Chapter 10: The Housing Market and Housing Finance in Russia and Its Regions

A Quantitative Analysis

Carsten Sprenger

ICEF, HIGHER SCHOOL OF ECONOMICS, MOSCOW, RUSSIA

***Branko Urošević*[1]**

FACULTY OF ECONOMICS, UNIVERSITY OF BELGRADE, SERBIA

In the past decade Russia has experienced a period of sustained economic growth. Russia's economy is largely based on natural resources, most notably oil and gas. Exhibit 10.1 shows the change in Russia's GDP since 2000 as well as the strong correlation between oil price levels and Russia's GDP. This does not imply, however, that Russia's GDP is influenced entirely by revenue from oil and gas exports. First of all, other sectors such as transport, financial services, construction, steel, parts of manufacturing, food as well as wholesale and retail trade have also grown strongly. Second, high capital inflows, based on the expectation of further resource-driven growth, have facilitated much-needed investment in the outdated capital stock in Russia. Third, a number of reforms such as a tax reform, setting up a stabilization fund to absorb part of the windfall gains from high oil prices, and prudent monetary and fiscal policies have contributed to trickling down of oil revenues through the economy and a general increase in living standards. These qualifying remarks do not, however, contradict the fact that the Russian economy remains highly susceptible to volatile world market prices for natural resources, in particular oil and gas.

Exhibit 10.1: GDP and oil price [figure - Bardhan_10_art.xls]

Source: Oil price: Finam; GDP: Federal Statistical Office (Rosstat)

The economic growth since the beginning of the 2000's has been accompanied by an unprecedented increase in house prices. The price to income ratio of the Russian housing market is now one of the highest in the

world: The ratio of the price of a 100 square meter apartment to annual GDP per capita is 140 according to the latest data from the Global Property Guide.[2] Comparable numbers are 46 in the UK, 35 in the US and in Poland, and 9 in Germany. During the mass privatization of apartments, residents who used to rent their apartments from the state were transferred ownership rights at almost no cost. This has lead to a high degree of owner-occupied housing. The rental market is, therefore, less developed, apart from an elite segment.

Since 2005, mortgage lending has shown strong growth, both in volumes and numbers of loans, but the use of mortgage financing is still relatively modest. In Moscow, Russia's most developed housing market, in 2008, less than 30 per cent of the transactions in the primary and secondary markets involved mortgage financing.

The main providers of mortgage loans are large Russian banks controlled by the government. In general, the Russian banking system is dominated by banks that are directly or indirectly controlled by the government. Vernikov (2009) estimates that the share of state-controlled banks in total assets is about 56 per cent (as of July 1, 2009). The five largest banks, Sberbank, VTB Group, Gazprombank, Rosselkhozbank and Bank Moskvy – all of them state-owned – account alone for 49 per cent of total banking assets in 2009. The market share of these five banks in mortgage lending, in 2008, was 47 per cent.

While in the US the decline in house prices preceded the outbreak of the financial crisis in 2007 and was one of its primary triggers, in Russia the situation was different. Namely, the crisis there was caused primarily by the slowing world economy, the corresponding reduction in oil revenues and the reversal in capital flows that previously entered emerging markets. In turn, this negatively affected housing and housing finance markets. The crisis reached Russia with some delay: during the year of 2007 it was still seen as a safe haven since Russia's direct exposure to subprime mortgage-backed securities was low.[3]

Many Russian banks had been relying on external borrowing as an important source of funding. This is reflected in the high loan to deposit ratio of more than 120 per cent in 2008, which is high for emerging market standards. At the beginning of the crisis, more than 40% of external borrowing by banks was short-term (World Bank, 2008). This entailed a considerable rollover risk, which has lead to liquidity problems once international capital started to withdraw from emerging markets. For Russia, the falling oil price accelerated the capital outflow. In the last months of 2008, liquidity problems were growing throughout the domestic banking sector.

Many banks reacted by curtailing their lending programs, in particular mortgage lending. If they did not abandon their mortgage lending programs altogether they increased downpayment and income requirements, increased interest rates and shortened the maturity of mortgage contracts. With decreased demand due to the overall economic uncertainty, prices in the primary housing

market stopped increasing in the fourth quarter of 2008 and were falling all throughout 2009. The secondary market moved in the same direction with some delay.

In this chapter, we focus on a quantitative analysis of the housing and housing finance markets in Russia and its regions. We describe the development of housing prices, volumes of construction and mortgage loans, interest rates, and maturity terms in the next section. We focus on the regional dimension since in Russia there are large discrepancies in the development of markets and of house prices across various regions. In the section ”An Econometric Model of Regional House Prices”, we exploit this regional variation and variation over time to identify the main drivers of housing prices. We use more than seven years of quarterly data on house prices and regional economic indicators for almost 80 Russian regions. The section “Currency Denomination of Mortgage Loans, Ruble Depreciation and Defaults” discusses in detail the default experience on mortgage loans during the crisis and two related issues: the currency denomination of loans and the ruble-dollar exchange rate. It is often thought that the denomination of loans in foreign currency (usually US dollars) reduces the risk of banks that attract funds from international capital markets by eliminating the exchange rate risk. However, as a result of a spillover of the exchange rate risk into credit risk a much higher default rate on loans denominated in foreign currency has been observed since the large ruble depreciation of 2008/2009. The last section summarizes our findings and concludes.

Development of the Housing Market and Housing Finance in Russia

In this section we present data on the developments on the Russian housing market (prices and square meters of newly constructed residential buildings) as well as data on the market for housing finance (amount of new loans, currency denomination, average mortgage contract term, and interest rates).

In the second quarter of 2010, the average price of one square meter of a newly constructed apartment in Moscow was 142,800 rubles (4,720 dollars). The equivalent numbers for the secondary market were 166,930 rubles (5,720 dollars). This is approximately three times more than the national average. These prices are the result of a recovery of housing markets in 2010 after the decline in 2009 due to the financial crisis. To get a correct picture of the price evolution on the housing market in Russia one needs to look at real prices since general inflation has been around 10 per cent annually in the past decade. We have computed real house prices using regional consumer price indices as

deflators. As the base period, where nominal and real prices coincide, we have chosen the last quarter of 2006.

Exhibits 10.2 and 10.3 show the evolution of average real prices of housing on the primary and secondary markets, respectively. Nominal prices are published by the Russian Federal Statistical Office (Rosstat) on the basis of pricing data reported by real estate agencies on the housing markets of the most important cities in each region. Data is then aggregated across regions using new construction and population as weights for the primary and secondary market, respectively. All data is reported in Russian rubles. After a prolonged period of appreciation of the ruble vis-à-vis the US dollar, by 2007 the ruble had replaced the US dollar as the currency of most transactions in urban residential properties (Institute for the Economy in Transition, 2010).

Exhibit 10.2 Real house prices on the primary market [figure - Bardhan_10_art.xls]

Source: Federal Statistical Office (Rosstat), authors' calculations

Exhibit 10.3 real house prices on the secondary market [figure - Bardhan_10_art.xls]

Source: Federal Statistical Office (Rosstat), authors' calculations

We can observe the strong increase in house prices until 2008. Russia has been and still is a country with largely unsatisfied housing demand. The housing stock per capita was 22 square meters in 2008, compared to around 70 square meters in the US. Construction activity, which practically collapsed in the 1990s, has recovered in the 2000s. But even in the years preceding the recent crisis it has still been below the level of the last years of the Soviet Union.

The decline in prices started at the end of 2008. The slump in house prices in the last quarter of 2008 and the first quarter of 2009 would be even more pronounced if we had expressed prices in US dollars because of the 35 per cent depreciation of the ruble during this period. The decline in prices was accompanied by a sharp decline in the volume of transactions on the housing market and by an almost complete freeze in mortgage lending.

We also observe considerable regional variation in the evolution of real prices of housing units. The city of Moscow, the most expensive city in the country, exhibits also a high volatility of real prices of housing units. On the other hand, there are regions with practically flat real house prices.[1] It is instructive to compare the house prices data to rental prices and to compute

[1] The following section investigates in more detail how differences in house prices across regions relate to differences in economic and demographic indicators.

rent to price ratios (cap rates). Unfortunately, data on rents in Russian cities is not readily available. We use data on rents for Moscow and Saint Petersburg from the Economist Intelligence Unit's Worldwide cost of living survey. This survey concentrates on living costs for expatriates, and is therefore biased towards the high end of the real estate market. We therefore compare these data to the high quality categories of our Rosstat house price data. Exhibit 10.4 present the evolution of cap rates from 2001 to 2009.[4]

Exhibit 10.4 Cap rates for apartments in Moscow and Saint Petersburg [figure - Bardhan_10_art.xls]

Source: Economist Intelligence Unit, Federal Statistical Office (Rosstat), authors' calculations

At the beginning of the last decade cap rates were exceptionally high due to high rents in the expat segment of the market. Nowadays this is not a separated market any more, and cap rates have approached normal values around 2006. Since then they have stabilized even though there is a remarkable gap between the two cities of Moscow and Saint Petersburg. The cap rate in Saint Petersburg in 2009 was 13.3 per cent, while in Moscow it was 7.5 per cent. (For the high (elite) quality standard we have computed 10.9 and 6.8 per cent, respectively.) This points to a still excessive price level in the Moscow real estate market.

Next, we turn to the supply side of the market. Exhibit 10.5 shows the dynamics of residential housing construction as well as its regional variation.

Exhibit 10.5 Residential housing construction [figure - Bardhan_10_art.xls]

Source: Federal Statistical Office (Rosstat)

There is a strong seasonal component since many objects are commissioned towards the end of each calendar year. Certain stagnation in the commissioning of new houses can be observed already in the first months of 2008 compared to the previous year. Sternik (2009) argues that this is due to the peculiar financing scheme of residential construction that has evolved in Russia in the 1990s. In the absence of a functioning banking system, a large part of new houses were financed by direct equity contributions of the future home owners. Consequently, home owners had to bear all of the risk. Episodes involving fraudulent construction companies abound. Share equity financing of residential housing was regulated only starting 2005. Typically, construction companies used bank credit as an additional source of funds, mostly for the acquisition of land. This credit was usually short-term since banks were unable to use land as collateral. This situation has not significantly improved since the adoption of the Land code in 2001. Large construction companies had also access to international capital markets. It is the lack of funds along with

specific risks (corruption, bureaucratic procedures in establishing legal ownership of land) that constrained greater construction activity in residential housing.

The financial crisis contributed to a further slowdown in construction. Construction companies were unable to refinance short-term loans and went bankrupt in several cases, abandoning many construction projects. Construction activity continued to decrease throughout the crisis.

We now turn to the housing finance market. The Russian market for mortgage lending is rather young. Even though the federal Agency for Home Mortgage Lending, a government-owned secondary mortgage provider, was established in 1997, mortgage lending took off only around 2005. In 2006, the Central Bank of Russia started to collect data on banks' activities in housing finance. Since then, mortgage lending has been increasing until the onset of the crisis.

The global financial crisis has hit the Russian market of mortgage lending with some delay but very hard. At the end of 2008 and the beginning of 2009, many commercial banks started to reduce or abandon their mortgage lending programs, decreasing the maximum loan to value ratios and increasing interest rates. As a result, in 2009, with respect to 2008, the total number of mortgage loans granted fell by 62 per cent while the total ruble volume of extended loans decreased by 76 per cent. Exhibit 10.6 presents the volume of mortgage loans in per capita terms across Russia.

Exhibit 10.6 Volume of new mortgage loans per capita [figure - Bardhan_10_art.xls]

Source: Central Bank of Russia, authors' calculations

The region with the highest loan amount per capita is the oil-rich Tyumen region, followed by Moscow and Saint Petersburg. On the other extreme, in several republics of the Northern Caucasus banks do not grant virtually any mortgage loans.

We now turn to the currency denomination of mortgage loans. The only important foreign currency in this market is the US dollar. For a long time real estate prices were quoted exclusively in dollars. Exhibit 10.7 shows that there is a relatively stable decreasing trend in the share of loans denominated in foreign currency. In 2009, the share of foreign currency denominated mortgage loans in the total volume of mortgage loans fell to about 6%. This decrease was a result of the change of the macroeconomic situation and the depreciation of the ruble at the end of 2008 and in the beginning of 2009. Both banks and borrowers were apparently more aware of the credit risk inherent in foreign currency loans. This had already shown up in the higher incidence of non-payment on foreign currency-denominated loans (see section 4 below).

Exhibit 10.7: Currency composition of mortgage loans [figure - Bardhan_10_art.xls]

Source: Central Bank of Russia, authors' calculations.

The regional variation in the fraction of foreign-currency denominated loan is remarkable. In Moscow it was more than 70 per cent still in 2007 and has come down to around 25 per cent according to the latest data. In several regions this fraction has come close to zero in the last two years.[5]

The Central Bank of Russia reports quarterly data on the average maturities and interest rates of mortgage loans since 2006. Weighted average indicators are calculated on the cumulative basis from the beginning of the year. This makes the comparison between quarters problematic. For example, a significant increase of interest rates combined with strongly decreasing volumes of mortgage loans as it occurred in the financial crisis of 2008/2009 would lead to only a small increase in the average cumulated interest rate. A similar effect occurred for strongly decreasing maturities of new mortgage contracts during the crisis.

The numbers on weighted average maturities and interest rates that we report in the following two figures are de-cumulated using an approximate methodology to recover weighted average maturities and interest rates during a quarter.[6]

Exhibit 10.8: Weighted average maturity of mortgage loans [figure - Bardhan_10_art.xls]

Source: Central Bank of Russia, authors' calculations

Until the end of the year 2008 weighted average maturities of both ruble denominated and foreign currency denominated mortgage loans were close and ranged between 170 and 230 months. In 2009, weighted average maturities on mortgage loans decreased; the average maturity of foreign currency-denominated loans decreased more sharply than domestic currency-dominated loans. This was presumably one device applied by banks to control the higher perceived risks in the market for mortgage loans, especially for foreign currency loans after the major ruble devaluation of 2008-2009. Banks did not only grant fewer loans, but also issued loans with shorter maturities.

The growth of weighted average interest rates from 2008Q2 to 2009Q2 can be explained mainly as a consequence of the world financial crisis. Interestingly, interest rates went up already before the virtual breakdown of the mortgage market at the beginning of 2009. Since the Lehman breakdown and the subsequent liquidity crisis in global financial markets, the Central Bank of Russia has supported liquidity in the domestic banking sector by lowering reserve requirements, extending funds, guaranteeing interbank loans and, at some point, even through direct lending without collateral. In 2009Q2 it started

to decrease the refinancing rate, which led to a gradual reduction in weighted interest rates on mortgage loans since 2009Q3.

Exhibit 10.9: Weighted average interest rates on mortgage loans [figure - Bardhan_10_art.xls]

Source: Central Bank of Russia, authors' calculations

Note that the interest rate spread between foreign-currency and ruble denominated loans has been decreasing during the crisis. While in the past high inflation expectations for the ruble contributed to higher ruble interest rates, now the higher default risk inherent in foreign-currency loans after the considerable ruble devaluation is priced in. We discuss the default experience in Russian mortgage loans after the following section, which presents an econometric analysis of Russian house prices.

An Econometric Model of Regional House Prices

In this section, we report econometric evidence on the driving forces behind house price formation in the regions of Russia utilizing a panel data model. Using regional data for estimating determinants of house prices has several advantages over using international data: one does not need to account for differences in regulations, taxation, and financing of construction and purchase of houses (Koetter and Poghosyan, 2010).

We use quarterly data of house prices and a wide range of explanatory variables.[8] In order to perform the estimation we use the pooled mean group estimator of Pesaran (1999). Previously, the approach was used to find the determinants of house prices across countries (Kholodilin et al., 2007, Stepanyan et al., 2010) and across German regions (Koetter and Poghosyan, 2010). This estimator is appropriate for the non-stationary nature of house prices and some of their determinants, such as income per capita. It integrates the estimation of a long-run (equilibrium) relationship and a short-run adjustment equation. The coefficients in the long-run relationship (except for a constant term) are assumed to be homogeneous across all regions while the speed of adjustment and the coefficients of all variables in the adjustment equation can vary across regions. The homogeneity restriction seems adequate given that we are using data of one country. Appropriate unit root tests have been applied to the data before running the model.[9]

Our model specification in error-correction form reads:

$$\Delta RHP_{it} = \phi_i \left(RHP_{i,t-1} - \theta_{i0} - \sum_h \theta_h X_{ih,t} \right) + \sum_h \delta_{ih} \Delta Z_{iht} + \varepsilon_{it}$$

where RHP_{it} denotes the real house price in region *i* and period *t*, Δ denotes the first difference, θ_{i0} is region-specific constant term in the long-run equation, $X_{ih,t}$ are factors in the long-run equation, and $\theta_1, \theta_2, \ldots$ are the corresponding coefficients, equal for all regions, ΔZ_{iht} are first differences of the factors in the short-term equation and $\delta_{i1}, \delta_{i2}, \ldots$ are their corresponding coefficients. The error correction term (in parentheses) can be interpreted as the deviation of house prices from their fundamental value. The coefficient ϕ_i denotes the adjustment parameter. It can be shown that the half-life of a shock, i.e. the time that elapses until a deviation from the long-run equilibrium is halved, equals $\frac{\ln(0.5)}{\ln(1+\phi_i)}$.

We report results for two specifications. In each of them, sets of variables in the long run equation (*X*) and the short-run equation (*Z*) are identical. In the first specification we include the logarithm of the real monthly disposable income per capita and the real interest rate (in per cent), which is computed as a national loan rate minus regional inflation. Income per capita is expected to increase house prices while the real interest rate as an opportunity cost of an investment into housing is expected to have a negative effect.

In a second specification we include additional variables, such as population growth, the unemployment rate, and the change in the volume of outstanding consumer loans. For these time series we have more than seven years of quarterly data (2002Q4 to 2010Q1). Instead of consumer loans, we would ideally like to use a series for the volume of newly granted mortgage loans, but this is available only since 2006. We present estimation results for the two specifications in Exhibit 10.10 below. Since we are mostly interested in the coefficients of the long-run relationship, only these and the adjustment coefficient are reported.

Exhibit 10.10: Pooled mean group (panel) estimations for the logarithm of average house prices on the secondary market in Russian regions, 2003Q1-2010Q1 [table - in text]

Variable	Specification 1		Specification 2	
Log income per capita	0.958	*28.72*	0.512	*6.10*
Real interest rate	-0.016	*-9.69*	-0.006	*-5.25*
Population growth			0.209	*2.08*
Unemployment rate			-16.946	*-12.23*
Log change in outstanding consumer loans			0.083	*4.96*
Adjustment coefficient	-0.130	*-11.98*	-0.159	*-12.28*
Log Likelihood	3037.3		3180.9	
Number of observations	2251		2173	

The italic number are z-statistics.

As expected, income per capita has a positive effect on house prices, with elasticity close to unity in specification 1. The real interest rate has a negative, but small effect. When we introduce population growth, unemployment and the change in consumer loans on banks' balance sheets, income per capita and interest rates continue to be important long-run determinants of house prices. In addition, the volume of loans to consumers has an independent positive effect on house prices. We can therefore conclude that the development of the banking system with a larger market for housing finance contributes to the price dynamics on the housing markets. The unemployment rate is both statistically and economically highly significant in explaining house prices and enters with a negative sign, as expected. Overall population growth is identified as another factor that increases the price level on the housing market.

The adjustment coefficient is -0.13 and -0.16 in the two specifications, respectively. The negative sign implies that after deviation from the long-run equilibrium, there is a tendency that these deviations are reduced in the following quarters. This suggests that there is indeed a co-integration relationship between house prices and the other non-stationary variables of the model. The corresponding half-lives of adjustment after a shock in the two specifications are 5 and 4 quarters, respectively.

A preliminary conclusion from this analysis is that house prices in Russia follow an expected pattern as for their dependency on traditional driving factors such as income per capita, interest rates, population growth and the unemployment rate. The volume of consumer loans as an indicator of the development of the banking system (and which is highly correlated with the volume of mortgage loans) has a positive effect on house prices.

Currency Denomination of Mortgage Loans, Ruble Depreciation and Defaults

The financial crisis of 2008-2009 has brought about a sharp increase in defaults on bank loans. We focus first on consumer loans since a longer time series is available than for mortgage loans. Exhibit 10.11 presents the fraction of overdue loans in consumer loans – for ruble-denominated loans, foreign currency-denominated loans and their weighted average. In addition, we plot the ruble-dollar exchange rate in the same graph.

Exhibit 10.11: Fraction of overdue loans in total outstanding consumer loans and the ruble-dollar exchange rate [figure - Bardhan_10_art.xls]

Source: Central Bank of Russia, authors' calculations

One observes a sharp increase in defaults since the fourth quarter of 2008. The default rate among foreign-currency denominated loans has increased the most. Note that there is a strong correlation between depreciation of ruble with respect to dollar and an increase in default rates of dollar-denominated loans. As outlined above, the funding strategy of many Russian banks involved a large portion of foreign funds. Issuing loans in US dollars has been traditionally perceived by these banks as a hedge against exchange rate risk. As the crisis experience now shows this risk has simply been transferred into credit risk.

Spillover of the exchange rate risk into default risk is, of course, not a new phenomenon, especially in the emerging markets (recall, e.g., Asian crisis of the late 90s). Suppose that a loan is issued in a foreign currency (or is pegged to it). A depreciation of the domestic currency leads to a reduced ability of a borrower to pay off the loan (in terms of the foreign currency) since her salary is typically issued in domestic currency and is not pegged to the foreign currency. This, in turn, leads to a greater probability of borrower's default (see Božović et al., 2009). An increased number of defaults reduces the readiness of banks to lend money or, alternatively, they lend at less favorable terms. As a result, the economy shrinks. This, in turn, may lead to a further deterioration in loan quality.[10]

The same argument holds for mortgage loans. Unfortunately, data on overdue mortgage loans in Russia is available only since the beginning of 2009. Exhibit 10.12 shows the fraction of overdue loans denominated in rubles, foreign currency and the weighted average of the two. Note that the increasing trend in defaults continues until present even though there are already signs of recovery in the Russian economy in terms of the GDP.

Exhibit 10.12: Fraction of overdue loans in total outstanding mortgage loans: ruble and foreign currency denominated loans and total [figure - Bardhan_10_art.xls]

Source: Central Bank of Russia, authors' calculations

Exhibit 10.13 studies the regional variation in default rates. While there are regions with virtually no defaults (at a small basis of outstanding loans), as of April 1st, 2010, default rates have reached 7 per cent in the Moscow region (areas neighboring to the city of Moscow). Also, the city of Moscow and the Kaliningrad regions are high up in the ranking with 6.5 and 6 per cent default rates, respectively. All these regions have a high fraction of mortage loans denominated in foreign currency. Default rates on ruble-denominated mortgage loans (not in the graph) are among the highest in Volgograd and Kemerovo regions (above 5 per cent), but also Moscow region and Kaliningrad (above 4 per cent) and Moscow (above 3 per cent) are relatively high.

Exhibit 10.13 Fraction of overdue loans in total outstanding mortgage loans, regional variation [figure - Bardhan_10_art.xls]

Source: Central Bank of Russia, authors' calculations

Conclusion

In this chapter we have summarized the developments in the Russian markets for housing and housing finance in the last decade, with a particular focus on the effects of the global financial crisis. While Russia was not immediately affected by falling house prices in the US and the subprime crisis, the spillover of the crisis into the banking and insurance sector and falling stock markets did affect Russian housing and housing finance markets. The value of the Russian stock market (represented by the RTS composite index) fell by 80 per cent between the peak in May, 2008 and the trough in January, 2009, compared to a loss of value of 50 per cent of the US stocks (S&P 500). The Russian government used its accumulated oil wealth in the stabilization fund to support the economy; the Central Bank injected liquidity into the banking sector and used a large fraction of its large currency reserves to prevent a crash of the exchange rate of the ruble with US dollar and Euro. Nevertheless, Russia experienced a severe contraction of its economy starting at the end of 2008 and continuing throughout 2009. The two major shocks that the Russian economy faced were the global liquidity crisis with capital flowing out of emerging markets and the sharp decline in the oil price. Russian banks reacted by freezing or reducing their mortgage lending programs in late 2008-early 2009. House prices started to decline significantly in 2009. The housing market was characterized by a much reduced number of transactions, but is recovering since the beginning of 2010. The number of newly constructed apartments commissioned to home owners is still decreasing in 2010 since many construction projects were stopped during the crisis.

We have presented evidence on house prices, residential property construction, the volume of mortgage loans, their currency denomination, average mortgage contract terms, and interest rates as well as default rates highlighting significant regional differences. The econometric evidence shows that the variation in Russian house prices can be well explained by traditional driving factors such as income per capita, unemployment rate, interest rates and population growth. The development of the banking system in a region (which we proxy by the volume of consumer or mortgage loans) is an additional driving force leading to higher house prices.

There are signs of recovery in the Russian economy in 2010, which are already reflected in higher house prices. The main policy challenges are to introduce a functioning regulation of urban land use together with a removal of exceptional bureaucratic barriers to establishing property rights on urban land, as well as improvements in regulations to foster the use of land as collateral in

the financing of construction. This could lead to construction activity that would better satisfy large pent-up demand for housing. Moreover, such measures should have a greater effect on affordability of housing than offering more and cheaper mortgage loans. In fact, the expansion in the volume of mortgage lending could lead to a further skyrocketing of price to income ratios in Russia.

Notes

1. The authors thank Anna Margolina for providing excellent research assistance. Carsten Sprenger gratefully acknowledges support from the Scientific Fund of the State University – Higher School of Economics, Grant No 10-01-0158. Branko Urošević gratefully acknowledges support by the Serbian Ministry of Science and Technology Grant No OH 179005.
2. See www.globalpropertyguide.com, data retrieved on July 20, 2010. The Global Property Guide uses the prices for upscale apartments, namely the price of 120 square meter apartments in the centre of the most important city of the country. If we use instead the average square meter price on the Moscow secondary market and national GDP per capita in 2008, the ratio is still 62.
3. Russia held, however, bonds of the large US mortgage refinancing organizations.
4. Rental data from EUI is given for typical 2, 3 and 4-bedroom apartments of either moderate or high quality. We compare this to the "improved" and "elite" categories in the Rosstat house price data for the secondary market. Exhibit 10.4 shows cap rates for 2-bedroom apartments assuming an average size of 70 square meters.
5. Note that, in contrast, in most countries in Eastern, Central, and South Eastern Europe mortgage loans are almost entirely pegged to foreign currency, usually EUR. See, e.g., the chapter on the Serbian housing market in this volume.
6. In order to be able to recover quarterly maturities and interest rates at least approximately we make the simplifying assumption that each bank grants one loan per quarter.
7. This means, however, that the coefficients are not comparable across years.
8. Some of the variables used in the cross-section regressions are, however, not available at quarterly frequency.
9. Following Holly et al. (2010) and Kholodilin (2007), we first test for cross-sectional dependence (using the test of Pesaran, 2004) and find that the residuals of individual augmented Dickey-Fuller regressions for the variables of our model are significantly correlated across regions. We therefore apply the panel unit root test of Pesaran (2007) that allows for cross-sectional dependence. We find that real house prices, real disposable income per capita, change in the volume of outstanding consumer loans and even unemployment rates are I(1) over the sample period, i.e. the hypothesis of a unit roots cannot be rejected for levels, but is rejected for first differences. Population growth and real interest rate are found to be stationary.

10. In countries of Emerging Europe the situation is particularly dangerous since there, in contrast to Russia, most loans are pegged to foreign currency (typically euro).

References

Agency for Home Mortgage Lending (2010), Rynok zhilya I ipotechnogo kreditovania: Itogi 1 kvartala 2010g. [The market for housing and mortgage lending: Results of the 1st quarter 2010], available at www.ahml.ru, in Russian.

Božović, Miloš, Urošević, Branko and Boško Živković (2009), On the Spillover of Exchange-Rate Risk into Default Risk, *Economic Annals*, vol 183, pp. 32-55.

Holly, Sean, M. Hashem Pesaran, and Takashi Yamagata (2010), A spatio-temporal model of house prices in the USA, *Journal of Econometrics*, 158 (1), pp. 160-173.

Institute for the Economy in Transition (2010), The Russian Economy in 2009, Section 5.7.2, The Russian Housing Market in 2009: from the Crisis Downfall to Stagnation, Author: Sternik G.M., available at www.iet.ru.

Kholodilin, Konstantin A., Jan-Oliver Menz and Boriss Siliverstovs (2007), What drives housing prices down? Evidence from an international panel, German Institute of Economic Research, DIW Discussion Paper No. 758.

Koetter, Michael and Tigran Poghosyan (2010), Real Estate Prices and Bank Stability, *Journal of Banking & Finance* 34(6), 1129-1138.

Pesaran, M. Hashem (2004), General Diagnostic Tests for Cross Section Dependence in Panels, IZA Discussion Paper No. 1240.

Pesaran, M. Hashem (2007), A Simple Panel Unit Root Test in the Presence of Cross-Section Dependence, *Journal of Applied Econometrics*, 22, 265-312.

Pesaran, M. Hashem, Yongcheol Shin, and Ron P. Smith (1999), Mean Group Estimation of Dynamic Heterogeneous Panels, *Journal of the American Statistical Association* 94, no. 446, 621-634.

Stepanyabn, Vahram, Tigran Poghosyan, and Aidyn Bibolov (2010), House Price Determinants in Selected Countries of the Former Soviet Union, IMF Working Paper WP/10/104.

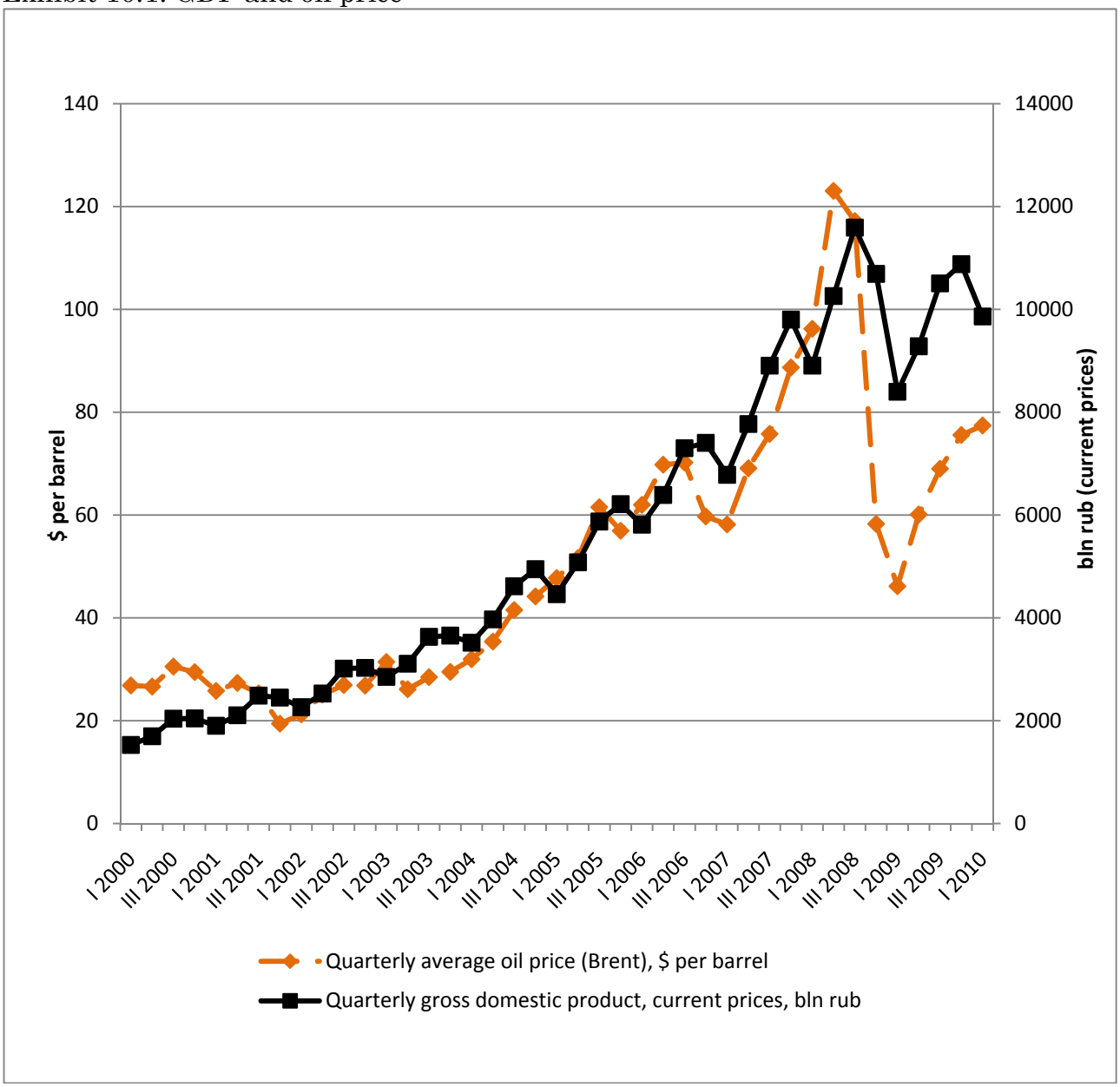
Sternik, Gennadi M. (2009), Spad na rynke stroitel'stva I prodazhi zhilya v Rossii [Decline on the market for construction and house sales in Russia], *Journal of the New Economic Association* No. 3-4, 185-207, in Russian.

Vernikov, Andrei (2009), Russian Banking: The State Makes a Comeback? Bank of Finland, BOFIT Discussion Paper No. 24/2009.

World Bank (2007), Russian Economic Report No. 17, available at www.worldbank.org.ru

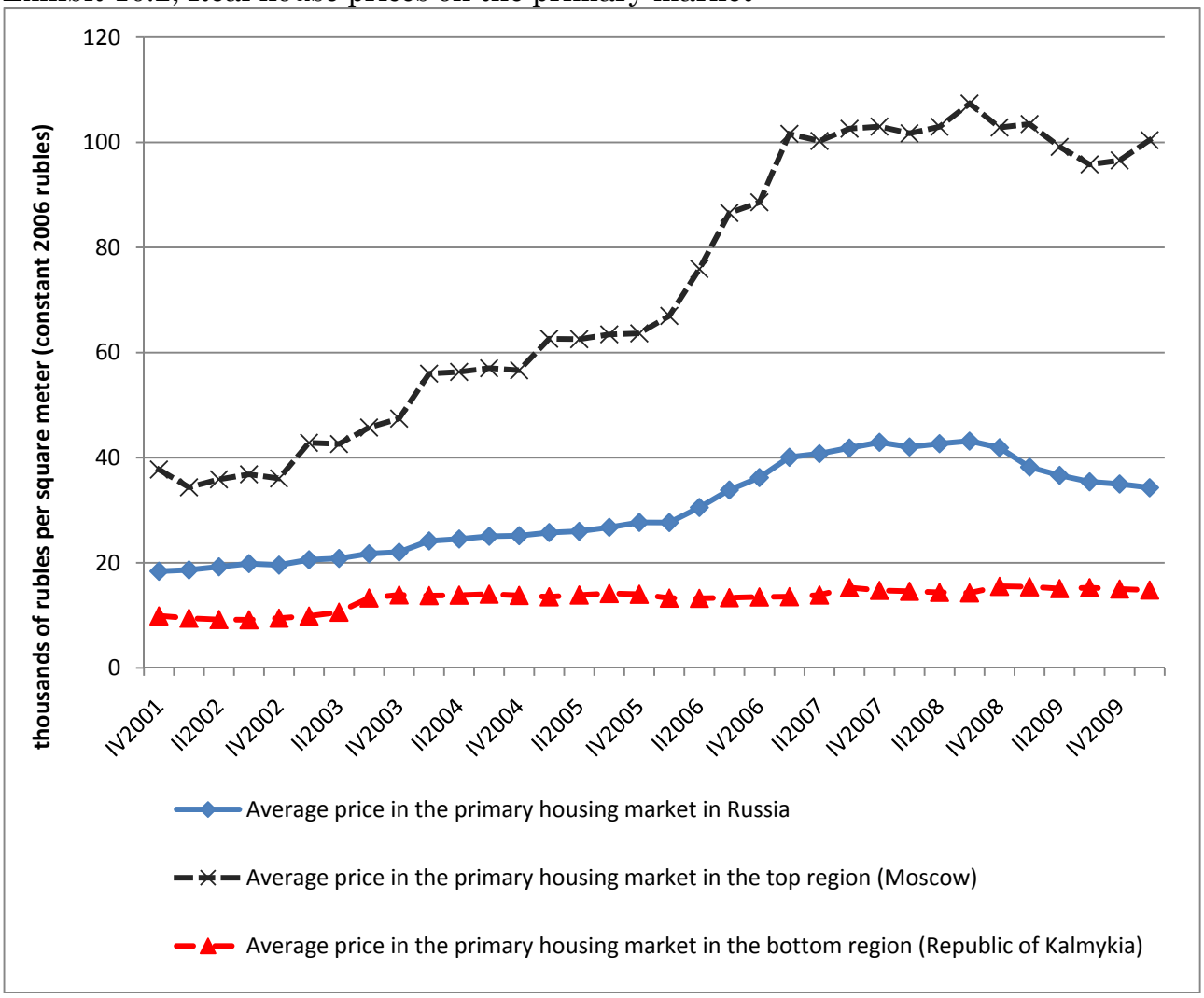
EXHIBITS

Exhibit 10.1: GDP and oil price



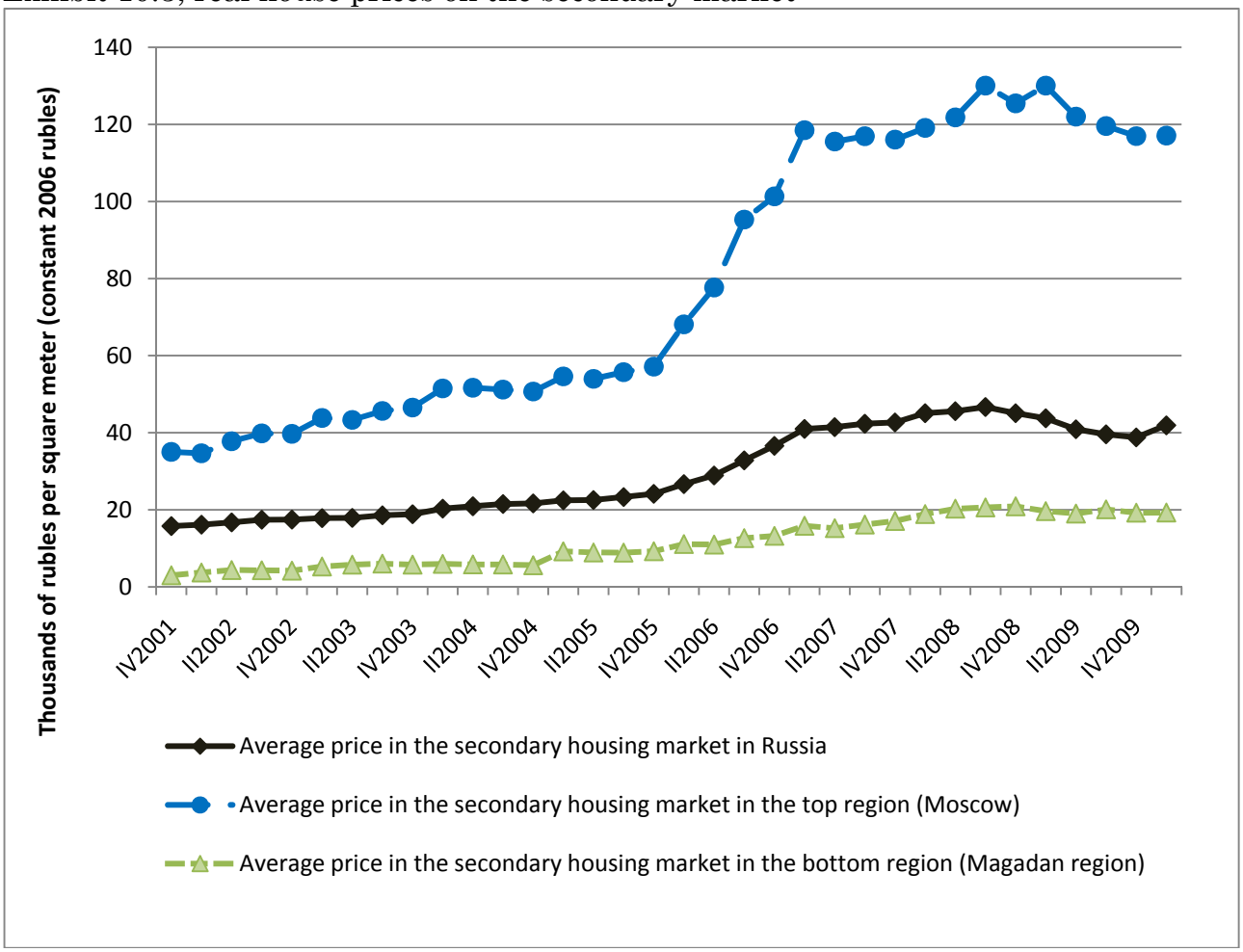
Source: Oil price: Finam; GDP: Federal Statistical Office (Rosstat)

Exhibit 10.2, Real house prices on the primary market



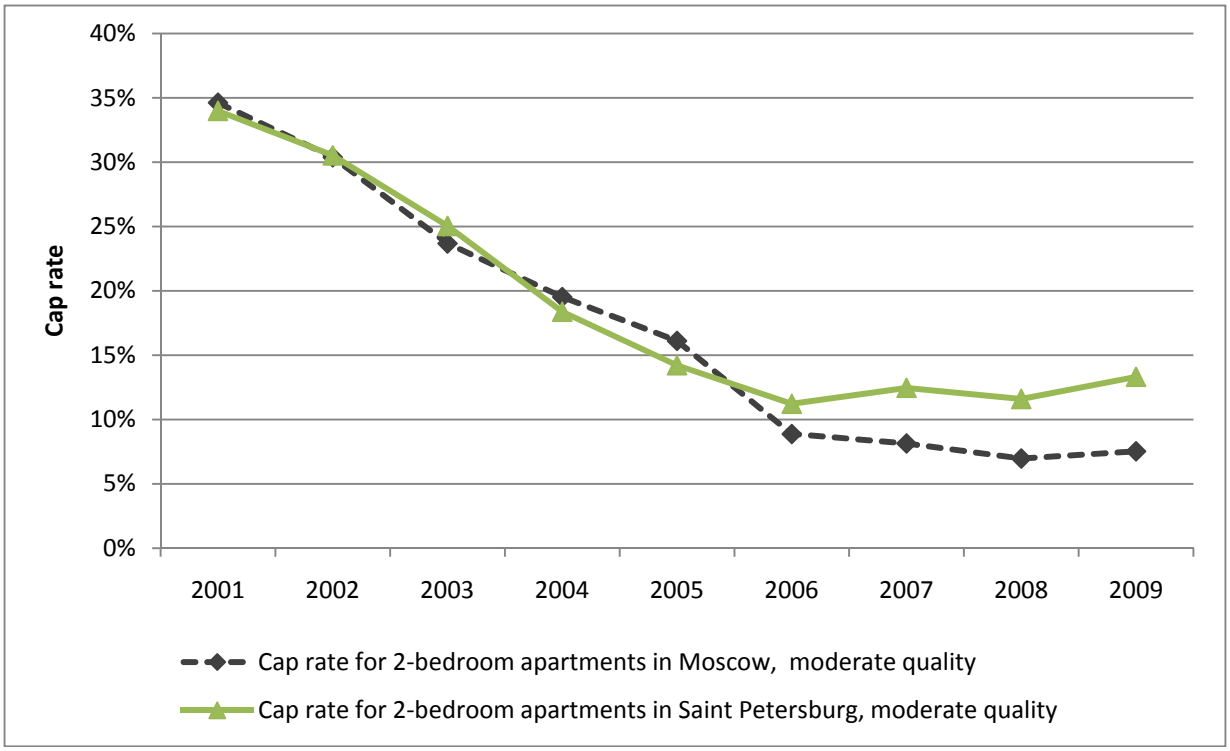
Source: Federal Statistical Office (Rosstat), authors' calculations

Exhibit 10.3, real house prices on the secondary market



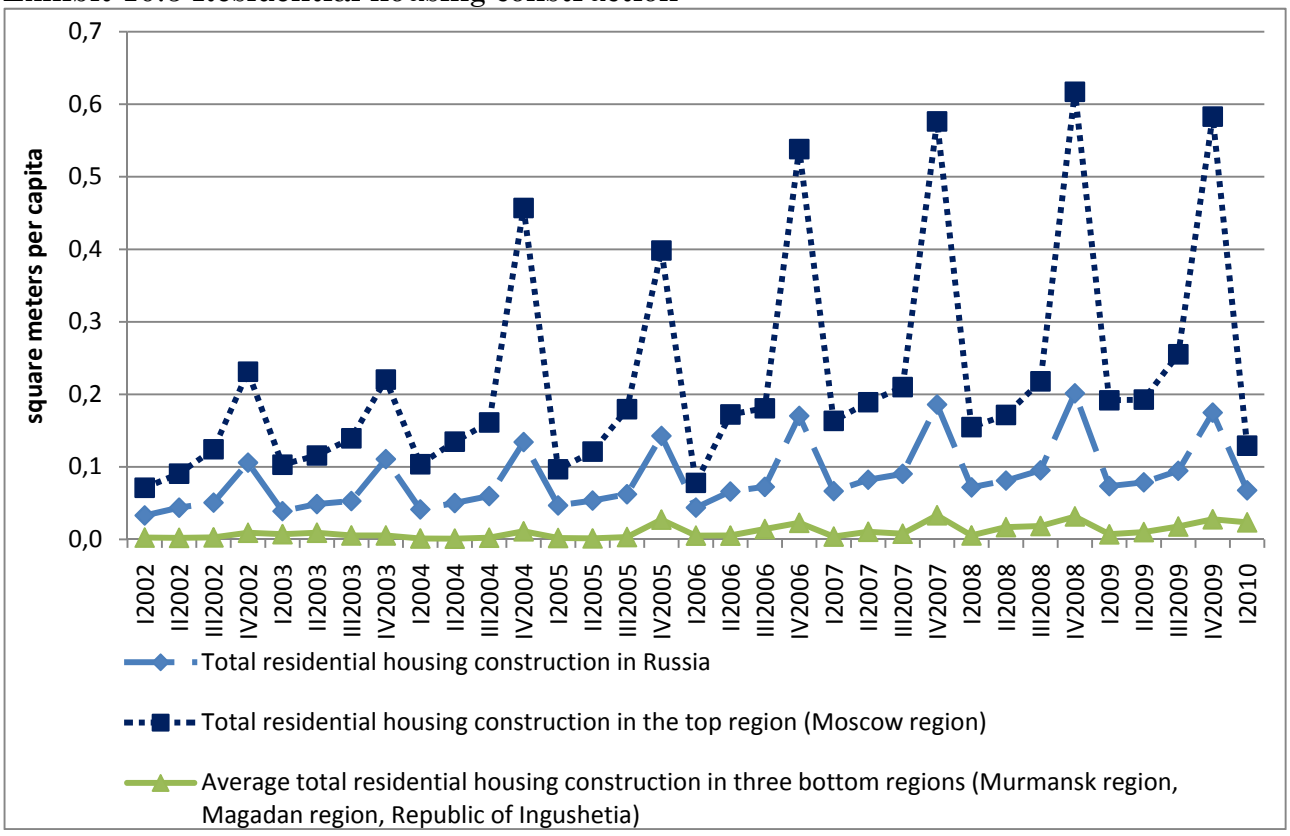
Source: Federal Statistical Office (Rosstat), authors' calculations

Exhibit 10.4 Cap rates for apartments in Moscow and Saint Petersburg



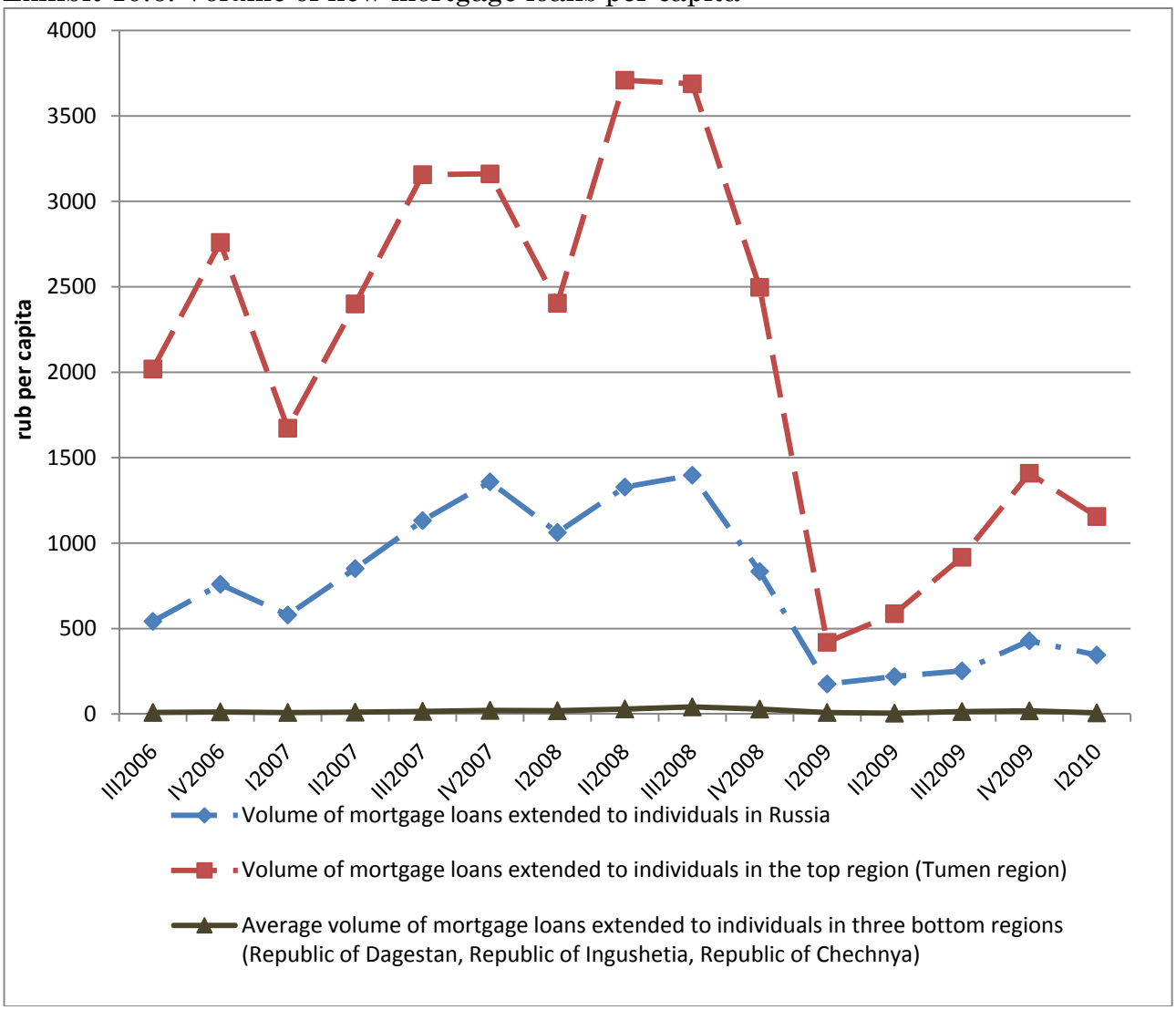
Source: Economist Intelligence Unit, Federal Statistical Office (Rosstat), authors' calculations

Exhibit 10.5 Residential housing construction



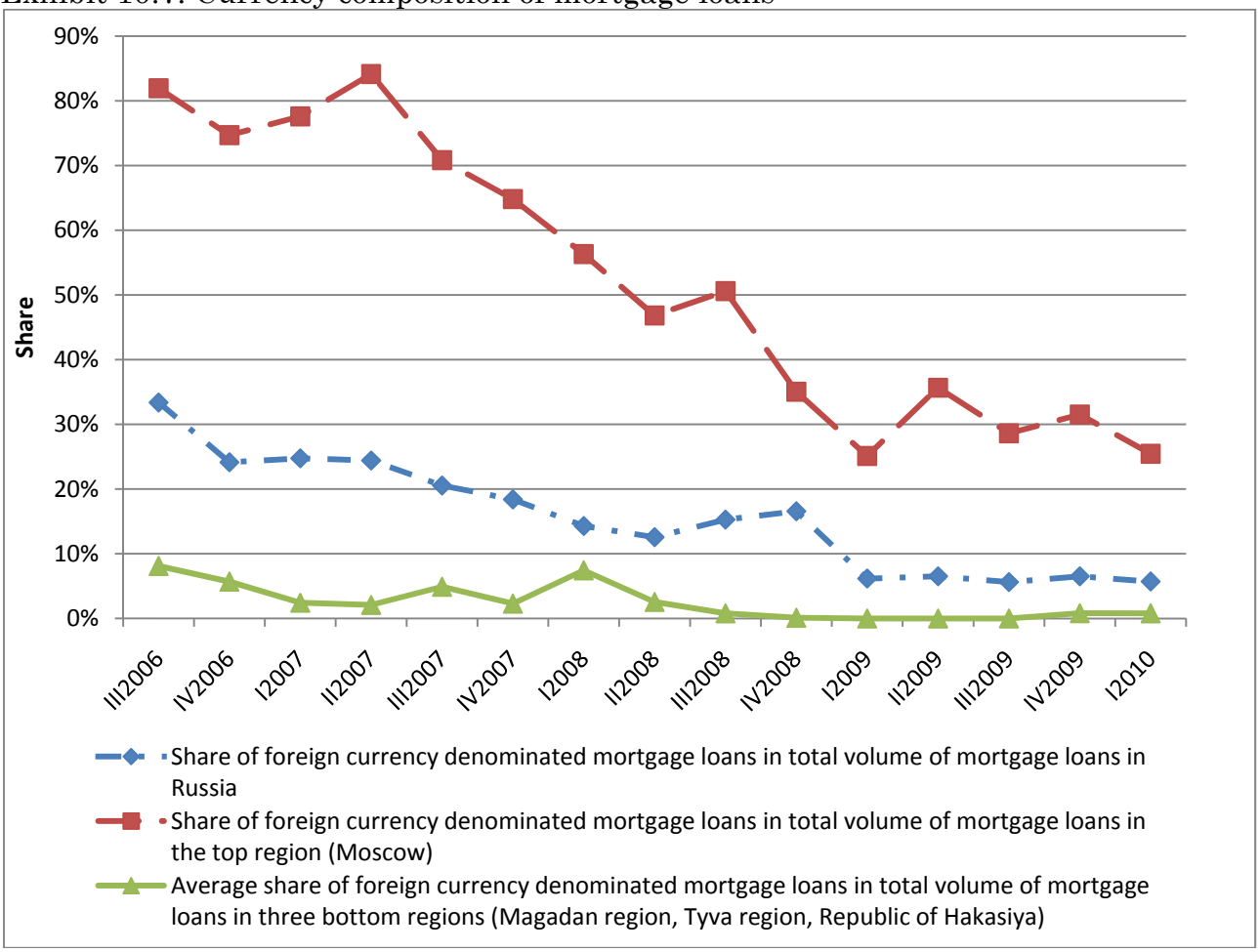
Source: Federal Statistical Office (Rosstat)

Exhibit 10.6: Volume of new mortgage loans per capita



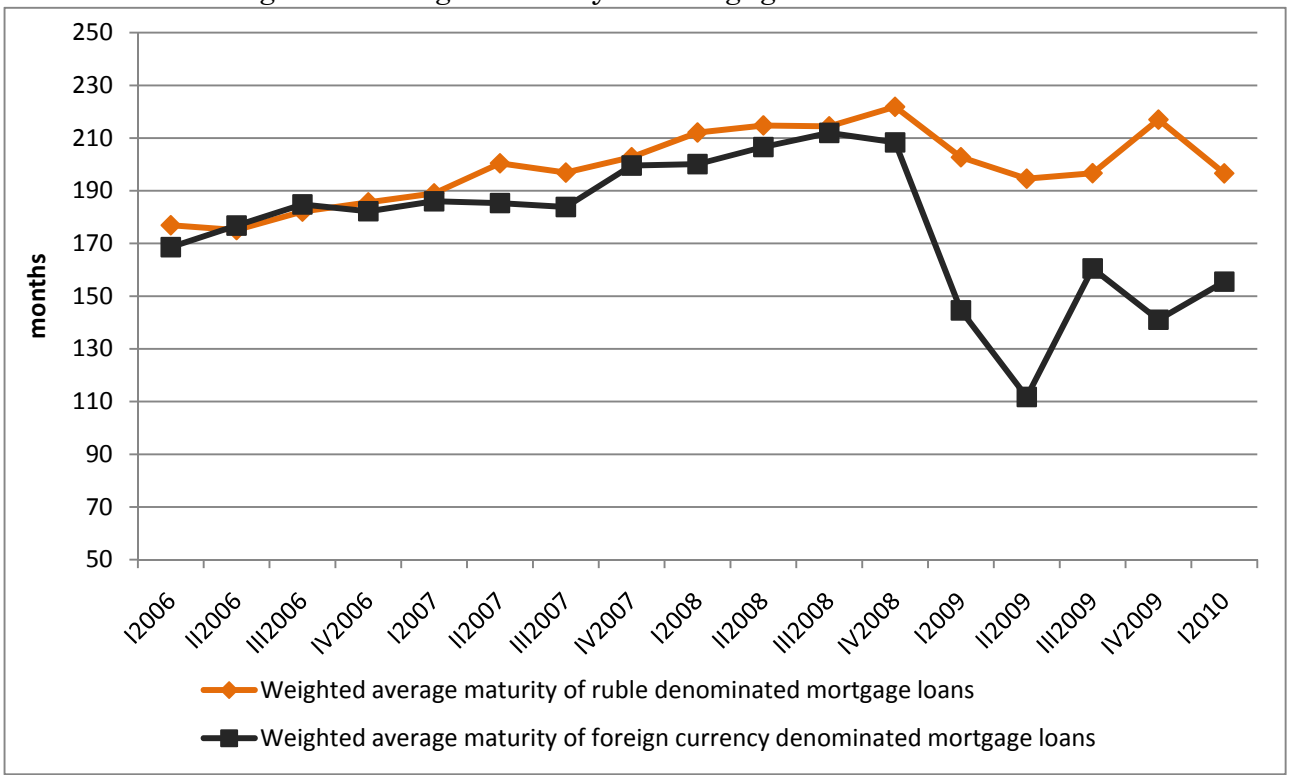
Source: Central Bank of Russia, authors' calculations

Exhibit 10.7: Currency composition of mortgage loans



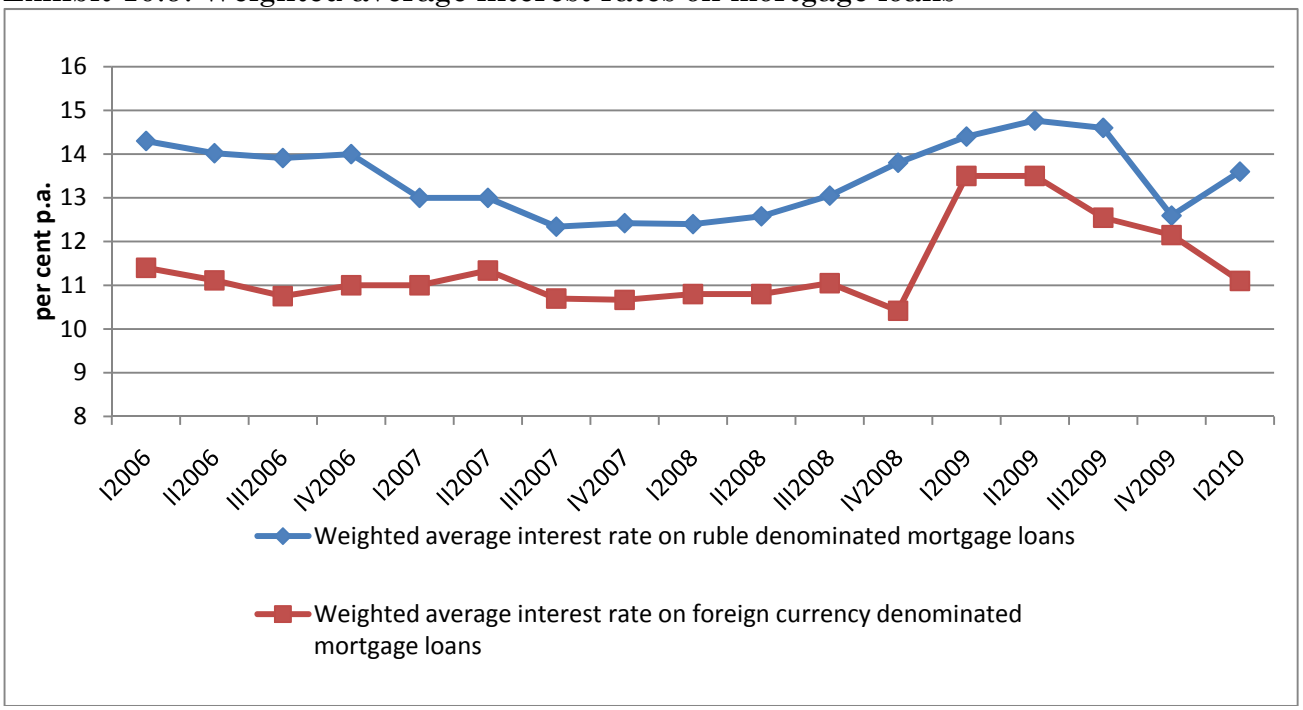
Source: Central Bank of Russia, authors' calculations.

Exhibit 10.8: Weighted average maturity of mortgage loans



Source: Central Bank of Russia, authors' calculations

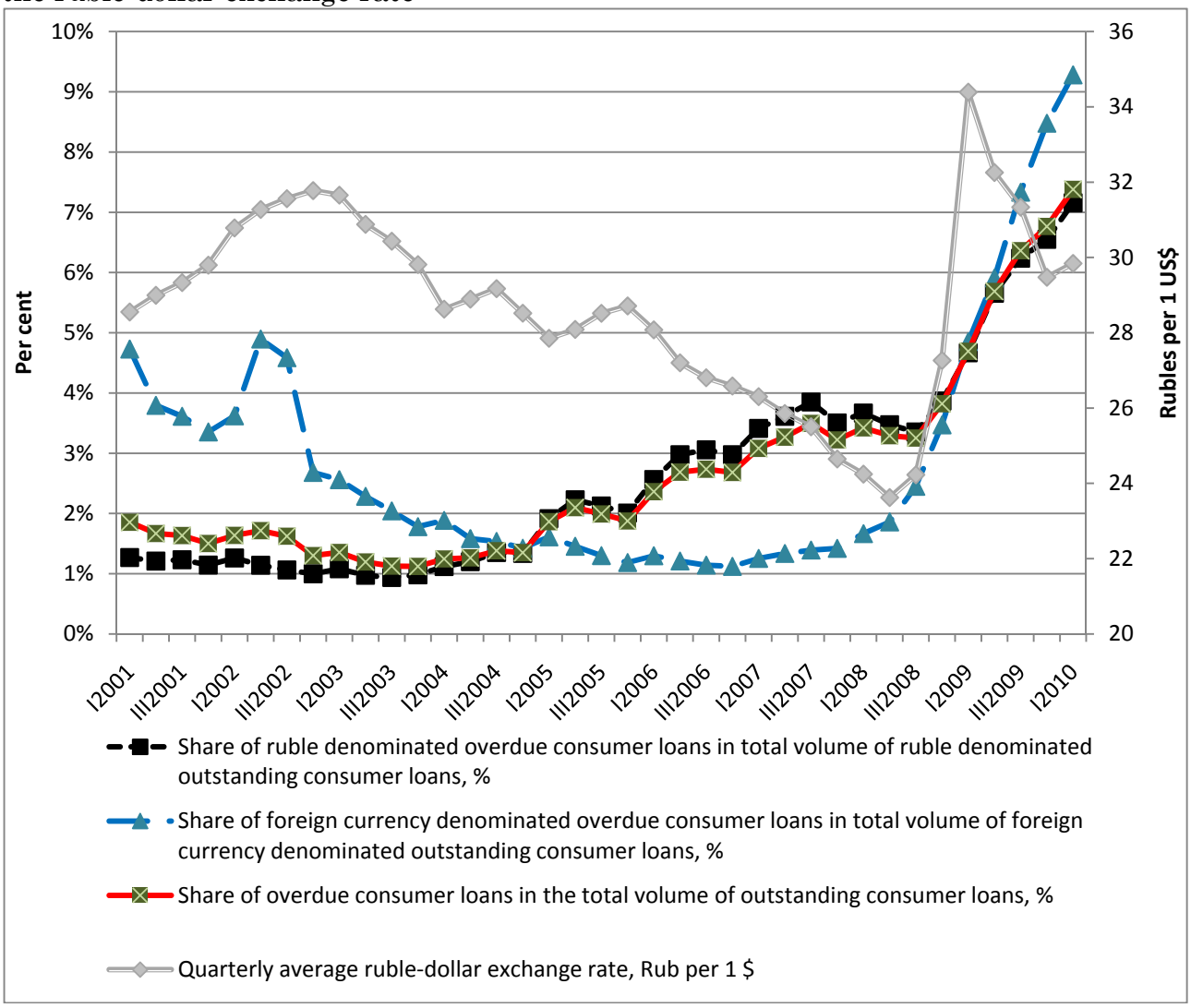
Exhibit 10.9: Weighted average interest rates on mortgage loans



Source: Central Bank of Russia, authors' calculations

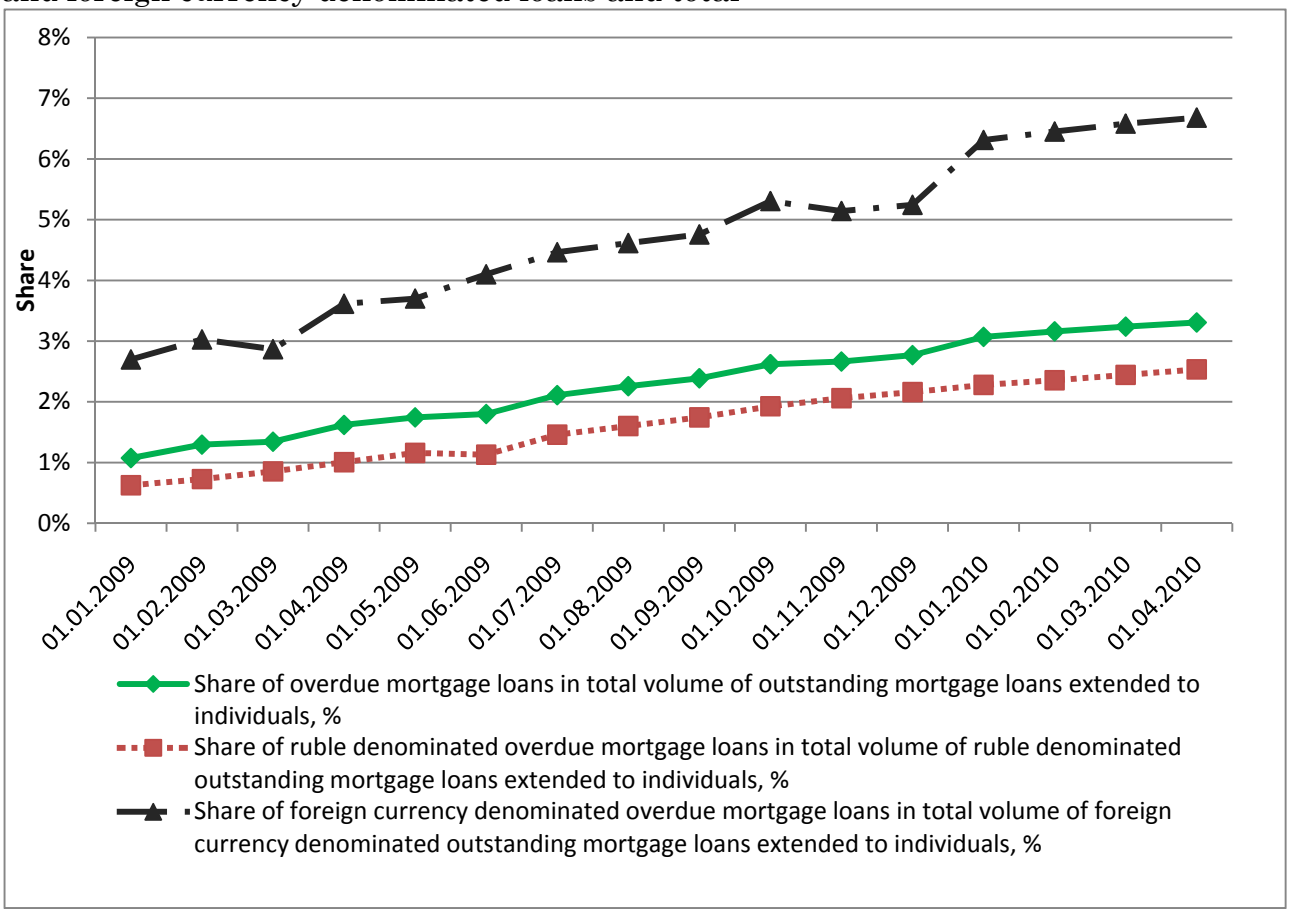
Exhibit 10.10: In the text.

Exhibit 10.11: Fraction of overdue loans in total outstanding consumer loans and the ruble-dollar exchange rate



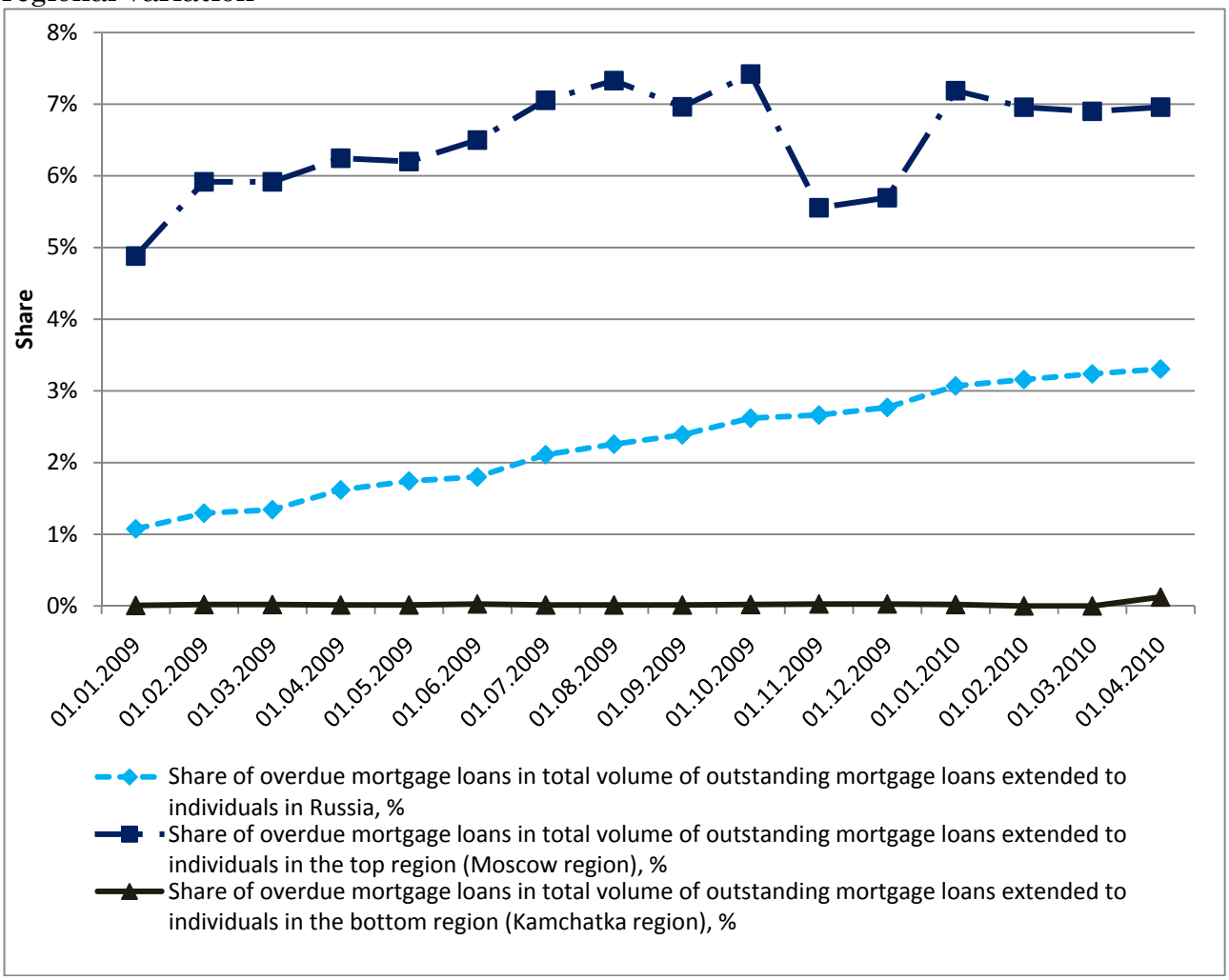
Source: Central Bank of Russia, authors' calculations

Exhibit 10.12: Fraction of overdue loans in total outstanding mortgage loans: ruble and foreign currency denominated loans and total



Source: Central Bank of Russia, authors' calculations

Exhibit 10.13: Fraction of overdue loans in total outstanding mortgage loans, regional variation



Source: Central Bank of Russia, authors' calculations