An Economic Examination of the Post-Transition Fertility Decline in Russia

Louise Grogan*

September 5, 2006

Abstract

In this paper I make use of longitudinal household data to examine the decline in the Total Fertility Rate in Russia from 2.0 in 1989 to 1.3 in 2001. Using individual and community-level panel data spanning the 1994-2001 era, I find that the decline in household income can account for about a 28% decline in yearly birth propensities amongst married couples. The relationship between educational attainment and fertility appears to have changed markedly in the post-Soviet era. More educated individuals now have greater propensities to bear children that their vocationally-educated counterparts within marriage. Female labour force participation is not strongly associated with fertility decisions of married women in the post-Soviet era, and local provisions for children also do not have important effects. These results suggest that improving real family incomes will be more important in raising fertility rates than improving child benefits levels or increasing community childcare provisions.

JEL codes: J13, J12, P0, P13

Keywords: fertility, birth timing, female labour force participation, economic transition.

*Dept. of Economics, University of Guelph

Correspondence to: Louise Grogan, Department of Economics, University of Guelph, MacKinnon Building Rm.743, Guelph ON. Tel. 1 (519) 824 4120 ext.53473. Fax. 1 (519) 763 8497. email: *lgrogan@uoguelph.ca*

I Introduction

The purpose of this paper is to provide an economic explanation for the dramatic decline in the Russian fertility rate after the beginning of transition to a market economy in 1991. The Total Fertility Rate (TFR)[1] fell from 2.0 in 1989 to 1.3 in 2002, after stagnating since 1970 around 2.0. The fall in fertility is a matter of substantial concern to policy-makers, who have recently become concerned with the fiscal implications of a much-reduced future workforce.

The State Duma (Russian Parliament) suspended federal family planning programmes in 1999 in reaction to the birth rate crisis. It was felt that increased access to contraceptives in the post-Soviet period was the cause of the birth rate fall. While abortion rates are still far higher in Russia than in the US, the TFR has scarcely changed since the introduction of the new legislation. While it is clear that 'transition' is responsible for the birth rate fall, how big a role each of the many transition phenomena have played in the TFR drop is not yet clear. Such information is, of course, prerequisite to designing effective economic policies to boost the TFR.

I employ data from the 1994-2001 Russian Longitudinal Monitoring Survey (RLMS)[2] to characterise the determinants of completed fertility and yearly fertility outcomes. The survey contains extensive information on

[1]The total Fertility Rate is the mean number of children expected to be born to a woman in her lifetime. This projection is based on a weighted average of age-specific live birth rates.

[2]Details of the survey methodology and household data are available from the University of North Carolina at Chapel Hill, $http://www.cpc.unc.edu/rlms/$.

women's health and labour market activities, as well as full information about households' incomes and expenses. The RLMS also contains yearly data on the economic situation of each respondent's community, including information on the prices and availability of contraception, abortion, and medical care.

Russia was not alone in experiencing a post-Soviet fertility decline. The sharp fertility decline which occurred in Russia in the 1990s was mirrored in other countries of the former Soviet Union between 1970 and 1998, where levels of economic development differed widely. Table I below illustrates. In 1970, a woman in Central Asia, a region of low economic development, could be expected to have 4.7 children in her lifetime, while in the Western Soviet Union, a more prosperous area, a woman could be expected to have 2.1 children at that time. By 1998, total fertility rates were below replacement levels (2.1) in six of the seven subregions. Only Central Asia had birth rates above this level.

The steepest declines in total fertility rates (TFR), the theoretical number of children a woman will have in her lifetime, have occurred at different times in different parts of the former Soviet Union. While the high fertility Caucasus and Central Asia regions experienced substantial falls in fertility between 1970 and 1980, Central and Eastern Europe and the Balkans experienced the strongest declines in the 1980s. All regions experienced declines in the 1990s, but in Central and Eastern Europe and the Balkans the declines were similar to those experienced in the previous decade. These

declines may be compared with the much-studied fall in US total fertility rates by 24% between 1929 (the beginning of the *Great Depression*) and 1941, and the rise in fertility rates by 46% between 1945 and 1957 (the *Baby Boom*). In the SEE, Baltics, WFSU, Caucasus, and Central Asia, population-weighted declines in fertility between 1989 and 1998 were all larger than 30%. In Russia, the TFR declined by 40% between 1989 and 2000[3]. Figure I compares these historical changes in fertility rates, which were all brought on by large political and economic events. Figure II shows that the Russian fertility decline was also large in comparison with contemporaneous TFR trends in the US and Western Europe (Sweden).

As yet there are no apparent trends toward recovery in fertility rates in countries which stabilised early and had only very minor institutional upheaval and output declines. While GDP per capita now exceeds its 1990 levels in several transition countries, birth rates have not yet recovered even in these countries. The Baltic States, Slovenia, Hungary, Poland, and the Czech Republic, all of whom joined the European Union in May 2004 and who have relatively buoyant economies, still have total fertility rates in the 1.1-1.5 range.

The examination of the causes of the fertility decline in former communist countries has been hampered by a lack of data collection in this region prior to the 1990s. Post-1990, longitudinal household surveys were conducted for some of the countries of the region (*e.g.* Russia: RLMS

[3]TFR 1989=2.0. TFR in 2000=1.2, (UNICEF (2002))

1992–2004 ($http://www.cpc.unc.edu/rlms/$), Tarki Hungarian Household Panel 1992-1997 ($www.tarki.hu$), and the Slovenian Social Science Data Archive ($www.adp.fdv.uni-lj.si/$))). Several cross-sectional labour force surveys (see for example $www.lisproject.org$) were carried out. The United Nations Economic Commission for Europe (UNECE) Family and Fertility Surveys ($www.unece.org$), now publicly available, are potentially rich sources of country-specific information on the factors behind the fertility decline. However, there was very little micro data collection prior to 1992, two years after the Iron Curtain fell. As such, available microeconomic data cannot provide us with a before-and-after picture of fertility determinants in this region. Moreover, in cross-sectional data potential endogeneity between household income and numbers of children observed in households (via female wages and participation decisions) cannot be easily eliminated. Using cross-sectional data investigations have been made of the fertility decline in Eastern Germany by Eberstadt (1994) and Witte and Wagner (1995), in the Czech and Slovak Republics by Chase (1998), and in Russia by Kohler and Kohler (2001), Rimashevskaya (1997) and Rutkevich (1996). To my knowledge, no panel data analyses have yet been undertaken using micro data.

In this analysis I use retrospective fertility data and panel data spanning the 1994-2001 era in order to understand both the factors determining completed fertility in the Soviet era, and those determining current fertility decisions. In Section II I discuss the historical context of the fertility

change in Russia and introduce institutional features of the Soviet system. In Section III I briefly introduce the RLMS survey data to be used in the analysis. Section IV is devoted to a brief overview of the economic theory of fertility behaviour. Section V consists of an analysis of completed fertility trends across cohorts in the post-Soviet era. In Section VI I analyse changes in the timing of births that have occurred from 1992 to 2001 in Russia. Section VII employs the 1994-2001 RLMS panel to analyse the determinants of yearly fertility amongst married couples, paying special attention to the importance of the local economic situation (kindergartens, child benefits, labour market conditions) in a couple's region. Section VIII concludes.

II Historical Context

Sharp changes in birth rates, such as those seen across Central and Eastern Europe and the Former Soviet Union in the past decade, are a cause for concern amongst policymakers (see UNECE (2000)). By 2000 there were declining population rates in several of the formerly socialist countries, with negative growth rates predicted in the near future for others. Figures III(i) and III(ii) show trends in the rate of natural population increase in Russia and net external migration, both of which point to a sharply declining population. In 1997 the TFR had fallen to less than 1.2 in the Czech Republic, Bulgaria, Latvia, Belarus, Russia, and Estonia. Such trends, shown in Table I, promise that already high old-age dependency ratios will rise

over time, and that states will eventually face difficulties meeting the pension and health needs of populations on a shrinking tax base. At the same time, life expectancy has continued to decline sharply in many Eastern European countries. Figure IV shows life expectancy by sex for Russia. The rise in the suicide rate in Russia has been investigated by Brainerd (2001), who concludes that a key factor behind the rise in male suicide in Russia is the macroeconomic shock of transition. Thus many demographic crises are associated with economic reforms such as the privatisation of enterprises, labour market liberalisation, the creation of housing markets, and the removal of centralised price-setting.

Extensive state policies to encourage fertility and to facilitate the combining of work and family life existed in Russia prior to 1991. Families with young children were prioritised for apartments, and state enterprises provided highly subsidised kindergarten and health care. As well, all levels of education were universally provided, so that many of the costs commonly associated with parenthood in Western countries were actually externalised from family resource allocation problems. While these state subsidies did not result in huge families, they effectively mitigated the relationship between a couple's personal finances and fertility decisions. The lack of consumer goods, and the various barter-type systems of rationing which existed in Soviet Russia meant that the relationship between incomes, which were not widely dispersed, and consumption patterns, was very different from that prevailing in market economies. In this context,

the TFR remained at about 2.0 through the 1980s in Russia, just below the replacement level of 2.1.

Changes in family stability have accompanied fertility and economic changes in former socialist nations. Rates of marriage have plummeted. In Latvia, the marriage rate per thousand 15-44 year olds dropped from 21 in 1990 to 9.2 in 1998. Ages of women at first marriage have generally risen 1-2 years in the transition period, but not nearly enough to account for the continuing fall in marriage rates. Figure V shows trends in the age at first marriage in Russia from 1988 to 1996. Only in Albania did marriage rates rise slightly over the period. Divorce rates rose substantially in nearly all countries. In Estonia they nearly doubled from 1990 levels, to a rate of 94.5 divorces for every 100 marriages observed in 1997. Figure VI shows the trend in the marriage rate in Russia in the 1990s. While it is true that a majority of these countries have aging populations, such huge swings in family formation patterns cannot be attributed to cohort size effects. Only in Albania, Latvia, and Azerbaijan did the fraction of 20-24 year olds in the population decline somewhat since transition began, and in most cases modest rises occurred. Thus it appears that economic change is a determining factor both for changes in family stability and in fertility. Figures VII(i)-VII(iii) explore trends in non-marital and young age births in Russia since 1989.

One reason put forward early on in transition for the fall in birth rates in the former communist countries was that of improved access to contra-

ception. Indeed this premise was behind the 1999 suspension of Russian federal family planning programmes. Access to contraceptives and abortion had varied widely across the East during the Cold War. Women in Hungary, East Germany, and the former Czechoslovakia had much better access to the pill, and much lower abortion rates, than women in Russia or the Ukraine. In the Soviet Union, the unpopularity of Soviet-made contraceptives meant that abortion was the most common means of controlling fertility prior to 1991. Despite the health costs associated with this method, monetary costs were virtually nil as this procedure was part of universal health care. Levine and Staiger (2002) develop a model of abortion as insurance against unwanted pregnancies and test it using information on post-1991 changes in abortion laws in this region. For more on the specifics of these legal changes, the reader is referred to this work.

Women in Russia have been able to control their fertility through abortion since the end of the Stalin era. Prior to 1990, Soviet contraceptives were considered to be all but poisonous, and western alternatives were not available. Thus, contraception costs (price plus harmful consequences) were considered to have made abortion an almost-universally preferred option. Since transition began, however, living standards in Russia have fallen sharply towards the levels of the developing world, and many health services are de facto fee-for-use. While western style contraceptives have gradually become available in most communities, they may be very expensive for families struggling to put food on the table. Thus, it may be

optimal for women to not use regular contraception (incurring a continuous flow of costs), but rather to use no protection in the hope that it is not necessary to pay for an abortion (incurring a one-off, or stock cost). Grogan (2003) finds that abortion costs in the mid-nineties were about 1/8 of mean monthly income in the RLMS sample, and that one half of abortions were provided free of charge. Females who use no protection, but who do not wish to have a child, may decide to carry the pregnancy to full term and incur only pregnancy costs. Indeed this third scenario may partially account for the doubling of the incidence of children placed in foster care in Russia since 1989.

In 2000, the abortion rate in Russia was 170 per 100 live births, far higher than any other country of the former East Block, and only slightly lower than its 1989 level of 204.9. Rates of contraceptive use remain lower than in any other G-8 country. Leaving aside moral concerns (abortion was not a moral/religious issue in Soviet Russia), rates this high certainly have general health consequences and may cause sterility. Up to 30 % of Russian females currently of reproductive age are unable to have children as a result of multiple abortions.

Universal child benefits were introduced in Russia in 1991, to help combat the negative effects on families of the crumbling of the Soviet Empire. These benefits were to be paid out by the governments of each of the 32 regions of Russia. Prior to this, only very poor families had received (means-tested) financial assistance for help with children. However, uni-

versality of child benefits was only briefly, if ever, achieved, due to regional budget crises. Denisova et al. (2000) finds that in 1996 only 33% of eligible families received child benefits. Misikhina (1999) provides evidence that relatively wealthy families were receiving much larger fractions of benefits disbursed than poorer families at this time.

Through the second half of the 1990s regional governments began adopting new strategies to deal with the fiscal burden of paying child benefits. Some governments began to target benefits at poor families in 1995, with several others following suit in subsequent years. In 1998 the Russian State Duma passed legislation conforming to current practise, and proclaiming that only families with incomes below the regional subsistence level could receive child benefits. Regions maintained the right to impose further restrictions. It was hoped that targeting would help clear benefit arrears and help tackle the spiralling problem of hunger and ill-health amongst young Russians.

As well as policy changes, there have been large changes in educational opportunities and returns to human capital in the former communist countries (see UNECE (2000)). Some of these are due to the deregulation of labour markets, which widened earnings distributions within and between skill groups during the emergence of widespread private enterprise (see Atkinson and Micklewright (1993) for early work on this). Some are due to increased higher educational capacity created by the opening of a range of private educational establishments across the former Soviet Union. The

higher education enrollment rate rose from 22.4 % of individuals aged 19-24 in 1995 to 36.2 % in 2000 (UNICEF (2002)). This steep rise came despite falling real incomes, and despite the fact that educational costs were increasingly being shouldered by individuals rather than the federal and state governments. It is well-known that better educated females tend to postpone family formation (see for example Gustafsson, Wetzels, Vlasblom, and Dex (1996)) and to have fewer children (see Micheal (1973)). The opportunity cost of childbearing becomes higher when returns to education improve. Thus, increasing returns to human capital may be one factor contributing to the fall in birth rates in this region. Figure VIII shows trends in higher educational enrollment rates by type of education, for Russia in the 1989-2000 era.

Individuals who spend longer in education marry later. A simple correlation of marriage rates amongst 15-44 year olds and higher educational enrollment rates in Russia in the 1994-2001 period yields $\rho = -0.6527$[4]. Educational attainment in Russia varied widely over the course of Soviet history. Figure IX presents educational attainment across cohorts of women in the RLMS. As in all of the analysis of this paper, an individual is considered to have 'higher' education if she has completed university, graduate study, or technical higher education. An individual is considered to have completed vocational training if she has completed factory school (PTU), with or without secondary school, or to have completed specialised profes-

[4]This calculation was made using the UNICEF-TRANSMONEE 2002 database

sional trades courses. Figure IX shows that higher education completion reached its peak with the cohort born in 1951-56, and has declined from over 50% to about 35% in the 1971-76 cohort[5]. Until the 1971 cohort, patterns of higher and vocational education appear to be inversely related, perhaps reflecting Soviet educational policies of the time more than individual preferences. Somewhat surprisingly, mean age at first birth appears to have declined over cohorts, despite the trend towards a more educated population over the course of Soviet history.

In Russia female labour force participation was essentially universal throughout the adult years during the Soviet era. Table 2 shows that participation has declined somewhat in the past 10 years, but remains above that of many Western European countries and the US. Male employment rates fell more dramatically than female in the initial years of Russian economic transition. As a result, male and female employment rates were very similar by 1998. Differences in the employment rates of males and females were generally smaller in Eastern than in Western Europe (except for Sweden) in the mid 1990's. As in the other former communist countries, female labour force participation rates remained high in Russia.

While in Western Europe and North America declines in fertility rates since the Baby Boom have commonly been associated with increased labour

[5]Although those born in 1976 were 25 in 2001, they may not have completed higher education. Evening university study has become a very popular way of combining work and school in Russia, and may be a reason for later graduation. Unfortunately the RLMS does not contain specific information on evening schooling.

market opportunities for women, there is recent evidence that this is changing. Several papers have now noted positive correlations between the labour force participation of women and fertility levels in OECD countries since the late 1980s. Ahn and Mira (2002) show that labour force participation has maintained an upward trend since the 1980s in several high-participation countries (notably Sweden and Denmark), while fertility levels have trended upwards. Several other papers (see for example Ermisch (1989), Brewster and Rindfuss (2000), Macunovich (1996), and Hotz, Klerman, and Willis (1997) have also documented such changes in the relationship between female labour force participation and fertility. Thus the fact that female labour force participation fell in transition economies at the same time as birthrates declined dramatically is not unprecedented. Before economic transition began, female labour force participation rates were relatively high across the region. While women retired relatively early in socialist times (age 55 on average), those with young families had participation levels far above those seen in Western Europe even today. The combination of high labour force participation and comparable TFRs to Western European countries was facilitated by universal provision of day care, education, and health services.

The microeconomic literature on the economics of fertility has, to date, not emphasised the role of economic security in shaping fertility decisions. However, given that income uncertainty has been long recognised as an important factor in savings decisions (see for example Leland (1968)), and

the common characterisation of children as either consumption or investment goods within households, there are theoretical grounds for believing that economic security and fertility may be related. It is intuitively plausible that fertility levels are affected by, for example, perceived employment security, security of person and property, and security of health. These potential links might operate directly, or via the ways in which changes in these factors influence the organisation of society. For example, such security measures might have direct effects on current savings and consumption decisions, and/or might induce changes in the organisation of society which also bear upon fertility decisions. The degree to which such factors as labour market uncertainty, changes in the rule of law, and population health have been important in the past ten years, and that to which other factors such as changes in returns to education, labour market opportunities for women, and the subsidisation of the costs of childbearing, are important in determining fertility in this region, has not before been investigated empirically.

Another potential reason for the post-transition fertility decline in Russia may be that of changing material aspirations. The range of consumer choice has expanded vastly for people since 1990. If young people now feel that they must save to purchase 'standard' material goods such as car stereos, this may delay or reduce their childbearing.

III RLMS Survey Data

The RLMS surveys consist of two panels, a four wave panel running between 1992 and 1994 and a (continuing) panel running now spanning 1994 to 2004. Both are nationally representative samples of Russian households and individuals. The first contains 6300 households and the second about 4000. These data were collected primarily to assess the health consequences of economic transition, although they also have detailed information on individuals' working lives. The very detailed women's health information facilitates analysis of the economic determinants of fertility because it includes questions on abortions and contraceptive use. As well, the second RLMS panel contains yearly information on prices of basic commodities and the availability of services in each of 157 interview sites in the RLMS. For examples of previous work using the RLMS, see Mroz and Popkin (1995) on poverty, Popkin, Baturin, Kohlmeier, and Zohoori (1996) on nutrition, and Sheidvasser and Benitez-Silva (1999) on returns to human capital. For more details on the RLMS panels see ($http://www.cpc.unc.edu/rlms/$).

IV Theory

Economic theory can help explain the changes observed in fertility during the transition to market economies. Becker (1960) emphasised that children can be viewed as commodities over which households have defined preferences. The effects of the economy on fertility are felt both through income,

and also through changes in rates of return to human capital investments. Becker considered both *quantity* and *quality* of children to be of importance in determining overall fertility rates, and developed a theoretical relationship between the two. His static modelling structure predicts that the 'true' elasticity of children with respect to income is positive, although individuals switch from having more children to having fewer better-quality children at higher income levels. Thus, because of increased demand for quality in children amongst parents at higher income levels, income would appear to reduce fertility–so long as the income elasticity for the quality of children is sufficiently greater than that for the quantity of children. Recent theoretical work by Micevska and Zak (2002) has explained the apparent positive correlation between income and fertility in the former Soviet Union using an overlapping generations model in which fertility declines once income has fallen below a perceived subsistence threshold. The authors find some support for their predictions using aggregate TFR and CBR data from former communist countries and from the RLMS.

Following Becker's 'commodification' of children in the static framework, and his emphasis on child quality, Becker (1965), Mincer and Polachek (1974), and Willis (1973) expanded the theoretical understanding of fertility and the economy by analysing the role of female labour force participation. This approach emphasised the opportunity cost of mother's time (in which children are intensive), and predicted that increases in women's wages would have a negative effect on the demand for children. As the value

of market time to a woman increases (say due to higher wage offers), the relative value of time spent inside the home necessarily decreases. Thus the opportunity cost to women of having children, who require substantial levels of home production, is increasing in the labour market opportunities of women. Still, if children are a normal good, the increase in income derived from greater female labour market participation may have a positive effect on fertility. Thus one possible explanation for the negative relationship between fertility and female labour force participation found in transition economies is that the income effects from participation declines have dominated substitution effects. Certainly the substantial falls in real wages, and rising levels of unemployment amongst both males and females in transition countries have contributed to a situation where it is increasingly difficult for households to satisfy basic needs without having two income earners.

The microeconometric analysis of the relationship between female labour supply and fertility has expanded since the 1970s with the groundbreaking work of Schultz (1978), Hotz and Miller (1988), Ermisch (1989), Ermisch (1990), Tommaso (1999), and others. These studies generally confirm the negative theoretical relationship between female labour supply and fertility. Other strands of the literature have used macroeconomic data to look at the effects of business cycles on fertility (see for example Butz and Ward (1979)), and focused on cohort and intergenerational wealth effects in affecting total fertility rates (see for example Easterlin (1961), Easterlin and Condran (1976), and Macunovich (1996)).

One aspect of fertility behaviour which has largely been ignored to date in the theoretical literature considering children as consumption goods is the that of economic security. There is, however, mounting evidence of the importance of security factors in the empirical fertility literature. Using cross–sectional data from the Czech and Slovak Republics in 1984 and 1993, Chase (1998) relates observed drops in fertility in these countries to changes in wages, prices, and employment risks. Historical evidence from England and other industrialised countries (see Wrigley and Schofield (1989)) shows that marriage rates drop substantially, and that ages at marriage rise, in periods of economic decline. These marriage effects can also be expected to have effects on fertility, as discussed in Neal (2001). Once fertility decisions are placed in an intertemporal setting, optimising agents may modify their current 'consumption' of or investment in children in response to changes in certainty about future states of the world. Indeed both the literature on intertemporal savings and intertemporal investment has long recognised the the important role played by uncertainty about the future in shaping today's decisions.

Despite the lack of attention given to the effect of economic security on fertility in the case where children are considered consumption goods, there is a substantive literature which considers children primarily as investment goods. When children are viewed as economic assets (see for example Friedman, Hechter, and Kanazawa (1994) and Nungent (1985)), fertility should rise in response to increased uncertainty about future incomes. The role

of children as investment goods should be particularly large in situations where financial markets are imperfect, and it is thus difficult to save in the form of money. Given the very imperfect nature of savings and credit institutions in the former Soviet Union, this situation could be said to apply to this region. Predictions regarding responses to uncertainty about future incomes depend on whether children are to be regarded as consumption or investment goods.

Since numbers of children cannot be reduced in the future if a bad state of the world occurs, children are very different types of goods from others. Work on investment under uncertainty (see for example Dixit and Pindyck (1994)), provides insight into such problems. Dixit and Pindyck show that, where investments are irreversible, can be postponed, and outcomes are uncertain, there is a value to waiting. Such *real option* frameworks would predict that changes in economic security would have effects on the timing of births across child-bearing years.

V Completed Fertility

Becker's characterisation of fertility implicitly refers to completed fertility. By assumption, completed fertility differences within populations are demand-driven, and fecundity is generally not a binding constraint. Seldom is information available to the econometrician about fecundity (a notable exception being the 1970-1975 National Fertility Survey used by Rosen-

zweig and Schultz (1985)), and it is expected that abortions may be severely under-reported.

Using the fertility data contained in the RLMS 1994-2001 survey it is possible to reconstruct total births accruing to a woman by aged 40. The 1994 questionnaire asks both about total live births and stillbirths, while subsequent household roster data and women's health data enable the addition of data up to 2001. Stillbirths are excluded from the present analysis.

I fit several count data models to completed fertility data for women born between 1936 and 1961. While I do not have information on incomes, marital stability, or labour force participation during child-bearing years, I do have information on educational attainment. The educational attainment of mothers should be an important determinant of desired *quality* of children, given that more educated mothers generally do expect their children to obtain more education. I define higher educational achievement as the completion of university, graduate school, or technical/medical school. Vocational educational achievement is defined as the completion of trades school (PTU), with or without secondary education, or the subsequent completion of professional trades courses. Individuals with neither vocational nor higher education are grouped as having secondary or less educational attainment.

The poisson regression model has been extensively used to describe data in which large numbers of zero values for dependent variables are observed,

and where positive values are small. Assume that each observed outcome, y_i is drawn from a Poisson distribution with parameter λ_i, whose value depends on the vector $\mathbf{x_i}$. The model can be formulated log-linearly as:

$$ln\lambda_i = \beta' x_i + \epsilon_i \tag{1}$$

Because the expected number of events per period is then $e^{\beta' x_i}$, the model can be easily estimated by maximum likelihood. In the present context of estimating lifetime completed fertility amongst older cohorts in the RLMS, the expected number of events per period can be interpreted as the mean number of children per year of the childbearing years.

Because I estimate count data models for a sample of women whose childbearing years are completed, I define the variable y_i as the lifetime total number of children born. In $\mathbf{x_i}$, I include only the educational attainment of the mother.

The log likelihood function for the Poisson model is then

$$lnL = \sum_{i=1}^{n} [-\lambda_i + y_i \beta' x_i - lny_i!] \tag{2}$$

One unattractive feature of the poisson model is that it assumes that the variance of y_i is equal to its' expectation. For this reason I also fit more flexible count models which allow for cross-sectional heterogeneity. Poisson

and negative binomial models, with and without zero-inflation components, are fitted to the 2001 completed fertility data. These models are described in more detail in Greene (1996).

Likelihood ratio tests suggests that the poisson model without zero-inflation fits the aggregate data best. As well, likelihood ratio tests of the restricted model (with education dummies as $x's$) versus unrestricted models estimated separately by education suggest that the hypothesis that the restricted model fits the data cannot be rejected at the 5% level. This implies that, across these older cohorts, the relationship between educational attainment and completed fertility has remained stable. Table III presents the results of this analysis.

Figure X presents predicted values from the restricted poisson model (without zero inflation) for the 1723 women aged 40 or more in 2001.IV. All cohorts of higher educated women have substantially lower completed fertility than their contempories with less education. Fertility rates for the higher-educated group are below replacement throughout the sample period. The model predicts that educated women will have 16% (1-$exp^{-.176}$) fewer children than their vocationally-educated counterparts, and that those with less than secondary education will have 15% (1-$exp^{.01414}$) more children than the vocationally-educated. The 1956-61 cohort, in their 20s during the early golden years of Brezhnev, had the highest completed fertility of all cohorts.

Given that wages were set to prioritise work in heavy industry and the

military during the Soviet era (ie. truck drivers earned more than doctors), the relationship between educational attainment and earnings was very different than in market economies. One of the few micro data studies to shed light on wages across educational groups is that of Katz (1994). Using a local sample, she finds that people with higher education earned slightly higher salaries in Taganrog, Russia, in 1989, but that differences were small enough to be statistically insignificant. Still, the relationship between education and living standards was not clear-cut. Due to the lack of consumer goods, there was a huge savings overhang at the end of the 1980s, which suggests that earnings and living standards were far less correlated than in the West. As well, female labour force participation was almost universal. All of these facts are of interest in assessing the relevance of Becker's fertility theory in Russia, because they suggest that family incomes and opportunity costs of labour force participation were far less relevant determinants of fertility in the Soviet era than in transition.

The observed differences in fertility by education are particularly interesting in the Russian context. Given that skilled trades people (vocationally educated) often had equal or better incomes than did individuals with university-equivalent training, and the full participation of all education groups in the labour market, the results seem mainly to suggest important differences in preferences across education groups. Individuals with more education seem have either (*i.*) consistently weaker preferences for children of a given quality, or (*ii.*) consistently stronger preferences for quality in

children. The second case is particularly interesting given that a large majority of the direct costs of children's schooling and education were borne by the state or enterprises. It appears that non-monetary costs of instilling 'quality' in children may have been particularly important in the Soviet era.

VI Timing of births

One way of looking at the effect of transition on fertility patterns is to look at the effect of exposure time to the market economy on patterns of completed fertility. Such an exercise can be done using the 2001 sample of women aged 40 and over. These women have a maximum exposure of ten years to the market economy[6] A rough way to measure the effects of such exposure to the market on completed fertility is to estimate count data models which allow for a flexible impact of market economy exposure on completed fertility.

Again, both poisson and negative binomial models were fitted to the data, as were zero-inflated versions of both, where the inflation factor was "ever married". The standard poisson model, restricted to a multiplicative effect of exposure across education groups, performed the best. Table IV shows the results. Most strikingly, the quadratic exposure variables were not significant at the 10% level in any specifications[7]. This indicates

[6]Exposure time is defined as follows: (Date of 2001 interview)-(January 1991).

[7]This was also true in the simple linear specification of exposure time.

primarily that births to women who were in their 30's at the beginning of transition were relatively unaffected by the process. As in the previous poisson regressions of completed fertility across cohorts, women with higher education were found to have fewer children ($1 - exp^{-.151} = 15\%$). However, in this cohort, those without secondary-education equivalent did not have significantly more children than those with vocational education. This result is consistent with a substantial lowering of fertility rates for this group who were in their late 30s in 2001.

In aggregate data, changes in the distribution of births across age groups suggest that timing effects are important. The following ratio is of use in assessing timing effects in aggregate data:

$$\frac{LBR_{it}}{LBR_t} \tag{3}$$

where i denotes the age group $i \in (< 20, 20-24, 25-29, 30-34, \geq 35)$, and t denotes the year[8]. Changes in this ratio allow quantification of the importance of timing effects at the aggregate level. Figure XI plots this ratio for Russia in the 1990s. In the figure, the upper line represents the 20-24 age group, the second the 25-29 age group, the third the 30-34 age group, the fourth the under-20 age group and the fifth the 35 plus age group.

[8]The general live birth rate per thousand women in the population, LBR_t may be obtained by dividing the crude birth rate (CBR) in a given year by the fraction of females in the population.

Looking at the oldest two age groups, the 30-34 (third line) and 35 plus (5th line) can provide information on whether births are being 'caught up' in later years. However, birth of these groups account for virtually the same fraction of all births in 2000 as in 1989. I interpret this as evidence against the idea that the decline in the TFR is primarily due to postponement. The major effects on the crude birth rate and the TFR which have been found for this period are due to generalised changes occurring across population groups, and not simply to tempo effects.

VII Evidence from the 1994-2001 RLMS Panel

The goal of this section is to investigate the relationship between economic conditions and the probability that a woman of childbearing age in Russia will give birth. I use the 1994-2001 RLMS panel to estimate the probability of having a child in a year, conditional on her economic situation in the previous year. I include continuously married women aged 23-33 at the time of the 1994 RLMS interview[9]. The panel is a balanced one, thus individuals who drop out of the sample are excluded. In focusing on a sample of already-married individuals who have completed their education, I also abstract from marriage market and educational attainment effects on fertility in transition. The analysis is specific to fertility processes *within* marriage.

[9]Individuals and their partners are excluded if sterilised.

Given that marriage and births are highly associated with household and geographical changes, this sample is less likely to suffer from attrition than the full RLMS sample. A total of 197 individuals are included in the estimation sample. A formal analysis of the potential implications of attrition for the estimation results is presented in Appendix A.

Prior to presenting the model estimates, it is of interest to look at some descriptive statistics about individuals and their mothers. Table V shows the characteristics of mothers of all children born in the RLMS in the 1994-2001 period. Row *iii* of Table V confirms that those with the least education have the most children: While 18% of the population has secondary education or less, 27% of the births in this period were to this group. Row *iv* shows that only 68% of children were born to married parents. A majority of children were born to mothers in the 20-24 age group (row *xiv* of Table V).

It is also of interest to know what fraction of women in the 23-33 age group have children in a year. Table VI presents this information, by income and education, for both married and unmarried individuals. I present results both conditional and unconditional on existing numbers of children.

What is striking in this Table is that, within income quartiles, it is generally true that those with higher education have higher propensities to have a child in the year following an interview than those with vocational education. This suggests a contrasts with the preceeding cohorts regarding the education-completed fertility relation across cohorts.

Tables VII and VIII present summary statistics for the estimation sample (restricted to continuously-married women) for 1994 and 2000. Table VII shows that a large majority of women are working in both years.

Employment and unemployment rates appear to have varied substantially over the period within education groups. These statistics are important because they will be used as measures of income uncertainty in the estimation to follow. The mean regional employment rate rose by 7% for those with secondary or less education, and by 10% for those with vocational education. However, it fell by 12% for those with higher education. Mean regional unemployment also rose the most for the higher-educated.

Table VIII shows household income means over the period. Household incomes fell substantially. The biggest losers were those with secondary education or less, who experienced a 36% real income fall over those 6 years. For other education groups, significant falls on the order of 10-15% were observed.

In addition to region and education-specific measures of the strength of labour markets, derived from the full RLMS sample, I have constructed measures of personal income insecurity in the following way. I count the number of spells of unemployment, wage arrears, and unpaid leave experienced by an individual and her spouse, respectively, in the 1994-1998 period. The means of these are presented in Table IX. This table shows that wage arrears and unemployment were far more important problems facing households than unpaid leave. On average a couple experiences 2.2

wage arrear spells in the period and 0.42 unemployment spells.

In the estimation sample, 47.2% have completed higher education (either university or technical/medical college equivalent), 38.2% have completed vocational education (PTU, with or without secondary school, or professional trades courses), and only 14.7% have less than this education at the 1994 interview.

I estimate random effects logit models with Gauss-Hermite quadrature approximation ($Q = 14$) for the probability of giving birth in the 12 months following a RLMS interview. This specification is used in order to avoid potential endogeneity between a couple's current income and the presence of a new child.

Random effects are preferable to fixed effects (conditional) logit models in this context. In fixed effects specifications, all women who do not experience a birth during the time period are excluded from the fixed effects estimation sample, resulting in biased and inconsistent estimates.

Formally, the model can be expressed as follows:

$$\mathrm{y}^*_{irt} = \alpha + \beta \mathbf{X_{irt}} + \gamma \mathbf{Z_{rt}} + \delta \mathbf{K_{rt}} + u_i + \epsilon_{irt} \tag{4}$$

Let y^*_{irt} denote the latent propensity of woman i to bear a child at time t. Here r refers to the individual's site of residence, X_{it} are individual-specific characteristics including a quadratic in age, number of children, education level, employment status at interview date[10], and a quadratic in real (June

[10]Individuals are considered to be employed if on maternity leave.

1992) household income. In Z_{rt} I include site-specific information on the mean level of *received* child benefits, and information on the availability of private or state nurseries in the community. The matrix K_{rt} reflects the local labour market situation (unemployment rate, unpaid leave frequency, employment rates, wage arrear frequencies).

This individual-specific, time-invariant unobserved heterogeneity term is u_i $\Theta(0, \sigma_u^2)$, where u_i is independent of ϵ_{irt} for all i, r, and t. Here ϵ_{irt} refers to a random error term, which is assumed to vary both between individuals and over time. For more on random effects models, the reader is referred to Greene (1996).

Note that the individual-specific, time invariant random effect u_i can be thought of as including fecundity. While some component of fecundity is age-driven, the medical literature suggests that the majority of variation in fecundity is not age-dependent until the mid 30s. In any case, age dependency in fecundity will be picked up in the age controls included in the X_{it} matrix.

In computing the household income variable used in the analysis, income from the sale of livestock, jewellery, property, and currency is excluded. Also excluded is income from picking mushrooms and berries. Income data is deflated to June 1992 levels.

The results of the random effects panel data estimation, presented in Table X, show a robust relationship between real household income and the probability of giving birth in a year. Changes in household income

can account for about a 28% decline in the probability of married couples having a child in this era[11] in the sample. Educational attainment appears to be an important determinant of giving birth, with vocationally-educated women far less likely to give birth than either their more or less-educated counterparts.

Real child benefits in an individual's region of residence do not appear to be related to the birth decisions amongst married couples. Variables reflecting the availability of state nurseries and preschools in the site in each year are generally not significant. Moreover, current labour force participation (which reflects the opportunity cost to a women of time spent at home versus the market) is not a significant factor in birth propensities. Note that these child benefits are small sums in comparison with income levels. In 1994 they amounted to 70% of the minimum wage, when received.

Coefficients of the constructed measures of income uncertainty are generally insignificant, with the exception of the regional education-specific employment rate. Stronger employment rates are associated with less childbearing. This result does not support simple predictions regarding consumption behaviour under uncertainty. These personal insecurity measures may not have been good labour market proxies for income insecurity. Unfortunately, the RLMS does not ask respondents for their entire work histories between interviews, nor does it ask for industry of work. As such, only a limited set of insecurity measures may be constructed.

[11] I calculate $(e^{0.21} - 1) * (\Delta_{1994,2000} \bar{income})$

VIII Conclusions

In this paper I have made use of longitudinal microdata to examine the economic causes of the post-1991 fertility decline in Russia. I have used information from the 1994-2001 RLMS to examine the relationship between fertility and income, education, female labour force participation, state support for children, and child care availability. The results broadly support the theoretical arguments first put forward by Becker in the 1960s. To my knowledge, this is the first study to use household panel data to examine the fertiity decline in any of the former communist countries in Eastern Europe.

One of the most striking findings of the panel data analysis is that the relationship between educational attainment and fertility seems to have changed dramatically from the Soviet to the post-Soviet era. Whereas women with university education had fewer children than those with less education throughout Soviet history, it now appears that married women with higher education have greater fertility than their vocationally-educated counterparts. This finding is likely related to changes in preferences for children versus material goods which tend to be common across education groups. As well, it is most likely related to changes in the factor prices of producing 'quality' in children, which would have had the largest effect on groups with stronger preferences for quality relative to quantity of children.

In post-Soviet Russia, female labour force participation does not appear

to be an important determinant of fertility behaviour amongst married couples. This finding contrasts strikingly with a large literature relating these two phenomena and deserves further investigation. Changes in the availability of childcare, as reflected in the availability of state preschools and nurseries in communities, do not appear to have substantive effects on the propensity of individuals to have children. Neither do child benefit levels appear to be important determinants of childbearing.

The analysis of birth propensities amongst married women does not suggest that labour market uncertainties are strongly associated with the birth rate declines in Russia in the 1990s. One potential line of reconciliation is that labour market changes operate primarily through marriage markets, and so do not surface in the analysis using the continuously-married sample. Unfortunately, the RLMS is not a survey with which an analysis of changes in marital patterns can be pursued, due to the fact that households which move or dissolve are not followed.

The RLMS data clearly show that changes in the timing of births have occurred in the 1990s. While it is impossible to know whether or not the completed birth rate for those aged 20 in 1991 will attain the levels of previous cohorts, the data available suggests that this will likely not be the case. The random effects analysis using the RLMS 1994-2001 panel strongly suggests that a recovery in real incomes will be an important factor in any recovery in fertility levels.

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Table I: Mean Total Fertility Rates (TFR), by region, 1970-1998

year	CEE	Balkans	SEE	Baltics	West FSU	Caucasus	C.Asia
1970	2.5	2.2	2.8	2.2	2.1	3.6	4.7
1980	2.1	2.1	2.4	2.0	1.9	2.7	4.0
1989	1.7	1.8	2.2	2.0	2.0	2.5	3.7
1998	1.4	1.5	1.4	1.2	1.2	1.6	2.5

Source: author's calculations using UNICEF/TRANSMONEE 2000 database.
Note: regional TFRs weighted by population size. The Total Fertility Rate (TFR) is the expected number of children that a female will have in her lifetime. The calculation of the TFR is described in Bryant, Bongaarts, and Rendall (1998). Subregions are (i.) CEE: Czech R., Hungary, Poland, Slovakia; (ii.) Balkans (note: Data is missing for FYR Yugoslavia and Bosnia–Herzegovina): Croatia, FYR Macedonia, Slovenia;(iii.) SEE: Albania, Bulgaria, Romania; (iv.) Baltics: Estonia, Latvia, Lithuania;(v.) West FSU: Belarus, Moldova, Russia, Ukraine; (vi.) Caucasus: Armenia, Azerbaijan, Georgia; (vii.) C. Asia: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan.

Table II: Labour force participation by country, percentages

	males			females		
	E	U	N	E	U	N
Eastern European Countries						
Russia, 1992 (RLMS)	93.3	4.4	2.3	87.8	5.1	7.1
Russia, 1995 (RLMS)	86.4	6.7	6.9	81.3	6.3	12.4
Russia, 1998 (RLMS)	79.3	10.4	10.3	77.2	8.6	14.2
Russia, 2000 (RLMS)	76.0	10.0	14.1	71.7	8.7	19.7
Czech Republic, 1994	96.6	2.6	.8	89.4	3.9	6.7
Slovakia, 1997	88.6	10.7	0.7	77.0	11.3	11.7
Poland, 1994	77.8	9.3	12.9	66.7	10.7	22.7
Slovenia, 1994	89.1	7.2	3.7	83.6	5.7	10.7
Hungary, 1993	79.8	12.8	7.4	76.7	8.0	15.3
Western European Countries and USA						
Spain, 1993	81.5	14.5	4.0	39.0	13.9	47.2
Sweden, 1990	94.8	.9	4.2	98.1	1.0	.9
USA, 1990	91.7	3.3	5.0	72.7	3.0	24.3
UK, 1989	89.6	6.3	4.1	68.7	4.8	26.6
France, 1997	86.9	7.8	5.3	68.8	8.9	22.4

Source: author's calculations using national labour force surveys and household panel surveys. Individuals aged 23-country-specific retirement are included. E=employed, U=unemployed, N=non-participant.

Table III: Completed fertility amongst 1936-61 cohorts, 2001.IV

dependent variable: no. of births (completed fertility)				
specification	negative binomial	poisson	zero-inflated negative binomial	zero-inflated poisson
Higher ed.[a]	-0.1768 **	-0.1768 **	-0.1870 **	-0.1870 **
	(0.043)	(0.043)	(0.047)	(0.047)
incomplete sec.[a]	0.1414 **	0.1414 **	0.1454 **	0.1454 **
	(0.047)	(0.047)	(0.051)	(0.051)
born 1936-41[b]	0.0200	0.0200	0.0235	0.0235
	(0.052)	(0.052)	(0.057)	(0.057)
born 1941-46[b]	0.0473	0.0473	0.0699	0.0699
	(0.062)	(0.062)	(0.067)	(0.067)
born 1946-51[b]	0.0090	0.0090	0.0065	0.0065
	(0.054)	(0.054)	(0.058)	(0.058)
born 1956-61[b]	0.1293 **	0.1293 **	0.1240 **	0.1240 **
	(0.057)	(0.057)	(0.059)	(0.059)
constant	0.7295 **	0.7295 **	0.7431 **	0.7431 **
	(0.048)	(0.048)	(0.053)	(0.053)
α (negative binomial)	0.0000		0.0000	
inflation factor				
never married			18.4079	21.1509
	.		(1900.997)	(7500.161)
constant			-22.0759	-24.8210
			(1900.995)	(7500.161)
Prob> χ^2	0.0000	0.0000	0.0000	0.0000
Log likelihood	-2488.7858	-2488.7858	-2128.772	-2128.772
No. obs	1723	1723	1723	1723
LR Test α= 0	0.0000		0.0000	

Source: author's calculations using the RLMS 1994-2001.
Notes:
[a] Reference education category is vocational education completion.
[b] Reference cohort is those born 1951-56.
** significant at 5% level, * significant at 10% level.
Standard errors in parentheses.
1994.IV individual sample weights are used.

Table IV: Poisson Regressions: Completed fertility as a function of exposure to the market, 2001.IV

dependent variable: no. of births (completed fertility), women 40-55 in 2001.IV				
	Full sample	Higher ed.	Vocational ed.	Incomplete Secondary
Higher ed.[a]	-0.1515 **			
	(0.053)			
Incomplete sec.[a]	0.0691			
	(0.068)			
exposure to transition	0.0339	0.0285	0.0341	0.0449
	(0.023)	(0.034)	(0.041)	(0.053)
exposure to transition ^{2}	-0.0031	-0.0027	-0.0038	-0.0029
	(0.003)	(0.004)	(0.004)	(0.006)
constant	0.7393 **	0.5954 **	0.7550 **	0.7697 **
	(0.053)	(0.050)	(0.071)	(0.081)
log likelihood	-1400.099	-745.412	-404.245	-249.974
Prob.$> \chi^2$	0.001	0.673	0.697	0.412
Chow LR $\chi^2(2)$	1.78 (accept)			
No. obs	1008	562	282	164

Source: author's calculations using the RLMS 1994-2001.
Notes:
[a] Reference education category is vocational education completion.
** significant at 5% level, * significant at 10% level.
Standard errors in parentheses.
1994.IV individual sample weights are used.

Table V: Characteristics of mothers of children born between 1994.IV and 2001.IV in RLMS

higher education	0.4411
	(0.017)
vocational education	0.2855
	(0.016)
secondary or less	0.2734
	(0.016)
married	0.6792
	(0.016)
higher education, married	0.4794
	(0.021)
vocational education, married	0.2629
	(0.018)
secondary or less, married	0.2576
	(0.018)
real household income[a] if married	73.6258
	(3.38)
real household income[a] if not married	74.107
	(5.64)
mean age	25.658
	(0.448)
fraction age<20	0.1221
	(0.011)
fraction age 20-24	0.3468
	(0.017)
fraction age 25-29	0.2100
	(0.014)
fraction age 30-34	0.0977
	(0.010)
fraction age 35-39	0.0720
	(0.009)

Source: author's calculations using the RLMS 1994-2001.

Notes:

[a] Income from the sale of livestock, jewelery, property, and currency is excluded. Income from picking mushrooms and berries is also excluded. Hundreds of rubles at June 1992 value.

Standard errors in parentheses.
1994.IV individual sample weights are used.

Table VI: Fraction of women having child in year, 1994.IV and 2001.IV RLMS

	Married and unmarried women						Married women					
no. children	all		no children		one child		all		no children		one child	
	1994	2000	1994	2000	1994	2000	1994	2000	1994	2000	1994	2000
higher education	0.0351	0.0158	0.0623	0.0159	0.0446	0.0089	0.0552	0.0152	0.1810	0.0523	0.0864	0.0113
	(0.008)	(0.004)	(0.022)	(0.008)	(0.014)	(0.006)	(0.012)	(0.005)	(0.062)	(0.027)	(0.029)	(0.008)
vocational education	0.0226	0.0105	0.0806	0.0120	0.0230	0.0050	0.0256	0.0120	0.1323	0.0134	0.0305	0.0000
	(0.007)	(0.004)	(0.031)	(0.007)	(0.016)	(0.005)	(0.010)	(0.005)	(0.071)	(0.014)	(0.021)	(0.000)
secondary or less	0.0460	0.0198	0.0487	0.0144	0.0720	0.0444	0.0754	0.0083	0.2610	0.0399	0.0776	0.0000
	(0.011)	(0.004)	(0.017)	(0.006)	(0.031)	(0.016)	(0.022)	(0.006)	(0.101)	(0.045)	(0.043)	(0.000)
real hh income quartile 1	0.0324	0.0129	0.0710	0.0221	0.0402	0.0056	0.0571	0.0133	0.2165	0.0786	0.0582	0.0100
	(0.009)	(0.004)	(0.028)	(0.011)	(0.020)	(0.006)	(0.017)	(0.007)	(0.078)	(0.059)	(0.033)	(0.011)
real hh income quartile 2	0.0321	0.0135	0.0573	0.0040	0.0527	0.0000	0.0376	0.0082	0.1507	0.0000	0.0601	0.0000
	(0.010)	(0.005)	(0.025)	(0.005)	(0.029)	(0.000)	(0.014)	(0.006)	(0.080)	(0.000)	(0.040)	(0.000)
real hh income quartile 3	0.0321	0.0141	0.0371	0.0081	0.0572	0.0099	0.0503	0.0166	0.2335	0.0413	0.0781	0.0000
	(0.010)	(0.005)	(0.025)	(0.006)	(0.028)	(0.009)	(0.017)	(0.008)	(0.150)	(0.031)	(0.037)	(0.000)
real hh income quartile 4	0.0387	0.0215	0.0669	0.0326	0.0505	0.0272	0.0416	0.0137	0.1324	0.0409	0.0697	0.0129
	(0.010)	(0.006)	(0.024)	(0.014)	(0.022)	(0.014)	(0.014)	(0.007)	(0.071)	(0.030)	(0.033)	(0.013)
Quartile 1, higher ed.	0.0344	0.0105	0.0554	0.0225	0.0592	0.0119	0.0642	0.0138	0.1973	0.0807	0.1129	0.0233
	(0.017)	(0.007)	(0.037)	(0.023)	(0.042)	(0.014)	(0.030)	(0.010)	(0.126)	(0.082)	(0.079)	(0.027)
Quartile 1, vocational ed.	0.0239	0.0000	0.0844	0.0000	0.0291	0.0000	0.0482	0.0000	0.1451	0.0000	0.0579	0.0000
	(0.013)	(0.000)	(0.084)	(0.000)	(0.028)	(0.000)	(0.026)	(0.000)	(0.144)	(0.000)	(0.055)	(0.000)
Quartile 1, less than sec.	0.0422	0.0227	0.0848	0.0298	0.0347	0.0000	0.0609	0.0363	0.2792	1.0000	0.0000	0.0000
	(0.021)	(0.009)	(0.047)	(0.017)	(0.036)	(0.000)	(0.033)	(0.028)	(0.142)	(-)	(0.000)	(0.000)
Quartile 2, higher ed.	0.0449	0.0167	0.0715	0.0000	0.0680	0.0000	0.0660	0.0093	0.1746	0.0000	0.1230	0.0000
	(0.019)	(0.009)	(0.049)	(0.000)	(0.045)	(0.000)	(0.027)	(0.009)	(0.114)	(0.000)	(0.080)	(0.000)
Quartile 2, vocational ed.	0.0174	0.0103	0.0694	0.0000	0.0000	0.0000	0.0161	0.0193	0.1468	0.0000	0.0000	0.0000
	(0.012)	(0.007)	(0.048)	(0.000)	(0.000)	(0.000)	(0.015)	(0.013)	(0.144)	(0.000)	(0.000)	(0.000)
Quartile 2, less than sec.	0.0345	0.0153	0.0334	0.0079	0.0748	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.023)	(0.008)	(0.033)	(0.009)	(0.073)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Quartile 3, higher ed.	0.0529	0.0164	0.0620	0.0134	0.0874	0.0000	0.0715	0.0154	0.1781	0.0427	0.1225	0.0000
	(0.019)	(0.008)	(0.058)	(0.015)	(0.048)	(0.000)	(0.028)	(0.011)	(0.171)	(0.048)	(0.067)	(0.000)
Quartile 3, vocational ed.	0.0000	0.0112	0.0000	0.0156	0.0000	0.0000	0.0000	0.0225	0.0000	0.0392	0.0000	0.0000
	(0.000)	(0.008)	(0.000)	(0.016)	(0.000)	(0.000)	(0.000)	(0.016)	(-)	(0.041)	(0.000)	(0.000)
Quartile 3, less than sec.	0.0346	0.0123	0.0394	0.0000	0.0563	0.0384	0.1063	0.0000	0.5121	0.0000	0.0987	0.0000
	(0.023)	(0.007)	(0.039)	(0.000)	(0.054)	(0.034)	(0.069)	(0.000)	(0.500)	(0.000)	(0.094)	(0.000)
Quartile 4, higher ed.	0.0187	0.0232	0.0487	0.0333	0.0282	0.0254	0.0207	0.0243	0.1021	0.0901	0.0325	0.0220
	(0.010)	(0.009)	(0.048)	(0.025)	(0.019)	(0.019)	(0.014)	(0.013)	(0.101)	(0.066)	(0.031)	(0.022)
Quartile 4, vocational ed.	0.0560	0.0137	0.1703	0.0364	0.0502	0.0000	0.0370	0.0000	0.1259	0.0000	0.0502	0.0000
	(0.026)	(0.008)	(0.089)	(0.027)	(0.049)	(0.000)	(0.025)	(0.000)	(0.117)	(0.000)	(0.049)	(0.000)
Quartile 4, less than sec.	0.0575	0.0216	0.0445	0.0258	0.2784	0.0570	0.1015	0.0000	0.2044	0.0000	0.3276	0.0000
	(0.023)	(0.009)	(0.025)	(0.018)	(0.183)	(0.038)	(0.048)	(0.000)	(0.202)	(0.000)	(0.210)	(0.000)

Source: author's calculations using the RLMS 1994-2001.
Notes: Income quartiles refer to respective years. Income from the sale of livestock, jewelery, property, and currency is excluded. Income from picking mushrooms and berries is also excluded. Hundreds of rubles at June 1992 value.
Standard errors in parentheses.
1994.IV individual sample weights are used.

Table VII: Summary statistics: Continuously-married sample, 1994.IV-2001.IV

	1994	2000
Baby born between t.IV and t+1.IV	0.0473	0.0168
	(0.015)	(0.009)
total lifetime abortions	1.3375	2.1260
	(0.112)	(0.149)
number of children	1.6656	1.9496
	(0.071)	(0.0781)
currently working [a]	0.7609	0.7355
	(0.030)	(0.032)
regional employment (ed. specific) (%)	79.5031	70.7108
	(0.768)	(1.133)
regional employment (higher ed.) (%)	83.842	71.352
	(0.617)	(1.64)
regional employment (vocational ed.) (%)	60.357	70.923
	(0.880)	(2.583)
regional employment (secondary or less) (%)	63.342	70.143
	(2.690)	(0.612)
regional unemployment (ed. specific) (%)	7.0983	9.5517
	(0.291)	(0.404)
regional unemployment (higher ed.) (%)	6.406	10.143
	(0.426)	(0.612)
regional unemployment (vocational ed.) (%)	8.063	9.273
	(0.375)	(0.584)
regional unemployment (less than secondary) (%)	6.815	8.376
	(0.997)	(1.171)
regional unpaid leave (%)	0.6941	0.2038
	(0.109)	(0.042)
regional wage arrears (% experiencing)	37.5858	22.5561
	(1.040)	(0.889)
state nursery in site	0.8028	0.5538
	(0.028)	(0.036)
state preschool in site	0.9539	0.9145
	(0.015)	(0.020)
private preschool in site	0.1119	0.1980
	(0.023)	(0.028)
private nursery in site	0.0657	0.1299
	(0.018)	(0.024)
at least one nursery in site	0.8028	0.5538
	(0.028)	(0.036)
at least one preschool in site	0.9584	0.9145
	(0.014)	(0.020)
hospital in site	0.7782	0.7774
	(0.030)	(0.030)
mean child benefits in region	162.5996	47.8441
	(3.115)	(4.005)
No. observations	197	197

Source: author's calculations using the RLMS 1994-2001.
Notes: [a] includes maternity leave
[b]Income from the sale of livestock, jewelery, property, and currency is excluded. Income from picking mushrooms and berries is also excluded. Hundreds of rubles at June 1992 value.
[c] Expenditure on luxury goods, durables, alimonies, tuition, stocks, bonds, and loan payments is excluded. Financial gifts from relatives are also excluded. Hundreds of rubles at June 1992 value.
Standard errors in parentheses.
1994.IV individual sample weights are used.

Table VIII: Mean income by education: Continuously-married sample, 1994.IV-2001.IV

	1994	2000
real household income[a]	82.5324	69.3994
	(5.008)	(6.882)
by education		
real household income[a], higher education	90.2161	81.0146
	(8.041)	(13.177)
real household income[a], vocational education	71.1782	59.5217
	(5.325)	(5.248)
real household income[a], secondary or less education	87.1601	52.7965
	(16.598)	(9.669)
No. observations	197	197

Source: author's calculations using the RLMS 1994-2001.

Notes:

[a] Income from the sale of livestock, jewelery, property, and currency is excluded. Income from picking mushrooms and berries is also excluded. Hundreds of rubles at June 1992 value.

Standard errors in parentheses.
1994.IV individual sample weights are used.

Table IX: Labour market insecurity measures, continuously-married sample, 1994.IV-2001.IV

No. times unemployed at 1994-1998 interview	0.3441
	(0.051)
No. times spouse unemployed at 1994-1998 interview	0.0739
	(0.027)
No. times in wage arrears at 1994-1998 interview date	1.6484
	(0.102)
No. times spouse in wage arrears at 1994-1998 interview date	0.5649
	(0.083)
No. times woman or spouse unemployed at 1994-1998 interview date	0.4180
	(0.060)
No. times woman or spouse in unpaid leave at 1994-1998 interview date	0.0310
	(0.015)
No. times woman or spouse in wage arrears at 1994-1998 interview date	2.2132
	(0.140)
No. observations	197

Source: author's calculations using the RLMS 1994-2001.
Notes: ILO-style unemployment definition is used.
Standard errors in parentheses.
1994.IV individual sample weights are used.

Table X: Random effects estimation: Probability of giving birth amongst continuously-married women 1994-2001.IV

dependent variable: birth occurs in 12 months following interview													
specification	I	II	III	IV	V	VI	VII	XIII	IX	X	XI	XII	XIII
X_{it}													
currently working	-0.2606	-0.1553	-0.1689	-0.1599	-0.1632	-0.1675	-0.1660	-0.3947	-0.3890	-0.3906	-0.1267	-0.0690	-0.1153
	(0.392)	(0.398)	(0.398)	(0.398)	(0.402)	(0.402)	(0.402)	(0.440)	(0.439)	(0.440)	(0.448)	(0.448)	(0.449)
real hhld income [a]	0.0206 *	0.0220 **	0.0229 **	0.0216 *	0.0204 *	0.0221 **	0.0199 *	0.0208 *	0.0227 **	0.0202 *	0.0203 *	0.0222 *	0.0196 *
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
real hhld income^2	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Higher ed. [b]	0.9564 **	0.9301 **	0.8654 *	0.9271 **	0.9491 **	0.8625 *	0.9459 **	0.9457 **	0.8483 *	0.9422 **	1.0096 **	0.9386 **	1.0115 **
	(0.445)	(0.448)	(0.452)	(0.449)	(0.446)	(0.450)	(0.447)	(0.445)	(0.450)	(0.446)	(0.454)	(0.459)	(0.456)
secondary or less	1.2503 **	1.2325 **	1.2254 **	1.1911 **	1.2981 **	1.2661 **	1.2473 **	1.2626 **	1.2261 **	1.2060 **	1.2677 **	1.2483 **	1.2110 **
	(0.551)	(0.554)	(0.554)	(0.566)	(0.552)	(0.554)	(0.565)	(0.553)	(0.554)	(0.564)	(0.553)	(0.555)	(0.562)
age	1.7517 *	1.7570 *	1.8779 *	1.7443 *	1.7637 *	1.9534 *	1.7503 *	1.7627 *	1.9525 *	1.7504 *	1.7279 *	1.9071 *	1.7130 *
	(1.038)	(1.042)	(1.053)	(1.041)	(1.042)	(1.058)	(1.041)	(1.041)	(1.057)	(1.041)	(1.036)	(1.049)	(1.035)
age squared	-3.1930 *	-3.1633 *	-3.3537 *	-3.1407 *	-3.1934 *	-3.4873 **	-3.1697 *	-3.2059 *	-3.4951 **	-3.1836 *	-3.1549 *	-3.4263 **	-3.1282 *
	(1.730)	(1.733)	(1.752)	(1.732)	(1.733)	(1.760)	(1.732)	(1.734)	(1.761)	(1.734)	(1.725)	(1.747)	(1.724)
number of children	-0.4206 **	-0.5319 **	-0.5695 **	-0.5227 **	-0.4615 **	-0.5367 **	-0.4507 **	-0.4336 **	-0.5224 **	-0.4222 *	-0.4160 *	-0.5078 **	-0.4019 *
	(0.214)	(0.222)	(0.226)	(0.223)	(0.217)	(0.224)	(0.218)	(0.216)	(0.223)	(0.217)	(0.215)	(0.223)	(0.216)
Z_{rt}													
mean child benefits in region	-0.0035	-0.0019	-0.0017	-0.0018	-0.0025	-0.0020	-0.0024	-0.0035	-0.0027	-0.0032	-0.0036	-0.0029	-0.0033
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
state nursery in site			-0.5202			-0.6848 *			-0.7569 **	-0.3482		-0.7859 **	
			(0.410)			(0.385)			(0.377)	(0.626)		(0.381)	
state preschool in site				-0.2353			-0.2917						-0.4055
				(0.633)			(0.634)						(0.626)
local bread price	-0.0894 **	-0.0818 **	-0.0813 **	-0.0819 **	-0.0891 **	-0.0873 **	-0.0891 **	-0.0891 **	-0.0870 **	-0.0890 **	-0.0896 **	-0.0878 **	-0.0895 **
	(0.032)	(0.032)	(0.033)	(0.032)	(0.031)	(0.032)	(0.031)	(0.032)	(0.033)	(0.032)	(0.032)	(0.033)	(0.032)
rural	0.4982	0.4373	0.2234	0.3585	0.5069	0.2054	0.4078	0.4783	0.1502	0.3605	0.5602	0.2325	0.4281
	(0.382)	(0.384)	(0.419)	(0.443)	(0.383)	(0.417)	(0.446)	(0.383)	(0.415)	(0.445)	(0.395)	(0.421)	(0.453)
K_{rt}													
Ed.-specific local employment rate		-0.0238 **	-0.0185 *	-0.0235 **									
		(0.010)	(0.011)	(0.010)									
Ed.-specific local unemployment rate					0.0438	0.0350	0.0425						
					(0.029)	(0.029)	(0.029)						
No. of unemployment spells 94-98								-0.1853	-0.1960	-0.1767			
								(0.296)	(0.295)	(0.296)			
No. of wage arrear spells 94-98											-0.0873	-0.1173	-0.0950
											(0.143)	(0.144)	(0.143)
constant	-25.6861 *	-24.6134	-26.5027 *	-24.2233	-26.5542 *	-29.0061 *	-26.0612 *	-25.7337 *	-28.2753 *	-25.2234	-25.2940 *	-27.6597 *	-24.6866
	(15.510)	(15.590)	(15.745)	(15.608)	(15.586)	(15.800)	(15.604)	(15.546)	(15.751)	(15.559)	(15.482)	(15.649)	(15.495)
Log likelihood	-145.842	-143.318	-142.525	-143.25	-144.732	-143.16	-144.628	-145.634	-143.623	-145.483	-145.654	-143.521	-145.45
prob> χ^2	0.001	0.0003	0.0005	0.0006	0.0008	0.0008	0.0012	0.0017	0.0012	0.0023	0.0018	0.0013	0.0024
ρ	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
No. obs	197 197	197	197	197	197	197	197	197	197	197	197	197	197

Source: author's calculations using the RLMS 1994-2001.
Notes:

[a] Income from the sale of livestock, jewelery, property, and currency is excluded. Income from picking mushrooms and berries is also excluded. Hundreds of rubles at June 1992 value.
[b] Reference education category is vocational education completion.

[c] Mean *received* child benefit level amongst eligible families in region in year.
[d] Mean education-specific employment rate in region in year.
[e] Mean education-specific unemployment rate in region in year.
[f] No. of times ILO-unemployed at interview date 1994-1998.
[g] No. of times in wage arrears at interview date 1994-1998.
** significant at 5% level, * significant at 10% level.
Standard errors in parentheses.
1994.IV individual sample weights are used. Married individuals aged 23-33 in 1994.IV.

Appendix A: Attrition and the RLMS

Attrition in the RLMS sample has been analysed by Heeringa (1997), with the specific purpose of assessing how representative the RLMS sample remains over time. While the RLMS made some attempt to follow individuals who moved over time within communities, this practise was not undertaken universally. No moves between communities were followed. Heeringa finds that 1994-96 attrition appears not to seriously distort the relative distribution of households by count of children or numbers of working men and women. Those who attrit appear to have slightly higher incomes than those who remain in the sample. However, Heeringa concludes that attrition effects on most economic and demographic characteristics of the observed cross-sectional samples is modest.

Residential mobility in Russia remains very low, and this is a likely a partial explanation for the observed nominal attrition effects. Andrienko and Guriev (2002) use 1990-99 panel data from the Ministry of Interior registration authorities and find that (*i.*) overall migration is very low despite large inter-regional variations in economic conditions, and (*ii.*), as expected, migration is to more dynamic regions.

Two analyses of attrition issues were undertaken prior to estimating panel data models. In Table XI I present results of a logit model which looks at the probability of attrition by 2001.IV of a 1994.IV sample of women 23-33. These estimates show clearly that marital status is strongly negatively associated with attrition. Educational attainment does not appear to be strongly related to the probability of leaving the sample by 2001.IV. Individuals who are working in 1994, and those in economically-depressed (high unemployment) regions are relatively unlikely to leave the sample. These estimates show only a minor role for number of children in determining attrition decisions.

A second analysis of attrition, presented in Table XII, looks at the probability of leaving the sample by 2001.IV conditional on having a child in the 1994-1998 period. Only two variables are consistently significant across specifications. Marital status is strongly negatively associated with leaving the sample. Stronger employment is associated with attrition while, as in Table XI, higher local unemployment is associated with staying in the sample.

Table XI: Logit Regression: Probability of attrition by 2001.IV of 1994.IV sample

dependent variable: not in sample by 2001.IV				
specification	expenditure		income	
includes:	local employment rate	local unemployment rate	local employment rate	local unemployment rate
currently working	-0.5196 **	-0.5237 **	-0.5372 **	-0.5432 **
	(0.210)	(0.210)	(0.209)	(0.209)
real hhld expenditure/income [a]	0.0000	0.0000	0.0000	0.0000
	(0.000)	(0.000)	(0.000)	(0.000)
higher ed.[b]	0.2717	0.2901	0.2772	0.2972
	(0.205)	(0.206)	(0.204)	(0.206)
incomplete sec.[b]	0.2757	0.3117	0.2680	0.3106
	(0.314)	(0.317)	(0.314)	(0.316)
age	0.0162	0.0178	0.0175	0.0186
	(0.037)	(0.037)	(0.037)	(0.037)
married	-2.2875 **	-2.2941 **	-2.3050 **	-2.3115 **
	(0.192)	(0.193)	(0.193)	(0.194)
no. children under 1.5	-0.0954	-0.0959	-0.0375	-0.0368
	(0.289)	(0.290)	(0.285)	(0.286)
no. children 1.5-6	-0.1337	-0.1237	-0.1410	-0.1312
	(0.148)	(0.148)	(0.149)	(0.149)
no. children 6-16	-0.3513	-0.3488 **	-0.3448 **	-0.3412 **
	(0.152)	(0.152)	(0.151)	(0.152)
no. of elders in hhld.	-0.6877 **	-0.7211 **	-0.7084 **	-0.7381 **
	(0.161)	(0.162)	(0.162)	(0.162)
regional employment (%)	2.1911		2.0345	
	(1.751)		(1.763)	
regional unemployment (%)		-11.9000 **		-11.3813 **
		(4.468)		(4.485)
Moscow/St. Petersburg	0.6517	0.7413	0.6151	0.7041
	(0.453)	(0.454)	(0.457)	(0.457)
North North-West	-0.7514 *	-0.5354	-0.7574 *	-0.5514
	(0.402)	(0.394)	(0.401)	(0.394)
Central Central Black Earth	-1.2543 **	-1.2813 **	-1.2628 **	-1.2901 **
	(0.352)	(0.350)	(0.352)	(0.350)
Volga Vyatski, Vyatski Basin	-1.0394 **	-1.2215 **	-1.0285 **	-1.2070 **
	(0.357)	(0.361)	(0.358)	(0.361)
North Caucus	-0.3769	-0.3728	-0.3757	-0.3717
	(0.395)	(0.388)	(0.396)	(0.388)
Urals	-0.8263 **	-0.5399	-0.8175 **	-0.5419
	(0.381)	(0.374)	(0.380)	(0.374)
Eastern Siberia	0.0361	0.0615	0.0345	0.0536
	(0.419)	(0.418)	(0.421)	(0.418)
real bread	-0.0026	0.0026	-0.0033	0.0015
	(0.017)	(0.017)	(0.017)	(0.017)
constant	-0.0729	2.3413 **	0.0003	2.2782 **
	(1.662)	(1.178)	(1.665)	(1.662)
Log likelihood	-385.8587	-383.047	-385.339	-382.740
Pr> χ^2	0.0000	0.0000	0.0000	0.0000
R^2	0.2591	0.2645	0.2601	0.2651
No. of obs	757	757	757	757

Source: author's calculations using the RLMS 1994-2001.

Notes: Sample is women aged 23-33 in 1994.IV. Attrition is 47% in the full sample by 2001.IV and 22% amongst those married in 1994.IV.

** significant at 5% level, * significant at 10% level.

Standard errors in parentheses.

[a] Expenditure on luxury goods, durables, alimonies, tuition, stocks, bonds, and loan payments is excluded. Financial gifts from relatives are also excluded. Income from the sale of livestock, jewelery, property, and currency is excluded. Income from picking mushrooms and berries is also excluded. Hundreds of rubles at June 1992 value.

[b] Reference education category is vocational education completion.

Table XII: Logit Regression: Probability of attrition by 2001.IV conditional on having child between 1994.IV and 1998.IV

dependent variable: not in sample by 2001.IV								
specification	regional employment rate	regional unemployment rate	regional employment rate	regional unemployment rate	regional employment rate	regional unemployment rate	regional employment rate	regional unemployment rate
	expenditure		income		expenditure		income	
currently working	-0.4396	-0.7229	-0.5440	-0.8438	-0.8956	-0.7219	-0.9280	-0.7487
	(0.924)	(0.932)	(0.886)	(0.889)	(0.721)	(0.687)	(0.708)	(0.667)
real hhld income/expenditure	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
higher education	0.4805	0.4127	0.4578	0.3811	0.3569	0.3215	0.2212	0.1361
	(0.952)	(0.950)	(0.943)	(0.938)	(0.838)	(0.818)	(0.802)	(0.776)
secondary or less	0.4834	0.7606	0.4024	0.6917	-0.2284	-0.3575	-0.3805	-0.5773
	(1.269)	(1.320)	(1.275)	(1.320)	(1.132)	(1.113)	(1.116)	(1.088)
age	0.2008	0.2699 *	0.2079	0.2800 *	0.1935	0.2140	0.2094	0.2242 *
	(0.151)	(0.162)	(0.153)	(0.164)	(0.132)	(0.133)	(0.135)	(0.136)
married in 1994	-2.7519 **	-3.0627 **	-2.7069 **	-3.0453 **	-1.8335 **	-1.9455 **	-1.8103**	-1.8500 **
	(1.029)	(1.137)	(1.005)	(1.129)	(0.738)	(0.759)	(0.733)	(0.734)
no. children 1-1.5 in 1994	-0.1460 0.91	-0.1973	0.0781	-0.0213	-0.8339	-1.0488	-0.5024	-0.7141
	(1.287)	(1.249)	(1.233)	(1.231)	(1.236)	(1.192)	(1.161)	(1.176)
no. children 1.5-6 in 1994	0.0360 0.956	-0.0950	-0.0221	-0.1371	-0.5230	-0.6044	-0.5938	-0.6789
	(0.648)	(0.656)	(0.661)	(0.668)	(0.613)	(0.619)	(0.624)	(0.636)
no. children 6-16 in 1994	0.7544 0.178	0.8790	0.7686	0.8806	0.5772	0.5894	0.5480	0.5304
	(0.559)	(0.611)	(0.565)	(0.621)	(0.488)	(0.493)	(0.490)	(0.495)
no. of elders in household in 1994	0.6027	0.8421	0.6448	0.8932	0.3287	0.3200	0.3222	0.2704
	(0.666)	(0.717)	(0.665)	(0.723)	(0.555)	(0.553)	(0.554)	(0.553)
mean emp./unemp.	13.9325 *	-49.5755 **	14.4941 *	-50.0510 **	7.5904	-17.5608	8.0743 *	-16.1328
	(7.947)	(21.075)	(7.877)	(20.904)	(4.841)	(13.226)	(4.849)	(13.179)
Moscow/St. Petersburg[c]	1.1633	1.7490	0.9780	1.5559				
	(1.631)	(1.632)	(1.608)	(1.613)				
North-North-West[c]	1.2921	2.8976 **	1.2742	2.9672 **				
	(1.477)	(1.458)	(1.477)	(1.454)				
Central Central Black Earth[c]	-0.9767	-0.7008	-1.2179	-0.9199				
	(1.700)	(1.774)	(1.700)	(1.755)				
Volga Vyatski, Volga Basin[c]	-0.9625	-0.7320	-1.0536	-0.8173				
	(1.438)	(1.316)	(1.441)	(1.314)				
North Caucasus 0.5991[c]	0.7772	0.5337	0.6485					
	(1.549)	(1.620)	(1.540)	(1.582)				
Urals[c]	-0.3943	1.8355	-0.3857	1.9252				
	(1.484)	(1.559)	(1.466)	(1.558)				
mean real local bread price	-0.0473	0.0180	-0.0515	0.0137	-0.0671	-0.0419	-0.0718	-0.0462
	(0.068)	(0.073)	(0.068)	(0.073)	(0.058)	(0.055)	(0.055)	
constant	-16.0326	-4.8788	-16.4329 **	-4.8750	-10.0640 *	-3.8929	-10.6136 **	-3.9590
	7.239	4.335	7.267	4.424	5.252	3.511	5.385	3.562
log likelihood	-30.3167	-28.7177	-30.4769	-28.9791	-35.331	-35.8268	-35.6309	-36.267
prob> χ^2	0.0643	0.0284	0.0695	0.0326	0.0525	0.0697	0.0624	0.099
No. obs	85	85	85	85	86	86	86	86

Source: author's calculations using the RLMS 1994-2001.

Notes: Sample is women aged 23-33 in 1994.IV who have a child between 1994.IV and 1998.IV.

** significant at 5% level, * significant at 10% level.

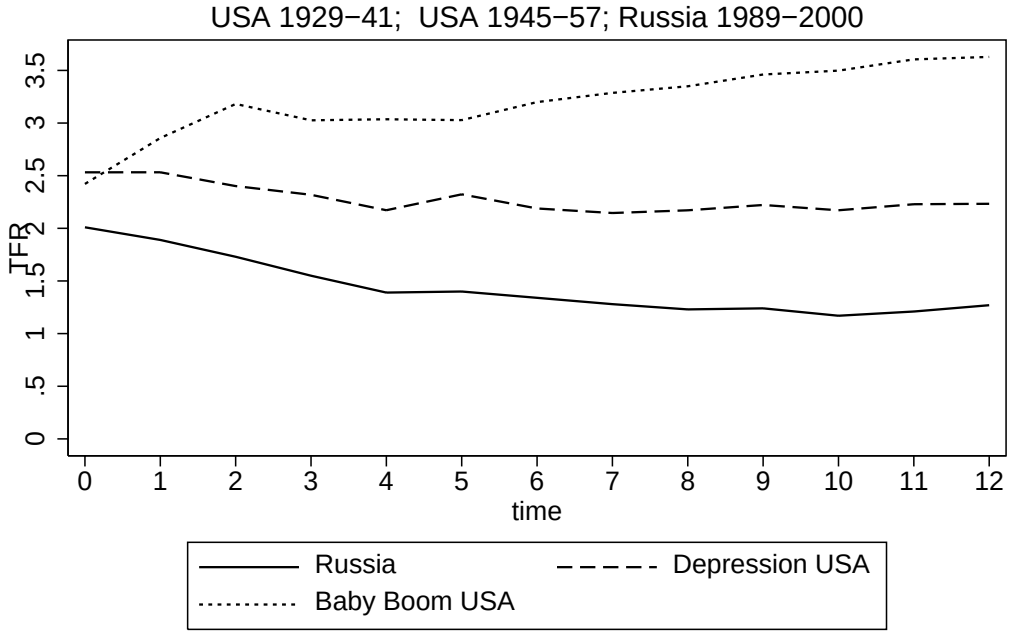
Standard errors in parentheses.

[a] Expenditure on luxury goods, durables, alimonies, tuition, stocks, bonds, and loan payments is excluded. Financial gifts from relatives are also excluded. Income from the sale of livestock, jewelery, property, and currency is excluded. Income from picking mushrooms and berries is also excluded. Hundreds of rubles at June 1992 value.

[b] Reference education category is vocational education completion.

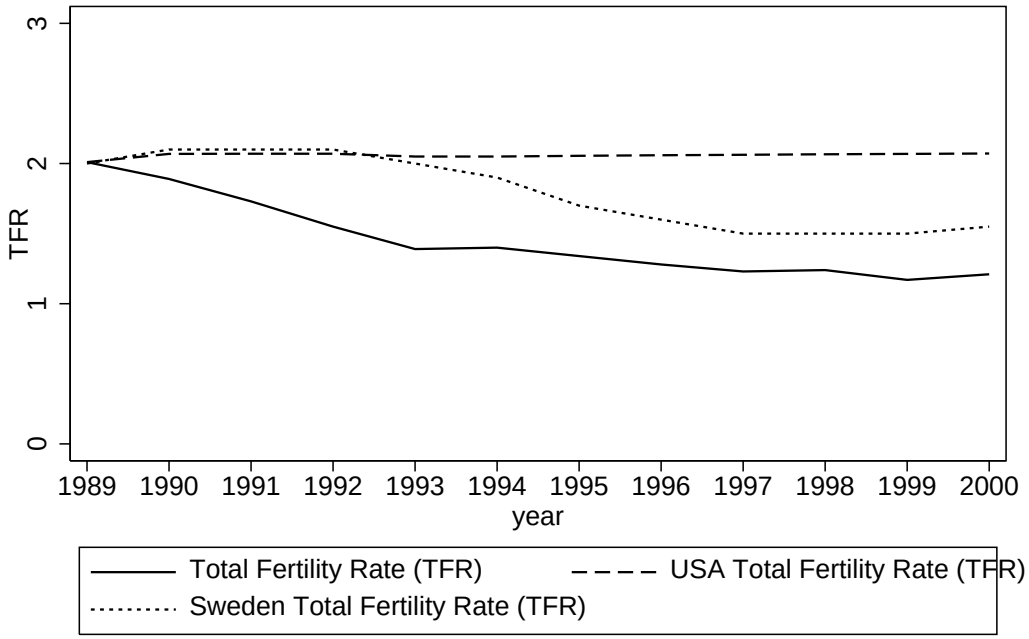
[c] Reference region is Western Siberia. Eastern Siberians all leave sample.

Figure I: The Post−Transition Fertility Decline in Historical Context



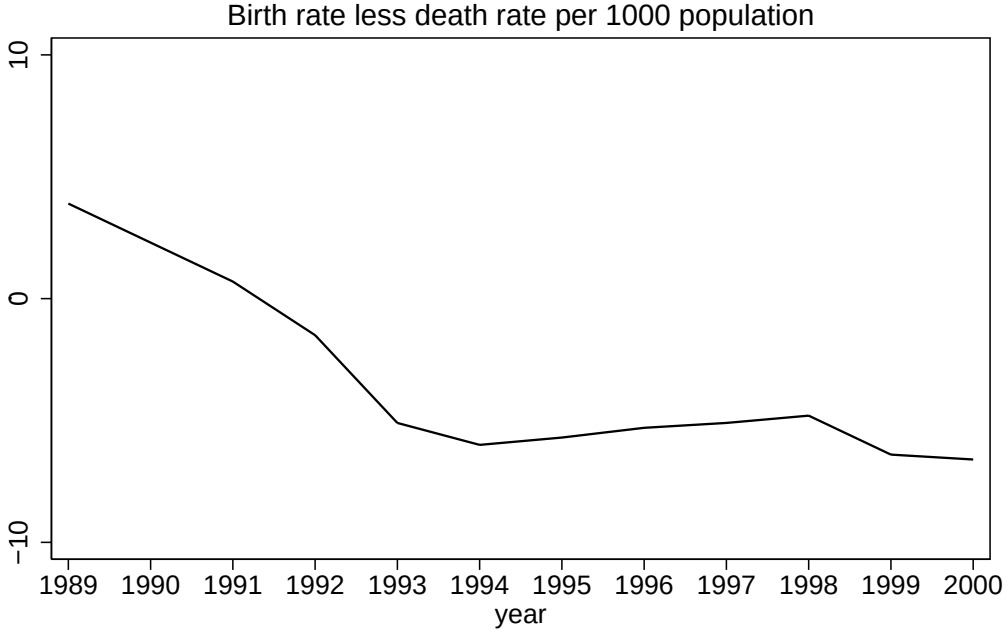
Sources: UNICEF−TRANSMONEE Database 2002 (Russia); National Center for Health Statistics(NCHS) (USA)

Figure II: An International Comparison of the TFR in the 1990s



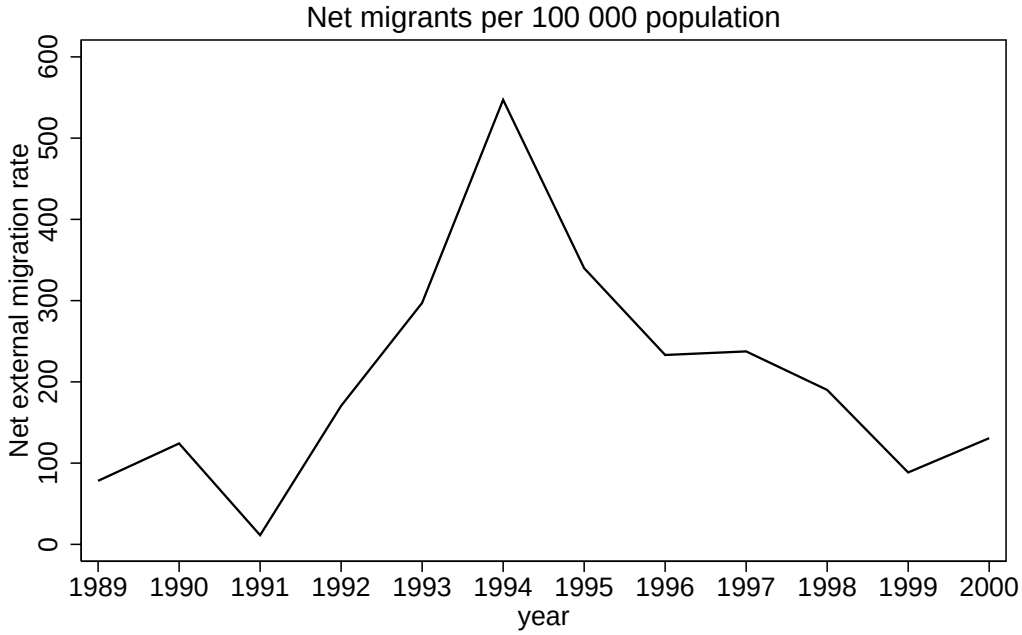
Sources: UNICEF−TRANSMONEE (Russia); WHO HFA_DB (Sweden); NCHS (USA)

Figure III(i): Rate of Natural Population Increase Russia 1989−2000



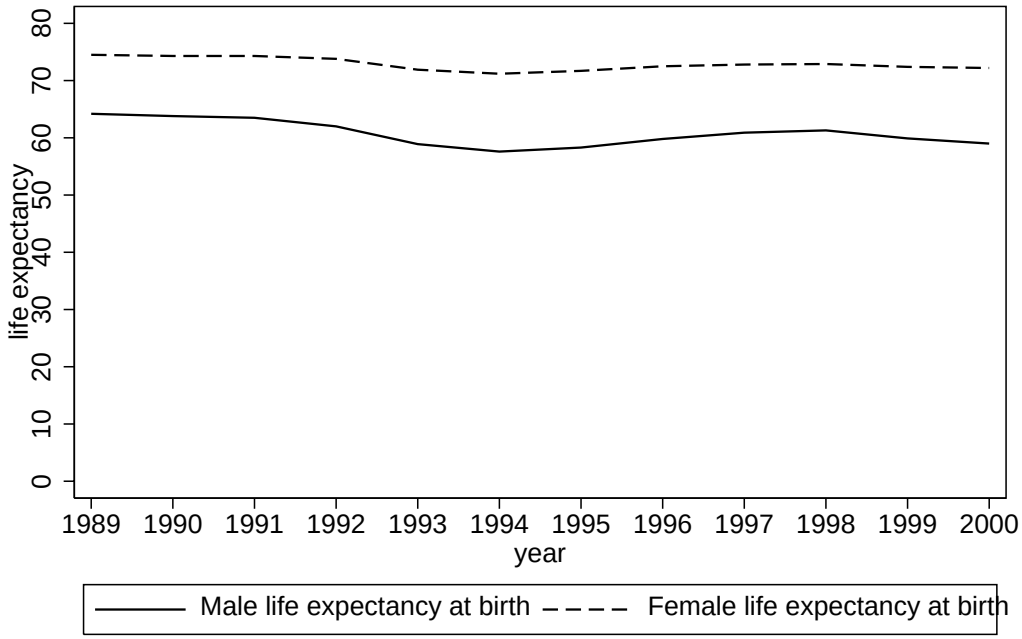
Sources: UNICEF−TRANSMONEE (Russia)

Figure III(ii): Net External Migration Russia 1989−2000



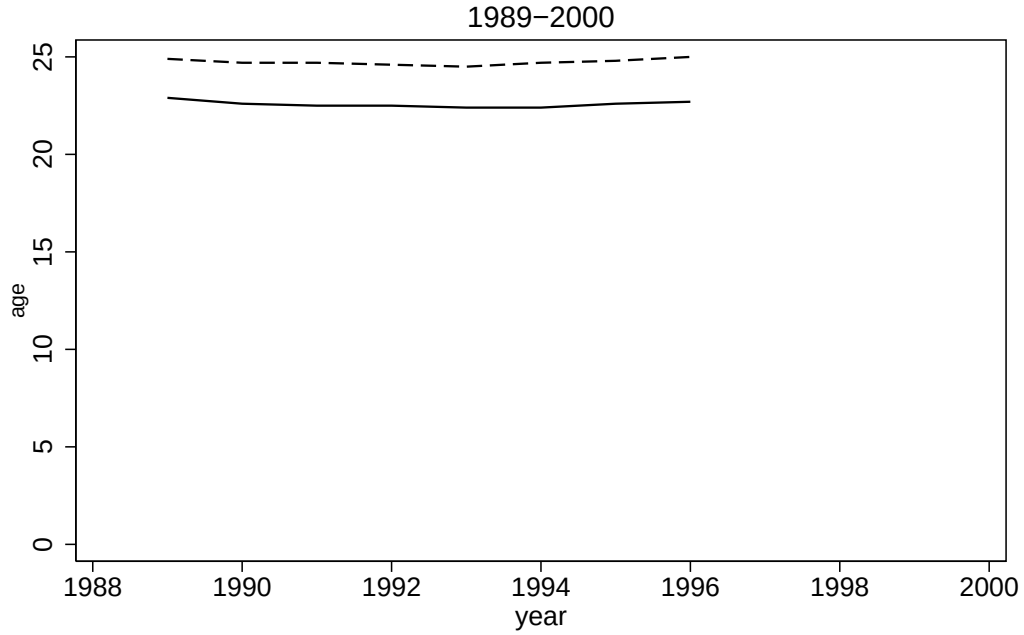
Sources: UNICEF−TRANSMONEE Database 2002

Figure IV: Life Expectancy at Birth



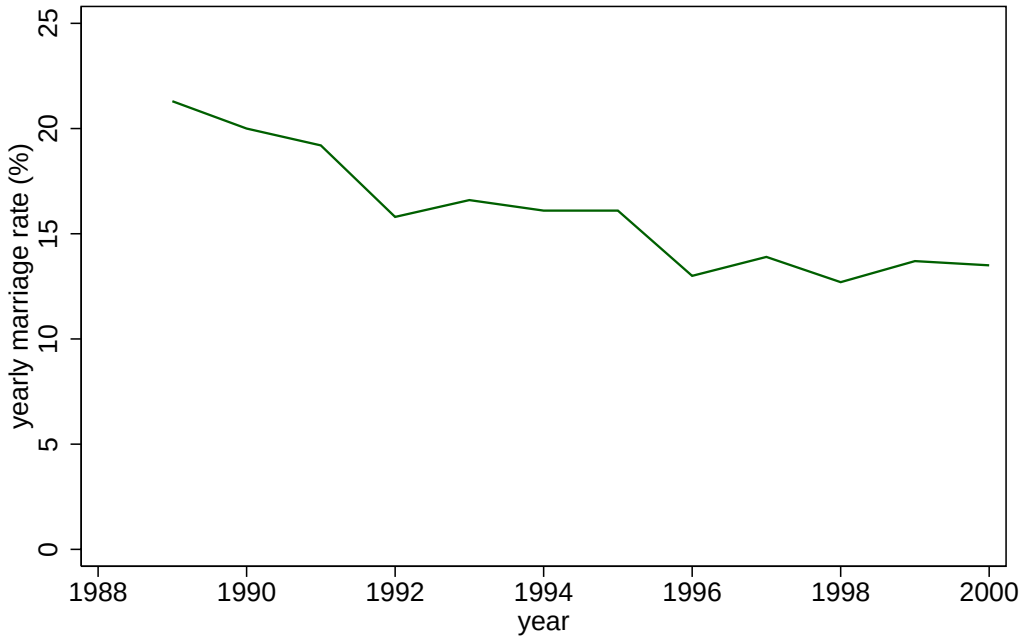
Sources: UNICEF−TRANSMONEE Database 2002

Figure V: Mean age at first marriage



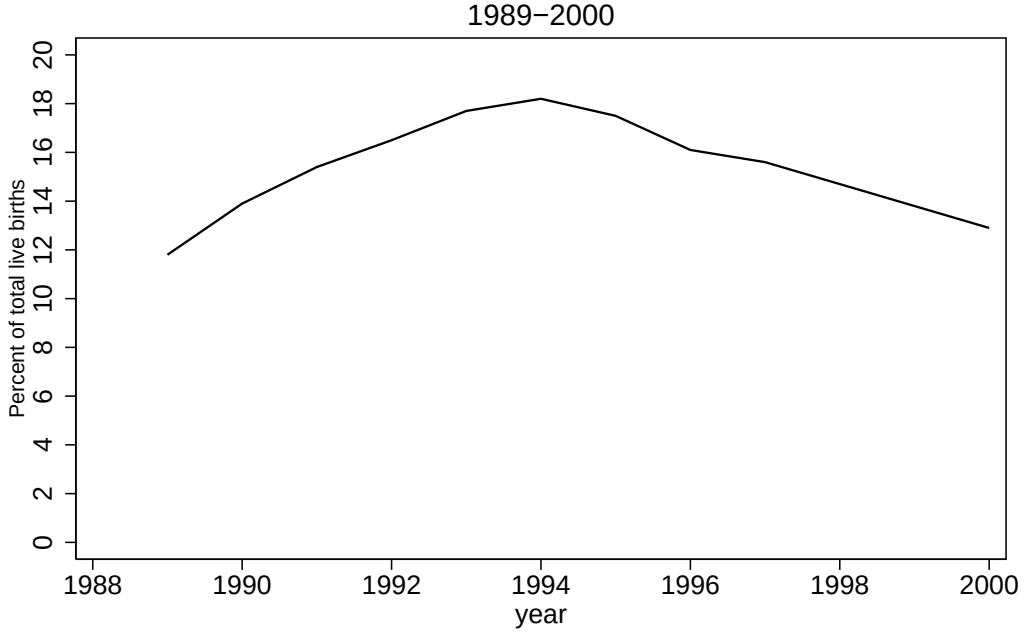
Source: UNICEF−TRANSMONEE Database 2002

Figure VI: Age−specific marriage rate aged 15−44



Source: UNICEF−TRANSMONEE Database 2002

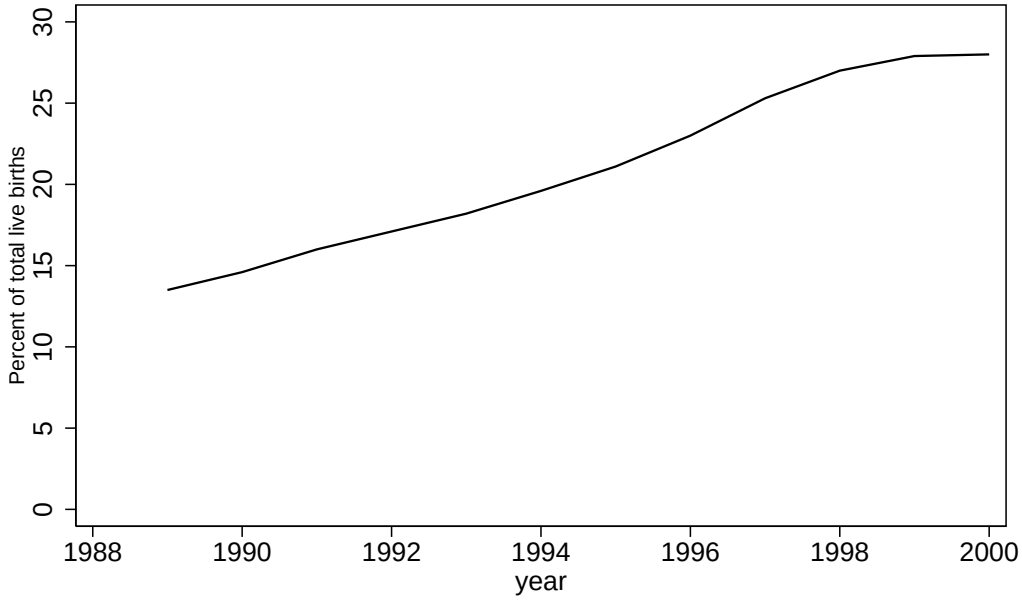
Figure VII(i): Share of births to mothers under 20



Source: UNICEF−TRANSMONEE Database 2002

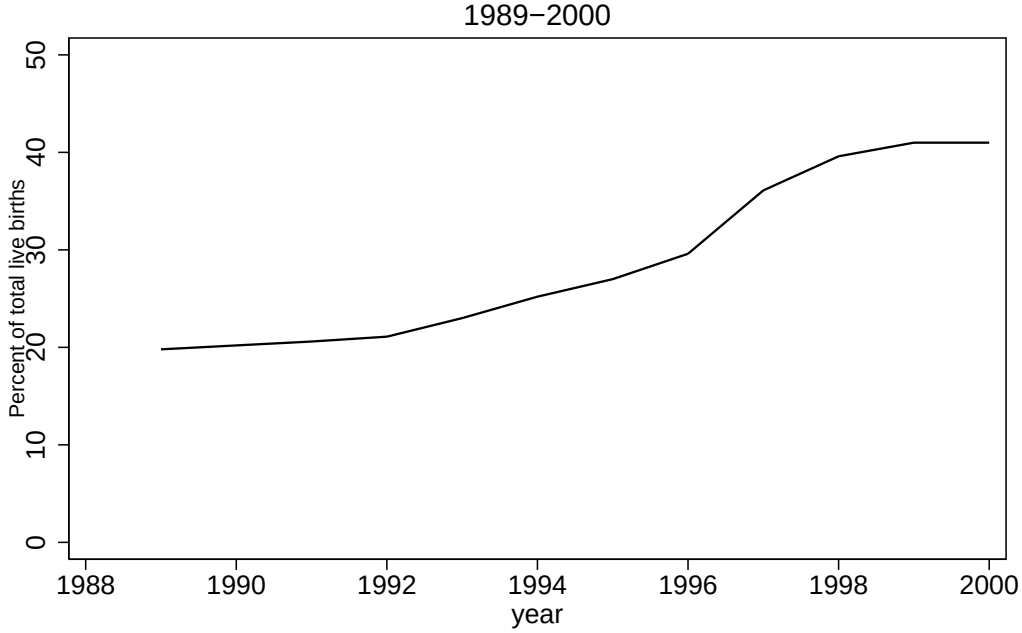
Figure VII(ii): Share of non−marital births

1989−2000



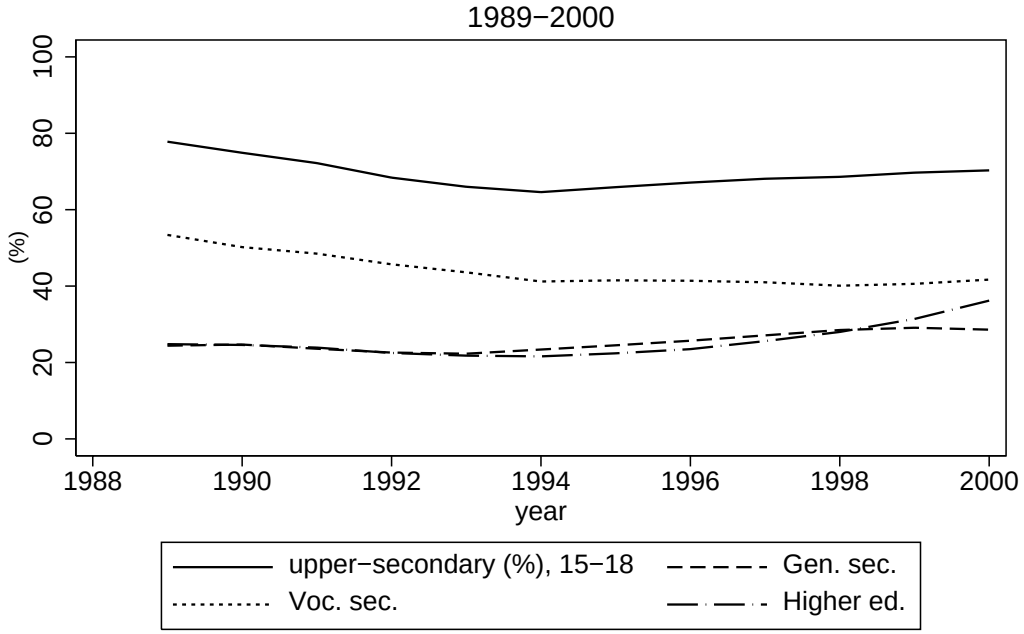
Source: UNICEF−TRANSMONEE Database 2002

Figure VII(iii): Share of non−marital births to women under 20



Source: UNICEF−TRANSMONEE Database 2002

Figure VIII: Educational Enrollment by Type



Source: UNICEF−TRANSMONEE Database 2002

Figure IX: Educational Attainment By Cohort

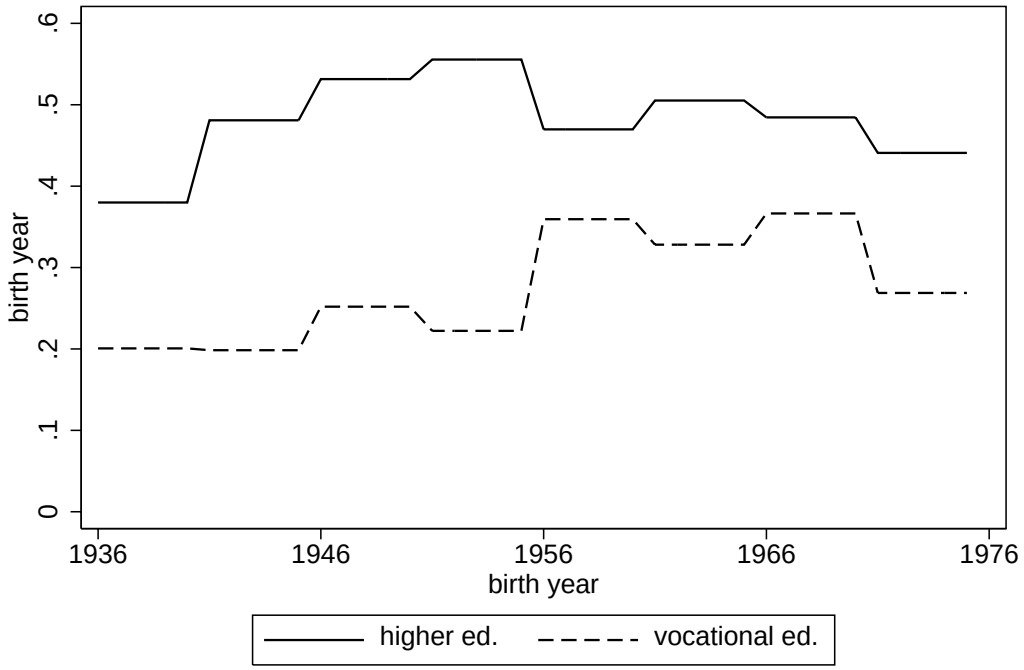
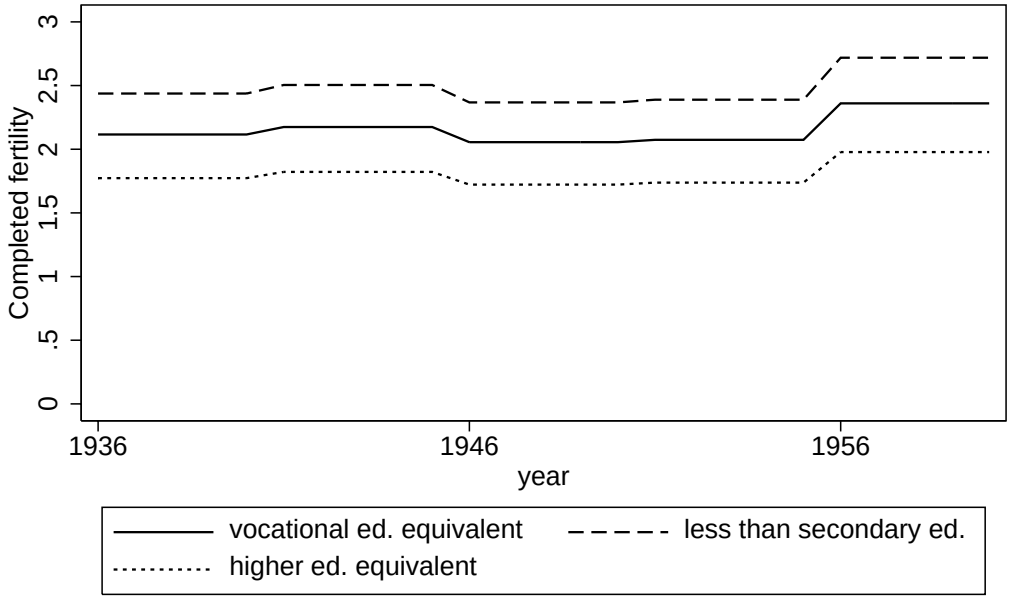


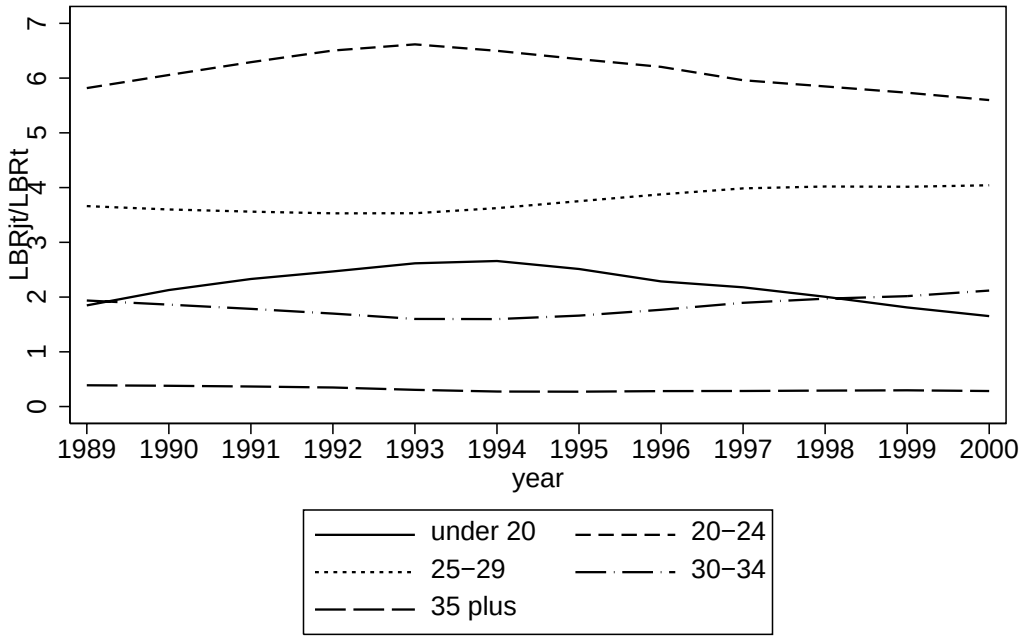
Figure X: Completed Fertility Russia 2001.IV

Restricted Poisson Model Estimates: Cohorts 1936−60



Source: Author's calculations using RLMS 1994−2001.IV

Figure XI: Birth Timing Changes in Post−Soviet Russia



Source: UNICEF−TRANSMONEE Database 2002. Note: LBRjt/LBRt is age−specific LBR deflated by LBR in year