Discussion Paper No. 2003/67

Quo Vadis? Inequality and Poverty Dynamics across Russian Regions

Ruslan Yemtsov*

September 2003

Abstract

This paper analyses regional data on inequality and poverty in Russia during 1994-2000 using published series from the regionally representative Household Budget Survey. The paper finds that the share of inequality in Russia coming from the between-regions component is large (close to a third of the total inequality), growing, and accounts for most of the increase in national inequality over 1994-2000. The paper demonstrates an absence of interregional convergence in incomes across Russian regions using various techniques. On the other hand, the paper finds evidence of convergence in inequality within regions, trended towards an internationally high level. Based on these two findings, the paper projects dynamics of inequality and poverty in Russia over a ten-year time horizon. The projections show that if the observed trend continues, by 2010 the absolute majority of Russia's poor will be concentrated in a few permanently impoverished regions, while relatively more affluent regions will become virtually free of poverty. Finally, the paper relates fluctuations in inequality within regions to a set of factors classified into four broad categories: endowments and initial conditions, preferences, policies, and shocks. Among these factors short-run fluctuations of the unemployment rate are revealed as significant and strong signals of inequality.

Keywords: Russia, transition, inequality, poverty, regional economics, convergence
JEL classification: C13, C15, D31, P29, P27, R12, R23, R29

---

*The World Bank

This study has been prepared within the UNU/WIDER project on Spatial Disparities in Human Development, directed by Ravi Kanbur and Tony Venables.

UNU/WIDER gratefully acknowledges the financial contributions to the 2002-2003 research programme by the governments of Denmark (Royal Ministry of Foreign Affairs), Finland (Ministry for Foreign Affairs), Norway (Royal Ministry of Foreign Affairs), Sweden (Swedish International Development Cooperation Agency-Sida) and the United Kingdom (Department for International Development).

Acknowledgements

This version of the paper reflects considerable revisions after its first presentation at the WIDER-Cornell-LSE Conference on Spatial Inequality and Development, at the London School of Economics on 28-30 June 2002, and at the WIDER Workshop on Microsimulation of Tax Benefit Reform in Russia, in Helsinki 2-3 August 2002. The author is indebted to Tony Shorrocks for detailed comments and many helpful suggestions. I am also grateful to Jim Davies and to David Weinstein for reviewing the first draft. The paper was prompted by the author's involvement in the poverty work on Russia at the World Bank lead by Radwan Shaban. The paper, however, does not represent any form of an official statement on the part of the World Bank. Ravi Kanbur motivated the author to pursue the study of regional inequality in Russia, and Martin Ravallion encouraged the work. The invaluable assistance provided by the staff of the Household Budget Survey Department of the Russian Goskomstat, in particular Elena Frolova and Tatyana Velikanova is acknowledged. Ksenia Krivenko, Vladimir Medvedev and Oleksyi Ivashenko helped to process the data. Finally, huge thanks go to Lorraine Telfer-Taivainen for her careful editorial work on the text and language, along with extremely useful suggestions on the readability of the study.

UNU World Institute for Development Economics Research (UNU/WIDER)
Katajanokanlaituri 6 B, 00160 Helsinki, Finland

Camera-ready typescript prepared by Lorraine Telfer-Taivainen at UNU/WIDER
Printed at UNU/WIDER, Helsinki

ISSN 1609-5774
ISBN 92-9190-518-6 (printed publication)
ISBN 92-9190-519-4 (internet publication)

Introduction

The increase of inequality during the transition appears particularly large in Russia compared to countries in Central and Eastern Europe.[1] The economic recovery, on the other hand, has been retarded. As a result of high inequality and depressed real incomes, poverty has become widespread. These two facts—high and rising inequality and protracted transitional recession—appear to be linked in the perception of the Russian transition by many scholars.[2] Many of these perceptions are based on a stark contrast between the high inequality in Russia and moderate levels of inequality observed in more successful transition economies.

The magnitude of the inequality increase in Russia remains perplexing and demand explanation. Very often the comparison of inequality across countries in transition overlooks differences in their size, geography and heterogeneity within the units that are being compared. Russia with its climatic, ethnic and economic variety stands to have a higher underlying level of inequality than more homogeneous countries, and the direct comparison of its inequality to other countries is therefore not very informative.

This paper looks closely at the contribution of regional variations to the overall inequality in Russia. In contrast to previous studies on the subject, which relied on small-scale survey data,[3] this paper uses data from the regionally representative Russian Household Budget Survey (HBS) over 1994-2000, and therefore provides a full regional extended time coverage.[4] The share of inequality due to differences in mean real incomes across regions is found to represent one-third of the total inequality in Russia—significantly more than in any country in Europe. The paper also finds that the increase in national inequality between 1994 and 2000 can be mostly accounted for by increasing interregional inequality. But, still at least two-thirds of the total inequality in Russia at any point in time is accounted for by inequality of within-region distributions.

Having established that inequality in real incomes across Russian regions is indeed a key driving force behind the increase of the inequality at the national level, the paper focuses on two particular questions. How and why have Russian regions become increasingly diverse in their mean real incomes? And what determines the evolution of inequality *within* regions?

---

1 As reported in Milanovic (1999a), Gini coefficient in Russia increased from 0.22 to 0.48 between 1989 and 1995, in contrast to 0.26 to 0.36 increase in Poland over the same time period. World Bank (2000) and Förster *et al.* (2003) confirm this conclusion.

2 See, for example the review in Campos and Coricelli (2000).

3 Such as Commander *et al.* (1999) and Förster *et al.* (2003) for Russia.

4 Kolenikov and Shorrocks (2003) used HBS data for only one year, 1995, to study the underlying factors of poverty and inequality at the level of regions; Fedorov (2002) used only data on money incomes.

The first question boils down to a known problem of convergence. A convergence framework can be applied to countries, or regions, to see whether over time there is a tendency for them to converge at income levels. The simple convergence model overlooks, however, complex dynamics across the entire distribution, and several studies have looked at the issue of convergence through a mobility analysis which takes into account the full spectrum of distribution. Researchers have applied either the first[5] or second[6] approach to study interregional inequality in Russia. However, the existing studies rely on a rather poor welfare indicator,[7] and a systematic study combining both approaches is not yet available. Despite data limitations, this paper concludes that there is *no* apparent tendency towards convergence, especially for the latter period under study (1997-2000). The transition matrix approach suggests emerging divergence across regions, with the poor regions staying poor or getting even poorer, and the rich regions getting richer.

The second question—whether regions increasingly look alike in their internal distribution of incomes—receives an affirmative answer. The paper applies a test for inequality convergence[8] to Russian regional data and finds statistically significant, albeit slow, convergence in regional levels of inequality towards a common (and high) level. Based on this finding, the paper argues that the future of the poverty dynamics in Russia is determined by the interregional inequality. As the inequality is found to be a very significant factor of poverty dynamics in Russia,[9] the issue of economic divergence across Russian regions has far-reaching social and political consequences. Observed differences between regions in their *current* levels of inequality can be interpreted as deviations from a common level of inequality, determined by the fundamental market forces. But it is important to establish what explains these deviations, and this is what the last part of this paper attempts to do.

The paper is organized into four sections. The first section briefly presents data and reviews basic trends for poverty and inequality for the country as a whole and its regions. The second section applies decomposition techniques to inequality at the national level and establishes trends in regional levels of inequality and regional real incomes, and their implications for poverty. The third section attempts to disentangle key factors behind variables and uneven changes in inequality across Russian regions. The fourth section concludes. To sum up, the first part of this paper distils the data on regional inequality

[5] Mikheeva (1999); Carluer and Sharipova (2001).

[6] Dolinskaya (2002).

[7] They use CPI to deflate the nominal money incomes to constant prices to a base year. This approach overlooks the poor quality of regional CPI data in Russia, especially for the earlier years, and/or assumes the equality of price levels across regions at a base point. We apply a robust measure which is based on the regional cost of the minimum subsistence (or poverty) basket as deflator.

[8] As developed by Ravallion (2001), based on an initial attempt by Benabou (1996).

[9] Shorrocks and Kolenikov (2001).

from published series, the second attempts to understand the resulting data structure, and the third brings in additional information to interpret this structure.

1 Data, methodologies and trends

The HBS, conducted by the Russian statistical agency (Goskomstat), has until now remained relatively unexplored as a source of welfare data in Russia. Given its unparalleled geographical coverage, it is surprising that published poverty data based on this source are little used in the economic literature on Russia—in contrast to a widespread use of similar data sources in other countries (EU, India, Brazil, etc.). This section briefly presents the context important to the interpretation of such data, by showing trends in incomes, inflation, poverty, inequality and regional differences in Russia over 1990-2000.

1.1 Data on regional incomes, poverty and inequality

Researchers focusing on poverty and inequality during Russia's transition have, to a large extent, relied on the only publicly available micro dataset on household welfare in Russia, the Russian Longitudinal Monitoring Survey (RLMS).[10] However this dataset, known to provide nationally representative data, is too small to give regionally representative results and can, thus, be of only limited use to study the regional determinants of poverty and inequality. The HBS conducted on a regionally representative sample of close to 50,000 households[11] provides an alternative dataset. These data constitute the basis for the published official series on poverty and inequality in Russia starting in the late 1980s. However, the primary records of HBS remain unavailable to researchers. Published data, more exactly, regionally disaggregated poverty data, is the main data source for this paper.

There are significant inconsistencies in the official methodology of compiling national-level data on inequality and poverty from regional distributions.[12] This paper is not aimed at assessing the peculiarities of such methods applied by Goskomstat, but it is important to mention here its major drawback, which is, since national-level estimates are produced with their own methods, they cannot be disaggregated into regional components. The paper uses results of a consistent method to estimate the national inequality and poverty based on regional data. This method uses the properties of distribution (lognormal) used by Goskomstat to adjust the household-level data, and obtains a full set of distribution parameters from only a limited set of published figures—the method is discussed in detail

10 More details are provided at the website www.cpc.unc.edu/rlms. A modified RLMS dataset represents Russia in the Luxembourg Income Study Database www.lisproject.org.

11 The Russian micro census of 1994 was used to completely revamp the sample in 1996 with a specific aim to achieve regional representativeness.

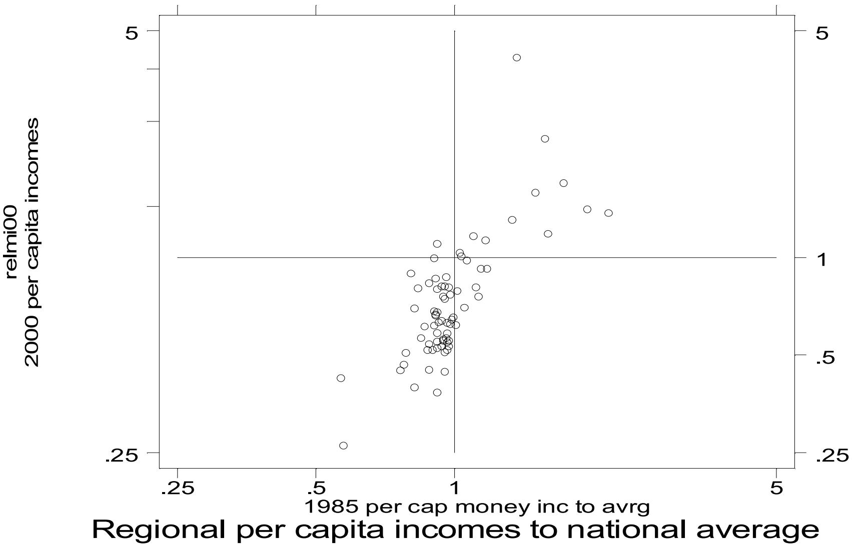
12 As demonstrated, for example, in Sheviakov and Kiruta (2001).

in Yemtsov (2003).[13] This method also allows the calculation of inequality indices by region, so far not published by Goskomstat.

1.2 Context: regional trends in nominal incomes in 1985-2000

Even before the economic reform of 1992, Russian regions were characterized by quite noticeable differences in incomes. These widened by 2000, as shown in Figure 1. To avoid problems with comparability of price levels over time, all regional average incomes are expressed in the figure as a ratio to the national mean per capita money income in the current year.

Figure 1: Per capita incomes in Russian regions, 1985 and 2000



Note: average weighted by population size. Log scale.
Source: data from Goskomstat (2001).

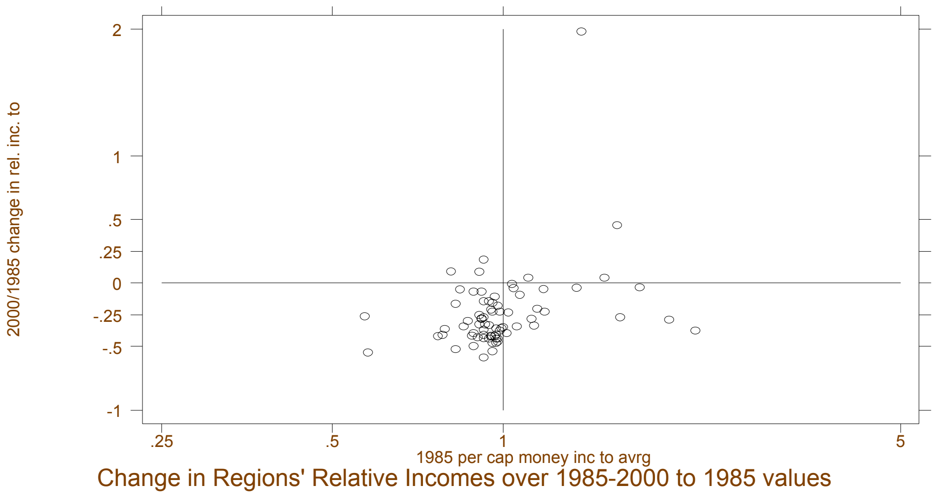
All dots (each representing one region of Russia) at the beginning of the period (1985) were in the interval ranging from 0.5 to 2 of national mean incomes (horizontal axis). The spread has noticeably increased by 2000, and the range between maximum and minimum incomes per capita extended to 0.25-5 of national mean incomes. Thus, the regions were drifting clearly apart. Crossing lines represent the national means (=1) for 1985 (vertical) and 2000 (horizontal). If the interregional inequality is to be measured by the spread, it has increased noticeably over the transition.

Next, Figure 2 demonstrates very peculiar dynamics of this widening. The figure plots the change over the period in the relative incomes—with regions with incomes increasing faster than national means plotted as positive values, and regions with falling incomes compared to national mean as negative values—against initial position of each region in

13 The idea behind the estimate is to use the officially published data on poverty by region. Jointly with the data on regional poverty lines and mean incomes, it gives a parameter of inequality consistent with Goskomstat derivation of distribution statistics using lognormal function for each region. The regional distributions are then aggregated back to obtain consistent inequality measures at the national level.

1985 (on the horizontal axis). All but three regions with initial incomes *below* the national average (that is, to the left of the vertical line on Figures 1 and 2) have seen their position vis-à-vis national mean deteriorate by 2000 (falling below the vertical line on Figure 2).

Figure 2: Change in relative regional incomes over 1985-2000 versus initial (1985) values



Note: Weighted by population. Log scale on horizontal axis.

Source: Computed based on Goskomstat (2000).

Many regions have seen their standing deteriorate very significantly; 25 to 50 per cent. One region above the national mean in 1985, Moscow, has improved its incomes from just over 35 per cent above the national mean in 1985 to four times the national average. Its move is represented by an outlier position on the top of the graph. Most of the regions slightly above the national average in 1985 however, slipped down, or have maintained their relative position. Interestingly enough, bar Moscow, the number of regions improving their standing is equal (to three) for regions originally below and above the mean. Figure 2 reveals complex dynamics, suggesting intense reranking. Initial position seems to matter relatively little in determining the performance over the transition. The conclusion from Figures 1 and 2, however, has to be cautioned for at least two reasons. First, it does not take into account the differences in price levels across regions of Russia. Second, it assumes that incomes of the regions' populations are measured with the same precision in 1985 as in 2000.[14] We will now examine in detail the implications of the first to address the second problem, and will from now on limit the period of analysis to 1992-2000.

1.3 Regional differences in the cost of living

Noticeable differences in price levels were observed in Russia already in 1985, and they widened considerably during the inflation which followed price liberalization in early 1992, amounting to some 2,500 per cent in 1992. Inflation declined to 22 per cent in 1996, to rise again during the crisis of 1998-99, with prices more than doubling between the third

---

14 Pretransition series are known to contain significant measurement errors, as documented in Atkinson and Micklewright (1995).

quarter of 1998 and the second quarter of 1999. The national price level, as measured by the consumer price index (CPI) between 1992 and 2001, increased 700 times.

Within this national inflation there were substantial differences across regions. Researchers working with regional statistics tend to take these differences into account by applying some form of price index (most often CPI) to the base (1985 or 1991).[15] Such an adjustment, however, overlooks the fact that already in 1992 regions had very different price levels. The only way to correct for these is to take into account differences in the cost of a fixed basket of goods. In Russia this widely accepted fixed basket of goods has existed since 1992 as an official national poverty line based on a subsistence minimum (referred to as the minimum subsistence income or MSI).[16] Over the period under study, the cost of the minimum subsistence basket per capita rose from RR635 in January 1992 to RR379,000 in December 1996, and then increased further to 908 new rubles[17] by the end of 1999 (RR908,000 in old rubles)—more than a thousandfold increase. Most importantly, the costs of this basket were monitored and reported regionally during 1992-2000.[18]

Figure 3 plots regional poverty lines in 1985 against 2000. To maintain consistency with previous figures, the values used are regional poverty lines divided by the national average poverty line for the corresponding year, and the figure uses the same scaling options. Figure 3 shows that there has been already a very high differentiation of regional living costs in 1992, and these differences, though narrowing somewhat over time, have not dwindled much by 2000. Therefore an obvious solution to achieve comparability of welfare measure across regions is to take a ratio of nominal regional incomes to the current cost of MSI. Methodological and measurement issues related to the adaptation of such a measure are fully discussed in Yemtsov (2003).

This paper uses regional money incomes divided by the regional poverty lines as a welfare indicator.[19] The alternative welfare indicator used in the literature—based on regional CPI

---

15 Example of such an approach is Mikheeva (1999).

16 The basis for establishing a poverty basket, or MSI, was a presidential decree on 2 March 1992. This decree allowed preparation of the official guidelines for region-specific baskets by the labour ministry published on 10 November 1992. These guidelines remained unchanged until the first quarter of 2000, when new methodology was introduced. This methodology itself takes its origin in a federal law of 24 October 1997 (No. 134) and the corresponding guidelines issued by the labour ministry and Goskomstat on 28 April 2000 (No. 36/34).

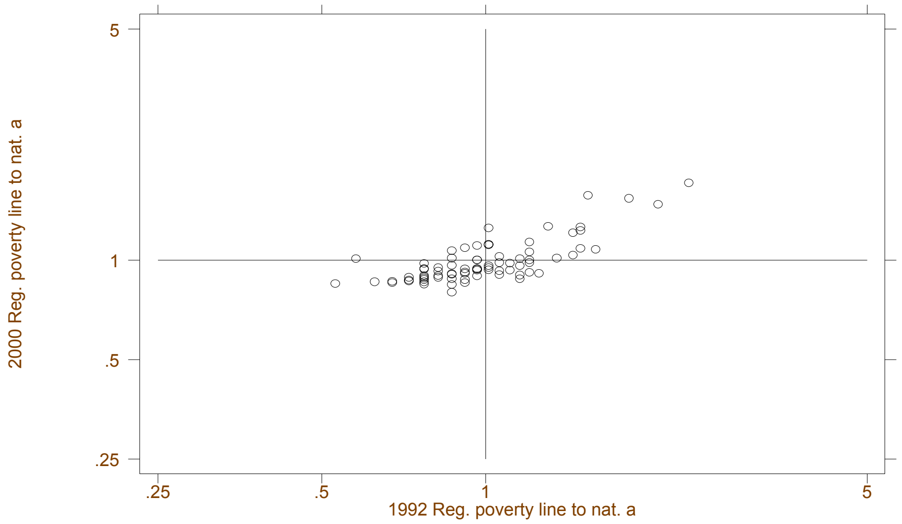
17 The redenomination in January 1998 lopped off three zeros from the Russian currency. The government took elaborate precautions to ensure the population's confidence in the new currency with the old ruble notes circulating alongside the new ones for the whole of 1997. The old notes were exchangeable for the new currency until 1 January 2002.

18 Note that the composition of the basket varies across six climatic zones, and cannot be judged as a fully fixed bundle. The analysis in this paper assumes that these regional differences in the composition of the basket does not represent differences in the utility levels, and take into account only differences in local tastes and climatic conditions.

19 Money incomes may seem somewhat an inferior indicator of living standards especially in the presence of significant in-kind components of consumption. However, money income is the only welfare index defined

indices with a base of 100 in 1992—give quite different results, as the cost of the CPI basket differs significantly from the cost of a basket of food items consumed by the poor. This difference has to be kept in mind while comparing results presented in this paper with other studies.

Figure 3. Regional poverty lines in 1992 and 2000 to the national average poverty line



Note: Average weighted by population size. Log scale.

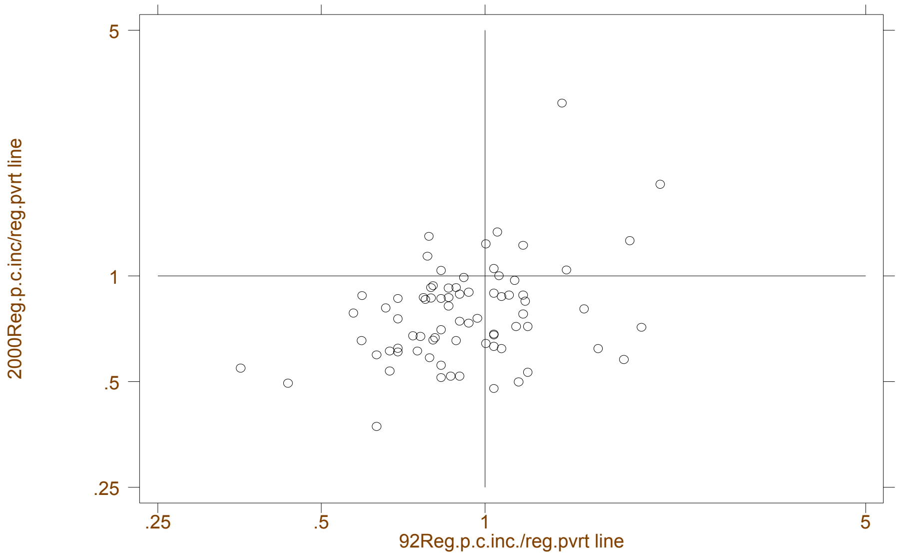
Source: Goskomstat (various).

1.4 Regional real per capita incomes between 1992 and 2000

Adjusting incomes by the regional differences in the cost of living substantially enriches the story on the regional dynamics of living standards. Figure 4 shows the regional variation of incomes per capita divided by the corresponding poverty lines, expressed as a ratio to all-Russia means for 1992 and 2000. All scaling conventions of previous figures are retained. Unlike the graph on relative *nominal* incomes, this one shows more dispersion across regions and significant reranking in region position vis-à-vis national average. The regions form a cloud rather than a line, but there is no sign of convergence or divergence prima facie, in that poorer regions are not necessarily catching up or increasingly lagging behind. The figure suggests seemingly chaotic movement in all directions. Most of such action happened in the middle of the distribution. It is also clear that the position of the region at the start of transition does not seem to have predetermined its performance by the year 2000. Figure 4 captures regions at the start of transition and eight years later. Such a comparison does not fully capture movements between the extreme points in time. The period of 1992-2000 was remarkably turbulent and produced very rich dynamics.

consistently over 1992-2000. Moreover, this is the only indicator used to officially assess the extent of poverty by regions in Russia. Due to upward adjustments to the household income data to match macroeconomic estimates of incomes, practiced by Goskomstat, money incomes are consistently higher than household survey-based measures of total consumption (Yemtsov 2003).

Figure 4: Regional per capita income to regional poverty lines in 1992 and 2000, expressed as ratio to national averages



Note: Average weighted by population size. Log scales.

Source: Calculated based on Goskomstat (various) and annually reported poverty lines.

1.5 Poverty and inequality between 1992 and 2000

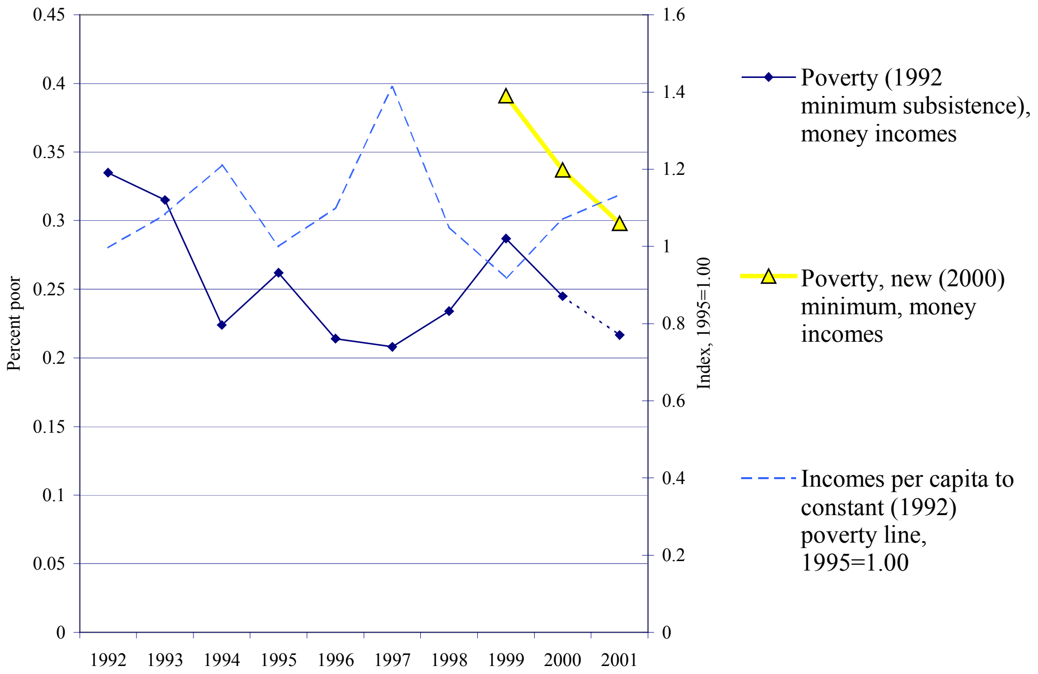
Figure 5 shows on a national level the evolution of per capita incomes relative to the cost of the poverty basket (dashed line). The second line captures the evolution of poverty incidence as measured by the share of the population with money incomes below the poverty line. The graph also illustrates the impact on the measured welfare index from an introduction of the new (higher) poverty line adopted as the new official minimum subsistence level in 2000 (the line marked with triangles for 1999-2001).

Figure 5 shows that starting with the shock of 1992, the evolution of real incomes in Russia follows a clear two-hump trajectory: rising before 1995, with a subsequent fall in the (now forgotten) crisis of 1995, and rising again to a historic high of 1997, to fall in the 1998-99 crisis. Although the costs associated with the 1998 meltdown were considerable—real GDP fell by 5 per cent—the recession proved to be short-lived. By the end of 2000 poverty returned to its precrisis level and by 2001 real incomes were at 10-15 per cent above the level of 1992, if one uses the poverty line deflators. The corresponding story of poverty looks like a mere reflection of the trend depicted by the evolution of money incomes. Extrapolating the poverty rate based on the old line to 2001 data (dotted line), the figure reveals that by 2001 poverty had gone down to the that of the lowest levels of the 1992-2000 period, if measured with a constant standard. The fact that there is such stability in the relationship between average real money incomes (expressed as a ratio to poverty line) and the poverty rate, as depicted by the figure, would suggest that inequality has remained roughly stable.[20] The officially published data on inequality do not support this conclusion.

[20] Any change in poverty can be decomposed to the change in the mean and the distribution , as shown by Datt and Ravallion (1998). Shorrocks and Kolenikov (2001) propose an approach that explicitly includes

These data, however, have been a subject of controversy in the research literature, and is known to contradict the evidence from publicly available surveys (RLMS).[21]

Figure 5: Real incomes and poverty in Russia, 1992-2001



Note: Officially published poverty headcount and calculated changes in per capita money incomes using published poverty lines, 1992-2001. The 2001 poverty rate with the old basket is the author's extrapolation based on published distribution (grouped data).

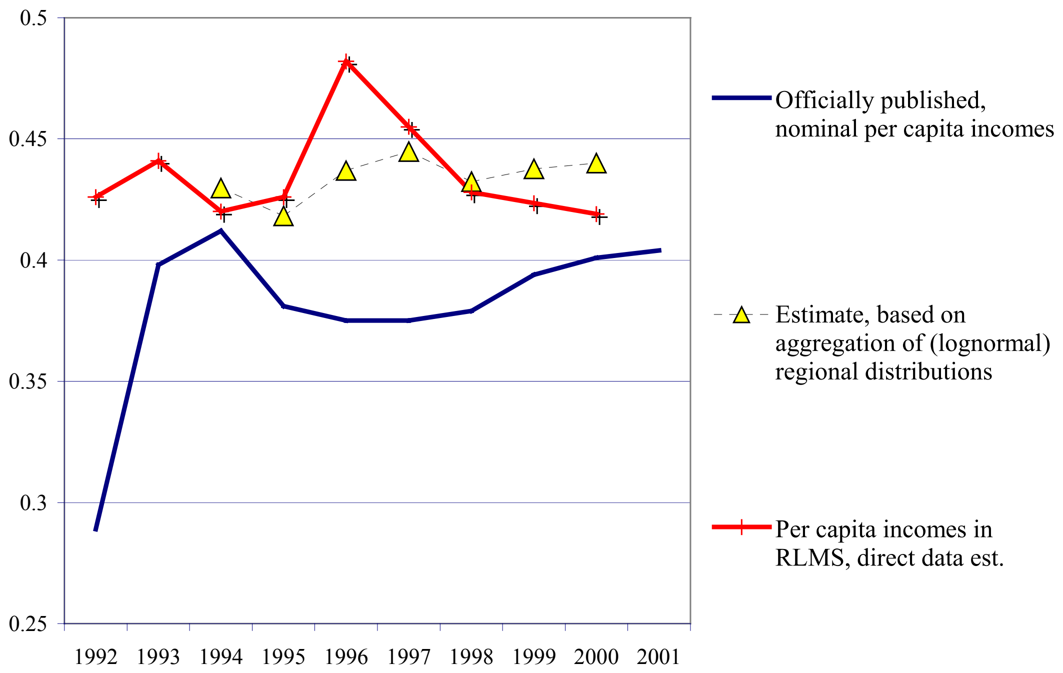
Source: Goskomstat (various) and author's calculations.

The series for official data on inequality and RLMS-based measures are plotted in Figure 6. It also plots regionally consistent series on inequality computed by Yemtsov (2003). Unfortunately, regionally disaggregated data are available only from 1994. This cuts two starting years from our analysis and leaves 1994-2000 as the time frame for analysis in this study. The figure shows notable difference not only in the levels, but also in the trends for inequality for data from different sources. According to official data, highest inequality was observed in Russia in 1994. In the estimated series inequality highs are recorded in 1996-97, the time when the inequality was decreasing according to Goskomstat data. In the 1998-99 crisis inequality did increase according to officially published data, but consistent estimates based on the same sources show that it actually went down. This paper is based on own estimates of the inequality (series marked by triangles), which is the index consistently decomposable by all regions.

changes in the poverty line in this decomposition framework. However, as our measure of real incomes are money incomes divided by (a constant in real terms) poverty line, this factor can be omitted from future analysis.

21 As documented in Commander *et al.* (1999).

Figure 6: Gini index for incomes per capita, Goskomstat



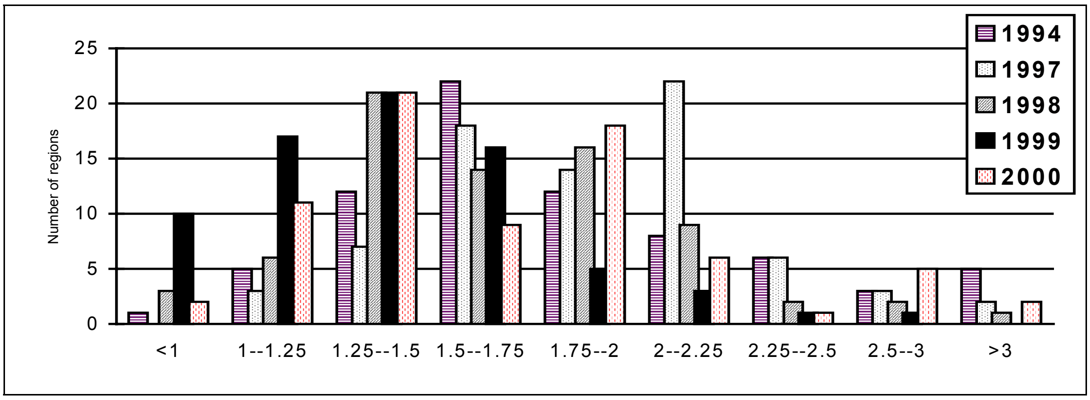
Source: Darker line; Goskomstat (various) for official data on inequality in nominal incomes. Lighter line; RLMS and estimates (money incomes to regional poverty lines) Commander *et al.* (1999) for 1992-93, and Lokshin (2001) for subsequent years. Triangles: own estimates based on regional data published by Goskomstat.

1.6 Regional inequality in Russia

Figure 4 presented the scale of regional disparities in Russia in 1992 and in 2000. Averaging over the years 1992-2001, the richest region in Russia was Moscow with incomes on average exceeding 3 times the national mean. At the opposite extreme, the Ingush Republic in North Caucasus was the least prosperous, with real money per capita equal to around 30 per cent of the average. Tuva Republic and Chita Oblast in Siberia and Dagestan in North Caucasus were second to last, with 50-70 per cent. Among the locations with the highest welfare are the predominantly resource-rich and/or export-oriented regions of Siberia (Tyumen oblast, Krasnoyarsk krai, Irkutsk, Kemerov and Tomsk oblast) and the northwest (Republic of Komi, Murmansk). In the richest group there are also several industrially developed regions of the Volga Basin (Tatarstan Republic, Rostov, Perm and Samara). The poorest Russian regions comprises, in addition to those already mentioned, South Siberia and several agrarian regions of the Volga Basin (Marii El, Chuvash and Mordova republics, Penza and Kirov oblast).

The distribution of regions by their real incomes was not constant over time. The extent of such changes is revealed from the distribution of regions by the ratio of the regional average money income per capita to official subsistence levels or regional poverty lines (see Figure 7). For example, this ratio in 2000 was below 1.25 in 13 regions, but above 2.5 in 7 regions. Figure 7 shows that the histogram of distribution by real incomes was characterized by twin peaks in 1997, 1998, and 2000. Such a distribution form suggests a tendency towards polarization. The figure records notable instability in the distribution of regions by their levels of welfare over 1994-2000. It also shows a significant shift in the distribution by groups in 1999 following the crisis, and a subsequent recovery mirroring the precrisis distribution.

Figure 7: Distribution of Russian regions by the average money income/poverty line ratio, 1994-2000



Source: Ovcharova *et al.* (2001). For 2000, author's calculations using Goskomstat data.

Data also suggests that, when measured by an alternative measure of living standards,[22] the regional disparities in the living standards are almost as high as in the case of monetary incomes. A simple Spearman correlation of the ranks between them is 0.75–0.79 for 1997-2000, and the Kendall's tau is between 0.50 and 0.60. Most of the regions are ranked as the poorest according to both monetary incomes and disposable resources. Therefore whichever measure is applied the size of regional disparities in Russia is large. When measured by the ratio of incomes in the top to bottom decile of regions, regional economic inequalities in Russia over this period (1:2.8) are at par with differences between regions of *countries* constituting the European Union, and much bigger than those between *states* in the United States.[23] The size and persistence of European regional inequalities has attracted much attention in the economic literature and is one of the key policy concerns of the EU, whereas in Russia it has only recently become a widely discussed policy topic. The spread of regions by their levels of inequality is substantial. Russia embraces both very egalitarian and very unequal places. The Gini coefficient in 1999 varied from a low of 0.212 (Republic of Karachaevo-Cherkessk) to a high of 0.626 (Moscow). Noteworthy, the rates of poverty in these locations in the same year were 64.6 per cent and 23.3 per cent, respectively. This suggests that while in some regions of Russia people can be equally poor, in others they are unequally well-off.

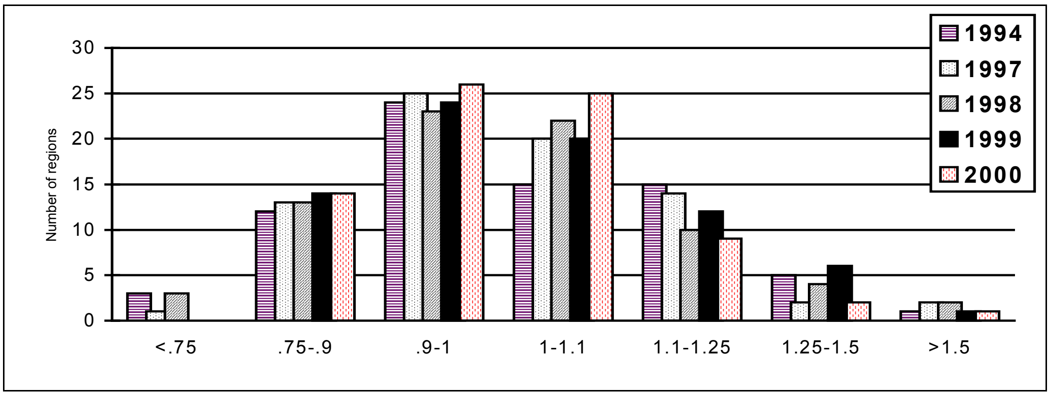
Figure 8 presents a histogram depicting changes over 1994-2000 in the distribution of regions by the level of their Gini indices for per capita incomes (expressed as ratios to the

[22] See Yemtsov (2003) for a detailed discussion.

[23] See Boldrin and Canova (2001) for a review.

median level of inequality in the country). Regions with values below 1 have levels of Gini index below the inequality in the median Russian region for the corresponding year, and those above one, record higher inequality. The distribution of Russian regions by their own inequality levels has not experienced as radical changes as their distribution by income levels. The figure shows that while most regions remained grouped quite closely to the median level of inequality, some important changes have nevertheless occurred. Specifically, the group of regions with inequality just above the median level (from 1 to 1.1) has increased dramatically between 1994 and 2000, while the group of regions with extreme values of inequality either vanished (group of less than 75 per cent of the median level), or was reduced.

Figure 8: Regional Gini indices for per capita incomes at ratio to the corresponding median value of Gini for 1994-2000



Source: Yemtsov (2003) based on published regional data.

This section shows that the performance of the Russian regions in transition is very diverse. Some regions have experienced dramatic changes in the level and the distribution of real incomes, and none of the regions were unaffected by changes. Overall, the set of dynamics produced in the Russian transition is very complex and these represent an unrivalled subject to study determinants of the variation in regional poverty and inequality.

2 Trends in regional inequality and poverty in Russia

Section 1 of this paper demonstrated a very complex set of dynamics across Russian regions over 1994-2000 in terms of real income and their distribution. This section will establish whether one can discern any orderly trends in these movements. The first part presents an integral view of the distribution as an aggregate of its regional components. Second and third parts will analyse convergence or divergence across regions in their mean incomes. The fourth part reveals trends in within-region inequality. The fifth part examines the implications for poverty. Each topic starts with a short review of the literature, followed by the theoretical framework and analysis of Russian data.

2.1 Russian regions in 1994-2000: more inequality between the unequal

To what extent is the growing inequality in Russia due to increased regional variation? As the transition started, several regions, such as Moscow, St Petersburg and Tyumen, benefiting from their natural resources, unique geographical position and accumulated human capital, significantly improved their standing vis-à-vis other regions. None of the popular representations of Russian realities is more dramatic than a huge contrast between the prosperity of Moscow and desperately grim images from Russian provinces. Is it possible to explain Russian inequality by this gap between a limited group of successful regions and a lagging majority?

These questions have prompted several researchers to analyse the regional dimension of inequality in Russia. Decomposition of inequality provides a useful accounting framework to assess the relative importance of between regional inequality and within regional distribution. Earlier attempts to decompose inequality (see Commander *et al.* 1999) suggested that regional differences play a very important role in explaining inequality changes at the national level. But this attempt relied on RLMS with its limited regional dimension. The findings of Commander *et al.,* however, are quoted in the literature[24] and provide motivation for further analysis. Now, when the basic picture of inequality inside each region based on HBS is established, one may attempt to provide a more accurate representation of the regional inequality and its sources.

Disentangling components of inequality is a useful step in the analysis of regional polarization,[25] another hotly discussed topic in the transition literature. In the Russian context, Fedorov (2002) introduced an explicit distinction between regional inequality and regional polarization in Russia. Relying on monetary income and expenditures per capita he finds that although regional inequality and polarization increased rapidly during 1991-96, the increases levelled off in the late 1990s. It shows that the main dimensions of increasing polarization are not so much that west–east, capitals–provinces, or ethnic Russian–national republics divides, but that factors such as export shares of regions or the relative sizes of their capitals do have effect. Fedorov posed questions on how the inequality between regions is related to inequality within regions, and how important was the increase in the interregional inequality in the Russian transition as an engine of overall inequality. Because of the data limitations these questions remained without answer. This section addresses the gap.

Commonly used inequality indices, such as Gini index or decile ratios are not strictly decomposable by population groups. But following Bourguignon (1979) and Shorrocks (1980) one can decompose the total level of inequality as measured by the Theil

24 Dolinskaya (2002).

25 As one of the indices of polarization uses the relationship between the between and within components of inequality (Kanbur and Zhang 1999).

generalized entropy inequality indices exactly into the sum of W_g, inequality from within each of the groups in the partition of the population n into G disjoint groups (where a subgroup g consists of n_g individuals), plus the term representing the inequality between groups, B. Here groups are regions. A similar approach to the Gini index would leave a residual component due to the overlap of distributions, which is difficult to interpret.

Let y_i be an income of the ith household (out of population n). The Theil entropy index T is defined by:

$$T = \frac{1}{n}\sum_{i}^{n} \frac{y_i}{\mu} \log \frac{y_i}{\mu} \tag{1}$$

where μ is the mean income, while the Theil mean log deviation index T_0 is given by:

$$T_0 = \frac{1}{n}\sum_{i}^{n} \log \frac{\mu}{y_i} \tag{2}$$

If total inequality is divided in the components B (between groups inequality) and W_g (within groups), then T and T_0 are:

$$T = W + B = \sum_{g=1}^{G} \left[\frac{n_g}{n} \frac{\mu_g}{\mu} \left(\frac{1}{n_g} \sum_{i \in g}^{n_g} \frac{y_i}{\mu_g} \log \frac{y_i}{\mu_g} \right) \right] + \sum_{g=1}^{G} \frac{n_g}{n} \frac{\mu_g}{\mu} \log \frac{\mu_g}{\mu}$$

$$T_0 = W_0 + B_0 = \sum_{g=1}^{G} \left[\frac{n_g}{n} \left(\frac{1}{n_g} \sum_{i \in g}^{n_g} \log \frac{\mu_g}{y_i} \right) \right] + \sum_{g=1}^{G} \frac{n_g}{n} \log \frac{\mu}{\mu_g} \tag{3}$$

Where W and W_0 represent the sum of the contribution to the overall inequality (as measured by T and T_0 respectively) due to the inequality *within* each of the subgroups of the population, and B and B_0 in the contribution to the national inequality due to the inequality *between* mean incomes μ_g for subgroups g=1,...,G. If the weight of gth group in the population is given by w_g, and the income share by v_g, and T_{0g} and T_g are correspondingly Theil mean log deviation and Theil entropy indices for the region g, the following basic formula for decomposing both Theil indices into the within groups (first term) and between groups (second term) components holds:

$$T = W_g + B = \sum_{g=1}^{G} v_g T_g + \sum_{g=1}^{G} v_g \log \frac{v_g}{w_g},$$

$$T_0 = W_{0g} + B_0 = \sum_{g=1}^{G} w_g \, T_{0g} + \sum_{g=1}^{G} w_g \log \frac{w_g}{v_g} \tag{4}$$

A question such as 'how much inequality can be attributed to the inequality between households in different regions?' might have two interpretations: (i) 'how much less inequality would be observed if regional differences are the only source of income differences?'; and (ii) 'by how much would inequality fall if region-related differences were eliminated?'. Only by using T_0 measure do we get numerically equivalent answers to these two questions, and we will rely mostly on this measure. However, we will also report results from the decomposition of T.

The lognormal distribution has a useful property,[26] according to which two Theil indices for each region g are:

$$T_{0g} = T_g = \frac{\sigma_g^{\ 2}}{2} \tag{5}$$

parameters σ_g for each region g are estimated based on published data. Note, however, that the national distribution is a sum of regional lognormal distributions (and thus generally not a lognormal distribution itself), and the two national level Theil indices do not have to be the same. As Theil indices are seldom used to assess the level and trends of inequality we also compute the Gini coefficent for each aggregate distribution, using a simple numerical approach (with partition of the whole distribution into a sufficiently large number of intervals of real income and summing regional distributions by these intervals with population weights).

Table 1: Inequality decomposition by regions of Russia for per capita real money incomes using Theil mean log deviation index

	1994	1995	1996	1997	1998	1999	2000	2000-94	2000-94, %
I. Total inequality in per capita real incomes at the national level								Change	
Theil mean log deviation	0.297	0.282	0.316	0.337	0.314	0.319	0.339	0.041	+14
of which									
Between regions	0.073	0.076	0.083	0.079	0.088	0.103	0.108	0.035	+47
as a share of total, %	*25*	*27*	*26*	*23*	*28*	*32*	*32*	*84*	
Within regions	0.224	0.206	0.234	0.258	0.226	0.216	0.231	0.007	+3
as a share of total, %	*75*	*73*	*74*	*77*	*72*	*68*	*68*	*16*	
Gini index	0.430	0.418	0.437	0.445	0.432	0.438	0.440	0.010	*+2*
II. Hypothetical distribution without Moscow, St Petersburg and Tyumen								Change	
Theil mean log deviation	0.192	0.171	0.198	0.230	0.212	0.209	0.225	0.033	+17
Between regions	0.049	0.051	0.054	0.044	0.045	0.051	0.051	0.003	+5
Within regions	0.143	0.12	0.144	0.186	0.167	0.158	0.174	0.030	22
Gini index	0.350	0.325	0.344	0.378	0.362	0.345	0.368		*+5*

Source: Author's estimations based on published data.

Table 1 presents results of Theil T_0 decomposition for per capita real money incomes. The table is organized as follows: each column represents one year from 1994 to 2000; the two

[26] Sigma is one of the two parameters defining lognormal distribution (variance). This property can be used to test for lognormality of the empirical distribution.

last columns report the total change in index over the entire period (in absolute value) and the change expressed as percentage to the initial value. The table has two panels, I and II. Panel I reports results for a full set of regions, while Panel II presents the simulated national distribution, from which Moscow, St Petersburg and Tyumen are removed. This hypothetical example helps to understand to what extent changes in the overall distribution were driven by these three regions known as outliers. The first row in Panel I is the Theil mean log deviation index for Russia. Over the period it rose from 0.297 to 0.339, a 14 per cent increase.[27] Note that the Gini coefficient (reported at the bottom of the first panel) for the same period has changed only slightly by 2 per cent. This discrepancy is not very surprising, as Theil mean log deviation and Gini indices are sensitive to changes in different parts of the distribution.

The middle rows of the first panel report the W_0 and B_0 contributions to inequality. As usually revealed by such decompositions, the bulk of inequality can be attributed to the within-group components (75 per cent in 1994). Nonetheless, a sizable and, more importantly, growing share of inequality is the result of the between-group differences, which accounted for 25 per cent of overall inequality in 1994 and for 32 per cent in 2000. This shift alone accounts for 84 per cent of the total increase in inequality in Russia between 1994 and 2000. The share of interregional inequality even at the beginning of the period was several times higher than similar shares in other European countries (see Förster *et al.* 2003). The first conclusion from this analysis is that regional differences are playing an increasingly important role in determining overall inequality. Up to 85 per cent of the total inequality increase during 1994-2000 can be attributed to the widening of interregional inequities.[28]

Repeating this decomposition while removing Moscow, St Petersburg and Tyumen from the distribution offers valuable insights. The last row in the second panel shows that Gini index of this hypothetical distribution would be significantly lower than the actual one (by about 16 per cent), but the inequality would increase faster compared to what was actually observed (the Gini would increase by 5 per cent as opposed to just 2).[29] The second conclusion therefore is that, contrary to popular opinion, inequality in Russia is *not* the inequality within these three regions and between these three regions and the rest of the country.

---

27 This level of inequality is substantially higher than in other countries. Using World Bank data (2000) for comparable per capita income, we find that inequality was in 1998 0.17 in Poland, 0.11 in Slovenia, Hungary and the Czech Republic, and 0.22 in Croatia.

28 Use of the Theil entropy index T yields qualitatively similar results. The share of inequality explained by the between component has increased from 25 per cent in 1994 to 29 per cent in 2000. Overall 54 per cent of the total inequality change as measured by T can be explained by the increase in the interregional differences in means.

29 For the Theil entropy index T the level of inequality would be reduced by as much as a half in 2000 if the three regions will be removed from the distribution, but the overall size of inequality increase will remain unaffected by this experiment.

The inspection of the middle rows of panel two in Table 1—representing changes in inequality by components with the three above mentioned regions removed—shows indeed that the inequality as measured by T_0 would increase by a sizeable 0.033 compared to 0.044 actually observed. But the decomposition shares would change considerably. In contrast to the actually observed changes, most of the change in inequality would come from interregional distribution, while the share of intraregional differences would remain stable. This exercise highlights the empirical importance for Russia in 1994-2000 of both stylized facts; the increased gap between high-income regions (such as Moscow, Tyumen and St Petersburg) and the rest of the country, and increasingly unequal distributions within other regions. We will now examine the first, that is increased variation between regions, before investigating the trend in the second factor.

2.2 Regional convergence in Russia

Reading the press reports one gets an impression that the outcome of transition by regions so far has been largely predetermined by the initial conditions, ultimately by the place of a region in the Soviet hierarchy, and that the market has moved the initially somewhat unequal regions further apart. Those who were doing better under communist rule are prospering under the market by reforming, privatizing and changing. But those who were poor are set to remain so in a self-perpetuating circle of impoverishment and poor policies. This image sadly contradicts the view of market reforms with opportunities for most to advance. How accurate is this representation and how persistent are regional inequities? The answer to this question requires an application of a set of models that were developed to study convergence across countries. Empirical studies on economic convergence are also extended to convergence across regions of countries.[30] This framework was recently enriched with the analysis of mobility of regions across the entire distribution, which we will review in detail in the next section.[31]

It is interesting that among researchers studying the Russian transition a consensus over the lack of convergence was achieved, even before any data become available.[32] Until very recently there were only a very few papers on regional convergence in Russia. Hanson and Bradshaw (2000), in their literature review on the regional dimension of systemic transformations in Russia, noted 'It is generally accepted that economic transition has

[30] The regional studies by Barro and Sala-i-Martin (1991, 1992) for states within the US and Europe, de La Fuente (1996) for Spain, Shioji (1996) for Japan, Coulombe and Lee (1995) for Canada and by Persson (1994) for Sweden, all conclude that there is indeed convergence across regions of the countries under investigation. What is important, is that the nature of convergence is absolute, which is often taken as evidence that regions within national boundaries are more likely to share similar economic and social characteristics. Regional convergence studies were long restricted to regions within developed nations because of the lack of data, but recently the literature on regional convergence expanded to developing nations. See the study on Indian states by Cashin and Sahay (1996) and by Bandyopadyaya (2002), by Filiztekin (1999) for Turkish provinces, and Andalon and Lopez-Calva (2002) for Mexican states.

[31] See for example Bandyopadyaya (2002) on the convergence across Indian states.

[32] See Mikheeva (1999) for a thorough review.

widened the gap between the rich and the poor, both in terms of individuals in society and regions in the federation. Yet there has been a relative lack of academic research examining the relationship between transition and regional inequality'.[33]

Authors of early contributions, with the exception of Mikheeva (1999) used the coefficient of variation as an inequality measure and applied it to several economic and social indicators including industrial output, housing availability and consumption of several food items. Russian convergence in a standard theoretical framework was thoroughly studied by Mikheeva (1999) using data for 1980-97. She found no convergence in real per capita incomes (and some signs of divergence for the part of the data representing transition (1990-97). Similar results were obtained for Russia by Carluer and Sharipova (2001), who found no absolute convergence for nominal per capita income between 1985 and 1999, and only weak conditional convergence in regional gross products and industrial output per capita. Importantly, both studies have shown that the standard growth model framework constituting a base for convergence analysis cannot be usefully applied to transition dynamics. These studies, however, are plagued by two problems: data and weak conceptual frameworks. This paper uses regional money incomes divided by regional poverty lines as welfare indices, and shows that this measure gives a more accurate representation of the regional variation compared to commonly used CPI deflated indices.

The problems with theoretical framework are more serious. Often 1990, 1991, or even 1985, are selected as starting points in the convergence analysis, overlooking crucial assumptions underlying convergence analysis. Neoclassical growth theory with standard assumption about decreasing returns to reproducible factors yields the following transitional dynamics of the output per capita around the steady state:

$$\ln(y_t) = e^{-\beta T} \ln(y_0) + (1 - e^{-\beta T}) \ln(y^*) \qquad (6)$$

where y_t is the output per capita y_0 and y^* are the initial level and the steady state level of output, respectively. This equation implies that the average growth rate of output per capita over an interval from time 0 to time T is

$$(1/T)\,[\ln(y_T) - \ln(y_0)] = x + [(1 - e^{-\beta T})/T]\,[\ln(y^*) - \ln(y_0)] \qquad (7)$$

where x is the growth rate of steady state level of output. Holding steady state growth rate and convergence rate constant across time and economic units, the equation shows that the growth rate of output is negatively related to initial level of output, and convergence rate, β, which can be estimated from regression of the value of y at point in time T to its value at previous period t:

---

33 Recently, the results of two major studies of regional economies in Russia have been published, one by Hanson and Bradshaw (2000), and another by Westlund *et al.* (2000). The Russian language periodical *Regions: Economics and Sociology* has published a series of papers on regional inequality (Mikheeva 1999; Kournishev 1999; Lavrovsky 1999; and Treivish 1999).

$$\ln(y_{T/} y_t)/ (T - t) = c - b \ln(y_t) + u_t \tag{8}$$

with usual assumptions about the error term and using that:

$$b = [(1 - e^{-\beta(T - t)})/(T - t)] \tag{9}$$

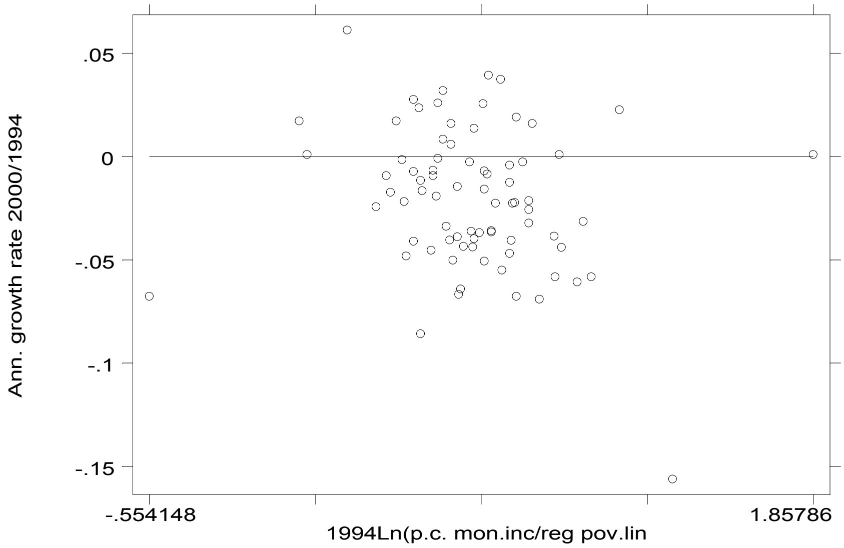
Extending to *i* regions and assuming equal rate of convergence yields absolute convergence result if *b*>0. This framework critically depends on the assumption of the same steady state values and trends across time. This assumption is hard to defend in the context of transition, and therefore the starting point *t* has to be moved forward. But this movement shrinks already short data series available to even shorter period. This dilemma is a blight on all convergence tests for Russia.

Generally, with the liberalization of economic activity and reduced fiscal resources characterizing early transition years, one should expect a considerable widening of the distribution. As demonstrated by Adelman and Vujovic (1998), central planning by trying to redistribute in favour of lagging regions within socialist economies artificially held back the regions with highest potential for growth. These pressures, however, never fully impacted and at the start of transition the distribution of regions can be represented as a compressed distribution compared to the one implied by economic forces. Thus at first it is expected that regions will diverge, moving to their equilibrium income levels. But once the market forces are unleashed, other mechanisms, including political economy, start to work that could eventually lead to a reduction of the spread. This observation underlines the need for utmost care in selecting time periods for studying convergence.

Figure 9: Real per capita income by region in 1992 (log) and average annual growth rate in real per capita income over 1992-2000

Source: Author’s estimates (growth rates) based on published data.

Figure 10: Real per capita income by region in 1994 (log) and average annual growth rate in real per capita income over 1994-2000



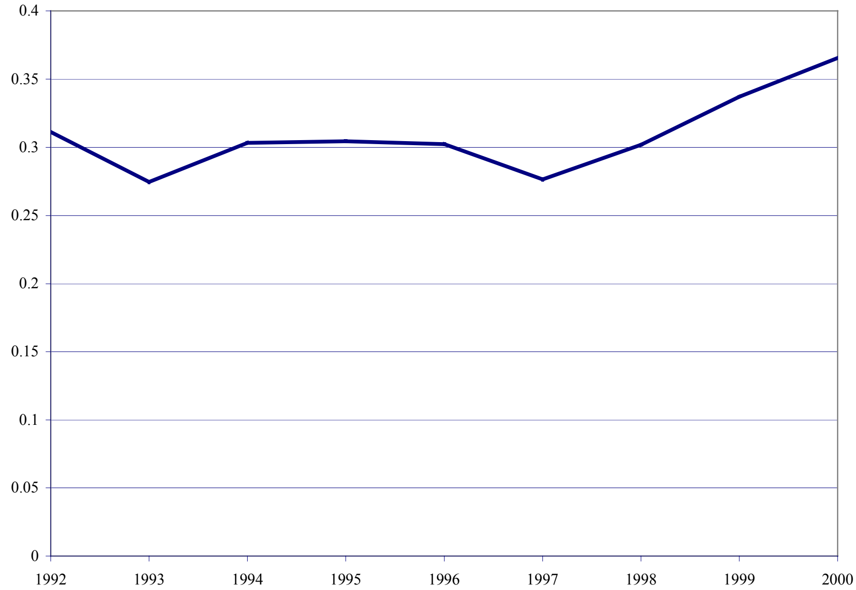
Source: Author's estimates (growth rates) based on published data.

The point is illustrated by the comparison of Figures 9 and 10. Both figures plot the average annual growth rates of real money incomes per capita in Russian regions against their initial values (in logs), but they take different starting points: Figure 9 plots average growth rates over 1992-2000 to 1992 values, while Figure 10 takes 1994 as a starting point. Casual inspection of Figure 9 may suggest the existence of convergence, as higher level values of real incomes in 1992 are associated with lower subsequent growth rates (one can fit the downward sloping line through dots that would yield a certain rate of convergence). Indeed the cross-sectional regression produces a statistically significant estimate of β (Equations 9 and 10) of 0.06. This apparently strong correlation completely vanishes in Figure 10. There are no more clear signs of convergence, as regions seem to form a cloud rather than a line, and the estimate of β gives only weakly significant values (at 15 per cent confidence) of convergence around 2 per cent per year. Both these finding are in contrast with earlier studies cited earlier, which relied on 1991 or 1985 as starting points and CPI deflated incomes, suggesting that these choices influenced the results. The assumption of equality of steady states across regions is removed in the definition of sigma-convergence, which is a simple tendency of regions to move closer to each other; specifically, the values of standard deviation of the mean of the log of a variable of interest have to decrease, i.e. for a period $\tau > t$, $\sigma_\tau < \sigma_t$, where σ_t is:

$$\sigma_t = \left[\frac{1}{n} \sum_i (\log y_{it} - \mu_t)^2 \right]^{1/2} \tag{10}$$

and in the case studied in this paper, y_{it} is per capita real incomes to poverty lines in region i in year t, μ_t is the average value of $\log y_{it}$.

Figure 11: Sigma-convergence for per capita regional money incomes to poverty lines over 1992-2000



Source: Calculation based on published data on average per capita incomes and poverty lines by years and regions.

Figure 11 plots the value of σ_t for real incomes per capita in Russian regions. It suggests rather stable values of variation across regions over 1992-97, and a robust increase in 1997-2000. Mikheeva (1999) reports falling levels between 1990 and 1994, one year jump in 1995, followed by no change over 1996-97. Both the level and the tendency are in striking contrast with results reported in Mikheeva (1999) for money incomes per capita deflated by CPI. The analysis of absolute and conditional convergence shows that it is difficult to discern any definite trend of convergence across Russian regions, data problems are key. The period 1992-2000 seems to include two subperiods with different trends: 1994-97 and 1997-2000.

2.3 Mobility of Russian regions across the distribution

Studies of convergence using the standard regression framework briefly reviewed in the pervious part of this section consider average or representative behaviour and say little about prospects of interregional mobility. An alternative approach uses mobility across the distribution in time to uncover long-term tendencies in the evolution of the distribution across the full spectrum of income levels.[34] The formulation of the approach relies on a key assumption (first-order Markov chain) that given the current realization of a process determining mobility, its future realizations are independent of the past. Although the assumption of first-order Markov process was criticized by Shorrocks (1976) in its applications to individual-level data on income mobility, it gained a wider use in the analysis of aggregated, such as country- or region-level, data. For Russia, this method was applied by Dolinskaya (2002) to study the regional mobility in real incomes per capita in

[34] See the application of a full version of stochastic kernels to Indian states by Bandyopadhyay (2002).

the period 1970-97, and in particular 1991-97. Her analysis reveals a very rich and complex set of dynamics, suggesting polarization into rich and poor convergence clubs and provides insights into the determinants of regional mobility. It suffers, however, from the same problems as the previously mentioned studies—the choice of both the base period (1991) and the final point (1997), and the use of a 'noisy' deflator based on CPI. The welfare index used in this paper may help to address some of these limitations, and it is useful to briefly review the theoretical framework for such analysis before applying it to the data in hand.

The transition matrix approach to studying dynamics of income distribution, pioneered by Quah (1993), focuses on capturing how the whole distribution evolves over time. At any point in time t regions occupy a certain position in the distribution F in the country. The movement to the next period t+1 can be described by a (stochastic) operator T, so that

$$F_{t+1} = TF_t \quad (11)$$

The task is to infer T from the observed data. In practice, this task is simplified by partitioning F into n finite states, or intervals of income, in which case T becomes a matrix M ($n \times n$). Each element m_{ij} in this matrix can be estimated from a sequence of observed transitions and represent a probability of moving from an initial state i to a state j. The sequence of M_t describing all transitions in the future converges to a limiting matrix (i.e., such that it will remain unchanged from t to $t+1$) if F_t is described by the distribution $\bar{\lambda}$, called ergodic. It is shown that this distribution is unique, and

$$\bar{\lambda} = \bar{\lambda} M \quad (12)$$

The approach requires meaningful partition of F into intervals. Following the approach developed by Dolisnkaya (2002), this paper partitions the distribution of regions by their level of real incomes into five intervals, as reported in Table 2: the poorest with incomes below 0.7 of the national mean; next is between 0.7 and 0.9 of the mean; followed by the 'middle' between 0.9 and 1.1; by the upper middle (1.1 to 1.3); and finally the rich (above 1.3). The table consists of four different panels. Panel A takes a snapshot of the mobility by comparing the position of each region in 1994 to its position in 2000. This period is then broken on panels B and C into two subperiods (1994-97 and 1997-2000). Finally, the last panel D represents the last period 1997-2000 as an aggregation of all transitions that occurred in 1997-98, 1998-99 and 1999-2000.

Matrices presented in Table 2 are self-explanatory. For example, the first element in the matrix presented in Panel A shows that with probability of 0.67 the poorest regions in 1994 will remain poor in 2000; they will move one class up with the probability of 0.17. Probabilities sum to one across columns in each row. The diagonal of each matrix is in bold print as it shows the persistence of the distribution. In addition to the matrix of

Table 2: Dynamics of the regional distribution in Russia by the level of real per capita income 1994-2000

A. Whole period: actual transitions between 1994 and 2000 (one 6-year transition)

	Income intervals (regional per capita money incomes to regional poverty line)	2000 position (class of income)				
		<0.7	*0.7-0.9*	*0.9-1.1*	*1.1-1.3*	*>1.3*
1994 position (class of income)	*<0.7*	**0.67**	0.17	0.00	0.17	0.00
	0.7- 0.9	0.19	**0.41**	0.26	0.15	0.00
	0.9-1.1	0.08	0.40	**0.28**	0.12	0.12
	1.1-1.3	0.00	0.18	0.45	**0.18**	0.18
	>1.3	0.13	0.00	0.38	0.13	**0.38**
Starting frequency (regions in each class in 1994)		0.08	0.35	0.32	0.14	0.10
Ending frequency (regions in each class in 2000)		0.16	0.31	0.29	0.14	0.10
	Ergodic distribution	**0.24**	**0.28**	**0.24**	**0.15**	**0.09**

B. First subperiod: transition between 1994 and 1997 (one 3-year transition)

	Income intervals (per capita incomes to poverty lines)	Position in 1997 (class of income)				
		<0.7	*0.7-0.9*	*0.9-1.1*	*1.1-1.3*	*>1.3*
Starting position (class of income)	*<0.7*	**0.50**	0.50	0.00	0.00	0.00
	0.7- 0.9	0.07	**0.52**	0.33	0.07	0.00
	0.9-1.1	0.08	0.20	**0.48**	0.16	0.08
	1.1-1.3	0.00	0.09	0.55	**0.27**	0.09
	>1.3	0.00	0.13	0.13	0.50	**0.25**
Starting frequency (regions in each class in 1994)		0.08	0.35	0.32	0.14	0.10
Ending frequency (regions in each class in 1997)		0.09	0.31	0.36	0.17	0.06
	Ergodic distribution	**0.11**	**0.31**	**0.37**	**0.15**	**0.06**

C. Second subperiod: transition between 1997 and 2000 (one 3-year transition)

	Income intervals (per capita incomes to poverty lines)	Position in 2000 (class of income)				
		<0.7	*0.7-0.9*	*0.9-1.1*	*1.1-1.3*	*>1.3*
Starting position (class of income)	*<0.7*	**0.86**	0.14	0.00	0.00	0.00
	0.7- 0.9	0.21	**0.54**	0.17	0.08	0.00
	0.9-1.1	0.04	0.32	**0.50**	0.14	0.00
	1.1-1.3	0.00	0.08	0.31	**0.38**	0.23
	>1.3	0.00	0.00	0.00	0.00	**1.00**
Starting frequency (regions in each class in 1997)		0.09	0.31	0.36	0.17	0.06
Ending frequency (regions in each class in 2000)		0.16	0.31	0.29	0.14	0.10
	Ergodic distribution	**0.12**	**0.06**	**0.03**	**0.01**	**0.78**

D. Second subperiod: year to year transition between 1997 and 2000 (average of three 1-year transitions)

	Income intervals (per capita incomes to poverty lines)	Final (2000) position (class of income)				
		<0.7	*0.7-0.9*	*0.9-1.1*	*1.1-1.3*	*>1.3*
Starting (1997) position (class of income)	*<0.7*	**0.89**	0.11	0.00	0.00	0.00
	0.7- 0.9	0.11	**0.79**	0.10	0.00	0.00
	0.9-1.1	0.00	0.17	**0.61**	0.23	0.00
	1.1-1.3	0.00	0.00	0.36	**0.57**	0.07
	>1.3	0.00	0.00	0.00	0.00	**1.00**
Starting frequency (regions in each class in 1997)		0.09	0.31	0.36	0.17	0.06
Ending frequency (regions in each class in 2000)		0.16	0.31	0.29	0.14	0.10
	Ergodic distribution	**0.19**	**0.18**	**0.10**	**0.06**	**0.47**

Source: Author's estimates.

transitions, each panel also contains three rows that provide useful insights into the dynamics of the distribution by income classes. The first row below the matrix presents the initial distribution by income classes, the second row the final distribution, and the third row the ergodic distribution which would prevail in the long run provided that transition dynamics remain unchanged. For example, by glancing over these three rows in Panel A for the first income interval (regions with incomes below 70 per cent of the national mean), one observes a very worrying expansion of this class from only 8 per cent of all regions in 1994 to 16 per cent in 2000, and poised to increase further in the long run to 24 per cent of all regions.

Each element in the transition matrix is essentially a stochastic parameter which is estimated based on data from actual transitions. The precision of an estimate will depend on how many transitions are assessed. By taking only starting and ending points, as in panels A-C, the analysis uses only limited information. On the other hand, the use of all transitions by years between starting and ending points, as panel D in Table 2 does, may blur the long-term tendencies with short-term fluctuations. Annex II shows different aggregations across years to estimate transition matrices, and assess the accuracy of predictions. Over the entire period under study, 1994-2000, the transition matrix and the ergodic distribution of Russian regions by their income levels display somewhat less persistence than suggested by the analysis in Dolinskaya (2002). For example, the probability of remaining rich, estimated using data from 2 three-year transitions between 1991 and 1997, is shown to be 0.75, while Annex II shows it, using data from 1994-2000, at 0.54 with the same methodology. The probability for remaining in the lowest income class though is exactly the same, 0.69. Properties of ergodic distribution are also similar; there is sizeable group of poor regions (24 per cent in the panel A) forecast to remain poor, and a small but persistent group of rich regions (9 per cent in Table 2, and 17 per cent according to Dolinskaya 2002).

Disaggregation into subperiods produces new findings. Transitions over 1994-97 presented on Panel B display weak persistence and smaller tails in the ergodic distribution, suggesting greater convergence to the middle class, than the whole 1994-2000 period. These dynamics were reversed in 1997-2000. Panels C and D show significant persistence at the tails of the distribution (the poor staying poor with almost 90 per cent probability, and the rich stuck with 100 per cent probability of remaining rich). As a result, the ergodic distribution displays classical features of polarization into two convergence clubs; richer regions, and a smaller but sizeable group of very poor regions, with a vanishing middle section. This conclusion is robust to the aggregation method as the comparison of panels C and D would suggest.

The finding of emerging tendency towards polarization for 1997-2000 should be taken with several caveats. The Annex II compares predicted probabilities based on the Markov first order process assumptions with the actual ones, and reveals significant imprecision in the model's prediction. But even with these limitations one can claim that there is no apparent sign of convergence across regions of Russia

2.4 Convergence in inequality: are Russian regions becoming equally unequal?

Despite the increasing role of interregional differences, the bulk of inequality is still coming from within the regions. Table 1 demonstrates that on aggregate there has been stability in the contribution of this component over time. What is behind it? Is it possible to identify trends and regularities in within-region changes in inequality? In other words, is inequality trended in any particular sense in each Russian region? Is there an identifiable convergence between regions in terms of inequality? How are the short-term dynamics influenced by longer term trends?

The motivation behind attempting to study convergence in the levels of inequality is clear as, ultimately, it is a test of market operations. Neoclassical growth models imply not only convergence in average incomes, but also in the distribution. Countries or regions with the same fundamentals should trend towards the same invariant distribution of wealth and pretax income. Application of the optimal taxation models to transition economies settings[35] revealed also factors mapping the pretax (or market) income into the distribution of disposable income. Key parameters defining this mapping are features in the fiscal system, and the extent of public goods provision by the state. Once the regions are characterized by similar parameters in these dimensions, one may expect the fiscal systems to operate in a way (given all of its general equilibrium effects) that would produce similar post-redistribution inequality levels across regions.

Regions of Russia prima facie have very different inequality aversion parameters, as may be revealed by a spread of regions across the political spectrum and significant regional differences in voting patterns. The observed behaviour, however, might be endogenous.[36] As shown in Ravallion and Lokshin (1999) proper treatment of revealed preferences gives significant differences in the attitudes to redistribution across some groups, such as urban and rural populations, but does not produce significant regional effects. Given the common history and commonality of some cultural institutions it should not be surprising that inequality aversion will not differ much across regions of Russia. Normally such preferences are known to differ across countries (as shown in Alesina *et al.* 2002), but not within the countries.

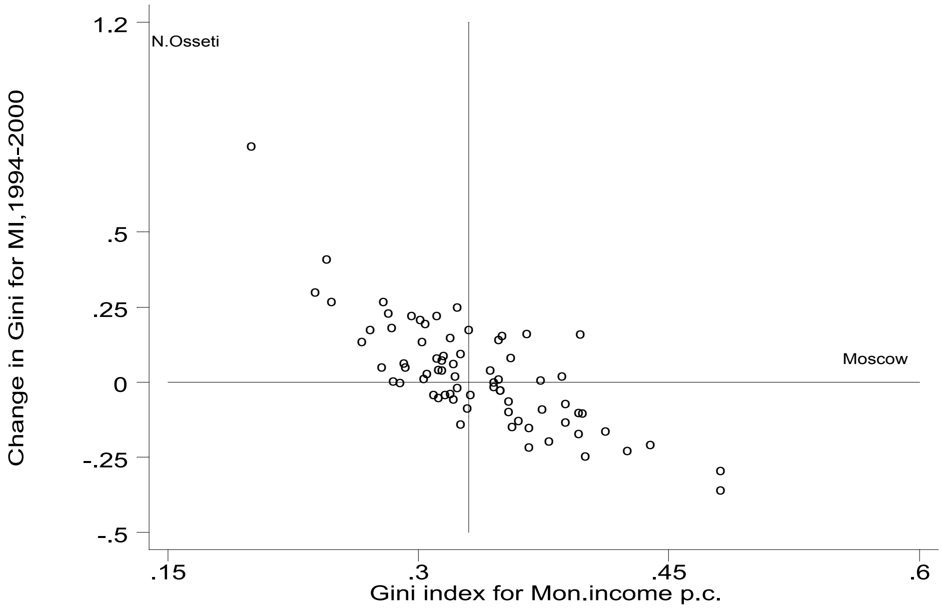
Key parameters of reductions of the public sector were common across regions of Russia (World Bank 1996), and produced similar outcomes. Regions did differ in the fiscal capacity considerably, but the system of fiscal federalism in Russia was known to produce a common set of rules and a common fiscal space (Zhuravskaya 2000). Only some regions (so called ‘donor’ regions with positive fiscal balances, rich regions in our classification) clearly stands out amidst these trends. Within these common patterns, regions of Russia

[35] Kanbur and Tuomala (2002).

[36] And lead to more redistribution in more unequal places, as shown in cross-country studies such as Milanovic (1999b). This might be a mechanism that eventually equalizes regions in terms of their levels of inequality.

display substantial differences in particular forms of adjustment and/or in the speed at which it occurred. Thus, one may expect to see a very gradual and uneven convergence in the levels of inequality as determined by the fundamentals.

Figure 12: Initial level of inequality (Gini index) in 1994 against the change in inequality over 1994-2000



Source: Data from Yemtsov (2003) based on published data from HBS.

A simple intuition is presented in Figure 12. The figure plots original (1994) values of regional Gini indices for per capita incomes on the horizontal axis, against subsequent change in the region's Gini index over the period 1994-2000 on the vertical axis. The horizontal line through the scatter plot represents no change of Gini over time, and the vertical line depicts median level of Gini observed across regions in 1994. Two outliers are labelled on the graph: Moscow with the level of inequality already close to 0.6 in 1994; and North Osetia on the top left with very low original inequality which more than doubled over the entire period. The graph reveals evidence of convergence. The higher the initial level of inequality, the more likely was a region to see a fall in its inequality by the year 2000. In contrast to the growth literature, there has been only a handful of studies looking at this inequality convergence, concentrating exclusively on cross-country datasets.[37] Clearly, no such attempt has ever been undertaken using data for Russia.

Borrowing from the literature on convergence in mean income, the simplest test for inequality convergence across regions is to regress observed changes over time in inequality (measured, say, by the Gini index) to its initial values. Keeping the same notations as in Ravallion (2001), let G_{it} denote the observed measure of inequality in a region i for t=0,1,…T period; the test equation for convergence is then

[37] See Ravallion (2001) for a review.

$$G_{iT}\text{-}G_{i0}=a+bG_{i0}+e_{i,} \tag{13}$$

e_i is an error term. If the convergence parameter b (analogous to β in means convergence literature) is negative, then there is inequality convergence, and for non-zero b, steady state inequality converges to an expected value similar across regions of $-a/b$. Application of this simple test to the actual data, as shown by Ravallion (2001), requires serious examination of concerns about the measurement error in the inequality indices, because these problems may have considerable effects on the results of convergence tests. If the initial level of inequality is underestimated (and there are reasons to believe it is in the context of Russia), the application of the simple framework will lead to overestimation of the subsequent trend. Thus, the dynamic structure of regional inequality has to be taken into account to determine its trend. Measurement error in the inequality data will bias a convergence test in the direction of suggesting convergence. We therefore employ a version of the test proposed by Ravallion (2001) that is robust to measurement error in the inequality data; it also uses panel structure of the data. Test equation to be estimated on Russian regional data can be written, as in Ravallion (2001)

$$G_{iT}\text{-}G_{i1}=(\alpha+\beta G_{i1})(t\text{-}1)+e_{it} \tag{14}$$

Where, as shown by Ravallion, composite error term e_{it} is such that it cannot be assumed that $\text{cov}(G_it,e_{it})=0$. But one can use G_{i0} (level of inequality in 1994) as an instrument for 'error free' G^*_{i1} in 1995; this estimation can be also performed together with other data to control for initial conditions that are supposedly not correlated with the measurement error to obtain as accurate an estimate as possible of error free G^*_{i1}.[38] The equation to be estimated then becomes

$$G_{iT}\text{-}G^*_{i1}=(\alpha+\beta G^*_{i1})(t\text{-}1)+e_{it} \tag{15}$$

This equation can be generalized to a linear panel data model of a measure of inequality on the region-specific initial level of inequality in 1995 (instrumented with 1994 level), and a time trend. Results of the test are reported in Table 3. These are regressions of the change in Gini index between each year and the 1995 (although the OLS estimate could have used 1994 data also, but these are removed to maintain comparability). As in Ravallion (2001), there are only small differences between robust specification allowing for the measurement error and straightforward OLS formulation. The table reports strong indication of convergence. The long-run Gini implied by this estimate are all around 0.35; rather close to actually observed mean level of inequality. The slope coefficient are significant and imply much faster convergence than obtained in cross-country estimate by Ravallion (2001). This estimate allows the identification of short-term dynamics as well. These dynamics imply that each region is converging to its 'true' level of inequality which is given by the long-term trend.

[38] Results from the instrumental variable regression are reported in Annex III.

Table 3: Inequality convergence: test results

Dependent variable is G_{iT}-G^*_{i1}	Intercept ( )	Slope (ß)	R^2	N	Long-run Gini
Panel OLS[a]	0.0617073	-.1812326	0.5376	383	0.340
	(.0105084)	(.0278383)			
Panel OLS on restr. Sample[b]	.0700591	-.2088037	0.623	373	0.335
	(.0114166)	(.0308504)			
IVE with Gini only[c]	.0563303	-.1609836	0.3794	383	0.350
	(0109525)	(0296237)			
IVE, large instrument set[d]	.0621956	-.1778161	0.4221	383	0.350
	(.0157239)	(.042447)			
IVE large set, rest. Sample[e]	.0775095	-.2297803	0.5052	373	0.337
	(.0187333)	(.0526736)			

Note: Data on regional Gini indices for real money per capita incomes; dependent variable is expressed in points. Stata command xtpcse is used which produces panel corrected standard error (PCSE) estimates for linear cross-sectional time-series models; when computing the standard errors and the variance–covariance estimates, the disturbances are assumed to be heteroskedastic. [a]Panel regression using actual data for 1994, no instruments. [b]Same as [a]but with Moscow and Tyumen removed. [c]Uses the value of Gini in 1994 as an instrument for Gini in 1995. [d]Uses Gini in 1994 initial conditions and time invariant characteristics of the region to instrument for Gini in 1995, which is then used as initial value 0. [e]Same as previous, but with Moscow and Tyumen removed. Bold marks preferred estimate, standard errors in parenthesis.

Source: Author.

Assuming that each region has a true underlying trend of inequality R_i, which can be revealed using the original instrumented value of G^*_{i1}

$$G^*_{it}-G^*_{i1}=R_i(t-1)+v_{it} \tag{16}$$

v is a zero-mean innovation term.

Disentangling trends in short-term dynamics requires a simple assumption that the observed inequality index is only partially adjusted at any given point in time to its underlying true value. Now imposing the restriction of the equality of autoregression coefficients across regions, the observed measure of inequality in a given region in a given period of time can be estimated using the following model:

$$G_{it}=\varphi G_{it-1}+(1-\varphi)G^*_{it}+\varepsilon_{it}, \tag{17}$$

where G^* is the true (error free) measure of inequality, and ε is an error term showing the difference between the true underlying inequality and measured inequality, which is assumed to be first-order autocorrelated. Table 4 reports estimates of the short-run parameter φ for 1995-2000 (1994 data had to be used to create an instrument). This estimate φ implies that the short-run movements of inequality are rather slow. Assume that the region has a current level of Gini index value of 0.45, while its underlying level for this year is 0.4. Then the estimate implies that next year the inequality will change to 0.4399, or by 2.3 per cent. This estimate implies that whatever is the long-run level of inequality, Russian regions will reach it very slowly, pointing to the persistence of differences in the inequality over time and complex dynamics. The empirical dynamics of inequality changes and implied long-term trends are illustrated in Figure 13 for two Russian regions.

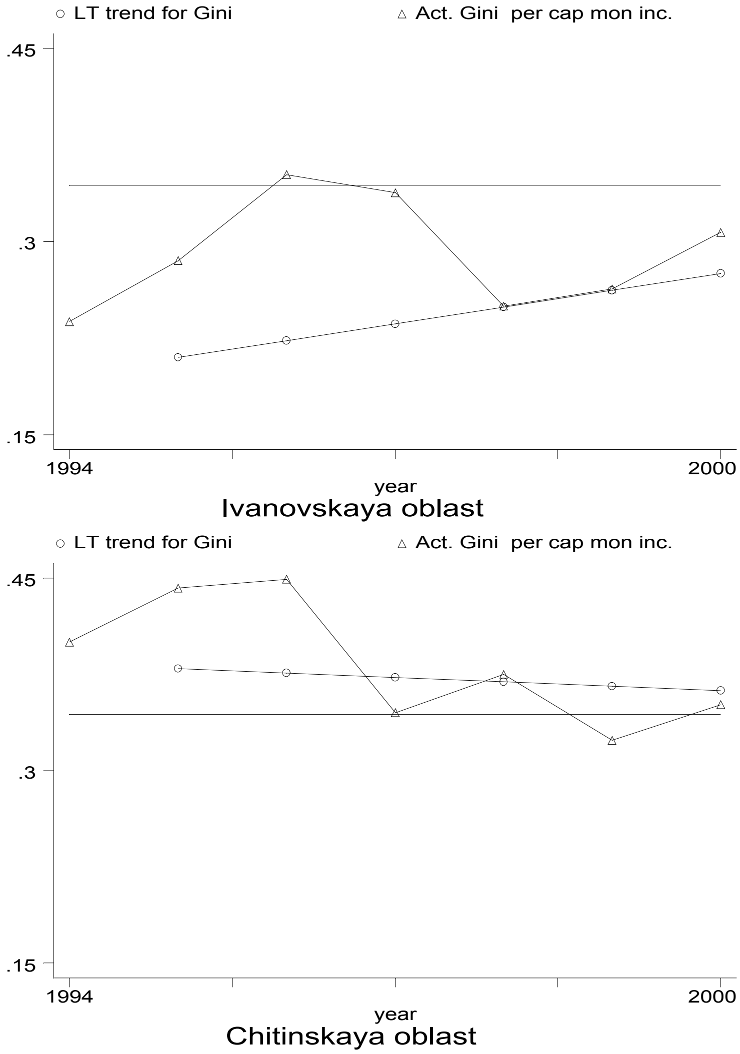
Table 4: Estimates for short-run dynamics of regional Gini indices based on their long-term trends

Dependent variable: observed Gini for money incomes in the current year		Coef.	Std. Err.	z
Gini for money incomes in the prev. year		0.682991	0.030216	22.604
Trend value for Gini index based on iv initial val.	1-	0.331475	0.03201	10.355

Note: Panel data, gtee with ar(1) option in stata. Number of obs 460, ^{2} 43636.91 Pearsons' ^{2} (454) = 0.86, Pearson's dispersion 0.00189. Test on equality of (1- + *)=1,* $^{2=}$ 7.66, P value 0.0056.

Source: Author.

Figure 13. Actual Gini, long-term Gini, and the implied trend for Gini in two representative Russian regions



Source: predictions based on Table 3.

Figure 13 is composed of two panels. The left panel represents Ivanovskaya oblast with originally low inequality level; the right panel, Chitinskaya oblast, gives the dynamics of inequality within the region with high initial values of Gini index. The figure shows a (common) long-term level of inequality based on regression results presented in Table 3. This level is shown as a horizontal line on the right and left panels. The estimated short-term trend from parameters reported in Table 4 is plotted as an upward slopping line on the left panel (in this region the initial level of inequality is below its long-term value, thus it has to increase), and downward sloping line on the right panel (the opposite is true; initially the region had a higher Gini than long term 0.35). The actual movement of Gini from year to year is shown by bumpy lines. This figure illustrates well both the long-term dynamics and the extent of short-term fluctuations around it, explaining the slow convergence estimated from results reported in Table 4. This part of the paper establishes robust results on inequality convergence across Russian regions in 1994-2000. Evidence of convergence towards some common level of inequality fits well the general expectations based on conceptual framework linking the forces determining the shape of distribution in transition.

2.5 Poverty projections and preliminary conclusions

Both trends in regional mean real incomes and trends in within-region distributions matter for poverty changes at the national level. Trends in regional means determine the share of the population living in poor regions. Intraregional distributions matter, because given a regional mean it can be determined how many people will be poor in that region. Poverty at the national level can change if the number of poor in regions changes, or if inequality within regions shifts.

The analysis in this section highlight the lack of convergence in the regional means, and convergence to similar levels of inequality across the regions. How would national inequality look if these trends are to persist? A simple simulation using the decomposition framework presented in subsection 2.1 is informative. Instead of taking the actual values of the Theil mean log deviation index, we can now derive the long-term Theil index which will be equal across all regions using the long-term value of Gini index derived in subsection 2.4.[39] Based on this calculation it is easy to reckon that the within-region component of the Theil mean log deviation index will be reduced by about 15 per cent compared to its 2000 value. If the inequality between regions will remain at its 2000 level, this will mean the reduction in the national level inequality by 10 per cent as measured by Theil T_0 index. A more intuitive measure, the Gini index, will record only a slight improvement falling from 0.44 to 0.425. This simulation is, of course, very hypothetical. It is unrealistic, based on the results presented in subsections 2.2-2.3, to assume that interregional inequality will stay at its 2000 levels. Thus, inequality in Russia is poised to increase. But such an increase could occur only gradually, as receding within-region inequality may compensate to a certain extent the unequalizing effect of regional divergence. The level of inequality implied by the Gini index between 0.425 and 0.45 that are projected in this simulation are informative, as they suggest that Russia will belong to

[39] Which, conveniently for lognormal distribution assumed to prevail within each region is Gini=$2\Phi(\sigma/2)-1$, where σ is the parameter defining Theil index, and Φ denotes the standard normal distribution function.

the high inequality club, despite the fact that within each region the distributions are likely to converge to a middle level of inequality of 0.35.

One can go a step further and combine projected levels of inequality with the likely growth paths of the regional real incomes levels derived from the transition matrices depicted in Table 2. To reflect the most recent dynamics, simulation takes the values from Panel D which represent an aggregate of 1997-2000. Such aggregations are normally considered as robust estimates of transitions. For each region its future real income level is projected based on its 2000 value, and the cumulative probabilities derived form 10 times repetition of the process depicted by the matrix in Panel D. Subsequently, the table projects future level of poverty if regions are to converge in 10 years to a common level of inequality as established in subsection 2.3. To derive poverty rates, simulation assumes that the shape of the real income distribution within each region will remain approximated by the lognormal form. Finally, it is assumed that the national mean will grow at a rate of 3 per cent per annum over ten years. Results with projected poverty incidence are presented in Table 5. Each row represents the initial (2000) income class where regions are grouped by the level of regional real income (expressed as ratio to regional poverty lines) compared to the national average real income (exactly as in Table 2). The columns report values for poverty incidence under various scenarios.

Table 5: Poverty projections, 2010

	Poverty incidence by income class, actual and simulated for 2010					
2000 income intervals, to national mean	Actual 2000	Projected, inequality convergence	Projected, income mobility	Projected, convergence and mobility combined	Projected, only equi-proportional growth	Projected, all combined
<0.7	0.49	0.50	0.39	0.40	0.34	0.26
0.7- 0.9	0.34	0.36	0.29	0.31	0.19	0.18
0.9-1.1	0.23	0.24	0.19	0.20	0.11	0.10
1.1-1.3	0.17	0.17	0.15	0.15	0.08	0.07
>1.3	0.14	0.06	0.14	0.06	0.08	0.02
Poverty incidence, all-Russia	0.25	0.24	0.21	0.20	0.14	0.11

Note: Intervals are based on the regional per capita money incomes in 2000 to regional poverty line, expressed as ratios to the national average. All poverty incidence figures are weighted by the population of regions in 2000. Poverty incidence is the share of regional population with incomes below the poverty line.

Source: Author's estimates.

The first column of Table 5 reports actual values for 2000. The poverty incidence varied in 2000 from 49 per cent on average in the group of poorest regions to 14 per cent in a group of rich regions. The second column gives estimates of poverty if the trend towards inequality convergence is to bring all regions to the same inequality levels. Interestingly, this trend will affect poverty only minimally in all groups, except the richest regions where it will go down to six per cent of the population. The third column simulates the results of divergence based on the transition matrix approach. No assumptions are introduced about the growth of the overall all-Russia mean incomes so far, and all observed effects are only results of the mobility across income classes. Reduction of poverty for the low-income regions are quite substantial: in the group of poorest regions poverty is projected to decrease from 49 per cent in 2000, to 39 per cent in 10 years. But relatively well-off regions are almost unaffected. Thus, despite the divergence, the overall vector of changes as suggested by the mobility over 1997-2000 is uplifting. The fourth column further enriches this scenario, combining the results of mobility projections with the trend determined by the inequality convergence. Since most of the 'action' in poverty rates are driven by the mobility across income classes these results are not that substantially different from what is reported in the third column. The fifth column introduces explicit assumptions about growth of national mean real incomes of equal 3 per cent per annum growth over 10 years for all regions and all parts of the distribution (i.e., inequality within regions is assumed to remain constant). In other words, the whole distribution simply shifts to higher real incomes. The effect on poverty is significantly more pronounced than the impact of mobility per se. Thus, better overall economic performance is likely to have very significant impact on poverty. Finally, the last and most informative column combines mobility, inequality convergence and national mean growth. The projection shows that a combined effect of these factors will reduce the poverty rate in Russia to 11 per cent; less than half of its level in 2000. It is striking that the effect on the richest regions is particularly large; poverty is almost completely eliminated (falling to just 2 per cent of the population from 14 per cent in 2000) in the group with real incomes per capita more than 30 per cent over the national mean in 2000.

While the overall outcome seems very positive at first glance, it is informative that the last column suggests that 56 per cent of Russia's poor will be concentrated in a group of regions with income levels below 90 per cent of the national average, and only 3 per cent will be found in the upper income group. This is a dramatic change compared to 2000 when the corresponding shares were 47 and 11 per cent. That the regions seem to converge to some predetermined levels of poverty should not misguide anyone. It does not mean that policies are of no effect. First we have seen that this conclusion is based on historically short period and needs to be revisited if and when more data comes on stream. Second, as we have seen, this process, if left to operate on its own, will polarize the country. The economic distance between the rich and the poor regions presents an important indicator of differences in values and aspirations. If the rich and the poor share no common economic and social reality, there will be little or no agreement on common social goals or vehicles to achieve these goals.

3 Chance, choice, or fortune? Factors determining regional inequality

So far we have assumed that underlying forces at work reveal within-region distributions determined by economic fundamentals. To what extent do regions differ in their paths of inequality changes and to what extent it is determined by their policies? Viewed from its end point (convergence) inequality at a given point in time in a region is a product of its initial level and the region-specific trend. This section starts with the analysis of factors determining the initial level (1994) of inequality in a given region. Since we know that regions are converging to some (common) inequality level, the current level can be presented as 'excess' inequality in each region; that is, inequality compared to its long-term trend value. Using this idea, the section seeks to explain the differences between regions in their short-run deviations from the long-run inequality trends.

3.1 Inequality in the early transition years

As the process of regional convergence towards a common level of inequality operated in 1994-2000 rather slowly, a region's observed *level* of inequality over the period was clearly determined by the 'initial' (1994) values of the Gini index. What can explain why certain regions had higher level of inequality than others?

Milanovic (1998) proposed a simple two-sector model to analyse drivers of inequality in the early transition. Its values were calibrated to fit the generally observed patterns of inequality dynamics in the pretransition period and immediately after the transition. The parameters of the distribution were defined by the share of state sector employment, the number of private sector workers (tagged as self-employed), the share of pensioners (transfer recipients), their relative incomes and distribution within each 'sector'. The transition is modelled as a shrinking of the state sector accompanied by the emergence of the private sector and an increase in the variation of incomes both across and within sectors (part of which is determined through a state budget constraint). The latter factor, however, is secondary and the key predictions of numerical experiments point to the direction of intersectoral dynamics as key determinant of inequality change following transition. Inequality may display considerable inertia, therefore one needs to control to the initial pretransition inequality to allow pretransition parameters of the distribution to survive the transition (such as the schedule of wage distribution in the state sector).

Unfortunately, almost none of the key parameters of this simple model can be directly traced in Russian regional data. But some indirect measures can be helpful. What is important is to catch in the model the factors determining (i) the size of the state sector and the level of state sector workers (resources available to maintain employment and income levels in the state sector), assuming that the distribution of incomes within the sector does not change considerably; (ii) the size of the private sector, its relative income level and changes in inequality within this sector (including its level of productivity, entry conditions, etc.); and (iii) the number of transfer recipients. Since the parameters of the distribution and the income level for the latter group are primarily defined at the national level, it is enough simply to have a good measure of the size of this sector. Clearly, there are complex interaction and simultaneity between all of these factors. For this reason, it is important to include lagged values in the analysis of the current inequality levels.

The transition model offers a useful taxonomy of factors driving inequality. The initial level inequality is a product of initial geographic and economic conditions of a region, its employment structure, productive endowments, and policies aimed for redistributing incomes. The model to be estimated to assess the factors which determine the initial values of inequality can be represented as:

Gini 1994 = *F* (initial conditions, employment structure, demography, infrastructure, geography) (18)

A detailed discussion of regionally disaggregated data on various indicators and their links to factors of inequality changes can be found in Annex III. It also explains the basic logic behind including or excluding certain variables in regressions that follow.

Kolenikov and Shorrocks (2003) also use a rather ad hoc regression framework to establish determinants of inequality in Russian regions in 1995. Specifications adopted in this paper are quite close to their approach. However, our aims are different. We seek to establish the relative importance of various factors, whereas Kolenikov and Shorrocks strive to increase the share of the explained interregional variance to conduct full Shapley-Owen-Shorrocks decompositions of poverty at the regional level.

For the first block of inherited parameters, this paper assumes that the 'usual' level of inequality in the region can be proxied by the ratio of money incomes in 1985 to the national mean, and by car ownership (the most unequally distributed asset under socialism). Human capital available in the region (measured as percentage of the population with higher education in 1990) has an influence on both the size of the private sector (more skilled labour force presumably facilitates private sector development), its relative income level, and the inequality of earnings distribution. But because the latter factor can be inequality-reducing, the overall impact of this factor on inequality is hard to predict. The share of workers in private firms in 1992 and the number of employed in SMEs per 1,000 population in 1992 directly measure entrepreneurial climate and predict the size of this sector by 1994. These two variables are likely to have a positive inequality-increasing effect. However if the hypothesis about smaller private sectors (in 1992) reflecting more hostile business environments[40] is true, then smaller private sectors with more risky (and thus significantly more unequal) incomes may push up inequality compared to regions with larger private sectors and lower business risks and, thus, less unequal incomes. Variables showing the number of person employed in industry in 1992 and the level of regional budget dependency on transfers from the central budget are both linked to the exposure to transitional recession and reveal the downward trend in the state sector. The higher these values, the more likely the region is to display some retardation in the decompression of the distribution.

[40] See Basareva (2002), and Earle and Sakova (1999).

The variable measuring the level of demographic dependency rate aims at establishing the size of the transfer recipients sector—one of the factors countervailing increases in inequality. The higher the dependency rate, the lower inequality would be, other things being equal. Another set of variables aims at capturing the levels of productivity, wages or rents in the new private sector—road quality, telephone lines/population, index of natural resources, and the prevalence of price controls (human capital also has a role here). The higher the indicators, the higher inequality one may expect as the relative income level in the private sector will be higher. Finally, the share of urban population, population density, distance to Moscow, control for large regional (>800,000) capital, and the region's share of population residing in the five largest cities all act as controls for geographical conditions.

Kolenikov and Shorrocks (2003) also classify the variables of the model into large classes such as natural resources, reform process, demographic, macroeconomic, politics, human capital and geography. Each class includes three and more variables. The dependent variable is the level of inequality 1995 by regions. Annex IV reports results of four alternative specifications for the framework adopted in this paper: for population weighted and unweighted regressions, and for the full set of regions as opposed to the sample without Moscow, St Petersburg and Tuymen. The results show that all factors, where the unambiguous assessment of expected influence on inequality can be made, have predicted signs. A large industrial sector, higher reliance on central transfers, higher demographic dependency rates in 1992, all reduce initial (1994) levels of inequality. The share of workers employed by SMEs in 1992 is linked to higher inequality by 1994; however, this effect is not robust to removal of the three regions from the distribution. The extent of price controls in 1992 definitely contributed to higher inequality two years later.

It is informative to find out that proxies for 'inherited' inequality (level of income in 1985 and car ownership) have insignificant impact as determinants of inequality in transition. On the other hand, a higher level of education seems to be one of the strongest and most significant factors reducing inequality. Unexpectedly, the share of private sector in employment by 1992 has an opposite sign compared to the share of SMEs; it tends to reduce the level of inequality. It is likely that we see here an effect of rents discussed above.

Most of the geography variables are either weak or insignificant. The natural resources, however, acted quite strongly to reduce inequality, contrary to expectations. What is observed here is, possibly, an indirect effect from more abundant natural resources through local fiscal revenue leading to the greater affordability of redistribution. The regression produces overall good fit and there is a consistency in the signs and size of estimated coefficients across its modification. But it gives only a static view on the distribution.

3.2 Changes in inequality

To describe the factors behind the transitional dynamics, one needs a formal representation, accounting for the role of each factor and the interplay between them.

Following Aghion and Blanchard (1994), the key channels of redistribution in transition can be formalized in a two-sector model in which the reallocation of labour and capital across *state* and *private* sectors (and unemployment as a transient step between the two) is seen as the determining feature of transition. The model is primarily concerned with the labour allocation, labour incomes and transfers and, hence, can provide the paths (short- and medium-term dynamics) of inequality and poverty over the transition. In a number of modifications of the model some simulations were presented which provide a set of simple benchmarks for understanding the size of likely effects from within-sector inequalities, restructuring and closure probabilities for state firms and the relative productivity of both state and private sectors.

The model produces a rich set of trajectories and paths depending on the key parameters; unfortunately it does not have a formal solution that would allow the development of a functional form for estimation. Simulations using versions of the model and their applications to study cross-country variation are described in detail in Commander and Tolstopiatenko (1996).[41] The simulations show that short- and medium-term dynamics of inequality are influenced by the dynamics of sectoral employment, differences in sectoral productivity, and by the levels of inequality within each sector, all of which are predetermined in the model. What is interesting is that within a general trend towards rising inequality to its long-term steady state level, there are substantial variations in the speed of such a movement across even a slight modification of parameter values. The path depends on the specific parameters of production and investment functions in each sector, but also on exogenously set probabilities of closure, and on taxation and benefit regime. The path is also sensitive to the initial level of inequality.

Simulations using this model and a set of parameters show that raising unemployment benefits results in a decrease in inequality. An increase in the probability of restructuring or closure leads to an increase in inequality. The taxation level does not have a clear impact on inequality under certain configuration of parameters, but does affect inequality, in other settings.

3.3 Empirical results

Based on the insights provided by the restructuring model, this paper adopts a very parsimonious specification for the empirical test. To empirically estimate the role of various factors affecting regional inequality, the test will relate the current level (t) of the

---

41 The economy consists of two sectors, state and private, and three basic labour market states, state employment, private employment and unemployment. The model assumes standard production functions and a given distribution of workers by skills and productivities, as well as utility functions. It endogenizes the decision of closure and restructuring by assuming that they depend on the difference between values of staying in different sectors compared to the value of being unemployed and to the value of being in the unrestructured firm. In addition a key parameter, probability of closure, is determined by exogenous institutional and financial factors. There are also exogenously chosen policy parameters, such as taxation and unemployment benefits, which makes this model somewhat less ‘closed’ than in the optimal taxation models as analysed in Kanbur and Tuomala (2002) referred to in the previous section.

Gini index to its initial 'error free' level, as well as to a number of factors which reveal the speed of convergence to a (common) steady state. A large instrument matrix and panel data are used, but no assumptions are made on the autocorrelation of residuals. The equation to be estimated is now modified to include initial level of inequality G^* (instrumented with a set of variables described above), and time-variant policy parameters.

$\text{Gini}_t = \text{F}\ (G^*,$ initial conditions, employment structure, demography, infrastructure, policies, geography) (19)

The results are presented in Table 6. Three estimators were used: the simple pooled OLS regression with instruments, and two panel regression set-ups (the between estimator and the random effect panel regressions). Most of the results are stable across methods. These results suggest that regional current levels of inequality depend critically on the initial conditions—the Gini index is strongly related to its initial level (instrumented to address the measurement error issue),[42] but this is not the only factor which determines the observed level of regional inequality. The current economic conditions, expressed by the unemployment rate, are the second key factor. It is related to inequality in a predictable manner—the higher the unemployment rate, the stronger the level of inequality deviates upwards from its initially set values, other factors being controlled for.

Policy related variables have predictable signs, but most of them are insignificant except for communists being in charge of the legislature which does reduce the current level of inequality, other things being equal. Price controls, which are normally associated with attempts to reduce inequality, do not have an independently measurable impact on slowing down the inequality changes. Regions which inherited larger industrial sectors have persistently lower levels of inequality, again ceteris paribus. All variables characterizing the business environment and the degree of restructuring have the right signs; they accelerate the move to a higher inequality.

Governance of the public sector also matters for inequality. It may be surprising that higher wage arrears act to reduce the level of inequality, but if one accepts the interpretation of arrears to civil servants as a politically manipulated phenomenon used by regional authorities to bargain more resources and transfers from the centre (see Treisman and Gimpelson 2000; and Zhuravskaya 2000), then its role in hampering market forces is consistent with negative effects on inequality. In a more narrow sense, transfers reduce inequality, as one may expect.

[42] Inequality convergence suggests that the coefficient for the initial level of inequality should be less than one and greater than zero, which is the case in Table 6.

Table 6: Factors determining current levels of inequality

	OLS IV			Random effect panel			Between panel		
Dependent variable: current Level of Gini	Coefficient	Standard error	P-values	Coefficient	Standard error	P-values	Coefficient	Standard error	P-values
Rsq: between					0.1896			0.0006	
Within					0.6866			0.6877	
Overall		0.5621			0.5763			0.5081	
Wald test					162.28	0.000		122.58	0.000
Level of Gini in 1994 (instrumented)	0.560	0.114	0.000	0.596	0.183	0.001	0.767	0.206	0.000
Experience of current governor in office	0.002	0.002	0.145	0.002	0.002	0.369	0.001	0.003	0.686
Legislature controlled by communists	-0.025	0.013	0.058	-0.030	0.021	0.159	-0.035	0.022	0.112
Price controls	0.000	0.000	0.093	0.000	0.000	0.178	0.000	0.000	0.246
Unemployment rate	0.397	0.125	0.002	0.352	0.120	0.003	0.560	0.288	0.052
Share of employed in industry	-0.004	0.001	0.000	-0.005	0.001	0.000	-0.003	0.001	0.059
Share of employed at SMEs	0.047	0.099	0.636	0.065	0.117	0.578	-0.088	0.194	0.652
Index of ownership restructuring	-0.025	0.078	0.751	-0.021	0.129	0.871	0.010	0.131	0.940
Index of sectoral shifts in employment	-0.472	0.148	0.002	-0.493	0.242	0.041	-0.512	0.250	0.041
Openness to trade	0.010	0.011	0.010	0.001	0.010	0.271	0.012	0.014	0.090
Wage arrears to civil servants	-0.143	0.044	0.001	-0.192	0.037	0.000	0.109	0.153	0.474
State transfers as share of population income	-0.176	0.102	0.086	-0.180	0.122	0.142	-0.194	0.195	0.321
Constant	0.317	0.061	0.000	0.351	0.090	0.000	0.193	0.117	0.100
Sigma_u					0.042507				
Sigma_e					0.041481				
Rho					0.512211				

Note: Instruments: urban, density, resource rich, distance to Moscow, large (>800,000) capital, dependency rate, road quality, telephone lines, early privatizer, number of SMEs in 1992.

Source: Author.

38

Estimations presented in this section are aimed to measure the impact of various economic fundamentals on the path of inequality convergence. The result looks consistent with the models of restructuring and suggests that inequality dynamics is determined by a complex combination of many factors, which all determine how fast the regions move to a distribution determined by market forces and fundamentals. But the fact that it occurs in all parts of Russia, and that even the least advanced reformers also move in the same direction, albeit slowly, shows the broad-based nature of on-going reforms.

4 Conclusions

A recent debate around poverty and inequality demonstrated the crucial importance of good quality comprehensive data covering sufficiently long periods of time to underpin the analysis. This is exactly where the information on Russian regions remains scarce and largely not up to the task. Despite these limitations, the analysis of data from HBS sheds light on many issues of regional dynamics pertaining to the socioeconomic impact of the Russian transition. It is especially relevant to discern tendencies suggested by this particular dataset, as it is effectively a mirror in which Russian politics is reflected—that of official statistics.

This study finds that the share of inequality in Russia coming from within its regions is dominant, but unlike in other countries in Europe where it accounts for 90-95 per cent of the total inequality, in Russia its share is 70 per cent. Inequality between regions is growing over time, and accounts for 85 per cent of the increase in the national inequality over 1994-2000. The analysis suggests that, on the one hand, the regions seem to exhibit divergence in per capita incomes (especially over 1997-2000), but, on the other hand, they converge in their inequality levels (to a common value of Gini index around 0.35). Projections show that if observed trends are to continue into the future, by 2010 the absolute majority (56 per cent) of Russia's poor will be concentrated in a few permanently impoverished regions (with incomes below 90 per cent of the national average), while relatively more affluent regions will become virtually free of poverty.

The paper shows that rather large observed differences between regions in their current levels of inequality can be traced to a set of economic, political and geographic factors that determine the evolution of income distribution. Over time the 'inherited' factors play lesser roles, and the labour market situation emerges as a particularly important factor of the inequality dynamics.

This paper is by far not the final word in economic studies of Russian regional dynamics. Economic fundamentals, especially those related to the rate of technological progress, need to be properly revealed before one attempts further to understand the regional convergence or divergence in Russia. The relevance of conclusions from the analysis of data presented in this paper, however, depends on the validity of assumptions underlying data processing techniques used by Goskomstat, some of which, as shown in the literature, are controversial. A recent study by Mistiaen and Ravallion (2002) argues that measures of inequality depend crucially on the assumptions about the behaviour regarding participation in the survey. A thorough reassessment of results has to rely on the raw data. The recently initiated joint Russian government-DFID-World Bank project aims at putting the data in the public domain, thus one can hope that significant advances in understanding the nature and dynamics of inequality in transition will be made in the near future.

Annex I: Definition of regions

By 1992 there were 73 statistically distinct units in the Russian Federation (72 without Chechnya, which stopped co-operation on statistical matters rather early). According to the hierarchy accepted after the break up, and prior to the adoption of the new constitutions, Russian statistics and politics comprised 77 oblasts, krais, and republics (without Chechnya). The difference between 72 and 77 is due to the fact that several republics of North Caucasus Adygeya and Karachaevo-Cherkessiya were not earlier covered by regular statistical monitoring, and by very late (1992) granting of the status of 'subject' of the Russian Federation to three Siberian regions (Altai, Evreiskaya, and Chukotskij). The definition of regions has again changed in the new constitution to represent subjects of the federation, numbering 89 territorial units.

The federative structure of the Russian federation as it emerged in the new constitution is somewhat peculiar. It consists of 89 politically equal federation members, including 21 republics (national-territorial entities), 55 krais and oblasts (administrative-territorial entities), two cities of federal significance, Moscow and St Petersburg, and eleven smaller okrugs and oblasts (autonomous national-territorial entities). Previously autonomous okrugs and oblasts, for statistical purposes, were considered as part of the respective krais or oblasts, but after adoption of the new constitution they are on par with other members. Goskomstat did not respond to these changes immediately, but starting in 1999[43] all information published referred to 89 federation subjects (88 in practice, as there were no data on Chechnya). No data, however, exists for autonomous okrugs and oblasts prior to 1999. The introduction of federal okrugs in 2000 changed the groupings of regions again, but confirmed and reinforced the equal treatment of all 89 regions for statistical purposes.[44] However, the total number of economically distinct regions for the entire period is narrower as earlier data were available only for a classification of 77 regions (and 72 regions prior to 1992).

A region represents a meaningful aggregation level for the purposes of inequality analysis. In addition to similar geographic, historic and social conditions, regions are the agents of fiscal, structural and social policy. They have the right to levy local taxes, invest in local infrastructure, provide subsidies to enterprises, legislate on local social transfers, supplement federally mandated transfers, and provide housing and utility subsidies to the households. At the same time authorities in some regions employ several quasi-legal methods of impeding free movement of capital, goods, services and labour. There is a wealth of data published for each of the regions. Understanding the true meaning of some of the published data, presented in this table, does require a special description of methodological issues, provided in Annex III.

---

[43] Goskomstat (1999).

[44] Data published from the 1997 HBS was in line with the new member-level groupings (again, in practice 88 regions).

Annex II

Table A1: Transition matrices for regions between income states

A: Year-to-year: distribution dynamics: average of one-year transitions between 1994 and 2000 (six 1-year transitions)

	Income intervals (per capita incomes to poverty lines)	2000 position (class of income)				
		<0.7	*0.7-0.9*	*0.9-1.1*	*1.1-1.3*	*>1.3*
1994 position (class of income)	*<0.7*	**0.78**	0.20	0.02	0.00	0.00
	0.7- 0.9	0.12	**0.69**	0.18	0.01	0.00
	0.9-1.1	0.00	0.19	**0.60**	0.20	0.01
	1.1-1.3	0.00	0.00	0.40	**0.51**	0.10
	>1.3	0.00	0.00	0.03	0.21	**0.76**
Starting frequency (regions in each class in 1994)		0.11	0.30	0.33	0.18	0.08
Ending frequency (regions in each class in 2000)		0.12	0.29	0.33	0.18	0.08
Ergodic Distribution		**0.17**	**0.30**	**0.30**	**0.16**	**0.07**

B: Three-year average: distribution dynamics between 1994 and 2000 (two 3-year transitions)

	Income intervals (per capita incomes to poverty lines)	Position at the completion of transitions (class of income)				
		<0.7	*0.7-0.9*	*0.9-1.1*	*1.1-1.3*	*>1.3*
Starting position (class of income)	*<0.7*	**0.69**	0.31	0.00	0.00	0.00
	0.7- 0.9	0.14	**0.53**	0.25	0.08	0.00
	0.9-1.1	0.06	0.26	**0.49**	0.15	0.04
	1.1-1.3	0.00	0.08	0.42	**0.33**	0.17
	>1.3	0.00	0.08	0.08	0.31	**0.54**
Starting frequency (regions in each class in 1994)		0.08	0.33	0.34	0.16	0.08
Ending frequency (regions in each class in 2000)		0.12	0.31	0.32	0.16	0.08
Ergodic distribution		**0.19**	**0.32**	**0.28**	**0.13**	**0.07**

Predictions of dynamics based on transition matrix models

C: Actual distribution dynamics between 1994 and 2000 (actual initial and final positions)

	Income intervals (regional per capita money incomes to regional poverty line)	2000 position (class of income)				
		<0.7	*0.7-0.9*	*0.9-1.1*	*1.1-1.3*	*>1.3*
1994 position (class of income)	*<0.7*	**0.67**	0.17	0.00	0.17	0.00
	0.7- 0.9	0.19	**0.41**	0.26	0.15	0.00
	0.9-1.1	0.08	0.40	**0.28**	0.12	0.12
	1.1-1.3	0.00	0.18	0.45	**0.18**	0.18
	>1.3	0.13	0.00	0.38	0.13	**0.38**

D. Predicted distribution dynamics from six 1-year transitions between 1994 and 2000

	Income intervals (per capita incomes to poverty lines)	2000 position (class of income)				
		<0.7	*0.7-0.9*	*0.9-1.1*	*1.1-1.3*	*>1.3*
1994 position (class of income)	*<0.7*	**0.45**	0.36	0.14	0.03	0.00
	0.7- 0.9	0.21	**0.40**	0.27	0.10	0.02
	0.9-1.1	0.07	0.27	**0.39**	0.21	0.07
	1.1-1.3	0.02	0.18	0.41	**0.27**	0.14
	>1.3	0.00	0.06	0.26	0.29	**0.40**

E: Predicted distribution dynamics from two 3-year transitions between 1994 and 2000

	Income intervals (per capita incomes to poverty lines)	2000 position (class of income)				
		<0.7	*0.7-0.9*	*0.9-1.1*	*1.1-1.3*	*>1.3*
1994 position (class of income)	*<0.7*	**0.52**	0.38	0.08	0.02	0.00
	0.7- 0.9	0.19	**0.40**	0.29	0.11	0.02
	0.9-1.1	0.11	0.30	**0.37**	0.16	0.07
	1.1-1.3	0.04	0.19	0.38	**0.23**	0.16
	>1.3	0.02	0.13	0.23	0.29	**0.35**

Source: Author.

43

Annex III: Variables for regional analysis of the inequality convergence

Variables used to characterize factors of inequality levels are as follows.

A3.1 Endowments and initial conditions of the regions

To characterize natural resource endowments we use a complex assessment score developed by Lavrov, which in addition to mineral resources includes also data on climatic conditions, soils etc. Alternatively, a simple dummy for the eight richest regions in terms of minerals is used.

To characterize population age profile (and labour resources available) we use demographic dependency rate (the sum of those below and above working age to total population). We also look at changes during 1985-95. Regions differ quite a lot, from 0.47 dependant for one person of working age up to 0.90. Changes in the demographic burden differ from 0 to 12 per cent increase. None of the regions witnessed a decrease in this rate.

Capital size is reported to be an important factor identified in the literature (see Fedorov 2002) as a good proxy for the opportunity for agglomeration, scale economies, concentration of wealth and therefore inequality.

Measures of education at the regional level are very poorly reported by statistical agencies. The latest available published information refers to micro census.

Physical assets are difficult to measure. The existing accounting method does not adequately capture the market value, etc. We approximate this endowment by the share of employment in industry.

To characterize the state of the infrastructure we use two proxies. 'Road quality' is the per cent of all roads that are paved; the latest available figures for 1995 give regional variations between 59.2 per cent to 100 per cent. The second is an infrastructure proxy: the density of telephone lines (urban only); regionally density varies tremendously from 9 to 193 telephone lines per 100 urban families.

A3.2 Restructuring policies: advanced reformers versus lagged regions

The paper identifies two groups of factors: proxies for 'quality of policies' that determine the investment climate, and the measures of the business climate.

A number of policy-related indicators are available for Russian regions, such as the dominant party in the parliament, the political orientation of governors, the number of governors since the start of transition, the experience of ruling governors etc. One of the key indicators of governance at the regional level is an early start in the privatization process. By 1995, the total share of productive assets in mixed, private or foreign ownership varied between regions from a low of 7 per cent to a high of 94 per cent (with an average of around 50 per cent). The list of lagging regions corresponds well with the known group of regions lead by conservative (communist) governments opposed to market reforms. A completely different though plausible proxy for governance quality can be fiscal data. Many scholars agree that wage arrears were a major sign of the breakdown of state authority in Russia. One can argue that wage arrears to civil servants can have especially detrimental consequences and reflect quite closely the degree of disorganization in the provision of basic state services. As measured by this indicator, regions ranged in 1997 between zero (no arrears) to 25 per cent of the annual wage bill owed to civil servants as unpaid wages (with a national average of 3 per cent). In 1998 the situation deteriorated dramatically with 17 per cent of the total wage bill owed, with a peak of 45 per cent (implying that in some regions wages have been almost half a year late). The year 1999 saw a dramatic improvement with the national average standing at 1.3 per cent (with a high of 35 per cent).

Development of SMEs is a clear outcome indicator for governance quality reflecting the investment climate. Russian statistics of SMEs, which rely on surveys or census-type registration, is quite problematic especially where the dynamic story and comparisons over time are concerned—but as a measure of regional ranking it is quite acceptable. We use the share of SME employment to total employment measured by Goskomstat as a more reliable indicator of the real importance of SMEs (compared to sales or the number of firms, which seems to be particularly biased). The most business-friendly Russian regions in 1996 had a high of 40 per cent of all workforce employed by SMEs (average of 12), but in the worst regions this index was below 3 per cent. We also use the per capita number of SMEs in 1992 to control for the initial entrepreneurial abilities of the population. Basareva (2002) in her study of regional aspects of SME development revealed two significant facts: links of entry to self-employment and SMEs to the entrepreneurial climate in the region (broadly defined); and links of entry to the level and dispersion of entrepreneurial incomes. She demonstrates that the level of SME development in 1992 reflected some general local preferences and largely predetermined the evolution of the sector in transition.

The dispersion of FDI share across regions in the gross regional product is, as one expects, exceptionally high but only a handful of regions have received substantial investments. Openness to trade is a better proxy for the overall effort of the regional government to integrate into the market economy. The ranking of regions according to this indicator has remained very stable over time. There are also all sorts of measurement problems (place of registration of import and export firms is different from the origin/final destination, etc.). Thus, the Republic of Ingushetia (with a special tax regime) serves clearly as a tax haven for many such firms, having a sum of export and import exceeding six times its regional gross product. The lowest share of around 2 per cent is registered in the Siberian Tuva Republic. However, as a general tendency this share is an informative indicator of both firms' and regional authorities' efforts to facilitate international trade and can therefore be used alongside other policy proxies.

An index of structural change (the sum of changes in the sectoral shares of employment) was originally proposed by Layard *et al.* (1991) in the analysis of unemployment. This index seems to perform well in assessing the depth of industrial restructuring by a certain date.

A3.3 Economic shocks

Regions were exposed to different shocks depending on their output composition. These shocks clearly influenced the transitional dynamics of inequality. Unemployment and employment rates as measured by the labour force survey (LFS) can be used to identify the magnitude of shocks to regional employment. Regions differ quite substantially in these indices; the unemployment rate in 1998 ranged from 5 to 50 per cent.

A3.4 Transfers: main types, role, variation across regions; transfer dependent versus transfer independent

We distinguish two types of transfers: budgetary transfers to regions; and transfers from regional budgets to populations. On average, a Russian region receives around 20 per cent of its spending budget from the federal budget as an interbudgetary transfer, with a low of only 3 per cent and a high of 90 per cent. The share of social public transfers in total population income varies in response to regional social policies and the demographic structure of the population, to produce a rather wide range between 5 and 31 per cent during 1997-99.

47

Annex IV

Table A2: Instrumental variables regressions for the initial level of inequality (Gini index in 1994), regression results

	A. Full sample unweighted			B. weighted by population			C. minus Moscow + Tyumen			D. minus Moscow + Tyumen weighted by population		
	Number of obs.	75		Number of obs.	75		Number of obs.	73		Number of obs.	73	
	F(22, 52)	4.07		F(22, 52)	11.23		F(22, 50)	2.71		F(22, 50)	3.22	
	Prob > F	0		Prob > F	0		Prob > F	0.0018		Prob > F	0.0003	
	R^2	0.6328		R^2	0.8261		R^2	0.5437		R^2	0.5861	
	Adj R^2	0.4775		Adj R^2	0.7525		Adj R^2	0.3429		Adj R^2	0.404	
	Root MSE	0.04419		Root MSE	0.0349		Root MSE	0.04428		Root MSE	0.03559	
Dependent variable is:												
Gini for real money incomes in 1994	coef.	std. err.	t	coef.	std. err	t	coef.	std. err	t	coef.	std. err.	t
Mon. inc. in 1985 to national average	-0.0180	0.0125	-1.4420	-0.0189	0.0126	-1.5020	-0.0189	0.0126	-1.5020	-0.0126	0.0113	-1.1140
Car ownership in 1990 (per 1,000 pop.)	-0.0002	0.0005	-0.5120	-0.0005	0.0004	-1.2880	-0.0003	0.0005	-0.5930	-0.0005	0.0004	-1.1030
% of population with high ed., 1990	-0.5552	0.1815	-3.0580	-0.3047	0.1687	-1.8070	-0.5464	0.1887	-2.8960	-0.2351	0.1753	-1.3410
Share of workers in priv. firms, 1992	-0.3982	0.1807	-2.2040	-0.3223	0.1818	-1.7730	-0.4044	0.1813	-2.2310	-0.3145	0.1829	-1.7200
SME per 1,000 pop., 1992	0.0115	0.0032	3.6510	0.0110	0.0025	4.4640	0.0083	0.0042	1.9980	0.0068	0.0052	1.3090
Employed in industry, pop. 1992	-0.8191	0.2467	-3.3200	-0.7859	0.2080	-3.7790	-0.7255	0.2590	-2.8010	-0.7037	0.2152	-3.2690
High dependency on budget transfers	-0.0243	0.0179	-1.3580	-0.0142	0.0148	-0.9590	-0.0215	0.0182	-1.1780	-0.0104	0.0150	-0.6940
Middle dependency on budget transfers	-0.0542	0.0217	-2.5020	-0.0413	0.0193	-2.1460	-0.0589	0.0220	-2.6780	-0.0465	0.0197	-2.3620
Score for price controls, max. =1	0.1108	0.0326	3.4030	0.0898	0.0308	2.9120	0.0951	0.0368	2.5850	0.0707	0.0349	2.0260
Relative price level, to average Russia	-0.0582	0.0269	-2.1640	-0.0645	0.0249	-2.5860	-0.0632	0.0274	-2.3090	-0.0676	0.0254	-2.6640
Middle level of demographic dependency rate	-0.0456	0.0216	-2.1120	-0.0358	0.0181	-1.9730	-0.0500	0.0221	-2.2630	-0.0389	0.0185	-2.1030

High level of demographic dependency rate	-0.0515	0.0271	-1.8990	-0.0400	0.0243	-1.6480	-0.0553	0.0278	-1.9880	-0.0426	0.0249	-1.7130
Middle level of road quality	0.0250	0.0151	1.6500	0.0227	0.0131	1.7240	0.0223	0.0155	1.4440	0.0185	0.0134	1.3760
High level of road quality	0.0264	0.0159	1.6640	0.0267	0.0137	1.9500	0.0263	0.0160	1.6470	0.0249	0.0137	1.8200
Middle level of telephone lines/population	-0.0084	0.0142	-0.5910	-0.0147	0.0128	-1.1510	-0.0069	0.0144	-0.4830	-0.0111	0.0130	-0.8590
High level of telephone lines/population	-0.0212	0.0150	-1.4090	-0.0109	0.0132	-0.8300	-0.0174	0.0154	-1.1300	-0.0055	0.0136	-0.4010
Share of urban population	0.1259	0.0914	1.3780	0.1259	0.0820	1.5350	0.0905	0.0958	0.9450	0.1019	0.0835	1.2200
Population density	0.0000	0.0002	0.0830	0.0000	0.0001	-0.4140	0.0000	0.0002	-0.1560	-0.0001	0.0001	-0.4950
Index of natural resources	-0.0373	0.0195	-1.9110	-0.0199	0.0172	-1.1530	-0.0400	0.0197	-2.0290	-0.0240	0.0178	-1.3500
Distance to Moscow	0.0000	0.0017	0.0250	-0.0011	0.0016	-0.6900	0.0007	0.0018	0.4190	-0.0005	0.0016	-0.2920
Dummy for large (>800 thousand) capital	0.0073	0.0159	0.4580	0.0046	0.0122	0.3780	0.0119	0.0163	0.7300	0.0082	0.0124	0.6620
Share of reg. pop. in 5 largest cities	-0.1128	0.0911	-1.2390	-0.0895	0.0833	-1.0750	-0.1319	0.0931	-1.4170	-0.1146	0.0849	-1.3500
Constant	0.7010	0.1026	6.8300	0.6223	0.1010	6.1630	0.7437	0.1090	6.8200	0.6447	0.1036	6.2250

Source: Author.

References

Adelman, I. and D. Vujovic (1998). 'Institutional and Policy Aspects of Transition: An Empirical Analysis', in A. Levy-Livermore (ed.) *Handbook on the Globalization of the World Economy*, Edward Elgar: Cheltenham.

Aghion, P. and O. Blanchard (1994). 'On the Speed of Restructuring' (mimeo), MIT: Cambridge MA, and EBRD: London.

Alesina, A., R. Di Tella and R. MacCulloch (2002). 'Inequality and Happiness: Are Europeans and Americans Different?' (mimeo), National Bureau of Economic Research: Cambridge MA.

Andalon, M.L. and L.F. Lopez-Calva (2002). 'The Many Mexicos: Income Inequality and Polarization in Urban Mexico During the 90s', paper presented at the WIDER-Cornell-LSE Conference on Spatial Inequality and Development in London on 28-30 June.

Atkinson, A. and J. Micklewright (1995). *Economic Transformation in Eastern Europe and the Distribution of Income*, Cambridge University Press: Cambridge.

Bandyopadhyay, S. (2002). 'Convergence Club Empirics: Some Dynamics and Explanations of Unequal Growth Across Indian States', paper presented at the WIDER-Cornell-LSE Conference on Spatial Inequality and Development in London on 28-30 June.

Barro, R. and X. Sala-i-Martin (1991). 'Convergence across states and regions', *Brookings Papers of Economic Activity* 1:107-58.

Barro, R. and X. Sala-i-Martin (1992). 'Convergence', *Journal of Political Economy* 100:223-51.

Basareva V. (2002). 'Institutional Features of New Enterprise Formation in Regions of Russia', *EERC Working Papers* 02/02, Economics Education and Research Consortium: Moscow.

Benabou, R. (1996). 'Inequality and Growth', in B. Bernanke and J. Rotemberg (eds) *NBER Annual*, MIT Press: Cambridge MA.

Boldrin, M. and F. Canova (2001). 'Inequality and Convergence: Reconsidering European Regional Policies', *Economic Policy* 32.

Bourguignon, F. (1979). 'Decomposable Income Inequality Measures', *Econometrica* 47(4):901-20.

Campos, N.F. and F. Coricelli (2000). 'Growth in Transition: What We Know, What We Don't, and What We Should' (mimeo), World Bank: Washington DC, and CEPR: London.

Carluer, F. and E. Sharipova (2001). 'Regional convergence in Russia? Or When Economic Geography Confirms Macroeconomic Analysis', *Russian-European Centre for Economic Policy Working Papers* June.

Cashin, P. and R. Sahay (1996). 'Internal Migration, Centre-State Grants, and Economic Growth in the States of India', *IMF Staff Papers* 43:123-71.

Coulombe, S. and F. Lee (1995). 'Convergence across Canadian Provinces, 1961 to 1991', *Canadian Journal of Economics* 28:886-98.

Commander, S. and A. Tolstopiatenko (1996). 'Restructuring and Taxation in Transition Economies' (mimeo) EBRD: London.

Commander, S., A. Tolstopiatenko and R. Yemtsov (1999). 'Channels of Redistribution: Inequality and Poverty in the Russian Transition', *Economics of Transition* 7(2):411–47.

Datt, G. and M. Ravallion (1998). 'Why Have Some Indian States Done Better Than Others?' *Economica* 65(257):17-38.

de La Fuente, A. (1996). 'On the Sources of Convergence: A Close Look at the Spanish Regions', *CEPR Discussion Papers* 1543.

Dolinskaya, I. (2002). 'Transition and Regional Inequality in Russia: Reorganization or Procrastination?', *IMF Working Papers* 169.

Earle J.S. and Z. Sakova (1999). 'Entrepreneurship from Scratch: Lessons on the Entry Decision into Self-Employment from Transition Economies'. *IZA Discussion Papers* 79, Forschungsinstitut zur Zukunft der Arbeit: Bonn.

Fedorov, L. (2002). 'Regional Inequality and Regional Polarization in Russia, 1990-1999', *World Development* 30(3)443-56.

Filiztekin, A. (1999). 'Convergence Across Turkish Provinces and Sectoral Dynamics' (mimeo), World Bank: Washington DC.

Förster, M., D. Jesuit and T. Smeeding (2003). 'Regional Poverty and Income Inequality in Central and Eastern Europe: Evidence from the Luxembourg Income Study', *WIDER Discussion Papers* 65, UNU/WIDER: Helsinki.

Goskomstat (1999). 'Results of the Household Budget Survey', *Statistical Bulletins* 11(61), Goskomstat: Moscow.

Goskomstat (2000). *Regions of Russia,* Goskomstat: Moscow.

Goskomstat (2001). *Regions of Russia,* Goskomstat: Moscow.

Goskomstat (various). *Russian Statistical Yearbook,* Goskomstat: Moscow.

Hanson, P. and M. Bradshaw (2000). *Regional Economic Change in Russia*, Edward Elgar: Cheltenham.

Kanbur, R. and M. Tuomala (2002). 'Understanding the Evolution of Inequality during the Transition: The Optimal Income Taxation Approach' (mimeo), Cornell University: Ithaca.

Kanbur, R. and X. Zhang (1999). 'Which Regional Inequality? The Evolution of Rural–Urban and Inland–Coastal Inequality in China from 1983 to 1995', *Journal of Comparative Economics* 27(4)686-701.

Kolenikov, S. and A.F. Shorrocks (2003). 'Regional Dimension of Poverty in Russia', paper presented at the WIDER Conference on Spatial Inequality in Asia, Tokyo 28-29 March.

Kournishev, B.B. (1999). 'Kontseptualnie Podkhodi k Snizheniyu Ekonomicheskoi, Sotsialnoi i Pravovoi Asymmetrii v Razvitii Regionov Rossiskoi Federatsii (Conceptual Approaches to Addressing Economic, Social and Legal Asymmetry in Regional Development of the Russian Federation)', *Regions: Economics and Sociology* 2 (Russian-language periodical).

Lavrovsky, B. (1999). 'Regionalnaya Asymmetria i Razvitie' (Regional Asymmetry and Development), *Regions: Economics and Sociology* (Special Issue), (Russian-language periodical).

Layard R., S. Nickell and R. Jackman (1991). *Unemployment,* Oxford University Press: Oxford.

Lokshin, M. (2002). 'Results of RLMS. Poverty and Inequality Changes' (mimeo), World Bank: Washington DC.

Mikheeva, N. (1999). 'Analysis of Interregional Inequality in Russia', *EERC Studies on Russian Economic Development* (10)5, Economics Education and Research Consortium: Moscow.

Milanovic, B. (1998). *Income, Inequality, and Poverty during the Transition from Planned to Market Economy,* World Bank: Washington DC.

Milanovic, B. (1999a). 'Explaining the Increase in Inequality during the Transition', *World Bank Policy Research Working Papers* 1935, World Bank: Washington DC.

Milanovic, B. (1999b). 'Do More Unequal Countries Redistribute More? Does the Median Voter Hypothesis Hold?' *World Bank Policy Research Working Papers* 2264, World Bank: Washington DC.

Mistiaen J.A. and M. Ravallion (2002). 'Survey Compliance and the Distribution of Income', *World Bank Policy Research Working Paper* 2956, World Bank: Washington DC.

Ovcharova L. *et al.* (2001). 'Working Towards a Poverty Eradication Strategy in Russia: Analysis and Recommendations' (mimeo), United Nations Theme Group on Poverty, ILO Moscow Office.

Persson, J. (1994). ‘Convergence in per capita income and migration across the Swedish counties 1906-1990’ (mimeo), IIES, Stockholm University: Stockholm.

Ravallion, M. (2001). ‘Inequality Convergence’, *World Bank Policy Research Working Papers* 2645, World Bank: Washington DC.

Ravallion, M. and M. Lokshin (1999). ‘Who Wants to Redistribute? The Tunnel Effect of 1990s Russia’, *World Bank Policy Research Working Papers* 2150, World Bank: Washington DC.

Sheviakov, A. and A. Kiruta (2001). ‘*Economic Inequality, Standards of Living and Poverty of Population in Russia (Measurement Methods and Analysis of Causal Dependencies),* Centre for Socioeconomic Measurement, Russian Academy of Sciences: Moscow, and Economics Education and Research Consortium: Moscow.

Shorrocks, A.F. (1976). ‘Income Mobility and the Markov Assumption’, *Economic Journal* 86:566-78.

Shorrocks, A.F. (1980). ‘The Class of Additively Decomposable Inequality Measures’, *Econometrica* 48(3):613-25.

Shorrocks, A.F. and S. Kolenikov (2001). ‘Poverty Trends in Russia during the Transition’ (mimeo), UNU/WIDER: Helsinki.

Shioji, E. (1996). ‘Regional Growth in Japan’, *CEPR Discussion Papers* 1425, Centre for Economic Policy Research: London.

Treivish, A.I. (1999). ‘Novie Tendentsii v Razvitii Regionov Rossii i ih Asymmetria. (New Tendencies in the Development of Regions in Russia and Their Asymmetry)’, *Regions: Economics and Sociology* (Special Issue), (Russian-language periodical).

Treisman, D. and V. Gimpelson (2000). ‘Political Business Cycles and Russian Elections, or the Manipulations of Chudar’, *CIRJE Working Papers* 39, CIRJE, Faculty of Economics, Tokyo University: Tokyo

World Bank (1996). *Fiscal Management in Russia,* World Bank: Washington DC.

World Bank (2000). *Making Transition Work for Everyone: Poverty and Inequality in Europe and Central Asia,* World Bank: Washington DC.

Westlund, H., A. Granberg and F. Snickars (2000). *Regional Development in Russia*, Edward Elgar: Cheltenham.

Yemtsov, R. (2003). ‘Through the Looking Glass: What Can Official Data on Poverty in Russia Tell Us?’ (mimeo), World Bank: Washington DC.

Zhuravskaya, E.V. (2000). ‘Market-Hampering Federalism: Local Incentives for Reform in Russia’ (mimeo), Russian-European Centre for Economic Policy: Moscow.