DEMOGRAPHIC RESEARCH

Research Article

Economic crisis and recovery:
Changes in second birth rates within
occupational classes and educational groups

Sunnee Billingsley

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Sunnee Billingsley[1]

Abstract

This study assesses the decline in second birth rates for men and women across different skill levels in transitional Russia. Changes within educational groups and occupational classes are observed over three distinct time periods: the Soviet era, economic crisis, and economic recovery. The most remarkable finding is the similarity in the extent second birth rates declined within educational groups and occupational classes during the economic crisis. Although further decline occurred in the recovery period, more variation emerged across groups.

[1] PhD, Demography Unit, Dept. of Sociology, Stockholm University.
E-mail: sunnee.billingsley@sociology.su.se. Department of Political and Social Sciences, Pompeu Fabra Universitat, Barcelona, Spain.

1. Introduction

The fall of the Soviet Union initiated an era of unparalleled political and economic reform according to the breadth, depth, and speed of changes. The shift towards democracy and capitalism entailed greater personal freedom for thought, expression, and lifestyles. The dismantling of the command economy allowed competition to flourish, thus improving productivity. Overall individual well-being should have been enhanced through increased freedom and economic resources. However in Russia and many other countries that underwent market reform, the transition was accompanied by economic crisis, which decreased well-being through insecurity and material hardship. Populations that had never dealt with extreme social risk suddenly found themselves unemployed, unpaid or having to cope with hyperinflation, while lacking a sufficient safety net and watching the "winners" of the transition achieve unprecedented wealth.[2]

Undoubtedly these complicated transformations influenced demographic trends, including whether and when individuals decided to have children. Indeed while the majority of men and women had two children in Russia before 1990, the total fertility rate (TFR) fell to below 1.2 by the end of the 1990s (Zhakarov and Ivanova 1996).[3] Research has shown very little relevance of postponement to the majority of this fertility decline, nor does it appear due to increasing childlessness; the decline seems to be due to stopping behavior in which second and higher order births declined (Sobotka 2002).

A widespread debate continues on whether fertility is related positively or negatively to economic conditions (see Örsal and Goldstein 2010 and Sobotka, Skirbekk, and Philipov 2010 for recent reviews). At the macro level, a pro-cyclical relationship across many countries has emerged in recent decades. In Russia this trend also appears to exist. Figure 1 shows the decline and moderate recovery of the total fertility rate, as well as demonstrates how it closely tracks GDP development.
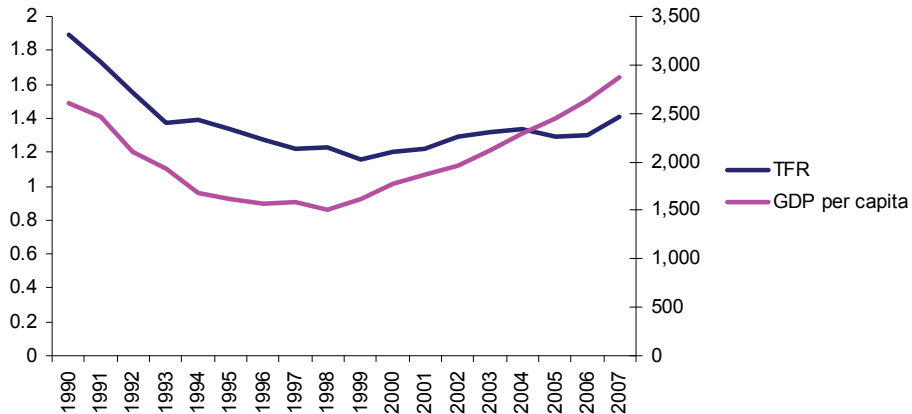
As Russia moved toward democracy and capitalism, the mainstream economic (Becker 1960, 1981; Hotz, Klerman, and Willis 1997) and ideational (Lesthaeghe and van de Kaa 1986) theories of fertility became increasingly relevant. Wage dispersion increased the returns to education and the difference between earnings by occupational class, which should have generated higher opportunity costs of childrearing for women with increasingly high income potential. New political and social freedoms, along with some later expansion of higher education, should have promoted more individualized decision-making in regards to major life course events. However little theory exists in

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[2] The increase in inequality during this time period across some former Soviet Union republics was the largest and most accelerated ever recorded (Milanovic 1998).
[3] Avdeev and Monnier (1995) point out that although the majority of women in much earlier cohorts had at least two children, it was not necessarily universal to have more than one.

mainstream fertility research to guide an investigation of whether and how women alter their fertility behavior during an economic crisis, as most economic theories of fertility are premised on contexts of continued economic growth and women's labor force expansion.

Figure 1:   Total fertility rate and GDP per capita trends in Russia

Note: TFR is measured on the left axis and GDP per capita is measured on the right axis in constant 2000 USD.
Source: TransMonee Database, Innocenti Research Centre, UNICEF

Sobotka, Skirbekk, and Philipov (2010) review research spanning the major economic recessions of the 20th century and list multiple mechanisms through which recession influences fertility behavior; these include job instability and unemployment, income effects related to unemployment, uncertainty and anomie, lower housing availability, prolongation of time spent in education, as well as differential effects of opportunity costs. Economic uncertainty in particular has received significant attention as an explanation that may explain low fertility levels (e.g., Blossfeld et al. 2005 and Kohler, Billari, and Ortega 2002).[4] Kreyenfeld (2009) analyzed economic uncertainty in a transitional society by comparing East and West Germans' first birth transition rates. She found some evidence that East German women were reluctant to start a family when worried about their job stability, but not that unemployment itself deterred them from having their first child.

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[4] Economic uncertainty has also been used as an explanation for why people continue to have a child when there is labor market uncertainty (Friedman, Hechter, and Kanazawa 1994).

In research on low fertility in Russia, Bühler (2004) found a positive relationship between extra sources of income or sustenance and second births. Perelli-Harris (2006) found a positive relationship between informal work, subjective well-being and second/higher order births. However in an attempt to address the straightforward impact of crisis on fertility behaviour in 1993, Kharkova and Andreev (2000) did not find evidence of a relationship. In their micro data analysis, Kohler and Kohler (2002) in fact found a positive relationship between labor market uncertainty/hardship and births between 1994 and 1996. On the other hand, macro level studies found evidence of a positive relationship between fertility and the economy across Russia and post communist Europe (Kohler and Kohler 2002; UNECE 2000; Cornia and Paniccia 1998; Billingsley 2010). Beyond the need for further research to understand these differential findings, Frejka (2008) has argued that the pathways through which fertility behavior was influenced during the critical transition period remain ambiguous and underspecified in much of the literature.

For example rarely discussed in this literature are other crisis/recession mechanisms that characterized the Russian economic crisis. Inflation, wage arrears, and wage devaluation all contributed to suppressing resources during the 1990s. Purchasing power is essential to the affordability of raising a child and decreasing purchasing power increases the cost of childbearing. If income is considered too low, the direct costs of childbearing may be considered too high (Becker 1960); this is how we understand the general conclusion that relatively high income is one of the prerequisites for childbearing in Europe (Hobcraft and Kiernan 1995). Little research has taken into account how purchasing power may be related to childbearing, particularly during economic recession or crisis. Becker (1960) found a positive relationship between birth rates and consumption of durables in the US. This positive relationship has been demonstrated in the Netherlands as well (Fokkema et al. 2008). While this relationship has not been assessed in the Russian context of the 1990s, we do know that the cost of goods rose dramatically and the value of wages fell (Barr 2001; Blanchard 1997), which implies that the direct costs of raising a child increased.

It is common practice in demographic research to consider education as a proxy for income potential when assessing the importance of opportunity costs to fertility behavior; we generally expect highly educated women to postpone or forego childbearing due to the high opportunity costs incurred with stepping out of the labor market to have a/another child. Women with lower income potential incur less of a loss in income if they become inactive. This study follows this standard and also assesses another indicator of potential income, occupational class. Both of these pieces of information can be used to assess long-term and immediate income potential.[5] In this

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[5] Differential contraceptive use by educational groups in Russia (Perlman and McKee 2009) may also generate differential fertility behavior across educational groups. While we cannot separate unplanned from

study I observe second birth rates according to these two measures of human capital for both men and women and juxtapose these rates across multiple time periods in which the economic context significantly varied to observe whether men and women with similar educational levels and occupational classes behaved differently depending on the economic context. While this strategy may provide new information and insight into determinants of lower second birth rates, it tells us nothing about the contribution to fertility behavior in Russia of changes in the culture surrounding childbearing or other long term processes. In other words, although the economic context is the focus of this study, it is not considered the sole driver of the fertility decline, as other social and cultural transformations undoubtedly played a role as well.

In the next sections, I discuss specific changes in the economic context from 1991 to 2004 and how they may have been experienced by individuals with different educational levels and occupational classes. I also explain how the analytical approach of this study deviates from past approaches. In the following sections I detail the data used in the analysis, methods and results. The final section discusses the findings and proposes interpretations of the results.

2. The economic context in Russia, 1991-1999 and 2000-2004

The first years of transition in Russia brought about massive and rapid economic changes, the effects of which are visible across many indicators. The proportion of households living below the poverty line grew from 11% in 1992 to 36% in 1996, while the ratio of income in the top 20% to the bottom 20% increased 68% (Zohoori et al. 1998). Labor force survey data on unemployment (Laborsta) show a steady increase from 1992-1999, in which the unemployment rate more than doubled (5.2-12.6%). Men's unemployment rates were slightly higher than women's throughout this increase, but both have declined similarly from 2000-2007. Milanovic (1998) reported that unemployment benefits were poorly targeted in Russia. From 1989 to 1998, Katz (2001) calculated that labor force participation rates in Russia declined from approximately 85% to 68% for women aged 20-29, 95% to 85% for women aged 30-49, and 82% to 75% for women aged 50-54. ILO data (Laborsta) also show a marked drop in the rate of the economically active. In 1989, 77% of all men 15 years or older were economically active, whereas 61% of women were. A decade later, a 10% decline was

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planned pregnancies in this analysis, widespread use of abortion in Russia may somewhat mitigate an effect of differential contraceptive use by education on the pregnancies that do come to term. However, there is evidence of a decline in abortions over the 1990s and an increase in modern contraception use (Troitskaya and Andersson 2007). Alternatively, occupational class may signal social status or prestige that may also be relevant to fertility decisions (e.g., Skirbekk 2008).
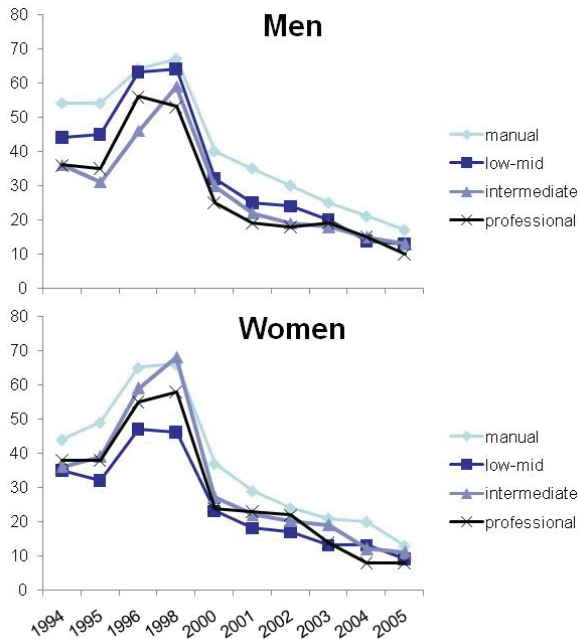
evident for both men and women. Enrolment in higher education stagnated and even declined slightly during the early years of transition in Russia; it was not until 1995, the first year of some economic recovery, that enrolment rates increased. Gerber (2000) explains this early decline, which was driven by lower enrolment of men, as a response to economic crisis and the opportunity costs of remaining in school when inflation and economic instability increased the need for earnings. Changes in the labor force have occurred as well.

As firms privatized and new private firms developed, returns to skill increased. Wage dispersion brought with it widening educational and occupational differentials that imply heterogeneous experiences of the economic transition and crisis. Indeed research on wage development in transitional Russia highlight different trajectories for different skill levels. Analyzing the first years of transition, 1991-1994, Brainerd (1998) found that significantly fewer individuals in the lower end of the wage distribution received wage increases in 1993 than those in the upper end (63% vs. 86%, respectively). In regards to specific differences between educational groups, university educated women received a wage premium of 38% in 1991, compared to secondary educated women, and this grew to 65% by 1994. The difference between the wages of women with secondary education and those with incomplete secondary education was negligible in 1991, but had increased by 1994 to the extent that women with incomplete secondary education received 15% lower wages. For men the gains were a little lower for those with university education, but by 1994 men who did not complete secondary school earned 20% less than men who did. This pattern persisted when Brainerd controlled for work and demographic characteristics. Wage premiums by occupational class revealed similar findings; relative to the average wage, the premium for top managers increased from 28% in 1991 to 81% by 1994. Unskilled workers' wages fell from 25% below the average wage in 1991 to 44% in 1994. Lukyanova (2006) analyzed wage inequality in Russia from 1994 to 2003 and confirmed that university educated individuals gained more in terms of real wages in this time period as well.

The rise in income inequality was exacerbated by wage arrears (i.e., unpaid or delayed wages) and Lehmann and Wadsworth (2001) estimate that wage dispersion would have been 20-30% less without wage arrears. Wage arrears also had a substantial impact on household finances; Gerber (2006) estimated the net effect of one earner in a household experiencing complete nonpayment of wages to be a 24% decline in per capita household income. Wage arrears appear to have increased throughout the late 1990s but this trend reversed in 2000 when arrears fell to much lower levels. The Russian Longitudinal Monitoring Survey (RLMS) has been used extensively to assess arrears and the time trend is visible in Figure 2. This figure also displays differences in arrears according to a basic division of occupational classes, including manual workers, low-mid grade workers, intermediate employees and managers, and the professional

class.[6] Almost uniformly more manual workers did not receive their full wages on time than in any other class. But working in higher occupational classes did not necessarily protect individuals from arrears.

Figure 2: **Percent of men and women within each occupational class that experienced wage arrears**

In the midst of this turbulent economic context, inflation—and hyperinflation in the first years—occurred. Changes in the consumer price index reveal that Russia's annual price index increased over 1000% in the early 1990s (TransMonee database, Innocenti Research Centre, UNICEF). Many aspects of the economic climate in the 1990s, therefore, suggest downward pressure on resources, which indicate an increase in the relative cost of having a child. From the onset of transition until 1999 is a time

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[6] This class schema is based on the European Socioeconomic Class (SeC) schema created at the Institute for Social and Economic Research.

period that is generally considered an unfavorable economic climate. We may expect the less skilled to have restricted or postponed childbearing particularly during this time. However keeping a position in the labor market was less rewarding during this time, which may have had the opposite effect of encouraging childbearing for those with lower returns to employment, at least for women.

Most of the discussion thus far has been focused on the turbulent 1990s. A reversal in the trends of both arrears and unemployment rates occurred in 2000. GDP per capita continued to increase at this point as well and the direction of trends in wage inequality reversed. Hence the time period from 2000 to 2004 is considered one of economic growth and recovery. This economic revival may have brought about even lower childbearing across all groups since employment became more available as well as more regularly paid and this should have dramatically increased the opportunity costs of stepping out of the labor market, particularly for the highest skilled. Conversely incomes should have increased at least to the degree that less people experienced wage arrears, rendering the costs of childbearing more feasible.

Although there is some room for hypothesizing about how human capital moderated the effects of economic crisis and recovery on fertility behavior for men and women, this study takes an exploratory approach. At the minimum we can expect direct cost effects to be more evident for men to the extent that men are still considered the main breadwinners within the household. Opportunity cost effects should be stronger for women than men since women provide the larger share of child care as well as more often step out of the labor force for childrearing. Higher non participation for women after having a first child also means that studying the effect of occupational class on second birth transitions implies different selectivity issues for men and women. Women who stay in the labor market and have an occupational class may be different in their childbearing behavior from women who are inactive after the first child; men, on the other hand, are unlikely to withdraw from the labor market after becoming a parent. The strategy to deal with this issue is explained in the results section, and different specifications of the occupational class model are not expected to alter the results for men.

In sum two layers of comparison structure this analysis. First second birth rates by educational level and occupational class are observed. The second source of comparison is time. Three distinct time periods have emerged in the discussion that are analyzed: the Soviet era, which lasted until the end of 1991; poor economic conditions, from the end of 1991 to 1999; and economic recovery, from 2000 to 2004. Rather than compare transition rates directly across occupational classes or educational categories, which would reveal nothing about the decline in second births over time, I compare the differences in transition rates over time within these groups. The results will tell us which educational groups or occupational classes had the greatest change in transition

rates across time periods. While past approaches that strictly compare rates across groups—such as in Kharkova and Andreev (2000) and Kohler and Kohler (2002)—may reflect data capacity at the time, in which information was available for only a limited time period, and may capture valid differences in the fertility behaviour among women of different educational levels or socioeconomic status, they do not offer information about the decline in fertility. Recent data collected in Russia allow us to go beyond the strategies in these early studies to better assess for whom fertility behaviour changed the most dramatically. Some degree of a human capital/fertility gradient is expected, but more important is to know which groups of individuals are having fewer children than they used to have.

3. Data and methods

The data used in this analysis are from the Russian Generations and Gender Survey (GGS)[7] and the supplementary Education and Employment Survey (EES)[8]. The GGS data are of a nationally representative sample of 18-79 year olds that was conducted in 2004. The EES data are of a GGS subsample of 18-55 year olds in 2005. A retrospective survey was given to this subsample, which collected detailed life histories of all education and employment activity since January of the year the respondent turned 17. Through these two sources, we have rich and complete knowledge of the main events occurring in the respondents' lives as they pertain to childbearing, work and education. All time-varying covariates are recorded on a monthly basis; therefore, the person-month is the unit of analysis. One limitation of the EES is that we have no information on partners' education and employment activity over the life course, which limits the analysis to individual-level factors and prohibits an analysis of household characteristics.

To analyze second birth rates, I use event history modeling, which is a particularly useful model when analyzing time dependent processes and allows the characteristics of the respondent to change over time. To allow for variation in the baseline hazard rate over time since the first birth, I use a piecewise constant model. The dependent variable is the rate of having a second child and the moment of observation begins when the

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[7] The Russian GGS was conducted by the Independent Institute of Social Policy (Moscow) with the financial support of the Pension Fund of the Russian Federation and the Max-Planck-Gesellschaft, Germany. The design and standard survey instruments of the GGS were adjusted to the Russian context by the Independent Institute of Social Policy (Moscow) and the Demoscope Independent Research Center (Moscow) in collaboration with the Max Planck Institute for Demographic Research (Rostock, Germany).
[8] The Education and Employment Survey for Russia was conducted by the Max Planck Institute for demographic Research (Rostock), the Independent Institute of Social Policy (Moscow), and the Demoscope Independent Research Center (Moscow) (Bühler et al. 2007).

respondent has a first child. Almost 5000 respondents in this sample had a first child and were therefore at risk of having a second child.[9] Over 2500 of these individuals went on to have a second child before participating in the survey. In order to carefully analyze second birth determinants, all second birth events are predated 8 months before the actual birth of the child. This accounts for a gestation period as well as shifts the event under analysis to the time around which a decision about the pregnancy would have been made. Individuals who do not carry the pregnancy to term are not counted as having conceived a second child. Respondents who did not have a second child were censored 8 months before the interview to allow for the possibility that they had a second child shortly following the interview. Since the focus of this study is on the decision to have a second child only, individuals who had twins instead of a single first child were excluded from the sample. Most of the second births in this sample occurred before market reforms began, but there were 257 second births for men and 398 for women from 1991-1999 and 130 births for men and 200 for women from 2000-2004. When there was missing information about the respondent, the respective indicator takes a value indicating missing information, rather than excluding the observation.

Educational level is constructed in this study as either low, medium or high. Low includes those who did not complete secondary education, even if they took some vocational courses. Medium educational attainment includes respondents who completed secondary education and may have also received technical training. Those who have a high educational attainment received an undergraduate or graduate degree from an institute, university, or academy. The survey provides the month and year in which the respondent moved from one educational level to another as well as when they reached their highest educational attainment and these changes are reflected across the person-months. When respondents report education or training as the main activity of a time period, they take the status of being in education.

When respondents report paid employment as their main activity, they are considered in the labor force and are assigned an occupational class according to the characteristics of their job. This information also varies by the month. We also know the main activity if the respondent was not employed, including military service, home-making, in education, unemployed, on leave, or on a pension. Of the women who were not participating in the labor force, 80% were on maternity or parental leave.[10] Since unpaid leave was extended until the child reaches age three during the 1990s, women are expected to have been on leave and not participating for at least some of the time

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[9] Since EES data only record histories from January of the year in which the respondent turns 17, all information recorded in the months before the respondent turns 17 are censored. Removing those respondents who had their first child before other information was recorded excludes 118 men and women, 81 of which conceived in the 16th year. 17 more respondents were excluded because they did not know the year of their first birth.

[10] The remaining women that are inactive are those with disabilities or studying.

period under observation. The link between leave-taking, labor force participation, and fertility is a complex aspect of second birth determinants and is addressed more directly in Billingsley and Sinyavskaya (2010).

Following other research on occupational class in Russia (Gerber and Hout 2004) and the Soviet Union (Marshall et al. 1995), I use a categorization based on the Erikson-Goldthorpe-Portocarero (EGP) schema and one that is similar to the European Socioeconomic Classification (SeC) used to construct occupational class in the RLMS data (see Figure 2). The bottom class (similar to SeC1) is comprised of manual and routine workers, including agricultural or unqualified workers; the next class (similar to SeC2) is comprised of low to mid-grade workers, including qualified workers and employees who perform relatively simple tasks; the next class (similar to SeC3) is comprised of intermediate level employees, including foremen, team leaders and highly qualified workers; the highest class (similar to SeC4) is comprised of the Salariat, or professionals. See Appendix A for a fuller description of the class schema, as well as a clear and expected distribution of educational attainment across the classes in Appendix B. As mentioned, respondents that are not gainfully employed are categorized as either being unemployed or not participating in the labor force; therefore, every model that takes into account occupational class also allows the respondent to be unemployed or not participating in the labor force at that moment. In order to not over-control for measured and unmeasured skills, education and occupational class are not included in the same models; but whether or not the respondent is participating in the labor force is included in all models.

A dummy variable is included in the model to reflect whether the survey took place in St. Petersburg or Moscow because the response rate was so low in these cities (about 15%) that selection into the survey may introduce bias.[11] To account for some of the intergenerational transmission of family culture that may generate a predisposition toward certain family sizes, the number of siblings the respondent has is included. Urban and rural differences in fertility behavior are common across many contexts, and are therefore important to include. In hopes of capturing some of the urban/rural influences on fertility behavior, the model controls for whether the respondent was born in an urban or rural location. Another factor that should be highly influential to fertility decisions is whether the respondent is in a serious relationship; this is measured by whether she/he is in a co-residential union (cohabiting or married), which can vary over the person-months. Finally, time since the first birth occurred and age at the time of the first birth are included; the latter aims to account for some of the remaining heterogeneity among the respondents, where postponement of entering parenthood is

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[11] For sensitivity analyses, I also excluded respondents interviewed in these two cities and the results did not change.

expected to be negatively related to further childbearing.[12] Summary statistics of exposures and occurrences for men and women are presented in Appendix C.
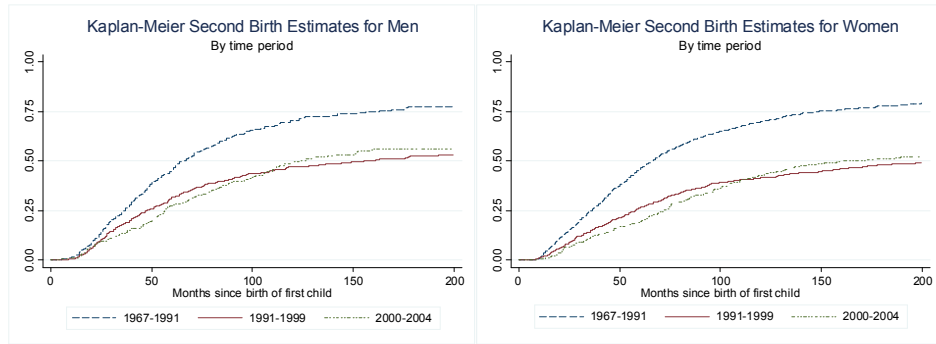
4. Results

First I display Kaplan-Meier failure estimates for transition to second births for both men and women in Figure 3. Three separate failure curves describe transitions in different time periods. Time period is a time-varying covariate and any respondent that had a first child contributes to each time period accordingly.[13] For example, a respondent who had a first child in January of 1994 and did not have a second child before being interviewed contributes to the failure estimate of the 1991-1999 time period for the first 72 months (along the x-axis), then contributes to the 2000-2004 estimate from 73 to around 121 months (give or take some months for various interview schedules). The figure demonstrates an obvious decline in second birth events after the end of the Soviet Union. In comparison to the 75% of women and men who had a second child before 1991, around 50% had a second child in transitional Russia. Moreover a difference appears between the two time periods; in the early years following a first birth, the share transitioning to a second child was higher in the period of economic crisis (1991-1999) than in the economic recovery period (2000-2004). However the overall share that transitioned to second birth by the end of the observation period was higher for men and women from 2000 to 2004 than from 1991 to 1999. A main difference between these two periods is related to the spacing of births. Women and men had their second child sooner in the 1991-1999 time period than in the 2000-2004 period; postponement of childbearing characterizes the economic recovery period and overall lower transition rates characterize the economic crisis period. At five years after the first birth, seven percent more women in the 1991-1999 period have had a second child. The difference completely disappears by the time ten years have passed since the first child was born and more births in later years give a three percentage point lead to women in the 2000-2004 period. The same pattern emerges for men.

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[12] This general expectation is not likely to be as pronounced where age at childbearing is as young as it is in the Russian context, however.

[13] Failure estimates based on time-varying covariates are technically not very meaningful. However, this strategy, creating synthetic cohorts, allows each respondent to contribute to each time periods' intensity as he/she progressed through these years—rather than allowing only those who, for example, had their first child in 1991 or later—and is appropriate when the point is to show an overall shift across time periods and avoids introducing selectivity based on postponement of the first birth into the estimates.

Figure 3: **Second birth estimates for men and women in Russia across three time periods, Kaplan-Meier failure estimates**

The next results are of those of a basic model that includes the covariates and controls discussed above as well as dummy variables to capture the impact of time periods, net of observable personal characteristics. Table 1 presents model results when educational level is included in the model and the second table shows results from a model in which occupational class was included instead of educational level. Table 2 presents only the estimates for the impact of occupational class and time period because these are the main variables of interest and the remaining estimates were almost identical in the two models. The relative risks for most of the control variables demonstrate expected relationships for both men and women: second birth rates were higher the more siblings the respondent has; respondents born in urban environments had a lower transition rate than those born in rural environments; second birth rates decreased as the age at first birth increased, particularly for women; respondents in co-residential unions had higher second birth rates than those who were not; and the transition rate increased within the first five years after the first child was born and decreased after this point.

One indicator had differential effects for men and women: men who were not participating in the labor market had a lower transition rate than men who were, whereas women who were not participating had a higher transition rate than those in the labor market. This difference is expected because men who drop out of the labor force in Russia are likely do so for health or disability reasons, whereas women are likely not participating because they are on leave or have chosen to stay home rather than return to work.

Table 1: **Hazard model of second birth rates for men and women in Russia, 1967-2004**

	MEN		WOMEN	
	Relative risk	S.E.	Relative risk	S.E.
St. Petersburg/Moscow residence	0.85	(0.14)	0.76*	(0.09)
Only child	0.94	(0.10)	0.87	(0.07)
One sibling	1		1	
Two siblings	1.46***	(0.13)	1.24**	(0.08)
Three or more siblings	1.72***	(0.15)	1.28***	(0.08)
Missing	1.09	(0.23)	0.78	(0.16)
Rural residence	1		1	
Urban residence	0.80**	(0.06)	0.83***	(0.04)
Missing	1.13	(0.24)	0.76	(0.12)
17-20 at first birth	1		1	
21-24 at first birth	0.95	(0.14)	0.88*	(0.05)
25-29 at first birth	0.94	(0.14)	0.90	(0.07)
30+ at first birth	0.89	(0.15)	0.46***	(0.06)
Single	1		1	
Married or cohabiting	2.50***	(0.36)	3.55***	(0.30)
In education	2.92**	(1.08)	0.48**	(0.12)
Low educational level	1.17	(0.10)	1.14*	-0.07
Medium educational level	1		1	
High educational level	1.06	(0.09)	1.02	(0.07)

Table 1: **(Continued)**

	MEN		WOMEN	
	Relative risk	**S.E.**	**Relative risk**	**S.E.**
Participating in the labor market	1		1	
Not participating	0.47**	(0.11)	1.60***	(0.10)
Missing	1.10	(0.43)	0.87	(0.36)
1967-1991	1		1	
1991-1999	0.55***	(0.04)	0.39***	(0.02)
2000-2004	0.49***	(0.05)	0.33***	(0.03)
0-1 year since first child born	1		1	
1-2 years since first child born	7.36***	(1.65)	6.67***	(0.95)
2-3 years since first child born	8.68***	(1.95)	8.49***	(1.25)
3-4 years since first child born	9.61***	(2.17)	9.89***	(1.49)
4-5 years since first child born	9.28***	(2.14)	10.43***	(1.61)
5 + years since first child born	4.89***	(1.07)	6.45***	(0.94)
	MEN		**WOMEN**	
# of subjects	1626		3198	
# of failures	907		1824	
time at risk	158828		329685	
Log Likelihood	-1845.90		-3596.53	
Prob > chi2	0.0000		0.0000	

Note: Statistical significance: * =5%, ** =1%, *** =0.1%

Turning to the two variables of most interest in this table, education did not have a consistent impact for men and women, but time period did; both men and women had a significantly lower transition rate from 1991 to 1999 and an even lower rate from 2000 to 2004. This is what we observed in the Kaplan Meier estimates. Men had a higher risk of second birth if they were still studying whereas women had a lower risk. Besides this finding, which is driven by men attending university, there were no statistically significant differences between any of the educational levels for men. On the other

hand, women with incomplete secondary education had an elevated second birth transition rate relative to women who completed secondary education. Having received university education did not show a statistically different effect of completing secondary, and possibly specialized secondary, education.

Table 2 presents only the estimates for occupational class and time period, as mentioned, from the full model results. First controlling for occupational class, rather than education, does not appear to alter the effect of the time periods. The relative risks for the two time periods are exactly the same in these models for women and within a few percentage points of each other for men (relative to time period in Table 1). Similar to the effect of education, the lowest-skilled women and men—those employed as manual workers—had higher transition rates than those with mid-level skills—in this case, the low-mid grade workers; manual working men have a 43% higher risk than low-mid grade workers and manual working women have a 24% higher second birth risk. Some evidence of a U-shaped relationship appears to exist for men, albeit the higher risk for professional men is not quite statistically significant. Again, inactive women have a higher transition rate than those in paid employment, in this case strictly relative to low-mid grade workers, and inactive men have a lower rate.

Table 2: **Truncated results for hazard models of second birth rates for men and women in Russia, 1967-2004**

	MEN		WOMEN	
	Relative risk	**S.E.**	**Relative risk**	**S.E.**
Unemployed	1.12	(0.29)	1.40	(0.28)
Manual	1.43***	(0.14)	1.24*	(0.11)
Low-mid	1		1	
Intermediate	0.94	(0.09)	1.01	(0.07)
Professional	1.15	(0.11)	1.05	(0.09)
Not participating	0.66*	(0.12)	1.60***	(0.12)
Missing	1.28	(0.49)	0.90	(0.37)
1967-1991	1		1	
1991-1999	0.54***	(0.04)	0.39***	(0.02)
2000-2004	0.47***	(0.05)	0.33***	(0.03)

Note: Models control for the same variables as in Table 1, with the exception of education.
Statistical significance: * =5%, ** =1%, *** =0.1%

As outlined earlier, this paper is focused on how second birth decisions have varied over time for women and men with similar characteristics. This question relates directly to understanding the decline in fertility over the last two decades,[14] which the previous analyses do not address. The next results therefore present estimates of an interaction between the time periods and educational level, followed by estimates of an interaction between the time periods and occupational class.[15] I present the relative risks for each educational level or occupational class in two post socialist time periods, relative to those of the 1967-1991 time period. For example, in Figure 4, low educated men had a transition rate of 0.56 in the 1991-1999 period and 0.59 in the 2000-2004 period, relative to the rate of low educated men in the 1967-1991 period. Although middle educated men experienced the lowest transition rate in the 1991-1999 period, relative to their rate in the Soviet era the variation, the fertility decline among all three educational levels in the crisis period was remarkably similar. In the 2000-2004 period, the highest educated men had the greatest reduction in second birth rates (0.43 vs. 0.48 for the middle and 0.59 for the lowest educated).
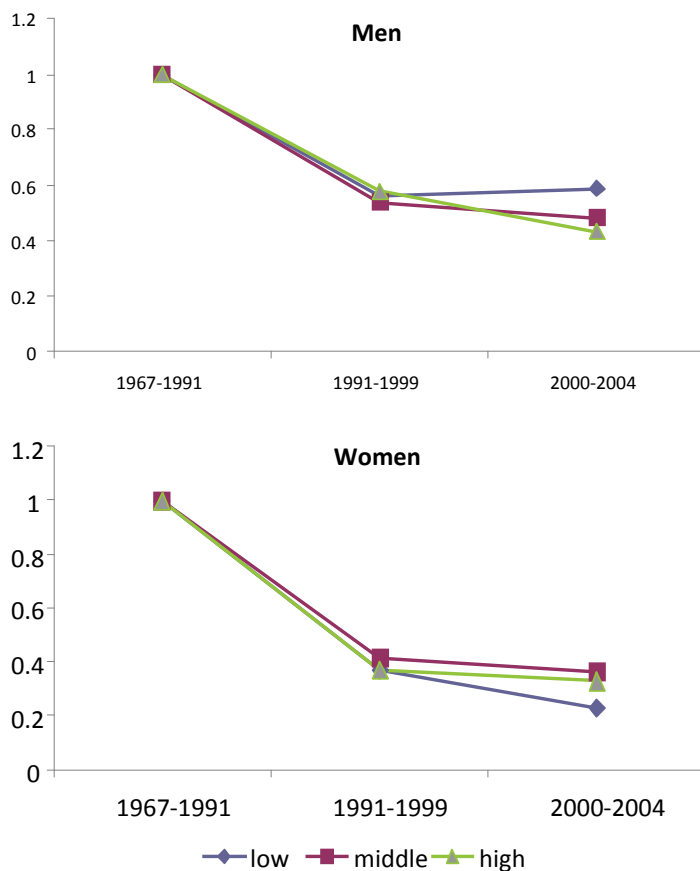
The estimates presented for women in the lower panel of Figure 4 reveal similar reductions in second birth transitions across educational groups. In the 1991-1999 period, the reduction was slightly greater (i.e., lower relative risks) for the lowest and highest educated women: both had a 63% lower risk than their predecessors. In the 2000-2004 period, women with the lowest educational level had the lowest transition rate, relative to women of the same educational level before the transition began; their relative risk is 0.23 in contrast to 0.33 for the highest educated women (relative to the risk of the highest educated women in 1967-1991) and 0.36 for women with middle educational attainment (relative to the risk of women with middle educational attainment in 1967-1991).

Figure 5 displays results of models in which occupational class was interacted with time periods. Measuring skill level and income potential with occupational class has both benefits and shortcomings. Occupational class can be considered more informative than educational level because it tells us how the respondent fared in the job market

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[14] Since this study focused on differences in second birth transition rates in the two time periods following 1991, separating the 1980s in which there were pronatalist policies from the 1970s adds a layer of complexity that is not key to the analysis. However, it should be noted that the decline would likely have been from a lower starting point had pronatalist policies not been in place in the 1980s and the relative risks may not be quite as low in the following time periods. Since the interesting comparison in this paper is how the declines within classes over the two time periods after the Soviet era vary by skill level or human capital accumulation, the average rate over the 1970s and 1980s is a suitable reference category.
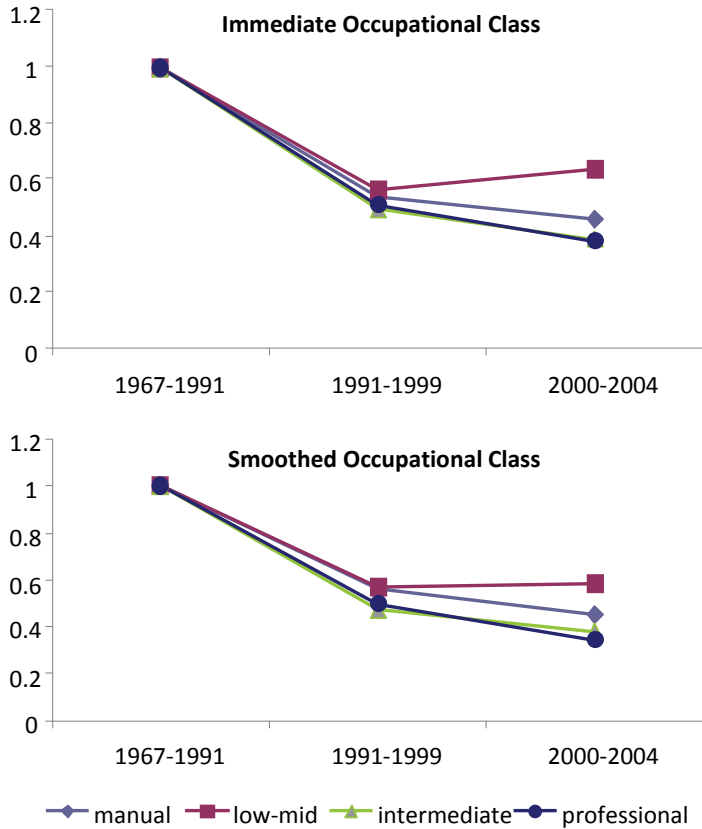
[15] Although all the interaction results presented in the figures are highly statistically significant, only some alternative interaction comparisons were. Specifically, the effect of being in some educational groups varies over the two later time periods for women and the effects of some occupational classes for men were significantly different within time periods.

Figure 4:   **Second birth risks by educational attainment, 1991-1999 and 2000-2004, relative to 1967-1991, Russia**

Note: Risks are relative to men and women in the same educational groups from 1967 to November of 1991. Models control for time since first birth, age at first birth, whether respondent was surveyed in St. Pet. or Moscow, missing categories, siblings, urban/rural birth, union status and labor force status. All relative risks are statistically significant at the 0.1% level.

Figure 5:   Men: Second birth risks by occupational class, 1991-1999 and 2000-2004, relative to 1967-1991, Russia
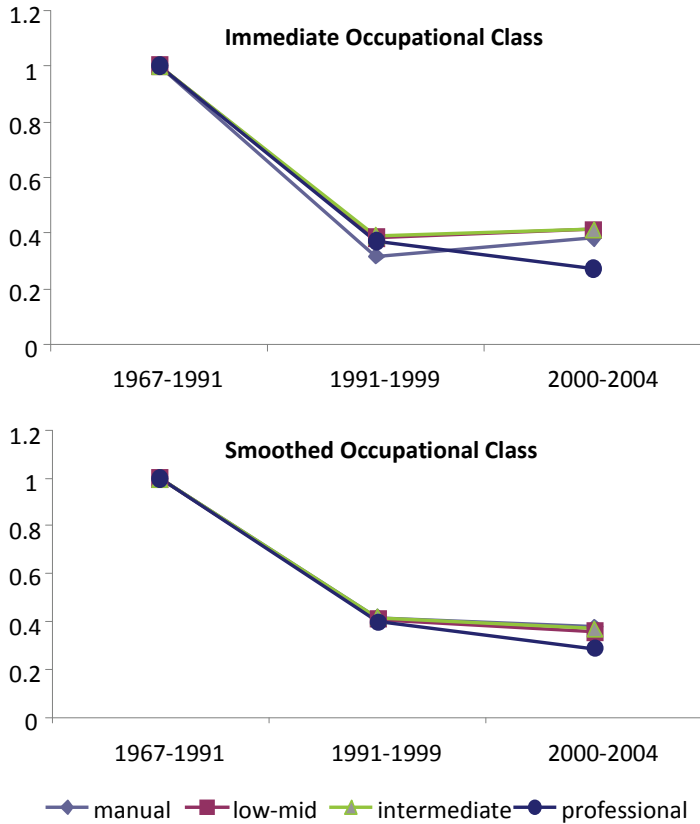
based on their human capital and is a more up-to-date indicator of skill development than education. On the other hand, if a respondent steps out of the labor force, they do not have an occupational class status at that moment in time. Given that women are likely to be out of the labor market for some time following the birth of the first child, the models are specified in two different ways. First the "immediate" occupational class

is interacted with time period, which will give us the estimates of occupational class only for those who are in the labor market at the time. The second model considers occupational class as a more constant or "smoothed" state, by holding the class status constant when the respondent stepped out of the labor force, took leave or was between jobs. This strategy reduces the effect that differential participation rates might have on the estimates of occupational class.

As expected very little difference emerged between the smoothed and immediate occupational class estimates for men. Men in the intermediate class had the lowest transition rate (0.49), relative to men in the same class in the Soviet Union, but as in the case of education, the declines were almost identical within groups. Divergence in the declines emerges in the economic recovery time period. Men in intermediate professions and the professional class had the lowest transition rates (0.39 and 0.38, respectively), relative to the rate of men in the same classes before 1991. One distinct finding is that, rather than a continuously declining rate, men in the low-mid occupational class experienced significantly higher transition rates than men in other classes during the economic recovery. However this differential effect was reduced in the smoothed model; i.e., if class was held constant in spells of non employment, rather than a second birth rate of 0.64 in the immediate model, the low-mid grade workers had a rate of 0.58 in the 2000-2004 time period.

Figure 6 displays results of the models discussed above for women, in which we see a somewhat more dramatic difference between the smoothed and immediate occupational class models. When class is specified only when women are participating in the market, women in the lowest class had the greatest decline in relative risks during the economic crisis (0.32 vs. the next lowest risk of 0.37 for the professional class); in contrast, women in the highest class had the greatest decline in the period of economic recovery (0.27). Holding class constant during periods of non participation, leave, or unemployment reveals only a small alteration in the decline across classes in the economic crisis period, which reveals greater similarity. Less difference in declines also exists in the economic recovery period, however women in the professional class still experienced a greater decline in transition rates than women in other classes (0.29). The difference between the two models (immediate vs. smoothed class) reveals that women in the lowest classes who maintained a foothold in the labor market during the economic crisis were perhaps more inclined to postpone or forego second births.

Figure 6: **Women: Second birth risks by occupational class, 1991-1999 and 2000-2004, relative to 1967-1991, Russia**

5. Discussion and conclusions

This study assessed how second birth transition rates varied over time in Russia after the transition from communism began at the end of 1991. Lower second birth rates was one of the main drivers of fertility decline in Russia at this time and this analysis contributes to our understanding of the fertility decline by assessing changes in rates over time among subgroups of men and women rather than comparing rates in one period across subgroups of individuals. Moreover the analysis juxtaposed two time periods in which the economic context varied dramatically and how transition rates varied across these time periods was observed. Until the end of the 1990s, the economic context in Russia can be characterized as one of crisis in which there was an exorbitant increase in prices, wage growth developed unevenly across skill levels, unemployment and wage inequality increased and wages were not always paid in full or on time. Human capital accumulation took on an increasingly significant role in financial security and well-being during this time period. In 2000, the economic climate reversed and GDP growth was accompanied by increased job stability, wage growth across all skill levels, less arrears in wages, and lessening inequality. These findings indicate varying circumstances for men and women and this study explored whether there were differential effects in these diverse economic climates.

Two main findings emerge from this study. First second birth transition rates were even lower in the period of economic recovery than they were in the period of economic crisis. However comparing Kaplan-Meier failure curves during the different periods reveals that the difference in second birth transitions between the two post socialist periods was largely driven by postponement of the second birth. This finding is in alignment with research that found a higher likelihood of postponement in more favorable economic contexts (Billingsley 2010). Still, the main picture is that of a decline in second birth rates after 1990 and that rates did not increase again to their pretransition levels. The second broad finding of this study is that the change in second birth rates across the three time periods was remarkably similar for all men and women, regardless of differential human capital investment and occupational class. While some differential effects by human capital levels were expected, this strong finding implies that all individuals were impacted similarly. Given the universal impact of high inflation and the fact that no occupational class was exempt from experiencing wage arrears, this finding is perhaps not surprising. Moreover it corroborates the finding in the Ukraine, which is a similar context to Russia, that women of all educational levels dramatically suppressed second births and that economic crisis likely accounts for the similarity in lower and highly educated women's altered fertility behavior (Perelli-Harris 2008).

Some differences do emerge in the period of economic recovery, but the relative differences in second birth risks that do exist among the different educational groups and occupational classes are small and should not be over-interpreted. A few distinct patterns emerged that may be worth considering, however. In the period of economic recovery, men in the higher educational groups and occupational classes had the greatest reduction in second birth transition rates. This pattern is surprising since men are not generally required to weigh the value of their time at work against their time at home, as women are. However, it may be that once the worst of the economic transition was over and the returns to upward mobility grew, men with high aspirations may have become more cautious and limited their family size to attain higher status (Bejin 1989; Dalla Zuanna 2007).

The pattern for women is more complex, partly because women are more likely to step out of the labor market after having a first child. Regardless of the difference in results based on specifications that held occupational class constant or considered only the immediate status, women in the professional class experienced the greatest reduction in second birth transition rates over the period of economic recovery. This finding supports the idea that when the rewards for participation are high, women postpone having a second child. This finding was robust to the two specifications of occupational class, which indicates that women in the highest occupational class almost unanimously participated in the labor market after the first child was born since allowing for selectivity into participation (the "immediate" occupational class model) hardly altered the estimate. In contrast the estimates during the economic crisis for women with the lowest skill level changed more dramatically across the different specifications, which indicates that the greater change in rates for manually employed women was partly driven by the selection of women at this skill level who remained in the labor market during the economic crisis. For women to opt out of the labor market when their occupational class was characterized by having lower wage growth and higher wage arrears than jobs in other classes is a logical strategy. However the women who did not make this choice and stayed in their jobs after the first child was born had the greatest reduction in transition rates, relative to their counterparts before the transition from communism. This finding may suggest greater need for these mothers to contribute to household income, which may be due to unobserved characteristics of the partner.

The majority of the rates discussed are those comparing women and men with similar skill levels over time, which are the results that are consistently statistically significant, rather than rates across different skill levels. Considering the information about declines within groups alongside information about rates across the groups, however, offers additional information when considering the fertility decline in Russia. Not only did women with the lowest skill level have as great a reduction in second birth

transition rates over the transition from communism as other women, they had higher transition rates to begin with; a change in their rates of transition over time would have had a noticeable impact on overall fertility levels in Russia.

A seemingly contradictory finding in this analysis is that women with the lowest educational level had a greater reduction in transition rates in the period of economic recovery than women with higher educational levels when the reverse is true when observing women's occupational class. Assuming that respondents' education matches their occupation to a high degree, we would expect women with incomplete secondary education to mostly find work in the lowest occupational sector. As the relative decline in second birth transition rates was stronger for the lowest educated than for women belonging to the lowest occupational class, it appears that when the economy began a consistent recovery, some of these women perhaps did not end up in the manual class after all. More research on the work trajectories of women after having their first child is needed to better understand this deviation in results, particularly in regards to job/education mismatch and job instability. Moreover it would be worthwhile to explore job growth or stability within the low-mid grade occupational class as men in these jobs experienced some recovery of second birth transition rates in the economic recovery period. Future research should also discuss and analyze the importance of gender roles and further explore how women reconciled paid and unpaid work in the Russian context. This research takes only a few steps in the direction of sorting through the complicated social and economic processes at work during the fertility decline in Russia and leaves many other factors to be explored.

6. Acknowledgments

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Appendix

A. Occupational class description

Manual laborers (SeC1): unqualified worker or agricultural employee
Low-mid grade worker (SeC2): Qualified worker or employee performing simpler tasks
Intermediate employee (SeC3): Team leader, foreman, highly-qualified worker, employee with complex tasks and some autonomy
Salariat (SeC4): Significant leader, professional, autonomous employee, self-employed in industry or trade

B. Distribution of educational attainment within each occupational class, 1967-2004

Occupational class	Education		
	low	medium	high
Manual class (SeC1)	37	58	5
Low-mid grade class (SeC2)	25	66	8
Intermediate class (SeC3)	11	65	24
Salariat or professional class (SeC4)	3	31	66

C. Summary statistics: Exposure and occurrence rates by men and women according to the two time spans analyzed: 1967-2004 and 1991-2004

	Men		Women	
	person-months	failures	person-months	failures
St. Petersburg/Moscow residence	11693.5	59	34496	113
Rural residence	60541.5	440	126423	881
Urban residence	91596.5	429	183519	881
Missing	6690	38	19750.5	62
Only child	28193	115	52232	208
One sibling	68490.5	301	126840.5	590
Two siblings	28795.5	206	66020	450
Three or more siblings	28263	261	76139	551
Missing	5086	24	8461	25
17-20 at first birth	9971	55	75292	487
21-24 at first birth	73034.5	443	157518	932
25-29 at first birth	56355.5	313	62742	333
30+ at first birth	19467	96	34140.5	72
Single	22461	50	93181	161
Married or cohabiting	136296	856	236498.5	1663
Missing	71	1	13	0
In education	1802.5	12	5466.5	18
Low educational level	31927	222	50188	343
Medium educational level	90067	484	203412.5	1151
High educational level	35031.5	189	70617.5	312

C. Summary statistics (Continued)

	Men		Women	
	person-months	failures	person-months	failures
Unemployed	4800	16	5384.5	26
Manual class (SeC1)	17038	150	25064	190
Low-mid grade class (SeC2)	67258	388	89486	512
Intermediate class (SeC3)	33149.5	167	73531.5	409
Salariat or professional class (SeC4)	24317.5	147	48142	226
Not participating in the labor force	11342	32	86858.5	455
Missing	923	7	1226	6
0-1 year since first child born	19240.5	23	38048.5	61
1-2 years since first child born	17677.5	153	34737	298
2-3 years since first child born	15258.5	151	30481.5	282
3-4 years since first child born	13173.5	139	26575	255
4-5 years since first child born	11312	109	23024.5	214
5 or more years since first child born	82166	332	176826	714