Incomes and Human Development in a Comparative Analysis of the Russian North with Other Regions[1]

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Russian northern territories are characterized by extreme climatic conditions and that is why these territories are unattractive for living. Nevertheless more than 10 million people are living in the North. This can be traced to historical, political, and economic peculiarities of development during the Soviet period. Economy in the North is not balanced, which is why northern inhabitants' living standards strongly depend on state guarantees. We can estimate the influence of well-being on human development in the Russian northern regions in comparison with others due to results of the process of transition in the 90ˢ in Russia. In this paper we consider main indicators of human development such as birth rates and mortality rates of population.

Of course, many factors influence birth rates and mortality rates, such as family pattern, education, ethnic structure, health care etc. (Демографическое будущее 2001). In this paper we consider the influence of economic factors on birth rates in assumption of constant

other factors. Main hypothesis is: income growth is a very important factor for population growth. We can't say "especially in the North" before modeling. This research gives us evidence of the importance of income growth for human development in Russia and difference estimation in it between the Russian North and other regions.

The Data

Far North status was an attribute to division of Northern regions and other. We carried out research to estimate interrelations between regional economic growth and human development in the twelve Russian northern regions in comparison with sixty six other regions excluding Moscow region and ten regions with mixed territories, where only a part of them has Far North status or territories granted equal status. We used panel data econometric analysis for annual data from 1990 to 2003 for Russian regions (Регионы Росси 2005), containing 2700 observations for 1220 indicators. Indicators used in the research are described before models' estimations.

The Evidence

We calculated average incomes, wages and pensions normalized by regional minimum subsistence level. Wages in the Russian North are greater than in other re-

Indicator	Observations	Mean	Std. dev.	Observations	Mean	Std. dev.
		other Russ. reg.				northern Russ. reg.
B	856	10.19	3.16	252	11.38	2.50
M	856	14.46	3.27	252	10.62	3.42
LE	1019	66.69	2.50	210	64.51	2.98

Table 1. Birth rates (B), mortality rates (M) and life expectancy (LE) for northern and other Russian regions

gions: 263.7% and 182.0% of minimum subsistence level, respectively, incomes are up too (208.6% vs. 170.0%), but pensions are below (86.7% vs. 113.9%). We can believe that birth rates are greater in the North due to the influence of income. Indeed, table 1 is illustrative of this suggestion. We also see, that mortality rates are below in the North.

However, if we consider these indicators normalized by demographic structure, difference in birth rates is

non-significant (table 2). The results in table 1 may be explained by a dominating younger population in the North. However, we see that mortality rates are significantly greater in the North, if we take into account the low population share of 'over working age'.

growth; especially during the stabilization period from 1994 and the crisis in 1998.

Life expectancy is lower in the North. For men: 58.9 vs. 60.6 years; for women 70.9 vs. 73.1 years.

Indicator	Observations	Mean	Std. dev.	Observations	Mean	Std. dev.
	Other Russian regions			northern Russian regions		
Share of population in working age	868	57.28	2.63	252	64.00	4.11
Share of population in over working age	868	20.67	3.74	252	11.26	4.43
B*	794	10.22	3.25	234	10.28	2.31
M*	794	12.99	1.85	234	19.09	4.90

Table 2. Birth rates (B*), mortality rates (M*) normalized by regional demographic structure for northern and other Russian regions

Normalized birth rates show that there are not differences between northern and other regions despite differences in incomes (fig. 1), but according to a social survey of women in the Komi Republic (Социально-экономические факторы 2002) low income is the main factor in delayed pregnancy; the second most important factor being expected low income in the future.

Mortality rates are persuasive of a negative process in human development in the North (fig. 2). The graphs also show macroeconomic influence on population

By panel data analysis we estimated the influence of wages (*W*) as a main element of households' income in the previous period (*t*-1) on normalized birth rates (*B**). We also used exogenous variables influencing households' income growth such as regional output (*Y*), changes in the level of employment $\Delta \log L$, and budget expenditures (G_{exb}). We took into account the macroeconomic impact by using dummies *Year*_1992, *Year*_1993, *Year*_1999 and *Year*_2000 to reflect reproductive behavior changes after crises. Additionally, indicators of the demographic structure (number of women to number
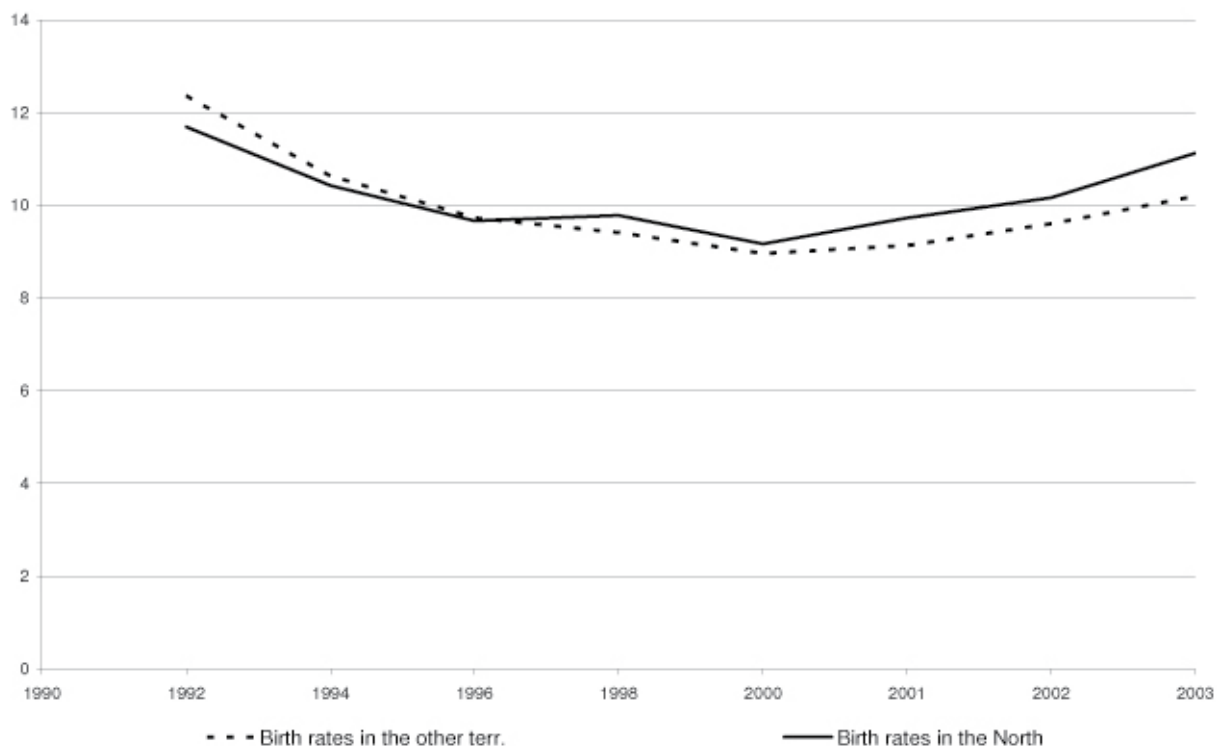
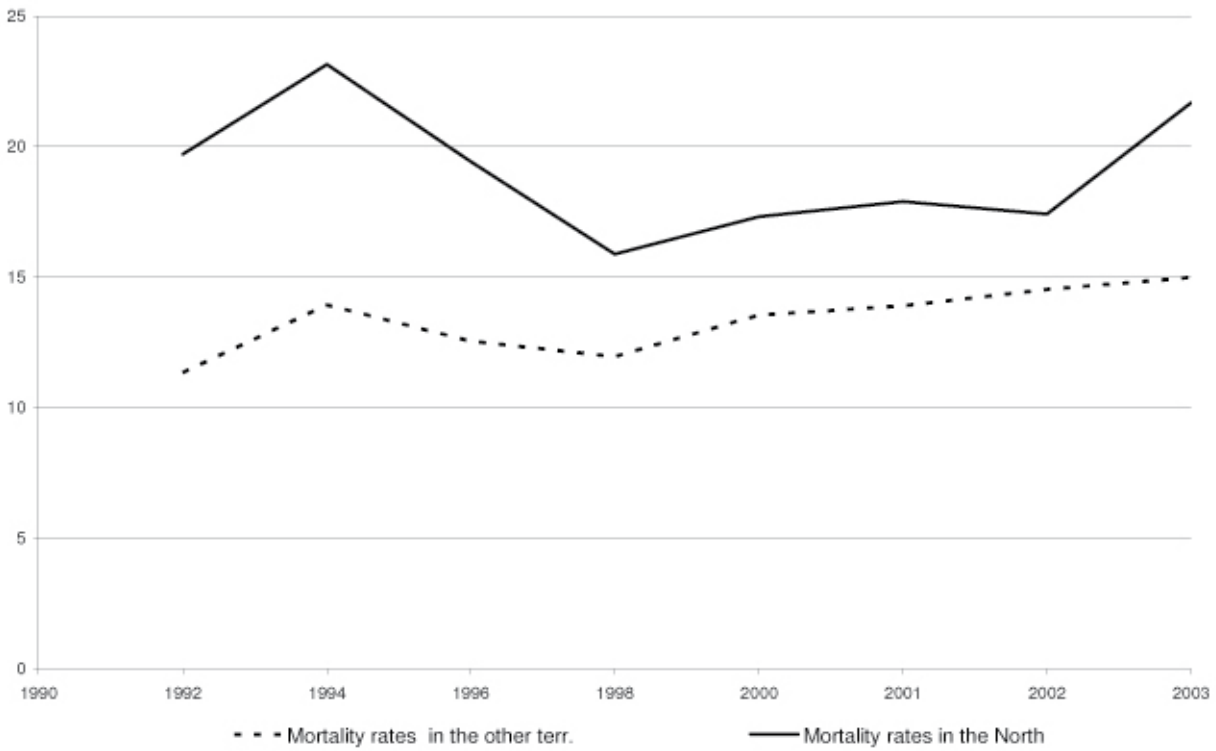**Figure 1. Birth rates (by Rosstat data).**

Figure 2. Mortality rates (by Rosstat data).

of men rate R_{wm}, share of rural population R_{rural}) were included in the model. We used additional variables $(\bullet) \cdot North^2$ to consider a difference between northern and other territories. We believe that many important factors exist, but 1) they are not observable at the macro data level, 2) we estimated income's influence on birth rates.
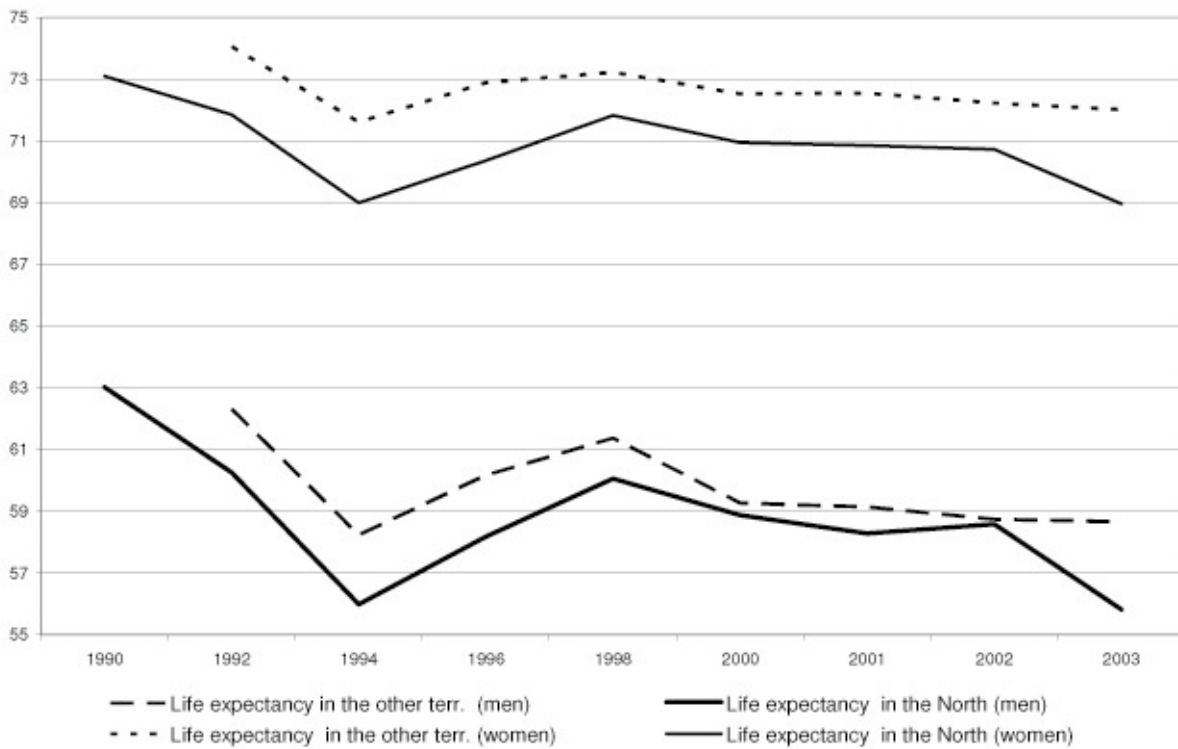

Figure 3. Life expectancy (by Rosstat data).

Endogenous variable B*		Estimated coefficients		
453 observations	between effect model (Between)	fixed effect model (FE)	ordinary least squares model (OLS)	**random effect model (RE)**
$\Delta\log Y_{t-1}$	1.252	.649**	1.441	**.694**
	(4.816)	(.326)	(1.156)	**(.355)**
$\Delta\log Y_{t-1}$ *North	5.047	-1.376***	-.312	**-1.148**
	(5.538)	(.399)	(1.316)	**(.433)**
$\Delta\log W_{t-1}$	-7.077	-.247	-.972*	**-.392**
	(8.375)	(.163)	(.561)	**(.176)**
R_{wm}	-.690*	1.818****	-.798****	**.920****
	(.372)	(.2284)	(.101)	**(.190)**
R_{rural}	1.291****	-.377	1.191****	**1.089****
	(.153)	(.506)	(.041)	**(.144)**
$\Delta\log G_{exb,\,t-1}$	8.015	.186	1.140	**.421**
	(4.141)	(.172)	(.800)	**(.185)**
$\Delta\log G_{exb,\,t-1}$ *North	-7.272**	.688****	-.680	**.532**
	(3.251)	(.185)	(.585)	**(.201)**
*Year*_1999	-1.031	-.623****	-.707***	**-.616****
	(9.299)	(.075)	(0.245)	**(.081)**
_cons	13.652**	-9.837***	14.650****	**-4.288***
	(4.921)	(3.374)	(1.078)	**(2.211)**
within R2	0.040	**0.375**		**0.314**
between R2	**0.601**	0.403		**0.268**
overall R2	0.297	0.306	**0.494**	0.265

**Table 3. Dynamic models illustrate interrelation between regional economic growth on birth rates3 (OLS)
Breusch and Pagan Lagrangian multiplier test for random effects indicates, that hypothesis about their non-significance is rejected. The best is random effect model.**

Through this analysis we see that regional budgetary expenditures' growth influences birth rate, especially in the North (coefficients are .421 and .421+.532=.953 respectively). In addition, both the share of rural population and the share of women are significant for growth in birth rates. The next period after the crisis in 1998 was a period of significant deacrease in birth rates. We see that wages and regional output growth are negative factors for growth in birth rates. The next model (table 2) explains these interrelations.

Wage is an endogenous variable to regional output growth. After using $\Delta\log Y_{t-1}$ as an instrument to $\Delta\log W_{t-1}$ in the model, wages have a positive influence on birth rates (.829) both in the North and in the other regions.

We also estimated the influence of income on mortality rates using the same exogenous variables. We can not conclude about the positive or negative influence of income on mortality rates by these models (table 5), but we do see that growth in regional output leads to a decrease in mortality rates and that this interrelation is observed only in the North. We may believe that both income growth and a good social perspective during a period of economic growth lead to a deacrease in mortality. Additionally, a higher share of a rural population as an attribute of no northern regions shows that mortality rates are greater in the North.

Endogenous variable B*			
453 observations	between effect model (Between)	fixed effect model (FE)	**random effect model (RE)**
$\Delta \log W_{t-1}$	14.468	1.023***	**.829****
	(11.661)	(.362)	**(.378)**
R_{wm}	-.762**	1.760****	**.961*****
	(.387)	(.248)	**(.200)**
R_{rural}	1.506****	-.524	**1.102*****
	(.248)	(.550)	**(.157)**
$\Delta \log G_{exb, t-1}$	1.200	.212	**.390****
	(7.409)	(.131)	**(.134)**
$\Delta \log G_{exb, t-1}$ *North*	2.581	.763***	**.601****
	(7.147)	(.223)	**(.232)**
_cons	12.931***	-8.738**	**-4.826****
	(4.008)	(3.670)	**(2.348)**
within R2	0.000	**0.132**	0.108
between R2	**0.469**	0.350	0.272
overall R2	0.129	0.289	0.258

Table 4. Dynamic models illustrate interrelation between regional economic growth on birth rates4 (2 OLS).
Breusch and Pagan Lagrangian multiplier test for random effects indicates, that hypothesis about their non-significance is rejected. The best is random effect model.

Endogenous variable M*	Estimated coefficients			
455 observations	between effect model (Between)	fixed effect model (FE)	ordinary least squares model (OLS)	**random effect model (RE)**
$\Delta \log L$	-61.690****	7.883***	-3.234	**6.014****
	(12.917)	(2.539)	(6.603)	**(2.242)**
$\Delta \log L$*North*	-.121	-3.025	.116****	**.132****
	(.084)	(2.864)	(.018)	**(.0468)**
$\Delta \log Y$ *North*	-3.490	-2.366***	-3.148*	**-2.232****
	(4.069)	(.756)	(1.922)	**(.792)**
R_{rural}	-.512***	-.766	-.336****	**-.342****
	(.143)	(1.328)	(.067)	**(.124)**
R_{wm}	-1.870****	4.452**	-2.153****	**-2.165*****
	(.286)	(1.779)	(.304)	**(.269)**
$\Delta \log G_{exb}$*North*	-10.150***	.741**	.485	**.676***
	(3.375)	(.358)	(.874)	**(.371)**
_cons	318.986****	-64.319***	53.288*	**10.989**
	(57.823)	(21.119)	(29.879)	**(10.408)**
within R2	0.016	**0.080**		0.036
between R2	**0.729**	0.287		0.497
overall R2	0.108	0.212	**0.398**	0.381

Table 5. Influence of income on mortality rates (OLS)
Breusch and Pagan Lagrangian multiplier test for random effects indicates, that hypothesis about their non-significance is rejected. The best is random effect model.

Bibliography

Демографическое будущее России. Под ред. *Л.Л. Рыбаковского* и Г.Н. Кареловой. М. 2001

Регионы России 2005. Росстат.

Социально-экономические факторы, оказывающие влияние на рождаемость. Аналитическая записка. Территориальный орган Росстата в Республике Коми. 2002. www.komistat.ru

Фаузер В.В., Рогожин Е.Н., Загайнова Г.В. Республика Коми в XX веке: демография, расселение, миграция. – Сыктывкар, 2001. – 124 с.

Notes

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2 Here North is dummy variable to indicate northern regions.

3 Standard errors of the estimated coefficients are in parentheses.

* Significant at the 90% level (two-tailed test).
** Significant at the 95% level (two-tailed test).
*** Significant at the 99.5% level (two-tailed test).
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