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FERTILITY IN RUSSIA: EVIDENCES AFTER 2010 CENSUS

Data: Russian Census 2002, Russian Census 2010.

Methodology: The method of cohort analysis and method of parity-progression table is used to study parity distribution (the probability-mass function) (Barkalov 2004). The Pollard's decomposition of the Total Fertility difference to measure the impact of each parity (each parity-progression ratio) on the cohort total fertility differences (the cohorts born from before 1932 to 1971-1975) also used (Pollard 1988). The mean number of siblings and the mean birth order (composite fertility quantum indicators) are calculated for total, urban and rural population.

Introduction in study

This study is devoted to cohort fertility in Russia. The purpose of the paper is to estimate the changes in Russian cohort fertility and parity cohort fertility, in particularly, in relation to level of education, main nationality.

Some conclusions on fertility trends and features in Russia after Census 2002 (Kalabikhina, 2006)¹:

- Fertility declines in Russia practically from cohort to cohort.
- The small rise of fertility 1953-1957 cohort (and nearly ones) was connected either with the pronatalist policy of the 1980th or with returning to general fertility trend after "weak" war cohorts.
- Younger actual birth cohort demonstrates higher fertility level than period cohort that is we note the ageing of fertility in Russia.
- There is convergence in fertility level of different groups of population: urban and rural cohorts, occupied and total cohorts, cohorts on extreme levels of education, and ethnic cohorts.
- The most significantly changes in parity distribution by actual rural cohorts 1930th-1960th were in order to second parity which dominates in modern parity distribution of modern rural cohorts. Urban cohorts had domination of second parity proportion during whole investigated period.
- The younger cohorts demonstrate the increasing of proportion of the first births.
- Cohort and parity analyses show that the changes in the fertility level and parity distribution of married and total cohorts appeared synchronously.
- The occupied cohorts had differences with total cohorts mainly in the past in relation to first births and births of higher (3d, 4th, 5th) parities.
- After war cohorts of occupied women had lower childlessness level than total ones because more active reaction of the occupied women on the policy 1980th.
- We forecasted the growth of the childlessness level for younger cohorts because the changes of welfare system, and the ageing fertility in Russia.

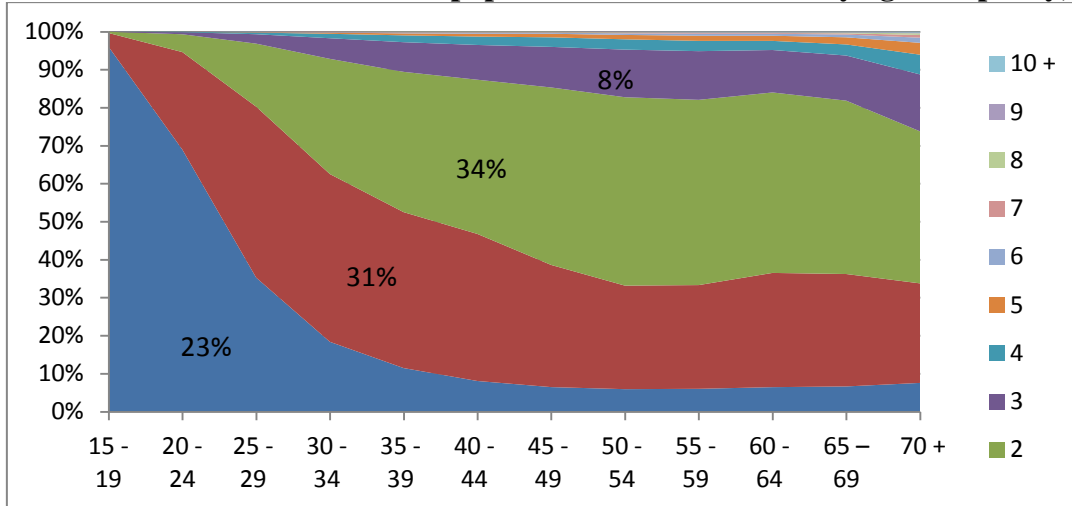
I am going to develop my work on parity analysis of Russian fertility using new Census 2010 data to estimate either fertility trends continue in Russia. Additional I present new data in Census 2010 on mean age of first birth (question "Date of birth of your first child").

¹ Some pictures and tables on 2002 see in Annex 1.

Is there new evidence from 2010 Russian census?

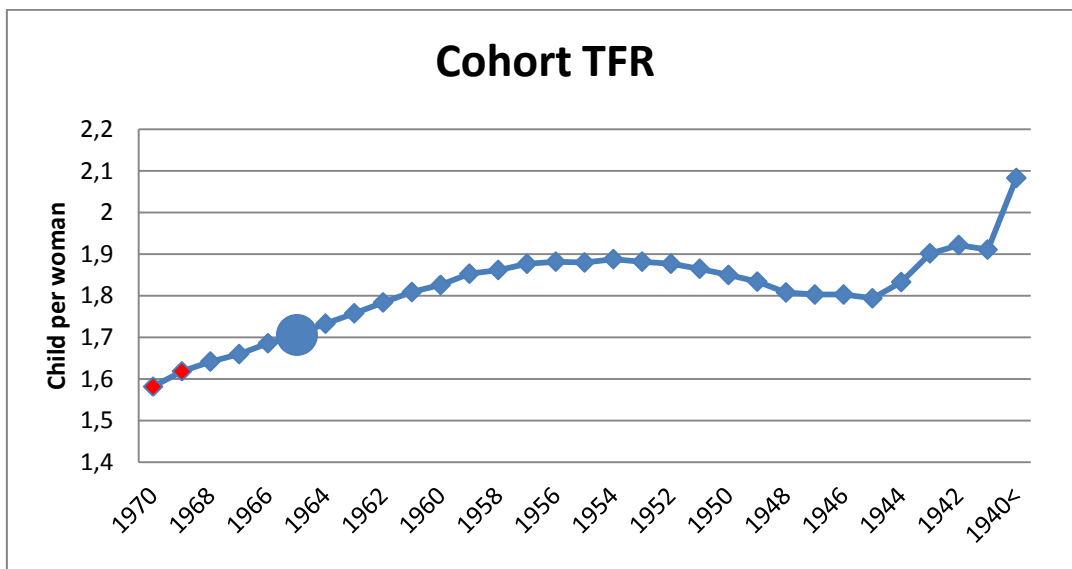
Let me start with static picture of female age-parity distribution. According to census 2010 distribution of female population in age 15 years and more by age and parity is constructed on Picture 1. Among women are over fifteen share of them who has no child is 23%, who has one child is 31%, etc. We have no some visual changes from 2002 till 2010. For example, these figures were 22 and 31 % in 2002.

Picture 1. Distribution of female population over 15 in 2010 by age and parity, census 2010



Analyzing changes in cohort fertility (we consider cohorts born from years before 1940 (women were over 70 years in 2010) to 1966-70 (women were 40-44 years in 2010)²) we faced with the same story: all tendencies of fertility – decreasing, convergence, ageing of one.

Picture 2. Cohort total fertility rates: total Russian female population, Russian census 2010



Pictures 2 and A1-1 show cohort total fertility rates of total female population.

Increasing of TFR for 1950th cohorts, probably, was connected with the pronatalist policy of the middle of the 1980th, when women of this cohort were “main” reproductive ages and risk

² For long period (from 1970th) we have type fertility in Russia when the proportion of all births which take place to women aged under 40 years no less than 98,6%. Some results of period fertility data see in Annex 2.

of second and third births was higher³. Another cause of this fluctuation is returning to general fertility trend after “weak” war cohorts.

From 1930th cohorts Russian population did not reach the replacement level of fertility. For three decades (from 1930th cohort to 1960th one) total fertility rate decreased from 2,01 to 1,67 (0,35 child per woman). By this fact rural TFR dropped more significantly (0,59 child per woman) than urban TFR (0,21 child per woman) because higher difference in level of fertility of older rural and urban cohorts.

Our adjusted TFRs for younger cohort (1958-62, 1963-67, 1968-1972) in 2002 – see also Picture A1-2 in Annex 1 – are close to real figures: 1,83; 1,71; 1,59 (in comparison with adjusted ones 1,83; 1,72; 1,56).

Picture 3 shows cohort TFRs for women with different levels of education.

On the background tendency of the fertility declining there is the closing in fertility level to majority of socio-demographic groups. If we exclude from our analysis women who has no education or has only basic one (because this social group in our days is small marginal group⁴) that we’ll get the proof of this hypothesis for the extreme levels of education. The difference between TFR for women with university level of education (graduated and post-graduated ones) and TFR for women with primary school level of education and no education for 1941-1945 cohort was 1 child per woman, but for 1961-1965 cohort – 0,23 child per woman (see Picture 2 and table 1).

Table 1. Cohorts total fertility rates by educational level, Russian census 2010

Cohorts	Total	IV	III	II	0-I
1966-1970	1,637091	1,431873	1,711111	2,053207	1,304848
1961-1965	1,760769	1,509301	1,844494	2,227111	1,371529
1956-1960	1,859343	1,594999	1,933002	2,338984	1,571314
1951-1955	1,878599	1,603997	1,929302	2,336531	1,800398
1946-1950	1,822097	1,550324	1,830173	2,227181	2,04795
1941-1945	1,880941	1,52394	1,759926	2,185416	2,522556
1940<	2,082513	1,519666	1,807248	2,164293	2,500848

³ Some Russian demographers recognize significant period effect of the policy 1980th (Elizarov 2005: 29) and forecast positive cohort effect of this policy. Another demographers suppose that the policy 1980th did not have positive effect on cohort fertility level, but it led only to shifts of births timing (Klupt 1988: 51-58; Demographic modernization... 2006:173).

⁴ According to 2002 census data educational structure of female population was changed dramatically for the investigated period. F.e., in cohort born in 1933-1937 graduated and postgraduated education rate was 120‰, college education rate was 205‰, primary school education rate was 250‰, and without education was 22‰. But in cohort born in 1963-1967 there were 241‰, 412‰, 6‰, and 3‰ correspondingly (<http://www.perepis2002.ru/index.html?id=12>).

Picture 3. Cohorts total fertility rates by educational level, Russian census 2010

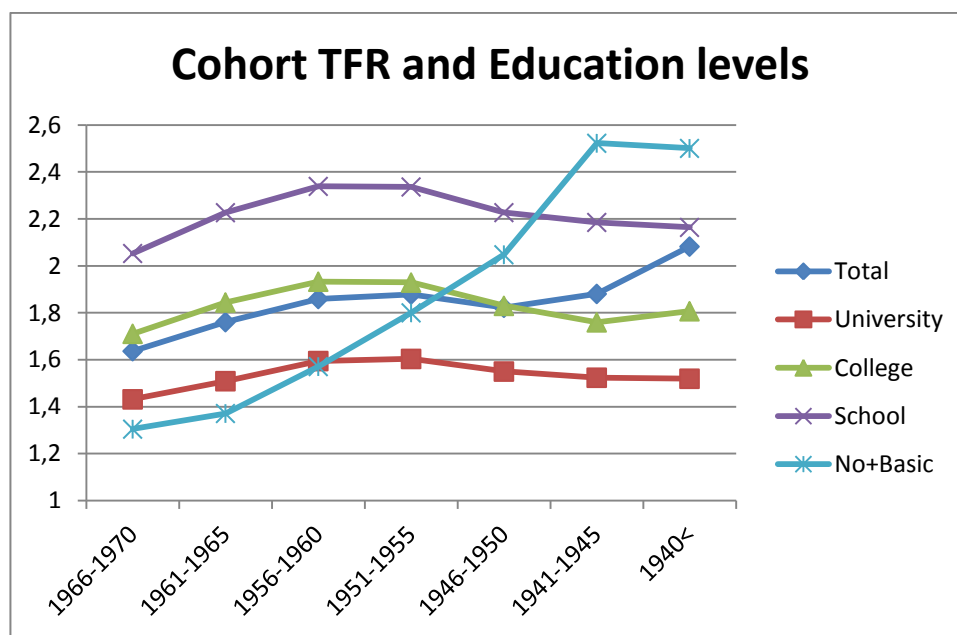


Table 2 consists of calculation of total fertility rates for cohorts by nationality.

Ethnic female groups in Russia are also in the process of the closing in fertility level on the background tendency of fertility declining (see dynamics of dispersion in ethnic TFRs in Table 2). Russian population (approx. 80% of population) has the lowest level of fertility (excluding Jewish women).

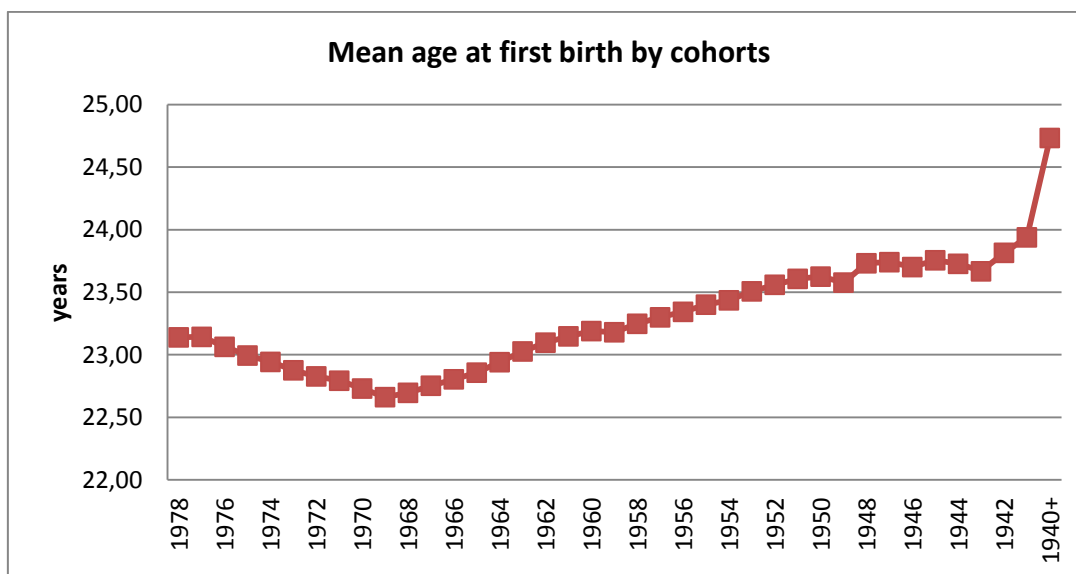
Table 2. Cohorts total fertility rates by some nationalities, census 2010

Nationalities	Cohorts							dispersion
	1966-1970	1961-1965	1956-1960	1951-1955	1946-1950	1941-1945	1940<	
Jewish	1,385	1,426	1,453	1,404	1,362	1,324	1,35	0,002
Russian	1,542	1,675	1,783	1,803	1,743	1,766	1,943	0,015
Byelorussian	1,614	1,736	1,85	1,895	1,874	1,972	2,107	0,025
Ukrainian	1,664	1,776	1,891	1,935	1,906	1,937	2,102	0,019
Mordovian	1,665	1,798	1,916	1,996	2,069	2,348	2,785	0,142
Tatar	1,732	1,833	1,932	2,012	2,052	2,277	2,758	0,118
Osset	1,825	1,971	2,089	2,216	2,209	2,321	2,487	0,049
Chuvash	1,839	1,969	2,136	2,248	2,337	2,563	2,974	0,146
Kalmyk	1,891	2,012	2,178	2,231	2,288	3,09	4,029	0,585
Bashkir	1,983	2,061	2,194	2,359	2,487	2,897	3,565	0,311
Armenian	1,985	2,104	2,175	2,197	2,23	2,315	2,533	0,030
Azerbaijani	2,233	2,343	2,505	2,776	2,891	3,181	3,698	0,263
Yakut	2,286	2,391	2,503	2,604	2,707	2,982	4,074	0,370

Avar	2,558	2,719	2,933	3,263	3,554	3,826	3,927	0,291
Chechen	2,869	2,995	3,148	3,388	3,746	4,071	4,645	0,411
Ingush	2,912	3,247	3,553	3,795	4,045	4,535	4,961	0,512
Roma	2,967	3,188	3,467	3,756	4,342	4,568	5,055	0,594
dispersion	0,251	0,298	0,366	0,493	0,735	0,922	1,234	

The mean age at first birth (picture 4) initial decreased till 1969 cohorts (22,66), then it increases constantly for younger cohorts. Real cohorts confirm process of fertility ageing.

Picture 4. Mean Age at first birth by cohorts, Russian census 2010

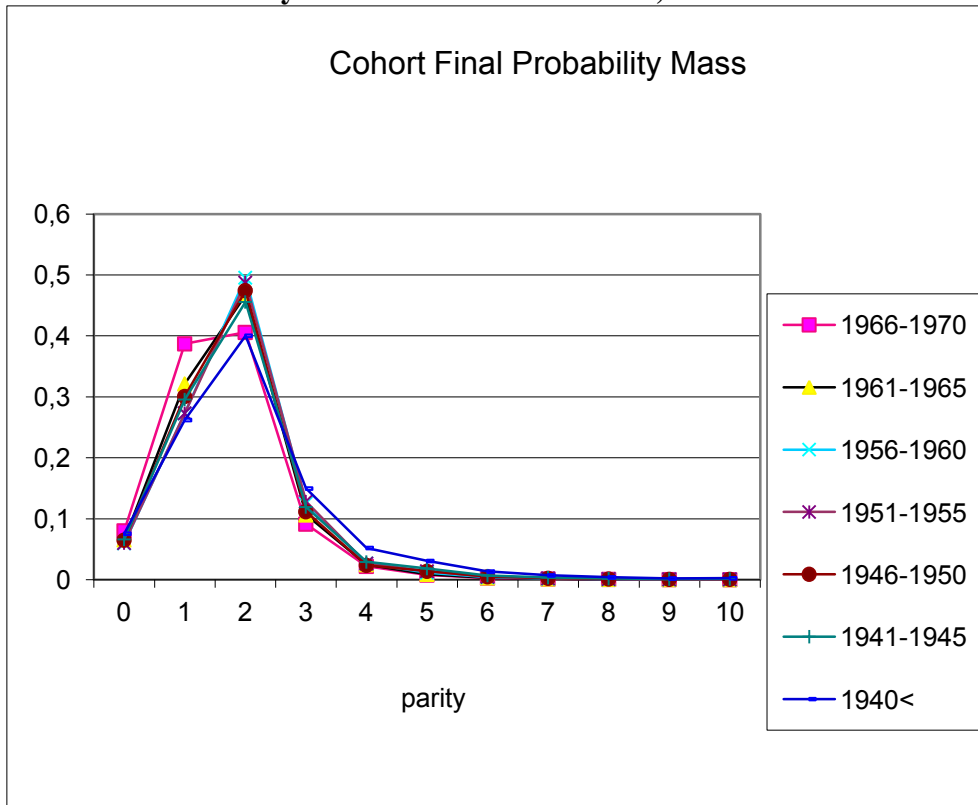


To analyze Russian cohort fertility by parity we constructed series of the parity-progression tables. The changes in Russian fertility for the cohorts born from 1930th to 1960th developed both decreasing of total level of fertility (see Table 3) and the transformation in parity distribution (see Pictures 5-6 and Annex 1). It was significantly for second parity.

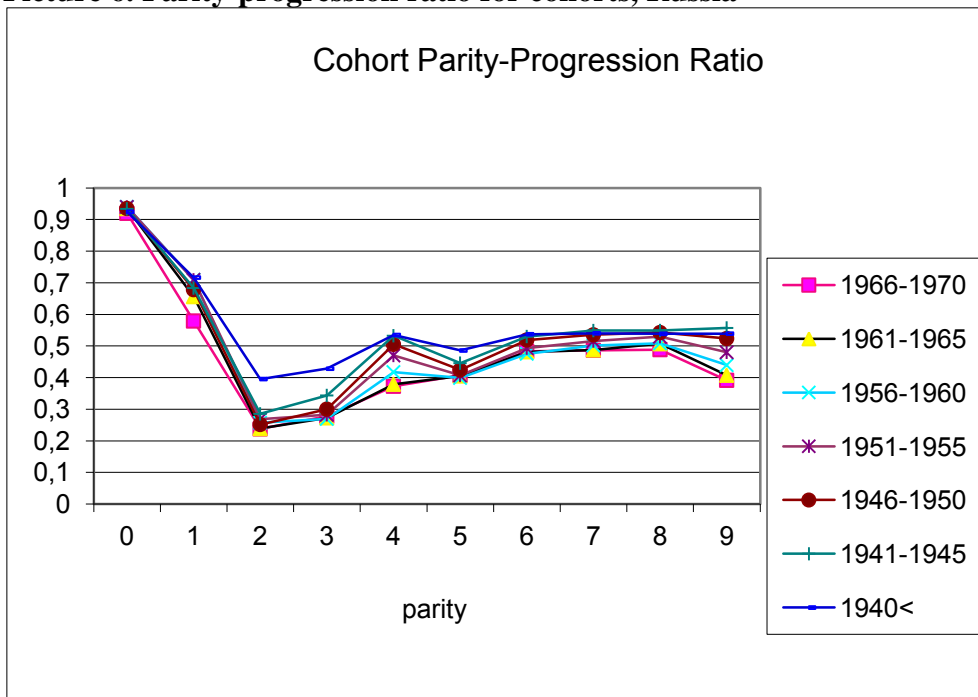
Table 3. Total fertility (TF), mean number of siblings (MNS) and the mean birth order (MBO) for Russian cohorts (total population)

cohorts	MNS	MBO	TF
1971-1975	2,12	1,56	1,51
1966-1970	2,22	1,61	1,64
1961-1965	2,31	1,65	1,76
1956-1960	2,41	1,70	1,86
1951-1955	2,47	1,73	1,88
1946-1950	2,45	1,72	1,82
1941-1945	2,60	1,80	1,88
1940<	3,04	2,02	2,08

Picture 5. Probability-mass function for cohorts, Russia



Picture 6. Parity-progression ratio for cohorts, Russia



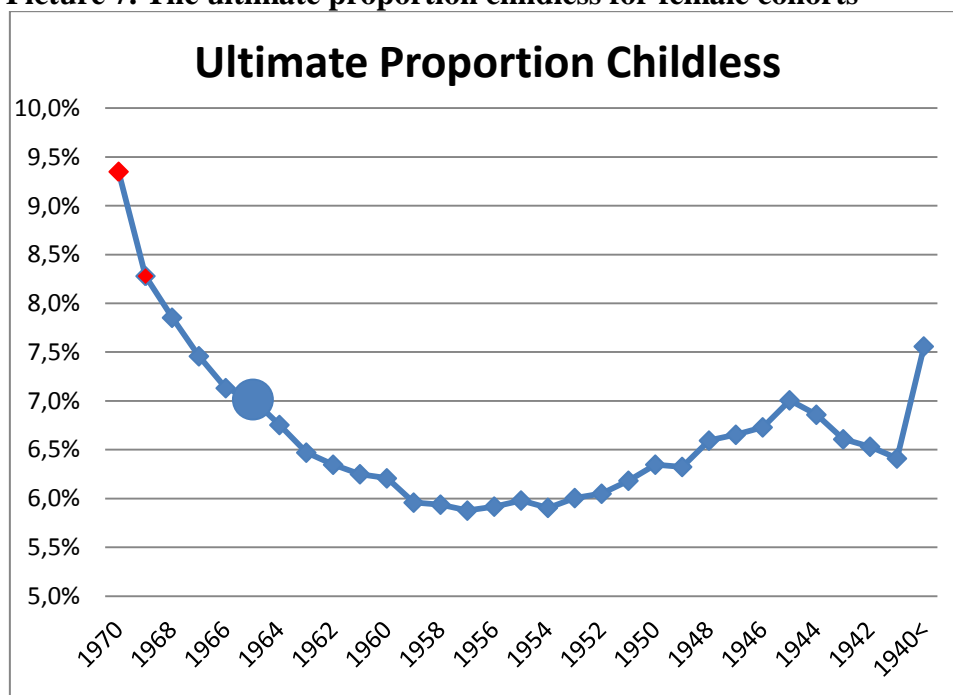
Pollard's decomposition (Pollard 1988: 265-276) of the TF difference (Picture A1-9) permits us estimate the impact of each parity-progression ratio on the cohort total fertility differences. Younger cohorts demonstrate increasing changes in weight of first birth.

Estimation of younger cohorts' parity fertility permits us to propose the important changes for Russia – the growth of impact of childlessness. The childlessness level was a main difference between parity-progression schedules of Western and Russian (and East European)

population. So cold “universal childbearing” was consequences of Socialist general welfare system and pronatalist policy (Barkalov 2004: 30) – there were free public child-care facilities, long paid post-maternity leaves, protection of childbearing of single mother, etc.

The cohorts were born before and in the time of Second World War had relatively higher level of childlessness (7-8% and 9% for 1930th) because disproportion on the marriage market during repression, war, and recovery periods (Picture 7). The next cohorts had biological level of childlessness (6%). Younger cohorts return to 7-8% level. Should we wait the following increasing of childlessness level (especially for urban population – till 8-10%)? In 2010 the urban women in 40-44 ages had 8,7%; in 45-49 ages - 7,1% of childless.

Picture 7. The ultimate proportion childless for female cohorts



Finally I would like to say a few words about fertility changes after Russian pronatalist Demographic Policy which starts in 2007. We could not make sharp estimation of policy effect in term of real cohort fertility till the period when younger cohort under policy action will reach the end of reproductive age. Today we could make some indirect estimation from period effect: either policy effect will lead only to shifts of births timing in cohort fertility or it will lead to increasing of cohort fertility level. Some indirect estimation (Zhdanov et al 2010) discusses the short and non-significant positive effect. Econometric model of fertility and employment fixes absence of “maternity capital” effect (one of the bright measure of modern policy) (Slonimczyk and Yurko 2012).

Brief conclusion

The 2010 Russian census confirmed the most of early described trends and features in Russian fertility: decreasing, convergence, ageing.

Discussed questions are about trend in ultimate proportion of childless and effect of pronatalist demographic policy.

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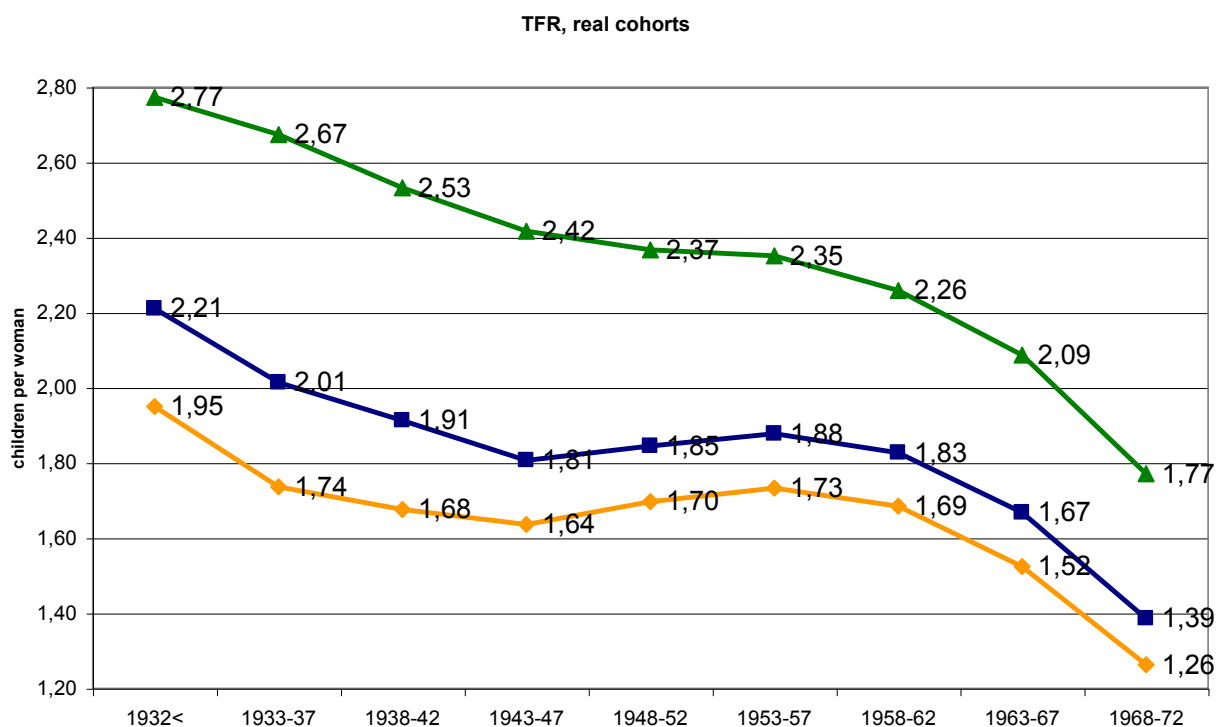
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Slonimczyk F, A. Yurko. (2012). Assessing the Impact of the Maternity Capital Policy in Russia Using a Dynamic Stochastic Model of Fertility and Employment. Working Paper, HSE, Moscow, October 3.

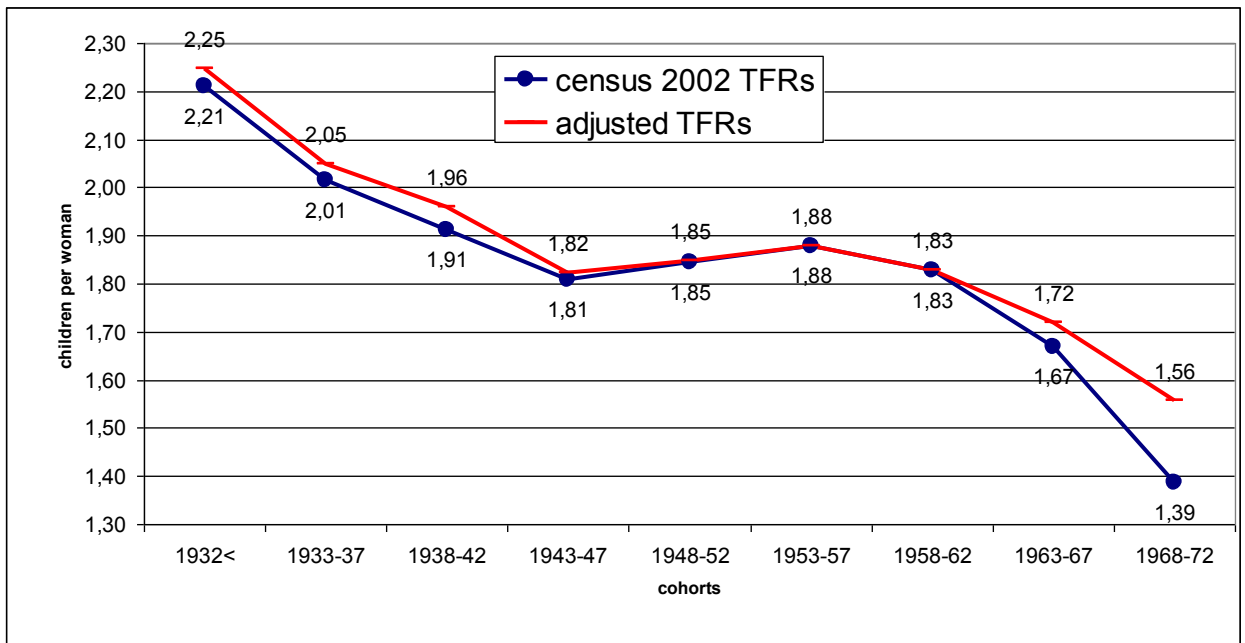
Zhdanov D. et all. (2010). Half Century of Fertility Changes in Russia. Demoscope Weekly. 447-448, December 13-31. <http://demoscope.ru/weekly/2010/0447/tema05.php>.

Annex 1. Evidence from 2002 Russian census. Some pictures and tables

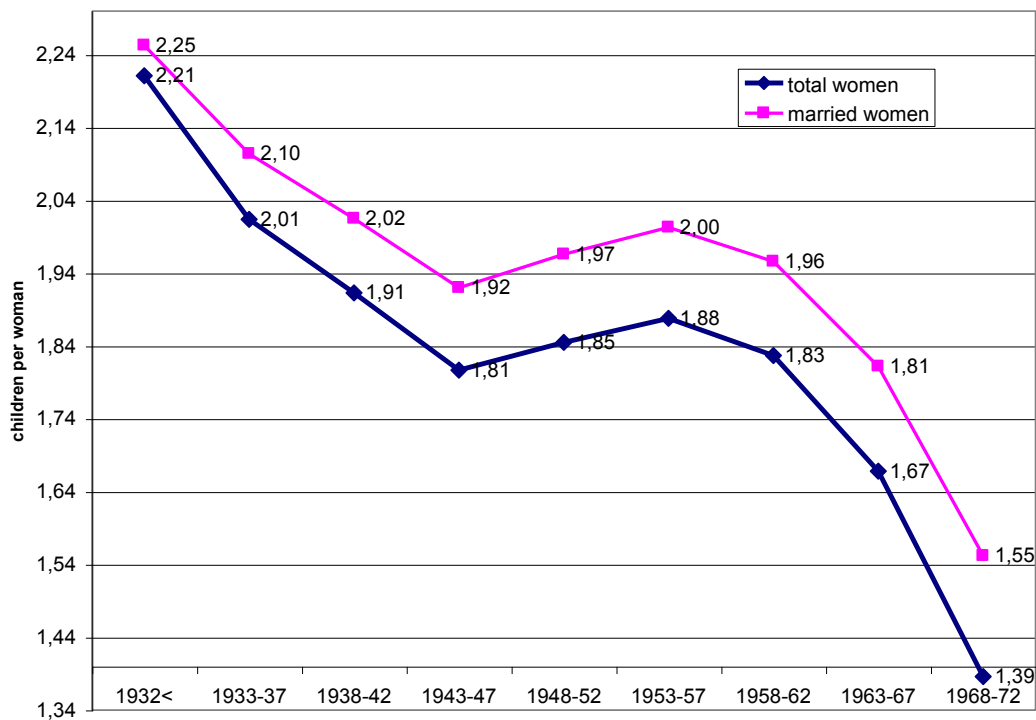
Picture A1-1. Cohort total fertility rates: total, urban and rural Russian female population, census 2002



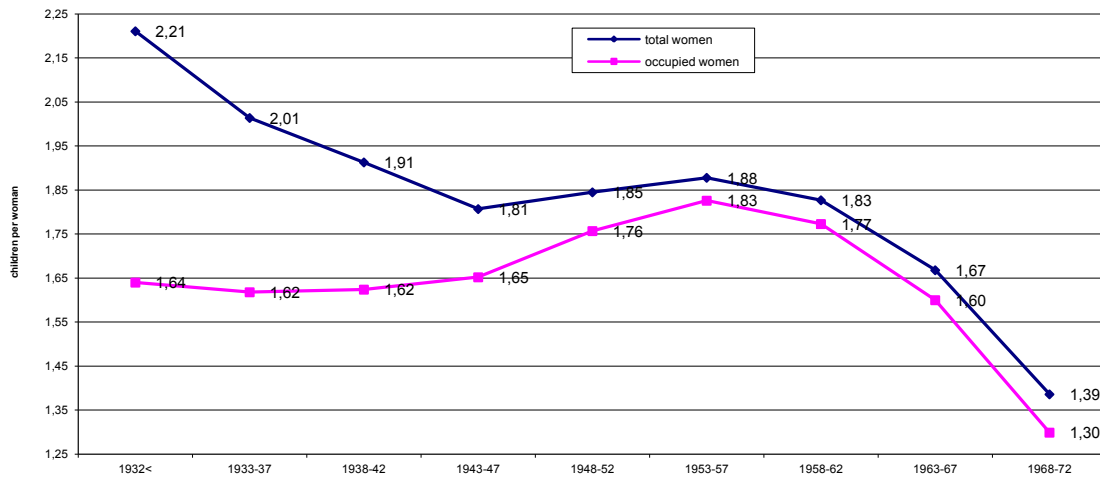
Picture A1-2. Adjusted cohort total fertility rates: total female population



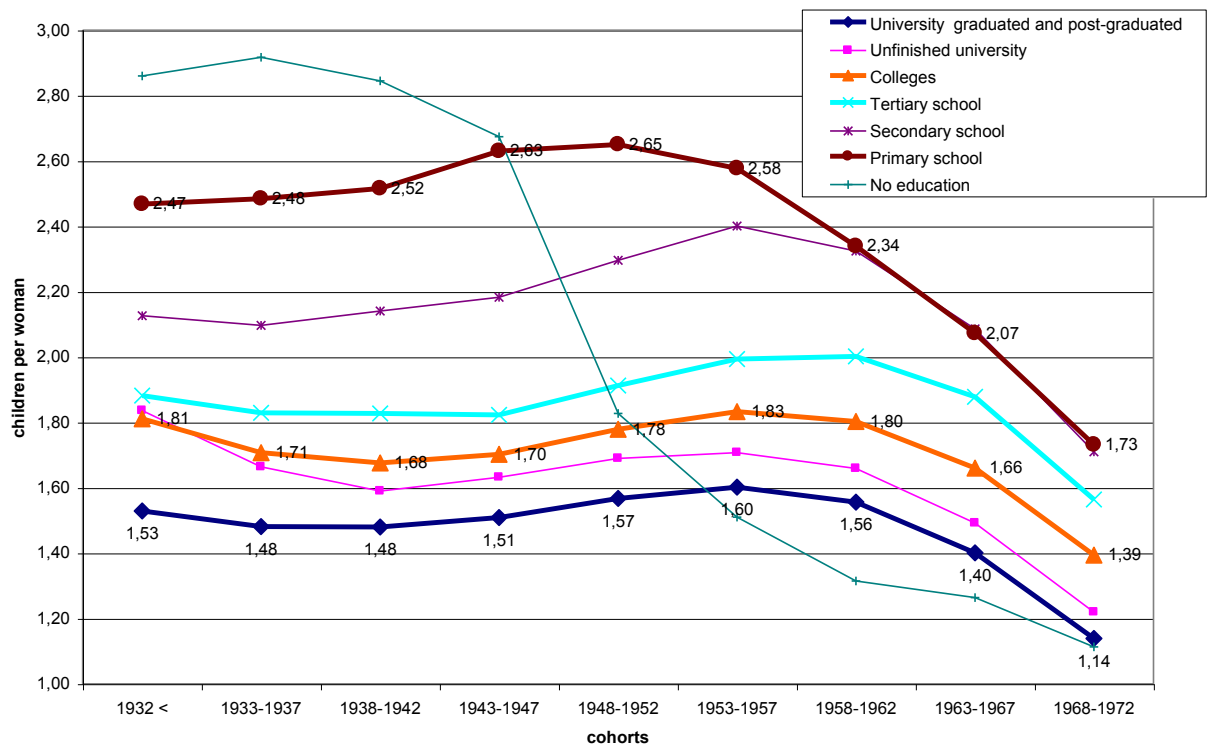
Picture A1-3. Cohort total fertility rates: total women and married women, census 2002



Picture A1-4. Cohort total fertility rates: total women and occupied women, census 2002



Picture A1-5. Cohorts total fertility rates by educational level, census 2002



Picture A1-6. TFRs' differences by educational level

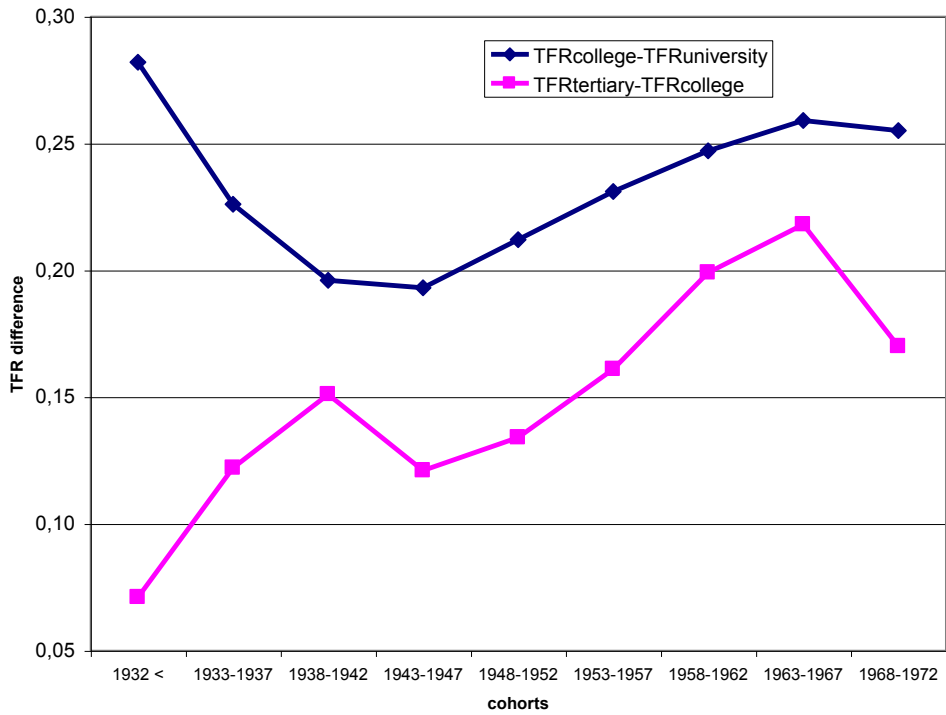
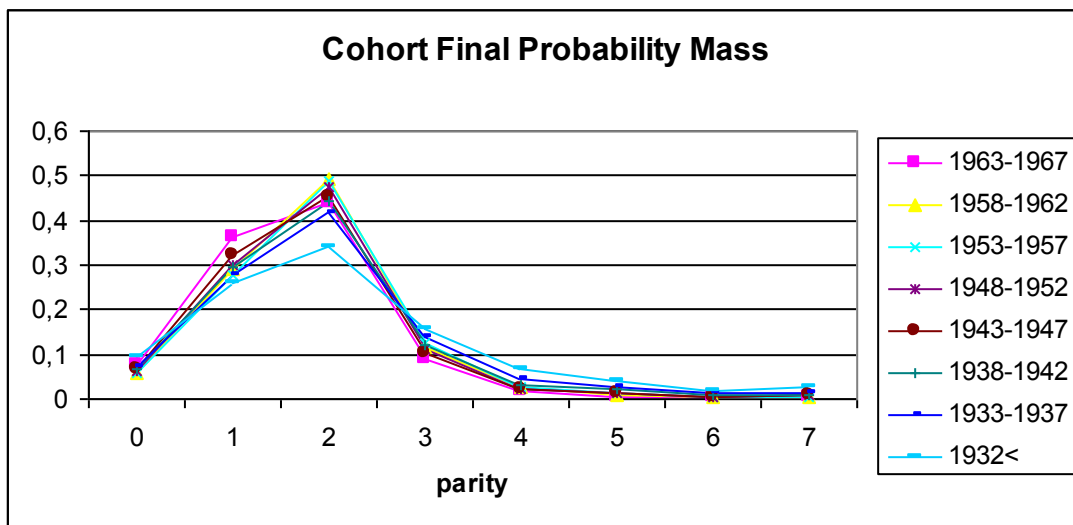


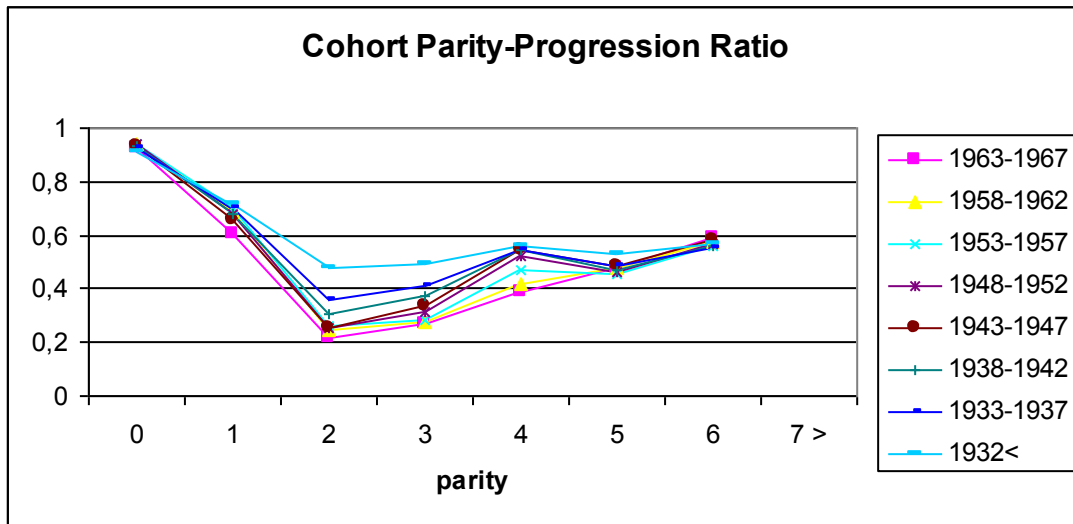
Table A1-1. Total fertility (TF), mean number of siblings (MNS) and the mean birth order (MBO) for Russian cohorts (total population)

Cohorts	MNS	MBO	TF
1963-1967	2,21	1,60	1,66
1958-1962	2,36	1,68	1,82
1953-1957	2,44	1,72	1,87
1948-1952	2,45	1,72	1,84
1943-1947	2,46	1,73	1,80
1938-1942	2,63	1,81	1,90
1933-1937	2,82	1,91	2,00
1932<	3,26	2,13	2,18

Picture A1-7. Probability-mass function for cohorts, Russia



Picture A1-8. Parity-progression ratio for cohorts, Russia



Picture A1-9. Pollard's decomposition of the TF difference for cohorts, Russia

TFr1-TFr2

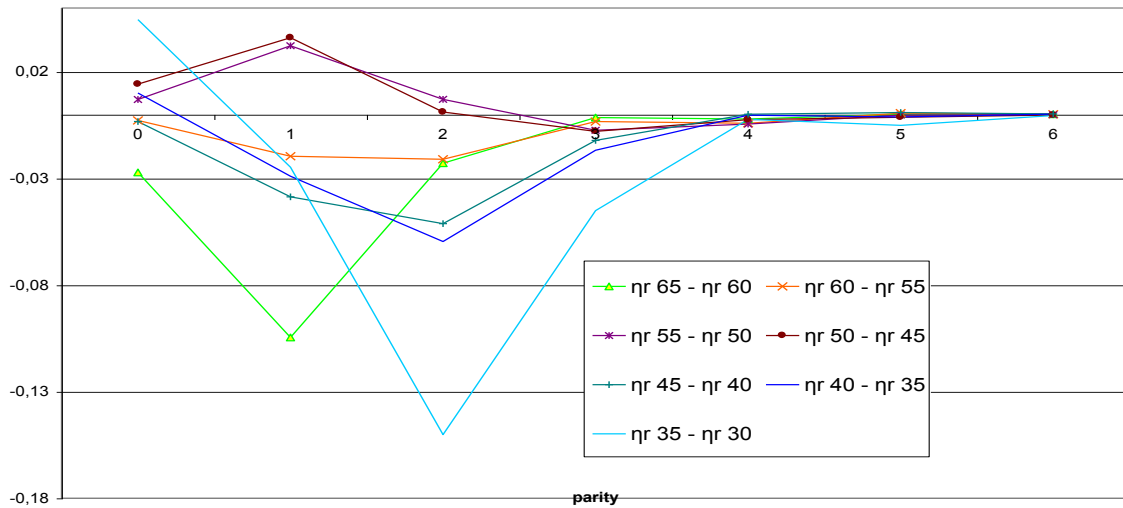
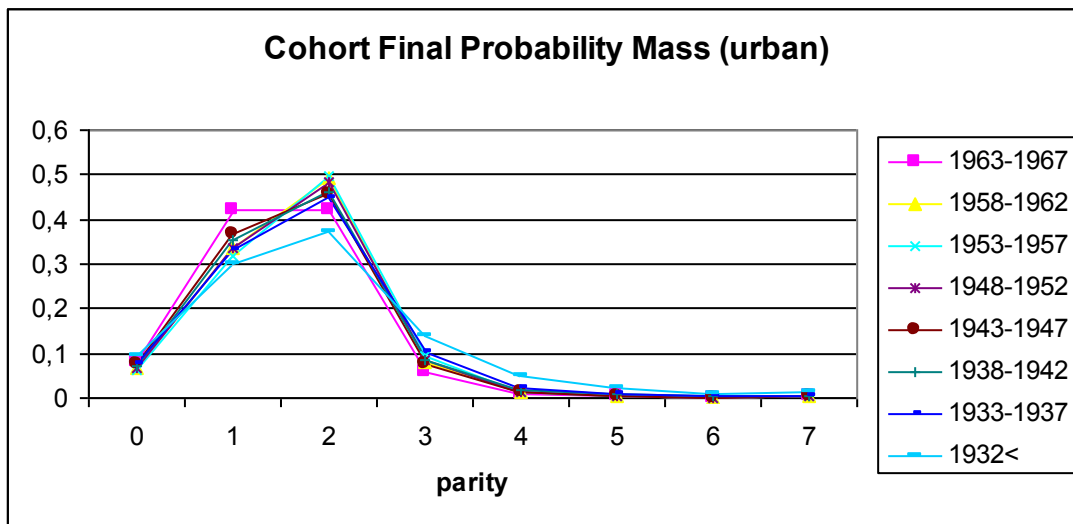


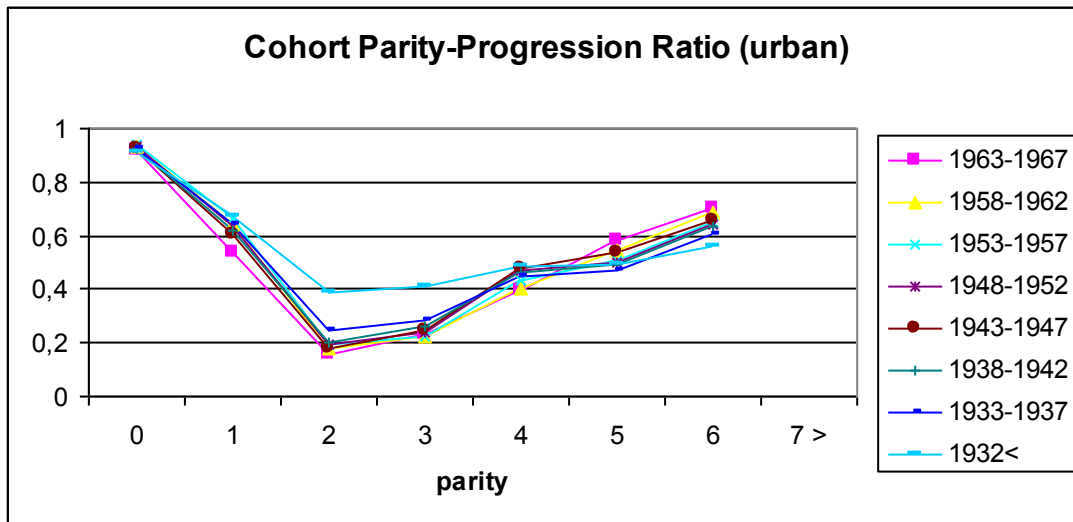
Table A1-2. Total fertility (TF), mean number of siblings (MNS) and the mean birth order (MBO) for Russian cohorts (urban and rural population)

Cohorts	MNS		MBO		TF	
	urban	rural	urban	rural	urban	rural
1963-1967	2,01	2,64	1,50	1,82	1,66	1,66
1958-1962	2,15	2,84	1,57	1,92	1,82	1,82
1953-1957	2,21	3,00	1,61	2,00	1,87	1,87
1948-1952	2,19	3,09	1,60	2,04	1,84	1,84
1943-1947	2,15	3,20	1,57	2,10	1,80	1,80
1938-1942	2,21	3,36	1,60	2,18	1,90	1,90
1933-1937	2,33	3,60	1,66	2,30	2,00	2,00
1932<	2,82	3,93	1,91	2,46	2,18	2,18

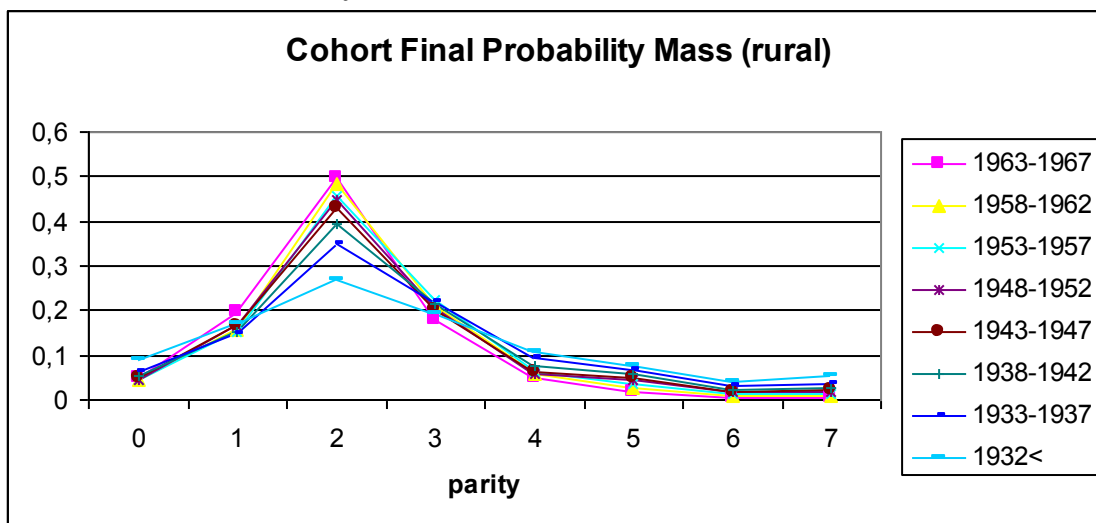
Picture A1-9. Probability-mass function for urban cohorts, Russia



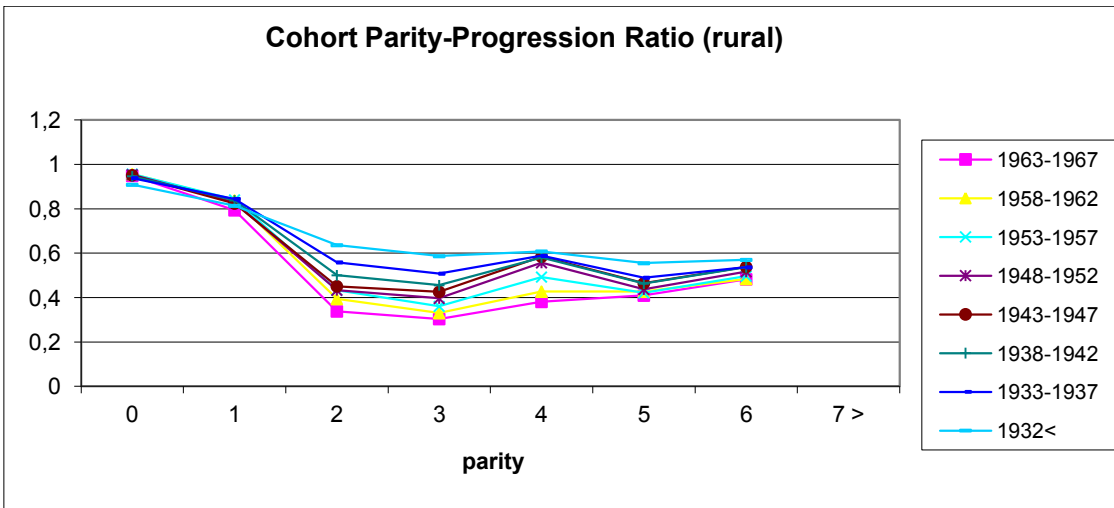
Picture A1-10. Parity-progression ratio for urban cohorts, Russia



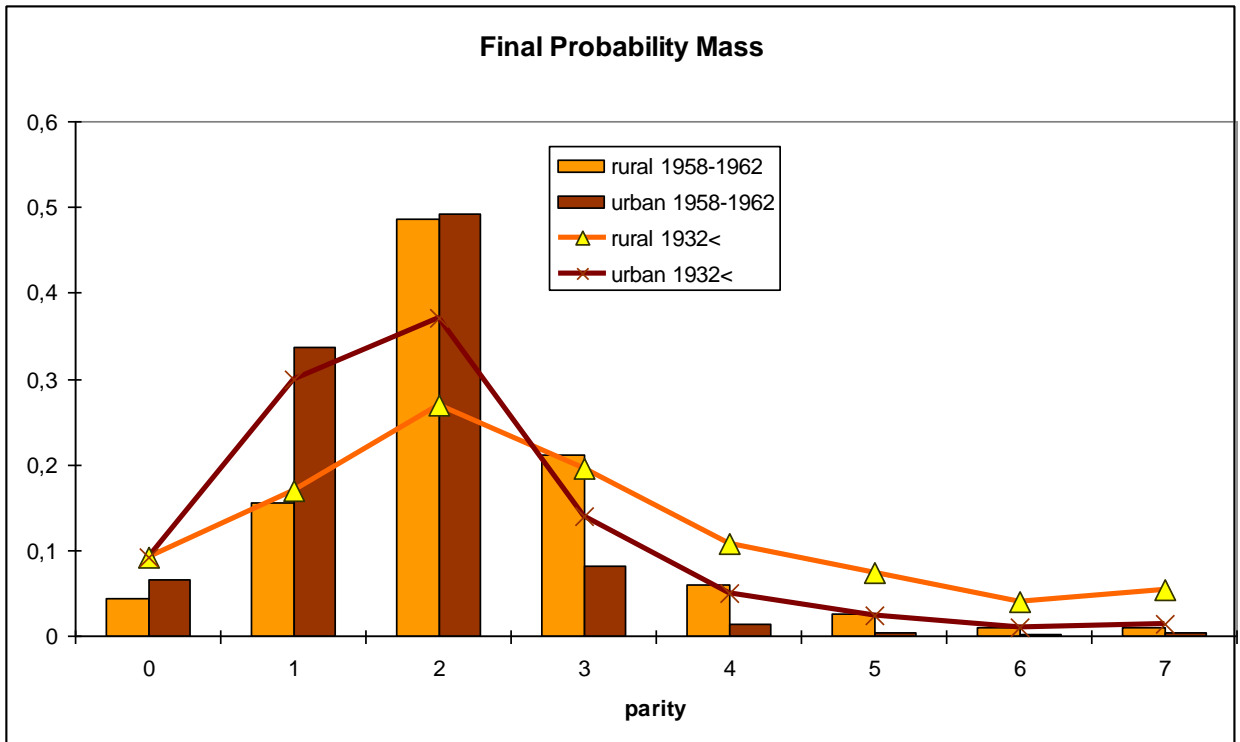
Picture A1-11. Probability-mass function for rural cohorts, Russia



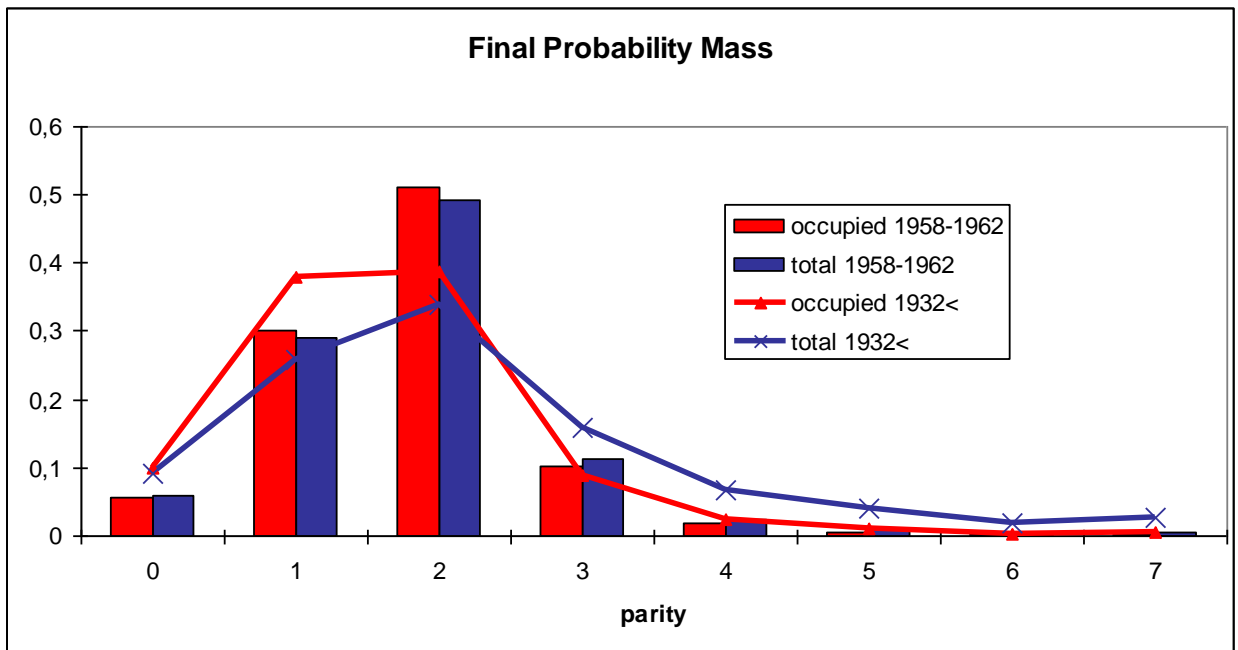
Picture A1-12. Parity-progression ratio for rural cohorts, Russia



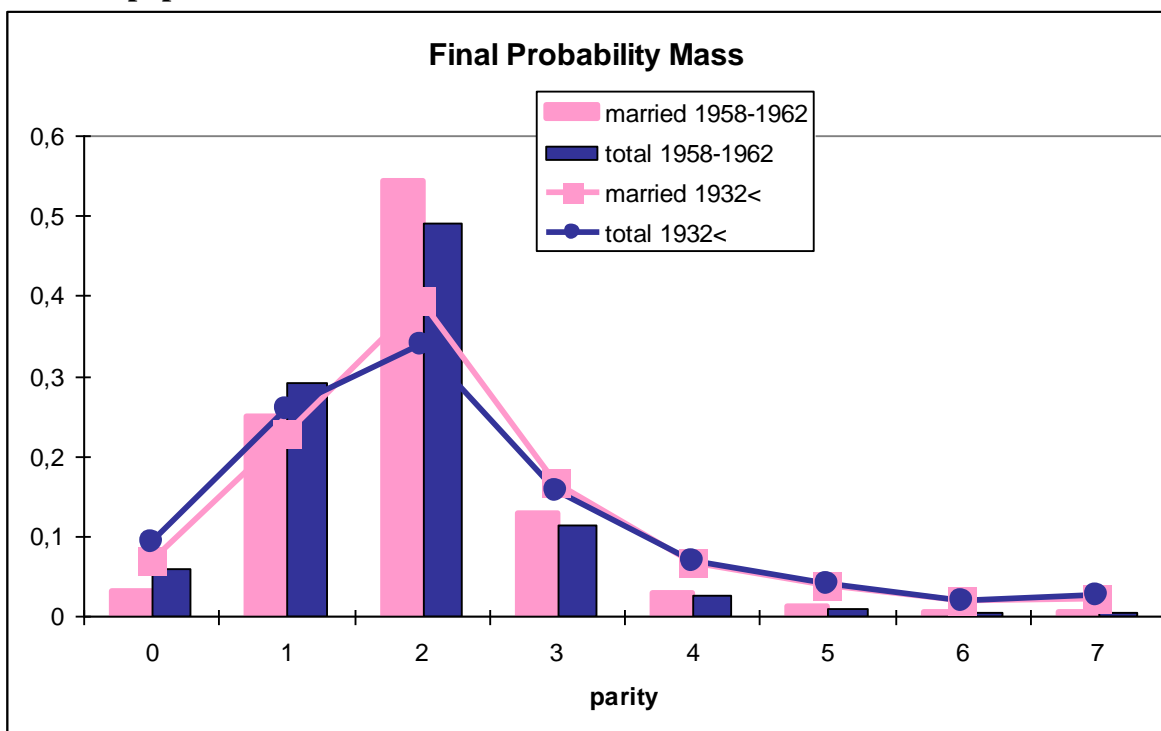
Picture A1-13. Probability-mass functions for younger cohort and older one by urban and rural population



Picture A1-14. Probability-mass functions for younger cohort and older one by occupied and total population

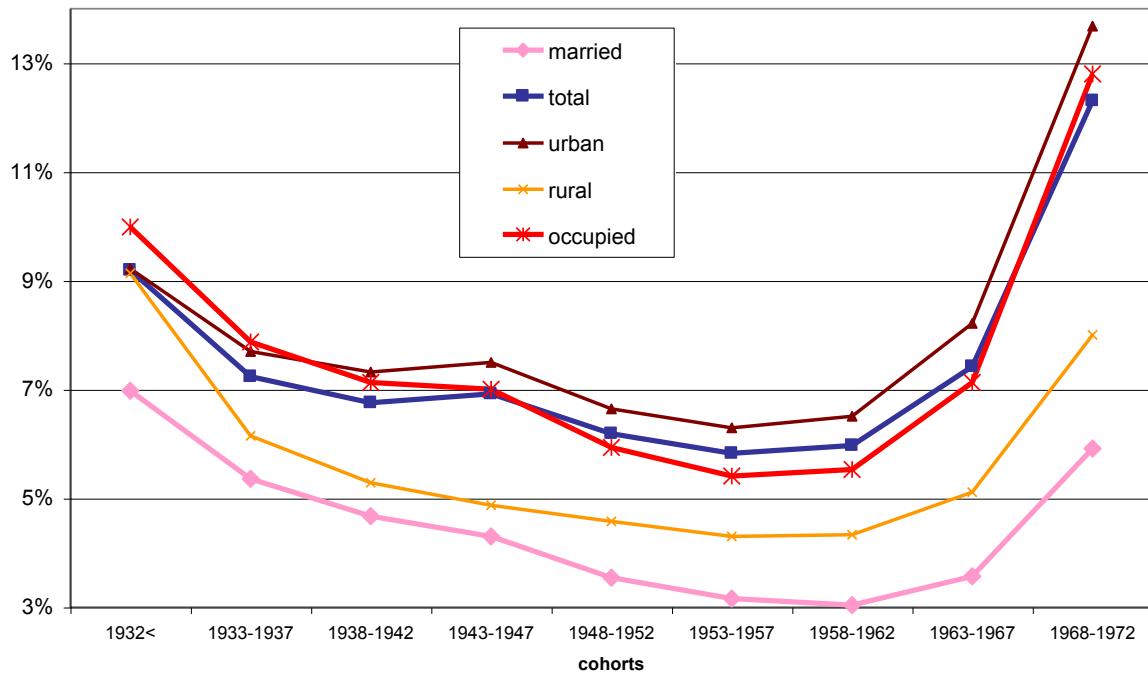


Picture A1-15. Probability-mass functions for younger cohort and older one by married and total population

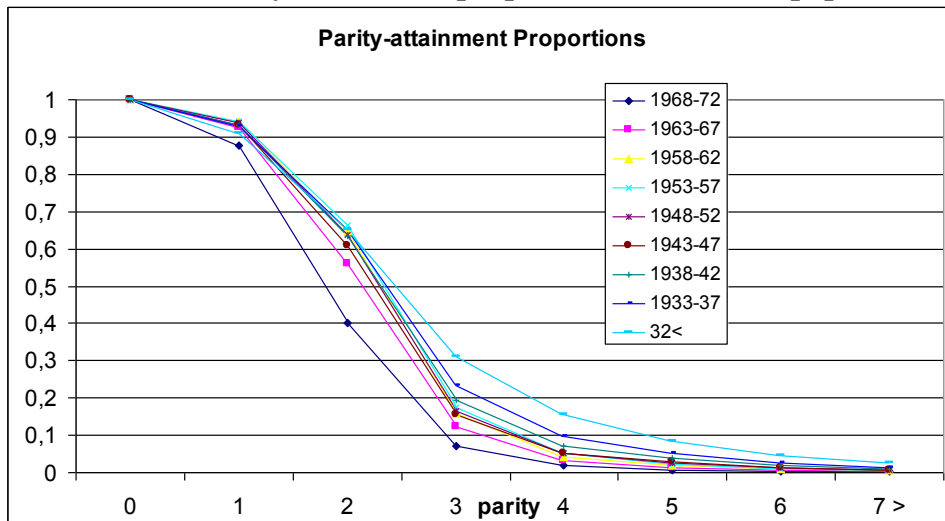


Picture A1-15. The ultimate proportion childless for different female population

Ultimate Proportion Childless



Picture A1-16. Parity-attainment proportion, total female population, Russian cohorts



Annex 2. Period fertility data, Russia, total population, 1958-2011

Calendar years	Age-specific fertility rates							MAB (years)	TFR	The proportion of all births which take place to women aged under 40 years
	15-19	20-24	25-29	30-34	35-39	40-44	45-49			
1958-1959	28,4	157,9	156,4	101,9	57,7	19,9	3,0	27,8	2,417	95,64
1964-1965	22,7	150,8	122,8	77,3	39,2	13,4	1,5	27,6	2,139	96,52
1969-1970	28,3	146,9	107,4	69,3	32,2	9,0	1,1	27,0	1,972	97,44
1974-1975	33,9	158,8	110,5	58,6	28,9	7,3	0,6	26,4	1,993	98,02
1979-1980	42,7	157,1	101,2	52,6	18,4	5,1	0,4	25,7	1,891	98,54

1980-1981	43,6	157,6	102,0	52,0	18,8	4,6	0,4	25,7	1,895	98,68
1981-1982	43,6	159,1	105,9	54,9	21,9	4,3	0,4	25,8	1,951	98,80
1982-1983	44,7	163,8	113,1	59,8	23,9	4,1	0,3	25,9	2,047	98,93
1983-1984	46,1	166,3	114,9	61,2	24,0	3,7	0,3	25,8	2,083	99,04
1984-1985	46,9	164,2	113,3	60,0	23,2	3,7	0,3	25,8	2,057	99,03
1985-1986	46,9	165,7	117,5	63,0	24,5	4,3	0,3	25,9	2,111	98,91
1987	48,5	170,6	122,6	67,8	27,8	6,1	0,2	26,0	2,194	98,58
1988	49,6	167,9	114,1	61,8	25,6	5,6	0,2	25,8	2,130	98,63
1989	52,5	163,9	103,1	54,6	22,0	5,0	0,2	25,5	2,007	98,70
1990	55,0	156,5	93,1	48,2	19,4	4,2	0,1	25,3	1,892	98,86
1991	54,2	145,9	82,7	41,5	16,5	3,7	0,2	25,0	1,732	98,87
1992	50,7	132,9	72,4	34,9	13,9	3,2	0,2	24,9	1,547	98,90
1993	47,3	119,1	63,7	28,8	11,0	2,5	0,2	24,7	1,369	99,01
1994	49,1	119,4	66,8	29,4	10,6	2,3	0,1	24,6	1,394	99,14
1995	44,8	112,7	66,5	29,5	10,6	2,2	0,1	24,8	1,337	99,14
1996	38,9	105,5	65,5	30,1	10,8	2,3	0,1	25,0	1,270	99,05
1997	35,8	98,0	64,8	31,2	10,8	2,2	0,1	25,2	1,218	99,05
1998	33,5	98,1	66,7	33,1	11,5	2,3	0,1	25,4	1,232	99,02
1999	28,9	91,8	63,7	32,2	11,1	2,2	0,1	25,6	1,157	99,00
2000	27,4	93,6	67,3	35,2	11,8	2,4	0,1	25,8	1,195	98,95
2001	27,3	93,1	70,2	38,0	12,9	2,4	0,1	25,9	1,223	98,98
2002	27,4	95,7	75,1	41,7	14,7	2,6	0,1	26,1	1,286	98,95
2003	27,6	95,3	78,3	44,0	16,0	2,7	0,1	26,3	1,320	98,94
2004	28,2	94,2	80,1	45,8	17,6	2,9	0,1	26,4	1,344	98,88
2005	27,4	88,4	77,8	45,3	17,8	3,0	0,2	26,5	1,294	98,77
2006	28,2	87,8	78,4	46,6	18,6	3,1	0,1	26,6	1,305	98,78
2007	28,3	89,5	86,9	54,1	22,7	3,9	0,2	27,0	1,416	98,56
2008	29,3	91,2	92,4	60,0	25,8	4,6	0,2	27,2	1,502	98,42
2009	28,7	90,5	95,9	63,6	27,6	5,2	0,2	27,4	1,542	98,27
2010	27,0	87,5	99,2	67,3	30,0	5,9	0,3	27,7	1,567	98,05
2011	26,7	87,5	99,8	68,2	31,4	6,3	0,3	27,7	1,582	97,94

Calculated on data from *Demographic Yearbook (2012)*