Determinants of homeownership rates in Russian regions

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Abstract

After 70 years of the Communist rule that condemned the private homeownership, the mass privatization carried out in the early 1990s — early 2000s led virtually overnight to the emergence of a broad class of homeowners in Russia. The homeownership rate in Russia surged from the meager 26.4% in 1990 to 87.1% in 2015. An additional impulse to this process was given by the introduction of the mortgage market in the early 2000s. Thus, the aim of this paper is to assess the impact of these two developments on the homeownership using a wide panel of Russian regions covering the period from 2001 through 2015. To do this we take advantage of the panel data model accounting for spatial dependence.

Keywords: Homeownership rate; Russian regions; panel data model with spatial effects.
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1. Introduction

The mass privatization carried out in Russia in the early 1990s — early 2000s led to the emergence of a broad class of homeowners.[1] Between 1990 and 2015, the homeownership rate increased from 26,4% to 87.1%, see Figure 1. The question of whether such a dramatic change is a success or failure is difficult to answer unequivocally. According to the literature, the choice between the own and rental housing can affect the social responsibility of the citizens, their political activity, and labor mobility.

On the one hand, the homeowners are thought to more actively participate in the social life of the local communities, as it may affect the value of their property.

On the other hand, it appears that many Russian homeowners who came in possession of the dwellings as a result of free privatization are incapable of fulfilling their ownership-related duties neither psychologically nor economically. They assume that their duties and problems as owners should be fulfilled and solved by the government and do not have funds in their possession enough to keep their property in proper state. In the newly built houses, where homeowners associations exist and property rights are diffused, the relationships between owners are often overly complicated, which also prevents the normal functioning of such houses.

Moreover, homeownership may limit the labor mobility, which is essential in terms of providing the economic growth. By reducing the incentive to move a higher homeownership can translate into higher unemployment — the hypothesis known as *Oswald conjecture*; see Oswald (1996). The findings of Lerbs (2011) for German regions and those of Blanchflower and Oswald (2013) for the US states support the Oswald hypothesis. By contrast, Huber et al. (2017), who investigate the relation between the homeownership and unemployment as well as mobility in

[1] In the Soviet Union, the very first legal act that paved the way to the privatization of housing was the ordinance of the Council of Ministers of the USSR №1400 of December 2, 1988 "On the selling of the state and public dwellings to the citizens in their personal property" («О продаже гражданам в личную собственность квартир в домах государственного и общественного жилищного фонда»). As already the name of the document suggests, it provided for a privatization against money. Possibly due to this reason, prior to the breakdown of the Soviet Union, few dwellings were privatized. In Russia, the mass and free privatization process was started by the federal law №1541-1 of July 4, 1991 "On privatization of the housing stock in the Russian Federation" («О приватизации жилищного фонда в Российской Федерации»). Initially, privatization was restricted in time. However, the federal law №14-ФЗ of February 22, 2017 "On recognizing obsolete some provisions of legal acts of the Russian Federation" («О признании утратившими силу отдельных положений законодательных актов Российской Федерации») lifted this restriction. From now on, the state and municipal housing can be privatized forever.

10 CEE countries (including three former USSR republics), find no evidence that homeownership has detrimental impact on individuals' unemployment risks and only weak evidence that homeownership limits mobility.

The literature also points out other possibly detrimental effects of the high homeownership. Lo (2012) using Taiwan data finds out that higher homeownership leads to lower fertility rates. Homeownership may exert adverse effects on the propensity to the enterpreneurship. As shown in Bracke et al. (2012), purchasing house reduces the probability of starting business by 20-25%. This result is driven by households with mortgages and persists for several years after entering in the homeownership. Using a hedonic house price model where neighborhood homeownership rate is included as an explanatory variable Kortelainen and Saarimaa (2015) find no evidence of positive externalities from neighborhood homeownership rate.

Therefore, a development and expansion of a well functioning rental housing market is needed. The government appears to recognize, at least rhetorically, the need to develop the rental housing market. For example, the Russian Federation Government Decree of September 17, 2001 №675 *"On Federal Target Program 'Housing' for the years 2002–2010"* stipulates the development of rental housing sector as well as 'change in the housing legislation in order to improve the mechanisms of tenants' rights protection on the housing market'. Among the main goals of the Russian Federation Government Decree of December 17, 2010 №1050 *"On Federal Target Program 'Housing' for the years 2015–2020"* there is a task to create a market of affordable rental housing. Finally, on the 21st of July 2014 the Federal Law *"Concerning the Introduction of Amendments to the Housing Code of the Russian Federation and certain legal acts of the Russian Federation in terms of legislative regulation of housing rental relationships concerning housing facilities intended for social needs"* was adopted, which allows the regional and municipal authorities of the subjects of Russian Federation as well as private developers to build rental apartment buildings. Moreover, private developers may receive various supports in the form of a cheap land and provision of utility infrastructure, provided that they offer the lowest rent rate in the auction.

However, the main focus of the legislative efforts of the Russian government is on promoting the private homeownership. An important step in this direction is the development of the mortgage market. A key piece of legislation enacted in 1998 is the federal law "On Mortgage

(Pledge of Real Estate)"; see Kosareva et al. (2000), p. 177.

Prior to the 1998 financial crisis, the overall housing loan volume remained low. According to the best survey-based estimate (at that time, the Central Bank of Russia did not collect data on mortgage lending), 10,000 to 15,000 loans per year were being originated nationally; see Kosareva et al. (2000), p. 181. In the mid-2000s, the volume of the housing credits increased substantially: while in 2000, the mortgage credit amounted to just 29 billion rubles, by 2007 it jumped to 556 billion rubles; Khmelnitskaya (2013). Neverless, even in the mid-2000s, just 10% of Russian households could afford to take out a mortgage; by 2012 this figure increased to 23%; Khmelnitskaya (2013).

In February 2017, a law was adopted that removed any time constraints on the housing privatization in Russia. On April 20, 2015, Russian government issued an ordinance to provide the state support to debtors in restructuring the mortgage credits: interest rate reduced to 12% and 4.5 billion rubles to compensate the bank losses due to inability of debtors to pay the credits.[2]

In this paper, our objective is to assess the impact that the mass privatization of 1990s and introduction of mortgage market in the early 2000s exerted on the homeownership rates in Russia. For this purpose, we will investigate the regional variation of the homeownership rate between 2001 and 2013.

2. Review of literature on determinants of homeownership

Eilbott and Binkowski (1985) was one of the first studies to investigate the determinants of the regional variation in the homeownership. Blackley and Follain (1988) study variations in aggregated homeownership rates among metropolitan areas. They find that the key determinants of variations in homeownership rates are mobility and racial composition characteristics, household income and the asset price of owner-occupied housing for some household types. Barrios Garcia and Rodriguez Hernandez (2004) examined the relationship between homeownership rates and unemployment and showed that the Oswald's hypothesis is no longer valid for Spanish provinces. Lauridsen et al. (2009) confirmed the effect of determinants on home

[2] «О предоставлении помощи отдельным категориям заёмщиков по ипотечным жилищным кредитам».

ownership for Denmark and showed the importance of accounting for geographical variation as well as considerable dynamics. Lerbs and Oberst (2014) cross-section of 90 German planning regions accounting for spatial dependence. They identify the regional price and affordability of owner-occupied housing, as well as the regional composition of the housing stock as important determinants of disparities in homeownership rates between western and eastern Germany. Gwin and Ong (2008) is a cross-country study based on the United Nations data from 1993 and 1998.

Typical U.S. studies consider individual decision to own as a function of the cost of owning, wealth, credit constraint, investment demand and household demand for housing services. Coulson (2002) studies differences in the propensity to own across U.S. regions, finding that the price of renting and owning plays a major role, whereas individual demographic characteristics are not important.

There are few studies that investigate the homeownership in Russia. They all use the microdata from surveys. For example, Plotnikova (2010) using the data from the Russia Longitudinal Monitoring Survey (RLMS) for the 1992-1994 period and a logit model investigates the factors behind the decision to privatize dwellings. She concludes that a significant contribution to the decision not to privatize is made by the uncertainty concerning the mechanisms of maintenance and servicing of own (privatized) housing. The level of income, unlike education, does not affect the decision on privatization of housing.

3. Data

In this study, we take advantage of the data on homeownership rates in 79 Russian regions between 1995 and 2015.

The Federal State Statistics Service holds record of the distribution of the housing stock (measured in million square meters) by types of ownership including the private property by individuals. However, this indicator is different from the indicators, calculated, for example, in the European Union or the United States, which look at the number of households living in own dwellings or the number of dwellings occupied by their owners. Thus, the Russian indicator cannot be directly compared with EU or US statistics. Moreover, by taking into account the property rights only but not the occupancy status the Russian measure of homeownership may

underestimate the actual tenant occupancy. In Russia, a non-negligible part of the private rental market is in shadow. For example, in Moscow alone, 1 million flats are illegally rented; Khmelnitskaya (2013).

There are two alternative sources of data based on which homeownership rate in Russia can be computed: 1) the Life in Transition Survey (LITS) by European Bank for Reconstruction and Development and 2) the Russian Longitudinal Monitoring Survey of National Research University Higher School of Economics, RLMS-HSE. Both sources allow calculating the homeownership rate according to the international standards. LITS was conducted two times — in 2006, 2010, and 2015/2016, but the questions concerning the housing ownership were included only in the last two waves. This survey covers 35 countries, including Russia. For Russia there are 1584 and 1507 observations available in this survey for 2010 and 2015/2016, respectively. If we take into account that these observations include households from all over the country, then it becomes clear that there are very few observations available for each specific city.

Unlike LITS, the RLMS-HSE is conducted annually since 1994. In total, for whole Russia the number of observations (households) varies between 3730 in 1996 and 8368 in 2012. But the regional coverage is not sufficient. The survey covers 36 regions and the largest numbers of observations are available for Moscow and St. Petersburg (varying between 450 and 600 for different years). The homeownership rates estimated using the RLMS data at the national level do not reflect the actual situation: since 1994, they remain almost constant varying within a narrow band between 89 and 92%. LITS produces for 2010 and 2015/2016 a HOR estimate of 84.1% and 84.9%, correspondingly. This is relatively close to the values reported by the official statistics for 2010 and 2015/2016: 82.9% and 87.1%, respectively.

The variables used in this study are listed in Table 1.

Only national nominal interest rate is available. However, since there are region-specific inflation rates, the regional real interest rates can be calculated as follows:

$$i^r_{it} = 100 \times \left(\frac{100 + i_t}{100 + \pi^e_{it}} - 1 \right) \tag{1}$$

where i_t is the nationwide nominal interest rate in period t and π^e_{it} is the expected inflation

rate in region i:

$$\pi^e_{it} = \pi^e_t + \overline{\pi}_i - \overline{\pi} \tag{2}$$

where π^e_t is the nationwide expected inflation rate; $\overline{\pi}_i$ is the average region-specific inflation rate over the whole sample period, and $\overline{\pi}$ is the average national inflation rate. The national expected inflation rate is approximated by inflation forecasts for the next year made for Russia by the International Monetary Fund and regularly published in its World Economic Outlook. Since the forecasts are produced twice a year — in the spring and the fall — the mean of the two is used. Unfortunately, there are only nationwide inflation forecasts. Therefore, the region-specific inflation forecasts are computed by subtracting from the national forecasts the difference between the long-run means of the national and regional inflation rates.

In addition, we account for the effects of economic crises, in particular, of the Great recession. According to the business cycle chronology of the Economic Cycle Research Institute (ECRI),[3] during the period under inspection there was one recession in Russia, which started after May 2008 and ended in May 2009. For this recession we constructed a dummy variable that was interacted with privatization, housing loans-to-income ratio, and real lending rate.

4. Methodology

Given a relatively short time dimension of our data ($T = 20$) and a large cross-section dimension ($N = 80$), we decided to apply the panel-data estimation techniques. Moreover, the spatial effects can be important when using regional data. The failure to account for the possible spatial dependence can lead to biased estimates. Therefore, the HOR data are tested for spatial dependence using Moran's I statistic.

Spatial panel data model using package *splm* of the statistical and graphical programming language **R** of Millo and Piras (2012).

A *general static panel model with a spatial lag of the dependent variable and spatial autoregressive errors* can be written as:

[3]The business cycle chronology of the ECRI for 21 countries, including Russian Federation can be found here: https://www.businesscycle.com/ecri-business-cycles/international-business-cycle-dates-chronologies.

$$y = \lambda(I_T \otimes W_N)y + X\beta + u \tag{3}$$

where y is an $NT \times 1$ vector of observations on the dependent variable, X is a $NT \times k$ matrix of observations on the non-stochastic exogenous regressors, I_T is an identity matrix of dimension T, W_N is the $N \times N$ spatial weights matrix of known constants whose diagonal elements are set to zero, and λ is the corresponding spatial parameter. The disturbance vector, u, is the sum of two terms

$$u = (\imath \otimes I_N)\mu + \varepsilon \tag{4}$$

where $\imath_T$ is a $T \times 1$ vector of ones, I_N is an $N \times N$ identity matrix, μ is a vector of time-invariant individual specific effects (not spatially autocorrelated), and ε is a vector of spatially autocorrelated errors following a spatial autoregressive process of the form:

$$\varepsilon = \rho(I_T \otimes W_N)\varepsilon + v \tag{5}$$

where ρ ($|\rho| < 1$) is the spatial autoregressive parameter, W_N is the spatial weights matrix, $v_{it} \sim IID(0, \sigma^2)$, and $\varepsilon_{it} \sim IID(0, \sigma_\varepsilon^2)$.

A *fixed effects spatial lag model* can be written in stacked form as

$$y = \lambda(I_T \otimes W_N)y + \lambda(\imath_T \otimes I_N)\mu + X\beta + \varepsilon \tag{6}$$

We also estimate spatial dynamic models: spatial autoregressive model and spatial durbin model.

$$y = y_{t-1} + \lambda(I_T \otimes W_N)y + \lambda(\imath_T \otimes I_N)\mu + X\beta + \varepsilon \tag{7}$$

$$y = y_{t-1} + \lambda(I_T \otimes W_N)y + \lambda(\imath_T \otimes I_N)\mu + X\beta + (I_T \otimes W_N)X\theta + \varepsilon \tag{8}$$

5. Discussion of results

5.1. Specification tests

The variables are first tested for stationarity using the panel unit root tests of ***. The p-values of the tests with deterministic intercept are reported in Table 2.[4] In all the tests, the null hypothesis is the presence of unit root. Except for new dwellings per 10,000 persons and net migration rates for which tests show mixed results, all other variables appear to be stationary.

Tests of fixed versus random effects.

Although housing markets have a local nature, they might be also related across regions, especially, if these are neighbor regions. Therefore, tests for spatial dependence are conducted. Three indicators of spatial proximity are used: Great Circle distance between the region capitals, railroad distances between these capitals (http://www.postcalc.ru/parcel_zones.html), and automobile travel times between the capital cities of regions (http://ati.su/Trace/). SOURCES, RESULTS.

5.2. Estimation results

Estimation results are reported in Tables 3 and 4.

We find that the share of old-age persons exerts a positive and significant effect on the HOR. This finding corroborates theoretical results formulated by Plotnikova (2010), p. 15: "the bequest motive will be stronger for older households making them more likely to privatize". Therefore, the probability of being homeowners should be higher for the older persons.

Migration exerts a statistically significant negative impact on the homeownership rate. The migrants may more likely lack money to buy housing, less likely to inherit it, or may simply need more time than locals to look around and find a dwelling that would match their preferences.

The share of rural population affects the HOR positively. In rural areas, the homeownership is more widespread, given the composition of its housing stock: single-family houses are dominating.

Privatization as a rule exerts no statistically significant impact on the homeownership rate. This can be explained by the effect that due to missing values our estimation sample starts in

[4]Similar results are obtained when no intercept is used.

2001, when the period of the most active privatization of housing was already over; see Figure 3. However, privatization has a positive statistically significant effect on the homeownership during the Great recession. During that period, its importance might have increased because quickly falling incomes made the purchase of housing much more difficult. Indeed, in 2009, the privatization rate almost doubled compared to the 2007–2008 period.

The real lending interest rate appears to have no impact on the homeownership. This might be a result of the two mutually offsetting effects. On the one hand, the real interest rate is an opportunity cost of investing in housing. Thus, an increase in the real interest rate should make owning the housing less attractive. On the other hand, it may well be the case that interest rates decrease during economic crises, when the ability to pay for purchasing dwellings is very low due to financial stress of the households.

The housing lending-to-income ratio positively and statistically significantly affects the homeownership in Russian regions.

Estimation results for dynamic spatial models are reported in Tables 5, 6 and 7, which correspond to three different measures of proximity: distances between regional capitals, travel time between regional capitals and railroad distances. We estimated two specifications of a dynamic spatial model: spatial autoregressive model and spatial durbin model. Spatial lag has a positive and significant effect only for the spatial autoregressive model with distances between regional capitals as a measure of proximity in contrast to models without dynamic lag. This might be related to the fact that spatial dependence revealed in non-dynamic models partly reflects homeownership rate in previous period.

Looking at the results of the estimation, in particular direct and indirect effects, we find that the number of new dwellings, share of working age population and migration do not have a significant impact on the homeownership rate.

Share of younger than working age population have a negative and significant impact on the homeownership rate. This means that young people are less likely to privatize, which corresponds to the theoretical finding that older people are more likely to privatize.

Privatization appears to have a positive and significant impact on the homeownership rate.

As for the real interest rate, similar to the case of non-dynamic models it has no influence on the homeownership rate.

5.3. Counterfactual experiments

In order to quantify effects of privatization of housing and development of the mortgage loans market the counterfactual experiments can be carried out. They answer the question: How high would be the homeownership had the government stop privatization in the early 2000s or had it not introduced the residential mortgage in Russia.

6. Conclusion

In this paper, we investigated the determinants of the regional variation of the homeownership rates as well as the effects of mass privatization and introduction of the mortgage market in Russia. Accounting for spatial dependence we find a positive and significant effect of the share of old-aged persons, significant and negative impact of migration, positive and significant effect of the share of rural population.

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Appendix

Table 1: Description of variables

Code	Description	Minimum	Mean	Maximum
New_houses	Floor area of completed houses, million sq. m	0	1,197	84,191
New_houses2pop	Floor area of completed houses, sq. m / 1000 persons	5	291.4	1,385
New_flats	Number of completed dwellings	8	15,451.4	1,124,446
New_flats2pop	Number of completed dwellings / 1000 persons	0.1	3.7	20.5
Gender_ratio	Females / 1000 males	901	1,137.9	1,249
Share_young	Share of younger than working age population, %	12.1	19.3	37.1
Share_WAge	Share of working age population, %	51.3	60.5	70.9
Share_old	Share of older than working age population, %	2.8	20.2	29.5
Migrate	Net migration / 10,000 persons	−1,849	−5.2	2,427
Rural	Share of rural population, %	0.01	31.9	76.1
Own_private	Share of housing in private property, %	27.9	79.6	99.8
Own_personal	Share of housing in personal private property, %	26	76.2	99.8
Own_state	Share of housing in state property, %	0	3.8	35.4
Own_municip	Share of housing in municipal property, %	0.1	16.4	70
Income_PC	Monthly income per capita, rubles	129	30,011	1,804,000
CPI	Consumer price index, with respect to December 1995, times	1	8.0	24.6

Table 2: Panel unit root tests, p-values

Variable	Levin-Lin	Im-Pesaran-Shin	Maddala-Wu
Own_personal	0	0	0
RIncome	0	0	0
New_flats	0.0001	0.003	0
New_flats2pop	0.000	0.464	0
Migrate	0.954	0.298	0
Share_WAge	0	0	0
Rural	0.000	0	0
RHous_loan.rub	0	0	0
Share_hous_loan	0	0.000	0

Table 3: Spatial panel data models, truck travel times as a measure of proximity

Coefficient	Spatial lag – spatial error	Spatial lag	Spatial error
λ	0.419^{***}	0.382^{***}	
	(0.122)	(0.048)	
ρ	-0.057		0.387^{***}
	(0.167)		(0.049)
New_flats2pop	0.018	0.015	-0.008
	(0.110)	(0.110)	(0.110)
Share_old	0.969^{***}	0.982^{***}	0.997^{***}
	(0.182)	(0.171)	(0.194)
Migrate	-0.009^{**}	-0.009^{**}	-0.009^{**}
	(0.004)	(0.004)	(0.004)
Rural	0.368^{***}	0.376^{***}	0.422^{***}
	(0.087)	(0.087)	(0.088)
Share_hous_loan	0.822^{***}	0.824^{***}	0.797^{***}
	(0.195)	(0.195)	(0.207)

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table 4: Spatial panel data models, railroad distances as a measure of proximity

Coefficient	Spatial lag – spatial error	Spatial lag	Spatial error
λ	0.639^{***}	0.234^{***}	
	(0.040)	(0.050)	
ρ	-0.543^{***}		0.207^{***}
	(0.066)		(0.053)
New_flats2pop	0.121	0.147	0.147
	(0.109)	(0.120)	(0.120)
Share_old	0.536^{***}	0.698^{***}	0.743^{***}
	(0.175)	(0.208)	(0.216)
Migrate	-0.007	-0.009^{*}	-0.008^{*}
	(0.004)	(0.005)	(0.005)
Rural	0.418^{***}	0.435^{***}	0.438^{***}
	(0.087)	(0.097)	(0.098)
Share_hous_loan	0.627^{***}	0.756^{***}	0.765^{***}
	(0.165)	(0.197)	(0.203)
RIncome	-3.255^{***}	-3.876^{***}	-3.796^{***}
	(0.795)	(0.865)	(0.860)

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

Table 5: Spatial dynamic panel data models, distances between region capitals as a measure of proximity

	(1) SAR		(2) SDM	
Main				
L.Own_personal	0.842***	(44.48)	0.834***	(41.17)
New_flats2pop	0.00486	(0.08)	-0.0275	(-0.42)
Share_WAge	−0.206*	(-2.04)	-0.196	(-1.55)
Share_young	−0.424*	(-2.28)	-0.385	(-1.88)
Migrate	-0.00378	(-1.05)	-0.00380	(-1.05)
Priv2pop	120.8***	(5.47)	92.69***	(3.49)
RLend_rate	0.0508	(1.22)	0.752	(0.31)
Spatial				
rho	0.0702*	(2.42)	0.0392	(0.89)
Variance				
sigma2_e	5.790***	(24.71)	5.745***	(24.71)
Direct				
New_flats2pop	0.00961	(0.14)	-0.0213	(-0.30)
Share_WAge	-0.200	(-1.85)	-0.189	(-1.41)
Share_young	−0.416*	(-2.17)	-0.378	(-1.88)
Migrate	-0.00313	(-0.90)	-0.00316	(-0.91)
Priv2pop	125.4***	(5.73)	99.01***	(3.75)
RLend_rate	0.0513	(1.25)	0.776	(0.31)
Indirect				
New_flats2pop	0.000245	(0.04)	0.286*	(1.98)
Share_WAge	-0.0132	(-1.93)	-0.00749	(-0.04)
Share_young	−0.0278*	(-2.27)	-0.135	(-0.36)
Migrate	-0.000269	(-0.82)	-0.0119	(-1.27)
Priv2pop	9.705*	(2.09)	72.37	(1.82)
RLend_rate	0.00370	(1.12)	-0.744	(-0.30)
Total				
New_flats2pop	0.00986	(0.13)	0.265	(1.73)
Share_WAge	-0.213	(-1.90)	-0.197	(-0.92)
Share_young	−0.444*	(-2.26)	-0.514	(-1.32)
Migrate	-0.00339	(-0.90)	-0.0150	(-1.48)
Priv2pop	135.1***	(5.61)	171.4***	(5.02)
RLend_rate	0.0550	(1.26)	0.0319	(0.73)
Wx				
New_flats2pop			0.287	(1.96)
Share_WAge			0.0223	(0.10)
Share_young			-0.0861	(-0.22)
Migrate			-0.0118	(-1.29)
Priv2pop			73.23	(1.90)
RLend_rate			-0.719	(-0.30)

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: Spatial dynamic panel data models, travel time as a measure of proximity

	(1) SAR		(2) SDM	
Main				
L.Own_personal	0.844***	(44.80)	0.824***	(40.87)
New_flats2pop	0.0231	(0.37)	-0.0223	(-0.35)
Share_WAge	−0.230*	(-2.18)	-0.223	(-1.70)
Share_young	−0.477*	(-2.46)	-0.381	(-1.77)
Migrate	-0.00379	(-1.05)	-0.00446	(-1.23)
Priv2pop	119.4***	(5.40)	90.09***	(3.45)
RLend_rate	0.0534	(1.28)	0.0834	(0.04)
Spatial				
rho	0.0577	(1.82)	0.00479	(0.11)
Variance				
sigma2_e	5.806***	(24.71)	5.732***	(24.71)
Direct				
New_flats2pop	0.0278	(0.41)	-0.0180	(-0.26)
Share_WAge	−0.223*	(-1.98)	-0.216	(-1.53)
Share_young	−0.468*	(-2.33)	-0.372	(-1.74)
Migrate	-0.00313	(-0.90)	-0.00377	(-1.09)
Priv2pop	123.9***	(5.66)	95.93***	(3.68)
RLend_rate	0.0538	(1.31)	0.110	(0.05)
Indirect				
New_flats2pop	0.00132	(0.26)	0.372**	(2.76)
Share_WAge	-0.0115	(-1.71)	-0.129	(-0.67)
Share_young	-0.0246	(-1.92)	-0.427	(-1.27)
Migrate	-0.000228	(-0.78)	-0.00558	(-0.64)
Priv2pop	7.909	(1.65)	85.97*	(2.17)
RLend_rate	0.00313	(1.04)	-0.0967	(-0.04)
Total				
New_flats2pop	0.0291	(0.40)	0.354*	(2.47)
Share_WAge	−0.235*	(-2.05)	-0.345	(-1.89)
Share_young	−0.492*	(-2.45)	−0.799*	(-2.43)
Migrate	-0.00336	(-0.90)	-0.00935	(-0.98)
Priv2pop	131.9***	(5.55)	181.9***	(5.40)
RLend_rate	0.0570	(1.32)	0.0136	(0.33)
Wx				
New_flats2pop			0.385**	(2.67)
Share_WAge			-0.108	(-0.51)
Share_young			-0.403	(-1.09)
Migrate			-0.00609	(-0.68)
Priv2pop			94.00*	(2.40)
RLend_rate			-0.0675	(-0.03)

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: Spatial dynamic panel data models, railroads distances as a measure of proximity

	(1) SAR		(2) SDM	
Main				
L.Own_personal	0.848***	(45.83)	0.851***	(43.16)
New_flats2pop	0.0271	(0.45)	0.0197	(0.31)
Share_WAge	−0.240*	(-2.39)	-0.199	(-1.56)
Share_young	−0.505**	(-2.77)	−0.503*	(-2.55)
Migrate	-0.00391	(-1.08)	-0.00334	(-0.92)
Priv2pop	120.4***	(5.45)	94.92***	(3.60)
RLend_rate	0.0537	(1.28)	0.913	(0.38)
Spatial				
rho	0.0482	(1.83)	0.0399	(1.03)
Variance				
sigma2_e	5.805***	(24.71)	5.768***	(24.71)
Direct				
New_flats2pop	0.0318	(0.47)	0.0248	(0.35)
Share_WAge	−0.234*	(-2.18)	-0.192	(-1.42)
Share_young	−0.496**	(-2.67)	−0.496*	(-2.56)
Migrate	-0.00325	(-0.93)	-0.00274	(-0.79)
Priv2pop	124.9***	(5.70)	101.2***	(3.86)
RLend_rate	0.0542	(1.33)	0.937	(0.39)
Indirect				
New_flats2pop	0.00139	(0.33)	0.0731	(0.71)
Share_WAge	-0.0103	(-1.75)	-0.0665	(-0.38)
Share_young	-0.0224	(-1.92)	-0.0708	(-0.22)
Migrate	-0.000198	(-0.81)	-0.0138	(-1.70)
Priv2pop	6.567	(1.66)	59.91	(1.55)
RLend_rate	0.00261	(1.05)	-0.883	(-0.36)
Total				
New_flats2pop	0.0332	(0.47)	0.0979	(0.76)
Share_WAge	−0.244*	(-2.26)	-0.258	(-1.40)
Share_young	−0.519**	(-2.78)	-0.567	(-1.68)
Migrate	-0.00345	(-0.93)	-0.0165	(-1.84)
Priv2pop	131.5***	(5.61)	161.1***	(4.79)
RLend_rate	0.0569	(1.34)	0.0540	(1.32)
Wx				
New_flats2pop			0.0745	(0.74)
Share_WAge			-0.0392	(-0.20)
Share_young			-0.0276	(-0.08)
Migrate			-0.0137	(-1.72)
Priv2pop			60.47	(1.60)
RLend_rate			-0.858	(-0.36)

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1: Evolution of homeownership rate in Russia, 1940–2014

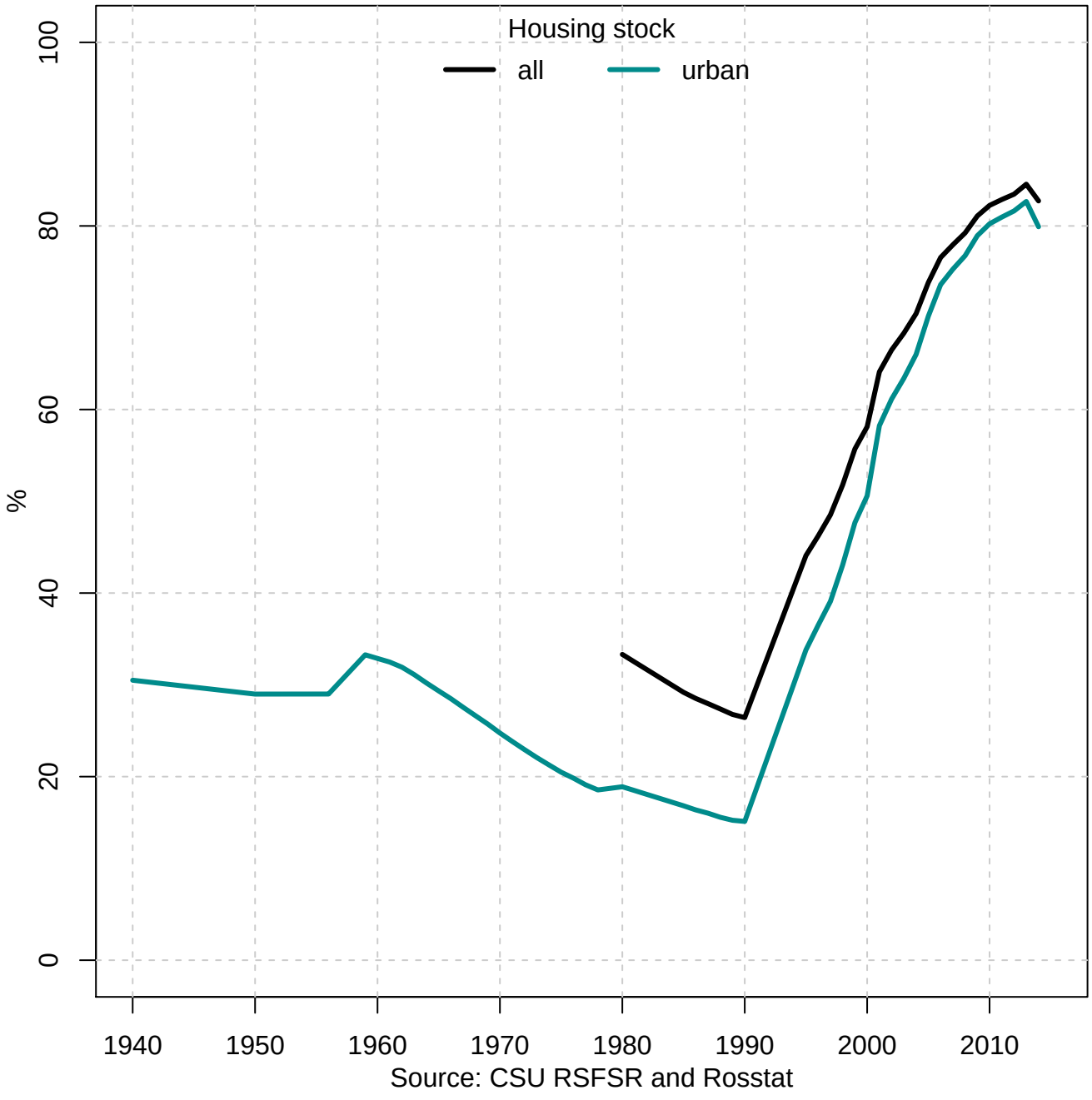

Figure 2: Homeownership rates in Russian regions, 2013

Figure 3: Privatization of housing in Russia, 1989–2015

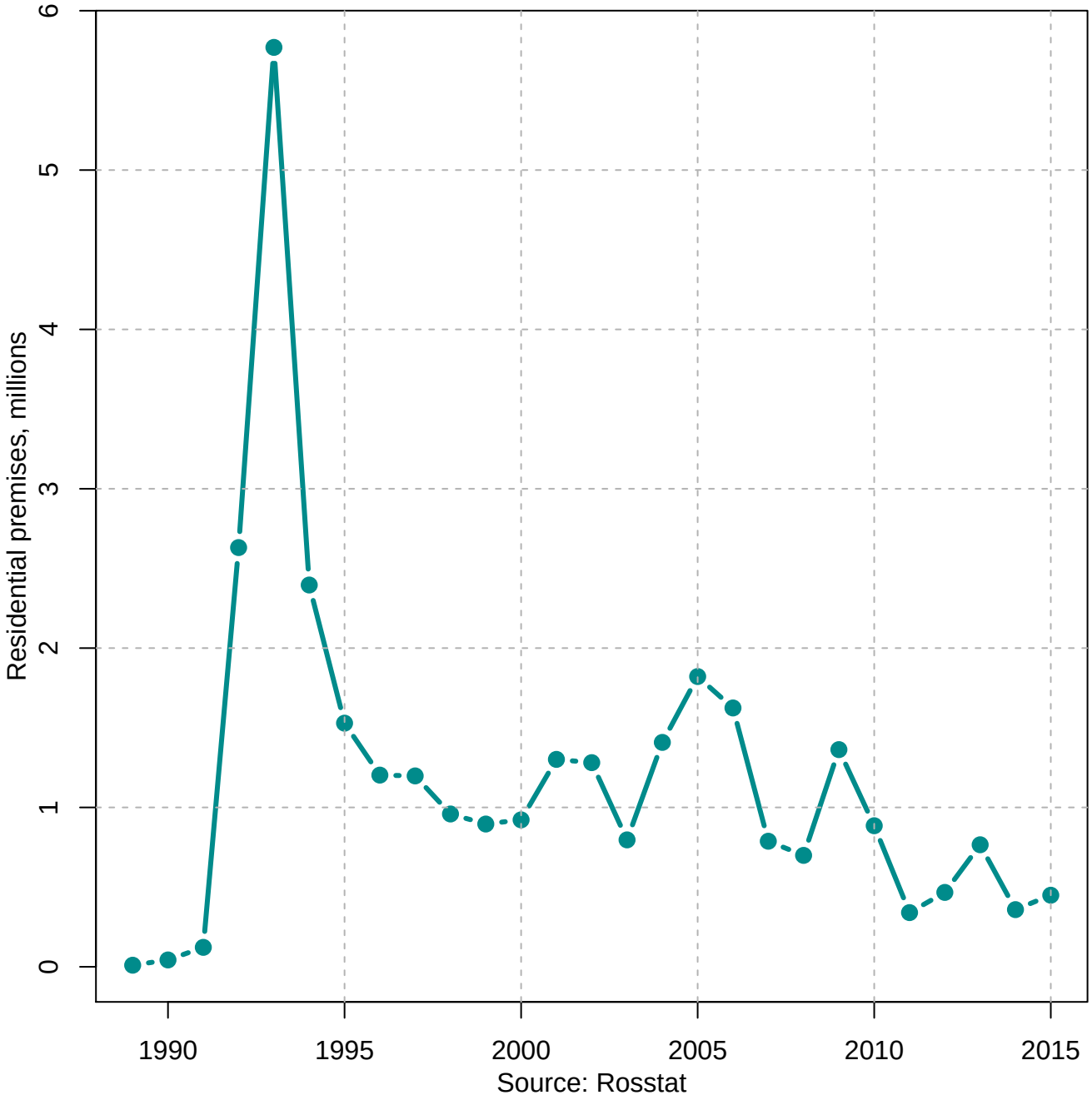

Figure 4: Mortgage loans-to-money income ratio in Russia, 2005–2015