Internal migration and interregional convergence in Russia[1]

Sergei Guriev[2] and Elena Vakulenko[3]

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Abstract

In this paper, we study panel data on region-to-region gross migration flows in Russia for 1995-2010. We find that barriers to labor mobility that hindered internal migration in 1990s, have been generally eliminated by the end of 2000s. In 1990s many poor Russian regions were in a poverty trap: potential workers wanted to leave those regions but could not afford to finance the move. In 2000s (especially in late 2000s), these barriers were no longer binding. Overall economic growth and development of financial markets allowed even poorest Russian regions to grow out of the poverty traps. This resulted in convergence in Russian labor market in 2000s; the interregional gaps in incomes, wages and unemployment rates decreased substantially and are now comparable to those in Europe.

Keywords: convergence, internal migration, poverty traps, liquidity constraints

JEL classification: J61, R23.

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[2] New Economic School. E-mail: sguriev@nes.ru

[3] National Research University Higher School of Economics. E-mail: evakulenko@hse.ru, esvakulenko@gmail.com

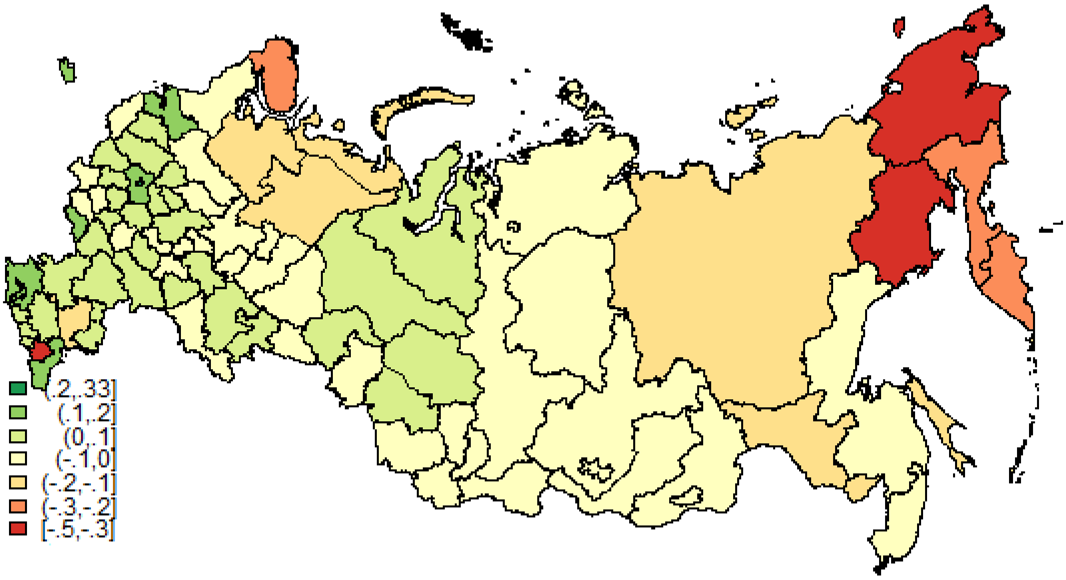
1. Introduction

This paper studies internal migration in Russia and convergence among its regions during Russia's transition from plan to market. Using the panel data on gross migration flows between Russian regions in 1995-2010, we study barriers to labor mobility; in particular we estimate the effect of financial constraints on ability to move. Using parametric and non-parametric econometrical methods and controlling for pair-wise region-to-region fixed effects we identify the importance of poverty traps. We show that in 1990s in many poor Russian regions workers would prefer to move out but could not afford to finance the move. We also show that by late 2000s overall economic growth and financial development virtually eliminated the poverty traps driven by low income and liquidity constraints.

The interregional reallocation of labor in Russia is important for several reasons. First, Russia represents a unique natural experiment. The allocation of population and physical capital at the beginning of transition was determined by non-market forces. Soviet industrialization policies often pursued political or geopolitical rather than economic goals. Even when they reflected economic realities, decision-making was distorted substantially by central planning, price controls and subsidies. Also, the allocation of production was intended to serve a different country – the Soviet Union (or even the whole Council for Mutual Economic Assistance countries) rather than Russia. In this sense, twenty years ago, the convergence started out with an exogenous allocation which was not driven by market forces and was therefore by definition far away from the spatial equilibrium in a market economy. Not surprisingly, transition to market resulted in millions of people moving across Russian regions. As shown in Figure 1, some Russian regions lost tens of percents of their populations with others gaining tens of percents just within 1995-2010.[4]

[4] As we discuss below, we focus on 1995-2010 period as the data before 1995 are not reliable. Also, in 2011, Russian statistical agency changes the methodology of accounting for internal migration and the data are no longer comparable to pre-2011 data.

Figure 1. Net migration for the period of 1995-2010, share of 1995 population.



Furthermore, an important feature of Soviet industrialization was the geographical concentration of production. Believing in economy of scale rather than in competition, Soviet planners have created many monotowns.[5] Whole towns, cities or even regions relied on a single industry. Therefore the economic restructuring and inter-sectoral reallocation implied not only moving workers or capital between employers in one town – those also required moving workers or capital between cities.

The second important feature of Russian transition was the timing of structural change. The subsidies, price controls and foreign trade restrictions were removed virtually overnight in 1992. This made many regional economies non-competitive and created substantial interregional differences in wages and incomes. However, as financial markets and real estate markets developed slowly, the reallocation was hindered by major barriers. In this sense the interregional convergence in Russia is a unique natural experiment for understanding how the markets and institutions matter for reallocation of production factors. While distortions were large already in 1990s, the markets were still underdeveloped. Over time, markets and institutions developed and barriers to reallocation of capital and labor decreased. Comparing

[5] Russian law defines monotowns as settlements where at least 25% employment is within a single firm. Even now, the Russian government's Program for the Support of Monotowns lists 335 monotowns (out of the total of 1099 Russia's towns and cities); their population accounts for a quarter of Russia's urban population.

the dynamics of convergence in 1990s and in 2000s therefore allows understanding the quantitative importance of market imperfections for factor mobility.

The first glance at the dynamics of interregional dispersion in Russia shows that the data are indeed consistent with the hypothesis that markets and institutions that are conducive to migration take time to develop. Convergence in incomes, wages and unemployment rates did not happen in 1990s but began only in 2000s, especially in the second half of 2000s (we will discuss below the fact that convergence in GDP per capita is still not happening).

In particular, while there was no convergence in 1990s (in fact there was even divergence), the situation changed dramatically in 2000s. As shown in Figure 2, the convergence process accelerated substantially with interregional differences in incomes and unemployment rates declining sharply in 2005-10. The convergence in wages started even earlier (around 2000). The magnitude of convergence in 2000s is large: interregional dispersions of real incomes, real wages and unemployment rates declined by a third. The differences between dispersions in 2000 and 2010 are statistically significant.

Figure 2. Differences among Russian regions in terms of logarithms of real incomes, real wages, unemployment, real GDP per capita.[6]

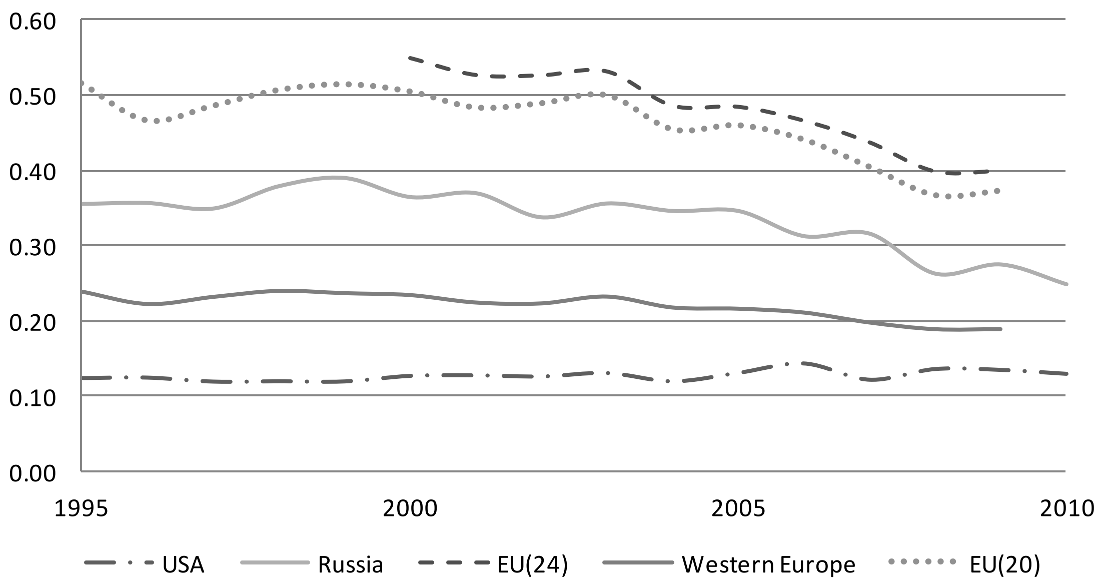
Source: Rosstat's official data, authors' calculations.

[6] We calculate population-weighted measures of interregional differences in order to make our results internationally comparable. The results are similar for the unweighted measures as well (see Figure 2 in the Online Appendix.). In order to control for interregional price differentials, we divide nominal variables by the regional subsistence levels.

Are these interregional differences still large compared to other countries? It turns out that while recent convergence in incomes did not make Russia as equal as the US or Western Europe, however, Russian interregional differences in income are lower than the differences between subnational NUTS-2 units in the EU-24 (Figure 3). This is quite striking given that EU also had a decade of fast convergence.

In this paper we show that this dramatic change in the dynamics of interregional convergence in Russia may be explained by the decreased barriers to labor mobility. Interestingly, a casual study of the correlation between interregional migration rates and interregional income differences (Figure 4) does not seem to be consistent with a conjecture that migration contributed to convergence. Indeed, migration was decreasing over time – along with the interregional differences.

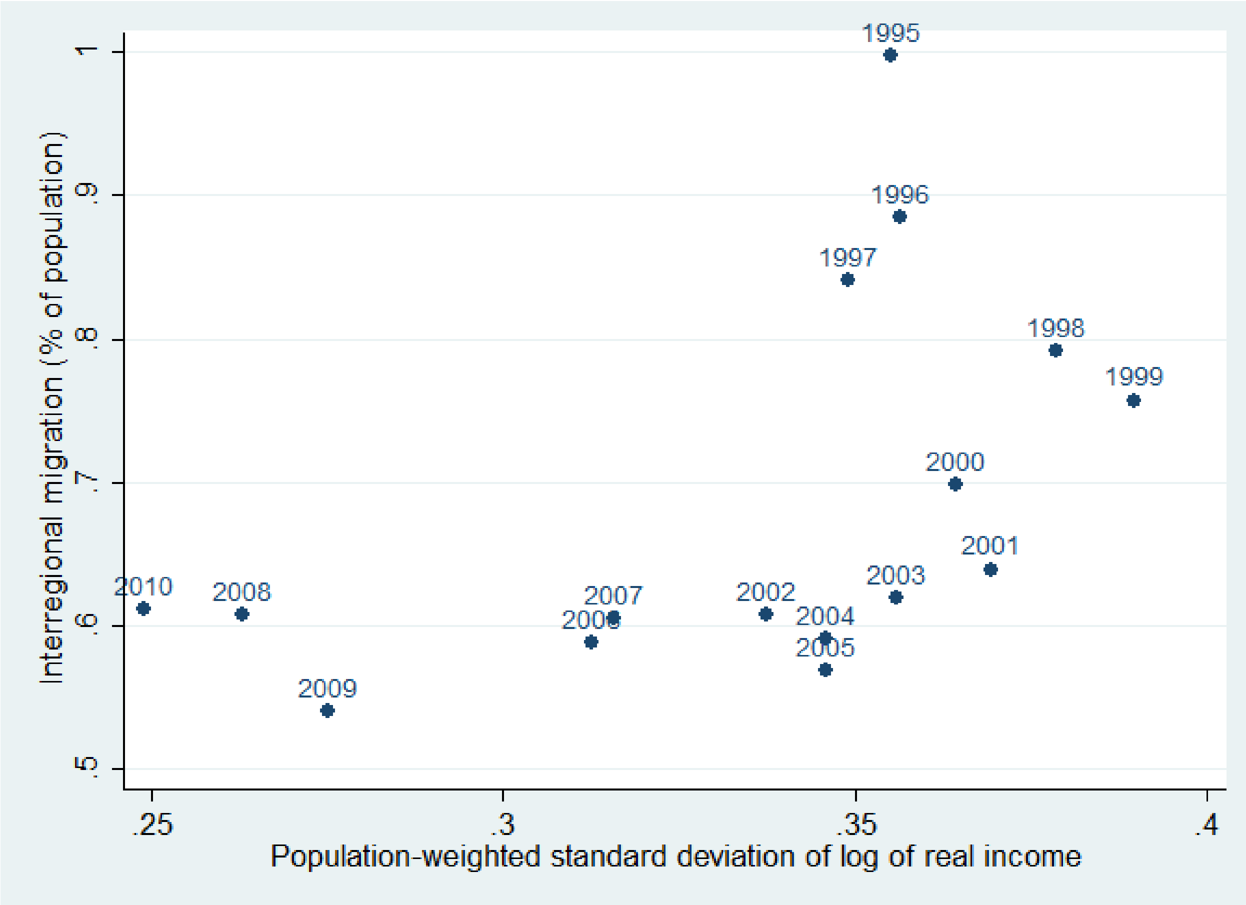
Figure 3. Russian convergence in the international perspective: population weighted standard deviation of log of real income.



Note: For the EU and Western Europe unit of observation is NUTS-2 region.[7]

[7] Data sources: EU, Statistics Database of European Commission, Eurostat http://epp.eurostat.ec.europa.eu. We consider disposable income deflated to purchasing power standard based on final consumption per capita. USA Census Bureau www.census.gov. Average size of NUTS-2 region is about 2.5 million people, average size of Russian region is 1.8 million people.
EU (20): Belgium, Czech Republic, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Latvia, Lithuania, Netherlands, Austria, Poland, Portugal, Romania, Slovakia, Finland, Sweden, United Kingdom.
EU (24): all European Union countries except Malta, Cyprus, Luxemburg. For EU (20) and EU (24) we consider only those NUTS-2 units for which there is data for each year.
Western Europe: Austria, Belgium, Germany, Ireland, Greece, France, Italy, Netherlands, Portugal, Finland, Sweden, United Kingdom.

Figure 4. Interregional migration rates and interregional differences in real incomes.



Our theory and evidence provides a very simple explanation for this seemingly puzzling relationship. We show that the low convergence in 1990s was explained by the high barriers to mobility. At that time, many Russian regions were in a poverty trap. While many poor regions' residents were willing to migrate to richer regions, they were not able to – as they simply were too poor to afford the move, and as the financial markets were underdeveloped so they could not borrow to finance the move. In 2000s the situation changed dramatically: as Russians' incomes grew and Russia's financial markets developed, these poverty traps disappeared. Russians became more mobile and the interregional differences went down.

How can the reduction in the interregional differences be consistent with low (or at least falling) migration rates? The explanation is straightforward. Lower barriers to mobility result in the convergence between wages and incomes – through a threat of mobility which has become more credible as barriers to mobility decreased. The convergence in wages and incomes reduces the incentives to migrate – so the migration rates do decrease.[8]

The empirical study of the importance of liquidity constraints as a barrier to mobility – that we undertake in this paper – is facilitated by the third unique feature of Russian transition to market. Russian households entered transition with very low – virtually trivial – personal assets. During the Soviet times most assets were owned by the state. The personal savings were destroyed by hyperinflation of 1992. The main asset of Russian household – housing – was given to them for free in 1990s but the size (16 and 23 square meters per capita in 1990 and in 2010, respectively) and the quality of this real estate was so poor that the market value of housing remained very small. This is especially true outside Moscow and Saint Petersburg – and even more so in depressed regions where potential migrants want to leave from. The Global Wealth Report (2012) estimates the average value of Russian real estate at about $8,000 per adult (about half of the annual GDP per capita). The very same report estimates the average financial assets at only $4000 per adult. Moreover, if one takes into account the acute wealth inequality in Russia (reported, higher in the world except for small Caribbean island) the median personal wealth is even lower – about $1200 per adult or less than 10% of annual GDP per capita (Global Wealth Report, 2012).

The rest of the paper is structured as follows. In the next Section we discuss related literature. Section 3 describes a rudimentary model of poverty traps that shows why the relationship between the income in the region of origin and the migration from this region is non-monotonic. In Section 4, we discuss our empirical specifications, describe the data, and provide basic facts on migration and financial development. In Section 5 we discuss the empirical results. In Section 6, we compare the magnitudes of the parameters of poverty traps that we estimate through different parametric and semiparametric specifications; we find that three different methodologies provide strikingly similar results. In Section 7, we discuss regressions that include proxies for financial development. Given that these variables are only available for a much shorter period of time, we present these results as additional evidence rather than include it into the main empirical section. In Section 8, we conclude and provide policy recommendations.

2. Related literature

As the literature on internal migration is very large, in this Section we only discuss papers that study the relationship between migration and income in origin region and the effect of liquidity constraints on migration. As discussed in Banerjee and Kanbur (1981), liquidity constraints may result in a non-linear relationship between income and propensity to migrate out of a region. In

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[8] When Molloy et al. (2011) discuss the puzzle of falling internal migration rates in the US in 2000s, they also suggest that one of the most plausible explanations may be that the potential of migration within the US is largely exhausted.

poor regions, potential migrants are willing to move but may not be able to afford the move; in this case an increase in income decreases the incentives to move but relaxes the financial constraints. In our paper, we develop these insights from Banerjee and Kanbur into a simple model of migration decisions of heterogeneous migrants under financial constraints.

Banerjee and Kanbur cite several studies that provide evidence of such a non-monotonic relationship; since publication of their paper, there has been a number of papers offering additional evidence. In particular, Andrienko and Guriev (2004) show that in about 30% poorest regions of Russia (hosting about 30% of Russia's population) the potential outgoing migrants are indeed locked in a poverty trap. For these regions, an increase in income would result in relaxing the liquidity constraints and *higher* rather than lower outmigration. These results are also consistent with Gerber (2006) who analyzes the determinants of net migration rates in 77 Russian regions. He finds that the (predictable) effect of wages on net migration is increasing over time. The importance of poverty traps in the early years of transition would weaken the positive effect of wages on net migration. Indeed, in a poor region an increase in wages would result in increase in both immigration and outmigration (the latter due to overcoming the binding financial constraints). In later periods, when poverty traps became less important, the latter effect disappeared so the positive effect of wages became stronger.

McKenzie and Rapoport (2007) find a similar non-monotonic relationship between wealth and probability to migrate for Mexico-to-US migration for communities with small migration network. However, they mention that liquidity constraints become less important for communities with larger network. They use survey data and estimate linear model of probability to migrate with quadratic term for wealth and the interactions of wealth with migration network.

Phan and Coxhead (2010) analyze inter-provincial migration and inequality in Vietnam. They find liquidity constraints for some provinces using semi-parametric estimates for the impact of income in the sending province on migration.

Michálek and Podolák (2010) analyze a relationship between socio-economic disparities and internal migration in Slovakia. They show that there are significant regional disparities in wage, unemployment in 1996-2007. However internal migration is relatively low. The authors suggest that the reason is liquidity constraints. Horváth (2007) finds similar results for internal migration of Czech population in 1992-2001 – most migration takes place between richer regions.

Abramitzky, Boustan and Eriksson (2012) study the effect of wealth on the decision to migrate, either internally or internationally, during the Age of Mass Migration (1850-1913) using data on 50 thousand Norwegian men. They estimate binary and multinomial logit models of migration choice. They explain the migration decision with various household characteristics including household assets. They do not find the evidence of liquidity constraints. In their data, parental wealth discourages migration. Apparently, wealth influenced the migration process through its effect on opportunities in the source country, rather than through the use of family resources to finance migration costs which were rather low. However, they suggest that today migration costs are much higher and liquidity constraints may be more important.

Golgher et al. (2008) and Golgher (2012) find that poor migrants in rural areas in Brazil have a limited range of options whether and/or where to migrate and are partially trapped in their home regions. The authors show that in the poor parts of Brazil there are substantial barriers to long-haul migration (even though short-haul migration is possible).

Our paper is also related to several other literatures. First, there is a large literature documenting the evolution of interregional differences in Russia covering different time spans and using different data and methodologies. This literature is surveyed Gluschenko (2010); in Guriev and Vakulenko (2012), we extend Gluschenko's survey to cover the most recent papers; also, in order to compare the results from different papers, for each paper, we calculate the speed of interregional convergence. According to most of these studies, in 1990s there was no convergence or even divergence among Russian incomes while there was some convergence in (late) 2000s.

The other important literature documents the decreasing internal migration in the US. Molloy, Smith and Wozniak (2011) provide an extensive survey of this literature and conclude that there is still no convincing explanation of the phenomenon. In particular, they show that the slowdown is not due to developments in demographics, labor and housing market. They conjecture that the reason may be that the potential for interregional migration is lower today than decades before – because of the completion of the "multidecade adjustement processes" or because of higher efficiency of working from home or because of more uniform geographical distribution of demand for skills.

3. A simple model of a poverty trap in migration

In this section we develop a simple model that captures the intuition for a non-monotonic relationship between income at the origin and migration flows.

Consider a model with two periods. In the first period, a migrant earns her income y in her home region and then decides whether to move or to stay. In the second period he/she receives income depending on the first period's decision. Suppose that the migrant receives income y in the origin region (we will refer to the origin region as the "region i") and expects to earn income Y in the destination region ("region j"). Also, there is a cost of migration C to be paid in cash. We assume that this cost is sufficiently small relative to the income at destination: $C<Y/2$.

There is a distribution of incomes y in the origin region with cumulative distribution function $F(\cdot)$.

Let us consider the migration outcomes:

1. If $y<C$, the migrant does not have cash to move. She stays in region i, and receives y in the first period and in the second period. Her total payoff is therefore 2y.
2. If $y \geq C$, the migrant may choose to migrate.
   a. If she migrates, she pays the cost C and in the second period she receives Y. Her total payoff is $y-C+Y$.
   b. If she stays, then in the second period she receives y. Her total payoff is 2y.

Comparing cases 2a and 2b, we immediately find that the potential migrant prefers to migrate if $y-C+Y>2y$ (for simplicity we assume that in case of indifference over payoffs, the migrant stays put). Therefore migration takes place if and only if $y \geq C$ *and* $y<Y-C$.

As the income at origin y is distributed with c.d.f. F(y), the number of migrants is

$$M=F(Y-C)-F(C).$$

As we assumed above that $C<Y/2$, we have $Y-C>C$, so at least some people migrate.

Let us now carry out comparative statics with regard to a shift of the whole income distribution in the origin region. For simplicity, let us assume that $F(\cdot)=F(y-y_m)$ and it is normalized so that $Ey=y_m$ (i.e. the average income in the region is y_m). Suppose that the distribution has a finite support (e.g. from y^L to y^H).

How does M depend on y_m? The answer is as follows (once again, assuming that $Y>2C$):

$$M'(y_m) = -f(Y-C-y_m) + f(C-y_m).$$

Now we can fully solve the model for all parameter constellations. There can be two cases:

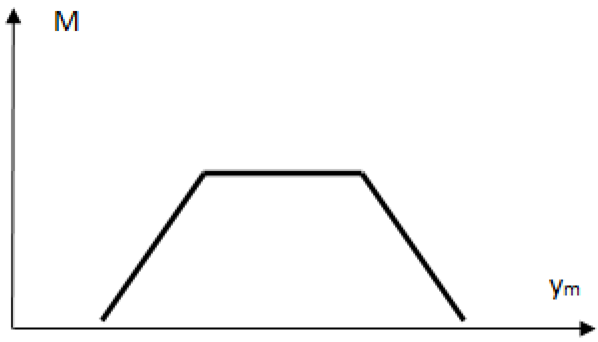
Case 1: $Y-C-y^H<C-y^L$		Case 2: $Y-C-y^H>C-y^L$	
Parameters	Outcome	Parameters	Outcome
$y_m< C-y^H$	$M'(y_m)=0$, $M=0$, nobody can migrate	$y_m< C-y^H$	$M'(y_m)=0$, $M=0$, nobody can migrate
$C-y^H < y_m< Y-C-y^H$	$M'(y_m)>0$	$C-y^H < y_m< C-y^L$	$M'(y_m)>0$
$Y-C-y^H < y_m< C-y^L$	$M'(y_m)$ may be either positive or negative[9]	$C-y^L < y_m< Y-C-y^H$	$M'(y_m)=0$, $M=1$, everybody migrates
$C-y^L < y_m< Y-C-y^L$	$M'(y_m)<0$	$Y-C-y^H < y_m< Y-C-y^L$	$M'(y_m)<0$
$Y-C-y^L < y_m$	$M'(y_m)=0$, $M=0$, nobody wants to migrate	$Y-C-y^L < y_m$	$M'(y_m)=0$, $M=0$, nobody wants to migrate

[9] If the distribution is uniform, $M'(y_m)=0$

In both cases, the relationship between average income in the origin region and the migration flow is non-monotonic. As the whole income distribution moves to the right, first M increases, then stays constant (in the Case 2) or goes up/down (in the Case 1), then certainly decreases.

The Figure 5 illustrates the relationship for the Case 2 ($Y\text{-}C\text{-}y^H > C\text{-}y^L$). In the Case 1 ($Y\text{-}C\text{-}y^H < C\text{-}y^L$), the middle range of the graph is flat only if the distribution is uniform: in this case, as the average income y_m increases, the number of migrants who break out of the poverty trap and emigrate equals exactly the number of people who lose the willingness to migrate. If the distribution is not uniform, the middle range of the graph does not have to be flat.

Figure 5. Migration as a function of the mean income at origin for the case of the uniform distribution of incomes at origin (for the case $Y\text{-}C\text{-}y^H > C\text{-}y^L$).



Also, the decreasing and increasing parts of the relationship may be non-linear (they are precisely linear only for the uniform distribution). But the model predicts with certainty that there is an increasing part for low y_m (for $y_m < C\text{-}y^H$), and there is a decreasing part for high y_m (for $y_m > Y\text{-}C\text{-}y^L$).

4. Empirical specification and data

4.1. Empirical specification

We estimate a modified gravity model similar to the one in Andrienko and Guriev (2004). The main idea of 'gravity' models is that migration flow depends positively on number of people in both sending region i and receiving region j and decreases with distance between two regions (similarly to the force of gravity between two bodies being proportional to masses of the two bodies and decreasing with distance between them). We use the following log-linear specification of the modified gravity model:[10]

$$\ln M_{i,j,t} = \alpha_{i,j} + \phi \ln income_{i,t} + \varphi \ln income_{j,t} + \sum_{k \in K} \gamma_k \ln X_{k,i,t} + \sum_{k \in K} \delta_k \ln X_{k,j,t} + \sum_{t \in T} \theta_t year_t + \varepsilon_{i,j,t} \quad (1)$$

The dependent variable is a logarithm of number of migrants who move from region i to region j in year *t.*[11] In order to control for distance, initial conditions and legacies, we include fixed effects $\alpha_{i,j}$ for each pair of regions. 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.[12]

The key variables are $\ln income_i$ and $\ln income_j$ are the logarithms of per capita real income in an origin and destination regions, correspondingly. $X_{k,i,t}$ and $X_{k,j,t}$ are characteristics of the source and host regions that may change over time, such as the unemployment rate, the characteristics of the housing market (housing price, new flats constructed, square meters of housing per capita), demographic structure (log population, share of young people, share of older people in the population), the provision of public goods, e.g., roads, healthcare (doctors per capita and hospital beds per capita), public transportation (buses per capita), education (number of students) etc. We also include time dummies: $year_t$ equals 1 for a year t and 0 otherwise.

As we are especially interested in the effects of liquidity constraints and poverty traps, we will also include squared real per capita income for the sending regions. In the previous Section we discuss why the existence of poverty traps implies a non-monotonic relationship between the income at the origin and the intensity of migration. If financial markets are developed and there are no liquidity constraints then coefficient ϕ should be negative and coefficient φ should be positive. Migration is the likelier the lower the income at origin and the higher the income at destination. However, as shown in the previous Section, in the presence of financial constraints, the coefficient ϕ should be positive for the poorest regions (this is exactly what Andrienko and Guriev, 2004, find for the 1990s panel data).

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[10] The alternatives include a Poisson model or a negative binominal model. However, as Andrienko and Guriev (2004) show, results are very similar.

[11] The log specification cannot deal with trivial observations. We add 0.5 to all observations. Only 1.7% of observations in the sample have zero number of migrants.

[12] Certainly, even this specification does not rule out endogeneity. For example, such variables as income, unemployment, public goods may depend on migration. We believe however that these effects are negligible since—as shown in Figure 6—migration in Russia is very small (0.5-1.0 per cent of population per year).

4.2. Data

We use official data on income per capita, the unemployment rate, GDP and different characteristics of quality of life and economic activity which we mentioned in the previous at the regional level from the Russian Statistical Service (Rosstat)[13] for the period of 1995-2010 for 78 regions.[14] We excluded the Republic of Ingushetia and the Republic of Chechnya due to the unavailability of data, as well as 9 autonomous districts (Nenets, Komi-Perm, Khanty-Mansijsk, Yamalo-Nenets, Taimyr/Dolgano-Nenets, Evenk, Ust-Ordyn Buryat, Aginsk Buryat, and Koryak) which are administrative parts of other regions. We restrict ourselves to 1995-2010 as there are no reliable data on deflators before 1995 and because as Rosstat changed methodology of measuring interregional migration after 2010.

In order to take into account price level differences, we deflate incomes by the regional consumer price index (CPI).[15] This allows us to control for region-specific inflation rates which are sufficient for regression models with fixed effects (Section 5).

We analyze interregional migration data for the period from 1995 to 2010 using region-to-region annual migration flows. These data are collected by the Interior Ministry and are available—albeit not free of charge—from Rosstat. These data reflect the official count of registered migrants (i.e. of those people who change their registration in this particular year). We end up with 77*77 observations every year.[16] In the next Subsection we discuss the main facts about interregional migration in Russia based on these data. Table 6 in the Appendix provides the summary statistics and definition of all the variables we use in our regressions.[17]

4.3. Interregional migration in Russia in 1995-2010

Provided the substantial decrease in interregional differences noted above, it is interesting to trace the dynamics of internal migration. It turns out that for some regions migration has been very important but overall it has been decreasing over time (Figure 6).

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[13] http://gks.ru Russian Statistical Service (Rosstat).
[14] In some specifications, data on Chukotka are not available. In these cases we have 77 observations.
[15] As a robustness check we also use the regional subsistence level in rubles as an alternative deflator; the results are very similar. There are no subsistence level data for 2000; we interpolated this year as an average of 1999 and 2001.
[16] We have data on migration for 78 regions but we exclude Chukotka as there are no data for many explanatory variables for this region.
[17] We fill in some missing data. For Leningrad oblast we take a number of students 0.1 per 1000 population in 1995 as it is in a 1994. For Sakhalin oblast we consider 1 bus per 100 thousand people for 2008 and 2010 – this is the value reported by Rosstat for the year 2009.

Figure 6. Internal migration (interregional, intraregional, total) in Russia over time as % total Russian population.

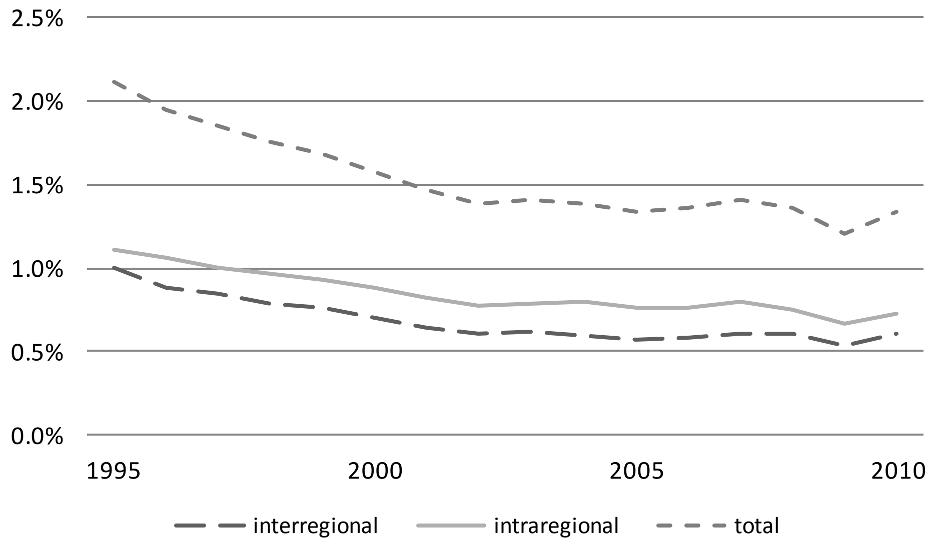


Figure 1 shows that migration greatly varied across regions. Several regions lost or gained tens of percents of their population due to migration. Most migrants moved from Russia's East and Far East to Russia's European part, especially to Moscow and Saint Petersburg. Figure 7 shows, however, that migrants also went to other regions: in 2010 the share of all internal migrants to Moscow and Moscow region is only 12% (with another 5% going to Saint Petersburg and Leningrad region).

Figure 7. Migration to Moscow and Saint Petersburg as a share of total migrants (%).

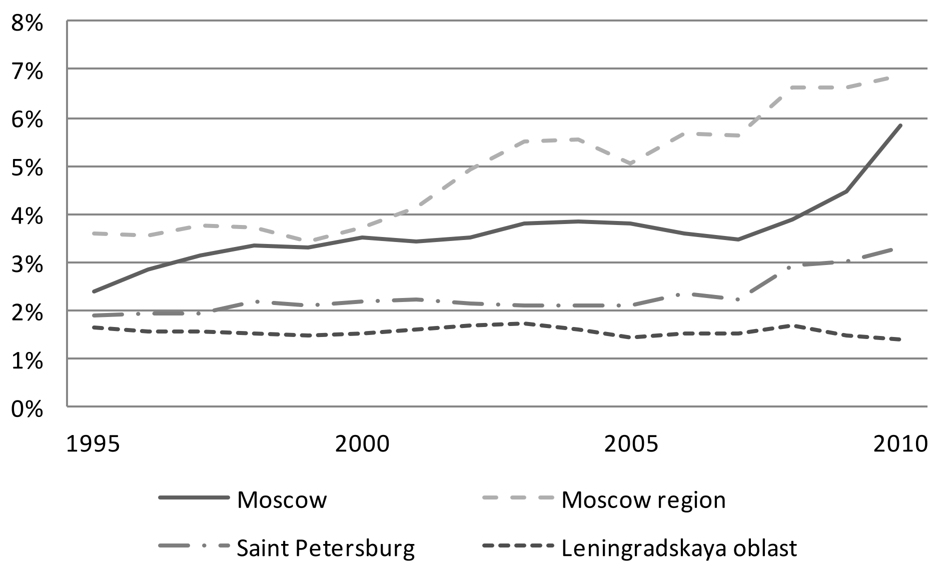
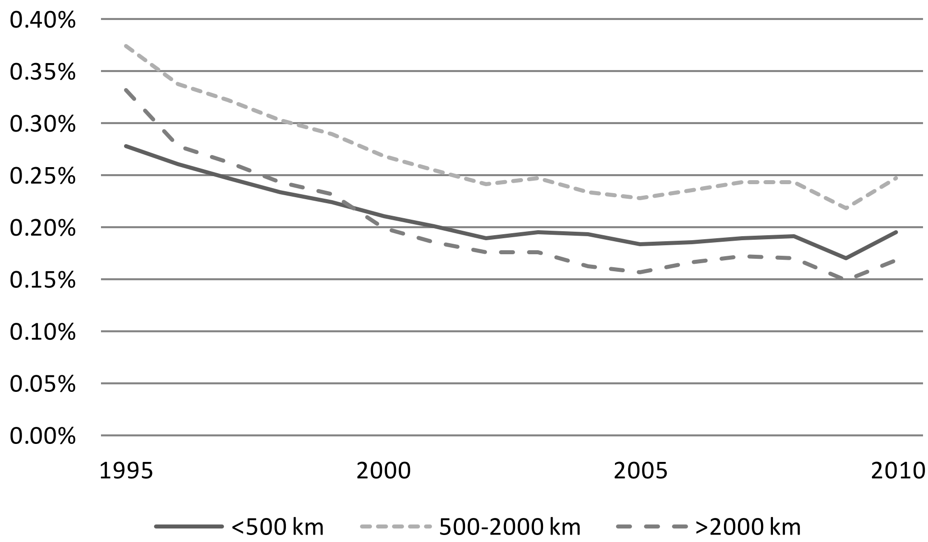


Figure 8 presents the structure of migration by distance between origin and destination. This distribution is quite stable. In 1995, 28% migrants (0.28% of population) moved by less than 500 kilometers, while in 2010 this number was 32% (0.19% of population). Share of long-haul migration (more than 2000 km) is decreasing over time from 34% (0.33% of population) at 1995 to 28% at 2010 (0.17% of population). As we will show in the next Section, the nature of short- and long-haul migration is very different, especially with regard to the financial constraints.

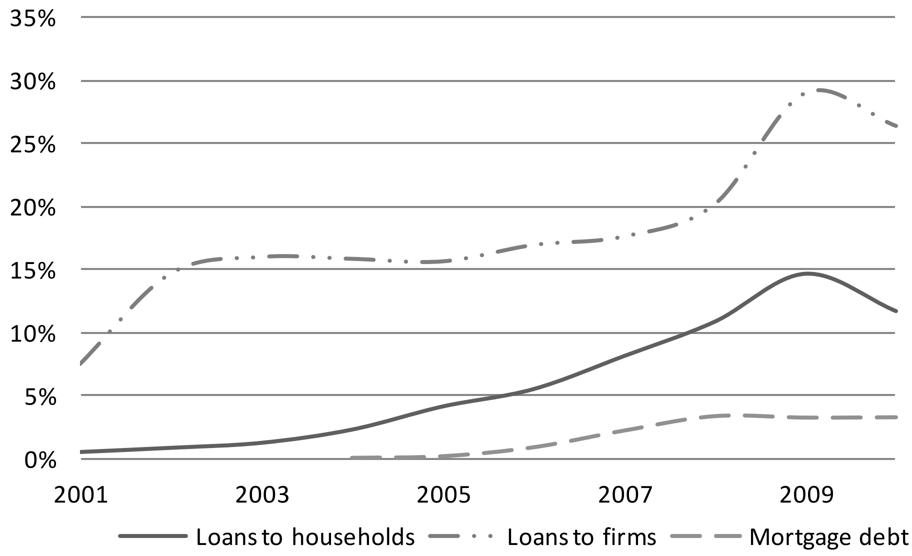
Figure 8. Interregional migration as % of population by distance.



4.4. Financial development

While increased mobility may be explained by an increase in incomes, the liquidity traps may also be relaxed due to financial development. In 2000s, Russia has experienced a rapid development of financial sector (unfortunately, reliable and consistent data only start in 2001, data on mortgages only begin in 2004). As shown in Figure 9, all indicators of financial development have grown substantially in 2001-2008. As a result of financial crisis there was a slight decline in 2009-10. At the peak, in 2009 the average level loans to firms, households and mortgage debt was 29%, 14.6% and 3.3% of GDP, correspondingly.

Figure 9. Average ratio of outstanding loans to households, loans to firms, and mortgage debt to GDP (%).



In order to understand the role of financial development, we control for it in the regressions. As a proxy for financial development we use ratio of outstanding loans to households and to firms to GDP. We also include an interaction between income and financial development. If our hypothesis of the importance of financial development is correct, we should find that financial development relaxes the liquidity constraints; thus, the positive effect of income in sending regions on migration is less likely. In other words, our theory predicts a negative coefficient at the interaction of financial development and income at the origin region.

5. Empirical results

5.1. Main results

Table 1 presents the main results for the specification (1). In column 1 we run the specification with linear terms for log income. In column 2, we add squared log income – in order to test for non-monotonicity of the relationship between income and migration. In columns 3 and 4 we re-run specifications 1 and 2 excluding Moscow and Saint Petersburg. Moscow and Saint Petersburg are the only two region-cities in Russia. Also, as we discussed above, they are a destination of choice for migrants from all other regions. Therefore it is important to check whether the results are robust to excluding these two cities.

The results are generally consistent with the gravity model. Migration is correlated with the size of both sending and receiving regions – with coefficients being significantly larger than 1. The coefficients at the proxies for public goods, amenities and quality of life are also generally intuitive. People move from regions with high unemployment and infant mortality to regions with low unemployment and infant mortality. Migrants prefer regions with a greater number of doctors and hospital beds per capita. Migrants also prefer regions with higher proportion of women, students, young and old people. They move from regions with higher highway density and higher number of buses per capita (both are measures of mobility). The effects of public goods and demographics should not be overinterpreted however as the measures of public goods provisions co-move together and may reflect omitted variables related to both regional and federal fiscal policy. In what follows we abstain from discussing the role of the public goods. However, we do include them into regressions to control for potential heterogeneity.

We also control for the income distribution through including Gini coefficient for income. The coefficients are significant and negative for both origin and destination regions. The negative coefficient for the destination region probably reflects the aversion to inequality (migrants prefer to migrate to more equal regions). The negative coefficient for the sending region is consistent with importance of poverty traps: those who would like to migrate are probably in the lower income quantiles; controlling for average income in the region, a higher Gini coefficient implies that these potential migrants are more likely to be poor and therefore less likely to be able to move.

We include two measures of the real estate market development: availability of housing (in square meters per capita) and price of real estate (in CPI-adjusted rubles per square meter). As both variables are in logs, the sum of the coefficients is the coefficient at the log of the value of housing per capita. The effect of real estate market is consistent with the importance of financial constraints – as well as with the existence of Tiebout competition. Migrants leave regions with lower housing prices in favor of regions with higher housing prices. This may be due to the fact that housing price (in real terms) reflects quality of life. The availability of housing (per capita in square meters) positively affects both the arrivals and the departures of migrants. If we add up the coefficients at the price per square meter and the number of square meters per capita, we find that the value of housing (in real rubles per capita) increases both in-migration and out-migration. The latter effect is consistent with the importance of financial constraints.

We also include newly constructed flats (using a three-year moving average) but do not find any significant effect.

The main focus of our analysis is on the role of income. It turns out that the effect of income in the receiving region is positive. When we add the squared income, the coefficient at the squared income is negative but small. In other words, migrants prefer to move to higher-income regions, but there is a satiation effect. The back-of-the-envelope calculation suggests that the peak of the quadratic relationship is at 12; this is above any regional incomes in our dataset – thus the effect of income in the receiving region is positive for all region-to-regions migrations in Russia in 1995-2010.

The effect of income in the sending region is different. The first specification (that only includes a linear term) shows that the average effect of income is insignificant. However, once we add a squared income term, we see that the relationship between income and out-migration is non-monotonic: the effect of income on out-migration is positive in poorer regions and negative in richer regions (as predicted by the model). Based on the coefficients at income and at squared income we calculate the peak of the relationship at 9.2. Using simulation methods for the joint distribution of the coefficients we estimate the confidence interval for the peak and find it to be (8.7, 10.0).

Table 1. Results of regressions with and without squared terms.[18]

VARIABLES	1 Main	2 With squared income	3 Without Moscow and Saint Petersburg	4 Without Moscow and St Petersburg, w/ sq. income
Population i (log)	1.75***	1.80***	1.57***	1.63***
	(0.10)	(0.10)	(0.11)	(0.11)
Population j (log)	1.96***	2.00***	1.74***	1.73***
	(0.10)	(0.10)	(0.10)	(0.11)
Income i (log)	0.03	0.76***	-0.03	0.45**
	(0.02)	(0.16)	(0.02)	(0.19)
Income squared i (log)		-0.04***		-0.03**
		(0.01)		(0.01)
Income j (log)	0.18***	0.70***	0.17***	0.15
	(0.02)	(0.17)	(0.02)	(0.20)
Income squared j (log)		-0.03***		0.00
		(0.01)		(0.01)
Gini i (log)	-0.08*	-0.08*	-0.09**	-0.09**
	(0.04)	(0.04)	(0.05)	(0.05)
Gini j (log)	-0.12***	-0.12***	-0.14***	-0.14***
	(0.04)	(0.04)	(0.05)	(0.05)
Unemployment rate I (log)	0.06***	0.06***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)
Unemployment rate j (log)	-0.07***	-0.07***	-0.07***	-0.07***
	(0.01)	(0.01)	(0.01)	(0.01)
Housing price i (log)	-0.05***	-0.05***	-0.05***	-0.05***
	(0.01)	(0.01)	(0.01)	(0.01)
Housing price j (log)	0.05***	0.05***	0.05***	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)
Provision of housing i (log)	0.41***	0.40***	0.15*	0.15*
	(0.08)	(0.08)	(0.09)	(0.09)
Provision of housing j (log)	0.62***	0.61***	0.61***	0.61***
	(0.08)	(0.08)	(0.09)	(0.09)
New flats i (moving average, log)	-0.01	-0.002	0.01	0.01

[18] We present only part of results in this section. The full estimation results are in Table 1 in the Online Appendix.

	(0.01)	(0.01)	(0.01)	(0.01)
New flats j (moving average log)	-0.01	-0.00	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Life expectancy i (log)	-0.05	-0.08	0.10	0.07
	(0.20)	(0.20)	(0.21)	(0.21)
Life expectancy j (log)	-0.56***	-0.58***	-0.36*	-0.36*
	(0.19)	(0.19)	(0.20)	(0.20)
Infant mortality rate i (log)	0.04***	0.04**	0.03*	0.03*
	(0.01)	(0.01)	(0.02)	(0.02)
Infant mortality rate j (log)	-0.08***	-0.08***	-0.08***	-0.08***
	(0.02)	(0.02)	(0.02)	(0.02)
Doctors i (log)	0.08	0.12**	0.12**	0.15**
	(0.06)	(0.06)	(0.06)	(0.06)
Doctors j (log)	0.17***	0.20***	0.19***	0.19***
	(0.06)	(0.06)	(0.06)	(0.06)
Hospital beds i (log)	0.04	0.04	-0.002	-0.003
	(0.04)	(0.04)	(0.04)	(0.04)
Hospital beds j (log)	0.31***	0.31***	0.27***	0.27***
	(0.04)	(0.04)	(0.04)	(0.04)
Telephones i (log)	-0.01	-0.03	-0.09***	-0.10***
	(0.03)	(0.03)	(0.03)	(0.03)
Telephones j (log)	-0.16***	-0.18***	-0.15***	-0.15***
	(0.03)	(0.03)	(0.03)	(0.03)
Highway density i (log)	0.04**	0.04**	0.03*	0.03*
	(0.02)	(0.02)	(0.02)	(0.02)
Highway density j (log)	-0.00	-0.00	0.03	0.03
	(0.02)	(0.02)	(0.02)	(0.02)
Buses i (log)	0.03***	0.03***	0.03***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
Buses j (log)	-0.02*	-0.01*	-0.03***	-0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
Share of young i, t-1	-0.02***	-0.01***	-0.02***	-0.02***
	(0.01)	(0.01)	(0.01)	(0.01)
Share of young j, t-1	0.06***	0.06***	0.05***	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)
Share of old i, t-1	-0.05***	-0.04***	-0.04***	-0.04***
	(0.004)	(0.004)	(0.004)	(0.004)
Share of old j, t-1	0.02***	0.03***	0.02***	0.02***
	(0.004)	(0.005)	(0.005)	(0.01)
Students i (log), t-1	-0.08***	-0.07***	-0.08***	-0.08***
	(0.01)	(0.01)	(0.01)	(0.01)
Students j (log), t-1	0.10***	0.10***	0.11***	0.11***
	(0.01)	(0.01)	(0.01)	(0.01)
Women i (log), t-1	0.47**	0.50**	-1.39***	-1.22***
	(0.23)	(0.22)	(0.29)	(0.29)
Women j (log), t-1	-3.06***	-3.04***	-3.72***	-3.73***
	(0.22)	(0.21)	(0.29)	(0.30)
Year dummies included	Yes	Yes	Yes	Yes

Observations	84,666	84,666	80,222	80,222
R2-within	0.308	0.308	0.309	0.310
Number of pairs	5,929	5,929	5,625	5,625

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5.2. Piecewise-linear specification

In the previous section we reported the results with quadratic specifications that imply that the relationship between migration and income in the sending region is non-monotonic. In regions with low incomes, a higher income is associated with higher out-migration – these are the regions in a poverty trap. However, the quadratic specification results in a large confidence interval for the peak of the income-migration relationship. In this subsection, we use a more straightforward method and consider a piecewise-linear specification. Our model (Section 3) implies that for high incomes the slope of the relationship between income in the sending region and migration is negative while for the low incomes the slope is positive. For simplicity, we approximate this relationship with just one kink and run the following regression:

$$\begin{aligned} \ln M_{i,j,t} &= \alpha_{i,j} + a \ln income_{i,t} I\left(\ln income_{i,t} \le \gamma\right) + \\ &+ b \ln income_{i,t} I\left(\ln income_{i,t} > \gamma\right) + cI\left(\ln income_{i,t} > \gamma\right) + controls_{i,t} + \varepsilon_{i,j,t} \end{aligned} \tag{2}$$

where $I(\cdot)$ is the indicator function, γ is the threshold at which the kink (and possibly a jump) takes place. An alternative way of writing (2) is:

$$\ln M_{i,j,t} = \begin{cases} \alpha_{i,j} + a \ln income_{i,t} + controls_{i,t} + \varepsilon_{i,j,t}, & \ln income_{i,t} \le \gamma, \\ \alpha_{i,j} + b \ln income_{i,t} + c + controls_{i,t} + \varepsilon_{i,j,t}, & \ln income_{i,t} > \gamma. \end{cases}$$

Thus in our case there are two regimes: "before" (to the left of the threshold: $\ln income_{i,t} \le \gamma$) and "after" (to the right of the threshold: $\ln income_{i,t} > \gamma$). Our model (in Section 3) would be consistent with the data as long as for some threshold γ there is a significant difference between slopes *a* and *b* and that *b*<0<*a*.

In order to estimate model (2) we use least squares estimation for transform variables (Hansen, 1999) to extract fixed individual effects (3).

$$\ln M^{*}_{i,j,t} = \beta \ln income^{*}_{i,t}(\gamma) + controls_{i,t}{}^{*} + \varepsilon^{*}_{i,j,t} \tag{3}$$

Where $\ln M_{i,j,t}^{*} = \ln M_{i,j,t} - T^{-1}\sum_{t=1}^{T}\ln M_{i,j,t}$,

$$\ln income_{i,t}^{*}(\gamma) = \begin{pmatrix} \ln income_{i,t} - T^{-1}\sum_{t=1}^{T}\ln income_{i,t} I\left(\ln income_{i,t} \le \gamma\right) \\ \ln income_{i,t} - T^{-1}\sum_{t=1}^{T}\ln income_{i,t} I\left(\ln income_{i,t} > \gamma\right) \end{pmatrix}$$ and

$\varepsilon_{i,j,t}^{*} = \varepsilon_{i,j,t} - T^{-1}\sum_{t=1}^{T}\varepsilon_{i,j,t}$, T is a number of years. Therefore, we do transformation of income variable separately before and after the threshold point. For all other variables we use conventional within-transformation.

Then we estimate (3) for different thresholds γ. Finally, we find $\hat{\gamma}$ as the threshold with the minimum residual sum of squares (RSS) from equation (3).

Figure 10 presents our estimations of equation (3) for different thresholds γ. The minimum RSS is at log real income equal to $\hat{\gamma}$=9.0. Using Hansen's methodology,[19] we test the hypothesis of the significance threshold. The test statistic is F1=112.7[20], p-value=0.000. Therefore there are indeed two 'regimes'.[21] We also calculate 95% confidence interval for threshold (Figure 10) and find (8.9, 9).[22]

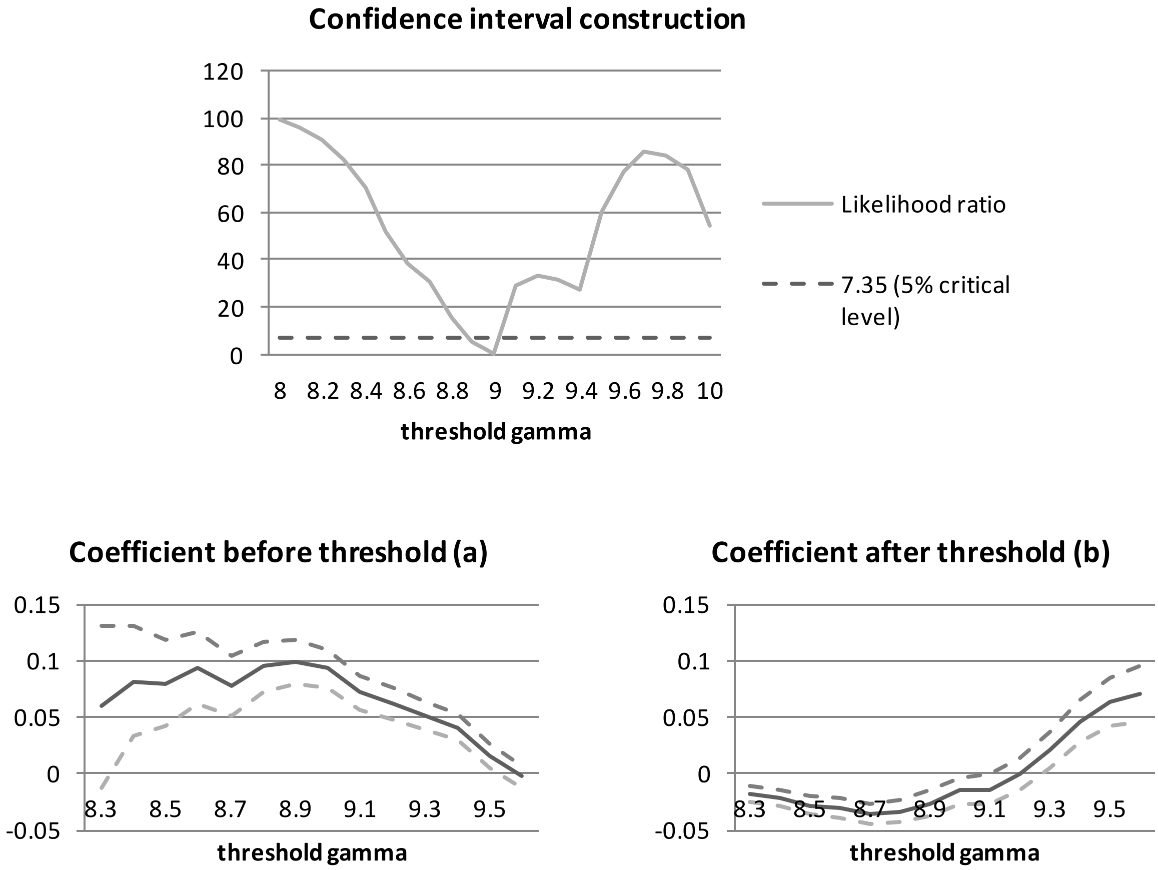
[19] For Hansen procedure we need a balanced panel. There is no price of housing for all regions and all periods. Thus we estimate model without this variable.

[20] Using bootstrap procedure (Hansen, 1999), we calculate 10%, 5%, 1% critical values for likelihood ratio test. They are 63.2, 68.9, and 80.8, correspondingly.

[21] We have also tested hypothesis of two thresholds, however, we did not find significant results.

[22] Confidence interval is defined as a threshold parameter for which likelihood ratio is below the 5% critical value (7.35). This rule and critical value are from Hansen (1999). In our case likelihood ratio is testing null hypothesis that $\gamma = 9$.

Figure 10. Results for regressions with structural break for different threshold levels.



5.3. Semiparametric estimations

In this Section, instead of estimating a quadratic or piecewise-linear relationship between income in the sending region and migration, we use a semiparametric approach. We suppose that there is a parametric form for all variables except income in the sending region and a non-parametric relationship between the income in the sending region and migration:[23]

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[23] Our approach is based on Baltagi and Li, (2002). We use the "xtsemipar" command for Stata written by Libois and Verardi (2012). To perform the non-parametric fit we use B-splines (Newson, 2001). Baltagi and Li (2002) prove that the curve *f* can be estimated by regressing residuals from equation (4) on log income in the sending region using a standard non-parametric regression estimator:

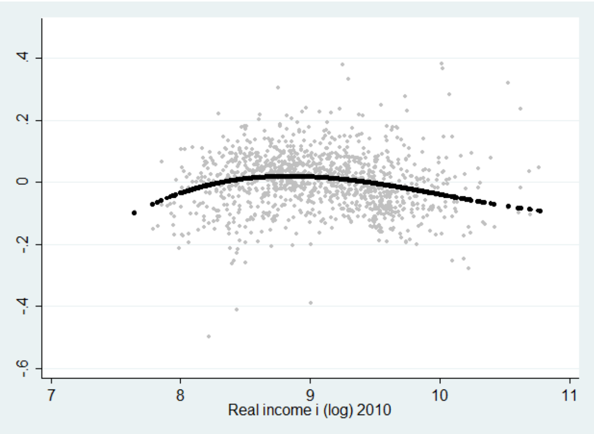
$$\hat{\varepsilon}_{i,j,t} = \ln M_{i,j,t} - \hat{\alpha}_{i,j} - \hat{\varphi} \ln income_{j,t} - \sum_{k \in K} \hat{\gamma}_k \ln X_{k,i,t} - \sum_{k \in K} \hat{\delta}_k \ln X_{k,j,t} - \sum_{t \in T} \hat{\theta}_t year_t$$

To obtain the estimates of the individual fixed effects $\hat{\alpha}_{i,j}$ and regression coefficients, the authors suggest estimate model (4) in first differences using ordinary least squares and approximate first difference of unknown

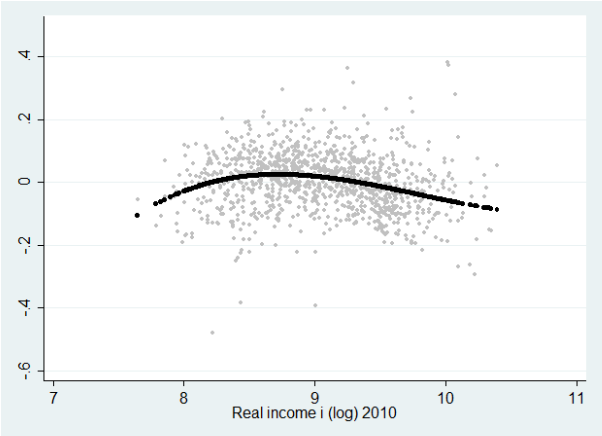
$$\ln M_{i,j,t} = \alpha_{i,j} + f\left(\ln income_{i,t}\right) + \varphi \ln income_{j,t} + \sum_{k\in K} \gamma_k \ln X_{k,i,t} + \sum_{k\in K} \delta_k \ln X_{k,j,t} + \sum_{t\in T} \theta_t year_t + \varepsilon_{i,j,t} \quad (4)$$

Figure 11 presents the results of the semiparametric estimation. Results for all regions and without Moscow and Saint Petersburg are quite similar. The graphs show that the data are generally consistent with the theoretical predictions. If the regions are poor, increase in income results in higher out-migration; for richer regions, further increase in income results in lower migration. The peak is now somewhat lower: it is reached at log income equal to 8.8 (rather than 9.0 as before). The 95% confidence interval for the peak is (8.6, 9.1)[24]. The log real income at 8.8 implies that the average income is equal to exp(8.8)≈6634 in 2010 rubles and 1.12 Russian average subsistence levels in 2010).

Figure 11. Results of semiparametric models. Log migration as a function of log real income in the sending region in 2010 rubles.



a) All regions



b) Without Moscow and Saint Petersburg

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function f by series $p^k\left(\ln income_i\right)$. Here $p^k\left(\ln income_i\right)$ are the first k terms of a sequence of functions $\left(p^1\left(\ln income_i\right), p^2\left(\ln income_i\right)\ldots\right)$.

[24] We calculate confidence interval using bootstrap procedure.

5.4. Robustness checks

To check the robustness of our results we estimate equation (1) for subsamples of close and distant regions. We also estimate the model for different sub-periods (we consider 1996-2000, 2000-05 and 2005-10).

Table 2 shows the results for geographical sub-samples. Columns 1-2 present the results for pairs of regions which are at most 500 kilometers away from each other. We calculate distance between regions as a railway distance between their capitals. If there is no railway connection between the regions' capitals, we calculate the distance by a highway. Columns 3-4 present the results for the pairs of regions which are 500-2000 kilometers away from each other. The results for the "distant" pairs of regions (more than 2000 kilometers away from each other) are presented in columns 5 and 6.

The coefficients at the income at origins show that the poverty traps only exist for large distances (this result is similar to Vakulenko et al., 2011a). For the long-haul migration (more than 2000 kilometers) we find a familiar non-monotonic relationship with a peak at log income equal to 1.087/(2*0.059)=9.2. If income in the sending region is below this level, the impact of income on migration is positive; if income is above this threshold, the slope of the relationship is negative. This relationship is not observed neither for the medium-haul nor for short-haul pairs of regions. For the intermediate distances (500-2000 kilometers) there is no significant relationship. For the close pairs of regions the relationship is actually U-shaped.

Table 2. Results for different distances between regions.[25]

VARIABLES	1 <500 km	2 <500 km With squared income	3 500-2000 km	4 500-2000 km With squared income	5 >2000 km	6 >2000 km With squared income
Population i (log)	1.04***	0.94***	1.49***	1.50***	1.85***	1.92***
	(0.26)	(0.25)	(0.14)	(0.14)	(0.15)	(0.15)
Population j (log)	2.24***	2.22***	1.71***	1.75***	2.24***	2.30***
	(0.24)	(0.24)	(0.14)	(0.14)	(0.14)	(0.14)
Income i (log)	0.12**	-1.61***	0.02	0.19	0.04	1.09***
	(0.05)	(0.39)	(0.03)	(0.22)	(0.03)	(0.23)
Income squared i (log)		0.10***		-0.01		-0.06***
		(0.02)		(0.01)		(0.01)
Income j (log)	0.13**	-0.56	0.19***	0.56**	0.18***	0.92***
	(0.05)	(0.41)	(0.03)	(0.25)	(0.03)	(0.25)
Income squared j (log)		0.04*		-0.02		-0.04***

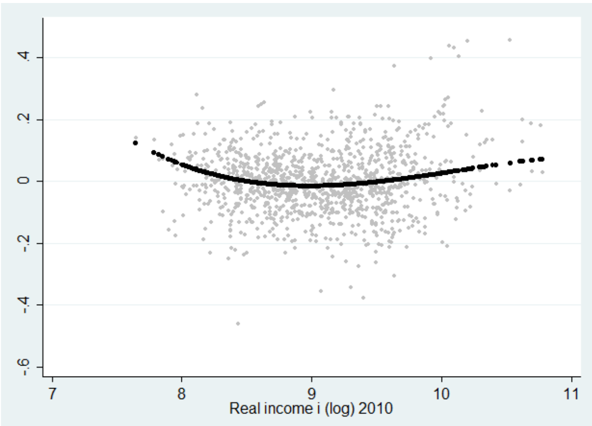
[25] This table contains coefficients only for the selected variables of interest. The full estimation results are in the Online Appendix Table 2.

		(0.02)		(0.01)		(0.01)
Unemployment rate i (log)	0.05**	0.05***	0.08***	0.08***	0.04***	0.03**
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Unemployment rate j (log)	-0.02	-0.02	-0.07***	-0.07***	-0.07***	-0.08***
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	6,246	6,246	31,104	31,104	47,286	47,286
R2-within	0.550	0.556	0.388	0.389	0.276	0.277
Number of pairs	427	427	2,144	2,144	3,356	3,356

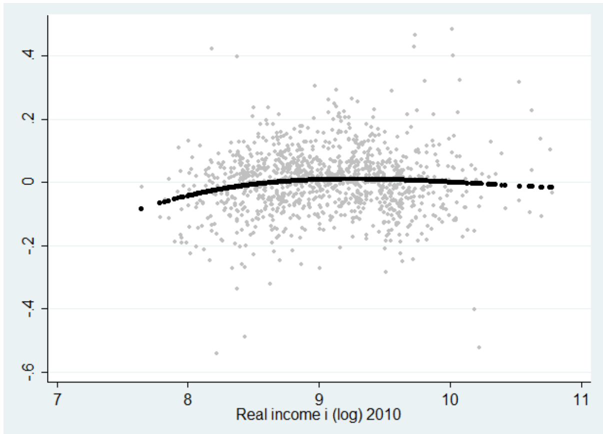
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Semiparametric results for different distances (presented in Figure 12) produce similar results. The peak for distant pairs of regions is 8.8 (in terms of the logarithm of real income).

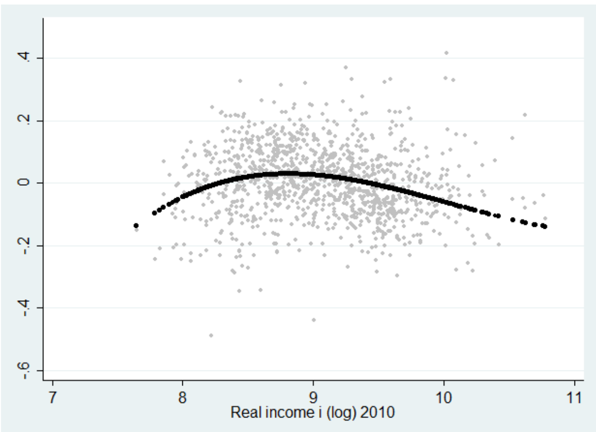
Figure 12. Results of semiparametric model for different distances.



a) Distance <500 km



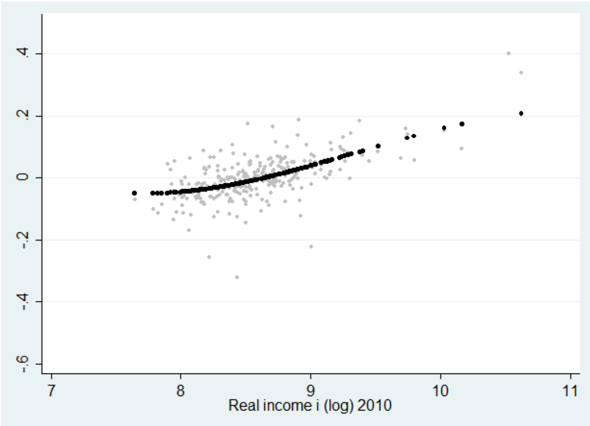
b) Distance 500-2000 km



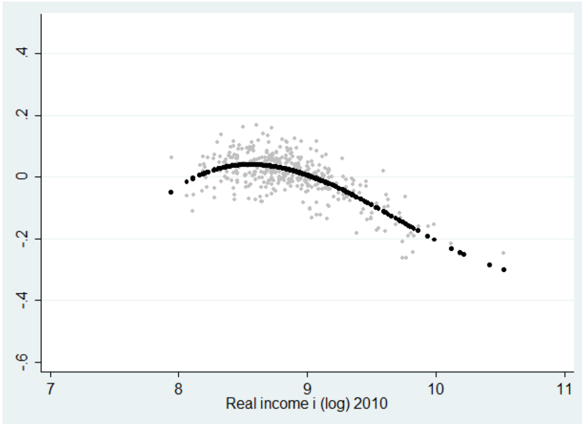
c) Distance >2000 km

We have also checked our results for different subperiods. Figure 13 presents the results for 1990s, early 2000s and late 2000s.[26] The graphs show that in 1990s the semiparametric relationship is increasing (the effect of poverty traps dominates). In early 2000s, there is indeed an inversed U-shaped relationship (consistent with our theory). This relationship disappears in 2005-10. This is not surprising – in 2005-10, incomes in the vast majority of regions are higher than the thresholds identified above.

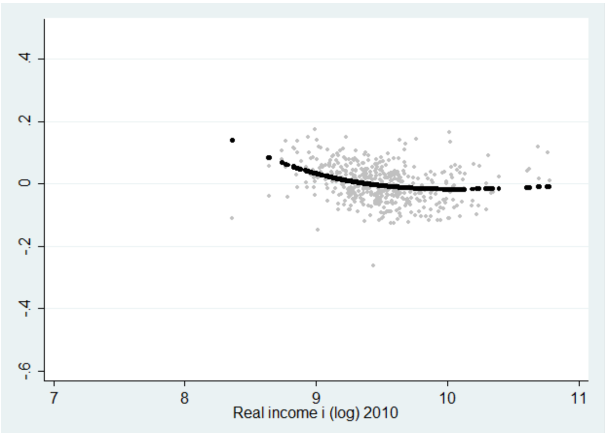
Figure 13. Results of semiparametric model for different subperiods.



a) 1996-1999



b) 2000-04



c) 2005-10

As a robustness check, we also run our main specification with lagged independent variables. The results for one-year and two-year lags are presented in Table 6 and Table 7 in the Online Appendix. It turns out that specifications with lags have much lower explanatory power. Also, in neither specification we find any significant relationship between lagged income (or squared

[26] The regressions with linear and squared terms for these and other subperiods are reported in Table 7 in the Appendix and Table 4 in the Online Appendix . The regressions confirm the absence of poverty traps in the 2005-10 period.

income) in the sending region and migration. This confirms our choice of the contemporaneous specification (1).

We have also estimated a specification where instead of incomes at origin and destination we included only a difference between them (see Table 8 in the Appendix). We do find that the difference between income at destination and income at origin does have a positive effect on migration (this is not trivial given that income at origin alone – because of liquidity constraints – may have a positive effect). We have also added squared difference and found that the coefficient at squared difference is positive. This is consistent with a conjecture that there is a fixed cost of migration and that the financial constraints are binding.

As yet another robustness check, we also estimate a semiparametric model with nonlinear relationships between migration and income in the receiving region. These results are presented in the Figure 16in the Appendix. The growth in income generally results in higher immigration. This is true for regions with logarithm of income higher than 8.3 (4024 in 2010 rubles); only very few region-year are below this threshold in our data.

6. Discussion

In the Table 3 we summarize the estimates of thresholds and peaks of the relationships between the real income in a sending region and intensity of migration. The results of different methods are quite similar.

Table 3. Estimates of peaks of the relationship between income and migration.

N	Model	Peak (in logarithms of monthly real income)	95% confidence interval	Russian rubles 2010 per month
1	Linear and squared income	9.2	(8.7, 10.0)	9897
2	Models with structural break	9.0	(8.9, 9.0)	8103
3	Semiparametric model	8.8	(8.6, 9.1)	6634

In Figure 14, we plot the evolution of percentiles of interregional income distribution over time.[27] Assuming the critical real income being to 9 in log terms (or 8103 rubles in 2010 prices),

[27] See the Online Appendix Figure 1 for the same graph with alternative deflators.

how many regions were locked in poverty traps in each year? It turns out that 89.6% of regions were in a poverty trap in 1995, 84.4% – in 2000, 27.2% – in 2005, and 1.3% (i.e. exactly 1 region, Kalmykia) – in 2010. In other words, the number of regions which are in a poverty trap has decreased substantially during 2000s.

Figure 14. Evolution of distribution of regions by real income.

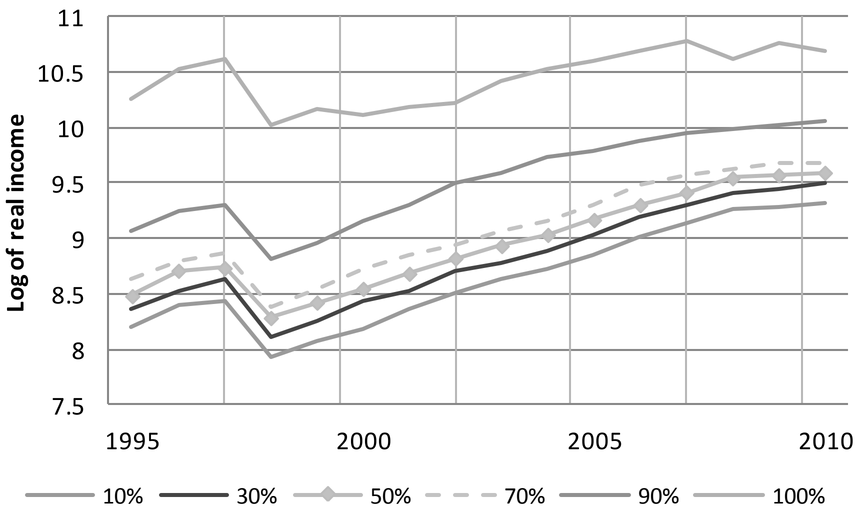
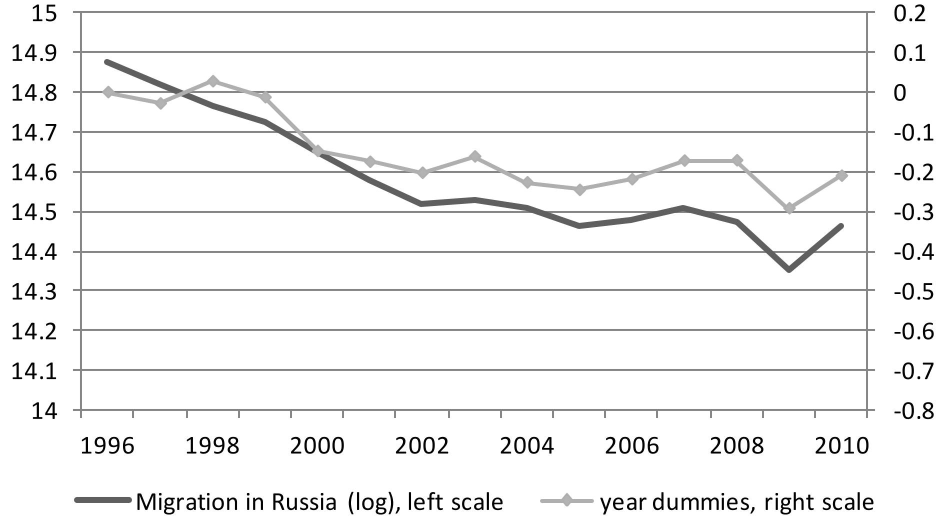


Table 3 implies that while convergence in 1990s was indeed slowed down by poverty traps, the situation changed in 2000s. The overall economic growth let the poor Russian regions "grow out" of their poverty traps. In addition, financial development relaxed liquidity constraints. This brought down an important barrier to labor reallocation across Russian regions and resulted in faster convergence between income and wages in 2000s.

How can this be reconciled with falling migration rates in 2000s? In order to understand this, in Figure 15 we plot the year dummies from the main specification (Table 1, Column 1). We see that there was almost no change in the year dummies in 2000s. This implies that the fall in interregional migration during 2000s was explained precisely by the decreases in interregional differences – and not by some exogenous downward trend in migration (whatever could explain such a downward trend). In this sense, the decrease in migration in 2000s is normal: as the barriers to migrations decreased and wages and incomes converged, the number of actual migrants also fell as the incentives to migrations are no longer as high as they used to be.

Figure 15. Evolution of migration over time: internal migration in Russia in 1996–2010 and time dummies in the main regression.



Also, once we compare Russian migration rates to migration rates in other countries (Table 4), we see the interregional migration in Russia comparable to that in the EU-27 (while still much lower than in other countries). However, it is difficult to compare the results of internal migration within countries where methodologies, definitions of migration, sources of data and sizes of regions are different.

Table 4. Migration rates in Russia and in other countries (interregional migration), % of population.[28]

Country	Average migration rates	Population (in thousands)	Area (km^2)	Average distance between regions (km)
Russia	0.6	1 826	218 961	3 626
USA	2.3	5 784	179 646	2 275
EU (27)	0.4	2 627	24 281	1 970
New Zealand	9.9	228	16 408	473
Japan	2.1	2 717	8 040	451

28 Source: authors calculations, http://gks.ru Rosstat Russia, http://www.e-stat.go.jp Portal Site of Official Statistics of Japan http://www.stats.govt.nz Statistics New Zealand, http://www.census.gov/ United States Census Bureau, interstate migration. http://epp.eurostat.ec.europa.eu Eurostat, www.statcan.gc.ca Statistics Canada, http://www.stats.gov.cn National Bureau Statistics of China Data for different countries are available for different time periods: Russia (2000-2010), USA (2000-2008), EU 27 (2002-2007), New Zealand (2001, 2006), Japan (2000-2010), Canada (2006), China (2010). Distances are distances between capitals of subnational units (in case of EU we take NUTS2); the distances are calculated using Yu (2009)'s SPATDWM and CHINA_SPATDWM Stata modules for US and China. For Japan, we use http://distancecalculator.globefeed.com/japan_distance_calculator.asp, for Canada, we use http://gocanada.about.com/library/bl_canadadistances.htm, for New Zealand http://www.tourism.net.nz/new-zealand/about-new-zealand/driving.html. For Europe we use Mayer and Zignago (2011) methodology. We consider 78 Russian regions. For the US, we only take 48 continental states.

Canada	2.9	2 575	699 500	3 225
China	3.0	40 103	284 070	1 470

7. Financial development

In this section we expand the main specification (1) adding proxies for financial development such as loans to firms, households and mortgage debt as a percent of GDP. As the data on loans to firms and households are available only since 2001 and data of mortgage debts only start since 2004, the time span in this section is much shorter.

Table 5 presents regressions with the ratio of loans to households to GDP (the regressions with alternative measures of financial development are provide in the Table 6 in Online Appendix; the results are similar).

We find that – consistent with our theory – that financial development results in higher outward migration. Moreover, the coefficient at the interaction term between financial development and income is negative. In other words, if this region is more financially developed, liquidity constraints are less binding as a barrier for migration – the outgoing migration is less positively linked to income in the sending region.

We also run regressions with squared income and interaction of financial development and interaction with squared income. Again, consistent with the theory, we find that in the regions with higher level of financial development the coefficient at squared income is more positive (i.e. is closer to zero); therefore in more financially developed regions the non-monotonic relationship between income and migration is less likely to be observed.

Table 5. Regressions with financial development.

VARIABLES	1 Main	2 With squared income	3 Without Moscow and Saint Petersburg	4 Without Moscow and St Petersburg, w/ sq. income
Population i (log)	1.40***	1.33***	1.50***	1.39***
	(0.15)	(0.15)	(0.17)	(0.17)
Population j (log)	2.37***	2.41***	2.10***	2.16***
	(0.14)	(0.14)	(0.16)	(0.16)
Income i (log)	-0.03	-4.14***	-0.03	-5.58***
	(0.05)	(0.84)	(0.05)	(0.95)
Income squared i (log)		0.22***		0.29***
		(0.04)		(0.05)
Income*loans i (log)	-0.02**	-0.63***	-0.02**	-0.89***
	(0.01)	(0.19)	(0.01)	(0.21)
Income squared*loans i (log)		0.03***		0.04***
		(0.01)		(0.01)
Loans i (log)	0.16**	3.13***	0.14*	4.32***
	(0.08)	(0.88)	(0.08)	(0.98)
Income j (log)	0.06	1.35*	0.11**	2.45***
	(0.05)	(0.78)	(0.05)	(0.87)
Income squared j (log)		-0.07*		-0.13***
		(0.04)		(0.05)
Income*loans j (log)	-0.01	0.34*	-0.01	0.83***
	(0.01)	(0.18)	(0.01)	(0.21)
Income squared*loans j (log)		-0.02*		-0.05***
		(0.01)		(0.01)
Loans j (log)	0.11	-1.47*	0.06	-3.69***
	(0.07)	(0.83)	(0.08)	(0.95)
Gini (log) i	-0.09	-0.03	-0.05	-0.02
	(0.08)	(0.09)	(0.10)	(0.10)
Gini (log) j	-0.21**	-0.25***	-0.36***	-0.45***
	(0.09)	(0.09)	(0.10)	(0.10)
Unemployment rate (log) i	0.03***	0.03***	0.03***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
Unemployment rate (log) j	-0.05***	-0.05***	-0.06***	-0.06***
	(0.01)	(0.01)	(0.01)	(0.01)
Housing price i (log)	-0.03**	-0.03**	-0.03*	-0.03*
	(0.02)	(0.02)	(0.02)	(0.02)
Housing price j (log)	0.06***	0.06***	0.05***	0.05***
	(0.02)	(0.02)	(0.02)	(0.02)
Provision of housing i (log)	0.53***	0.44***	0.56***	0.43**
	(0.16)	(0.16)	(0.17)	(0.17)
Provision of housing j (log)	0.39***	0.41***	0.40***	0.43***
	(0.14)	(0.14)	(0.15)	(0.15)
New flats (moving average, log) i	-0.05***	-0.04***	-0.05***	-0.04***

	(0.01)	(0.01)	(0.01)	(0.01)
New flats (moving average log) j	0.05***	0.04***	0.05***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)
Life expectancy (log) i	0.70**	0.75***	0.69**	0.74***
	(0.27)	(0.27)	(0.28)	(0.28)
Life expectancy (log) j	-1.50***	-1.55***	-1.17***	-1.20***
	(0.26)	(0.25)	(0.26)	(0.26)
Infant mortality rate (log) i	0.06***	0.07***	0.06***	0.06***
	(0.02)	(0.02)	(0.02)	(0.02)
Infant mortality rate (log) j	-0.07***	-0.07***	-0.07***	-0.06***
	(0.02)	(0.02)	(0.02)	(0.02)
Year dummies included[29]	Yes	Yes	Yes	Yes
Public goods included	Yes	Yes	Yes	Yes
Observations	58,223	58,223	55,211	55,211
R2-within	0.104	0.105	0.104	0.106
Number of pairs	5,929	5,929	5,625	5,625

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

8. Concluding remarks

In this paper, we analyze interregional migration in Russia. We use panel data for gross region-to-region migration flows for 1995-2010. We control for region-to-region pair-wise fixed effects and for time fixed effects which allows us to control for macroeconomic conditions and for time-invariant geographical, cultural, religious, ethno-linguistic legacies and pair-wise affinities that may affect region-to-region migration. This allows us to concentrate on the impact of incomes, unemployment rates, public goods, and development of financial and real estate markets.

Our parametric and semi-parametric regressions show that barriers to labor mobility decreased substantially (or even disappeared) in 2000s. In 1990s, labor mobility from poor to rich regions was slowed down by financial constraints. The migrants from poor regions were willing to move but—because of the underdevelopment of financial and real estate markets—they were not able to move. Our results shows that in these regions the increase in income resulted in higher (rather than lower) outward migration – increase in income allowed breaking out of the poverty traps. Using several parametric and semiparametric specifications we identify the critical threshold of income that allowed for overcoming liquidity constraints. While in 1990s tens of regions were below this threshold (and therefore were locked in the poverty trap), by

[29] Coefficients at the year dummies and public goods are in the Table 5 in the Online Appendix.

2010 only one (small) region was below the threshold. In this sense, overall economic growth allowed Russian regions to overcome liquidity constraints through simply growing out of the poverty traps. We run additional tests to show that financial development has also contributed to relaxing liquidity constraints.

Lowering barriers to labor mobility resulted in convergence in wages and incomes which was followed by a reduction of the labor mobility per se. Interregional migration rates have gone down in 2000s. We show that this reduction is explained by lower interregional differences (and therefore lower incentives to migrate).

The convergence in wages and incomes was not accompanied with convergence in GDP per capita. As we show in Guriev and Vakulenko (2012), interregional dispersions in GDP per capita remain high not only by European standards but also by standards of less developed countries. The only way to reconcile convergence in wages and incomes and non-convergence in per capita GDP is as follows. While there is a functioning market for geographical reallocation of labor and capital,[30] Russian regions still differ substantially in terms of total factor productivity. These differences may be explained either by (i) geographical factors, (ii) productivity of inherited capital stock, or (iii) political and economic institutions. The geographical factors are exogenous and cannot be changed, while the role of inherited capital stock will continue to decrease over time due to capital reallocation. Institutional factors are endogenous to changes in political system and in federalism. We do not have data to distinguish between these three explanations. Such analysis would require detailed data on capital stock and panel data on investment and business climate.

What are the policy implications of our analysis? One important result is that, in order to ensure interregional convergence in incomes and wages, one does not need convergence in GDP per capita. As long as barriers to labor and capital mobility are removed, mobility (or even a threat of mobility) protects workers. Therefore – if the government's objective is to reduce inequality in living standards – the very fact of remaining large interregional dispersion in GDP per capita should not serve as a justification for government intervention (e.g. region-specific government investment).

As reducing barriers to mobility is important for convergence in incomes, this is exactly where the policies can contribute the most. Developing financial and housing markets and improving investor protection is the best policy to reduce interregional differences in income. These factors have already reduced income differentials among Russian regions; further progress should be encouraged.

We should however provide an important caveat. Our analysis is done at the regional level. We therefore do not address the sub-regional level and have nothing to say on the need for town-level government interventions. There may well be many cases where individual towns (e.g. so

[30] See Guriev and Vakulenko (2012) for the evidence on capital mobility between Russian regions.

called mono-towns) are locked in poverty traps. In those cases government intervention may be justified and desirable. Our results show that poverty traps did exist in Russia in 1990s at the regional level. These may well still exist at the town level even now.[31] We cannot extrapolate the quantitative value of the income threshold we identified for the poverty traps from regional to town level but our analysis provides very clear qualitative criteria for government intervention. If the average citizen of a town would benefit from moving out but cannot finance the move (e.g. because his/her real estate is worthless) then government can and should step in through supporting financial intermediaries that can finance the move.

[31] We are not aware of the studies of internal migration in Russia that use nationwide town-level data. However, Vakulenko (2012) who studies town-level migration in 2004-08 in Central Russia (307 towns) and Siberia (127 towns), finds the evidence of existence of poverty traps in Siberia. Similarly, Vakulenko et al. (2011b) study municipality-level migration in three Russian regions (Altai, Chuvashia, and Perm – with 67, 24, 47 municipalities, respectively) in 2003-09, find the presence of poverty traps in Altai and Perm.

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10. Appendix

Table 6. Summary statistics of the variables.

Variable	Definition	Years available	Obs	Mean	Std. Dev.	Min	Max
Migration	Number of people migrated from one region to another in a given year	1995-2010	97344	363.13	2313.11	0.5	67520
Migration (log)	Logarithm of migration	1995-2010	97344	3.91	1.74	-0.69	11.12
Population	Average population per year	1995-2010	97344	1838781	1606615	49056	11500000
Income	Income per capita to subsidence level	1995-2010	97344	2.00	0.79	0.71	6.45
Income (log)	Log of Income per capita to subsidence level	1995-2010	97344	0.63	0.36	-0.34	1.86
Real income	Income per capita (2010 prices)	1995-2010	96096	9602.50	5955.797	2092.72	47747.7
Real income (log)	Log of Income per capita (2010 prices)	1995-2010	96096	9.01	0.550	7.646	10.77
Wage	Wage to subsidence level	1995-2010	91104	2.32	0.82	0.71	7.84
Wage (log)	Log of wage to subsidence level	1995-2010	91104	0.79	0.34	-0.34	2.06
GDP	Real GDP per capita	1996-2010	85176	11011.0	9393.81	1577.72	97736.71
Poverty	Share of population with money income below subsistence level %	1995-2010	96486	26.87	12.51	8.1	77.9
Gini	Gini coefficient (measure of inequality in a region)	1995-2010	96564	0.36	0.05	0.23	0.62
Fund coefficient	Income ratio of 10% rich population to 10% poor population	1995-2010	96564	11.64	4.62	4.5	49.1
Unemployment rate	Unemployment rate ILO	1995-2010	97344	10.11	4.64	0	32.4
Housing price	Price per square meter deflated by CPI	1996-2010	87828	29234.7	16878.16	4541.54	186018.8
Provision of housing	Availability of dwellings per capita in square meters	1995-2010	97344	20.40	2.84	12.1	31.5
New flats	New flats constructed	1995-2010	97344	30.81	16.44	0.90	122.42
Life expectancy	Life expectancy at birth	1995-2010	97344	65.49	2.88	53.76	74.37

Infant mortality rate	Number of deaths of children under 1 year per 1,000 newborn per year	1995-2010	97344	13.59	5.02	4.28	42.1
Doctors	Number of doctors per 10,000 population	1995-2010	97344	45.69	10.37	27	87.4
Hospital beds	Number of hospital beds per 10,000 population	1995-2010	97344	120.05	23.43	68.1	252.4
Telephones	Number of telephone lines per 100 households	1995-2010	97344	204.09	73.41	42.9	420.4
Highway density	Highway density per 1,000 square km	1995-2010	97344	120.59	98.23	0.8	670
Buses	Number of busses per 100,000 population	1995-2010	97188	62.09	26.26	1	153
Share of young	Share of people less than working-age	1995-2010	97344	19.16	4.09	12.3	35.8
Share of old	Share of people greater than working-age	1995-2010	97344	19.89	4.38	5.2	27.4
Students	Number of students per 10,000 population	1995-2010	97344	334.686	174.3048	0	1256.25
Women	Relation of women to 1,000 men	1995-2010	97344	1137.47	61.69	901	1249
Homicides	Number of reported homicides and attempts to murder	1995-2010	97344	348.42	300.84	7	1749
Mobile telephones	Number of registered mobile phones, thousand	2000-2010	65442	1808.09	4228.42	0.1	39688.8
Urban	Towns residents %	1995-2010	97344	69.33	12.50	23.6	100
Loans to households	Loans to households with respect to GDP	2001-2010	60294	0.061	0.054	0.001	0.267
Loans to firms	Loans to firms with respect to GDP	2001-2010	60684	0.137	0.176	0.007	3.064
Mortgage debt	Mortgage debt with respect to GDP	2004-2010	42432	0.019	0.017	0.000	0.083

Table 7. Results for different time periods[32].

VARIABLES	1 1996-2000	2 1996-2000 With squared income	3 2000-2005	4 2000-2005 With squared income	5 2005-2010 With squared income	6 2005-2010 With squared income
Population i (log)	2.20***	2.23***	2.04***	2.16***	0.97***	0.93***
	(0.31)	(0.32)	(0.31)	(0.32)	(0.21)	(0.21)
Population j (log)	1.22***	1.23***	0.84***	0.94***	2.19***	2.26***
	(0.30)	(0.30)	(0.30)	(0.31)	(0.19)	(0.20)
Income i (log)	0.002	-0.86***	0.04	1.01***	-0.005	-0.72
	(0.05)	(0.25)	(0.04)	(0.33)	(0.05)	(0.67)
Income squared i (log)		0.05***		-0.06***		0.04
		(0.01)		(0.02)		(0.04)
Income j (log)	-0.13***	-0.57**	0.02	0.85**	-0.01	1.11*
	(0.04)	(0.24)	(0.05)	(0.33)	(0.05)	(0.67)
Income squared j (log)		0.03*		-0.05**		-0.06*
		(0.01)		(0.02)		(0.03)
Unemployment rate i (log)	0.05***	0.04***	-0.01	-0.01	0.03**	0.03**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)
Unemployment rate j (log)	-0.04**	-0.04**	-0.01	-0.02	-0.02*	-0.02*
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)
Observations	25,376	25,376	35,270	35,270	35,574	35,574
R2-within	0.159	0.160	0.105	0.105	0.040	0.040
Number of pairs	5,625	5,625	5,929	5,929	5,929	5,929

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8. Results of regressions with difference between incomes at origin and destination. Dependent variable: log migration.

VARIABLES	1 With difference in incomes	2 With difference in incomes and squares	3 With difference in income and income in origin	4 With difference in income and income in origin and squares
Population i (log)	1.83***	1.84***	1.75***	1.81***
	(0.10)	(0.10)	(0.10)	(0.10)

[32] We present only part of results in this section. The full estimation results are in the Online Appendix Table 3.

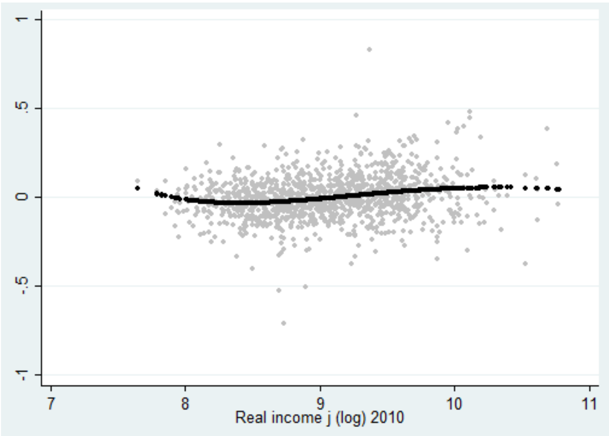
Population j (log)	2.05***	2.05***	1.96***	1.97***
	(0.10)	(0.10)	(0.10)	(0.10)
Ln(income)j – ln(income)i	0.07***	0.07***	0.18***	0.17***
	(0.02)	(0.02)	(0.02)	(0.02)
(Ln(income)j – ln(income)i)^2		0.05***		0.05***
		(0.01)		(0.01)
Income i (log)			0.21***	0.96***
			(0.03)	(0.16)
Income squared i (log)				-0.04***
				(0.01)
Gini i (log)	-0.01	-0.02	-0.08*	-0.10**
	(0.04)	(0.04)	(0.04)	(0.04)
Gini j (log)	-0.05	-0.06	-0.12***	-0.14***
	(0.04)	(0.04)	(0.04)	(0.04)
Unemployment rate I (log)	0.06***	0.06***	0.06***	0.06***
	(0.01)	(0.01)	(0.01)	(0.01)
Unemployment rate j (log)	-0.07***	-0.07***	-0.07***	-0.07***
	(0.01)	(0.01)	(0.01)	(0.01)
Real housing price i (log)	-0.05***	-0.05***	-0.05***	-0.05***
	(0.01)	(0.01)	(0.01)	(0.01)
Real housing price j (log)	0.05***	0.05***	0.05***	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)
Housing availability i (log)	0.46***	0.41***	0.41***	0.35***
	(0.08)	(0.08)	(0.08)	(0.08)
Housing availability j (log)	0.67***	0.62***	0.62***	0.57***
	(0.08)	(0.08)	(0.08)	(0.08)
New flats i (moving average, log)	-0.01	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)
New flats j (moving average log)	-0.00	-0.00	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Life expectancy i (log)	-0.05	-0.05	-0.05	-0.08
	(0.20)	(0.20)	(0.20)	(0.20)
Life expectancy j (log)	-0.56***	-0.56***	-0.56***	-0.56***
	(0.19)	(0.19)	(0.19)	(0.19)
Infant mortality rate i (log)	0.04***	0.04***	0.04***	0.04**
	(0.01)	(0.01)	(0.01)	(0.01)
Infant mortality rate j (log)	-0.08***	-0.08***	-0.08***	-0.08***
	(0.02)	(0.02)	(0.02)	(0.02)
Doctors i (log)	0.08	0.08	0.08	0.13**
	(0.06)	(0.06)	(0.06)	(0.06)
Doctors j (log)	0.17***	0.17***	0.17***	0.17***
	(0.06)	(0.06)	(0.06)	(0.06)
Hospital beds i (log)	0.06	0.05	0.04	0.03
	(0.04)	(0.04)	(0.04)	(0.04)
Hospital beds j (log)	0.32***	0.32***	0.31***	0.30***
	(0.04)	(0.04)	(0.04)	(0.04)

Telephones i (log)	-0.00	-0.01	-0.01	-0.04
	(0.03)	(0.03)	(0.03)	(0.03)
Telephones j (log)	-0.15***	-0.16***	-0.16***	-0.17***
	(0.03)	(0.03)	(0.03)	(0.03)
Highway density i (log)	0.03*	0.03*	0.04**	0.04**
	(0.02)	(0.02)	(0.02)	(0.02)
Highway density j (log)	-0.01	-0.01	-0.003	-0.002
	(0.02)	(0.02)	(0.02)	(0.02)
Buses i (log)	0.02***	0.03***	0.03***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
Buses j (log)	-0.02**	-0.02*	-0.02*	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Share of young i, t-1	-0.02***	-0.02***	-0.02***	-0.01***
	(0.01)	(0.01)	(0.01)	(0.01)
Share of young j, t-1	0.05***	0.05***	0.06***	0.06***
	(0.01)	(0.01)	(0.01)	(0.01)
Share of old i, t-1	-0.05***	-0.05***	-0.05***	-0.04***
	(0.004)	(0.004)	(0.004)	(0.004)
Share of old j, t-1	0.02***	0.02***	0.02***	0.03***
	(0.004)	(0.004)	(0.004)	(0.004)
Students i (log), t-1	-0.08***	-0.08***	-0.08***	-0.07***
	(0.01)	(0.01)	(0.01)	(0.01)
Students j (log), t-1	0.10***	0.10***	0.10***	0.10***
	(0.01)	(0.01)	(0.01)	(0.01)
Women i (log), t-1	0.55**	0.36	0.47**	0.31
	(0.23)	(0.24)	(0.23)	(0.23)
Women j (log), t-1	-2.98***	-3.17***	-3.06***	-3.24***
	(0.22)	(0.23)	(0.22)	(0.23)
year1997	-0.02*	-0.01	-0.03***	-0.02*
	(0.01)	(0.01)	(0.01)	(0.01)
year1998	-0.06***	-0.06***	0.03	0.05**
	(0.01)	(0.01)	(0.02)	(0.02)
year1999	-0.07***	-0.06***	-0.01	0.01
	(0.02)	(0.02)	(0.02)	(0.02)
year2000	-0.18***	-0.17***	-0.15***	-0.12***
	(0.02)	(0.02)	(0.02)	(0.02)
year2001	-0.20***	-0.18***	-0.18***	-0.12***
	(0.03)	(0.03)	(0.03)	(0.03)
year2002	-0.21***	-0.18***	-0.20***	-0.14***
	(0.04)	(0.04)	(0.04)	(0.04)
year2003	-0.15***	-0.11**	-0.16***	-0.08
	(0.05)	(0.05)	(0.05)	(0.05)
year2004	-0.21***	-0.16***	-0.23***	-0.13**
	(0.05)	(0.05)	(0.05)	(0.05)
year2005	-0.21***	-0.15***	-0.25***	-0.13**
	(0.06)	(0.06)	(0.06)	(0.06)
year2006	-0.15**	-0.10	-0.22***	-0.09
	(0.06)	(0.06)	(0.06)	(0.07)

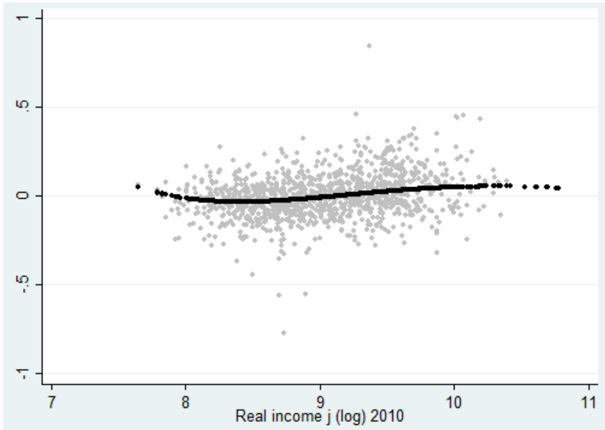
year2007	-0.09	-0.03	-0.17***	-0.04
	(0.07)	(0.07)	(0.07)	(0.07)
year2008	-0.07	-0.01	-0.17**	-0.03
	(0.07)	(0.07)	(0.07)	(0.07)
year2009	-0.18***	-0.12*	-0.29***	-0.15**
	(0.07)	(0.07)	(0.07)	(0.07)
year2010	-0.09	-0.03	-0.21***	-0.07
	(0.07)	(0.07)	(0.07)	(0.07)
Observations	84,666	84,666	84,666	84,666
R2-within	0.307	0.308	0.308	0.309
Number of pairs	5,929	5,929	5,929	5,929

Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

Figure 16. Results of semiparametric regression models for receiving regions.



a) All regions



b) Without Moscow and Saint Petersburg

Online Appendix

Table 1. Results of regressions with and without squared terms. Dependent variable: log migration.

	1	2	3	4
VARIABLES	Main	Squared income	Without Moscow and Saint-Petersburg	Without Moscow and Saint Petersburg, squared income
Population i (log)	1.750***	1.802***	1.572***	1.633***
	(0.099)	(0.098)	(0.109)	(0.111)
Population j (log)	1.964***	2.002***	1.737***	1.734***
	(0.096)	(0.096)	(0.104)	(0.107)
Income i (log)	0.035	0.758***	-0.027	0.450**
	(0.023)	(0.157)	(0.024)	(0.192)
Income squared i (log)		-0.041***		-0.027**
		(0.009)		(0.011)
Income j (log)	0.175***	0.696***	0.169***	0.148
	(0.023)	(0.169)	(0.025)	(0.205)
Income squared j (log)		-0.029***		0.001
		(0.010)		(0.012)
Gini i (log)	-0.084*	-0.082*	-0.093**	-0.092**
	(0.043)	(0.043)	(0.047)	(0.047)
Gini j (log)	-0.124***	-0.123***	-0.143***	-0.143***
	(0.042)	(0.042)	(0.046)	(0.046)
Unemployment rate I (log)	0.062***	0.059***	0.037***	0.036***
	(0.009)	(0.009)	(0.009)	(0.009)
Unemployment rate j (log)	-0.069***	-0.071***	-0.072***	-0.072***
	(0.009)	(0.009)	(0.009)	(0.009)
Housing price i (log)	-0.051***	-0.050***	-0.048***	-0.048***
	(0.011)	(0.011)	(0.012)	(0.012)
Housing price j (log)	0.047***	0.049***	0.055***	0.055***
	(0.011)	(0.011)	(0.011)	(0.011)
Provision of housing i (log)	0.409***	0.404***	0.147*	0.155*
	(0.082)	(0.083)	(0.087)	(0.088)
Provision of housing j (log)	0.617***	0.613***	0.608***	0.608***
	(0.082)	(0.083)	(0.086)	(0.086)
New flats i (moving average, log)	-0.010	-0.005	0.010	0.013
	(0.009)	(0.009)	(0.010)	(0.010)
New flats j (moving average log)	-0.006	-0.002	-0.012	-0.012
	(0.009)	(0.009)	(0.009)	(0.009)
Life expectancy i (log)	-0.047	-0.082	0.096	0.067
	(0.201)	(0.201)	(0.208)	(0.208)
Life expectancy j (log)	-0.556***	-0.581***	-0.363*	-0.361*
	(0.191)	(0.191)	(0.199)	(0.199)
Infant mortality rate i (log)	0.039***	0.037**	0.029*	0.028*
	(0.015)	(0.015)	(0.015)	(0.015)
Infant mortality rate j (log)	-0.082***	-0.084***	-0.077***	-0.077***
	(0.016)	(0.016)	(0.016)	(0.016)
Doctors i (log)	0.077	0.121**	0.125**	0.147**
	(0.059)	(0.061)	(0.061)	(0.062)
Doctors j (log)	0.169***	0.200***	0.194***	0.193***
	(0.056)	(0.057)	(0.057)	(0.058)
Hospital beds i (log)	0.043	0.036	-0.002	-0.003
	(0.039)	(0.039)	(0.040)	(0.040)
Hospital beds j (log)	0.311***	0.306***	0.271***	0.271***
	(0.039)	(0.039)	(0.040)	(0.040)
Telephones i (log)	-0.010	-0.035	-0.091***	-0.101***
	(0.026)	(0.026)	(0.027)	(0.028)
Telephones j (log)	-0.163***	-0.180***	-0.154***	-0.154***
	(0.025)	(0.026)	(0.029)	(0.029)
Highway density i (log)	0.037**	0.037**	0.034*	0.034*
	(0.018)	(0.018)	(0.018)	(0.018)

Highway density j (log)	-0.003	-0.003	0.026	0.026
	(0.018)	(0.018)	(0.019)	(0.019)
Buses i (log)	0.027***	0.028***	0.033***	0.033***
	(0.007)	(0.007)	(0.007)	(0.007)
Buses j (log)	-0.015*	-0.015*	-0.027***	-0.027***
	(0.009)	(0.008)	(0.009)	(0.009)
Share of young i, t-1	-0.022***	-0.015***	-0.025***	-0.020***
	(0.005)	(0.005)	(0.006)	(0.006)
Share of young j, t-1	0.056***	0.061***	0.051***	0.050***
	(0.005)	(0.005)	(0.006)	(0.006)
Share of old i, t-1	-0.050***	-0.042***	-0.041***	-0.037***
	(0.004)	(0.004)	(0.004)	(0.005)
Share of old j, t-1	0.023***	0.028***	0.020***	0.020***
	(0.004)	(0.005)	(0.005)	(0.005)
Students i (log), t-1	-0.077***	-0.074***	-0.085***	-0.082***
	(0.009)	(0.009)	(0.009)	(0.009)
Students j (log), t-1	0.102***	0.104***	0.111***	0.111***
	(0.011)	(0.011)	(0.011)	(0.011)
Women i (log), t-1	0.469**	0.497**	-1.387***	-1.223***
	(0.229)	(0.224)	(0.286)	(0.293)
Women j (log), t-1	-3.058***	-3.038***	-3.725***	-3.732***
	(0.216)	(0.212)	(0.290)	(0.299)
year1997	-0.029***	-0.020**	-0.017	-0.014
	(0.010)	(0.010)	(0.011)	(0.011)
year1998	0.027	0.064***	0.004	0.019
	(0.020)	(0.020)	(0.022)	(0.022)
year1999	-0.013	0.020	-0.015	-0.002
	(0.020)	(0.021)	(0.022)	(0.023)
year2000	-0.148***	-0.112***	-0.144***	-0.131***
	(0.025)	(0.025)	(0.027)	(0.027)
year2001	-0.175***	-0.124***	-0.123***	-0.106***
	(0.032)	(0.032)	(0.036)	(0.036)
year2002	-0.203***	-0.144***	-0.130***	-0.112***
	(0.038)	(0.038)	(0.043)	(0.043)
year2003	-0.162***	-0.086*	-0.062	-0.039
	(0.045)	(0.046)	(0.052)	(0.052)
year2004	-0.227***	-0.136***	-0.119**	-0.091
	(0.051)	(0.052)	(0.058)	(0.059)
year2005	-0.246***	-0.142**	-0.123*	-0.091
	(0.056)	(0.058)	(0.064)	(0.065)
year2006	-0.219***	-0.103	-0.099	-0.062
	(0.062)	(0.064)	(0.070)	(0.072)
year2007	-0.172***	-0.050	-0.056	-0.017
	(0.066)	(0.068)	(0.075)	(0.076)
year2008	-0.172**	-0.045	-0.061	-0.019
	(0.069)	(0.071)	(0.078)	(0.079)
year2009	-0.292***	-0.165**	-0.177**	-0.135*
	(0.069)	(0.071)	(0.078)	(0.080)
year2010	-0.210***	-0.090	-0.101	-0.061
	(0.070)	(0.071)	(0.079)	(0.080)
Observations	84,666	84,666	80,222	80,222
R2-within	0.308	0.308	0.309	0.310
Number of pairs	5,929	5,929	5,625	5,625

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2. Results for different distances between pairs of regions (migration model).

	1	2	3	4	5	6
VARIABLES	<500 km	<500 km With squared income	500-2000 km	500-2000 km With squared income	>2000 km	>2000 km With squared income
Population i (log)	1.041***	0.940***	1.488***	1.497***	1.846***	1.921***
	(0.257)	(0.252)	(0.144)	(0.142)	(0.148)	(0.147)
Population j (log)	2.244***	2.217***	1.714***	1.745***	2.242***	2.297***
	(0.241)	(0.240)	(0.142)	(0.144)	(0.144)	(0.143)
Income i (log)	0.124**	-1.610***	0.016	0.187	0.041	1.087***
	(0.052)	(0.392)	(0.033)	(0.221)	(0.032)	(0.235)
Income squared i (log)		0.098***		-0.010		-0.059***
		(0.022)		(0.012)		(0.013)
Income j (log)	0.130**	-0.556	0.190***	0.560**	0.178***	0.919***
	(0.052)	(0.410)	(0.032)	(0.247)	(0.032)	(0.250)
Income squared j (log)		0.039*		-0.021		-0.042***
		(0.023)		(0.014)		(0.014)
Gini i (log)	-0.174**	-0.157*	-0.008	-0.012	-0.182***	-0.164***
	(0.085)	(0.087)	(0.061)	(0.061)	(0.064)	(0.063)
Gini j (log)	-0.046	-0.050	-0.149**	-0.156***	-0.152**	-0.138**
	(0.087)	(0.087)	(0.059)	(0.059)	(0.063)	(0.063)
Unemployment rate I (log)	0.048**	0.048***	0.082***	0.082***	0.041***	0.035**
	(0.019)	(0.018)	(0.012)	(0.012)	(0.014)	(0.014)
Unemployment rate j (log)	-0.020	-0.018	-0.068***	-0.069***	-0.073***	-0.077***
	(0.019)	(0.018)	(0.012)	(0.012)	(0.014)	(0.014)
Housing price i (log)	-0.002	-0.004	0.004	0.005	-0.076***	-0.074***
	(0.025)	(0.024)	(0.014)	(0.014)	(0.016)	(0.016)
Housing price j (log)	0.037	0.032	0.064***	0.064***	0.045***	0.046***
	(0.025)	(0.024)	(0.015)	(0.015)	(0.015)	(0.015)
Provision of housing i (log)	0.548***	0.531***	0.588***	0.590***	0.256**	0.237**
	(0.181)	(0.172)	(0.127)	(0.127)	(0.117)	(0.117)
Provision of housing j (log)	0.895***	0.917***	0.894***	0.898***	0.468***	0.453***
	(0.160)	(0.157)	(0.129)	(0.130)	(0.111)	(0.111)
New flats i (moving average, log)	-0.113***	-0.129***	-0.060***	-0.059***	0.019	0.027**
	(0.024)	(0.023)	(0.015)	(0.015)	(0.012)	(0.012)
New flats j (moving average log)	0.074***	0.068***	0.026*	0.029*	-0.029**	-0.023*
	(0.024)	(0.024)	(0.015)	(0.015)	(0.012)	(0.012)
Life expectancy i (log)	0.297	0.461	-0.132	-0.146	0.182	0.128
	(0.483)	(0.476)	(0.298)	(0.298)	(0.279)	(0.277)
Life expectancy j (log)	0.608	0.541	-1.246***	-1.269***	-0.364	-0.405
	(0.467)	(0.463)	(0.291)	(0.292)	(0.265)	(0.265)
Infant mortality rate i (log)	0.043	0.045	0.045**	0.045**	0.044**	0.038*
	(0.028)	(0.027)	(0.022)	(0.022)	(0.021)	(0.021)
Infant mortality rate j (log)	-0.036	-0.036	-0.080***	-0.080***	-0.089***	-0.094***
	(0.034)	(0.033)	(0.021)	(0.021)	(0.023)	(0.023)
Doctors i (log)	0.049	-0.040	0.302***	0.313***	0.052	0.112
	(0.144)	(0.148)	(0.084)	(0.085)	(0.082)	(0.083)
Doctors j (log)	0.168	0.112	0.251***	0.276***	0.091	0.133*
	(0.132)	(0.137)	(0.081)	(0.083)	(0.078)	(0.079)
Hospital beds i (log)	0.335***	0.363***	0.102*	0.097*	-0.016	-0.018
	(0.092)	(0.095)	(0.053)	(0.053)	(0.059)	(0.059)
Hospital beds j (log)	0.186**	0.206**	0.270***	0.260***	0.367***	0.366***
	(0.092)	(0.094)	(0.053)	(0.053)	(0.057)	(0.057)
Telephones i (log)	0.054	0.111*	0.011	0.004	-0.060	-0.090**

	(0.064)	(0.066)	(0.036)	(0.036)	(0.037)	(0.037)
Telephones j (log)	-0.191***	-0.163***	-0.187***	-0.201***	-0.129***	-0.150***
	(0.061)	(0.061)	(0.036)	(0.037)	(0.037)	(0.038)
Highway density i (log)	0.120***	0.106***	0.054**	0.056**	0.006	0.003
	(0.037)	(0.038)	(0.025)	(0.025)	(0.026)	(0.026)
Highway density j (log)	-0.107***	-0.103***	-0.026	-0.023	0.010	0.008
	(0.037)	(0.038)	(0.027)	(0.027)	(0.027)	(0.027)
Buses i (log)	0.009	-0.002	0.024**	0.025**	0.029***	0.029***
	(0.019)	(0.019)	(0.012)	(0.012)	(0.009)	(0.009)
Buses j (log)	-0.034*	-0.038*	-0.052***	-0.050***	-0.005	-0.005
	(0.020)	(0.021)	(0.011)	(0.011)	(0.012)	(0.012)
Share of young i, t-1	-0.006	-0.020	-0.028***	-0.027***	-0.029***	-0.018**
	(0.013)	(0.014)	(0.008)	(0.007)	(0.008)	(0.008)
Share of young j, t-1	0.061***	0.055***	0.079***	0.082***	0.037***	0.045***
	(0.013)	(0.013)	(0.008)	(0.008)	(0.008)	(0.008)
Share of old i, t-1	-0.044***	-0.058***	-0.022***	-0.020***	-0.048***	-0.037***
	(0.015)	(0.016)	(0.007)	(0.008)	(0.006)	(0.006)
Share of old j, t-1	0.027*	0.018	0.023***	0.027***	0.025***	0.033***
	(0.014)	(0.015)	(0.008)	(0.008)	(0.006)	(0.006)
Students i (log), t-1	-0.043**	-0.048***	-0.103***	-0.102***	-0.061***	-0.055***
	(0.018)	(0.018)	(0.012)	(0.012)	(0.015)	(0.014)
Students j (log), t-1	0.023	0.018	0.092***	0.093***	0.117***	0.121***
	(0.019)	(0.020)	(0.013)	(0.012)	(0.020)	(0.020)
Women i (log), t-1	1.665***	1.922***	0.141	0.136	-0.119	-0.013
	(0.458)	(0.483)	(0.307)	(0.305)	(0.372)	(0.361)
Women j (log), t-1	-1.335***	-1.368***	-4.237***	-4.227***	-2.481***	-2.410***
	(0.443)	(0.489)	(0.320)	(0.318)	(0.326)	(0.320)
year1997	-0.064***	-0.075***	-0.032**	-0.029**	-0.028*	-0.015
	(0.023)	(0.025)	(0.013)	(0.014)	(0.016)	(0.016)
year1998	0.004	-0.057	0.003	0.018	0.023	0.079**
	(0.037)	(0.041)	(0.028)	(0.029)	(0.031)	(0.032)
year1999	-0.007	-0.062	-0.039	-0.027	-0.029	0.024
	(0.040)	(0.043)	(0.028)	(0.029)	(0.034)	(0.033)
year2000	-0.040	-0.099*	-0.150***	-0.137***	-0.201***	-0.142***
	(0.048)	(0.052)	(0.034)	(0.035)	(0.041)	(0.041)
year2001	-0.070	-0.159**	-0.142***	-0.123***	-0.254***	-0.173***
	(0.065)	(0.074)	(0.043)	(0.045)	(0.054)	(0.053)
year2002	-0.090	-0.194**	-0.181***	-0.159***	-0.288***	-0.196***
	(0.079)	(0.090)	(0.052)	(0.054)	(0.063)	(0.062)
year2003	-0.056	-0.192*	-0.135**	-0.105	-0.257***	-0.142*
	(0.097)	(0.112)	(0.062)	(0.064)	(0.075)	(0.074)
year2004	-0.076	-0.242*	-0.190***	-0.154**	-0.344***	-0.207**
	(0.110)	(0.129)	(0.070)	(0.073)	(0.084)	(0.084)
year2005	-0.128	-0.318**	-0.208***	-0.166**	-0.371***	-0.216**
	(0.120)	(0.143)	(0.077)	(0.080)	(0.092)	(0.092)
year2006	-0.178	-0.391**	-0.201**	-0.153*	-0.340***	-0.166
	(0.132)	(0.157)	(0.086)	(0.090)	(0.102)	(0.102)
year2007	-0.175	-0.401**	-0.173*	-0.123	-0.289***	-0.106
	(0.138)	(0.165)	(0.092)	(0.096)	(0.109)	(0.109)
year2008	-0.189	-0.424**	-0.187*	-0.134	-0.287**	-0.097
	(0.143)	(0.171)	(0.097)	(0.101)	(0.113)	(0.113)
year2009	-0.337**	-0.575***	-0.301***	-0.248**	-0.412***	-0.221*
	(0.143)	(0.171)	(0.098)	(0.102)	(0.114)	(0.114)

year2010	-0.262*	-0.486***	-0.234**	-0.184*	-0.320***	-0.140
	(0.139)	(0.165)	(0.099)	(0.103)	(0.115)	(0.115)
	(6.144)	(6.321)	(5.187)	(5.351)	(5.794)	(6.068)
Observations	6,246	6,246	31,104	31,104	47,286	47,286
R2-within	0.550	0.556	0.388	0.389	0.276	0.277
Number of pairs	427	427	2,144	2,144	3,356	3,356

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3. Results for different time periods (migration model).

VARIABLES	1 1996-2000	2 1996-2000 With squared income	3 2000-2005	4 2000-2005 With squared income	5 2005-2010 With squared income	6 2005-2010 With squared income
Population i (log)	2.196***	2.232***	2.043***	2.155***	0.974***	0.930***
	(0.315)	(0.316)	(0.312)	(0.317)	(0.208)	(0.214)
Population j (log)	1.216***	1.235***	0.843***	0.939***	2.189***	2.259***
	(0.298)	(0.299)	(0.304)	(0.312)	(0.193)	(0.200)
Income i (log)	0.002	-0.859***	0.044	1.015***	-0.005	-0.721
	(0.048)	(0.246)	(0.044)	(0.328)	(0.050)	(0.674)
Income squared i (log)		0.050***		-0.056***		0.038
		(0.014)		(0.019)		(0.035)
Income j (log)	-0.132***	-0.571**	0.017	0.846**	-0.013	1.106*
	(0.044)	(0.245)	(0.045)	(0.333)	(0.051)	(0.670)
Income squared j (log)		0.025*		-0.048**		-0.059*
		(0.014)		(0.019)		(0.035)
Gini i (log)	-0.091*	-0.081*	-0.066	-0.040	0.074	0.073
	(0.047)	(0.047)	(0.096)	(0.097)	(0.173)	(0.173)
Gini j (log)	0.086*	0.092**	0.040	0.063	-0.274	-0.271
	(0.046)	(0.046)	(0.099)	(0.100)	(0.173)	(0.172)
Unemployment rate I (log)	0.047***	0.044***	-0.006	-0.013	0.033**	0.031**
	(0.016)	(0.016)	(0.015)	(0.015)	(0.013)	(0.013)
Unemployment rate j (log)	-0.038**	-0.040**	-0.012	-0.018	-0.025*	-0.023*
	(0.017)	(0.017)	(0.015)	(0.015)	(0.013)	(0.013)
Housing price i (log)	-0.069***	-0.075***	-0.016	-0.020	0.014	0.014
	(0.013)	(0.013)	(0.019)	(0.019)	(0.020)	(0.020)
Housing price j (log)	0.062***	0.059***	0.049**	0.045**	0.051**	0.051**
	(0.013)	(0.013)	(0.019)	(0.019)	(0.020)	(0.020)
Provision of housing i (log)	0.144	0.102	0.587***	0.446**	0.236	0.205
	(0.144)	(0.143)	(0.198)	(0.208)	(0.190)	(0.193)
Provision of housing j (log)	0.114	0.092	0.323	0.203	0.600***	0.649***
	(0.154)	(0.153)	(0.207)	(0.216)	(0.174)	(0.177)
New flats i (moving average, log)	-0.032	-0.038	-0.027	-0.016	-0.007	-0.008
	(0.024)	(0.024)	(0.019)	(0.019)	(0.021)	(0.021)
New flats j (moving average log)	0.103***	0.100***	0.049**	0.058***	-0.046**	-0.045**
	(0.024)	(0.024)	(0.019)	(0.019)	(0.020)	(0.020)
Life expectancy i (log)	-0.535	-0.462	-0.485	-0.514	0.376	0.416
	(0.372)	(0.375)	(0.397)	(0.396)	(0.368)	(0.364)
Life expectancy j (log)	-0.364	-0.327	0.285	0.260	-1.048***	-1.111***
	(0.391)	(0.391)	(0.390)	(0.389)	(0.351)	(0.349)
Infant mortality rate i (log)	-0.009	-0.008	0.028	0.030	0.056**	0.060***
	(0.031)	(0.031)	(0.024)	(0.024)	(0.023)	(0.023)
Infant mortality rate j (log)	-0.016	-0.016	-0.017	-0.015	-0.064**	-0.069***
	(0.031)	(0.031)	(0.025)	(0.025)	(0.026)	(0.025)
Doctors i (log)	0.089	0.062	0.332**	0.398***	-0.085	-0.089
	(0.106)	(0.106)	(0.147)	(0.150)	(0.095)	(0.095)
Doctors j (log)	0.541***	0.527***	-0.135	-0.079	0.060	0.066
	(0.107)	(0.107)	(0.142)	(0.145)	(0.112)	(0.112)
Hospital beds i (log)	-0.329***	-0.318***	0.018	-0.004	-0.111*	-0.111*

	(0.095)	(0.095)	(0.087)	(0.087)	(0.061)	(0.061)
Hospital beds j (log)	-0.181**	-0.175*	0.341***	0.322***	0.102*	0.103*
	(0.090)	(0.090)	(0.088)	(0.088)	(0.062)	(0.062)
Telephones i (log)	-0.040	-0.062	-0.041	-0.087*	0.009	0.015
	(0.057)	(0.057)	(0.041)	(0.044)	(0.065)	(0.065)
Telephones j (log)	-0.364***	-0.376***	0.022	-0.017	-0.041	-0.049
	(0.060)	(0.061)	(0.040)	(0.044)	(0.069)	(0.069)
Highway density i (log)	-0.216**	-0.190**	0.037	0.036	0.055**	0.052**
	(0.097)	(0.096)	(0.026)	(0.026)	(0.022)	(0.022)
Highway density j (log)	0.313***	0.327***	0.036	0.035	0.012	0.016
	(0.105)	(0.105)	(0.030)	(0.030)	(0.022)	(0.022)
Buses i (log)	-0.130***	-0.134***	0.018	0.015	0.045***	0.041***
	(0.041)	(0.041)	(0.014)	(0.014)	(0.014)	(0.014)
Buses j (log)	0.126***	0.124***	0.018	0.015	-0.067***	-0.060***
	(0.041)	(0.041)	(0.015)	(0.015)	(0.014)	(0.014)
Share of young i, t-1	-0.021	-0.019	-0.025*	-0.014	-0.021	-0.025*
	(0.017)	(0.016)	(0.013)	(0.013)	(0.014)	(0.015)
Share of young j, t-1	0.112***	0.114***	0.064***	0.072***	0.010	0.016
	(0.017)	(0.017)	(0.013)	(0.014)	(0.015)	(0.016)
Share of old i, t-1	-0.060***	-0.058***	-0.053***	-0.044***	0.028**	0.022
	(0.016)	(0.016)	(0.008)	(0.009)	(0.013)	(0.014)
Share of old j, t-1	0.047***	0.048***	0.034***	0.042***	-0.046***	-0.037**
	(0.015)	(0.015)	(0.009)	(0.009)	(0.013)	(0.014)
Students i (log), t-1	-0.119***	-0.116***	-0.051***	-0.048**	-0.086*	-0.087*
	(0.019)	(0.019)	(0.019)	(0.019)	(0.049)	(0.049)
Students j (log), t-1	0.069***	0.071***	0.072***	0.074***	0.064	0.066
	(0.020)	(0.020)	(0.018)	(0.017)	(0.048)	(0.048)
Women i (log), t-1	-4.754**	-3.748*	1.377***	1.247***	-2.014	-2.402
	(2.209)	(2.229)	(0.303)	(0.305)	(1.944)	(1.955)
Women j (log), t-1	8.585***	9.098***	-2.325***	-2.436***	0.664	1.269
	(2.125)	(2.154)	(0.295)	(0.299)	(1.909)	(1.918)
year1997	0.034**	0.035**				
	(0.016)	(0.016)				
year1998	-0.026	-0.029				
	(0.034)	(0.034)				
year1999	0.031	0.039				
	(0.039)	(0.038)				
year2000	0.013	0.028				
	(0.050)	(0.050)				
year2001			-0.043	-0.001		
			(0.029)	(0.031)		
year2002			-0.076	-0.007		
			(0.047)	(0.050)		
year2003			-0.051	0.060		
			(0.064)	(0.072)		
year2004			-0.127	0.019		
			(0.081)	(0.091)		
year2005			-0.142	0.034		
			(0.097)	(0.109)		
year2006					0.014	0.013
					(0.022)	(0.022)
year2007					0.054	0.053
					(0.035)	(0.035)
year2008					0.032	0.030
					(0.044)	(0.044)
year2009					-0.071	-0.074
					(0.050)	(0.051)
year2010					0.027	0.022
					(0.055)	(0.058)
Observations	25,376	25,376	35,270	35,270	35,574	35,574
R2-within	0.159	0.160	0.105	0.105	0.040	0.040
Number of pairs	5,625	5,625	5,929	5,929	5,929	5,929

Table 4. Results for different periods (before and after crisis 1998).

VARIABLES	1 All	2 1996-2000	3 1996-1997	4 1995-1997	5 1998-2010	6 1998-2000
Population i (log)	1.802***	2.156***	0.177	1.755***	1.689***	1.846***
	(0.098)	(0.314)	(1.651)	(0.499)	(0.116)	(0.572)
Population j (log)	2.002***	1.158***	8.857***	2.101***	2.071***	1.189**
	(0.096)	(0.298)	(1.709)	(0.511)	(0.110)	(0.595)
Income i (log)	0.758***	-0.718***	2.148	0.274	1.089***	3.587***
	(0.157)	(0.238)	(2.321)	(0.670)	(0.171)	(0.539)
Income squared i (log)	-0.041***	0.044***	-0.117	-0.011	-0.060***	-0.215***
	(0.009)	(0.013)	(0.133)	(0.038)	(0.010)	(0.033)
Income j (log)	0.696***	-0.431*	-4.939*	-5.407***	0.600***	-1.691***
	(0.169)	(0.238)	(2.530)	(0.726)	(0.178)	(0.533)
Income squared j (log)	-0.029***	0.019	0.251*	0.309***	-0.024**	0.101***
	(0.010)	(0.013)	(0.145)	(0.041)	(0.010)	(0.032)
Gini i (log)	-0.082*	-0.124***	-0.188	0.068	0.011	-0.140*
	(0.043)	(0.045)	(0.115)	(0.047)	(0.052)	(0.077)
Gini j (log)	-0.123***	0.049	0.523***	0.035	-0.142***	0.061
	(0.042)	(0.045)	(0.114)	(0.047)	(0.052)	(0.079)
Unemployment rate I (log)	0.059***	0.061***	0.041	-0.002	0.053***	0.093***
	(0.009)	(0.016)	(0.030)	(0.023)	(0.009)	(0.027)
Unemployment rate j (log)	-0.071***	-0.023	-0.094***	-0.034	-0.080***	-0.043*
	(0.009)	(0.017)	(0.032)	(0.024)	(0.009)	(0.025)
Housing price i (log)	-0.050***	-0.084***	0.041		-0.033***	-0.014
	(0.011)	(0.013)	(0.033)		(0.012)	(0.022)
Housing price j (log)	0.049***	0.050***	0.129***		0.038***	0.024
	(0.011)	(0.013)	(0.031)		(0.012)	(0.024)
Provision of housing i (log)	0.404***	-0.017	2.046***	0.681**	0.356***	-0.001
	(0.083)	(0.140)	(0.789)	(0.282)	(0.093)	(0.205)
Provision of housing j (log)	0.613***	-0.027	2.064***	-0.250	0.556***	-0.607***
	(0.083)	(0.149)	(0.668)	(0.340)	(0.088)	(0.211)
New flats i (moving average, log)	-0.005	-0.042*	0.132	0.045	-0.014	0.018
	(0.009)	(0.024)	(0.082)	(0.045)	(0.010)	(0.040)
New flats j (moving average log)	-0.002	0.096***	-0.245***	-0.063	-0.000	0.056
	(0.009)	(0.024)	(0.086)	(0.044)	(0.010)	(0.040)
Life expectancy i (log)	-0.082	-0.942***	-2.174	-2.179***	-0.014	-1.558***
	(0.201)	(0.339)	(1.403)	(0.385)	(0.223)	(0.590)
Life expectancy j (log)	-0.581***	-0.806**	2.378	0.910**	-0.774***	-0.562
	(0.191)	(0.368)	(1.517)	(0.418)	(0.211)	(0.596)
Infant mortality rate i (log)	0.037**	0.008	-0.112	-0.220***	0.052***	-0.042
	(0.015)	(0.030)	(0.077)	(0.048)	(0.015)	(0.048)
Infant mortality rate j (log)	-0.084***	0.000	0.090	-0.013	-0.090***	-0.047
	(0.016)	(0.030)	(0.072)	(0.044)	(0.016)	(0.049)
Doctors i (log)	0.121**	0.109	0.861***	0.434***	0.116*	-0.134
	(0.061)	(0.106)	(0.333)	(0.133)	(0.066)	(0.178)
Doctors j (log)	0.200***	0.574***	0.613*	0.123	0.215***	0.927***
	(0.057)	(0.108)	(0.330)	(0.122)	(0.063)	(0.181)
Hospital beds i (log)	0.036	-0.363***	-1.974***	-1.008***	0.012	0.054
	(0.039)	(0.095)	(0.316)	(0.209)	(0.040)	(0.184)
Hospital beds j (log)	0.306***	-0.220**	0.903***	0.047	0.353***	-0.137
	(0.039)	(0.089)	(0.310)	(0.194)	(0.041)	(0.178)
Telephones i (log)	-0.035	-0.040	-0.601***	-0.099	-0.062**	0.072
	(0.026)	(0.057)	(0.214)	(0.094)	(0.029)	(0.119)
Telephones j (log)	-0.180***	-0.354***	-0.244	0.155*	-0.112***	-0.240**

	(0.026)	(0.058)	(0.212)	(0.094)	(0.028)	(0.119)
Highway density i (log)	0.037**	-0.182*	-0.190	0.169	0.045**	-0.679***
	(0.018)	(0.096)	(0.223)	(0.125)	(0.018)	(0.165)
Highway density j (log)	-0.003	0.335***	0.686**	-0.050	0.003	0.531***
	(0.018)	(0.105)	(0.273)	(0.111)	(0.019)	(0.183)
Buses i (log)	0.028***	-0.137***	-0.146	-0.221***	0.028***	0.047
	(0.007)	(0.040)	(0.148)	(0.076)	(0.007)	(0.063)
Buses j (log)	-0.015*	0.121***	-0.013	0.036	-0.018**	0.032
	(0.008)	(0.040)	(0.140)	(0.068)	(0.009)	(0.064)
Share of young i, t-1	-0.015***	-0.020	0.066	0.075***	-0.009	-0.008
	(0.005)	(0.015)	(0.050)	(0.026)	(0.006)	(0.037)
Share of young j, t-1	0.061***	0.113***	0.068	0.071**	0.057***	0.051
	(0.005)	(0.014)	(0.056)	(0.028)	(0.006)	(0.035)
Share of old i, t-1	-0.042***	-0.043***	-0.052	-0.056***	-0.022***	0.016
	(0.004)	(0.015)	(0.035)	(0.018)	(0.005)	(0.040)
Share of old j, t-1	0.028***	0.063***	-0.068*	0.099***	0.022***	0.028
	(0.005)	(0.015)	(0.037)	(0.018)	(0.005)	(0.039)
Students i (log), t-1	-0.074***	-0.113***	-0.151**	-0.109***	-0.070***	-0.101***
	(0.009)	(0.019)	(0.059)	(0.032)	(0.013)	(0.033)
Students j (log), t-1	0.104***	0.073***	-0.173***	0.026	0.125***	0.129***
	(0.011)	(0.020)	(0.051)	(0.027)	(0.013)	(0.035)
Women i (log), t-1	0.497**	-4.706**	11.180*	5.122***	-0.202	-13.926***
	(0.224)	(2.153)	(6.380)	(1.694)	(0.218)	(4.318)
Women j (log), t-1	-3.038***	8.140***	-4.240	-9.608***	-2.809***	15.657***
	(0.212)	(2.046)	(6.800)	(1.736)	(0.223)	(4.331)
year1996	-0.064***			-0.146***		
	(0.020)			(0.026)		
year1997	-0.084***	0.031**	0.014	-0.143***		
	(0.018)	(0.013)	(0.049)	(0.049)		
year1998	0.000					
	(0.000)					
year1999	-0.043***				-0.053***	-0.017
	(0.011)				(0.012)	(0.032)
year2000	-0.175***				-0.194***	-0.078
	(0.018)				(0.018)	(0.058)
year2001	-0.187***				-0.204***	
	(0.025)				(0.027)	
year2002	-0.207***				-0.234***	
	(0.032)				(0.035)	
year2003	-0.149***				-0.184***	
	(0.040)				(0.044)	
year2004	-0.199***				-0.234***	
	(0.046)				(0.050)	
year2005	-0.206***				-0.241***	
	(0.052)				(0.056)	
year2006	-0.167***				-0.202***	
	(0.058)				(0.064)	
year2007	-0.113*				-0.150**	
	(0.063)				(0.069)	
year2008	-0.109*				-0.142**	
	(0.066)				(0.072)	
year2009	-0.229***				-0.256***	
	(0.066)				(0.072)	
year2010	-0.154**				-0.184**	
	(0.067)				(0.073)	
Observations	84,666	25,376	9,661	17,328	75,005	15,715
R2-within	0.308	0.159	0.068	0.140	0.226	0.108
Number of pairs	5,929	5,625	5,037	5,776	5,929	5,625

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 5. Regressions with financial development (migration model).

VARIABLES	1 Main	2 With squared income	3 Without Moscow and Saint Petersburg	4 Without Moscow and Saint Petersburg, with squared income
Population i (log)	1.399***	1.332***	1.502***	1.390***
	(0.153)	(0.155)	(0.166)	(0.168)
Population j (log)	2.370***	2.412***	2.096***	2.165***
	(0.143)	(0.145)	(0.157)	(0.158)
Income i (log)	-0.028	-4.143***	-0.033	-5.580***
	(0.049)	(0.844)	(0.051)	(0.946)
Income squared i (log)		0.216***		0.292***
		(0.044)		(0.050)
Income*loans i (log)	-0.020**	-0.633***	-0.018**	-0.887***
	(0.008)	(0.189)	(0.009)	(0.213)
Income squared*loans i (log)		0.031***		0.045***
		(0.010)		(0.012)
Loans i (log)	0.155**	3.134***	0.144*	4.321***
	(0.077)	(0.876)	(0.081)	(0.985)
Income j (log)	0.058	1.346*	0.114**	2.452***
	(0.048)	(0.779)	(0.051)	(0.870)
Income squared j (log)		-0.070*		-0.130***
		(0.041)		(0.046)
Income*loans j (log)	-0.010	0.336*	-0.006	0.828***
	(0.008)	(0.181)	(0.009)	(0.207)
Income squared*loans j (log)		-0.019*		-0.046***
		(0.010)		(0.011)
Loans j (log)	0.110	-1.474*	0.057	-3.687***
	(0.075)	(0.833)	(0.079)	(0.948)
Gini i (log)	-0.088	-0.027	-0.046	-0.025
	(0.085)	(0.089)	(0.096)	(0.098)
Gini j (log)	-0.208**	-0.253***	-0.357***	-0.448***
	(0.088)	(0.091)	(0.099)	(0.101)
Unemployment rate i (log)	0.035***	0.034***	0.031***	0.031***
	(0.011)	(0.011)	(0.012)	(0.012)
Unemployment rate j (log)	-0.049***	-0.046***	-0.063***	-0.058***
	(0.010)	(0.011)	(0.011)	(0.011)
Housing price i (log)	-0.032**	-0.033**	-0.029*	-0.029*
	(0.015)	(0.015)	(0.016)	(0.016)
Housing price j (log)	0.058***	0.062***	0.048***	0.055***
	(0.015)	(0.015)	(0.016)	(0.016)
Provision of housing i (log)	0.534***	0.439***	0.561***	0.429**
	(0.164)	(0.163)	(0.170)	(0.169)
Provision of housing j (log)	0.388***	0.407***	0.400***	0.427***
	(0.142)	(0.143)	(0.149)	(0.151)
New flats i (moving average, log)	-0.047***	-0.042***	-0.046***	-0.040***
	(0.012)	(0.012)	(0.013)	(0.013)
New flats j (moving average log)	0.046***	0.043***	0.046***	0.041***
	(0.012)	(0.013)	(0.013)	(0.013)
Life expectancy i (log)	0.699**	0.753***	0.689**	0.737***
	(0.272)	(0.271)	(0.281)	(0.280)
Life expectancy j (log)	-1.503***	-1.546***	-1.168***	-1.202***
	(0.255)	(0.255)	(0.264)	(0.262)
Infant mortality rate i (log)	0.063***	0.071***	0.056***	0.060***
	(0.017)	(0.017)	(0.018)	(0.018)
Infant mortality rate j (log)	-0.066***	-0.068***	-0.065***	-0.063***
	(0.018)	(0.018)	(0.019)	(0.019)
Doctors i (log)	0.094	0.076	0.103	0.085
	(0.081)	(0.081)	(0.083)	(0.083)
Doctors j (log)	0.019	0.016	0.007	-0.010
	(0.084)	(0.084)	(0.086)	(0.086)

Hospital beds i (log)	0.029	0.037	0.041	0.051
	(0.046)	(0.046)	(0.047)	(0.047)
Hospital beds j (log)	0.305***	0.301***	0.261***	0.249***
	(0.047)	(0.047)	(0.048)	(0.048)
Telephones i (log)	-0.040	-0.005	-0.047	-0.018
	(0.031)	(0.032)	(0.033)	(0.033)
Telephones j (log)	-0.002	-0.004	-0.007	-0.003
	(0.031)	(0.032)	(0.034)	(0.034)
Highway density i (log)	0.046**	0.032*	0.035*	0.020
	(0.019)	(0.019)	(0.020)	(0.020)
Highway density j (log)	-0.050**	-0.048**	-0.028	-0.031
	(0.020)	(0.020)	(0.021)	(0.021)
Buses i (log)	0.031***	0.028***	0.038***	0.035***
	(0.009)	(0.009)	(0.009)	(0.009)
Buses j (log)	-0.041***	-0.038***	-0.055***	-0.048***
	(0.009)	(0.009)	(0.010)	(0.010)
Share of young i, t-1	-0.012	-0.022***	0.000	-0.006
	(0.008)	(0.008)	(0.009)	(0.009)
Share of young j, t-1	0.062***	0.065***	0.044***	0.044***
	(0.008)	(0.008)	(0.009)	(0.009)
Share of old i, t-1	0.012*	-0.005	0.021***	0.001
	(0.007)	(0.008)	(0.007)	(0.008)
Share of old j, t-1	-0.016**	-0.011	-0.030***	-0.022***
	(0.007)	(0.008)	(0.008)	(0.008)
Students i (log), t-1	-0.080***	-0.085***	-0.082***	-0.087***
	(0.021)	(0.021)	(0.022)	(0.022)
Students j (log), t-1	0.111***	0.111***	0.108***	0.106***
	(0.021)	(0.021)	(0.022)	(0.022)
Women i (log), t-1	-1.593**	-1.244	-2.859***	-3.324***
	(0.791)	(0.797)	(0.954)	(0.957)
Women j (log), t-1	-6.050***	-6.226***	-4.615***	-4.812***
	(0.806)	(0.814)	(1.013)	(1.018)
year2002	-0.001	-0.007	0.000	0.004
	(0.014)	(0.015)	(0.017)	(0.018)
year2003	0.057**	0.040	0.057*	0.059*
	(0.027)	(0.028)	(0.035)	(0.035)
year2004	0.022	-0.001	0.018	0.021
	(0.039)	(0.040)	(0.050)	(0.050)
year2005	0.031	0.007	0.026	0.036
	(0.051)	(0.052)	(0.064)	(0.064)
year2006	0.101	0.080	0.081	0.103
	(0.064)	(0.065)	(0.079)	(0.080)
year2007	0.179**	0.164**	0.152*	0.189**
	(0.075)	(0.076)	(0.091)	(0.093)
year2008	0.197**	0.192**	0.160	0.211**
	(0.082)	(0.083)	(0.099)	(0.101)
year2009	0.096	0.100	0.054	0.123
	(0.086)	(0.088)	(0.103)	(0.106)
year2010	0.175**	0.184**	0.126	0.196*
	(0.086)	(0.087)	(0.102)	(0.105)
Observations	58,223	58,223	55,211	55,211
R2-within	0.104	0.105	0.104	0.106
Number of pairs	5,929	5,929	5,625	5,625

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6. Regressions with different indicators of financial development (migration model).

VARIABLES	1 Loans to firm	2 Loans to firm with squares	3 All Loans	4 All loans with squares	5 Mortgage debt	6 Mortgage debt with squares
Population i (log)	1.415***	1.396***	1.400***	1.368***	0.737***	0.585**
	(0.150)	(0.153)	(0.151)	(0.153)	(0.243)	(0.246)
Population j (log)	2.321***	2.280***	2.337***	2.306***	2.110***	2.375***
	(0.140)	(0.141)	(0.140)	(0.142)	(0.225)	(0.231)
Income i (log)	0.000	-0.151	-0.005	-0.720	-0.040	-15.118***
	(0.043)	(0.646)	(0.042)	(0.620)	(0.095)	(3.366)
Income squared i (log)		0.008		0.038		0.789***
		(0.034)		(0.033)		(0.174)
Income*fin_dev i (log)	-0.024**	0.136	-0.027**	0.016	0.024	-3.170***
	(0.010)	(0.222)	(0.010)	(0.232)	(0.022)	(0.730)
Income squared*fin_dev i (log)		-0.009		-0.003		-0.069***
		(0.012)		(0.013)		(0.022)
Fin_dev i (log)	0.204**	-0.507	0.232**	0.085	-0.169	15.058***
	(0.090)	(1.033)	(0.096)	(1.074)	(0.204)	(3.510)
Income j (log)	0.042	-0.883	0.040	-0.530	-0.183**	10.629***
	(0.043)	(0.575)	(0.043)	(0.570)	(0.081)	(2.121)
Income squared j (log)		0.050		0.031		-0.567***
		(0.030)		(0.030)		(0.109)
Income*fin_dev j (log)	-0.022**	-0.435**	-0.020*	-0.296	-0.040***	1.276***
	(0.010)	(0.207)	(0.011)	(0.224)	(0.013)	(0.437)
Income squared*fin_dev j (log)		0.023**		0.015		0.167***
		(0.011)		(0.012)		(0.038)
Fin_dev j (log)	0.171*	2.061**	0.166*	1.422	0.398***	-5.906***
	(0.089)	(0.955)	(0.098)	(1.033)	(0.128)	(2.136)
Unemployment rate (log) i	0.032***	0.034***	0.033***	0.036***	0.036**	0.029*
	(0.011)	(0.011)	(0.011)	(0.011)	(0.015)	(0.015)
Unemployment rate (log) j	-0.045***	-0.047***	-0.045***	-0.046***	-0.034**	-0.031**
	(0.011)	(0.011)	(0.011)	(0.011)	(0.014)	(0.015)
Housing price i (log)	-0.033**	-0.030*	-0.032**	-0.031**	0.047**	0.031
	(0.015)	(0.016)	(0.015)	(0.016)	(0.023)	(0.023)
Housing price j (log)	0.048***	0.044***	0.050***	0.048***	0.069***	0.051**
	(0.015)	(0.015)	(0.016)	(0.016)	(0.023)	(0.024)
Provision of housing i (log)	0.656***	0.638***	0.577***	0.571***	0.231	0.187
	(0.160)	(0.160)	(0.160)	(0.160)	(0.204)	(0.203)
Provision of housing j (log)	0.508***	0.523***	0.471***	0.469***	0.591***	0.805***
	(0.140)	(0.140)	(0.139)	(0.139)	(0.183)	(0.186)
New flats i (moving average, log)	-0.049***	-0.051***	-0.046***	-0.049***	-0.014	0.008
	(0.012)	(0.012)	(0.012)	(0.012)	(0.025)	(0.025)
New flats j (moving average log)	0.039***	0.041***	0.040***	0.041***	-0.103***	-0.090***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.024)	(0.024)
Life expectancy i (log)	0.561**	0.575**	0.587**	0.600**	0.435	0.800
	(0.273)	(0.272)	(0.273)	(0.271)	(0.511)	(0.522)
Life expectancy j (log)	-1.436***	-1.435***	-1.400***	-1.384***	-1.671***	-1.680***
	(0.257)	(0.257)	(0.257)	(0.257)	(0.498)	(0.495)
Infant mortality rate i (log)	0.051***	0.052***	0.059***	0.062***	0.029	0.032
	(0.017)	(0.017)	(0.017)	(0.017)	(0.026)	(0.027)
Infant mortality rate j (log)	-0.071***	-0.070***	-0.066***	-0.064***	-0.076**	-0.071**
	(0.018)	(0.018)	(0.018)	(0.018)	(0.030)	(0.030)
Doctors i (log)	0.174**	0.151*	0.170**	0.144*	-0.154	-0.116
	(0.084)	(0.084)	(0.083)	(0.084)	(0.109)	(0.109)
Doctors j (log)	-0.155*	-0.138	-0.126	-0.118	0.164	0.173
	(0.088)	(0.090)	(0.087)	(0.087)	(0.117)	(0.117)
Hospital beds i (log)	-0.017	-0.016	-0.008	-0.010	-0.088	-0.109
	(0.046)	(0.046)	(0.045)	(0.045)	(0.070)	(0.070)
Hospital beds j (log)	0.327***	0.323***	0.323***	0.323***	0.007	-0.014
	(0.047)	(0.047)	(0.046)	(0.046)	(0.070)	(0.070)
Telephones i (log)	-0.043	-0.033	-0.035	-0.020	0.031	0.040
	(0.032)	(0.032)	(0.032)	(0.032)	(0.077)	(0.077)

Telephones j (log)	-0.007	-0.004	-0.010	-0.008	0.176**	0.166**
	(0.031)	(0.031)	(0.031)	(0.032)	(0.083)	(0.083)
Highway density i (log)	0.049**	0.046**	0.048**	0.045**	0.075*	0.056
	(0.019)	(0.019)	(0.019)	(0.019)	(0.044)	(0.043)
Highway density j (log)	-0.041**	-0.039*	-0.041**	-0.041**	-0.061	-0.042
	(0.020)	(0.020)	(0.020)	(0.020)	(0.043)	(0.043)
Buses i (log)	0.028***	0.029***	0.029***	0.029***	0.045***	0.041**
	(0.008)	(0.009)	(0.008)	(0.009)	(0.016)	(0.016)
Buses j (log)	-0.030***	-0.036***	-0.036***	-0.040***	-0.077***	-0.057***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.017)	(0.017)
Share of young i, t-1	-0.009	-0.013	-0.011	-0.016*	0.002	-0.007
	(0.008)	(0.008)	(0.008)	(0.008)	(0.020)	(0.020)
Share of young j, t-1	0.064***	0.061***	0.061***	0.059***	0.009	0.008
	(0.008)	(0.009)	(0.008)	(0.009)	(0.022)	(0.022)
Share of old i, t-1	0.005	0.001	0.008	-0.000	-0.006	-0.032
	(0.006)	(0.008)	(0.007)	(0.008)	(0.020)	(0.021)
Share of old j, t-1	-0.024***	-0.027***	-0.022***	-0.025***	-0.054***	-0.030
	(0.007)	(0.008)	(0.007)	(0.008)	(0.017)	(0.019)
Students i (log), t-1	-0.099***	-0.104***	-0.091***	-0.098***	-0.139**	-0.152**
	(0.022)	(0.022)	(0.021)	(0.021)	(0.066)	(0.066)
Students j (log), t-1	0.113***	0.113***	0.110***	0.110***	0.147**	0.158**
	(0.021)	(0.021)	(0.021)	(0.021)	(0.066)	(0.066)
Women i (log), t-1	-1.763**	-1.993**	-1.924**	-2.055**	0.003	-0.337
	(0.778)	(0.819)	(0.773)	(0.809)	(2.398)	(2.386)
Women j (log), t-1	-6.543***	-6.159***	-6.303***	-6.074***	0.379	2.917
	(0.806)	(0.843)	(0.798)	(0.839)	(2.277)	(2.282)
year2002	0.010	0.007	0.011	0.008		
	(0.014)	(0.015)	(0.014)	(0.015)		
year2003	0.080***	0.070**	0.079***	0.069**		
	(0.027)	(0.028)	(0.027)	(0.028)		
year2004	0.046	0.029	0.044	0.026		
	(0.037)	(0.039)	(0.037)	(0.039)		
year2005	0.058	0.037	0.056	0.033		
	(0.047)	(0.049)	(0.047)	(0.049)		
year2006	0.135**	0.111*	0.133**	0.107*		
	(0.061)	(0.062)	(0.061)	(0.063)		
year2007	0.212***	0.186***	0.214***	0.187***	-0.004	-0.031
	(0.070)	(0.072)	(0.071)	(0.073)	(0.028)	(0.029)
year2008	0.230***	0.204***	0.236***	0.211***	-0.029	-0.070
	(0.076)	(0.077)	(0.077)	(0.078)	(0.043)	(0.044)
year2009	0.143*	0.119	0.144*	0.123	-0.075	-0.127**
	(0.080)	(0.081)	(0.081)	(0.083)	(0.052)	(0.054)
year2010	0.222***	0.202**	0.223***	0.208**	0.041	-0.017
	(0.081)	(0.082)	(0.082)	(0.083)	(0.061)	(0.063)
Gini i (log)	-0.126	-0.150	-0.119	-0.131	0.384*	0.580***
	(0.087)	(0.092)	(0.086)	(0.092)	(0.204)	(0.201)
Gini j (log)	-0.145	-0.099	-0.132	-0.103	-0.308	-0.309
	(0.089)	(0.094)	(0.089)	(0.094)	(0.211)	(0.210)
Observations	58,525	58,525	57,919	57,919	29,645	29,645
R2-within	0.103	0.103	0.104	0.105	0.045	0.048
Number of pairs	5,929	5,929	5,929	5,929	5,929	5,929

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 7. Results of regressions with one-year lagged independent variables. Dependent variable: log migration.

VARIABLES	1 Main	2 With squared income	3 Without Moscow and Saint Petersburg	4 Without Moscow and St Petersburg, w/ sq. income
Population i (log), t-1	2.251***	2.284***	2.109***	2.123***
	(0.116)	(0.118)	(0.126)	(0.130)
Population j (log), t-1	1.652***	1.738***	1.519***	1.611***
	(0.114)	(0.115)	(0.124)	(0.128)
Income i (log), t-1	-0.005	0.221	-0.042*	0.039
	(0.023)	(0.166)	(0.024)	(0.199)
Income squared i (log), t-1		-0.013		-0.005
		(0.009)		(0.011)
Income j (log), t-1	0.272***	0.861***	0.254***	0.772***
	(0.023)	(0.168)	(0.025)	(0.205)
Income squared j (log), t-1		-0.033***		-0.029**
		(0.009)		(0.012)
Gini i (log) , t-1	-0.026	-0.025	-0.024	-0.024
	(0.042)	(0.042)	(0.046)	(0.046)
Gini j (log), t-1	-0.288***	-0.285***	-0.287***	-0.286***
	(0.041)	(0.041)	(0.044)	(0.043)
Unemployment rate i (log), t-1	0.051***	0.050***	0.029***	0.029***
	(0.009)	(0.009)	(0.010)	(0.010)
Unemployment rate j (log), t-1	-0.028***	-0.030***	-0.042***	-0.043***
	(0.009)	(0.009)	(0.009)	(0.009)
Housing price i (log), t-1	-0.035***	-0.034***	-0.033***	-0.033***
	(0.011)	(0.011)	(0.011)	(0.012)
Housing price j (log), t-1	-0.001	-0.000	-0.000	0.000
	(0.011)	(0.011)	(0.011)	(0.011)
Provision of housing i (log), t-1	0.464***	0.455***	0.280***	0.279***
	(0.082)	(0.083)	(0.085)	(0.086)
Provision of housing j (log), t-1	0.861***	0.837***	0.756***	0.748***
	(0.086)	(0.086)	(0.088)	(0.088)
New flats i (moving average, log), t-1	-0.008	-0.007	0.011	0.011
	(0.009)	(0.009)	(0.010)	(0.010)
New flats j (moving average log), t-1	-0.028***	-0.023**	-0.035***	-0.031***
	(0.009)	(0.009)	(0.010)	(0.010)
Life expectancy i (log), t-1	-0.405**	-0.425**	-0.308	-0.315
	(0.205)	(0.204)	(0.211)	(0.211)
Life expectancy j (log), t-1	-0.753***	-0.805***	-0.521**	-0.566***
	(0.198)	(0.197)	(0.203)	(0.203)
Infant mortality rate i (log), t-1	0.052***	0.051***	0.047***	0.047***
	(0.015)	(0.015)	(0.016)	(0.016)
Infant mortality rate j (log), t-1	-0.070***	-0.071***	-0.050***	-0.051***
	(0.016)	(0.016)	(0.017)	(0.017)
Doctors i (log), t-1	0.167***	0.180***	0.219***	0.223***
	(0.062)	(0.063)	(0.064)	(0.065)
Doctors j (log), t-1	0.274***	0.306***	0.278***	0.303***
	(0.058)	(0.059)	(0.059)	(0.060)
Hospital beds i (log), t-1	0.061	0.057	0.031	0.030
	(0.041)	(0.041)	(0.042)	(0.042)
Hospital beds j (log), t-1	0.364***	0.356***	0.313***	0.310***
	(0.042)	(0.042)	(0.043)	(0.043)
Telephones i (log), t-1	-0.041	-0.050*	-0.119***	-0.121***
	(0.027)	(0.028)	(0.029)	(0.029)
Telephones j (log), t-1	-0.160***	-0.181***	-0.136***	-0.151***
	(0.027)	(0.028)	(0.030)	(0.031)
Highway density i (log), t-1	0.010	0.010	0.003	0.003
	(0.018)	(0.018)	(0.019)	(0.019)
Highway density j (log), t-1	0.034*	0.034*	0.063***	0.062***

	(0.020)	(0.020)	(0.020)	(0.020)
Buses i (log), t-1	0.021***	0.021***	0.025***	0.025***
	(0.008)	(0.008)	(0.008)	(0.008)
Buses j (log), t-1	-0.024***	-0.024***	-0.042***	-0.043***
	(0.009)	(0.009)	(0.009)	(0.009)
Share of young i, t-1	-0.013**	-0.010*	-0.016**	-0.015**
	(0.006)	(0.006)	(0.006)	(0.007)
Share of young j, t-1	0.037***	0.044***	0.034***	0.040***
	(0.006)	(0.006)	(0.006)	(0.007)
Share of old i, t-1	-0.045***	-0.043***	-0.039***	-0.038***
	(0.004)	(0.005)	(0.005)	(0.005)
Share of old j, t-1	0.026***	0.033***	0.022***	0.027***
	(0.005)	(0.005)	(0.005)	(0.005)
Students i (log), t-1	-0.059***	-0.058***	-0.064***	-0.064***
	(0.011)	(0.011)	(0.011)	(0.011)
Students j (log), t-1	0.115***	0.119***	0.128***	0.132***
	(0.013)	(0.013)	(0.013)	(0.013)
Women i (log), t-1	0.469*	0.496**	-1.193***	-1.167***
	(0.245)	(0.244)	(0.296)	(0.302)
Women j (log), t-1	-4.191***	-4.120***	-4.543***	-4.373***
	(0.232)	(0.231)	(0.308)	(0.316)
year1998	-0.062***	-0.057***	-0.050***	-0.047***
	(0.010)	(0.010)	(0.010)	(0.010)
year1999	0.038*	0.065***	0.028	0.048**
	(0.021)	(0.022)	(0.023)	(0.024)
year2000	-0.129***	-0.101***	-0.125***	-0.105***
	(0.023)	(0.023)	(0.025)	(0.025)
year2001	-0.187***	-0.148***	-0.143***	-0.118***
	(0.031)	(0.031)	(0.034)	(0.035)
year2002	-0.233***	-0.189***	-0.178***	-0.150***
	(0.036)	(0.036)	(0.040)	(0.040)
year2003	-0.217***	-0.165***	-0.147***	-0.114**
	(0.043)	(0.043)	(0.048)	(0.049)
year2004	-0.279***	-0.212***	-0.188***	-0.145**
	(0.049)	(0.051)	(0.057)	(0.058)
year2005	-0.291***	-0.215***	-0.188***	-0.139**
	(0.055)	(0.056)	(0.063)	(0.065)
year2006	-0.265***	-0.179***	-0.151**	-0.096
	(0.060)	(0.062)	(0.069)	(0.071)
year2007	-0.211***	-0.117*	-0.100	-0.039
	(0.065)	(0.068)	(0.074)	(0.077)
year2008	-0.215***	-0.118*	-0.115	-0.051
	(0.069)	(0.072)	(0.078)	(0.081)
year2009	-0.313***	-0.214***	-0.212***	-0.146*
	(0.072)	(0.074)	(0.081)	(0.084)
year2010	-0.252***	-0.155**	-0.147*	-0.083
	(0.071)	(0.074)	(0.080)	(0.084)
Observations	78,737	78,737	74,597	74,597
R2-within	0.270	0.271	0.272	0.272
Number of pairs	5,929	5,929	5,625	5,625

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8. Results of regressions with two-year lagged independent variables. Dependent variable: log migration.

VARIABLES	1 Main	2 With squared income	3 Without Moscow and Saint Petersburg	4 Without Moscow and St Petersburg, w/ sq. income
Population i (log), t-2	2.376***	2.343***	2.321***	2.274***
	(0.126)	(0.127)	(0.138)	(0.143)
Population j (log), t-2	1.287***	1.451***	1.058***	1.228***
	(0.124)	(0.127)	(0.135)	(0.142)
Income i (log), t-2	0.005	-0.222	-0.017	-0.283
	(0.024)	(0.166)	(0.025)	(0.203)
Income squared i (log), t-2		0.013		0.015
		(0.009)		(0.012)
Income j (log), t-2	0.311***	1.459***	0.294***	1.249***
	(0.025)	(0.167)	(0.027)	(0.209)
Income squared j (log), t-2		-0.065***		-0.054***
		(0.009)		(0.012)
Gini i (log) , t-2	0.037	0.036	0.046	0.046
	(0.042)	(0.042)	(0.046)	(0.046)
Gini j (log), t-2	-0.334***	-0.331***	-0.341***	-0.340***
	(0.042)	(0.042)	(0.044)	(0.044)
Unemployment rate i (log), t-2	0.022**	0.024**	0.001	0.002
	(0.009)	(0.009)	(0.010)	(0.010)
Unemployment rate j (log), t-2	-0.027***	-0.034***	-0.030***	-0.034***
	(0.009)	(0.009)	(0.010)	(0.010)
Housing price i (log), t-2	-0.007	-0.008	-0.005	-0.006
	(0.011)	(0.011)	(0.011)	(0.011)
Housing price j (log), t-2	0.022**	0.025**	0.026**	0.029**
	(0.011)	(0.011)	(0.011)	(0.011)
Provision of housing i (log), t-2	0.354***	0.365***	0.210**	0.217**
	(0.083)	(0.083)	(0.087)	(0.087)
Provision of housing j (log), t-2	0.620***	0.563***	0.522***	0.497***
	(0.098)	(0.098)	(0.100)	(0.100)
New flats i (moving average, log), t-2	-0.007	-0.009	0.011	0.009
	(0.010)	(0.010)	(0.010)	(0.010)
New flats j (moving average log), t-2	-0.043***	-0.033***	-0.053***	-0.045***
	(0.010)	(0.010)	(0.011)	(0.011)
Life expectancy i (log), t-2	-0.490**	-0.471**	-0.429**	-0.406*
	(0.210)	(0.210)	(0.218)	(0.218)
Life expectancy j (log), t-2	-0.747***	-0.845***	-0.472**	-0.553**
	(0.210)	(0.209)	(0.215)	(0.215)
Infant mortality rate i (log), t-2	0.002	0.002	-0.003	-0.002
	(0.015)	(0.015)	(0.016)	(0.016)
Infant mortality rate j (log), t-2	-0.082***	-0.085***	-0.052***	-0.053***
	(0.017)	(0.017)	(0.017)	(0.017)
Doctors i (log), t-2	0.228***	0.213***	0.289***	0.272***
	(0.066)	(0.067)	(0.068)	(0.069)
Doctors j (log), t-2	0.173***	0.250***	0.165***	0.223***
	(0.062)	(0.063)	(0.063)	(0.065)
Hospital beds i (log), t-2	0.073*	0.076*	0.051	0.053
	(0.043)	(0.043)	(0.044)	(0.044)
Hospital beds j (log), t-2	0.310***	0.293***	0.251***	0.245***
	(0.044)	(0.044)	(0.045)	(0.045)
Telephones i (log), t-2	-0.030	-0.022	-0.114***	-0.106***
	(0.028)	(0.028)	(0.030)	(0.031)
Telephones j (log), t-2	-0.069**	-0.111***	-0.038	-0.066**
	(0.028)	(0.029)	(0.031)	(0.032)
Highway density i (log), t-2	0.013	0.014	0.005	0.006
	(0.019)	(0.019)	(0.019)	(0.019)

Highway density j (log), t-2	0.067***	0.065***	0.099***	0.096***
	(0.020)	(0.020)	(0.020)	(0.020)
Buses i (log), t-2	0.015*	0.016*	0.019**	0.020**
	(0.008)	(0.008)	(0.008)	(0.008)
Buses j (log), t-2	-0.032***	-0.034***	-0.054***	-0.057***
	(0.010)	(0.009)	(0.010)	(0.010)
Share of young i, t-2	-0.003	-0.006	-0.006	-0.009
	(0.006)	(0.006)	(0.007)	(0.007)
Share of young j, t-2	0.023***	0.036***	0.017**	0.028***
	(0.006)	(0.006)	(0.007)	(0.007)
Share of old i, t-2	-0.035***	-0.037***	-0.028***	-0.031***
	(0.005)	(0.005)	(0.005)	(0.005)
Share of old j, t-2	0.032***	0.046***	0.025***	0.035***
	(0.005)	(0.005)	(0.005)	(0.006)
Students i (log), t-2	-0.027**	-0.028**	-0.035***	-0.037***
	(0.011)	(0.011)	(0.011)	(0.011)
Students j (log), t-2	0.093***	0.098***	0.108***	0.113***
	(0.012)	(0.012)	(0.012)	(0.012)
Women i (log), t-2	0.261	0.231	-0.970***	-1.055***
	(0.246)	(0.246)	(0.310)	(0.317)
Women j (log), t-2	-4.599***	-4.449***	-5.143***	-4.838***
	(0.243)	(0.242)	(0.320)	(0.331)
year1999	-0.039***	-0.032***	-0.031***	-0.026**
	(0.010)	(0.010)	(0.011)	(0.011)
year2000	-0.004	0.025	-0.016	0.007
	(0.022)	(0.022)	(0.024)	(0.025)
year2001	-0.150***	-0.119***	-0.150***	-0.127***
	(0.023)	(0.023)	(0.025)	(0.026)
year2002	-0.191***	-0.148***	-0.160***	-0.131***
	(0.032)	(0.033)	(0.036)	(0.037)
year2003	-0.205***	-0.156***	-0.168***	-0.134***
	(0.038)	(0.039)	(0.042)	(0.043)
year2004	-0.316***	-0.257***	-0.269***	-0.228***
	(0.046)	(0.046)	(0.051)	(0.052)
year2005	-0.358***	-0.282***	-0.291***	-0.239***
	(0.053)	(0.054)	(0.060)	(0.062)
year2006	-0.340***	-0.254***	-0.268***	-0.208***
	(0.059)	(0.061)	(0.067)	(0.070)
year2007	-0.314***	-0.218***	-0.232***	-0.166**
	(0.064)	(0.067)	(0.073)	(0.077)
year2008	-0.352***	-0.247***	-0.284***	-0.210**
	(0.070)	(0.073)	(0.079)	(0.084)
year2009	-0.476***	-0.367***	-0.417***	-0.340***
	(0.075)	(0.078)	(0.084)	(0.089)
year2010	-0.390***	-0.278***	-0.334***	-0.255***
	(0.077)	(0.081)	(0.087)	(0.092)
Observations	72,808	72,808	68,972	68,972
R2-within	0.222	0.223	0.225	0.225
Number of pairs	5,929	5,929	5,625	5,625

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure 1. Number of regions above and below thresholds over time for log of income to minimum living standards.

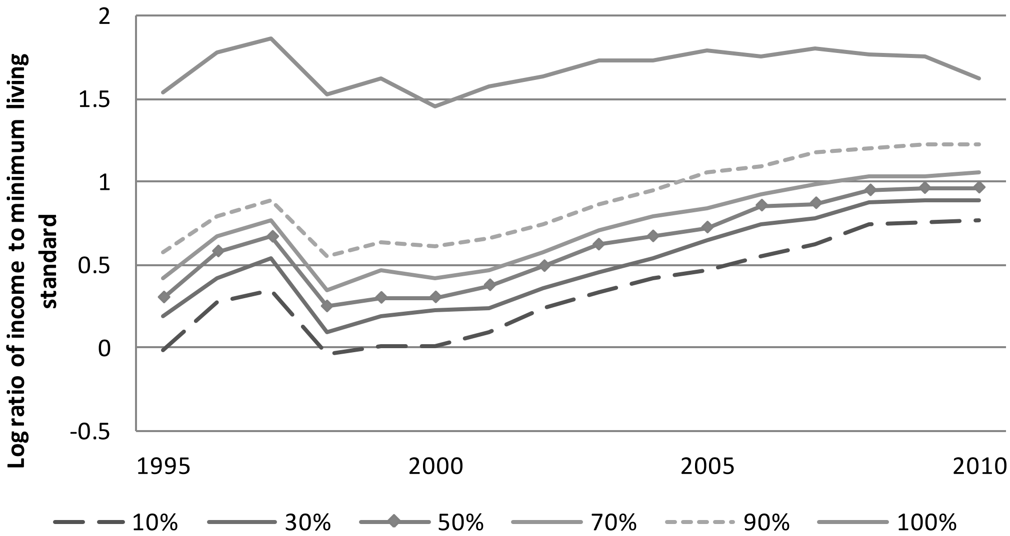


Figure 2. Unweighted standard deviation between regions, logs of real wages, real incomes, real GDP per capita and unemployment rate.