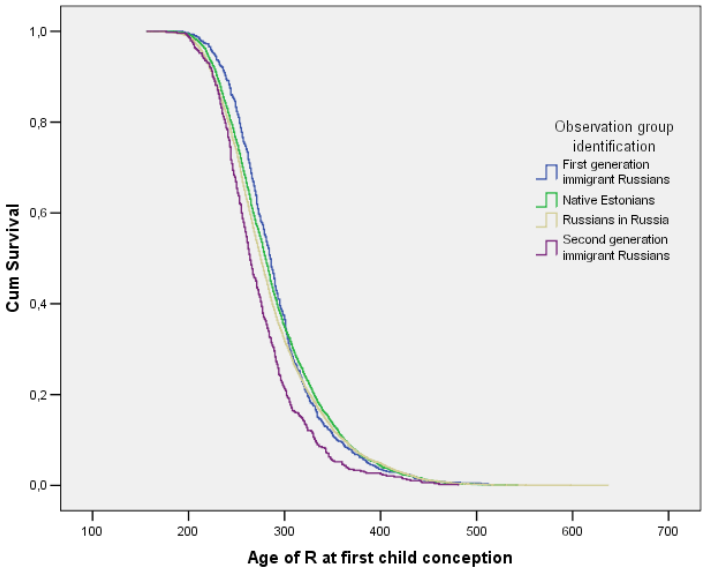


Figure 8. Mean age at conception, Russians in Russia



Kaplan-Meier estimates of the timing of first conception by four observation groups are presented on figure 9. The survival curves demonstrate indeed that second generation immigrant Russians have the lowest age at first conception. First generation immigrant Russians start their childbearing the latest, however most of the native Estonians still indicate cumulation of first births to older ages than other groups.

Figure 9. Kaplan-Meier survival curves of timing of first conception, four observation groups



4. Time interval between first and second births

Mean age of the respondent at second birth and interval between first and second births were calculated for these respondents who have had first child. For first generation only these have been included who had their first birth after migration. Since the number of cases where migration event took place after first birth was relatively small (77), these cases were not included in the second birth analysis.

Again, the second generation immigrant Russians show the youngest mean age at second birth at the age of 27,8 years (figure 12); the first generation immigrant Russians show the oldest mean age at second birth (figure 10) at the age of 29,5 years while native Estonians and Russians in Russia stay just in between the other two groups (figures 14 and 16) demonstrating almost the same mean age at conception of second child (28,5 and 28, 9 years, respectively).

However, since the timing of second birth is dependent on the timing of first birth, the time interval (in months) between second and first birth can give a better indication of reproductive behaviour patterns between different observation groups. For first generation immigrant Russians the mean interval is 19,8 months (figure 11). Second generation immigrant Russians have an interval of 21,5 months (figure 13). Russians in Russia have the highest interval of 23,5 months, i.e. almost 2 years (figure 17) while native Estonians have the lowest interval range of 16,4 months (figure 15).

Figure 10. Mean age at second birth, first generation

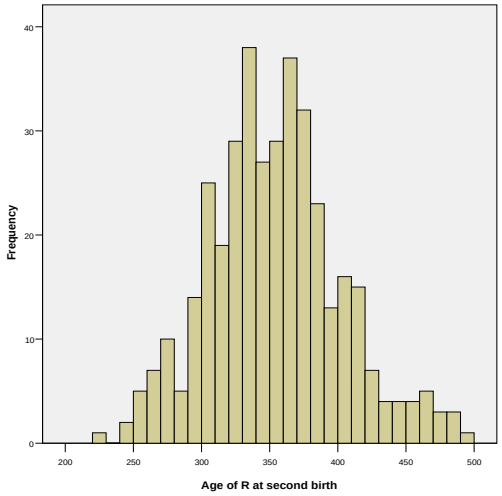


Figure 11. Interval between births, first generation

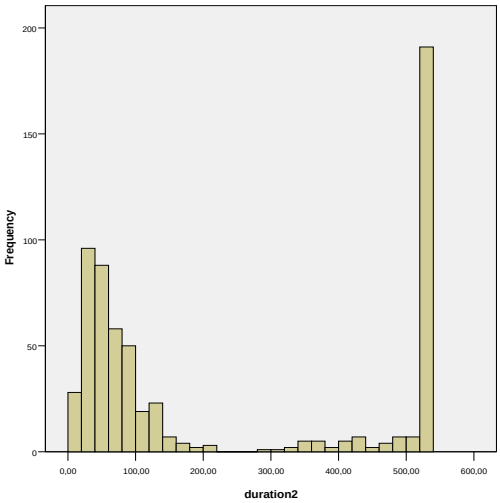


Figure 12. Mean age at second birth, 2nd generation

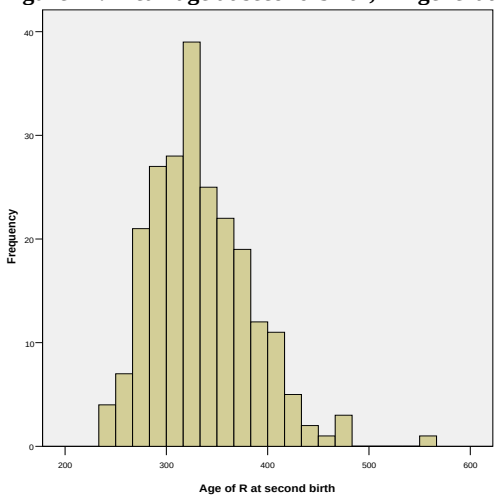


Figure 13. Interval between births, 2nd generation

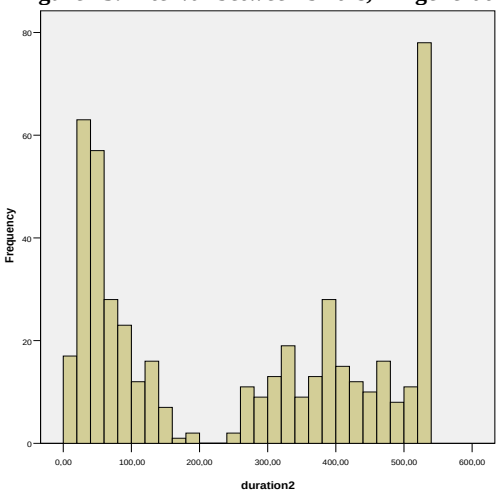


Figure 14. Mean age at second birth, native Estonians

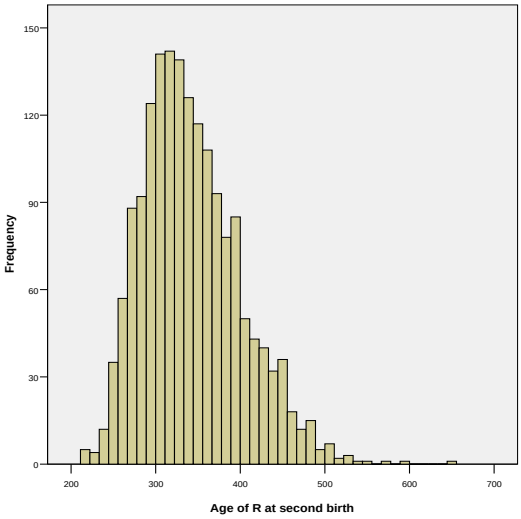


Figure 15. Interval between births, native Estonians

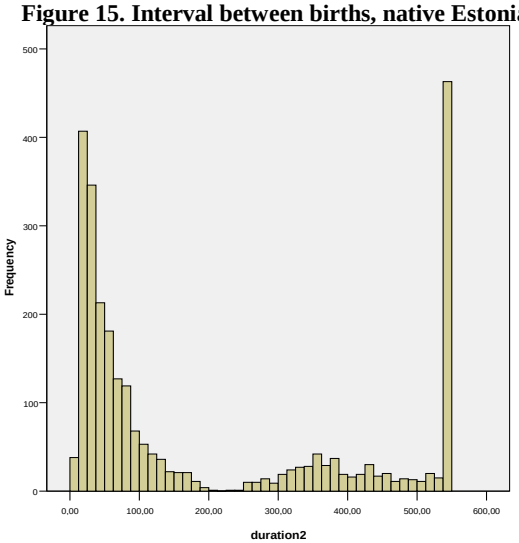


Figure 16. Mean age at second birth, Russians in Russia

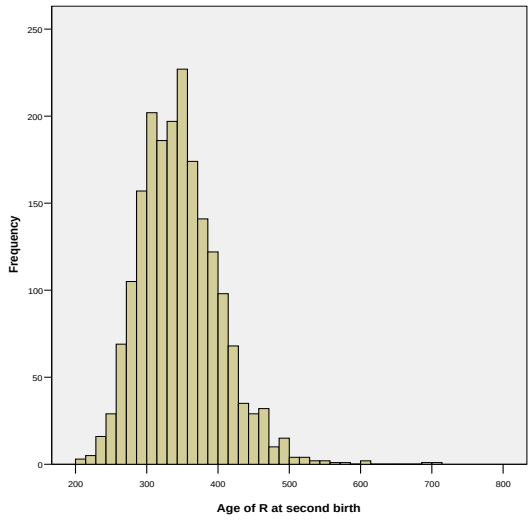
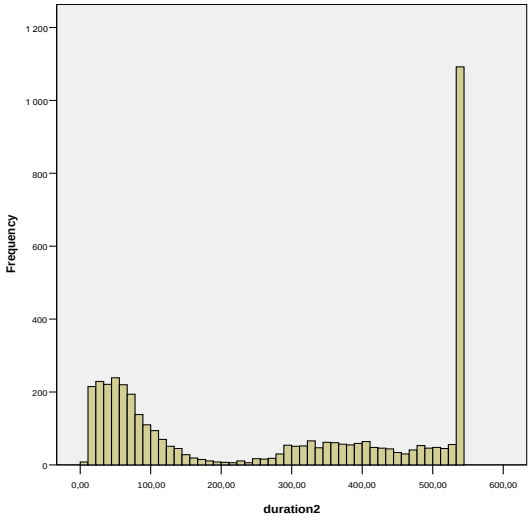


Figure 17. Interval between births, Russians in Russia



The mean of time interval includes also these respondents who have not had a second child by age 45 or by the time of interview, as illustrated by the peak of respondents in the last age category on the interval histograms. The lowest mean interval for native Estonians is due to the fact that they tend to have their first child at a rather late age, followed quite soon by the second child, as illustrated by the high prevalence of second births within a short interval (figure 15). At the same time, as was seen from table 3, 70% of Russians in Russia have not had a second child and therefore the interval also spreads out over the years more evenly and demonstrates a much lower prevalence compared to other groups.

Figure 18. Kaplan-Meier survival curves of timing of second birth, four observation groups

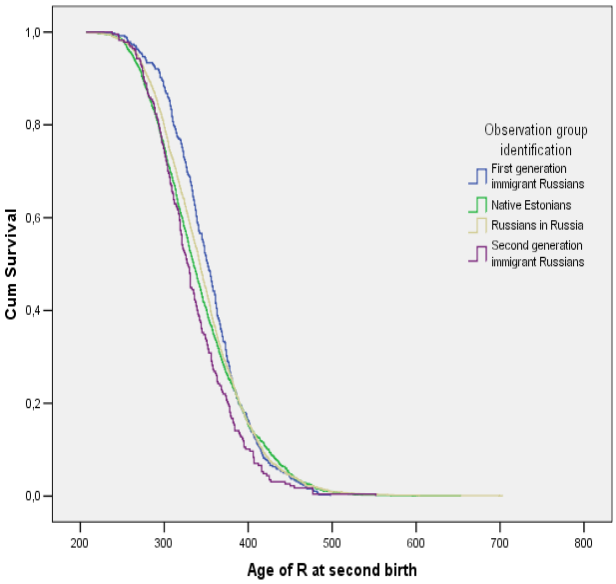
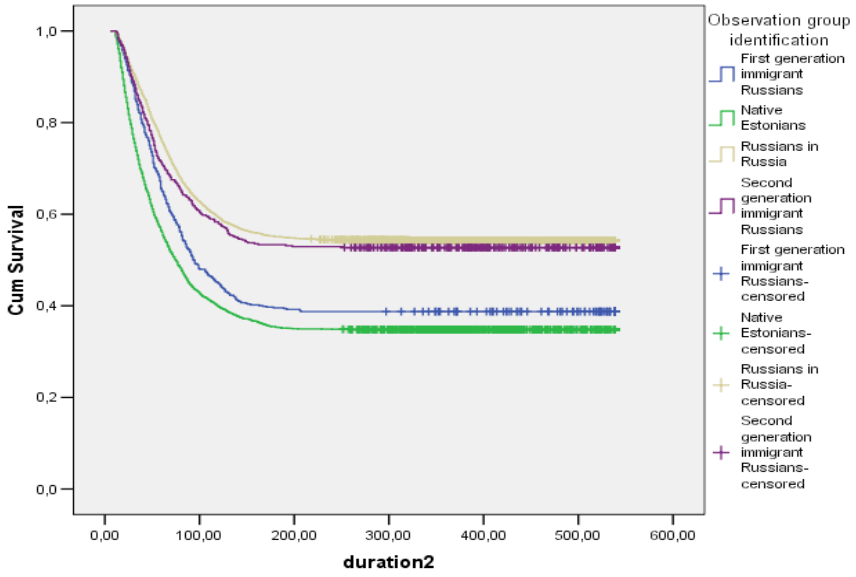


Figure 18 illustrates the Kaplan-Meier survival curves of the timing of second birth among four observation groups indicating again to low ages among the second generation immigrant Russians. First generation immigrant Russians tend to have their second child at later ages than other groups, but this is partly dependent also on the age at the timing of first child.

Figure 19 demonstrates the differences in the interval between first and second birth, including also censored cases. According to this illustration, native Estonians have the shortest interval between first and second child (so even if giving birth starts at later ages than in other groups, they tend to have their second child soon after the first one). The longest interval between births is demonstrated for Russians in Russia and second generation immigrant Russians. These groups also have a relatively large share of censored cases, while the first generation immigrant Russians have the smallest amount of censored cases.

Figure 19. Kaplan-Meier survival curves of interval between first and second birth, four observation groups

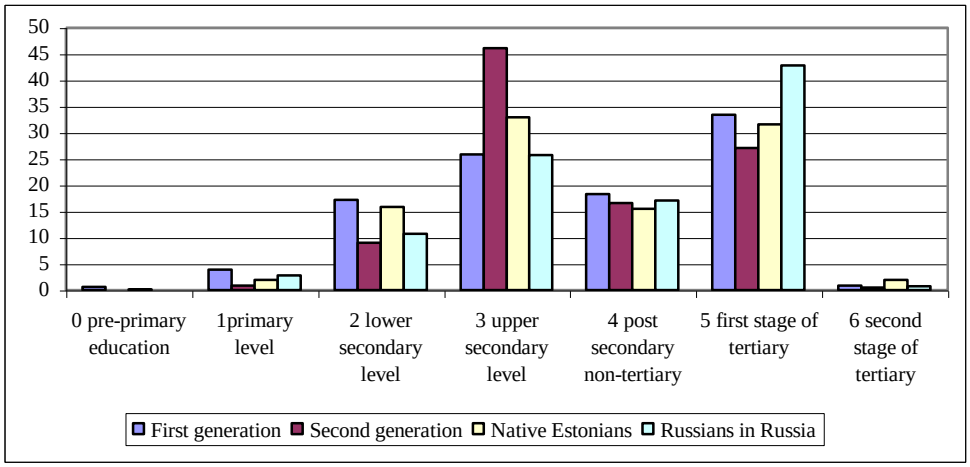


5. Highest reached education level

Highest attained level of education was measured at the time of the interview according to the international ISCED categorisation standards. The Russian population in Russia has higher education levels with over 40% of them stating to have first stage tertiary educational level (table 3). In comparison, 33,4% of first generation immigrant Russians have reported having first stage of tertiary education, and 31,6% of native Estonians reporting the same level. Only 27% of second generation immigrant Russians have reported having first stage of tertiary education. High levels (46%) of upper secondary education level among this latter group indicates to their uncompleted educational careers.

When interpreting the educational levels of the first generation immigrants, Russians in Russia and native Estonians, the survival effect should be taken into account (Rogers 1992). Usually people with higher education level tend to have lower mortality at all ages, and we can observe data only on those who have survived (Crimmins 1989). This has been mentioned as one of the drwbacks of event-history analysis in general (Blossfeld 2002). However, since 1991 Russia has had a more rapid decline in life expectancy and population health status than other former Soviet Union countries (Buckley et al 2011). Since mortality of first generation immigrant Russians in Estonia and Russians in Russia has been higher than for native Estonians (Sakkeus & Karelson 2008), the survival effect could have an especially significant role to play when the education and fertility outcomes are analysed for these specific groups (Klesment 2010).

Table 3. Highest reached education level (ISCED) at the time of the interview by group identification (%), urban population



6. Currently enrolled in education

From all the urban second generation immigrant Russians, 9,6% were enrolled in any level of education at the time of the interview. Similarly, 9,6% of native Estonians and 9,7% of Russians in Russia were enrolled in education while only 1,5% of first generation immigrants were enrolled in education.

There were 9,6 % of second generation immigrant Russians with at least upper secondary education enrolled in higher education at the time of the interview. Also, 9,6% of the native Estonian population and 10,4% of Russians in Russia with at least upper secondary education were enrolled in higher education. Only 1,5% of first generation immigrant Russians with at least upper secondary education were enrolled in higher levels at the time, however, this can be mostly explained by their older age structure and therefore completed education careers.

7. Timing of migration

Most of the first generation immigrant Russians have migrated before age 25 (91,2%), more specifically 45,4% came to Estonia between ages 18 and 25. Over a third (34,9%) migrated during their childhood – before age 14. This corresponds to the most frequent age at migration according to the age-migration schedule (Rogers et al 1978). However, life period between 18-25 also covers the most typical ages to have a first child. Therefore it might be expected that if one migrated during this period of life, then also the age at first birth would be higher than for non-migrating people (this is also described by the disruption effect of migration (Milewski 2010)).

8. Type of origin settlement

Although most of the migrants have settled in urban areas (table 2, previously), they have not always originated from urban areas. Table 4 presents the results of the type of settlement during childhood of four observation groups.

For native Estonian population, first and second generation immigrant Russians the type of origin settlement could be established until age 14. If the person had been born in one type of settlement and lived there throughout their childhood until at least age 14, this type of settlement was chosen as the childhood region of origin. However, if the respondent moved from the place of birth and spent most of the childhood type in a different settlement, then the place where most of the childhood time was spent, was chosen as the basis for childhood region of origin. For Russians in Russia this variable was available only according to their place of birth (and unfortunately not for all respondents, in some cases due to missing labels for regions). However, this variable is still included for Russians in Russia to get an approximate indication of the regional origin of each observation group.

Table 4. Type of origin settlement of four observation groups

	First generation		Second generation		Native Estonians		Russians in Russia	
Rural	290	40,7%	19	2,7%	1337	39,2%	2155	33,1%
Urban	422	59,3%	676	97,3%	2077	61%	3290	50,5%
No response/NA	0	0	0	0	0	0	590	9,0%
Missing system	0	0	0	0	0	0	485	7,4%
Total	712	100%	720	100%	3414	100%	6520	100%

39,2% of native Estonians and 33,1% of Russians in Russia have rural background. For first generation immigrant Russians this indicator is smaller – 40,7% of them have been living in rural areas during childhood (which might indicate somewhat towards a selection bias among immigrants – more urban people come to urban host society). Among the second generation immigrants very small proportion (only 2,7% of them) have been living in rural areas during their childhood.

5.2 Cox regression models

5.2.1 Timing of first birth

Six Cox regression models were conducted to analyse the differences in timing of first conception for native Estonians, first and second generation immigrant Russians and Russians in Russia.

The first model included only sex variable, and birth cohort was added to the second model to test the age structure and cohort effects. The variable most interesting for us is the group identification variable which demonstrates how each group performs when additional control variables are added to a new model. Highest attained educational level at the time of interview was added to the third model. The fourth model included the dichotomous variable of timing of migration between age 18 -25. Type of origin settlement (urban or rural) was added to the fifth model, and interactions between cohort and group identification were added in the final model to test whether differences in ethnic groups depend on birth cohorts. First generation immigrant Russians have been set as reference group in each model. Second generation was set as the reference group to test the socialisation effect on second generation fertiliy.

Results of the first five Cox regression models are presented in table 5 (figure 20 on page 31 illustrates the Cox survival curves of timing of first conception for four observation groups after controlling for all variables). The time variable for first child was timing of first conception in months. Status or event was defined whether a respondent has had a first child or not by age 45 or by the time of interview.

Female respondents have a lower age at first conception than male respondents (in all models). When only sex is included in the first model, second generation and Russians in Russia indicate a statistically significantly different timing of first conception from the first generation. Second generation immigrants demonstrate 47,3% lower age at first conception than the first generation and Russians in Russia have around 10% lower age at first birth than the first generation. Native Estonians show a similar curve line to the first generation and are not significantly different from the reference group.

Birth cohort was added to the second model to test the effect of age. The first (or oldest) cohort of those born between 1924-1933 have the highest age at first conception. This outcome coincides with other research results on Estonia and this specific characteristic stands out in the comparison with other Western and Northern European countries (Katus & Puur 2006). For Russia there is evidence of similar exceptionality of the same cohort (e.g. Alich 2007, Zakharov 2008) indicating to the effect of the World War II. This cohort was supposed to start their reproductive behaviour during or shortly after WWII, however, due to traumatic experiences (famine in the 1930s, war in the 1940s, high death rates, especially of young males) the beginning of childbearing had to be postponed. In addition to the "retrospective selection bias" (Alich 2007, p 12) in the Russian case, similar survival effect can be attributed to the Estonian cohorts. However, additional selection (of education, region of origin) is tested in the following models.

After controlling for age and sex, native Estonians demonstrate the highest age at first conception, i.e. they tend to have their first children later than other groups (although in the descriptive results we observed that first generation immigrant Russians have the oldest age at first birth). Also, Russians in Russia have higher ages at first conception than first generation immigrant Russians while second generation immigrant Russians have their first child at younger ages than the first generation immigrant Russians. In the second Cox regression model, both second generation and native Estonians differ around 10% from the first generation in terms of the Exp(B) values of timing of first conception, however, only native Estonians are statistically significantly different from the first generation below the p-level of 0,05.

For educational level, the respondents having higher education (ISCED level 5 or 6) have the highest age at first conception than respondents with other educational levels at interview time. Exp(B) values for these levels show 20% (ISCED 5) and 40% (ISCED 6) higher age at first conception than compared to people with post-secondary non-tertiary educational level (ISCED 4 – reference group). The reference group shows similar age at first conception as respondents stating ISCED 0 (pre-primary) or ISCED 1 (primary) education level, while also respondents with (lower and upper) secondary educational levels are statistically signficantly different from the reference group (but those with secondary levels have 10-15% lower age at fist conception). Those enrolled in education at the time of the interview indicate around 10% lower age at first birth than compared to these who are not enrolled in education, however, the difference is not significantly different.

When the educational variables were added to the third model, the differences in the timing of first conception between the first generation immigrant Russians and other observation groups diminished slightly. The second generation and Russians in Russia become more similar to the reference group, while the difference with native Estonians doesn't practically change at all and remains still statistically significantly different from the reference group below the p-level of 0,05. Therefore, if education plays a role in explaining some of the timing differences for Russians, it does not change the position of native Estonians' timing of first conception in reference to the first generation immigrant Russians.

Table 5. Cox regression models of timing of first conception, four observation groups (N=7067)

Label	Model 1			Model 2			Model 3		
	B	SE	Exp(B)	B	SE	Exp(B)	B	SE	Exp(B)
Group (ref: First generation)									
Second generation immigrants	0,387***	0,061	1,473	0,101	0,062	1,107	0,07	0,063	1,072
Native Estonians	0,019	0,045	1,019	-0,098*	0,045	0,907	-0,097*	0,045	0,908
Russians in Russia	0,096*	0,044	1,101	-0,032	0,044	0,968	-0,014	0,044	0,986
Sex (ref: male)									
Female	0,318***	0,025	1,375	0,342***	0,025	1,407	0,380***	0,026	1,463
Birth cohort (ref: 1924-1933)									
1934-1943				0,139**	0,048	1,149	0,216***	0,050	1,241
1944-1953				0,308***	0,046	1,361	0,427***	0,051	1,532
1954-1963				0,412***	0,045	1,51	0,536***	0,050	1,709
1964-1973				0,691***	0,046	1,996	0,819***	0,052	2,269
1974-1983				1,041***	0,052	2,832	1,128***	0,057	3,089
Education (ref: ISCED 4 post-secondary non-tertiary)									
0 pre-primary							0,402	0,382	1,495
1 primary							0,124	0,088	1,132
2 lower secondary							0,141**	0,046	1,151
3 upper secondary							0,101**	0,036	1,107
5 first stage tertiary							-0,216***	0,034	0,806
6 second stage tertiary							-0,523***	0,125	0,593
Currently enrolled in education (ref: yes)									
Not enrolled							-0,114	0,063	0,893
Type of origin settlement (ref: urban)									
Rural									
Timing of migration (ref: has migrated between age 18-25)									
Has not migrated (between 18-25)									
-2 LL			111052			110420,4			110256,4
Chi Square from Previous			206,167***			837,850***			163,960***
Degrees of Freedom			4			10			7

*** p < .001; ** p < .01; * p < .05

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Table 5. (Continued) Cox regression models of timing of first conception, four observaton groups (N=7067)

Label	Model 4			Model 5		
	B	SE	Exp(B)	B	SE	Exp(B)
Group (ref: First generation)						
Second generation immigrants	0,069	0,063	1,071	0,025	0,074	1,025
Native Estonians	-0,097*	0,045	0,908	-0,141*	0,060	0,680
Russians in Russia	-0,014	0,044	0,986	-0,059	0,059	0,943
Sex (ref: male)						
Female	0,381***	0,026	1,463	0,380***	0,026	1,463
Birth cohort (ref: 1924-1933)						
1934-1943	0,215***	0,051	1,240	0,215***	0,051	1,239
1944-1953	0,426***	0,051	1,531	0,426***	0,051	1,530
1954-1963	0,535***	0,051	1,707	0,535***	0,051	1,707
1964-1973	0,818***	0,053	2,266	0,817***	0,053	2,264
1974-1983	1,126***	0,058	3,084	1,125***	0,058	3,080
Education (ref: ISCED 4 post-secondary non-tertiary)						
0 pre-primary	0,403	0,382	1,496	0,414	0,382	1,512
1 primary	0,124	0,088	1,132	0,124	0,088	1,132
2 lower secondary	0,141**	0,046	1,152	0,140**	0,046	1,151
3 upper secondary	0,101**	0,036	1,107	0,100**	0,036	1,105
5 first stage tertiary	-0,216***	0,035	0,806	-0,217***	0,035	0,805
6 second stage tertiary	-0,524***	0,125	0,592	-0,525***	0,125	0,591
Currently enrolled in education (ref: yes)						
Not enrolled	-0,114	0,063	0,893	-0,113	0,081	0,893
Type of origin settlement (ref: urban)						
Rural	-0,004	0,026	0,996	-0,001	0,026	0,999
Timing of migration (ref: has migrated between age 18-25)						
Has not migrated (between 18-25)				0,09	0,081	1,094
-2 LL			110256,4			110255,15
Chi Square from Previous			0,021			1,231
Degrees of Freedom			1			1

*** p < .001; ** p < .01; * p < .05

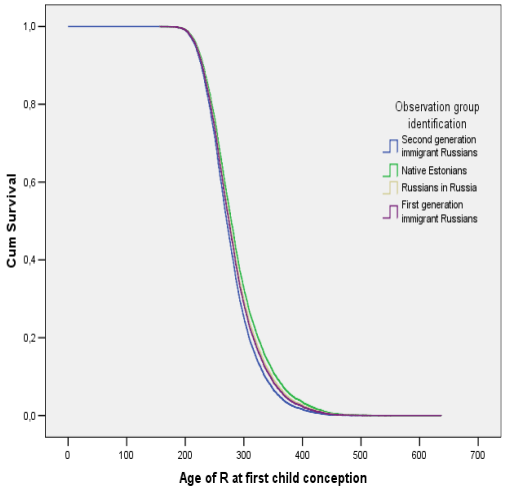
The type of origin settlement (urban as reference category) was added to the fourth model to test the effect of region of origin on the timing of first conception. People with rural background demonstrate slightly higher age at first conception than population with urban background, however the Exp(B) value shows almost identical value to that of the urban origin and it is not significantly different from the reference group. When adding this variable to the model, none of the Exp(B) values of observation groups changed in reference to the first generation immigrant Russians. Again, only native Estonians remain significantly different from the first generation immigrant Russians below the p-level of 0,05. Therefore type of origin settlement does not contribute to the explanation of differences in timing of first conception between the observation groups.

The fifth model included the timing of migration between ages 18-25 (those migrating within this period were set as reference category). Those respondents who had not migrated within this age range had 9,5% lower age at first conception than those who did migrate during this age range. This might give some indication of the postponement effect that migrating might have had on the timing of first child (disruption), however, the differences are not statistically significnt.

When adding the timing of migration to the fifth model, the differences in the Exp(B) values of the observation groups became the largest – with native Estonians having around 14% higher age at first conception, Russians in Russia about 6% higher age at first birth, and second generation only 2,6% lower age at first conception than the first generation. Again, only native Estonians are statistically significantly different from the first generation. The significance level becomes bigger than in previous models, but still remains below the level of 0,05.

The final model included interaction terms between birth cohort and group identification variables (results not presented here). These were included to examine whether differences between the observation groups depend on birth cohorts (due to different timing of the onset of demographic transition among Estonians and Russians). None of the interaction terms turned out to have significant results. Also, the Exp(B) values largened for second generation (19%) and Russians in Russia (7%), but remained the same for native Estonians (13%), however, none of them were statistically significantly different from the first generation immigrant Russians anymore.

Figure 20. Cox regression survival curves of timing of first child, four observation groups



In the analysis of the timing of first conception in reference to the first generation immigrant Russians, most explanation power was observed by birth cohort variable, less so by education and timing of migration (and nothing changed when the type of region of origin was controlled for).

For testing the third hypothesis of socialisation effect for the second generation immigrant Russians, this group was set as the reference category and same Cox regression models were conducted. In order not to duplicate the results, these are not presented here and only most important findings are described. As was also seen from previous analysis, the second generation immigrant Russians had the lowest age at first birth compared to the rest of the observation groups.

All groups remained significantly different from the second generation at the p-level of 0,001 in the first model where only sex was included. The highest difference was with the first generation who demonstrated 32% higher age ta first birth, followed by native Estonians with 31% higher age at first birth and Russians in Russia with 26% higher age at first birth than the refrence group. After inclusion of birth cohort, the significant difference with the first generation disappeared and only native Estonians and Russians in Russia remained significantly different from the reference group. Native Estonians indicated 19% higher age at first conception (p-level below 0,001) and Russians in Russia showed 13% higher age (p-level below 0,01) at first conception than the reference group.

The third model included educational level and enrollment in education variables which indicated similar trends as previously – those with higher education demonstrate higher age at first birth (20-40% difference in Exp(B) values). However, after including these variable, the differences diminished among observation groups – with first generation showing 7% and Russians in Russia 8% higher age at first birth, and none of them significantly different anymore from the reference group. Again, native Estonians had around 15% higher age at first birth than second generation (p-level below 0,01).

After including region of origin to the fourth model, the differences did not change much for the observation groups, with native Estonians still having 15% higher age at first birth and remaining significantly different below the p-level of 0,01. When the timing of migration was included to the next model, the Exp(B) value diminished for the first generation (2,4%), but not much for other groups. Native Estonians demonstrated 15% higher age at first birth (p-level below 0,01). Finally, after including the interaction terms of cohort and group identification variables, the differences with all groups were not significant anymore from the second generation. In the analysis of timing of first conception in reference to the second generation, again birth cohort explained much of the timing differences between groups.

Based on the results of the analysis of timing of first conception it seems that the first hypothesis of the socialisation effect regarding the first generation immigrant Russians is confirmed. The first generation were more similar to the origin country population (Russians in Russia) than to the native Estonian population in terms of timing of first conception. Birth cohort, timing of migration and education contributed the most in the explanation of change in the differences between first generation and native Estonians.

Since the fertility differentials remained significant between the first generation and native Estonians throughout most of the models while these were not significantly

different from Russians in Russia, it can be concluded that the second hypothesis regarding the selectivity of first generation immigrant Russians is not confirmed in terms of timing of first conception.

Finally, the third hypothesis regarding the socialisation effect of the second generation immigrant Russians has not been confirmed as well. It was expected that the main socialisation of the second generation has been to the host society and therefore they resemble to the native Estonians. However, native Estonians remained significantly different from them in all (but the final) models while first generation immigrants did not. Therefore the second generation still resembles more their parents' generation rather than the native Estonians, even after controlling for compositional differences like birth cohort, educational level, region of origin, and migration experience. The main reason for that can be explained in their lower contacts with the residence society than with their parents' origin country - a great proportion of the second generation are residing in an environment where contacts with locals are rare (Rahnu 2011). Also, they have been mainly educated in Russian-language schools and they follow the media of their parents' origin country - Russia. Thus the real integration into the birhtplace society has not taken place and it is also represented among others in their demographic behaviour patterns (see also Rahnu 2011, Sakkeus 2000).

5.2.2 Time interval from first to second birth

The analysis of time interval between first and second births in months was conducted also with six Cox regression models. Time variable was defined as time interval in months from first to second birth. Status or event was defined when the respondent had a second child by age 45 or by the time of interview. Similarly to the analysis of the timing of first conception, first model included sex; birth cohort was added to the second model. Highest reached education level by the time of interview and enrollment in education were added to the third model, type of origin settlement was added to the fourth, timing of migration to the fifth model, and interaction terms with cohort and group identification variables were added to the final regression model. First generation remained as the reference category in all models, except for testing the socialisation effect for second generation when the reference group was changed to second generation. Results are presented in table 8 and Cox survival curves on figure 21 (on page 37).

In the case of the timing of first conception, female respondents had their first child at younger ages than males and they were significantly different from male respondents. In case of the interval between two births, females have a longer time interval than males, however, it is not statistically significantly different from males. In the first model, all groups show significantly different time intervals than the first generation immigrants. Second generation has 30% longer interval (p-level below 0,001) between two births, Russians in Russia have around 34% longer interval (p-level below 0,001) between two births and native Estonians have 20% shorter interval (p-level below 0,01) between two births than the first generation. Thus Estonians have the shortest interval compared to the rest of the observation groups (also confirms the results of Katus & Puur 2006) while they start their childbearing careers later than others.

The differences between cohorts as was demonstrated in the timing of first conception, are not so distinct in the case of interval between two births. Now, the cohort of 1954-1963 shows a 15% shorter interval than the reference cohort (1924-1933) below the p-level of 0,05. The cohort of 1964-1973 has 20% longer interval (p-level below 0,001) than the reference cohort, and the cohort of 1974-1983 has 73% longer interval (p-level below 0,001) than the reference cohort.

When birth cohort was included to the second model, the difference in the interval with the second generation diminished to 15% and was not significant anymore. The difference also diminished with Russians in Russia to 25,4% (p-level below 0,001), but it widened with native Estonians to 37% (p-level below 0,001).

People with higher education levels (ISCED 5 and 6) as well as people with upper secondary level (ISCED 3) have shorter intervals between first and second birth than those with ISCED 4 level (model 3). And people with other (lower) education levels have longer intervals. However, only those with ISCED 5 level (first stage of tertiary education) have a significantly different interval which is 10% lower than compared to people with post-secondary non-tertiary education level (ISCED 4). For the current enrollment in education, those currently not enrolled have significantly shorter interval than those currently enrolled in education.

In this model the differences with all observable groups remain the same – Russians in Russia having 25% longer interval between two births than the first generation, native Estonians having around 37% shorter interval (both p-levels below 0,001) and second generation group having 15% longer interval than first generation (not significantly different).

By including the type of origin settlement into the fourth model, it shows that people originating from rural areas tend to have shorter interval between two births than those originating from urban areas. The Exp(B) value is 9,1% higher for rural origin population and the difference from urban origin population is statistically significant below 0,05 level. Again, interval between births for native Estonians and Russians in Russia remain significantly different from the first generation, with native Estonians having about 36% shorter interval than first generation and Russians in Russia having 25,6% longer interval than first generation. For both the level of statistical significance is below 0,001 level. It is worth noting here that the difference with native Estonians is larger by 10 percentage points (although in a different direction than Russians in Russia).

When the timing of migration between ages 18-25 was included to the fifth model, the differences in Exp(B) values widened for native Estonians – now indicating a 41% shorter interval than first generation (p-level below 0,001). The difference for Russians in Russia and second generation immigrant Russians diminished from the previous models – the first showing 23% longer interval (p-level below 0,01) than first generation and the second generation demonstarting 10% longer interval than the first generation (not significantly different).

Table 8. Cox regression models of interval between the timing of first and second birth (N=3850)

Label	Model 1			Model 2			Model 3		
	B	**SE**	**Exp(B)**	**B**	**SE**	**Exp(B)**	**B**	**SE**	**Exp(B)**
Group (ref: First generation)									
Second generation immigrants	-0,356***	0,084	0,700	-0,160	0,086	0,852	-0,162	0,086	0,850
Native Estonians	0,184**	0,057	1,202	0,315***	0,057	1,370	0,313***	0,057	1,367
Russians in Russia	-0,417***	0,057	0,659	-0,293***	0,058	0,746	-0,286***	0,058	0,751
Sex (ref: male)									
Female	-0,0526	0,034	0,949	-0,051	0,034	0,950	-0,045	0,034	0,956
Birth cohort (ref: 1924-1933)									
1934-1943				-0,058	0,062	0,943	-0,020	0,065	0,980
1944-1953				0,119*	0,059	1,126	0,186**	0,064	1,204
1954-1963				0,14*	0,057	1,150	0,205**	0,063	1,228
1964-1973				-0,219***	0,061	0,804	-0,163*	0,066	0,850
1974-1983				-1,286***	0,089	0,276	-1,257***	0,092	0,285
Education (ref: ISCED 4 post-secondary non-tertiary)									
0 pre-primary							0,547	0,414	1,729
1 primary							0,087	0,114	1,091
2 lower secondary							0,065	0,059	1,068
3 upper secondary							-0,038	0,048	0,962
5 first stage tertiary							-0,098*	0,047	0,906
6 second stage tertiary							-0,069	0,161	0,340
Currently enrolled in education (ref: yes)									
Not enrolled							-0,191*	0,093	0,826
Type of origin settlement (ref: urban)									
Rural									
Timing of migration (ref: has migrated between age 18-25)									
Has not migrated (between 18-25)									
Interactions (cohort*groupid)									
1934-1943*Native Estonians									
1954-1963*Native Estonians									
-2 LL			656326,22			64820,9			4,5
Chi Square from Previous			309,559***			505,289***			16,452*
Degrees of Freedom			4			6			7

*** p < .001; ** p < .01; * p < .05

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Table 8. (Continued) Cox regression models of interval between the timing of first and second birth (N=3850)

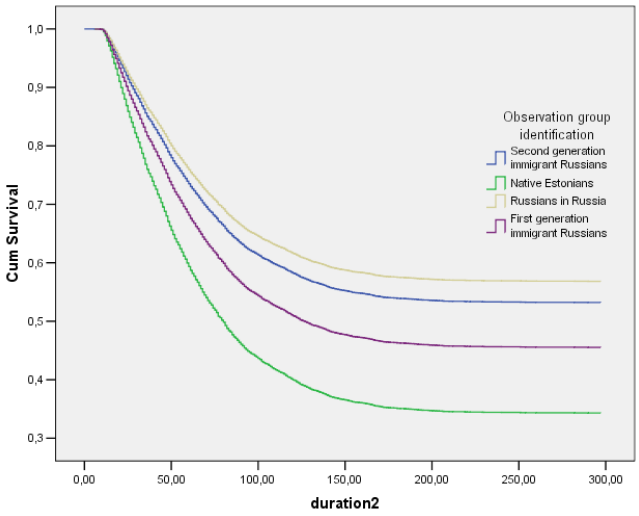
Label	Model 4			Model 5			Model 6		
	B	**SE**	**Exp(B)**	**B**	**SE**	**Exp(B)**	**B**	**SE**	**Exp(B)**
Group (ref: First generation)									
Second generation immigrants	-0,142	0,086	0,868	-0,108	0,1	0,898	-0,414	0,500	0,661
Native Estonians	0,307***	0,058	1,362	0,342***	0,078	1,407	-0,005	0,165	0,995
Russians in Russia	-0,296***	0,058	0,744	-0,261**	0,079	0,77	-0,360*	0,170	0,697
Sex (ref: male)									
Female	-0,048	0,034	0,953	-0,048	0,034	0,953	-0,052	0,034	0,949
Birth cohort (ref: 1924-1933)									
1934-1943	-0,013	0,065	0,987	-0,012	0,065	0,988	-0,362*	0,173	0,696
1944-1953	0,204**	0,064	1,226	0,205**	0,064	1,227	0,091	0,168	1,096
1954-1963	0,228***	0,064	1,256	0,234***	0,064	1,257	-0,14	0,175	0,869
1964-1973	-0,131	0,068	0,877	-0,130	0,068	0,878	-0,33	0,229	0,719
1974-1983	-1,223***	0,094	0,294	-1,222***	0,093	0,295	-1,014*	0,473	0,363
Education (ref: ISCED 4 post-secondary non-tertiary)									
0 pre-primary	0,523	0,414	1,687	0,528	0,414	1,695	0,479	0,418	1,614
1 primary	0,076	0,114	1,079	0,077	0,114	1,08	0,017	0,116	1,018
2 lower secondary	0,056	0,060	1,058	0,057	0,06	1,058	0,051	0,060	1,053
3 upper secondary	-0,035	0,048	0,966	-0,034	0,048	0,966	-0,037	0,049	0,963
5 first stage tertiary	-0,090	0,047	0,914	-0,089	0,047	0,914	-0,09	0,047	0,914
6 second stage tertiary	-0,049	0,161	0,952	-0,048	0,161	0,954	-0,069	0,161	0,933
Currently enrolled in education (ref: yes)									
Not enrolled	-0,187*	0,093	0,830	-0,187*	0,093	0,830	-0,170	0,094	0,844
Type of origin settlement (ref: urban)									
Rural	0,088*	0,035	1,092	0,086*	0,035	1,090	0,088*	0,035	1,092
Timing of migration (ref: has migrated between age 18-25)									
Has not migrated (between 18-25)				-0,07	0,103	0,933	-0,059	0,106	0,943
Interactions (cohort*groupid)									
1934-1943*Native Estonians							0,464*	0,193	1,591
1954-1963*Native Estonians							0,511**	0,192	1,666
-2 LL			64802,2			64801,7			64770,1
Chi Square from Previous			6,270**			0,456			27,838*
Degrees of Freedom			1			1			13

*** p < .001; ** p < .01; * p < .05

The interaction terms between cohort and group identification variables were added to the final model. For the interval between two births, native Estonians born between 1934-1943 had a 59% shorter interval than the first generation immigrant Russians of the same cohort, being different below the significance level of 0,05. Also, native Estonians born between 1954-1963 showed 66% shorter interval than the first generation immigrants of the same cohort, demonstrating a difference below the significance level of 0,01. Other interaction terms did not yield statistically significant differences and are thus not presented in the table.

However, when these interaction terms were included in the final regression model, the difference between Exp(B) values between Russians in Russia and first generation widened to 30%, meaning that Russians in Russia demonstrated 30% longer interval at the significance level below 0,05. Also, the difference widened for the second generation – showing 24% longer interval than first generation, but still not at a statistically significant level. Finally, the Exp(B) value diminished for the native Estonians and the difference from the first generation was not significantly different anymore which can be attributed to the interaction effect found in the cohorts of 1934-1943 and 1954-1963.

Figure 21. Cox regression survival curves for interval from first to second birth, four observation groups



In order to test the hypothesis of the socialisation effect for second generation, this group was set as a reference category in a separate Cox regression analysis. Since most of the values are duplicated, these results will not be presented here, but only most important findings are described.

In the first model, with only sex included, Russians in Russia have 6% longer interval between first and second birth than second generation, but it is not significantly different. However, native Estonians have 71% shorter interval (below p-level of 0,001) and first generation 42% shorter interval (p-level below 0,001) than the second generation. With the inclusion of birth cohort, the difference with Russians in Russia widens to 13% but

not to a significant level. The difference with native Estonians (60% shorter) and first generation (17% shorter) diminishes, while only the native Estonians remain significantly different below the p-level of 0,001.

With inclusion of education variables, the difference with native Estonians widens slightly to 61% (p-level below 0,001) while it does not change significantly for the rest of the groups. When adding region of origin, the difference with Russians in Russia widens to 15% and it becomes significant below the level of 0,05. The difference with native Estonians diminishes to 57% (p-level below 0,001), as well as for first generation (to 15%), but not to a significant level for the latter group.

Adding timing of migration, the differences do not change significantly and results for observation group differences from previous model remain the same. As in the case of previous analysis, also by adding interaction terms to the final model here, all significant differences between groups disappear.

Based on the analysis of time interval from first to second birth, it can be concluded that the first hypothesis regarding the socialisation of first generation is not confirmed since the differences remained significantly large (23%) from the Russians in Russia. However, it cannot be concluded also that the first hypothesis is rejected (as if first generation resembles more native Estonians), because the differences with native Estonians grew even larger (up to 41% when all variables were controlled for). Therefore the first generation have not experienced any socialisation process to the host society, and at the same time have also remained very different from their oirigin society. Again, birth cohort explains most of the differences, however, type of region of origin plays a more important role in the explanation of interval differences than in the timing differences of first conception.

Although the analysis of the timing of first conception indicated that the first gneration immigrant Russians resemble Russians in Russia, final conclusions of their socialisation can be drawn only after analysing also the timing to second birth. Since the probability of second births has been very low for Russians in Russia (70% did not have a second child), the differences between the first generation and their origin country population stem exactly from these different risks in having a second child.

Russians in Russia remained significantly different from the first generation immigrant Russians throughout all regression models in the analysis of time interval between first and second birth. Thus it can be said that the second hypothesis is confirmed and the first generation immigrant Russians are a selective group when compared to their origin country population in terms of time interval from first to second birth. As mentioned, the selectivity seems to come mostly from the very low proportion of Russians in Russia having a second child. Due to the difference with native Estonians being even bigger (which comes from Estonians having the shortest interval, especially those born between 1934-1943 and 1954-1963), the selectivity does not point towards first generation being closer to native Estonians. It seems that the first generation demonstrate a third type of fertility behaviour and does not resemble their origin nor host country populations.

The third hypothesis regarding the socialisation effect of second generation immigrant Russians is rejected since analysis indicated that the second generation does not resemble native Estonian population in terms of the interval from first to second child, but are closer to first generation immigrant Russians, after controlling for all variables. Also, Russians in Russia remained significantly different from the second generation when educational variables were included. Age, cohort and relatedly, educational attainment effects explained most of the differences in time interval in reference to the second generation. It seems that the second generation immigrant Russians follow the path of their parents' generation (or the first generation immigrant Russians) in terms of both timing of first conception as well as time interval between first and second birth, and therefore also no socialisation to their country of birth has taken place. Although this paper did not analyse directly the impact that different socialisation agents can have on an individual (such as school, language use, media) regarding the timing of births, it can be concluded that due to attending Russian-speaking schools, consuming Russian media and having mostly networks among non-Estonian speaking communities (Rahnu 2011), the second generation immigrant Russians have socialised into a different environment than the native population of the same residence country which has an impact on their demographic behaviour as well.

6. DISCUSSION

This paper addresses trends in the timing of first and second child among native Estonian population, first and second generation immigrant Russians in Russia and their fellow Russians in Russia. Migrants can be different from their origin country population as well as the host country population in terms of various demographic attributes, including fertility. This paper tests the theory of effects of migration on fertility, especially from the aspect of long-term development and effects of socialisation and selectivity. Based on the Cox regression analysis, findings are presented about fertility behaviour among the migrant groups in Estonia in comparison to their origin country as well as host country populations.

The results of this analysis confirm the selectivity of first generation immigrant Russians in being different from their origin country population – Russians in Russia. Although in terms of the timing of first birth, the first generation immigrant Russians showed similar behaviour to their origin country population and thus indicating to carrying socialisation elements from their origin environment, the differences occurred and widened when the interval from first to second brith was analysed. Thus the socialisation environment lost its effect by the time of the second birth. This was mainly observed due to the censored cases among Russians in Russia, i.e. low proportion of Russians having a second child. The results could have been influenced also by the survival effect that among the Russian population (in Russia) has proved to be especially strong – health status declined and mortality enlargened after 1991 much more in Russia than compared to other former Soviet Union republics. However, this is a general problem that retrospective surveys face, thus detailed analysis could give additional insights to the selectivity reasons between these groups.

It is important to note that final conclusions about selectivity (or any other long-term effect) are difficult to make only based on analysis of first birth as fertility differentials reveil themselves only in higher order births.

In terms of the direction of selectivity of first generation immigrant Russians, it turned out that the first generation group is even more different from the native Estonians than they are from the Russians in Russia. Therefore they have not socialised to their host society at all. It seems that the first generation immigrant Russians have not been connected to the origin environment nor to the host environment, and as a result a third type of fertility behaviour pattern has occurred.

As the socialisation and selectivity hypotheses were set to contradict each other, the findings of this analysis observe that in the case of migrants in Estonia, selectivity of first generation dominates over socialisation effect.

Similarly to the first generation immigrant Russians, socialisation of the childhood environment has not been confirmed for the second generation immigrant Russians. Both for the timing of first as well as second child, they indicate significantly different

behaviour only from native Estonians although it was expected that some socialisation of their birthplace might have had an effect. Instead they show more similar behaviour to the first generation, and in some cases (when education is controlled for) are even closer to the Russians in Russia. The latter outcome is similar to some of the findings of analysis of second generation integration in other Western European countries (e.g. Simon 2003). In the Estonian case, the second generation immigrant Russians seem to have socialised mainly through the first generation immigrant Russians and therefore their behaviour is especially affected by the overall integration into the host society, which is facilitated by access to Russian-language schools, Russian media and immigrant-origin networks.

Much of the differences between the four observation groups in the timing of first conception as well as time interval from first to second birth could be explained when controlled for birth cohort, therefore for cohort as well as age structure differences. Much less explanation power can be attributed to educational variables, however it does seem to be more important for explaining differences between second generation immigrant Russians and Russians in Russia in the time interval from first to second birth. For the time interval between first and second birth also timing of migration as well as type of region of origin explained some of the differences between the observation groups. However, not all possible effects have been taken into account in this analysis and deeper analysis of different effects could give fruitful insights into the explanation of differences between groups – regarding the selectivity of first generation as well as lack of socialisation of immigrant Russians in Estonia.

Educational level has been viewed as a time-constant variable in the current analysis. We are aware of the problems this might bring when interpreting the causality between educational attainment and fertility outcomes since education can be a characteristic acquired throughout lifetime (Hoem & Kreyenfeld 2006). However, one of the prerequisties for conducting a more spohisticated analysis of fertility and education dynamics is the existence of full education histories (not just the highest reached educational level at the time of interview as is the case in harmonized GGS files). Therefore additional insight into the differences in timing of births between different groups can be gained when further information about previous education careers is available.

Distinguishing the so-called 1,5 generation from the first and second generation is another propostion for future analysis on this topic. The "1,5-generation" refers to migrants moving during their childhood with their parents. In this study these people were included within the first generation immigrant Russians, however, if a larger sample would be available, it would be interesting to observe fertility differentials also in comparison to the 1,5 generation migrants.

Thirdly, the ethnicity of partner of migrants can be additionally controlled for in the analysis of countries or ethnic groups where intermarriages play a more significant role than in the Estonian case. Since a partner can have an important impact in terms of socialisation and childbearing decision-making, having a partner from a different ethnic

background can also change the overall fertility behaviour of migrants.

Finally, in the current analysis the region of origin was included in terms of rural or urban type of settlement. However, it would be interesting to include the region of origin according to specific regions (e.g. European Russia, South Russia, etc). Currently, this was not possible due to missing information on some of the administrative units, but distinction by more specific regions could give further indication about the impact that region of origin might have on the selectivity of migrant fertility timing.

This analysis has demonstrated the importance of distinguishing foreign-origin (or immigrant) populations from native populations in the analysis of fertility behaviour. The same distinction is recommended also for analysis of any other demographic pattern, or sociological, economic, political trends of a society. Special attention to making clear definitions of foreign-origin and native populations should be paid in the case of large proportion of foreign-origin population in a country. Such distinctions (also, breaking down to different generations, where possible) would help to better understand the demographic development of a country. Also, if possible, specific ethnic groups should be analysed separately, and in relation to their origin country populations.

The Estonian case has proved to be a useful case-study in the analysis of migrant fertility. Firstly, earlier timing of immigration compared to other European countries has enabled to test long-term demographic development among native and migrant groups based on a relatively large proportion of foreign-origin population. Thus the analysis of the demographic development of first and second generation immigrant Russians in Estonia can serve as one of the examples for other similar research on migrant fertility. Secondly, due to very specific definitions of the observation groups, clear demographic patterns between different groups have been distinguished from each other which is not often the case when the total population of Estonia has been analysed in terms of fertility (or other socio-demographic patterns) during several previous studies. Often, conclusions about migrant populations in relation to their origin country population have been made through indirect sources. Current research has contributed to the existing literature on migrant fertility by comparing migrants in Estonia to their origin country population based on data with similar methodology and principles.

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