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Determinants of interregional mobility in Russia

*Evidence from panel data**

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Abstract

The paper studies the determinants of internal migration in Russia. Using panel data on gross region-to-region migration flows in 1992–99, we estimate the effect of economic, political and social factors. Although overall migration is rather low, it turns out that its intensity does depend on economic factors even controlling for fixed effects for each origin–destination pair. People move from poorer and job scarce regions with worse public good provision to those which are richer and prospering better both in terms of employment prospects and public goods. Migration is, however, constrained by the lack of liquidity; for the poorest regions, an increase in income raises rather than decreases outmigration. Our estimates imply that up to a third of Russian regions are locked in poverty traps.

JEL classifications: P23, J61, P36, R23.
Keywords: Internal migration, liquidity constraints, gravity model, Russia's transition.

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1. Introduction

In this paper, we study what determines the gross migration flows in modern Russia. We test whether internal migration is explained by differentials in income, unemployment, poverty, education, life expectancy, conflict, public good provision etc. or by initial conditions inherited from the Soviet time. In other words, we estimate whether people 'vote with their feet', i.e., whether there is any degree of Tiebout competition between Russian regions.

Interregional labour mobility is crucial for Russia's successful transition to capitalism. To transform its economy, Russia has to reallocate resources from inefficient enterprises established under the Soviet system to new sectors. This problem has a regional dimension: Russia has inherited a geographically concentrated industrial structure. Many towns and even regions rely upon a single industry or, in many cases, a single enterprise.[1] Intersectoral reallocation of resources therefore requires *interregional* mobility of factors. Since Russia still lacks capital market institutions, including market infrastructure and good corporate governance, capital mobility is limited. Capital cannot move to the regions with cheap and skilled labour. This is why geographical labour mobility is vital for restructuring.

However, interregional migration in Russia is low by international standards. Moreover, it is also lower than it used to be in the Soviet Union. The interregional differentials in real income, wage and unemployment rates are quite large, and what is more important, are not decreasing over time. The lack of convergence indicates that the labour force does not reallocate from the backward regions. Certain Russian regions seem to be locked in a poverty trap. To understand the nature of the trap, one has to study the barriers to geographical mobility and check to what extent migration depends on economic performance and policy in the regions.

When analysing labour mobility in modern Russia, one needs to control for fixed factors, such as geography, initial conditions and legacies. The latter are very important: interregional migration in Russia is influenced by the huge regional distortions that accumulated during the Soviet regime. First, there are legacies of the Soviet government's ethnic policies. Central government used to move whole nations (Crimean Tartars, Chechens and Ingushes, Jews, Volga Germans etc.) by force. The political liberalization allowed these people to come back home, and this has become a major determinant of the post-communist migration flows.

The second issue is the rise of nation states and republics, both within Russia and in former Soviet republics, which drives many native Russians back to Central Russia (Zayonchkovskaya, 1994).

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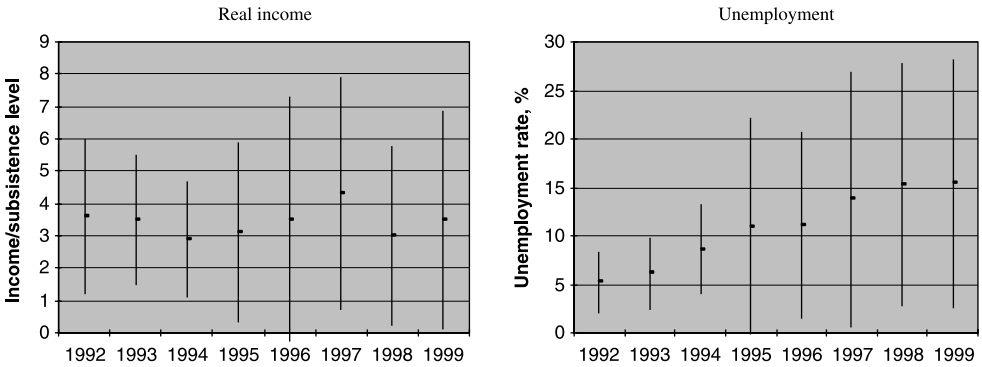
[1] According to the Expert Institute (2000) and World Bank (2001), about 24.5 million Russians (out of a total 146 million) reside in mono-towns (i.e., settlements where the largest enterprise accounts for more than 50 percent of employment). Using a nationally representative survey of households RLMS, Friebel and Guriev (2002) estimate that the average share of the four largest employers in total local employment is 59 percent.

Figure 1. Interregional dispersion in real income and unemployment rates in Russia, 1992–99



Evolution of income dispersion over time: Average real regional income ± 2 standard deviations.

Evolution of interregional dispersion over time: Average unemployment rate income ± 2 standard deviations.

***Source*:** Goskomstat (2000).

The third source of distortions is the Soviet system of restricting mobility from rural areas and small towns to metropolitan areas (through so-called *propiska*). The controls imposed on migration to major cities resulted in significantly faster growth of population in uncontrolled cities (Gang and Stuart, 1999). The Soviet government also expelled criminals and the (voluntarily) unemployed from major cities, which led to significant differentials in living conditions, in particular in crime levels (Shelley, 1982). All these legacies have created a large potential for migration from the northeast of Russia to the European part of the country.[2]

In order to estimate to what extent the internal migration depends on current economic performance, controlling for fixed factors (including those due to Soviet legacies), we (i) study the gross region-to-region flows, and (ii) use panel data. This methodology allows us to distinguish between migration induced by current living standard differentials and the fixed determinants of migration; the latter are controlled for by using fixed effects for origin–destination pairs.

The paper proceeds as follows. In Section 2 we discuss related literature and provide some basic facts on the internal migration in Russia. Section 3 describes our hypotheses (Subsection 3.1), empirical strategy (Subsection 3.2), the dataset (Subsection 3.3) and the results of econometric analysis (Subsection 3.4). Section 4 draws some conclusions.

[2] Heleniak (1999) estimates that out of 9 million people residing in Russian North, about 2 million should be considered potential migrants.

2. Literature

Although worker mobility is central to the restructuring of formerly planned economies, a lack of data makes studying labour mobility in transition economies rather difficult. *Job* flows in large and medium-sized industrial enterprises have been studied relatively well (see, for example a survey in Brown and Earle, 2002). As for the *worker* flows, there are only a few papers on Central and East European countries and virtually none on Russia and the CIS. A survey by Filer *et al.* (2001) suggests that geographical mobility has been low in all transition countries because of administrative barriers and underdevelopment of housing markets. Boeri and Flinn (1999) explained lack of worker mobility in transition economies by low monetary returns to job changes and by market segmentation of job offers. A survey by Svejnar (1999) concludes that, while most labour markets in transition countries have been rather flexible, the geographical mobility was lower than expected given the huge and often growing regional differentials. In a paper closest to ours in terms of methodology, Fidrmuc (2003) studies interregional migration in the Czech Republic, Poland, Hungary and Slovakia using panel data on gross region-level flows. He finds that higher wage and lower unemployment increase both inflows and outflows from a region. This suggests that potential migrants may be liquidity constrained and lack cash to finance mobility. Indeed, in the absence of financial constraints, higher wages should reduce rather than increase outmigration.

While the low level of geographical labour mobility in Russia has been recognized by many authors, there has been almost no direct evidence. First, it is hard to measure mobility since there are large informal flows. Second, it is hard to compare interregional mobility in Russia and Central European countries simply because of the different size of regions. The indirect measures suggest that internal migration in Russia is indeed low. The interregional job flows in Russia are much lower than in other transition countries (see Faggio and Konings, 1999, and Konings's calculations cited in Friebel and Guriev, 2002). Also, regional disparities in income and unemployment are large and not decreasing over time. Figure 1 shows the evolution of interregional dispersion in real incomes and unemployment rates. While there was some decrease in interregional income dispersion in 1992–94, it was proportional to the decline in real income itself. Since 1994, interregional differentials have remained constant or even increased both in relative and absolute terms.

The official migration data (the dataset is described in the next section) also suggest that interregional mobility is lower in Russia than in other countries of similar size. As shown in Table 1, only 2 percent of the population have changed their residence within Russia's borders each year since 1991 (including intra-regional mobility) compared with about 3–4 percent in the Soviet Union during the 1980s. In developed countries, these percentage are considerably higher. In 1981, Canada and the US had internal migration rates of between 17 to 19 percent

(Greenwood, 1997). According to national statistics, the internal migration rates in Russia are also lower than those in Korea, Finland, Australia and Japan, as well as those in Central European transition countries (Besstremyannaya, 2001).[3]

Official migration data also do not include commuting which has become an (imperfect) substitute for migration in some transition countries (see Filer *et al*., 2001). Boeri *et al*. (1996) estimate the commuting distance that pays off in transition economies to be 30 kilometres at the most. While in Central Europe this distance is far enough to mean travelling to another region, this is usually not so for Russian regions many of which extend for thousands of kilometres.[4]

There have been a few econometric studies of interregional migration in Russia. Using cross-section Russian regional data on gross migration flows in the early transition, Brown (1997) has shown that migration responded to average wages and prices. She found that higher wages and higher rates of apartment privatization increased both immigration and outmigration. Like Fidrmuc's results, this finding points to the importance of financial constraints and suggests that underdevelopment of financial and housing markets may be a serious barrier to mobility. This is consistent with a survey of potential migrants in Heleniak (1997) where housing market imperfections and financial constraints are named as the most important barriers to migration from the Russian North.

Korel and Korel (1999) did a similar study for 1998. The cross-section OLS regression analysis showed that average income, housing prices and geography (from northeast to southwest) are significant determinants of mobility but that the unemployment rate is surprisingly not significant. As noticed by Gerber (2000), this study has a number of methodological weaknesses, like simultaneity problems and double counting for some regions (*autonomous okrugs* that are parts of other regions).

Gerber (2000) went a step further in the empirical analysis of Russian migration. Instead of analysing cross-section data, he built a panel dataset of net migration flows in Russian regions from 1993 to 1997. His results indicate that labour market conditions have an impact on migration similar to that in the market economies. A poor economic situation in a region makes people seek more attractive regions

[3] Russian official data do not cover informal migration. To estimate the latter, we have used a nationally representative survey of Russian households RLMS (see Zohoori *et al*., 1998). RLMS includes a question 'are you going to move in the next 12 months?' If people have answered positively and are not found in the same community after a year, it can be assumed that they have moved or passed away. Using the average national age-adjusted death rate, we obtained a rough estimate for the total outmigration of about 3.5 percent in 1996. Hence, the informal migration is about as large as the official one.

[4] See, however, World Bank (2001) on commuting in Central Russia where people work in neighbouring regions, returning home for weekends only. There is little evidence on the magnitude of this phenomenon which is somewhat similar to informal temporary migration. It is not negligible: according to Zayonchkovskaya (2001), in the town of Vyazniki 300 kilometres from Moscow (the major destination), about 25 percent of the population is involved in commuting; her survey of five regional capitals (Irkutsk, Barnaul, Moscow, Smolensk, and Stavropol) provides an estimate of 11 percent.

with higher real wages, lower unemployment and a lower proportion of insolvent enterprises. These results remain valid after controlling for public goods provision, including the availability of housing, crime rates, urbanization and geography, which are also significant and have intuitive signs. However, this paper also suffers from certain methodological problems. The author applies a random effects model, which is marginally applicable in only one specification out of five. Also, unobserved heterogeneity of regions may well be correlated with other regressors; fixed effects would therefore be more applicable. In this paper, we address these problems; also, we study gross region-to-region flows rather than net flows. We can therefore control for origin–destination fixed-effects (unlike region-level fixed effects as in Fidrmuc, 2003).

Internal migration in modern Russia is also discussed in sociology literature (see Zayonchkovskaya, 2001). This literature uses case studies and small surveys to analyse the reversal of flows of highly qualified workers from neighbouring CIS countries. The literature focuses on the two 'problem zones' in Russia: the North where outmigration is making several regions non-sustainable, and the South-West where the labour market cannot fully accommodate the incoming migrants. The literature also looks at the age profile of migrants and explains the low mobility of the 1990s by reduced migration opportunities for the young. The young, always the most mobile age group, have been hit badly during the transition by financial and housing market imperfections.

3. Empirical analysis

3.1 Migration and financial constraints

As Table 1 indicates, population mobility in Russia has been decreasing during the 1990s. One might expect that this implied convergence in income and unemployment levels. However, that was not the case. Figure 1 shows that interregional differentials in income and unemployment rates have increased over the course of transition. Interregional dispersion in incomes fell in 1992–94 but the fall was proportional to the fall in income itself: the standard deviation of real income only fell from 33 percent of mean income in 1992 to 31 percent in 1994. Since 1994, the dispersion has been constant or even increasing either in relative or absolute terms.

Figure 2 presents the analysis of unconditional convergence. There was a certain amount of convergence in regional incomes in 1992–94: the decline in income was much faster in rich regions. This, however, may be due to the mean reversion effect: the overall degree of interregional inequality has not decreased (Figure 1). Since 1994, there has been no convergence: there is no significant difference in growth rates of rich and poor regions. As for the unemployment rates, Russian regions have been *diverging* rather than converging: unemployment increased faster in regions where initial unemployment was already high.

Table 1. Migration in Russia, percent of mid-year present-in-area population

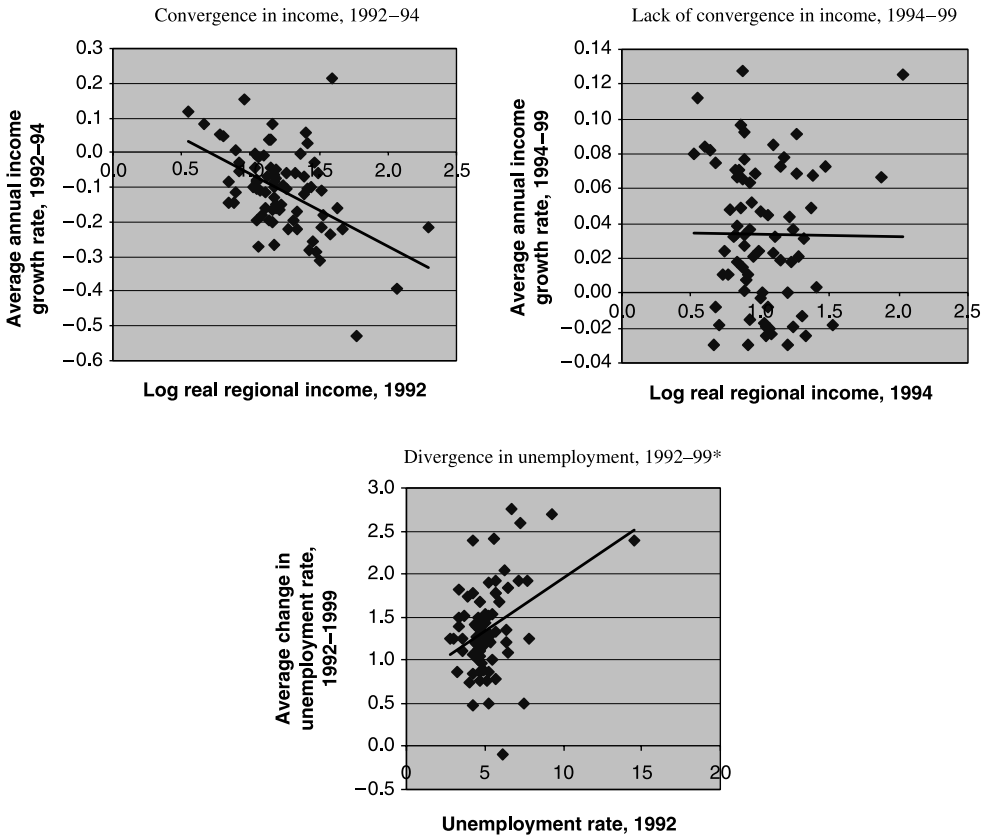
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total arrivals	4.1	3.5	3.0	2.7	2.9	2.7	2.4	2.2	2.1	1.9
Out of which										
From Russia	2.9	2.5	2.2	2.0	2.0	2.1	2.0	1.8	1.8	1.7
Out of which										
Same region			1.2	1.0	1.0	1.1	1.1	1.0	1.0	0.9
Other regions			1.0	0.9	1.0	1.0	0.9	0.8	0.8	0.8
Other countries	0.7	0.5	0.7	0.7	0.8	0.6	0.4	0.4	0.3	0.3
N/A	0.5	0.5	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total departures	3.6	3.2	2.7	2.4	2.3	2.3	2.1	2.0	1.9	1.8
Out of which										
Within Russia	2.7	2.3	2.1	2.0	2.0	2.1	1.9	1.8	1.7	1.7
Out of which										
Same region			1.2	1.0	1.0	1.1	1.1	1.0	1.0	0.9
Other regions			0.9	1.0	1.0	0.9	0.8	0.8	0.8	0.7
Other countries	0.5	0.5	0.5	0.3	0.2	0.2	0.2	0.2	0.1	0.2
N/A	0.4	0.4	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0

***Notes*:** Migration is defined as the number of individuals that have changed official place of residence (registration/*propiska*) during a given year.
***Source*:** Goskomstat database, authors' calculations.

Given the magnitude of the liberalization shock, one would expect migration to respond and reduce interregional differentials.[5] One of the possible explanations of low mobility and lack of convergence is based on financial constraints. In a world of perfect financial markets, a utility-maximizing individual should compare her utility at origin and destination and move if the change in utility exceeds the cost of moving. Therefore we should have observed migration from places with lower incomes, high unemployment, and poor provision of public goods to areas with high incomes, low unemployment and good public goods. However, if financial markets are imperfect, the effect of income on emigration is not monotonic: individuals cannot borrow to pay the migration costs; hence, only people with high income can afford to migrate (Ghatak *et al.*, 1996 suggest that a higher wage gap between receiving and sending regions increases migration only if potential migrants do not face borrowing constraints).

[5] The evidence from the US states suggests that migration is the single most important force behind interregional convergence (Blanchard and Katz, 1992).

Figure 2. Convergence and (lack thereof) in real income and unemployment rate in Russian regions, 1992–99



*Removing the outlier (14.5 percent unemployment in 1992) does not change the slope.

***Source*:** Goskomstat (2000).

To test the hypothesis that financial constraints are an important barrier to mobility, we shall study whether the effect of income on outgoing migration is different for rich and poor regions. People with higher income are less likely to be *willing* to leave, since the other regions are less attractive to them; however, their *ability* to leave is higher.

The liquidity effect is stronger for poorer people and regions; it should disappear once the income level is sufficiently high. Hence, for low income levels the marginal effect of an additional ruble (in real terms) of income on mobility should be less negative than for high incomes. Moreover, for the lowest income levels the

liquidity effect should be stronger than the effect of returns to mobility, so that the marginal effect of income may even become positive.[6]

The assumption that financial constraints matter is consistent with anecdotal evidence on Russia. Friebel and Guriev (2002, Appendix I) have compiled rents, consumer prices, and wages for several blue-collar occupations for 28 major Russian cities in the year 2000 and compared the wage differentials to costs of migration, including rent differentials, transportation costs, and temporary registration fees. According to Friebel and Guriev, a painter moving to Moscow from Ryazan (a city 200 km from Moscow) would recover the moving costs after 1–1.5 years. The financial constraints are aggravated by the underdevelopment of Russia's housing market. Rents are a major component of moving costs. The lack of access to mortgages keeps rents very high, especially in the prospering areas attractive to potential immigrants.[7] For example the monthly rent for the bottom-level Moscow apartment would be in the range of 1.3–2 monthly wages of a Ryazan painter. Even though his real wage in Moscow would be three times as high, he would still need to save cash to move. That may be a challenge given that wages in poor regions exceed the subsistence level by only a small margin (Friebel and Guriev, 2002).

3.2 Methodology

Our empirical analysis is based on the so-called 'gravity model' which is very common in the migration literature (e.g., Greenwood, 1997). The gravity model is similar to Newton's law of universal gravity: the number of people M_{ij} 'attracted' by a given region i from another region j increases with the size of each region P_i, P_j and decreases with the distance between the two regions (D_{ij}):

$$M_{ij} = G \cdot \frac{P_i^{\alpha} \cdot P_j^{\beta}}{D_{ij}^{\gamma}},$$

where G is a constant, and parameters α, β, γ are to be estimated. While Newton's law of gravity assumes $\alpha = 1$, $\beta = 1$, $\gamma = 2$, there is no reason to believe that α, β and γ should be the same in the case of migration.

Distance influences migration decisions through costs of moving which include transportation costs, costs of search and information acquisition, and psychological costs of leaving the place of birth and close relatives and friends. Apparently, these costs increase with physical distance ($\gamma > 0$). Taking into account modern

[6] A better test of the liquidity effect is to study the incomes of the lowest quantiles of a region's population. However, regional income distribution data are not available.

[7] In 1992–99, the mortgage market was limited to high-level bank employees. Even after spectacular growth in recent years, it remains negligible. According to Russia's Real Estate Market Indicators, www.irn.ru, the mortgages financed in 2002 amounted to US$130 million (about 0.4 percent of annual GDP). The total mortgage debt outstanding is estimated at 1–2 percent of GDP.

information and transportation technologies, one should not, however, expect γ to be very large. Since all these costs increase slower than linearly, γ should be below 1. It was found that distance elasticity of migration γ declines over time (Greenwood, 1997, p. 667).

The gravity model as stated above is certainly incomplete. Regions differ in terms of economic development and public goods provision. Migrants should take into account the difference between their utility at the current place of residence and the potential utility they will enjoy in the place to which they move. Thus, the gravity model should be extended by adding various characteristics of the origin and destination areas. The modified model assumes G to depend on the characteristics of i and j, rather than being a universal constant. Modified gravity models are usually specified in a logarithmic form:[8]

$$\ln M_{ijt} = c + k'Y_{it} + \lambda'Y_{jt} + \eta_{ij} + \delta_t + \xi_{ijt} \quad (1)$$

Here Y_{it} and Y_{jt} are characteristics of the source and host regions that may change over time, such as the logarithm of per capita real income, the unemployment rate, the poverty level, the crime level, the development of housing market, the provision of public goods, e.g., roads, healthcare (doctors per capita and hospital beds per capita), public transportation (buses per capita) etc. We will assume throughout the paper that error terms are not correlated with explanatory variables and fixed effects, and are not serially correlated, so the fixed-effects estimation is not biased.

To control for distance, initial conditions and legacies, we include fixed effects η_{ij} for each pair of regions. Suppose that the Soviet government moved an ethnic group from region j to region i. Then migration from region i to j will be influenced by this event: when political liberalization started, people were allowed to go back (and sometimes even claim their property). Another example is the presence of a federal programme of housing construction in a particular central region for people resettled from a particular northern territory (these programmes, however, have usually been poorly financed and have had a negligible effect on migration, see Regent, 1999). We also include time dummies δ_t to control for macroeconomic and global shocks.

The equation (1) allows us to test whether current migration flows depend upon changes in living standards and public goods provision, controlling for initial conditions and long-term trends in migration. Then, in order to understand the long-term determinants of migration, we estimate an OLS regression with between-effects:

[8] The log specification cannot deal with trivial observations. The alternatives include a Poisson model or a negative binominal model. For the sake of simplicity, we use log specification, treatment of zero observations is described below; the other methods provide very similar results.

$$\ln M_{ij} = b + \gamma \ln D_{ij} + k'Y_i + \lambda'Y_j + \mu'X_i + \nu'X_j + \xi_{ij} \quad (2)$$

Here $\ln M_{ij}$ and Y_i are the averages over time of $\ln M_{ijt}$ and Y_{it}, respectively. D_{ij} is the distance between two regions. X is a matrix of regional variables that do not change over time or change very slowly, including population (in logarithms), climate, geography, education, demographic and ethnic structure, urbanization, resource potential, reform indicators and conflict.

3.3 Data

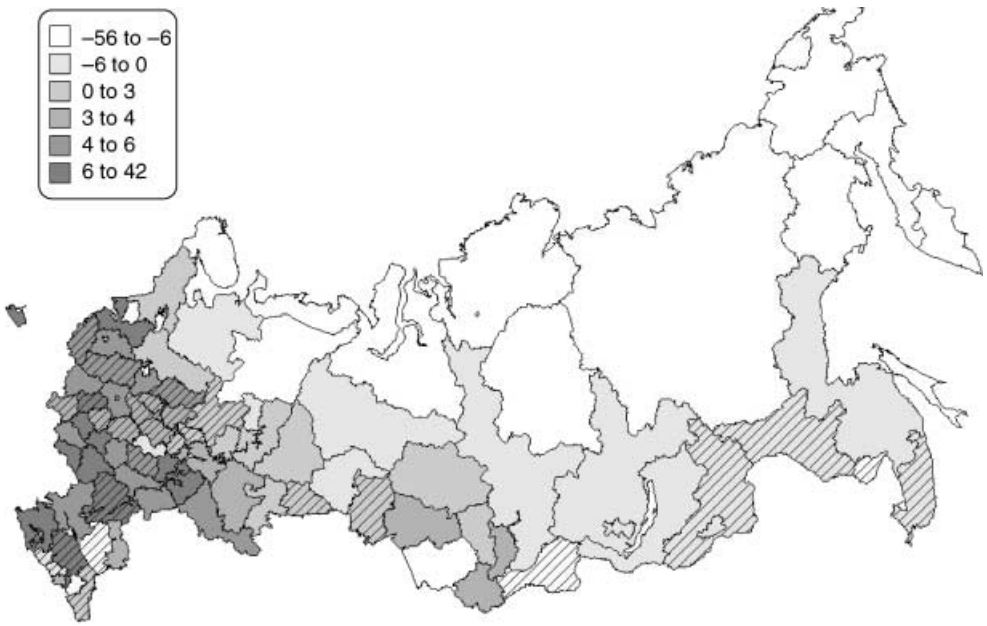
The main source of data is the official dataset on migration between 89 Russian regions from 1992 to 1999. For each pair of regions and each year, we know how many people migrated from one region to the other one during the year. These data are collected by the Interior Ministry's registration authorities (formerly in charge of *propiska*). Propiska is the system of registration at the local police department which the Soviet government used to restrict migration. The registration is still required for getting access to official jobs, social benefits, and public goods such as kindergartens, schools and healthcare. In most regions, registration is granted to all applicants, although in some (Moscow, Sakha-Yakutiya republic, Krasnodarskiy and Stavropolskiy krays) the authorities still can deny registration even though this is against federal law.

To the best of our knowledge, this is the only available dataset on region-to-region migration flows in Russia. It has a number of shortcomings. We do not have time series for many variables for 11 regions. Ten of those are administrative parts of other regions and have to be excluded from the analysis. We have also excluded the Chechen Republic which was the scene of a full-scale civil war for more than a half of our time period. Our unbalanced panel therefore includes 78 regions, including 4 with less than 8 years of observations.

The map in Figure 3 shows the net migration to a region (the number of immigrants less the number of emigrants) for the ten-year period from 1990 to 1999 as a percentage of the 1990 population. Northern and Eastern areas of the Russian Federation are net sources of emigrants, while the regions in the Central and Southern parts of the country are major receiving areas. It is worth noting that the poorest regions had negative but moderate net migration, while it was the middle-income regions which had highest emigration rates. In particular, in the ten regions with the largest fall in real incomes during the two first years after price liberalization (1992–94), net emigration was quite low: annual net emigration rate in these regions was 0.3 percent in 1992–94 and 0.2 percent afterwards (for case studies, see World Bank, 2001, and Zayonchkovskaya, 2001). This may be explained by the non-linear effect of income on migration due to financial constraints.

The official registration data count every single person who moved. If the official data report zero migration from region i to region j in year t, we substitute

Figure 3. Net migration, total for 1990–99 as percentage of 1990 population (colour). Hatching marks the 35 percent poorest regions



zero by half a person in order to be able to keep the logarithm finite. This does not affect the results since zero observations constitute only 0.3 percent of the panel.

The other region-level indicators (Y and X in equations (1) and (2)) come from Russia's Federal Committee for Statistics (Goskomstat), mainly from Goskomstat (2000). Real income is calculated in logarithms of the number of consumer baskets (the conventional 25-product basket used by Goskomstat) which the average regional income can buy. We use income rather than wages because income data are less vulnerable to the problem of unregistered economic activity. Goskomstat estimates income by expenditures and savings therefore all informal wages are included in income but not in wage data.

The unemployment rate is calculated according to the ILO definition. Poverty is measured as the share of population with income below subsistence level. The natural resource potential index and distribution of population by city size in 1996 are provided by the Renaissance Capital Investment bank (Ahrend, 2000). The index of socio-political conflict in Russian regions has been constructed by the Moscow Center for Study and Resolution of Conflicts at our request. Crime rate is approximated by the number of homicides per 1,000 population, the measure

which suffers the least from underreporting relative to other types of crime (Andrienko, 2001). Distance between regions is proxied by the distance between geographical centres of the regions in kilometres. Distance for intra-regional migration is measured as a half of the regional 'radius' based on the area of the region and assuming circular shape. The data on the demographic structure of the population come from the 1989 Census.

Exact definitions and descriptive statistics of all variables used in the empirical analysis are presented in Table 2.

3.4 Results

The results of fixed effects OLS estimations (equation (1)) are reported in Table 3. The Hausman test is rejected at the 1 percent level in all specifications so that the random effect model is not valid.

Income and unemployment. The main results are the estimates of the effect of income on migration. In the linear regression (first column) we find intuitive effects: the poorer the source region and the richer the destination region, the higher the migration flow. A one percent fall in real income at the origin increases migration by 0.07 percent, while a one percent increase in real income at the destination raises migration by 0.1 percent. In order to test for the presence of financial constraints, we need to check whether elasticity with regard to income at the origin is higher in poorer regions. We estimate several non-linear specifications. First, we test whether the effect of income is significantly less negative (or even positive) if income is below a certain threshold. We have tried the full range of possible thresholds and found the maximum threshold under which income still positively and significantly influences migration. The cut-off value of log real income is 1.04; this corresponds to an average regional income of 2.83 consumer baskets (35 percentile of distribution). The results of piece-wise linear estimation are reported in the second column: in regions with income below the threshold, the effect of income on migration is *positive*: a 1 percent increase in income results in a 0.09 percent increase in migration. In richer source regions, the coefficient is significantly different and is negative $0.09 - 0.22 = -0.13$. This result is similar to what Banerjee and Kanbur (1981) have found for inter-regional rural-urban migration in Indian states. As discussed above, this result is consistent with the liquidity constraint hypothesis.

We also estimate the effect of income separately for the subsamples of the poorest 35 percent of regions and the richest 65 percent of regions. The results are similar to those for the joint estimation for the whole sample. In rich regions, the higher the income, the less migration outflow; the elasticity is -0.15, being similar to -0.13 obtained before. In poor regions, higher income *increases* outgoing migration, and the coefficient is even higher than in the estimation for the full sample. The result is striking: roughly one-third of Russian regions are locked in poverty traps. In 1999, 28 percent of the Russian population resided in regions with income below the threshold level. These regions are shown in Figure 3.

Table 2. Descriptive statistics of the variables

Variable	Definition	Obs	Mean	Std. Dev.	Min	Max
Migration (log)	Number of people migrated from one region to another in a given year	46,836	4.4	1.7	−0.7	11.2
Life expectancy	Life expectancy at birth, years	46,836	65.7	2.4	55.3	72.3
Conflict	General socio-political conflict indicator	46,836	8.9	6.4	0.2	46.6
Income (log)	Average income over the price of 25-product-basket, as of December of the given year	46,836	1.2	0.3	0.2	2.8
Unemployment	Unemployment rate, percent (ILO definition)	46,836	10.6	5.0	2.8	31.2
Poverty	Share of population with income below poverty line	34,211	31.4	13.9	11.5	88.8
FDI	Foreign direct investment, dollars per capita	28,435	18.2	94.3	0.0	1679
Transfers	Federal budget transfers, thousand 1992 rubles per capita	46,836	6.8	11.8	−0.1	182
Share of men	Share of men as of beginning of 1991	43,669	47.5	1.5	45.4	52.0
Share of young	Share of 0–15 age group as of 1991	43,669	25.1	3.5	19.4	36.8
Share of old	Share of 60+ (men) and 55+ (women) age group as of 1991	43,669	18.1	5.0	5.1	25.7
Apartment privatization	Share of privately owned apartments	46,836	35.3	15.2	1.0	82.0
Homicides	Homicide rate per 1,000 residents	46,836	0.20	0.09	0.04	0.79
Buses	Number of buses per 100,000 residents	46,836	83	20	32	156
Doctors	Number of doctors per 1,000 residents	46,836	9	9	0	73
Hospital beds	Hospital beds per 1,000 residents	46,836	1.3	0.2	0.8	2.5
Highway density	Highway density, km per 1,000 km^2	46,836	103	77	0.8	327

Table 2 (cont). Descriptive statistics of the variables

Variable	Definition	Obs	Mean	Std. Dev.	Min	Max
Telephones	Number of telephones per 100 households	46,836	36	13	18	105
Population (log)	Population as of beginning of 1990, thousands	43,669	7	1	5	9
Distance (log)	Distance between two regions, km	43,669	7.8	1.1	3.2	9.6
Education	Average years of schooling for individual of 15 years and older	43,669	9.3	0.4	8.7	10.4
ELF	Ethno-linguistic fractionalization	43,669	0.3	0.2	0.1	0.8
Big cities	Share of population residing in big cities with more 500,000 inhabitants	43,669	0.1	0.2	0.0	0.6
Rural population	Share of rural population	43,669	0.3	0.1	0.1	0.8
Resource potential	Resource potential index	43,669	1.0	0.5	0.4	2.7
Temperature in January	Average temperature in January, degrees centigrade	46,836	–11	7	–44	3
Temperature in July	Average temperature in July, degrees centigrade	46,836	18	3	9	27
Precipitation in January	Precipitation in January	46,836	32	17	2	118
Precipitation in July	Precipitation in July	46,836	65	34	5	223
Dummy for port	Dummy for regions with major ports	43,669	0.2	0.4	0	1
Subsidies to agriculture	Budget subsidies per 100 rubles of agricultural production as of 1995	43,669	10	5	1	29
Small privatization	Share of privatized businesses in trade, catering and household services as of 1996	43,669	82	32	20	306
Price regulation	Proportion of goods and services with regulated prices as of 1996	43,669	15	9	3	69

***Source*:** Goskomstat (2000), Goskomstat's database on internal migration, authors' calculations.

Table 3. Regression results: OLS fixed effect regressions for migration

	I	II	III	IV	V	VI
	Main	**Break in income**	**Poorest 35%**	**Richest 65%**	**Squared income**	**Poverty 94–99**
Income *i*	−0.067***	0.086***	0.135***	−0.148***	−0.058***	0.064***
(Income *i* − 1.04)*		−0.219***				
Dummy (income *i* > 1.04)						
(Income − 1.18)^2 *i*					−0.047***	−0.049***
Income *j*	0.098***	0.098***	0.029	0.125***	0.064***	−0.097***
(Income − 1.18)^2 *j*					0.171***	0.114***
Unemployment *i*	0.001	0.002**	0.007***	−0.002	0.001	0.003***
Unemployment *j*	−0.012***	−0.012***	−0.01***	−0.014***	−0.013***	−0.006***
Poverty *i*						0.001**
Poverty *j*						−0.002***
Life expectancy *i*	−0.021***	−0.02***	0.049***	−0.025***	−0.02***	−0.042***
Life expectancy *j*	0.004	0.004	−0.011*	0.013***	0.001	−0.002
Socio-political conflict *i*	−0.001	−0.001	0.008***	−0.004***	−0.001	−0.001
Socio-political conflict *j*	−0.0001	−0.0001	−0.002	0.0004	−0.001	−0.003***
Apartment privatization *i*	−0.004***	−0.004***	−0.007***	−0.001	−0.004***	−0.003***
Apartment privatization *j*	0.003***	0.003***	0.001	0.004***	0.003***	0.004***
Homicides *i*	0.128	0.176**	0.901***	−0.06	0.158*	0.456***
Homicides *j*	0.159*	0.159*	−0.251	0.358***	0.052	−0.129
Buses *i*	−0.003***	−0.003***	−0.003***	−0.003***	−0.003***	−0.001***
Buses *j*	−0.001*	−0.001*	−0.002***	0.0001	−0.001***	−0.0001
Doctors *i*	0.022***	0.026***	0.046***	0.028***	0.026***	0.031***
Doctors *j*	0.038***	0.038***	0.059***	0.026***	0.023***	0.057***
Hospital beds *i*	−0.418***	−0.416***	0.446***	−0.725***	−0.419***	−0.353***
Hospital beds *j*	0.169***	0.169***	0.223***	0.162***	0.175***	0.151**
Highway density *i*	−0.001***	−0.001***	−0.002***	−0.0001	−0.001***	0.0000
Highway density *j*	0.004***	0.004***	0.003***	0.004***	0.003***	0.002***
Telephones *i*	−0.002***	−0.002***	−0.009***	0.003***	−0.003***	0.003***
Telephones *j*	0.004***	0.004***	0.007***	0.003***	0.005***	−0.001
Const	5.164***	4.862***	−0.086	5.061***	5.442***	6.782***
Number of observations	46836	46836	16267	30569	46836	34211
Number of groups	6084	6084	4494	5928	6084	6080
R-squared within	0.140	0.142	0.116	0.184	0.144	0.174
R-squared between	0.178	0.187	0.190	0.178	0.176	0.227
R-squared overall	0.173	0.182	0.166	0.172	0.171	0.209
Hausman test, p-value	0.000	0.000	0.000	0.000	0.000	0.000

***Notes*:** Significance levels: *** –1%, ** –5%, * –10%. Index *'i'* denotes source region and *'j'* denotes destination.

In yet another test of the non-linear effect of income on migration, we estimate a quadratic specification (column V). We include both income and income squared (adjusted for the mean to reduce multicollinearity). Again, the average effect of income is negative −0.06 percent, but its magnitude is significantly weaker for poorer regions. Indeed, the coefficient at the squared income is negative and equals −0.047. The marginal effect of income on mobility is therefore $-0.06 - 2 \times 0.047 \times (\text{income} - 1.18)$. Again, an increase in income increases outgoing mobility for low incomes and decreases it otherwise.[9]

The effect of the host region income is also non-linear. As shown in column V, the greater the income in the host region, the stronger the marginal effect – the coefficient on the squared income in the host region is positive. This may be explained by non-trivial fixed costs of moving – if income differential is too small, only a few people are willing to move, but once the income differential covers the fixed costs, more people respond to gross returns to mobility.

Unemployment is also an important determinant of migration. The effect is especially strong for the choice of destination: if the unemployment rate increases by 1 percent, *ceteris paribus*, then 1 percent less people want to migrate to this region. The effect of unemployment in the source region is positive but weaker or, in some specifications, insignificant.

The share of privately-owned apartments is positively correlated with immigration and negatively with outmigration. This may reflect the higher utility of being able to own a home. More likely though, apartment privatization is a good proxy for the progress of reforms in the region (assuming that the mobile part of population prefers economic reforms). This result is at odds with the evidence from cross-section data in Brown (1997), where apartment privatization increases outgoing mobility (which may be explained by the need to sell an apartment to finance the move). This is due to the difference between fixed-effects and cross-section analysis. The cross-section analysis suggests that emigration is positively affected by the *level* of privatization (which reflects financial constraints) while the fixed-effects analysis studies the effect of subsequent *changes* in privatization (a proxy for reforms). Similarly, in our between-effects regression results (Table 4), the level of apartment privatization also increases outgoing migration. This suggests that both the financial constraints and progress of reforms explanations may be consistent with the evidence.

Public goods. The next set of results deals with different measures of public goods provision within a region. According to the famous Tiebout hypothesis (Tiebout, 1956), people 'vote with their feet' for the better provision of local public goods. *Ceteris paribus*, migrants prefer a region with better public goods provision. This hypothesis appears to hold for public healthcare and infrastructure. Higher

[9] One can even use the quadratic specification to estimate the threshold level of income at which the effect of income on migration changes sign. Solving $0 = -0.06 - 2 \times 0.047 \times (\text{income} - 1.18)$ and using the standard errors for the coefficients, we have obtained an estimate 0.54 ± 3 which is certainly too crude but is at least broadly consistent with the results from the piecewise linear specification above.

Table 4. Regression results: OLS between-effects regressions for migration

Variable	Main	Poorest 35%	Richest 65%	Squared income	Poverty 94–99
Distance	–0.867***	–0.907***	–0.859***	–0.867***	–0.865***
Education *i*	0.355***	0.279**	0.664***	0.364***	0.342***
Education *j*	0.081	0.309***	0.097	0.074	0.254***
Income *i*	–0.587***	0.352	–1.118***	–0.482***	0.267*
Income *j*	–0.199**	–0.2**	–0.105	–0.28***	0.483***
(Income – 1.16)^2 *i*				–0.271*	–0.763***
(Income – 1.16)^2 *j*				0.207	–0.325**
Unemployment *i*	0.049***	0.073***	0.04***	0.054***	0.041***
Unemployment *j*	–0.009	–0.015**	–0.014**	–0.013*	–0.011
Poverty *i*					0.016***
Poverty *j*					0.014***
Life expectancy *i*	–0.135***	–0.006	–0.069***	–0.125***	–0.086***
Life expectancy *j*	–0.103***	–0.049***	–0.064***	–0.11***	–0.085***
Socio-political conflict *i*	0.01***	–0.016***	0.0003	0.007*	0.005
Socio-political conflict *j*	–0.006*	–0.002	–0.01***	–0.003	–0.007*
Initial population *i*	1.543***	1.181***	1.51***	1.551***	1.404***
Initial population *j*	0.881***	0.767***	0.76***	0.875***	0.934***
Share of men *i*	0.28***	0.484***	0.354***	0.286***	0.308***
Share of men *j*	0.197***	0.258***	0.213***	0.192***	0.19***
Share of young *i*	–0.149***	–0.177***	–0.114***	–0.146***	–0.163***
Share of young *j*	–0.09***	–0.077***	–0.075***	–0.092***	–0.108***
Share of old *i*	–0.117***	–0.058**	–0.068***	–0.117***	–0.101***
Share of old *j*	–0.056***	–0.033	–0.043**	–0.056***	–0.047**
Apartment privatization *i*	0.008***	0.002	0.008***	0.008***	0.008***
Apartment privatization *j*	0.011***	0.005**	0.008***	0.011***	0.01***
Homicides *i*	–3.577***	–0.997**	–1.753***	–3.43***	–3.067***
Homicides *j*	–2.825***	–2.134***	–2.387***	–2.936***	–2.476***
Buses *i*	0.005***	0.0000	0.007***	0.006***	0.005***
Buses *j*	0.002*	0.001	0.001	0.001	0.002*
Doctors *i*	–0.068***	–0.027***	–0.058***	–0.066***	–0.057***
Doctors *j*	0.009	0.017**	0.022***	0.007	0.004
Hospital beds *i*	–0.074	–1.064***	0.218*	–0.063	–0.286***
Hospital beds *j*	–0.707***	–0.596***	–0.601***	–0.716***	–0.662***
Highway density *i*	0.001***	–0.0004	0.001*	0.001***	0.001***
Highway density *j*	0.002***	0.001***	0.002***	0.002***	0.001***

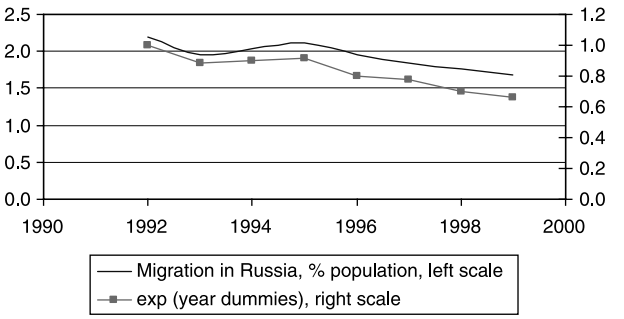
Table 4 (cont). Regression results: OLS between-effects regressions for migration

Variable	Main	Poorest 35%	Richest 65%	Squared income	Poverty 94–99
Telephones *i*	–0.01***	–0.017***	–0.01***	–0.012***	–0.012***
Telephones *j*	–0.009***	–0.012***	–0.011***	–0.008***	–0.011***
Ethno-linguistic fractionalization *i*	–0.646***	–0.05	–0.689***	–0.635***	–0.523***
Ethno-linguistic fractionalization *j*	–0.235*	–0.422***	–0.346**	–0.245*	–0.222
Big cities *i*	0.161	–0.244*	0.086	0.106	0.03
Big cities *j*	–0.09	–0.108	–0.129	–0.048	–0.174
Rural *i*	1.036***	0.814***	1.182***	1.106***	0.878***
Rural *j*	0.382*	0.286	0.274	0.329	0.526**
Resource potential *i*	0.145***	0.103	0.042	0.125***	0.222***
Resource potential *j*	0.187***	0.233***	0.194***	0.202***	0.179***
Temperature in January *i*	–0.036***	–0.041***	–0.032***	–0.035***	–0.036***
Temperature in January *j*	–0.026***	–0.028***	–0.025***	–0.026***	–0.02***
Temperature in July *i*	–0.032***	–0.058***	–0.045***	–0.036***	–0.03***
Temperature in July *j*	–0.023**	–0.022**	–0.03***	–0.021**	–0.025**
Dummy for port *i*	–0.081**	0.09*	–0.211***	–0.091**	–0.098**
Dummy for port *j*	0.016	–0.026	0.02	0.023	–0.01
Subsidies to agriculture *i*	0.002	–0.01**	–0.002	0.002	0.003
Subsidies to agriculture *j*	–0.0002	–0.009***	–0.001	–0.0003	0.002
Small privatization *i*	0.002***	0.002***	0.0004	0.002***	0.002***
Small privatization *j*	0.002***	0.002***	0.002***	0.002***	0.002***
Price regulation *i*	0.0003	–0.002	–0.001	0.0001	–0.002
Price regulation *j*	–0.0004	–0.003*	–0.002	–0.0003	–0.002
Const	–6.789	–28.9***	–21.6***	–7.064*	–15.17***
Number of observations	43,669	15,482	28,187	43,669	32,274
Number of groups	5,625	4,177	5,475	5,625	5,623
R-squared within	0.008	0.016	0.001	0.008	0.019
R-squared between	0.768	0.786	0.760	0.768	0.761
R-squared overall	0.654	0.718	0.667	0.655	0.684

***Notes*:** Significance levels: *** –1%, ** –5%, * –10%. Index *'i'* denotes source region and *'j'* denotes destination.

Figure 4. Evolution of migration over time: Intra-Russia migration rates in 1992–99 and time dummies in the main regression

Since the regression is run for the log migration, the graph presents exp(year dummies)



number of buses, hospital beds, telephones per capita and higher road density decrease population outflow. At the same time more doctors, hospital beds, roads, and telephones stimulate migration inflow. The magnitude of these effects is substantial: one standard deviation change in each variable results in a 5 to 20 percent change in the migration rates. The effect of crime rates on the inflows is insignificant. Not surprisingly, higher crime rates significantly increase outflow; the effect is especially large in poor regions. Overall, the effect of public goods on migration is less robust than that of income and unemployment: the magnitude and sometimes significance depends on specification and sample.

Table 3 does not present time dummies. These are shown in Figure 4, along with the overall internal migration rates. Despite the remaining interregional gaps in income and unemployment, migration has been declining over time. A possible explanation may also be related to the existence of poverty traps. Those, who were both willing *and* able to migrate, already migrated in the early years. The remaining potential migrants may be too poor to afford the move.

It is interesting to test what part of the variation is explained by the current economic variables and public goods provision. In turned out that both fixed effects and time-varying indicators explain substantial shares of the variation in migration. In the regressions with six thousand fixed effects and seven time dummies only, the R^2-within was 0.109, compared with 0.140 when the 22 time-varying variables are added.

Impact of fixed factors. Besides estimating the determinants of migration controlling for region-to-region fixed effects, we also estimated the between-effects model (equation (2)). Results of the five regressions are reported in Table 4.

All regressions show that population in both sending and receiving regions is a significantly positive determinant of migration flows. As expected, larger regions send and attract more migrants. Elasticities of migration with respect to the population are close to 1 for receiving regions and above 1 for sending regions.

Elasticity of migration with respect to distance is negative and significant, with its absolute value being approximately equal to 1. This suggests that, at least to a certain extent, low mobility in Russia is related to huge distances. Indeed, as a thought experiment, let us reduce Russia's territory by 50 times to make it comparable with Japan (Japan's population is only 15 percent lower than Russia's), Norway or Finland. Then internal mobility of Russians would increase sevenfold and exceed Japanese mobility by a factor of 2, Norwegian mobility by 50 percent, and will be higher than mobility in Finland (which is among the highest in the EU). At the same time, this exercise may be misleading: other countries of similar size (US, Canada and Australia) do have much higher internal migration rates. Also, the USSR had the same geographical problems and yet had high migration rates.

Other geographical and demographical variables also play an important role. People do not tend to leave regions with access to the sea and the largest rivers. The demographic and ethnic structure of the population is very significant in all specifications.

Education significantly increases both outgoing and to some degree incoming migration flows, but outflow is more sensitive than inflow. An additional year of education increases outmigration by 35 percent. A one standard deviation increase in education raises outmigration by 14 percent.

The last set of results describes the impact of reforms. Small business privatization, approximated by the share of privatized firms in trade and services, seems to favour both migration inflows and outflows. The effect of price regulation and agricultural subsidies is mostly insignificant. This may suggest that residents value the reform outcome (such as higher income and lower unemployment) more than reform *per se*.[10]

How do our coefficients compare to estimates for other countries? We are aware of five similar studies, most of which use a Poisson model or an extended negative binomial model accounting for overdispersion, or extra-Poisson variation: Shen (1999) for China, Congdon (1988) for Greater London, Boyle and Halfacree (1995) for England and Wales, Fik and Mulligan (1998) for the US, and Devillanova and Garcia-Fontes (1998) for Spain. Unfortunately, population size and distance are the only variables common to all of these studies. Our estimates of elasticities of migration with respect to population (from 0.8 to 1.5 in the five models) are higher than the ones in these studies (0.4 to 0.8 for Spain provinces and 0.3 to 0.9 in China). Our estimates of distance elasticity (−0.9) are very close to distance elasticity of labour migration in US, (−0.8 to −1.1) and slightly below that in Spain and China, (−1.1). Some studies include income and unemployment, the results being

[10] An important time-varying proxy for reforms is foreign direct investment (Yudaeva, 2002). However, the regional data on FDI are only available since 1995; also FDI in 1992–99 have been very small on average, and negligible in the vast majority of Russian regions (see Yudaeva *et al*., 2003, for a detailed discussion of FDI in Russia). We have tried to add FDI per capita to the fixed-effects regressions and mostly obtained insignificant results. In the only specification where the effect of FDI was statistically significant, it was economically negligible: one standard deviation increase in FDI reduced emigration by less than 1 percent.

similar to ours. In Spain, income in the origin area has a negative effect on out-migration. Also, a negative sign for unemployment in destination is reported for London and a positive impact of the ratio between unemployment in the origin to that in the destination is found in Spain.

Endogeneity and serial correlation. The fixed-effects OLS approach is based on certain restrictive assumptions. First, the error terms are supposed to be serially uncorrelated. Second, the regressions above do not take into account possible endogeneity of income and unemployment with regard to migration. Indeed, income and unemployment may depend on migration (Blanchard and Katz, 1992); moreover, the relationship may be dynamic and not constrained to one period interactions. Certainly, in Russia this effect is relatively unimportant since migration itself is on average too small to affect the local labour conditions.

We have tried to use a linear, dynamic panel data estimator for an autoregressive model in first differences (Arellano and Bond, 1991) assuming endogeneity of income and unemployment. However, the number of moment conditions is too large; the test for overidentification shows that the model is indeed overidentified. This is why instead of GMM we have estimated an instrumental variable fixed-effects specification instrumenting income and unemployment with federal transfers per capita, grain yield, and, in some specifications, winter and summer precipitation. Federal transfers affect income and unemployment but have no direct effect on migration. The grain yield is the economic outcome of current weather, and also directly affects income and unemployment but not migration. Precipitation is somewhat more problematic. It directly affects productivity and therefore income and unemployment, but one can also argue that precipitation may enter the potential migrant's utility function. One can assume, however, that migrants understand the volatility of weather and only take into account long-term averages of temperature and precipitation rather than the current year's weather; the long-term weather/climate variables are captured by the fixed effects. The results of the instrumental variable regressions are presented in Table 5. The signs and significance of coefficients are mostly similar to those in Table 3. The liquidity effect is present: the effect of income on migration outflows is positive if income is low, and negative if income is high. The magnitude of the effect is stronger than in the OLS regressions.

To perform yet another robustness check, we replace the assumption of normal distribution with that of exponential distribution (often used in migration literature) and estimate a Poisson fixed-effect specification. The results (presented in Table 6) are broadly similar to those in Table 3.

4. Concluding remarks

The main goal of this paper is an empirical analysis of internal migration in Russia. We use a panel dataset of gross migration flows between Russian regions. Our methodology allows us to distinguish the effect of current economic performance

Table 5. Instrumental variables[1]

	Main	Break in income	Poorest 35%	Richest 65%	Squared income	Poverty 94–99
Income *i*	−0.134	1.821***	0.65***	−0.567***	−0.091	0.125
(Income *i* – 1.04)*		−2.491***				
Dummy (income *i* > 1.04)						
(Income – 1.16)^2 *i*					−0.154***	−0.048
Income *j*	0.027	0.027	−0.121	0.114	0.062	0.01
(Income – 1.16)^2 *j*					−0.122***	0.189***
Unemployment *i*	0.0002	−0.014	−0.062***	0.074***	0.005	−0.007
Unemployment *j*	−0.027**	−0.027**	0.016	−0.047***	−0.023**	−0.043***
Poverty *i*						0.001
Poverty *j*						−0.001***
Life expectancy *i*	0.014***	0.008*	0.026***	0.031***	0.014***	−0.019***
Life expectancy *j*	−0.006	−0.006	−0.013	−0.0003	−0.006	−0.011**
Socio-political conflict *i*	0.0000	0.003***	0.008***	−0.003***	0.001	−0.0001
Socio-political conflict *j*	−0.003***	−0.003***	−0.005***	−0.003***	−0.003***	−0.006***
Apartment privatization *i*	−0.003***	−0.003***	−0.007***	0.001*	−0.003***	−0.002*
Apartment privatization *j*	0.003***	0.003***	0.001	0.004***	0.003***	0.003***
Homicides *i*	−0.116	0.278	0.603*	−0.166	0.01	0.461**
Homicides *j*	−0.25*	−0.25*	−0.426	−0.118	−0.15	−0.282
Buses *i*	−0.003***	−0.002***	−0.005***	−0.002***	−0.003***	−0.002***
Buses *j*	−0.001***	−0.001***	−0.001	−0.001**	−0.001***	−0.001
Doctors *i*	0.028***	0.033***	0.023	0.048***	0.03***	0.036***
Doctors *j*	−0.024***	−0.024***	−0.011	−0.034***	−0.022***	−0.01
Hospital beds *i*	−0.222***	−0.29***	−0.012	−0.212***	−0.184***	−0.214***
Hospital beds *j*	0.138**	0.138**	0.206	0.116	0.169***	−0.135*
Highway density *i*	−0.001***	−0.002***	−0.004***	0.002***	−0.001***	−0.001
Highway density *j*	0.003***	0.003***	0.004***	0.002***	0.003***	0.001
Telephones *i*	−0.003	−0.008***	−0.019***	0.012***	−0.003	−0.006**
Telephones *j*	0.003	0.003	0.013***	−0.002	0.003	−0.005**
Const	4.626***	3.284***	3.34***	2.621***	4.258***	7.414***
Number of obs.	40616	40616	14855	25761	40616	29825
Number of groups	5325	5325	3984	5173	5325	5319
R-squared within	0.129	0.13	0.114	0.157	0.13	0.152
R-squared between	0.014	0.015	0.054	0.002	0.020	0.135
R-squared overall	0.021	0.022	0.051	0.002	0.027	0.121

***Notes*:** Significance levels: *** –1%, ** –5%, * –10%. Index '*i*' denotes source region and '*j*' denotes destination. [1] Income, income interaction with dummy and unemployment are instrumented by federal transfers per capita, grain yield and precipitation in January and July.

Table 6. Regression results: Poisson fixed effect regressions for migration

Variable	Main	Poorest 35%	Richest 65%	Squared income	Poverty 94–99
Income *i*	−0.036***	0.006	−0.039***	−0.016***	0.058***
(Income − 1.18)^2 *i*				−0.003	−0.038***
Income *j*	0.192***	0.2***	0.177***	0.135***	0.012***
(Income − 1.18)^2 *j*				0.132***	0.121***
Unemployment *i*	0.012***	0.008***	0.011***	0.012***	0.011***
Unemployment *j*	−0.011***	−0.005***	−0.015***	−0.011***	−0.006***
Poverty *i*					0.001***
Poverty *j*					−0.001***
Life expectancy *i*	−0.037***	−0.022***	−0.038***	−0.037***	−0.043***
Life expectancy *j*	0.031***	0.001	0.043***	0.027***	0.022***
Socio-political conflict *i*	−0.002***	−0.002***	−0.001***	−0.002***	−0.0002
Socio-political conflict *j*	0.002***	−0.001***	0.003***	0.001***	−0.0003**
Apartment privatization *i*	0.001***	−0.001***	0.002***	0.001***	0.001***
Apartment privatization *j*	0.0004***	−0.001***	0.001***	0.0004***	0.003***
Homicides *i*	0.102***	0.808***	−0.09***	0.12***	0.512***
Homicides *j*	0.214***	−0.469***	0.504***	0.078***	−0.426***
Buses *i*	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***
Buses *j*	0.001***	0.0000	0.001***	0.0001	−0.0001*
Doctors *i*	0.023***	0.017***	0.026***	0.027***	0.024***
Doctors *j*	0.005***	0.03***	−0.005***	−0.005***	0.009***
Hospital beds *i*	−0.325***	−0.141***	−0.383***	−0.322***	−0.29***
Hospital beds *j*	0.28***	0.338***	0.264***	0.284***	0.36***
Highway density *i*	−0.001***	−0.002***	−0.001***	−0.001***	0.001***
Highway density *j*	0.003***	0.003***	0.003***	0.002***	0.0003***
Telephones *i*	0.005***	−0.002***	0.008***	0.005***	0.006***
Telephones *j*	−0.006***	−0.006***	−0.005***	−0.005***	−0.009***
Number of obs.	46,810	15,509	30,136	46,810	33,883
Number of groups	6,080	3,764	5,504	6,080	5,772

***Notes*:** Significance levels: *** –1%, ** –5%, * –10%. Index '*i*' denotes source region and '*j*' denotes destination.

and public goods provision in the regions from the fixed factors such as initial conditions. The empirical analysis shows that although overall internal migration is low in Russia, it does depend on income per capita, the unemployment rate, poverty and public goods provision in the intuitive way, controlling for fixed effects (for each pair of host-source regions) and macroeconomic shocks. This has

important policy implications for Russia's regional policy and fiscal federalism. Indeed, our analysis suggests that Tiebout competition between Russian regions does exist. Regional policies that improve living standards, create jobs and improve public goods provision, do attract migrants. These effects are substantial relative to the average migration rate.

Our empirical analysis shows that liquidity constraints are an important barrier to migration. The population of the poorest regions cannot leave simply because they are unable to finance the cost of moving. For these regions, income growth *increases* rather than decreases outgoing migration. The financial constraints effectively attach the population to the region, reducing outside options and wages. We estimate that a third of the Russian population is locked in such a poverty trap.

We have also found that the elasticity of migration to distance is as high as in other countries (i.e., close to one), so the effect of geography on interregional labour reallocation should not be underestimated.

Three caveats are necessary. First, we use official data which do not include informal migration. Informal migration is at least as high in Russia as official migration. What is more important, it may not be proportional to official migration; for instance, informal migration is higher in places where one needs the authorities' permission to register. Hence the analysis of official migration may be biased. Second, we study regional rather than individual data. This implicitly assumes that migrants are representative of their region, which is unlikely to be the case. These two problems cannot be resolved without migration data from a nationally representative survey of potential and actual migrants that (to the best of our knowledge) does not exist.

Third, we assume that fixed factors (such as initial conditions, geography, legacies of the Soviet period) have an additive effect on migration. It is quite possible that the fixed factors interact with current economic variables and public goods in their effect on migration. Friebel and Guriev (2002) propose a theory in which industrial structure influences the effect of financial constraints on migration. There is certainly room for more theoretical research to generate testable hypotheses along these lines.

Another interesting avenue for further research is the analysis of intraregional migration and the determinants of mobility between rural and urban areas. Since some Russian regions are larger than most European countries in terms of area, and some even in terms of population, it is important to study the determinants of migration within regions. As shown in Table 1, intraregional migration in Russia is as large as interregional migration. Unlike most developing countries, Russia is already industrialized and urbanized; hence rural-urban migration is relatively unimportant. Our research also shows that education and access to finance should make the urban population more mobile, so it is interesting to study urban-urban and urban-rural migration flows. Another important effect is substitution between migration and commuting which should play an important role in the analysis of intraregional migration.

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