Methods for Measurements of Inequality and Poverty in big Cities and Urban Areas of Russian Federation

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Measurements of economic inequality and poverty in big cities and large urban areas come across a number of substantial methodological problems. The most crucial of them is how to estimate and correct deviations of results of household budget sample survey — the principal source of information on socioeconomic differentiation of population — from characteristics of inequality in income and consumption in the whole totality of population, i.e. in the general sample. A range of other problems concerns the choice of a system of indicators, giving the most informative aggregated representation about inequality, standards of living, and poverty. Overall inequality and poverty measures are insufficiently informative and can lead to misunderstanding socioeconomic conditions of population and effects of socioeconomic changes. It is highly relevant to supplement them with structural inequality measurements. They include estimates of inequality in economically adaptable and passive population groups, of proportions between incomes from different sources, of inequalities by income sources, and of endowments of inequality by income sources into overall inequality and inequality in distinguished population groups. Solutions to these methodological problems are especially important for correct explanation of features of socioeconomic stratification in Russian megalopolises Moscow and Sanct-Petersburg, and in large industrial areas with more than 80% of urban population, such as Samara, Saratov, Perm, Sverdlovsk, Chelyabinsk, Kemerovo, Novosibirsk, Krasnoyarsk and other similar regions. This report focuses on methods for solving the listed problems, and on analysis of dynamics of inequality and poverty in Russian large urban areas during the process of economic reforms. Especially effects of 1998's economic crisis and consequent economic growth on economic inequality will be estimated and explained. The estimates in this report are significantly different from the official ones by Russian State Committee of Statistics (Goscomstat), which substantially underestimate inequality and poverty magnitudes. They are also different from alternative estimates by some analysts, which overestimates both them. Such discrepancies are due to various methodological fallacies, especially with no taking into account significant biases of initial sample survey data with respect to the general sample in the estimates by Goscomstat and by these analysts.

The problem of sample survey data bias conditioned by the fact that many households, included into sample survey design, refuse to be interviewed, and probability of refuse is the more, the higher is household income. So probabilities of getting into sample households with different levels of income are different, and hence the sample income distribution turns out to be biased in respect with income distribution in the general sample. In other words, while the sample seems to be representative from viewpoint of standard statistical criteria, the sample income distribution significantly deviates from income distribution, which could be revealed in total population survey. This means that in order to obtain correct estimates of inequality and poverty we must assign to each household in survey sample a weight inversely proportional to probability to get a household of the same type into the sample. In the case of large urban areas such phenomenon has an additional characteristic: the richest groups of urban population with incomes from business undertakings, property and ownership are not represented in any survey sample. So, besides sample data reweighting, it is necessary to correct data on income and consumption in the right tail-end of income distribution in order to obtain accurate inequality estimates for the general sample.

In this report a new methodology for sample data reweighting and correcting developed and applied. It bases on comparing sample weighted average per capita indicators of income and expenditure (by main income sources and expenditure kinds) with corresponding indicators taken from macroeconomic balances. The choice of weights, assigned to sample observations, and corrections to incomes and expenditures in observations satisfies two conditions. The first is that weighted average indicators of corrected data on incomes and expenditures must coincide with corresponding indicators taken from macroeconomic balances. The second is that distinguishing information between initial data and reweighted corrected data must achieve its minimum under constraints, related with the balance requirements. Besides obtaining accurate estimates of income and expenditure distributions in the general sample, the use of this methodology allows us to reveal significant distortions of inequality and poverty magnitudes in Goscomstat's official estimates and in alternative investigations, giving contradictory estimates to those by Goscomstat. With the use of our new techniques we show that in all known household budget survey samples low income groups of population are represented excessively, whereas top income groups are represented weakly. But Goscomstat's sample data after reweighting and correction give sufficiently accurate approximations to income and expenditure distributions in the general samples for each Russian region, including all large urban areas. In reform process in Russia income distribution in Russia as the whole and in Russian large urban areas acquired a new complicated (multimodal) form, which cannot be described by simple parametric distribution models, traditionally used in statistics.

Decomposition of inequality and poverty indices by income sources allows us to reveal factors, determining effects of economical changes on inequality and poverty magnitudes. But the most important innovation consists in subdivision of overall inequality into normal inequality (in the case of poverty elimination), and excess inequality, related to poverty (defined as relative excess of the overall inequality over the normal one). Such subdivision, together with corresponding subdivisions by income sources, reveals substantial features of socioeconomic conditions in Russian megalopolises and large urban areas. Complete description of all these decomposition and subdivision techniques can be found in A. Sheviakov, A. Kiruta (1999), as well as description of sample data reweighting model. Now let us consider some estimates, obtained with the use of these techniques.

Estimates of inequality (overall G,F, normal GN, FN, and excess GE) and poverty (P) in Russia and in distinguished Russian big cities and large urban areas

Territories	Years	Indices					
		G	GN	GE	P	F	FN
Russia as the whole	1998	0.476	0.353	25.8	0.319	23.1	6.1
	1999	0.489	0.331	32.3	0.378	25.2	5.6
Moscow city	1998	0.510	0.501	1.8	0.073	31.8	20.9
	1999	0.561	0.538	4.1	0.159	45.4	19.8
St.-Petersburg city	1998	0.335	0.284	15.1	0.148	8.3	4.4
	1999	0.345	0.248	28.2	0.247	8.9	3.7
Sverdlovsk area	1998	0.433	0.311	28.2	0.331	18.6	4.9
	1999	0.439	0.295	32.7	0.370	19.4	4.6
Novosibirsk area	1998	0.434	0.283	34.9	0.277	20.1	4.3
	1999	0.400	0.197	50,7	0.457	16.2	3.0
Krasnoyarsk area	1998	0.442	0.383	13.4	0.215	19.8	7.3
	1999	0.446	0.368	17.6	0.260	20.6	6.5

Notations:

G — Gini index of inequality in money income

GN — Gini index of normal inequality in money income, defined as Gini index of censored income distribution, where all incomes below subsistence level (poverty cut-off) are enhanced up to subsistence level

GE = 100·(G — GN)/G — index of excess inequality, defined as the percentage of overall inequality, caused by poverty

P — poverty index in the form of D. Thon, P = (M/Z)(G — GN) + (DM/Z)(1 — GN), where M — mean per capita income, Z — subsistence level, DM — increment of M in result of enhancing all incomes below poverty line up to subsistence level

F — the ratio between incomes of top 10% and bottom 10% of population

FN — the value of index F, applied to censored distribution, as in definition of index GN; FN is an alternative measure of normal inequality

Structural decomposition of overall inequality in distinguished Russian big cities and large urban areas by main income sources

Cities and areas	Years	Inequality by income sources*				Endowments into overall inequality by income sources, %			
		1	2	3	4	1	2	3	4
Moscow city	1998	0.505	0.381	0.620	0.524	18.2	4.6	19.4	57.8
	1999	0.527	0.316	0.630	0.582	17.9	4.3	23.2	54.6
St.-Petersburg city	1998	0.334	0.245	0.431	0.346	43.7	10.4	13.3	32.7
	1999	0.335	0.200	0.422	0.379	42.0	7.0	15.5	35.1
Sverdlovsk area	1998	0.426	0.317	0.539	0.443	51.4	11.2	8.6	28.8
	1999	0.438	0.261	0.537	0.490	49.4	9.5	10.6	30.5
Novosibirsk area	1998	0.446	0.332	0.563	0.464	45.2	11.4	7.9	35.5
	1999	0.388	0.235	0.478	0.434	41.7	9.4	7.1	43.3
Krasnoyarsk area	1998	0.437	0.326	0.551	0.454	57.3	9.4	5.8	27.6
	1999	0.443	0.265	0.542	0.495	54.7	6.4	8.1	30.9

*List of income sources:

1 — incomes from wages and salaries
2 — incomes from social transfers
3 — incomes from property and ownership
4 — incomes from business undertakings and other sources

The first table shows that normal and excess inequality measures vary across large urban areas with more contrast than overall ones. In fact, overall inequality is statistically independent on macroeconomic indicators across Russian regions, while normal and excess inequalities have strong and robust explanations in dependence on macroeconomic factors. Dependence of *normal* inequality on per capita regional gross domestic product across the whole set of Russian regions is the same as in Kuznets' hypothesis, i.e. it has form similar to inverted "U". It is important to note that poverty lines in Russian regions have normative-statistical definition as total expenditure levels, sufficient for normal consumption of foods, given observed expenditure structure and regional consumer price level. The second table shows that extremely high overall and normal inequality in Moscow is due to very high endowments into inequality by incomes from business undertakings, property and ownership. Generically in cross-section, the more definite is principal inequality source, the more is normal inequality, and the lower are excess inequality and poverty.

Reference

A. Sheviakov, A. Kiruta, 1999. *Economic inequality, standards of living, and poverty of population in Russia and its regions during reforms: measurement methods and analysis of causal dependencies.* — Moscow, CSEM RAS and Goscomstat of Russian Federation