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Prevalence and determinants of childlessness in Russia and Moscow

1. INTRODUCTION

The transformation of fertility has come both from ideational shifts during the second demographic transition and from the influence of economic factors. In the 20th century, the development of social norms turned the question of maternity from a social obligation or duty into a voluntary, individual choice. Consequently, childlessness or a childfree lifestyle has become a possible option. Moreover, having children nowadays is often a competing alternative to other life components, such as a successful working career, active lifestyle or marital relations themselves. The growth in women's education level and in their labor market involvement raises the alternative benefit from childlessness in terms of the economic theory of fertility behavior. Childless women do not need to overcome temporary drop-outs from the labor market, they do not face the issue of combining a full-time job with motherhood and they are more rarely discriminated against by employers. In Russia the continuously rising high educational level of women is now combined with high female labor force participation. In the Russian capital city, Moscow, these trends are particularly strong.

Although the fertility model transformation has gained ample attention in Russian demographic studies, the phenomenon of childlessness has been largely ignored. The majority of political actors still agree that a first child, or a first birth, occurs in the life of almost every Russian woman. That is why Russian family policy generally addresses families with two, or even three or more children. The issue of postponing the first birth beyond the age of 30, which has become more common nowadays, as well as the question of voluntary and involuntary childlessness still have not appeared in the political agenda.

Therefore this study investigates the existing prevalence of childlessness in Russia and then explores who childless individuals are in modern Russia.

Specifically we try to answer the following research questions: Can we observe a rise in childlessness in Russia over the past years? If so, what is the predictable scenario for its dynamics among generations born in 1970-1980s? What are the main demographic or socio-economic characteristics of the

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childless population in Russia? Finally, can we actually attribute observed childlessness to voluntary behavior or should it rather be treated as involuntary childlessness?

2.   THEORETICAL FRAMEWORK

During the second demographic transition the rank of desire for having children in individuals' value systems changed. At the same time the fertility level attained strongly depends on reproductive preferences and intentions. The existence of a correlation between an ideal or desired family size and actual reproductive behavior has been reported since the 1960s (Freedman, Baumert and Bolte, 1959). Miller and Pasta (1995) also report a positive association between childbearing and the desired number of children. Individual reproductive preferences emerge in youth, but then they can be modified under the influence of different life circumstances (hypothesis first formulated by Udry, 1983). For older individuals the intention to have the first and second child tends to be lower (Philipov *et al*., 2004). Women with a marital experience show a desire for a higher number of children compared to those who have never been married (Engelhardt, 2004). Furthermore, growing up in a two-parent household and having more siblings are associated with a greater desired family size (Heiland *et al*., 2008).

Existing estimations of the influence of the main socio-economic characteristics on individual fertility intentions (e.g. education or income influence) are sometimes found to be contradictory. In particular, some researchers report that higher education raises an individual's desired number of children (Heiland *et al*., 2005), while others discover the opposite effect (Rindfuss, Morgan and Offut, 1996). Also, women with higher social status show a higher tendency to decrease their fertility intentions, while cases of a rise in intentions are rare (Iacovu and Tavares, 2011).

The choice of remaining childless itself receives less attention from researchers, though Gobbi (2013) even states that the development of a *theory for childlessness* is necessary, noting that fertility rates and childlessness are not always negatively correlated.

Generally childlessness can be considered as a result of involuntary childlessness (infertility), voluntary childlessness, circumstantial childlessness or delayed childbearing also known as temporary childlessness (Graham *et al*., 2013). The question of distinguishing all these types of childlessness often generates an additional methodological issue in the research and causes a broad discussion in the academic community. The childless population is usually defined as people having no children by the end of their reproductive period or, if we consider those who are still in the reproductive ages, as childless at the moment of the survey or the interview. The survey data on individual reproductive plans, including information about the desirable and/or

expected number of children, provides researchers with a chance to set apart temporary childlessness and childfree intentions, voluntary and involuntary childlessness. Yet estimations of voluntary childlessness prevalence based solely on this information might be unreliable, because actually people who for some reasons cannot have children sometimes tend to denote their eventual childlessness as a voluntary act. Therefore facts regarding individuals' ability to have children, namely, serious health limitations, confirmed biological sterility or vasectomy etc., sometimes get incorporated into the analysis. Aside from this, some authors assume that we should also take into account the contraceptive behavior of individuals, noting that those who do not use any contraceptives and still declare zero as desired number of children could in some cases be treated as infertile rather than voluntarily childless (Poston *et al*., 1983; Graham *et al*., 2013). Usually incorporation of all these factors or variables is limited by the data structure and as will be shown later to a certain extent this will be the case in the current study.

Studies devoted to the determinants of voluntary childlessness observe a wide variety of economic, social, cultural or even psychological factors. The economic backgrounds of childlessness come from the reduction in the gender wage gap or an increase in the fixed cost of becoming a parent, which have a negative effect on both fertility and childlessness (Gobbi, 2013). Work-centered women, although constituting a minority, often remain childless, even when married (Hakim, 2003). Among other factors usually are listed age at the first marriage, facts of marital instability and partnership status, employment status, number of siblings in parent family and level of woman's education (for example, see De Jong and Sell, 1977; Heaton *et al*., 1999; Miettinen, 2010; Seiz, 2013). An increase in women's education level and growth in their economic independence have led to a higher level of social acceptance of the childfree lifestyle (Tanturri and Mencarini, 2006). Merz and Liefbroer (2012) corroborated the importance of individual-level expectations on the role of gender and socioeconomic status in relation to this type of reproductive behavior.

The demographic history of developed countries has already recorded some periods of the growth of eventual childlessness rates in the 20th century. Usually its spikes have appeared due to wars, starvation or other severe social shocks. Nevertheless, an increase in the level of eventual childlessness among the present generations of women has a universal character, even though some variety in the starting date of growth can be found across countries or regions. In Northern and Western Europe the growth arises in the cohorts of women born in the 1940s, in Southern Europe it can be observed among women born in the 1950s or later and, finally, in Central and Eastern Europe it shows up for the first time in the cohorts of women born in the 1960s (Frejka, 2008). The list of regions with the highest registered and projected levels of eventual childlessness starts with the Netherlands, Western

Germany, England and Wales, where its rate is likely to reach 25% among women born after the 1970s. Generally, the trends described can be observed in all European countries except for France (see Sobotka, 2005).

The rate of eventual childlessness in Russia, which has stayed around 5-7% until recently, can be considered rather low compared with the European level (Zakharov, 2008). In general steadily high probabilities of first birth were observed in most ex-Soviet countries up to the middle of the 1990s. This can mainly be explained by the prevalence of pronatalist social norms and by the limited spread of modern contraception methods at that time. However, a share of eventually childlessness women in the generations presently coming to the end of their fertility period is already noticeably higher. Hence we can say that Russia is getting in line with the global Eastern European trends (Frejka, 2008).

Regarding the main fertility tendencies, Moscow coheres rather well with the regions of the European part of Russia. However in Moscow, the biggest Russian megalopolis, all the trends appear to be more obvious compared to the rest of the country. Differences in fertility levels in the various types of settlements, namely, relatively high fertility in the small cities and rural areas along with relatively low fertility in the big cities, were repeatedly revealed on the basis of empirical data (see review in Kulu, 2013). The principal causes of these differences account for composition or contextual effects. The compositional effect reflects the fact of diverse population composition in Russian settlements, meaning that big cities substantially attract active career-oriented individuals demanding higher wages. The contextual effect indicates disparities in living conditions, for instance, in housing. The prevalence of the modern life-style and of the least traditional behavior with respect to the demographic issues runs up to its maximum in the big cities (Livi-Bacci, 2000). Hence, Moscow is a predictable leader among all Russian regions in the second demographic transition track. This fact thus requires examining it separately and determines the logic of the following research on the whole, as well as the structure of the data used.

3.   DATA AND METHOD

Within this study an estimation of the childlessness dynamics in the cohorts of Russian women is based on the National Censuses data.

The most recent Russian National Censuses were held in 2002 and 2010. Both 2002 and 2010 questionnaires included questions about the total number of births (excluding stillbirth) and about the date of birth of the first child for women aged 15 or older living in private households. At the end of the year 2013 the Russian Federal State Statistics Service (Rosstat) provided open web access to the microdata of these two censuses. This gave us a chance to apply some basic techniques of survival analysis on the country level using the data array for the whole population rather than a survey sample.

To estimate the childlessness rate dynamics we drew out de facto childless women from the census array. The only factor we included in the model was a woman's year of birth or, in other words, the generation to which this woman belongs. Unfortunately, some particular features of the data layout on the Rosstat website do not allow incorporating more than one explanatory variable into the model yet. However, we are now working on the specific methodology of data extraction, which could let us elevate this constraint in the future.

The modeling of childlessness factors is performed on the basis of survey data. Particularly, we used the third wave of the Russian Generations and Gender Survey (GGS-Russia, 2011) and the second wave of the Moscow and its Citizens Survey (MaCS, 2013).

GGS-Russia is a part of the international Generations and Gender Program (GGP). The sampling of the third wave covers 11,183 respondents aged from 18 to 79 years (each respondent represents one household) from 32 out of 83 Russian regions ensuring the survey representativeness on a country scale.

MaCS is an annual survey of the Russian capital population, which has been held regularly by the Institute of Humanitarian Development of the Megapolis since 2012. The 2012 wave is a pilot one. In 2013 the sample covers 3,109 respondents aged from 18 to 82 years (each respondent represents one household), and the survey is representative on a city scale. The structures of MaCS and GGS questionnaires are fairly similar and both of them cover a wide range of socio-economic issues, which makes the data comparable.

The childlessness models were based on childless individuals aged 18-49. Both in the Russian GGS and MaCS surveys the desired number of children was recognized through an open question, which can be translated from Russian as «*If it was entirely up to you: How many children in total do you want or rather would you have wanted?*».

The GGS-Russia questionnaire also contains questions about individual reproductive intentions, firstly, for a three year long period and secondly, for a more remote prospect. It provided us with an opportunity to adjust the declared reproductive intentions for those who give contradictory answers about desired and actually planned numbers of children. Unfortunately, the MaCS survey does not have similar questions.

To explore the factors of childlessness we applied regression analysis. We set the dependent variable as a binary outcome of 'zero child preferences' / 'non-zero child preferences' and therefore chose logistic regression. In the model the dependent variable takes a value equal to 1 if the respondent prefers a family without children and 0 otherwise; that is, a family with at least one child.

4. DYNAMICS OF CHILDLESNESS PREVALENCE IN RUSSIA

The last census revealed growth of the proportion childless women in the total female population. In 2010, 11.5% of Russian women aged 35-39 were

childless. By the end of their reproductive age this rate will hardly be lower than 10%. In Moscow the share of childless women among 35-39 year olds mounts up to 17.1% (Table 1). This means that for the present moment in the Russian capital city childlessness is more common than, for example, having 3+ children, which refers to nearly 8% of women. Nevertheless there is still a principal question to what extent this status is unwanted (i.e., when fertility norms are lowered to zero due to unfavorable life circumstances) or truly voluntary.

Table 1 – *Share of childless women by ages 35-49, percent*

| Age group	Census-2010		Census-2002	
	Russia	Moscow	Russia	Moscow
35-39	11.52	17.15	7.42	10.69
40-44	8.03	11.58	5.97	8.04
45-49	6.55	8.96	5.83	7.84

Source: Federal State Statistics Service data.

To track the dynamics of the childlessness prevalence among Russian women we performed a survival analysis on the basis of the 2010 National Census data. We examined life patterns of all women beginning with their 15th birthday, excluding those who had already had their first child born by this age. We checked the status of these women annually and as soon as the first child was born, the woman was excluded from the sample under review. We followed those who remained childless up to the end of their fertility period, i.e. 45th birthday, or by the Census date if it came earlier..

To meet the technical requirements of the software used we scaled the Census data on 51.7 million women with the ratio 1:100. As a result we got a sample of 516,638 observations, each one standing for 100 women. The sample consists of women born in the years 1926-1995. We excluded from our analysis the youngest generations of women who basically have not started their fertility careers yet. We also left out the oldest cohorts born in 1928-1934 and stayed with those born in 1935-1988, 84.8% of which have already given birth to their first child.

The results of the Kaplan-Meier method (Kaplan and Meier, 1958) are introduced in Figures 1 and 2. The log-rank test (Mantel, 1966) reveals statistically significant differences between the survival distributions of women born in the observed years. Pairwise comparisons were run for generations of women demarked with 5-year long intervals, starting with those born in 1935-1939 and going up to a truncated generation of women born in 1985-1988. Differences between all generations, except for 1940-44/1945-49, 1945-49/1970-74 and 1955-59/1960-64 were found at the Bonferroni-corrected significance level (Dunn, 1961).

Figure 1 shows the generations of women born in the interval of 1935-1969, all of which have already left their reproductive ages or came very close to this point by the time of Census 2010. Here we can easily observe that the *start of family* event has gradually shifted towards younger ages. Thus, in the oldest generation a third of women remained childless by the age of 25, while only a quarter of the youngest did so. This dynamic is mainly attributed to the general decrease in the mean age of marriage. In response to post-war gender disproportion in the Russian population and intense rural to urban migration these generations shifted to an earlier start of their marriage careers (Vishnevsky, 2006). A break in this tendency can be found only in generations born in 1970 or later, which is a delayed change compared to other developed countries.

Figure 1 – *Cumulative survival function for the status of childlessness in accordance with the woman's year of birth, cohorts born in 1935-1969*
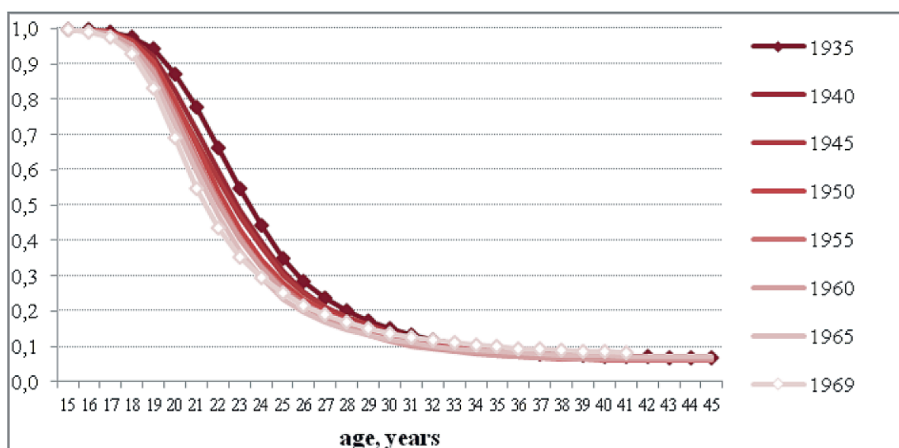
Source: National Census (2010) data.

Figure 2 pictures the transition from childlessness to maternity for women born in the years 1970-1988. Here, on the contrary, the scope of the family start postponement grows from older cohorts of women to younger ones. For instance, in the generation of women born in 1970 the probability of being childless by the age of 25 reached 27% and in the generation born in 1985 the same probability mounts to 48.6%. If we move on to the age of 30 the corresponding probabilities lie at the level of 15.2% among women born in 1970 and at 24% among those born in 1980.

Figure 2 – *Cumulative survival function for the status of childlessness in accordance with the woman's year of birth, cohorts born in 1970-1988*
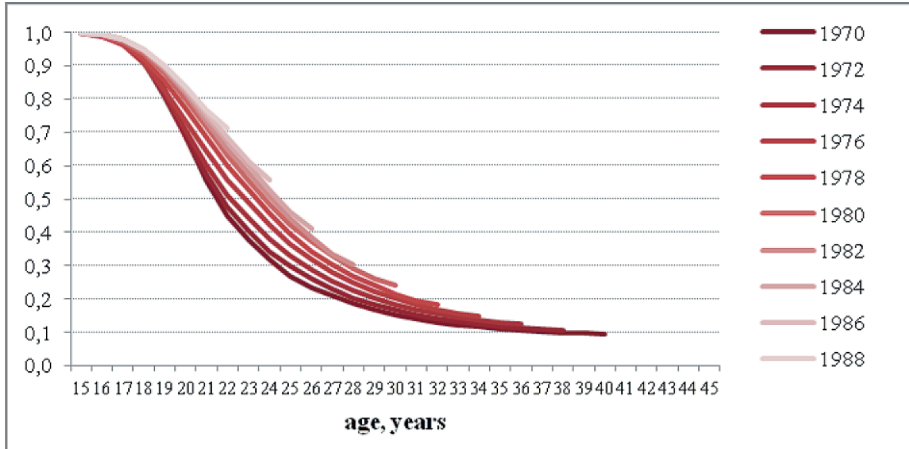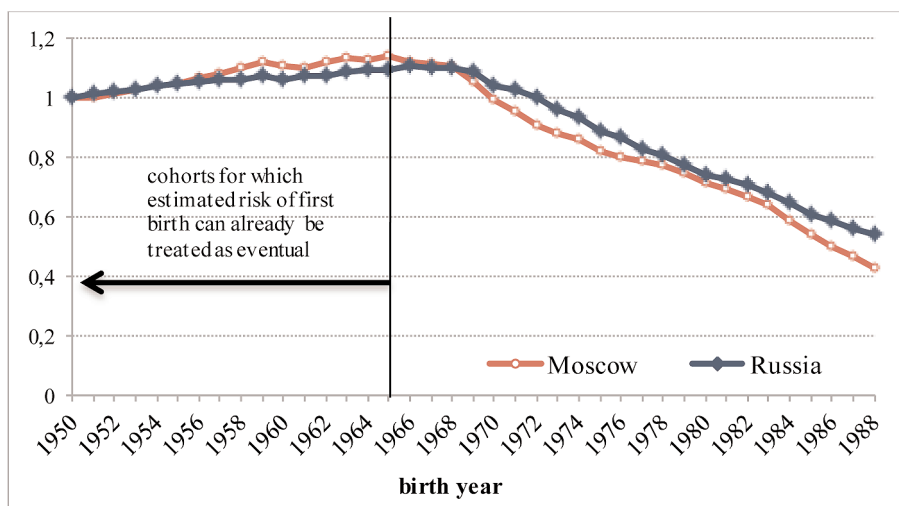

Source: National Census (2010) data.

The question is how many of the delayed births in the last set of generations would actually be carried out in the future. The youngest generations of women might still have their first births later, although we do not have any reason to await the recuperation to be intense enough for the cohort to catch up with previous ones. Hence we expect the eventual childlessness among these women to be higher compared with the older cohorts.

To compare risks of the eventual childlessness in different generations of women we employed Cox proportional-hazards regression with cohort as the main covariate. Here we stuck with the simple regression without further covariates as the Census data structure does not yet allow us to incorporate more than one characteristic of a woman.

The cohort of women born in 1950, which is the first generation essentially non-affected by war, was set as reference. A *chi*-squared statistic test for the model was statistically significant at the *p*-value of 0.01. The results of the estimations are shown in Figure 3. The probability to give birth to the first child rises right up to the cohort of women born in 1965. In Moscow the decline in this indicator can be observed right from 1965 and in Russia as a whole it has fallen since 1969. Generally women living in the capital city reach the lowest level of the chart for having the first birth. The risk of experiencing the first birth for the youngest generation observed - women born in 1988 - is less than half that of those born in 1950.

Figure 3 – *Estimated relative risk of the first birth,*
Cox proportional-hazards regression

Source: National Census (2010) data.

5.   REGRESSION ANALYSIS: FACTORS OF CHILDLESSNESS

To put voluntary childlessness aside from involuntary and therefore to treat its dynamics properly we have to apply regression analysis to the survey data described above. Comparing Moscow and Russia on the whole we observe a significantly higher share of individuals declaring 'zero' as a desired number of children in the capital city. MaCS shows 18% of childless respondents of reproductive age planning to have no children at all, while in the GGS the same proportion makes up only 7%.

As already mentioned, to identify the most influential factors for 'zero child preference' we employed regression analysis using a binary logistic model. The number of cases observed in each of the samples restrained analysis opportunities. Specifically we could not use separate regressions for sub-samples of males and females in the MaCS sample. To ensure higher comparability of results we did not split the GGS sample either. Gender parameters, as well as different social and economic variables, namely, education, income level and employment status, are included as factors in the model.

Table 2 and Table 3 present binary logistic regression results for a series of models examining the factors of zero fertility preferences. The *chi*-squared values presented at the bottom of these tables are statistically significant. Calibration of the models showed that reducing the number of variables included does not lead to higher log likelihood or *r*-squares, but cuts down the number of correctly

9

predicted outcomes. To assess the fit of the models we used corrected Cox-Snell *R*-square known as Nagelkerke *R*-square (1991). It has a fixed upper bound of 1.0, which makes the values comparable. Sample distributions for both surveys can be found in Tables A1-A4 in Appendix.

As we have different questionnaires in the two surveys we cannot use an identical set of variables in the regressions. This constraint lowers the comparability of the models.

In Moscow the directions of different variable influences correspond well with each other. The highest likelihood to report preferences for childlessness are found for highly educated men born in Moscow, who were the only child in their family. The last factor has actually the greatest influence, it almost triples the chances to have 'zero' as a desired number of children. The tendency to regard marriage as not necessary generally and children as not essential for happiness both raise the chance 1.8 times (Table 2).

Table 2 – *Odds ratios for zero child preference. Estimates from binary logistic regression model. Moscow*

	Odds ratio	Std. error
Women	1 *	
Men	1.495 *	0.206
18-29 years old	1 ***	
30-39 years old	0.708	0.251
40-49 years old	2.558 ***	0.330
3 children in parental family	1 **	
2 children in parental family	2.033 *	0.404
1 child in parental family	2.957 ***	0.395
Has a cohabitation experience	1	
No cohabitation experience	1.003	0.220
Low education (ISCED 4 and lower)	1 *	
Specialized professional education (ISCED 5B)	2.027 *	0.364
Higher education (ISCED 5A and higher)	2.230 **	0.342
Low and middle income groups	1 *	
High income group	1.419 *	0.350
Opinion: "Happiness is *impossible* without children"	1 **	
Opinion: "It is hard to tell if happiness is possible without children"	1.019	0.286
Opinion: "Happiness is *possible* without children"	1.780 ***	0.219
Born out of Moscow	1 *	
Born in Moscow	1.747 *	0.297

...Cont'd...

Table 2 – *Cont'd*

	Odds ratio	Std. error
Opinion: "Official marriage registration is necessary for cohabitation"	1 *	
Opinion: "Cohabitation is necessary before official marriage registration"	1.018	0.226
Opinion: "Official marriage registration is not necessary at all"	1.863 **	0.306
Nagelkerke R-squared		0.149
Log likelihood		-345.7
χ^2 *(df)*		77.7 (14)
Number of observations		815

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$
Source: Calculations based on the MaCS 2013 data.

On the other hand a rather strong effect is observed for the oldest age group. Compared with the youngest age group with all other variables controlled for, high age makes chances grow 2.6 times. It could mean that those individuals who have lower real chances to have children (due to health limitations etc.) tend to explain it with their personal preferences rather than their inability. Thus individuals declaring 'zero' child preferences are not purely those who consciously stick with voluntary childless behavior. Yet the significance of all the non-age factors named in the previous paragraph proves that some sprouts of it indeed exist.

Regression analysis based on the GGS sub-sample (from which Moscow was excluded) shows different results (Table 3). The variable characterizing the number of children in the parental family appears to be nonsignificant here. That means that the *low fertility trap*[1], which definitely has an effect in Moscow, does not work in the rest of the country. Herewith the role of individuals' age in the country regression is even higher than in Moscow. High age with all other variables controlled increases the chances of "zero" desired number of children more than 9 times which makes age a principal factor for childlessness in the country. Absence of a partner increases the chances to have childless preference 2.1 times. Adherence to the opinion that self-fulfillment is impossible without children has a rather modest effect (significance at 0.05 level and increase of chances 1.9 times). Higher education, on the contrary, lowers chances of falling into the group with "zero" desired number of children by more than 40%, while living area together with income level are nonsignificant.

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[1] The low fertility trap hypothesis was introduced and elaborated by Lutz, Skirbekk and Testa (Lutz and Skirbekk, 2005; Lutz, Skirbekk and Testa, 2006). When explaining fertility dynamics it refers to a social pattern, which predicts desired family size to decline in countries that have experienced very low fertility rates previously.

Table 3 – *Odds ratios for zero child preference. Estimates from binary logistic regression model. Russia*

	Odds ratio	Std. error
Women	1	
Men	1.416	0.222
18-29 years old	1 ***	
30-39 years old	2.632 ***	0.270
40-49 years old	9.212 ***	0.269
Cohabiting or non-cohabiting partner	1 ***	
No partner	2.077 ***	0.224
3 children in parental family	1	
2 children in parental family	1.016	0.262
1 child in parental family	1.024	0.279
Low and middle income group	1	
High income group	0.771	0.239
Low education (ISCED 4 and lower)	1	
Specialized professional education (ISCED 5B)	0.949	0.248
Higher education (ISCED 5A and higher)	0.572 **	0.283
Big cities [a]	1	
Other cities	1.102	0.258
Rural areas	1.310	0.256
Opinion: "Self-fulfillment is *impossible* without children"	1 *	
Opinion: "It is hard to tell if self-fulfillment is possible without children"	1.244	0.243
Opinion: "Self-fulfillment is *possible* without children"	1.940 **	0.296
Nagelkerke R-squared		0.174
Log likelihood		-696.3
χ^2 *(df)*		114.5 (13)
Number of observations		1 594

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$
Note: [a] These cities are Russian regional capitals. Moscow is withdrawn from the sample.
Source: Calculations based on the GGS 2011 data.

The opposite effects of education on childless in Russia and in Moscow may relate to differences in its quality and economic returns. Higher education is an effective social mobility channel in the capital city, where the labor market is at the same time capacious and competitive. That is why in Moscow educational level can be treated as a good social class marker; the higher education stands for the higher social position and the broader acceptance of liberal values. In the rest

of the country returns from education are considerably lower and its level correlates with the individual social or economic status rather poorly.

Based on the GGS data we also ran a model that includes an additional parameter on respondent's self-estimated ability to have children (Table A5 in Appendix)[2]. Incorporation of this parameter brings the odds ratio for the oldest age group down to 7.1, raises the role of partner absence to 2.3 and has almost no influence for the rest of the model. Physical inability to have children itself raises chances to have a childless preference 3.3 times, which is still weaker than the age factor.

We assume that such a big role for the age factor stands for 'circumstantial childlessness'. Those who find themselves getting close to the upper bound of their reproductive period without having children, for example because they have not had a stable partner, tend to expose the situation as their deliberate choice. These people, together with infertile individuals, are those who state childless intentions in Russia on the whole.

6.   CONCLUSIONS AND DISCUSSION

This study has demonstrated the existence of childlessness in Russia. The level of childlessness in Russia is not high compared with other European countries, but according to the National Censuses data it has recently increased from low to the middle range. Thus, the share of childless women rose from 5.8% to 6.6% among 45-49 year olds and from 6% to 8% among 40-44 year olds in 2002-2010. In 2010, 11.5% of those aged 35-39 were childless. It is highly unlikely that this rate will come down to much lower than 10% by the end of their reproductive age, which means that we actually do observe a rise in childlessness in Russia. The importance of this discovery can hardly be overestimated.

This socio-demographic process occurs in Moscow to a larger extent than in the rest of the country, the same as for other demographic changes that have occurred in Russia. Women born in 1970-1975 reached their 40s in 2010 and yet 17% of them were childless in Moscow. This means that in the Russian capital for this generation eventual childlessness will hardly drop lower than 15%. Our general forecast for the level of childlessness growth for younger generations in Russia comes close to existing Central and Eastern European estimations. The forecast there is 15-22% for generations born in 1970 and later (Frejka, 2008).

The regression analysis provides us input on the characteristics of the childless population in Russia. In Moscow childless intentions are prevalent among 40-49-year-old well-educated and well-paid individuals who are the

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[2] Unfortunately MAC Survey questionnaire does not include any questions about infecundity or other pertinent physical limitations.

only child in the parental family and who do not consider official marriage or having children to be prerequisites for happiness. With regard to the rest of the country we can name fewer significant factors of zero child preferences and they are higher age, biological infertility and absence of a partner. Thus, the portraits of childfree individuals and the main determinants of childlessness in Moscow and in Russia in general differ significantly.

We know that Moscow has held the eldest fertility schedule in the country for a long time. After Moscow women shifted to a later start of parenthood the age of maternity also gradually increased in the rest of the country. Now childlessness is becoming an increasingly widespread behavior in Moscow. But does that mean that the rest of Russia will follow this path? We do not have enough information to answer this question; this would be a question for further research in the field.

The Moscow labor market has vast capacity, which is why it attracts career-oriented people, who tend to be well educated and then strive for superior job positions. This could be one reason for the higher prevalence of *voluntary* childlessness in Moscow compared with the rest of the country. We will soon probably observe similar dynamics in other big Russian cities, but not in small cities or rural areas.

At the same time city infrastructure and the existing social protection system do not give a lot of opportunities to combine parenthood and a full-time job in Moscow. What we capture in the data might be a reflection of more common unsuccessful so-called 'catching up' strategies, that is, eventual childlessness due to long postponement, which sometimes can afterwards be claimed as voluntary. In this case, since the pattern of delaying the first birth is growing wider overall, we can expect the eventual rise of the (not quite voluntary) childlessness level everywhere in the country.

The same logic works for 'circumstantial childlessness', which usually occurs in the absence of a stable partner during the reproductive years. The rapid post-Soviet social transformations lowered the stability of marriage and hence could have extended the prevalence of this type of childlessness first in big Russian cities, and then everywhere in the country.

So the answer to our last research question would be again different for the capital city and the country as a whole. We actually believe that in Moscow we now face all the mechanisms described above and observe at once involuntary childlessness (infertility), childlessness due to postponement, circumstantial childlessness, and truly voluntary childlessness. As for the country on the whole, only the first three types of behavior have a significant influence on the eventual childlessness level.

Finally, we believe that the results of this study have important policy implications. First of all, they reveal the limitations of the current policy measures addressed to families with two or more children only. The study

shows that the question of childlessness should be taken in consideration while forming the political agenda. Secondly, Russia faces challenges in women's reproductive health. As already mentioned, postponing the start of fertility careers has become more and more popular in Russia. Therefore many women may find out they have reproductive health problems only after age 30 when they decide to have the first child. The limited access to assisted reproductive technologies in Russia then impedes the fulfillment of women's childbearing goals.

Acknowledgements

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Appendix

Table A1 – *Sample distributions, MaCS Survey*

	Non-zero child preference		Zero child preference		Total %
	row %	abs.	row %	abs.	
Men	78.9	360	21.1	96	56.0
Women	85.8	308	14.2	51	44.0
18-29 years old	85.7	490	14.3	82	70.2
30-39 years old	77.6	132	22.4	38	20.9
40-49 years old	63.0	46	37.0	27	9.0
1 child in parental family	77.2	305	22.8	90	48.5
2 children in parental family	84.1	253	15.9	48	36.9
3 children in parental family	92.4	110	7.6	9	14.6
No cohabitation experience	83.3	413	16.7	83	60.9
Has a cohabitation experience	79.9	255	20.1	64	39.1
Low and middle income groups	85.7	335	14.3	56	48.0
High income group	78.5	333	21.5	91	52.0
Opinion: "It is hard to tell if happiness is possible without children"	84.7	122	15.3	22	17.7
Opinion: "Happiness is *impossible* without children"	86.0	368	14.0	60	52.5
Opinion: "Happiness is *possible* without children"	73.3	178	26.7	65	29.8
Born in Moscow	79.7	511	20.3	130	78.7
Born out of Moscow	90.2	157	9.8	17	21.3
Low education (ISCED 4 and lower)	89.6	112	10.4	13	15.3
Specialized professional education (ISCED 5B)	80.7	167	19.3	40	25.4
Higher education (ISCED 5A and higher)	80.5	389	19.5	94	59.3
Opinion: "Official marriage registration is necessary for cohabitation"	84.3	214	15.7	40	31.2
Opinion: "Cohabitation is necessary before official marriage registration"	83.6	387	16.4	76	56.8
Opinion: "Official marriage registration is not necessary at all"	68.4	67	31.6	31	12.0

Source: MaCS 2013 data.

Table A2 – *Sample distributions, GGS-Russia*

	Non-zero child preference		Zero child preference		Total %
	row %	abs.	row %	abs.	
Men	92.1	807	7.9	69	55.0
Women	94.0	675	6.0	43	45.0
18-29 years old	96.0	1168	4.0	49	76.3
30-39 years old	89.9	223	10.1	25	15.6
40-49 years old	70.5	91	29.5	38	8.1
1 child in parental family	93.1	338	6.9	25	22.8
2 children in parental family	92.1	244	7.9	21	16.6
3 children in parental family	93.2	900	6.8	66	60.6
Cohabiting or non-cohabiting partner	94.9	706	5.1	38	46.7
No partner	91.3	776	8.7	74	53.3
Low education (ISCED 4 and lower)	90.0	415	10.0	46	28.9
Specialized professional education (ISCED 5B)	90.6	375	9.4	39	26.0
Higher education (ISCED 5A and higher)	96.2	692	3.8	27	45.1
Low and middle income group	86.6	284	13.4	44	20.6
High income group	94.6	1198	5.4	68	79.4
Big cities [a]	94.4	720	5.6	43	47.9
Other cities	92.9	420	7.1	32	28.4
Rural areas	90.2	342	9.8	37	23.8
Opinion: "Self-fulfillment is *impossible* without children"	94.1	976	5.9	61	65.1
Opinion: "It is hard to tell if self-fulfillment is possible without children"	91.6	347	8.4	32	23.8
Opinion: "Self-fulfillment is *possible* without children"	89.3	159	10.7	19	11.2
Opinion: "I can have children"	93.9	1442	6.1	94	96.4
Opinion: "I cannot have children" *(due to health limitations)*	69.0	40	31.0	18	3.6

Note: [a] These cities are Russian regional capitals. Moscow is withdrawn from the sample.
Source: GGS 2011 data.

Table A3 – *Sample distributions, men and women declaring zero child preferences, MaCS Survey, separately for the two sexes*

	Men		Women	
	% [a]	abs.	% [a]	abs.
18-29 years old	16.6	53	11.5	29
30-39 years old	28.0	26	15.6	12
40-49 years old	38.6	17	34.5	10
1 child in parental family	25.7	62	18.2	28
2 children in parental family	17.8	27	14.1	21
3 children in parental family	11.1	7	3.6	2
No cohabitation experience	19.9	58	12.3	25
Has a cohabitation experience	23.2	38	16.8	26
Low and middle income groups	16.9	37	11.0	19
High income group	24.9	59	17.1	32
Opinion: "It is hard to tell if happiness is possible without children"	18.9	18	8.2	4
Opinion: "Happiness is *impossible* without children"	15.7	33	12.4	27
Opinion: "Happiness is *possible* without children"	29.8	45	21.7	20
Born in Moscow	23.3	86	16.2	44
Born out of Moscow	11.5	10	8.0	7
Low education (ISCED 4 and lower)	11.8	11	6.3	2
Specialized professional education (ISCED 5B)	23.8	30	12.3	10
Higher education (ISCED 5A and higher)	23.2	55	15.9	39
Opinion: "Official marriage registration is necessary for cohabitation"	16.2	19	15.3	21
Opinion: "Cohabitation is necessary before official marriage registration"	20.1	54	11.3	22
Opinion: "Official marriage registration is not necessary at all"	32.9	23	28.6	8

Note: [a] 100% states for all respondents in the group showed in the row name, both declaring zero child preferences and not.
Source: MaCS 2013 data.

Table A4 – *Sample distributions, men and women declaring zero child preferences, GGS-Russia, separately for the two sexes*

	Men		Women	
	% [a]	abs.	% [a]	abs.
18-29 years old	5.6	38	2.1	11
30-39 years old	8.4	11	12.0	14
40-49 years old	32.3	20	26.9	18
1 child in parental family	10.6	20	2.9	5
2 children in parental family	9.2	14	6.3	7
3 children in parental family	6.6	35	7.2	31
Cohabiting or non-cohabiting partner	5.1	20	5.2	18
No partner	10.2	49	6.8	25
Low education (ISCED 4 and lower)	9.9	32	10.2	14
Specialized professional education (ISCED 5B)	8.8	21	10.3	18
Higher education (ISCED 5A and higher)	5.1	16	2.7	11
Low and middle income group	14.5	27	12.0	17
High income group	6.1	42	4.5	26
Big cities [b]	6.7	27	4.4	16
Other cities	6.6	17	7.7	15
Rural areas	11.5	25	7.5	12
Opinion: "Self-fulfillment is *impossible* without children"	7.2	42	4.2	19
Opinion: "It is hard to tell if Self-fulfillment is possible without children"	8.7	18	8.1	14
Opinion: "Self-fulfillment is *possible* without children"	10.1	9	11.2	10
Opinion: "I can have children"	7.5	65	4.3	29
Opinion: "I cannot have children" *(due to health limitations)*	33.3	4	30.4	14

Notes: [a] 100% states for all respondents in the group showed in the row name, both declaring zero child preferences and not; (b) These cities are Russian region capitals. Moscow is withdrawn from the sample. *Source:* GGS 2011 data.

Table A5 – *Odds ratios for zero child preference. Estimates from the binary logistic regression model. Russia*

	Odds ratio	Std. error
Women	1 **	
Men	1.691**	0.235
18-29 years old	1***	
30-39 years old	2.403 ***	0.276
40-49 years old	7.113 ***	0.297
Cohabiting or non-cohabiting partner	1 ***	
No partner	2.301 ***	0.231
3 children in parental family	1	
2 children in parental family	1.007	0.264
1 child in parental family	0.974	0.284
Low and middle income group	1	
High income group	0.732	0.239
Low education (ISCED 4 and lower)	1	
Specialized professional education (ISCED 5B)	0.926	0.250
Higher education (ISCED 5A and higher)	0.615 *	0.285
Big cities [a]	1	
Other cities	1.112	0.260
Rural areas	1.339	0.257
Opinion: "Self-fulfillment is *impossible* without children"	1	
Opinion: "It is hard to tell if self-fulfillment is possible without children"	1.238	0.245
Opinion: "Self-fulfillment is *possible* without children"	1.880 **	0.299
Opinion: "I can have children"	1 ***	
Opinion: "I cannot have children" *(due to health limitations)*	3.321 ***	0.369
Nagelkerke R-squared		0.188
Log likelihood		-686.4
χ^2 *(df)*		124.4 (14)
Number of observations		1 594

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$
Note: [a] These cities are Russian regional capitals. Moscow is withdrawn from the sample.
Source: Calculations based on the GGS 2011 data.

22