THE BABY DECISION AMID TURMOIL: UNDERSTANDING THE FERTILITY DECLINE IN RUSSIA OF THE 1990S

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Executive Summary

1989 and 1999 the total fertility rate in Russia declined from 2.01 to 1.16, one of the lowest fertility rates in the world and substantially below the level of population replacement of 2.1 children per woman. Was this decline in fertility caused by the economic collapse that accompanied Russia's transition from communism in this period? Is the decline only temporary, with women simply delaying births, or does it represent a shift to a permanently lower level of fertility? This paper explores these and related questions using data across Russia's regions for this period and using individual-level data that record births and abortions. The results indicate that the fertility decline in Russia is related to the large decrease in income experienced by much of the population in this period, as well as to declining marriage rates and (in some specifications) rising unemployment. Measures of macroeconomic instability and uncertainty about the future show surprisingly little correlation with fertility rates and the probability of having a birth, but women with positive expectations about the future were much less likely to have an abortion than were women with negative expectations about the future.

In May 2006 Russian president Vladimir Putin announced a radical new package of pro-natalist policies designed to halt, and preferably reverse, the steep decline in Russia's birth rate over the past fifteen years. This package included increased child benefits, longer maternity leaves, and, most strikingly, a payment of over $9,000 to each woman who has a second child. While economists and demographers continue to debate the efficacy of this and similar pro-natalist government policies in raising birthrates, the intention of this package of measures was clear: to stop the large declines in population that have affected Russia since the early 1990s.

Russia's population stood at 147 million in 1989 but had fallen to just over 143 million by 2005, a rate of decline remarkable in its size and speed.[1] The population decline is even more dramatic if one excludes the substantial net immigration inflows that Russia experienced over the period: roughly 5.6 million immigrants arrived between 1989 and 2004, suggesting that the number of native Russians fell by close to 10 million people in those years. Declines of this magnitude are alarming, particularly due to the substantial threat such a population change poses to government-funded retirement programs that rely on contributions from current workers to maintain solvency. The drastic measures proposed by President Putin indicate that Russian leaders comprehend the magnitude of the problem created by this population decline.

While part of the population decline is due to the massive increase in mortality that occurred in Russia in the 1990s, particularly among middle-aged men,[2] a large part is also due to the equally dramatic declines in fertility that were recorded over the last 15 years. In the decade

[1]Unless noted otherwise, all demographic data in the paper are from *Demograficheskii ezhegodnik Rossii 2005 (The Demographic Yearbook of Russia 2005)* (Moscow 2005).

[2]See Brainerd and Cutler (2005) for an overview and analysis of the mortality crisis in the former Soviet Union. Stillman (2006) provides a comprehensive survey of the literature on health and mortality in Eastern Europe and the former Soviet Union.

between 1989 and 1999, the total fertility rate (the average number of children a woman can expect to have over her lifetime) fell from 2.01 to 1.16. The latter figure is one of the lowest recorded fertility rates in the world, and is well below the population replacement level of 2.1 children per women. The total fertility rate has rebounded slightly since 1999, reaching 1.34 in 2004, but it remains extremely low and has failed to slow Russia's population decline.

This paper analyzes the causes of this fertility decline, focusing on the role of the income declines and economic uncertainty caused by the economic collapse that accompanied the transition to a market economy. It also investigates whether the fertility decline is temporary (couples delaying births) or represents a permanent decline in fertility rates, and the role (if any) played by the upsurge in male mortality rates in Russia in the 1990s. Two data sources are used: cross-regional data, which enable one to test the correlation between age-specific birth rates and macroeconomic variables across regions and over time; and individual-level data from the Russian Longitudinal Monitoring Survey, which allow one to identify whether individual behaviors and expectations are correlated with the decision to have a child (or an abortion). The two approaches give consistent results in some respects, with both data sets indicating that the decline in income played an important role in changing fertility over the period. Surprisingly, most measures of economic uncertainty, either at the macroeconomic level or the individual level, show little or no relationship with having a child. The high death rates of middle-aged men in this period also appear to have had little impact on women's decisions to have a child.

I. Previous literature

A number of recent papers have explored the reasons for the fertility declines that occurred across most of the countries of Eastern Europe and the former Soviet Union in the 1990s. Most of these attempt to identify whether the change in fertility is permanent or temporary, and most assess the effect of the economic crisis on fertility outcomes and (in some cases) fertility intentions. Few papers to date have analyzed the abortion decision in this context, which is one of the contributions of this paper.

Two recent papers are relatively close in spirit to this paper: those by Kohler and Kohler (2002) and by Grogan (2003). Both use the Russian Longitudinal Monitoring Survey (RLMS) to analyze the question; the former focuses on explaining the occurrence of a birth while the latter examines fertility intentions. Kohler and Kohler assess birth outcomes in the early period of reform, 1994 - 1996, and find few relationships in the data between the decision to have a child and measures of labor market uncertainty. Some of their results are in fact counterintuitive, for example a woman with an unemployed husband was more likely to have a baby than a woman with an employed husband. Grogan (2003) uses the 1994 RLMS to examine whether a woman planned to have a child or another child. Surprisingly, the results indicate that income and fertility intentions were negatively correlated in this period, in contrast to the macro-level analysis in the paper, which shows a positive relationship between actual fertility outcomes and income levels. Measures of economic security and expectations about the future were related to fertility intentions in the expected way, with women who were concerned about job security or who were more pessimistic about the future being less likely to want a child or more children.

Researchers examining the fertility declines in other countries of the former Soviet Union and Eastern Europe have also focused on the role of economic uncertainty in this decline. Bhaumik and Nugent (2005) study the large fertility decline in eastern Germany between 1992 and 2002 and find a significant effect of unemployment uncertainty – particularly women's unemployment uncertainty – on the probability of childbirth. Chase (2003) examines fertility in the Czech and Slovak Republics, comparing fertility in the two countries and in the pre-transition (1981-1984) and post-transition (1989-1993) periods. While he finds no evidence of a relationship between economic uncertainty and fertility behavior for these samples, the measure of economic uncertainty used in the paper – whether the respondent changed jobs in the past four years – is a relatively poor measure of job insecurity, given that some of the respondents would have changed jobs voluntarily and for reasons other than job security or insecurity.

Finally, a number of papers examine the fertility declines across Eastern Europe and the former Soviet Union from the demographic point of view. The primary issue addressed in most of these papers is whether the fertility decline in these countries is a temporary phenomenon caused by women simply delaying births, or represents a permanent transition to a lower level of fertility. The emerging consensus of this research is that the fertility declines in Central Europe are due to a rapid shift toward later child-bearing, while the fertility declines in the former Soviet Union are primarily due to an increase in one-child families (Kharkova and Andreev 2000; Sobotka 2003; Barkalov 2005; Heleniak 2005). As pointed out by a number of these authors, the answer regarding the temporary versus permanent nature of the fertility decline will not be determined for another decade or so, when all of the women in their childbearing years in the 1990s have completed their fertility careers.

II. Background on family policies, fertility and abortion trends in Russia

When the Bolsheviks came to power in 1917 they implemented a series of measures designed to radically change the 'bourgeois' nature of the family and to equalize the status of men and women. These measures had a profound impact on Soviet society and likely continue to account for some of the peculiarities of Russian marriage and fertility that are still observed in society to this day. The most far-reaching legislative change was the legalization of abortion in 1920. The Soviet Union was the first country in the world to legalize abortion; the procedure was legal and free if performed in a hospital, and the practice became widespread in the 1920s (Engel 2004). Some analysts trace the current extensive use of abortion in Russia to this early legalization of abortion, which in the absence of alternative contraception options became widely accepted as the country's primary means of fertility control (Popov 1993).

The legalization of abortion and the relative emancipation of women in this period led to sharp declines in fertility in the 1920s (including a steep drop during the 1932-33 famine); see Figure 1. These trends were reversed with the changing political climate of the 1930s, particularly the 1936 Family Law which outlawed abortion; in the same year a secret directive ordered that all contraceptive devices be withdrawn from sale (Engel 2004). Abortion did not become legal again until 1955, largely in response to the widespread use of illegal abortion and high mortality rates from abortion (Popov 1993). Because the state failed to increase the availability of contraceptives as a substitute for abortion, abortion became one of the primary means of birth control for women in the Soviet Union and abortion rates rose to extremely high

levels. For example, in 1975 (the first year in which comparable data are available), the number of abortions per 1,000 women aged 15-49 was 126.3 in the USSR and 21.7 in the United States.

Throughout much of the postwar period, Soviet policies toward the family have been relatively pro-natalist. Since 1944 both married and unmarried women with children have received child benefits from the state; 'motherhood medals' and special privileges were bestowed upon women with five or more children. Generous maternity benefits and an extensive system of subsidized state-provided day care centers further encouraged women to have children while remaining in the work force. Despite these efforts, the fertility rate continued to fall until the late 1960s, representing a strikingly rapid fertility transition from the high fertility rates of only a few decades earlier (see Figure 1). As Figure 1 indicates, the total fertility rate stabilized and even increased slightly in the 1970s and 1980s, likely due at least in part to increases in child benefits implemented in the 1980s. Finally, Figure 1 also illustrates the rapid decline in fertility that began around 1989.

To put this in the context of the transition experience more generally, Figure 2 shows the change in fertility rates across selected countries of Eastern Europe and the former Soviet Union, along with that of the United States for comparison. The Russian experience is not unique: all of these countries, and nearly every country from the region not shown on the graph, experienced an extremely rapid decline in fertility rates beginning in the late 1980s. The decline in Russia was slightly earlier and steeper than those of the other countries, but the pattern is remarkably similar across countries. As noted above the fertility declines in Eastern Europe are primarily attributed to an increase in the average age at first birth (by 2 to 3 years in many countries over

just one decade); in Russia, in contrast, there has been almost no change in the average age at first birth (Kharkova and Andreev 2000; Heleniak 2005).

A major factor in determining whether the fertility decline is temporary or permanent is the age distribution of the fertility decline: were the fertility declines concentrated among younger women, implying that they may simply be postponing births in an uncertain economic environment, or among older women, implying that little 'catch-up' in fertility will be possible over the next five to ten years? Figure 3 illustrates the answer to this question, to the extent possible given that data on age-specific birth rates in Russia are currently available only through 2004. This figures reflects that births in Russia have been and continue to be concentrated among women aged 20 to 24 and 25 to 29, a well-known peculiarity of Russian fertility that has remained unchanged for decades.[3] The fertility decline was concentrated in these age groups, along with a large decline for women aged 30 to 34; fertility changes were negligible for women aged 35 and over. If a 'catch-up' effect is occurring, one should observe an increase in birth rates among women in the older cohorts in the latter years of the period. This does appear to be occurring to some degree; a noticeable increase in fertility rates occurred for women aged 25 to 29 and 30 to 34 beginning around 1999 (Figure 3). However, these increases (currently) appear to be too small to make up for the deficit of births that occurred in the early- to mid-1990s.

Finally, Figure 4 indicates that – somewhat surprisingly – an increase in abortion rates does not account for the decline in birth rates. On the contrary, the very high abortion rate in Russia plummeted from over 100 abortions per 1000 women aged 15 to 49 in 1990 to 50 by the year 2000. While these abortion rates remain high compared with the United States and other

[3]See Heleniak (2005) for a discussion of the peculiarities of Russian marriage and fertility.

western countries, the decline is significant and is likely due at least in part to the increased availability of modern contraceptive methods in the 1990s.

III. Economic theories of fertility: why the decline in Russia?

The standard neoclassical theory of fertility was developed by Gary Becker and is described in his influential work *A Treatise on the Family* (1981). One of the key insights from this work is that income and fertility may be negatively related: while children are considered to be a 'normal' good (when income increases couples desire more children), the time-intensive nature of child rearing also represents a significant opportunity cost for parents, particularly women. As women's wages have risen over the last century, the opportunity cost of having children has increased, leading to declines in fertility rates and a negative relationship between income and fertility rates. For Russia in the 1990s, however, this theoretical framework provides little insight into the nature of fertility decline: the wages of Russian women fell dramatically both in real terms and relative to men in the 1990s (see Brainerd 2000 for an analysis), implying that fertility should have increased – or at least not plummeted – if the opportunity cost of not working played an important role in the fertility decisions of Russian women.

This traditional neoclassical view of fertility does not explicitly include a role for economic uncertainty in fertility decisions, which is sensible if one is trying to explain long-term changes in fertility rates. In the context of the transition countries, however, which experienced sharp annual movements in fertility rates in the 1990s, it seems likely that the uncertainty surrounding the change from a socialist system to a capitalist one would influence a couple's decision to have children. As is well-known, workers in the socialist countries did not enjoy a

high standard of living, but were entitled to stable employment and income, guaranteed pensions, universal medical care and free education. With the transition to a market economy, this social contract was broken and workers had few guarantees, facing great uncertainty at the individual level regarding whether they would survive the shift and at the national level regarding the growth or stagnation of the economy under such a transition. The economic theory of investment under uncertainty has clear predictions about the optimal course of action in an uncertain climate: for investments which are irreversible (e.g., children) and which can be postponed, there is an option value to waiting to make the investment (Dixit and Pindyck 1994; Grogan 2003). If this theory is relevant for Russia, one would expect to observe a correlation in the data between measures of economic uncertainty or insecurity and women's fertility decisions.

A number of other factors may have accelerated the decline in fertility in Russia during the 1990s. One of these is the decrease in the number of state-supported nurseries and pre-school facilities and the near-disappearance of daycare facilities provided at enterprises. Between 1989 and 1997 the share of children in kindergarten and nurseries declined by over 55 percent; the price of such care also rose sharply in this period (Lokshin 2005). Marriage rates also fell a great deal; for example the crude marriage rate (number of marriages per 1,000 population) fell from 9.4 in 1989 to 5.8 in 1998. Since most Russian fertility occurs within marriage, this decline in marriage rates alone would mechanically account for some share of the fertility decline. A third factor is simply the decrease in the number of middle-aged men: as noted above, Russia experienced a dramatic increase in mortality rates among men aged 30 - 55 in the 1990s; if women are reluctant to rise a child as a single mother, this too would be expected

to account for at least part of the decline in fertility over the period. Other factors which likely played some role include the increase in the availability of contraceptives with the opening of markets, the sharp increase in the number of women attending institutions of higher education, and possibly an 'echo effect' of the high abortion rates of the past, if multiple abortions increases the probability of infertility.

IV. Empirical strategy and results

This paper uses two types of data to investigate the correlates of fertility rates in Russia: data across Russia's regions between 1990 and 2001, and individual-level data collected in the Russian Longitudinal Monitoring Survey (RLMS) between 1994 and 2003. This section first describes the data, methodology and results using the cross-regional data, then turns to the data, methodology and results using the RLMS.

The regional fertility data used in this paper comprise age-specific birth rates by five-year age group for women age 15-39 for 1990 to 2001; while data are also available for ages 40- 44 and 45- 49, since the fertility rates of these groups are so low these data series are not used here. Consistent data are available for 72 regions in Russia; the regions of Chechnya and Ingushetia are excluded due to the civil unrest and war that affected these areas in much of the period.

B sub jt`=`alpha sub j`+`beta sub t`+`E sub jt gamma `+`X sub jt delta`+` epsilon sub jt

The primary empirical strategy is to estimate fixed effects regressions of the form:

where *j* and *t* index region and year, respectively; B_{jt} is the birth rate per 1,000 women in each age group; E_{jt} are measures of economic conditions such as income per capita and unemployment; X_{jt} is a vector of regressors capturing social correlates of fertility rates such as

the crude marriage rate, daycare availability, and the amount of housing space per capita, and ε_{jt} is the error term. The fixed effects specification is appealing because it eliminates the impact of any (relatively) time-invariant factors such as culture, education level and urbanization that are usually correlated with fertility levels but which are unlikely to explain the large annual fluctuations in fertility rates in Russia. These unchanging regional attributes are absorbed into the regional fixed effect α_j's, while β_t controls for time trends. All regressions are weighted by population and standard errors are heteroskedasticity-consistent. Ideally the independent variables would include all of the factors discussed previously, but because of data limitations some factors cannot be tested, such as the price of daycare services. Means and standard deviations of the variables used in the analysis are given in Table 1.

Cross-regional results

The first set of regressions tests the relationship between fertility, income and other variables for the age-specific birth rate for women of all childbearing ages (15 - 49). These results are shown in Table 2. The first regression, shown in column 1, tests the relationship between real per capita income and fertility in the absence of other covariates, aside from time effects. The results indicate a strong, positive relationship between fertility and income; this result is statistically significant at less than the 1 percent level and is robust to alternative specifications such as logged birth rates and income, and income lagged one year (results not shown). The second column adds several measures of social and economic conditions discussed earlier: the marriage rate and housing per capita, as well as a measure of the capacity of the health care system (medical clinics per capita in each region) and the net migration rate. The

latter variable is included to control for the large population movements that occurred in Russia in the 1990s, which appear to disproportionately comprise the migration of young people out of the low-fertility regions of the North, Siberia and the Far East in response to the elimination of government subsidies to these regions and the subsequent deterioration of supplies (Heleniak 1999). The statistically significant positive sign on this measure in most regressions indicates that positive migration inflows have occurred in regions with higher fertility rates, as expected.

Continuing with the results in column 2, the marriage rate is strongly and positively related to fertility rates,[4] as is the per capita supply of housing. The latter is unsurprising given the well-known constraints on housing in the Soviet Union which continued to be problematic for young couples in Russia of the 1990s. The proxy for the capacity of the health care system, the number of medical clinics per capita, is statistically insignificant in this regression, although in other specifications it is positively related to fertility (columns 3 and 6).

Column 3 of Table 2 tests whether one indicator of economic uncertainty, the unemployment rate, is related to fertility rates. Unfortunately this variable is only available starting in 1992, because the Russian government did not begin to measure unemployment rates until that year. The results indicate a strong negative relationship between fertility rates and the unemployment rate; this relationship is statistically significant at less than the one percent level.

The next regression tests the hypothesis that part of the reason for Russia's fertility decline was the dramatic increase in mortality among men, particularly middle-aged men, that occurred concurrently. Using male life expectancy at birth as a proxy, one would expect a positive coefficient on this variable if the hypothesis is supported. While the coefficient is

[4]The crude divorce rate showed no relationship with fertility rates.

positive, it is also statistically insignificant, indicating that the mortality crisis and fertility collapse were largely unrelated phenomena.

Finally, the last two columns examine whether the decline in the availability of daycare was related to fertility changes across the period. The specification in Column 5, using all available data for daycare availability for this period, indicates a positive relationship between fertility and daycare availability (significant at the 10 percent level), as one would expect. Once the unemployment rate is included, however (column 6), this variable becomes statistically insignificant. As discussed below, the fertility behavior of younger women appears to be most affected by daycare availability; for women of childbearing age on average it does not appear to be a significant factor.

Figure 5 probes the relationship between income and fertility rates further by examining the correlation between real per capita income and age-specific fertility rates. One might expect, for example, that the fertility decisions of younger women (who are more able to postpone childbirth than are older women) may be more sensitive to changes in income than those of older women. Figure 5 illustrates the standardized coefficients from fixed effects regressions identical to those shown in column 1 of Table 2, but with the age-specific fertility rate rather than the age 15 to 49 fertility rate as the dependent variable.[5] The lightly shaded areas in Figure 5 represent ± one (standardized) standard error around the coefficient estimate, which is given by the middle line between the two shaded areas. For example, the coefficient on income for women age 20 to 24 is 0.406, with a standard error of 0.134. All of the coefficients shown in Figure 5 indicate a

[5]Standardized coefficients are presented to enable comparison across all specifications. The standardized coefficient is the estimated coefficient multiplied by (standard deviation of the independent variable / standard deviation of the dependent variable).

positive relationship between income and fertility; all are statistically significant at the 6 percent level or less. The magnitude of the effect is greatest for women aged 24 to 29 and women aged 25 to 29, which are the groups that account for (by far) the largest share of births in Russia. These results suggest that the collapse of household incomes in Russia during its transition from communism did in fact contribute to the fertility decline in the same years.

Table 3 illustrates the results of similar regressions that examine the relationship between fertility and other economic and social variables by five-year age group. While income and marriage rates remain important across all age groups (particularly younger women), the largest differences in the effects of the independent variables by age are for daycare availability and unemployment rates. Daycare availability appears to be particularly important for the fertility decisions of younger women, and the unemployment rate is strongly negatively related to fertility only for women under age 30. These results suggest that, to the extent possible in the individual-level data, one should examine how the effects of the independent variables differ by age.

Finally, it is worth noting that several other measures of economic disruption or state capacity showed no correlation with fertility rates during this period. Other indicators of the capacity of the health care infrastructure – the number of nurses, hospital beds, and clinics per capita – were also uncorrelated with fertility rates. The crime rate, used as a proxy for the extent of social upheaval in a region, was uncorrelated with fertility rates. The regional inflation rate was included as a measure of the macroeconomic instability (and uncertainty, given the high level of inflation rates in Russia during the period); the coefficient on this variable was negative as expected but was statistically insignificant. Finally, measures of state capacity such as the

level of the real minimum wage and the share of regional budgets spent on social measures also failed to predict fertility.

Individual-level results using the RLMS

Although these cross-region regressions provide clues to the factors related to changing fertility rates in Russia, ideally one would like to test whether these relationships hold at the individual level. For example, is there any evidence at the individual level that a region's unemployment rate or daycare availability affects the probability of having a child? How is income related to fertility at the individual level? This section attempts to answer these questions using data from the second panel of the Russian Longitudinal Monitoring Survey (RLMS), a nationally representative survey of Russian households conducted in the fall of 1994, 1995, 1996, 1998, and 2000 - 2004.[6] The RLMS provides detailed information on income, employment, and demographic characteristics of individuals and families, as well as on women's fertility history. Because the latter includes questions on whether a woman had a birth or an abortion in the previous twelve months, it is possible to use the RLMS to explore fertility behavior from both sides of the issue. While the number of births and abortions reported in the survey is relatively small, at least some of the coefficients are estimated with sufficient precision to draw conclusions regarding the impact of individual characteristics and behavior on fertility.

Given the small sample size and the relatively short time period for which data are available, the analysis here takes a straightforward approach to identifying correlates of the births that occurred during the period: logistic regressions are estimated with the dependent variable

[6]A detailed description of the sampling design and implementation of the RLMS is available at the RLMS website at http://www.cpc.unc.edu/rlms.

equal to one if the woman had a baby, zero if not.[7] In regressions using these data, each round of the survey is stacked so that each regression uses all rounds of the survey and includes multiple observations on individuals. Standard errors are clustered by individual to correct for these multiple observations. Independent variables relate to the previous round of the survey; for example, whether a person reported having a baby in the previous year in the 1995 survey is regressed on their real per capita household income in 1994. Due to this design, the regressions only use observations on women who were in two consecutive rounds of the survey. Furthermore, only data in the 1994 - 1996 and 2000 - 2003 rounds are used; because the RLMS was not conducted in 1997 or 1999 it is not possible to relate births in those years to the levels of economic variables recorded in the previous year. Other independent variables include the individual's age, marital status, and education level, as well as a number of subjective valuations of economic uncertainty and outlook on the future. The analysis primarily focuses on women age 18 to 44, although some of the regressions examine the fertility behavior of women younger or older than thirty. Table 4 shows the results for births; Table 5 shows the results for abortions.

Focusing first on the correlates of births, the first column of Table 4 explores the relationship between the probability of having a birth and the basic demographic characteristics of respondents such as age, marital status, and education level. Unsurprisingly, older women are less likely to have a child; adding a quadratic in age failed to improve the fit of the regression. The probability of a married woman having a birth was over 90 percent greater than that of a

[7]For regressions with abortion as the dependent variable, the variable is equal to one if the woman reports having an abortion in the previous 12 months, zero if not. While it is likely that the number of abortions is underreported in the RLMS, it should also be noted that abortion does not carry the stigma with it in Russia as it does in many other western countries (Popov 1993), so the underreporting may not be an important issue.

single woman (the omitted category of the marital status variables).[8] The relationship between the log odds of a birth and education levels is surprisingly weak, indicating that only women with higher education and incomplete secondary education have a higher probability of birth than that of women in the omitted category (primary education). For most countries the fertility-education gradient is much stronger, with more educated women having fewer children; for Russian women with higher education the sign is in fact the opposite one would expect based both on economic theory and on the experience of other countries. However, once one includes a control for per capita household income (column 2), the coefficient on higher education becomes statistically insignificant. The results in column 2 indicate that fertility is positively related to household income. Based on these results and in combination with the results of the fixed effects regressions, it appears that declining income did decrease the probability of birth for women in Russia in the 1990s. Whether this income effect is directly causal or is a proxy for something else that affected fertility remains an open question.

The positive and statistically significant relationship between household living space per capita and the probability of having a birth (column 3) is also consistent with the regional regressions which showed a similar relationship. However, once one includes controls for both household income and living space in the same regression (column 4), the coefficient on living space becomes statistically insignificant. This suggests that income and living space are positively correlated, and that it is the former rather than the latter that is driving fertility change. Given that the housing stock changes only very slowly over time and that the declines in fertility

[8]The coefficients in the RLMS regressions are presented as odds ratios, i.e. the coefficient represents the probability of a birth for those with this factor divided by the chance of death for those without it. For example, a coefficient of 1.5 means that an individual's odds of having a birth are 50 percent greater if they have this factor.

occurred over a short period of time, it is unlikely that changes in the housing stock would have a large effect on changes in fertility in this period.

Column 5 of Table 4 tests the hypothesis that economic uncertainty contributed to the fertility decline. Two measures of uncertainty and future expectations are used here: an indicator for whether the respondent was 'very concerned' she would be able to provide for herself in the next twelve months, and whether the respondent had positive expectations about the future. Surprisingly, both variables are uncorrelated with the probability of a birth; this was also true of a number of other measures of economic uncertainty – particularly the certainty or uncertainty of keeping one's current job – and measures of pessimism or optimism about the future. Being unemployed in the previous round also failed to predict the probability of having a birth, a result at odds with those of the fixed effects regressions (results not shown).

Finally, the last two columns of Table 4 examine these regressions for younger women (under age 30) and older women (age 30 and older) separately. The only difference between the two results is that measures of economic uncertainty and future expectations are significantly associated with the probability of having a birth for women over age 30, but are uncorrelated with the probability of a birth for women under age 30. The sign on the 'provide' variable is as expected: women over age 30 who were very concerned were much less likely to have a birth than women who did not express this concern. However, the sign on the 'positive expectations' variable (which equals one if a women felt that her family would live 'much better' or 'somewhat better' over the next twelve months, zero if not) is not as predicted: women with positive expectations about the future were less likely to have a child than women with negative expectations about the future. One possible explanation for this result is that women with

positive expectations about the future may have been expressing optimism regarding work and career, which took precedence over (more) children.[9]

Table 5 shows the results of a similar set of regressions using abortion as the dependent variable: the variable equals one if a woman reported having an abortion in the last year, zero if not. Younger, married women (relative to single women) were more likely to have an abortion; divorced women were over two times as likely as single women to have an abortion in this sample. Women with higher education were also much less likely to have an abortion relative to less-educated women.

In contrast to the birth regressions, these regressions indicate that income plays no role in the decision to have an abortion: in all specifications shown in Table 5, the per capita income variable is highly statistically insignificant. What matters instead appears to be living space – less space increases the likelihood of an abortion (columns 3 - 5) – and positive expectations about the future: women with positive expectations were much less likely to have an abortion than those with negative expectations (column 5). The latter effect was especially important for younger women (column 6). Finally, women who were very concerned about their ability to provide for themselves over the next twelve months were 30 percent more likely to have an abortion than women who were less concerned (column 5); this proportion increases to nearly 50 percent for women over age 30 (column 7). In summary, in contrast to the birth regressions, income appears to have played little role in the decision to have an abortion, while uncertainty and expectations about the future did affect these decisions.

[9]Note that the sign and significance of the coefficients on these expectations variables are unchanged if the two variables enter into the regression separately.

V. Concluding remarks

The past decade, much like the past century, has been a time of extraordinary upheaval for Russians. The reforms intended to improve the country's standard of living instead, at least initially, impoverished part of the population and led to continuing economic instability. Rarely in modern history has a population experienced such a massive loss of income and fundamental transformation of life circumstances in such a short period of time.

The evidence presented in this study indicates that the decline in income likely did play an important role in the decreasing the odds of having a birth in Russia in the 1990s. The macroeconomic instability and economic uncertainty created by the transition to the market appears to have played a relatively small role in Russia's fertility decline, but did influence a woman's decision to have an abortion. While there is some indication that the fertility trend is reversing, with the birth rates of older women increasing slightly, in the absence of other changes this increase in births is unlikely to compensate for the decline in births over the 1990s. On the other hand, given the evidence presented in this paper that fertility in Russia is sensitive to changes in income, it is possible that President Putin's proposal to give large cash transfers to women having a second child will prove to be effective in raising the country's birth rate.

References

Barkalov, Nicholas B., "Changes in the Quantum of Russian Fertility During the 1980s and Early 1990s," *Population and Development Review* 31:3 (September 2005), 545 - 556.

Becker, Gary S., *A Treatise on the Family* (Cambridge: Harvard University Press, 1981).

Bhaumik, Sumon Kumar and Jeffrey B. Nugent, "Does Economic Uncertainty Affect the Decision to Bear Children? Evidence from East and West Germany," Institute for the Study of Labor (IZA) Discussion Paper 1746, September 2005.

Brainerd, Elizabeth, "Women in Transition: Changes in Gender Wage Differentials in Eastern Europe and the Former Soviet Union," *Industrial and Labor Relations Review,* Vol. 54 no. 1 (October 2000), 138 - 162.

Brainerd, Elizabeth and David M. Cutler, "Autopsy on an Empire: Understanding Mortality in Russia and the Former Soviet Union, *Journal of Economic Perspectives*, Vol. 19, No. 1, Winter 2005.

Chase, Robert S., "Household Fertility Responses Following Communism: Transition in the Czech Republic and Slovakia," *Journal of Population Economics* 16 (2003), 579 - 595.

Dixit, Avanish K. and Robert S. Pindyck, *Investment Under Uncertainty* (Princeton, NJ: Princeton University Press, 1994).

Engel, Barbara Alpern, *Women in Russia, 1700-2000* (Cambridge, UK: Cambridge University Press, 2004).

Grogan, Louise, "What Caused the Post-Transition Fertility Decline in Central and Eastern Europe and the Former Soviet Union?" unpublished manuscript, University of Guelph, July 2003.

Heleniak, Timothy, "Out-Migration and Depopulation of the Russian North During the 1990s," *Post-Soviet Geography and Economics* 40 (3), 1999, 155-205.

Heleniak, Timothy, "The Causes and Consequences of Fertility Decline in the Former Soviet Union and Central and Eastern Europe," unpublished manuscript, Innocenti Research Center, University of Bologna, April 2005.

Kharkova, Tatiana L. and Evgueny M. Andreev, "Did the Economic Crisis Cause the Fertility Decline in Russia: Evidence from the 1994 Microcensus," *European Journal of Population* 16: 3 (September 2000), 211 - 233.

Kohler, Hans-Peter and Iliana Kohler, "Fertility Decline in Russia in the Early and Mid 1990s: The Role of Economic Uncertainty and Labour Market Crises," *European Journal of Population* 18 (2002), 233 - 262.

Lee, Ronald, "The Demographic Transition: Three Centuries of Fundamental Change," *Journal of Economic Perspectives* 17:4 (Fall 2003), 167 - 190.

Lokshin, Michael, "Household Childcare Choices and Women's Work Behavior in Russia," The *Journal of Human Resources* 39 (4), 2005, 1094 - 1115.

Popov, Andrej A., "A Short History of Abortion and Population Policy in Russia," *Planned Parenthood in Europe*, June 1993, Vol. 22, No. 22, 23 - 25."

Sobotka, Tomás, "Re-Emerging Diversity: Rapid Fertility Change in Central and Eastern Europe After the Collapse of the Communist Regimes," *Population* (English Edition), 58: 4/5 (Jul. - Oct. 2003), 451 - 485.

Stillman, Steven, "Health and Nutrition in Eastern Europe and the Former Soviet Union During the Decade of Transition: A Review of the Literature," *Economics and Human Biology* 4 (2006), 104 - 146.

Statistical sources:

Goskomstat of Russia, *Demograficheskii ezhegodnik rossii (The demographic yearbook of Russia)*. Moscow, various issues 1993-2005.

Goskomstat of Russia, *Pokazateli sotsial'nogo razvitya respublik, kraev I oblastei Rossiiskoi Federatsii (Indicators of the Social Development of the Republics, Krais and Oblasts of the Russian Federation)* (Moscow 1992).

Goskomstat of Russia, *Regiony Rossii (Regions of Russia)*, Vol. 2 (Moscow 1998a; Moscow 2002a).

Goskomstat of Russia, *Rossiiskii statisticheskii ezhegodnik 2000 (Russian Statistical Yearbook 2000)* (Moscow), 2000b.

Goskomstat of Russia, *Sotsial'noe polozhenie I uroven' zhizni naseleniya Rossii (Social Conditions and Living Standards of the Population of Russia)* (Moscow), 1997, 1999a, 2000c, 2002b.

Fig. 1 Births Per 1000 Pop., Russia

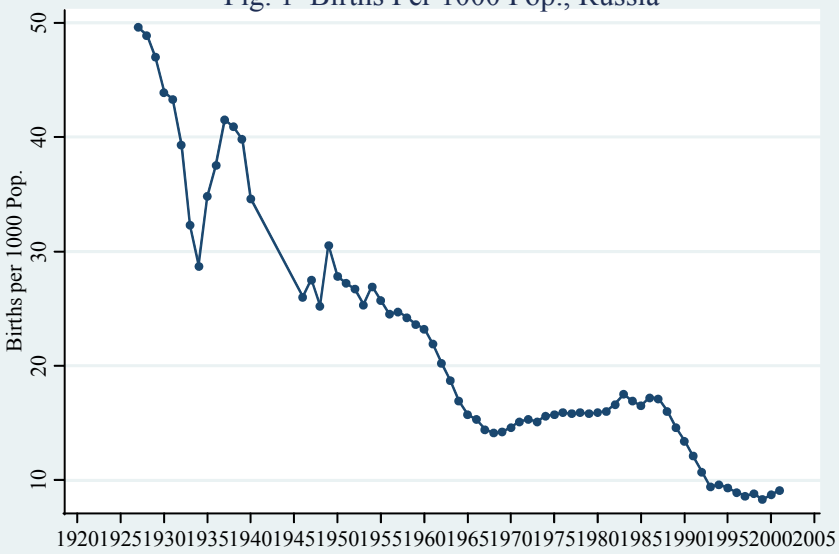

Fig. 2 Total Fertility Rate, Selected Countries

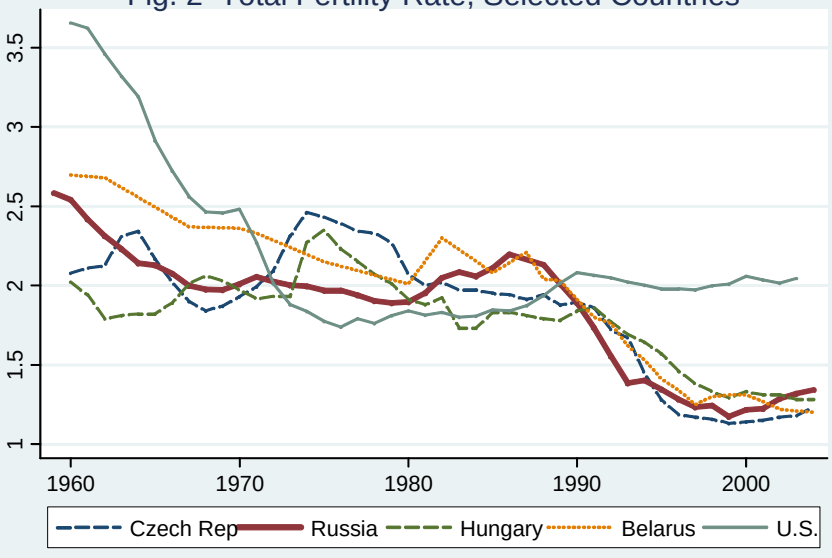

Fig. 3 Age-specific birth rates

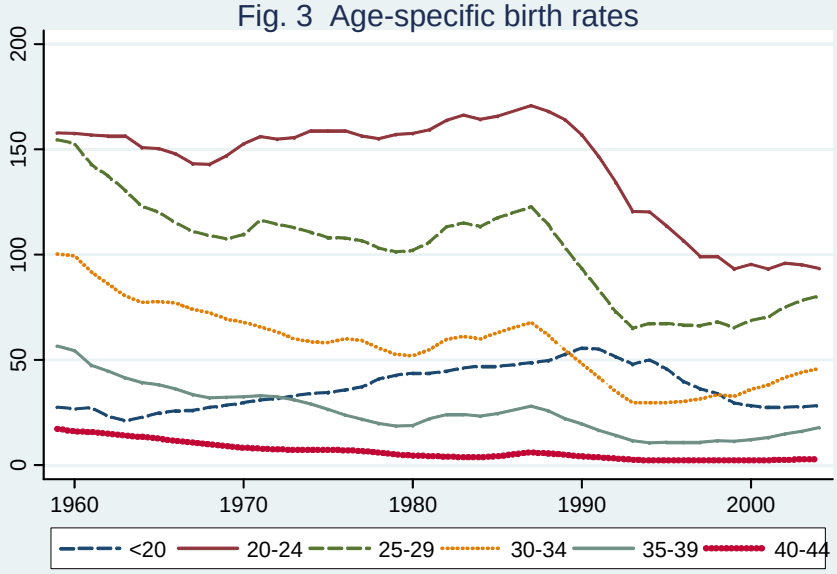

Fig. 4. Abortions per 1000 Women Aged 15-49

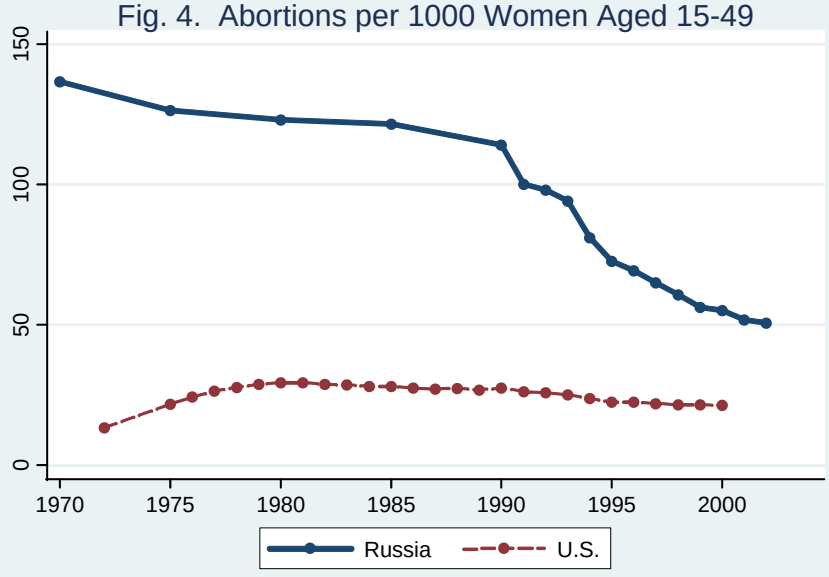

Table 1. Means and standard deviations of variables, cross-region regressions

	Mean	Standard deviation
Dependent variables:		
Age-specific birth rates (births per 1000 women in each age group):		
All women aged 15-49	38.22	11.24
Age 15-19	33.10	14.96
Age 20-24	114.73	27.64
Age 25-29	70.75	16.90
Age 30-34	34.65	12.93
Age 35-39	12.59	5.21
Independent variables:		
Real monthly income per cap., 1000s of 1990 rb.	.184	.093
Registered crime rate per 100 pop.	1.67	.574
Marriage rate per 1000 pop.	7.21	1.28
Annual net migration rate per 10 pop.	.022	.065
Unemployment rate	9.48	4.22
Housing per cap., cubic meters	17.93	1.86
Daycare availability (% of children age 1-6)	59.32	11.01

Table 2. Fixed effects regressions 1990-2001
Dependent variable: age-specific birth rate (births per 1,000 women age 15 - 49)

	DV: Age-specific birth rate, ages 15-49					
	(1)	(2)	(3)	(4)	(5)	(6)
Income per capita, 1990 rb	24.79*** (6.75)	11.50*** (3.30)	8.79*** (2.32)	11.37*** (3.32)	10.91*** (3.25)	9.19*** (2.35)
Marriage rate	–	3.05*** (0.45)	2.01*** (0.34)	3.04*** (0.43)	2.69*** (0.44)	1.92*** (0.32)
Net migration rate	–	6.38** (3.22)	13.01*** (3.08)	5.91* (3.08)	5.44** (2.67)	12.45*** (3.04)
Medical clinics per capita	–	0.286 (0.257)	0.711*** (0.250)	0.339 (0.228)	0.297 (0.284)	0.697*** (0.265)
Housing per capita	–	0.753*** (0.293)	0.340 (0.322)	0.771*** (0.296)	0.621** (0.292)	0.359 (0.348)
Unemployment rate+	–	–	-0.333*** (0.058)	–	–	-0.325*** (0.059)
Male life expectancy at birth	–	–	–	0.144 (0.194)	–	–
Daycare availability (% kids age 1-6)	–	–	–	–	0.128* (0.070)	-0.004 (0.059)
R2	.959	.972	.968	.972	.975	.971
N	868	868	717	864	796	645

+ Data available for 1992 - 2001 only.

Robust standard errors in parentheses. Regressions are weighted by population and include year effects.

*** Statistically significant at the 1 percent level or less.
** Statistically significant at the 5percent level or less.
* Statistically significant at the 10 percent level or less.

Fig. 5. Relationship between income and birth rate by age group

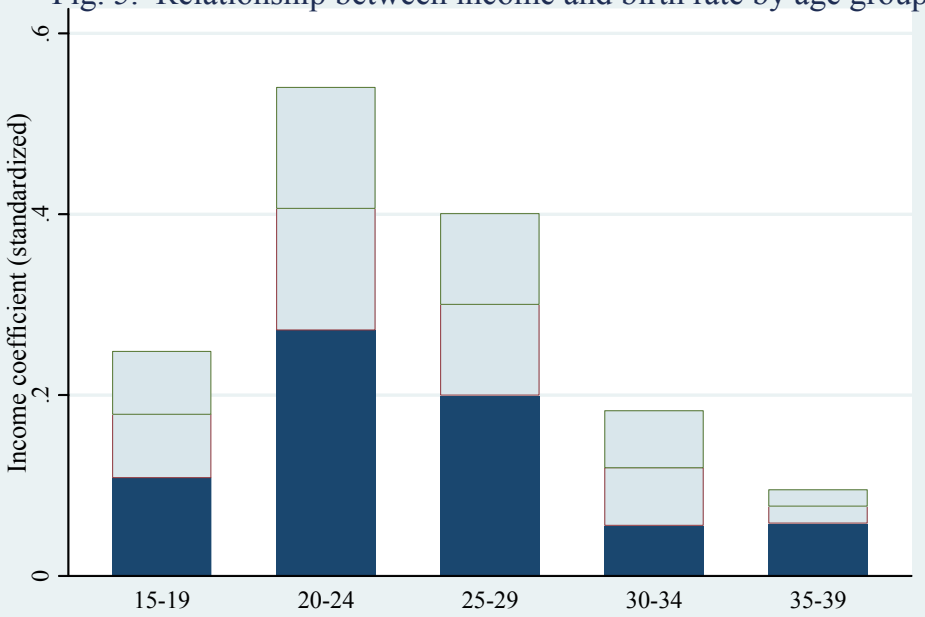

Table 3. Fixed effects regressions 1990-2001
Dependent variable: age-specific birth rate by 5-year age group
(births per 1,000 women in each age group)

	DV: Age-specific birth rate by age group:									
	15-19		20-24		25-29		30-34		35-39	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Income per capita, 1990 rb	11.34** (4.60)	10.60** (5.36)	27.75** (12.30)	25.04*** (9.44)	21.76** (6.12)	18.42*** (5.49)	9.51*** (3.69)	7.49* (4.15)	5.61*** (1.49)	4.45*** (0.96)
Marriage rate	1.94*** (0.67)	1.17* (0.69)	6.04*** (1.27)	4.93*** (1.26)	4.27*** (1.09)	3.86*** (0.79)	0.983 (1.72)	0.343 (1.90)	1.13*** (0.18)	0.690*** (0.117)
Net migration rate	15.58** (7.16)	16.92** (7.91)	8.15 (5.65)	16.20** (6.70)	10.06** (4.95)	23.30*** (6.45)	6.66 (4.19)	17.4** (7.56)	1.58 (1.09)	4.06** (1.57)
Medical clinics per capita	0.416 (0.263)	1.25*** (0.339)	1.84*** (0.588)	3.07*** (0.609)	-0.348 (0.523)	0.830* (0.491)	-0.642* (0.333)	-0.421 (0.298)	0.237* (0.132)	0.255** (0.108)
Housing per capita	-0.169 (0.351)	0.194 (0.375)	2.15** (0.900)	1.63 (1.20)	1.42*** (0.482)	0.760 (0.483)	0.609 (0.497)	0.251 (0.504)	-0.032 (0.154)	-0.027 (0.143)
Daycare availability (% kids age 1-6)	0.337*** (0.077)	0.270** (0.109)	0.424** (0.208)	0.094 (0.172)	0.227** (0.115)	-0.041 (0.097)	0.127*** (0.047)	-0.004 (0.061)	0.079*** (0.025)	0.036 (.022)
Unemployment rate+	–	-0.510*** (0.116)	–	-0.821*** (0.136)	–	-0.516*** (0.136)	–	-0.201 (0.128)	–	-0.081* (0.042)
R2	.967	.971	.970	.962	.960	.957	0.698	0.590	.968	.973
N	796	645	796	645	796	645	796	645	796	645

+ Data available for 1992 - 2001 only.
Robust standard errors in parentheses. Regressions are weighted by population and include year effects.
*** Statistically significant at the 1 percent level or less.
** Statistically significant at the 5percent level or less.
* Statistically significant at the 10 percent level or less.

Table 4. Logistic Regressions for Women Age 18 - 44 in the Russian Longitudinal Monitoring Survey, 1994-1996; 2000 - 2004

Dependent variable: dummy variable for whether the person had a baby in the previous year

Independent variable	(1)	(2)	(3)	(4)	(5)	(6) 18 - 29	(7) 30 - 44
Age	.872*** (15.2)	.875*** (14.3)	.872*** (14.3)	.874*** (14.0)	.882*** (12.1)	.906*** (4.50)	.842*** (5.19)
Log(income per capita), 1992 rb	–	1.15** (2.16)	–	1.13* (1.84)	1.08 (1.12)	1.08 (0.94)	1.09 (0.45)
Living space per capita, cb. mtrs.	–	–	1.024*** (3.11)	1.009 (1.09)	1.009 (0.94)	1.013 (1.29)	0.992 (0.44)
Very concerned about providing for self in next 12 mos.	–	–	–	–	1.018 (0.16)	1.18 (1.32)	0.524*** (2.61)
Positive expectations	–	–	–	–	0.963 (0.53)	1.10 (1.25)	0.676*** (2.64)
Married	1.92*** (5.36)	1.80*** (4.60)	2.04*** (5.42)	1.90*** (4.68)	1.71*** (3.65)	1.92*** (3.90)	0.58*** (2.09)
Divorced	.971 (0.12)	.933 (0.27)	.909 (0.36)	.970 (0.11)	.963 (0.14)	.899 (0.29)	.458* (1.84)
Widowed	.395 (0.91)	.417 (0.85)	.422 (0.84)	.432 (0.82)	.472 (0.73)	.432 (0.82)	.379 (0.95)
Incomplete secondary ed.	1.43*** (3.33)	1.48*** (3.43)	1.47*** (3.39)	1.52*** (3.54)	1.59*** (3.69)	1.49*** (2.81)	1.49 (1.48)
Secondary ed.	1.32* (1.86)	1.28 (1.44)	1.25 (1.30)	1.34* (1.67)	1.37* (1.69)	1.34 (1.37)	1.29 (0.58)
Vocational ed.	1.05 (0.49)	1.03 (0.26)	1.05 (0.41)	1.03 (0.21)	1.03 (0.19)	1.13 (0.81)	0.63 (1.55)
Specialized secondary ed.	1.04 (0.33)	.882 (1.03)	.990 (0.08)	.923 0.643)	.966 (0.27)	.893 (0.75)	1.39 (1.28)
Higher ed.	1.43** (2.45)	1.25 (1.40)	1.33* (1.85)	1.27 (1.48)	1.23 (1.19)	1.12 (0.52)	1.11 (0.34)
N	9881	8862	8977	8491	7257	3288	3960
Pseudo R^2	.105	.103	.106	.103	.097	.035	.113

Coefficients are reported as odds ratios. Z-statistics in parentheses. Standard errors are calculated using the Huber/White method and are corrected for individual clustering. All regressions include controls for the year of the survey and large region. Omitted variables are single (marital status) and primary education.

*** Statistically significant at the 1% level or less; **5% level or less; *10% level or less.

Table 5. Logistic Regressions for Women Age 18 - 44 in the Russian Longitudinal Monitoring Survey, 1994-1996; 2000 - 2004

Dependent variable: dummy variable for whether the person had an abortion in the previous year

Independent variable	(1)	(2)	(3)	(4)	(5)	(6) 18 - 29	(7) 30 - 44
Age	.933*** (9.25)	.932*** (9.26)	.938*** (8.44)	.934*** (8.74)	.937*** (7.62)	.989 (0.43)	.862*** (6.26)
Log(income per capita), 1992 rb	–	.962 (0.70)	–	.990 (0.18)	1.027 (0.44)	1.013 (0.16)	1.07 (0.68)
Living space per capita, cub. mtrs.	–	–	.962*** (2.74)	.962** (2.49)	.957*** (2.53)	.966 (1.40)	.953** (2.24)
Very concerned about providing for self in next 12 mos.	–	–	–	–	1.31** (2.40)	1.19 (1.20)	1.46** (2.04)
Positive expectations	–	–	–	–	.823*** (2.79)	.786*** (2.62)	.842 (1.59)
Married	2.42*** (6.37)	2.42*** (6.38)	2.05*** (5.20)	2.24*** (5.65)	2.02*** (4.58)	2.04*** (3.88)	1.20 (0.64)
Divorced	2.66*** (4.71)	2.65*** (4.69)	2.37*** (4.28)	2.65*** (4.65)	2.63*** (4.43)	2.54*** (3.20)	1.57 (1.34)
Widowed	2.02 (1.00)	2.02 (1.42)	1.83 (1.22)	2.09 (1.49)	1.64 (0.77)	3.30 (1.12)	1.01 (0.01)
Incomplete secondary ed.	1.29** (2.09)	1.28** (2.05)	1.26** (1.95)	1.21 (1.53)	1.25* (1.66)	1.22 (1.13)	1.16 (0.66)
Secondary ed.	1.20 (1.11)	1.20 (1.11)	1.27 (1.48)	1.25 (1.35)	1.11 (0.58)	1.18 (0.74)	.901 (0.34)
Vocational ed.	.961 (0.30)	.964 (0.27)	.990 (0.07)	.952 (0.35)	.909 (0.65)	.744 (1.55)	1.13 (0.54)
Specialized secondary ed.	.823 (1.39)	.831 (1.31)	.891 (0.84)	.875 (0.93)	.808 (1.41)	.731 (1.58)	.927 (0.32)
Higher ed.	.614*** (2.64)	.624*** (2.52)	.683** (2.11)	.655** (2.22)	.637*** (4.58)	.481*** (3.88)	.791 (0.93)
N	10977	10977	11100	10492	8889	4091	4798
Pseudo R^2	.048	.048	.048	.051	.055	.048	.075

Coefficients are reported as odds ratios. Z-statistics in parentheses. Standard errors are calculated using the Huber/White method and are corrected for individual clustering. All regressions include controls for the year of the survey and large region. Omitted variables are single (marital status) and primary education.

*** Statistically significant at the 1% level or less; **5% level or less; *10% level or less.