

The Dynamics of Household Savings in Foreign Currency in the Russian Border Regions under the External Shocks Impact

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Abstract

The article discusses the impact of external shocks on the volume of Russian household savings in foreign currency as an alternative to Bank deposits method of savings for the period from 2002 to 2014. We use data on the purchase volume and sale of Euro by Central Bank of the Russian Federation to estimate Euro nest egg amount by the population of the regions. We then empirically investigate the relevance of the region's border position on the volume of purchases of Euros by the population. We made a comparative analysis of the dynamics Euro purchase and sale by groups of regions with similar spatial effects during external shocks (the global financial crisis and the beginning of western sanctions against Russia). Our results confirm the existence of a direct relationship between the volume of purchase of Euro and the income of the population. We show (i) that the border with the EU is relevant for determining the volume of Euro purchases by the population (ii) the purchase and sale of Euros in the internal and border regions differ depending on the nature of the external shock.

Keywords: cross-border location, savings, Euro, modeling.

Introduction

The impact of external shocks is reflected not only in the dynamics of the economic indicator of separate enterprises, economic sectors and regions, but also in the behavior of the population, manifested in a change in the ratio between consumption and saving. Turning to the issue of assessing the amount of savings accumulated by Russians, researchers mainly consider them as the main source of resources of the banking system (Olkhovick, 2011; Yumanova and Mazikova, 2015). Another important issue in the study of savings is the income of the population. It is obvious that there is a relationship between the amounts of savings and incomes. The researchers note that the spatial distribution of Russian population income is uneven (Gerasimova, 2009), since the main source of population income is wages (Olkhovick, 2011; Biglova and Yumakaeva, 2015). Perspectives for higher earnings in other places lead to a labor mobility increases (Malkina, 2017), therefore, the spatial distribution of savings in Russia will be uneven.

During the period 2000-2013, against the background of a small increase in Russian household income, there was a decrease in the growth rate of savings (Lapteva, 2015). It should be noted that after a number of economic crises that lead to the depreciation of the national currency (Oomes and Ohnsorge, 2005), Russian citizens have less confidence in the domestic financial systems (Dabrowski, 2016), and some citizens refuse to place funds on bank deposits (Malkina, 2017). They convert part of their savings into foreign currency, implementing an insurance financial strategy (Panova, 2017). Currency substitution is often viewed as a safety precaution during periods of depression (Prock et al., 2003). It is impossible to ignore the fact that the demand for foreign

currency arises from the population, including, for holidays abroad. However, the demand surges have a distinct seasonal nature (Anaeva, 2016). Note that foreign currency “nest egg” of citizens are difficult to calculate and often fall out when trying to estimate the available amount of financial resources of the population. The spatial distribution of foreign currency savings can also be influenced by the geographical location of separate subjects of the Russian Federation. In particular, the population of the border regions has great opportunities for contact with foreign citizens (Banfi et al., 2005; Asplund et al., 2007; Baggs et al., 2018; Jansen and Jonker, 2018) and work abroad in comparison with citizens of internal subjects of the Russian Federation. So the study of the external shocks impact on the spatial distribution of foreign currency savings of individuals in the context of border and internal regions seems to us extremely important and actually. Building on comparison Russian border and internal regions we use regression models to assess preliminary hypothesis of the importance of the “borderline position” factor for the accumulation of the population in foreign currency outside the financial system, as well as the spatial heterogeneity of the use of Euro (currency) as a means of saving and accumulation.

Research Methodology

The empirical base of the study was made up of data on: per capita income, average annual population, deposits of individuals on currency and Ruble accounts of credit institutions, the consumer price index, monthly data on the amount of purchase and sale to individuals of Euro and its average exchange rate. As sources of data were used the statistical collection “Regions of Russia. Socio-economic indicators” and the database of regional data of the Central Bank of the Russian Federation. The study period covers 2002-2014, as the data in the context of the regions for the purchase and sale of currency from the population by authorized banks are available only for this period. However, the time frame of the study allows us to assess the impact of two external shocks – the global financial crisis of 2008 and the beginning of western sanctions against Russia, what affected the dynamics of the exchange rate (figure 1). The study included 79 subjects of the Russian Federation, the Chechen Republic was excluded from the study due to the lack of necessary data, the Nenets Autonomous District was considered together with the Arkhangelsk region, and the Khanty-Mansi and Yamalo-Nenets Autonomous Districts were considered together with the Tyumen region.

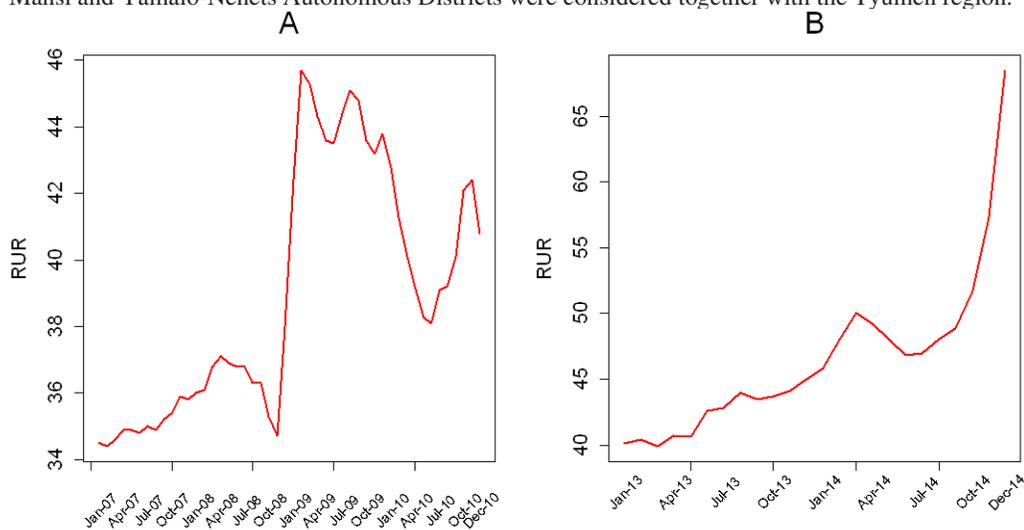


Fig. 1: The official exchange rate of the Central Bank of the Russian Federation of the Euro-Ruble pair (part A – during the global financial crisis; part B – during the beginning of the sanctions)

The following actions were taken for the primary analysis of data and design of mathematical models. Data on the purchase and sale of currency (SaleEuro) were converted into Rubles at the average monthly exchange rate and summed by year (SaleEuroCur). We did not use it in estimations converting foreign currency into Ruble equivalent and a comparable form may arise a situation when

the indicators of foreign currency and income of the population become highly correlated due to the joint connection with the third indicator – inflation in the Russian Federation. In this regard, it was decided to consider currencies (US dollar and Euro) separately, because in this case it is possible to design one model for several types of data (two indicators reflecting the purchase of Euro by the population are presented above in brackets). Despite the fact that Russians prefer to store savings outside the banking system in US dollars (Prokopyev and Roslyakova, 2018), in this paper, Euro was chosen as the currency for analysis. Choosing the Euro for the purposes of our study has the following advantages: 1) we can track savings in this currency since its inception; 2) Russia directly borders with countries where Euro is the official currency.

Further, we were tried to estimate the amount of accumulated savings (Euro “nest egg”) of the population. Based on the available data, we assumed that the difference between the amount of currency sold by authorized banks to the population and bought from the population for the year forms the savings of the population outside the banking system. The savings amount of each year is make cumulative. At the same time, in a number of regions there was an excess of Euro purchased by banks over Euro sold to the population. In order to avoid transition to the following years a negative amount of savings we accept it equal to 0 (zero) in the case when amount of savings of previous years was "ate" in period under review. Objectively, it is quite difficult to estimate the real amount of such savings, since in this case possible earnings and expenses abroad, the import and export of currency to other regions and countries, remittances, as well as the presence of increase in non-cash payments.

The results of the estimate of Euro savings of the population are shown in figure 2. All data are presented per capita, and monthly income represents as the average per capita income adjusted for inflation for the period from 2002 to 2014. Only in 1 region (Republic of Ingushetia) evaluated savings exceeded deposits in banks. However, such evaluations on the US dollar showed exceedances in 17 regions, 14 of which were border (Prokopyev and Roslyakova, 2018). On the other hand, the difference between purchasing and selling Euro to the population over the years in the North-West Federal district (NWFd) shows the excess of purchasing Euro from the population over selling it. A good example is the Pskov region (table 1). This indirectly confirms our assumptions about the greater availability of Euro for the population in the contact zones (the regions bordering the EU). In this regard, it was proposed to test the hypothesis of the impact on the purchase Euro by the population some factors related to the border position and contact areas: border region; border region with land border; border region with sea border; the presence of land border; the presence of land border with the EU countries.

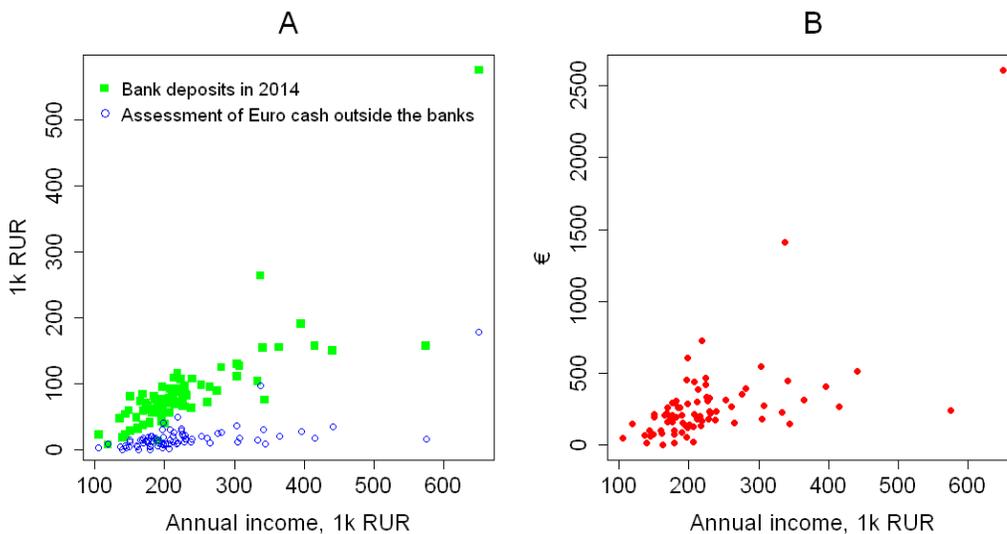


Fig. 2: The ratio of monthly income and savings of citizens in 2014 (part A – the ratio of deposits (Ruble and foreign currency) with the available Euro holding by the population,

converted at the rate of December 2014; part B – the same, but without conversion into Ruble equivalent)

Table 1: The difference between the sale and purchase of currency to the population in the NWFO, million Euros

Region	2002	2004	2005	2006	2007	2008	2009	2010	2011	2014
Arkhangelsk region	3.6	4.4	4.2	7.4	12.5	37.1	15.5	-0.1	13.4	33.5
Vologda region	6.5	10.6	11.1	14.9	30.6	49.0	12.5	8.8	31.3	69.9
St. Petersburg	28.5	132.1	251.6	184.9	172.8	1450.3	532.6	-235.7	451.3	1973.8
Kaliningrad region	0.3	-1.1	18.0	26.5	65.1	136.8	-58.0	-87.0	67.3	154.0
Leningrad region	-1.4	10.8	34.9	95.7	95.8	307.1	61.6	-63.4	46.8	124.3
Murmansk region	7.8	10.3	13.3	17.3	30.6	74.1	38.2	12.8	28.3	44.0
Novgorod region	1.8	2.3	1.1	3.1	5.7	23.2	7.4	-2.6	3.8	15.6
Pskov region	-0.6	-4.2	-6.8	-6.4	-1.7	11.0	-5.8	-12.5	-6.8	4.1
Republic of Karelia	1.0	-0.5	2.8	7.1	14.2	26.1	5.7	3.9	13.4	26.9
Komi Republic	6.7	8.1	5.7	9.2	18.4	45.1	18.2	3.7	11.6	19.9

Source: Authoring

To analyze the significance of the boundary indicators, was evaluated the following specification of the regression model:

$$Y_{ij} = C + A \times \text{Income}_{ij} + B \times \text{Population}_{ij} + D \times \text{Border}_i \quad (1)$$

Where, Y_{ij} - the resulting indicator for the purchasing of currency by the population of the i -th region in the j -th year, expressed in various in natural (SaleEuroCur) and reduced (SaleEuro) units; Income_{ij} – factor indicators of the population income in the i -th region in the j -th year, also expressed in the current and reduced values; Population_{ij} – factor indicator of number population in the i -th region in the j -th year; Border_i – dummy variable, expressing a type of border, present in the i -th region; A , B , D – coefficients expressing the increment of the function (Y_{ij}) in the case of a single change in the corresponding factors (variables); C – free term.

For a more detailed analysis, conclusions were compared between models without cross-section (spatial) fixed effects (specification 2) and models that reveal cross-section (spatial) fixed effects (specification 3):

$$Y_{ij} = C + A \times \text{Income}_{ij} + B \times \text{Population}_{ij} \quad (2)$$

$$Y_{ij} = C + C_i + A \times \text{Income}_{ij} + B \times \text{Population}_{ij} \quad (3)$$

Where, C_i is an individual coefficient for each i -th region, which allows adjusting the common free term evaluated for all regions (coefficient C). Further, based on the evaluated C_i , was identify groups of regions with similar spatial effects which allow selecting internal and border regions for a detailed study of the impact of external shocks on the dynamics of purchase and sale of Euro by the population. The periods of population responses to interesting for us external shocks affect the time period from August 2008 to March 2009, as well as from August to December 2014.

Result and Discussion

The generalized characteristics of the evaluated models (1) are presented in table 2. Here are only the parameters of the models, which have all factors significant at the level of 5%. Among all the considered border factors, the significant was shown only by the factors of the border with the EU. Table 2 shows that all models have a low explanatory power (just over 50%). It is impossible to make conclusions about the preference of one or another expression for estimation the level of Euro savings by the population, but it should be noted that the parameter SaleEuro shows more 48% (R^2) vs. 45% for the SaleEuroCur. In the process of creating models, it was found that the introduction of dummy variables (presence or absence of border) in the model has almost no effect on the explanatory power of models: they increased by tenths of a percent (table 2, specification 2).

Table 2: The parameters of the dependence purchase Euro by the population of the European bordering factor

Parameters	SaleEuro	SaleEuroCur
R^2	0.478194	0.451175
St.Er.	26493559	485120.2
D	9275856.0	177878.9

Source: Authoring

The generalized characteristics of the models evaluating by specifications (2) and (3) are given in table 3. The important conclusion is that models with the spatial effects have higher explanatory power, since the value of the determination coefficient increases to 82-83% (table. 3). Based on the spatial effects coefficients, we can distinguish at least two groups of regions in which regional factors enhance or weaken the country-wide trend, that is, regional coefficients (C_i) differ in sign. Moreover, only in the case when spatial effects are included in the models the explanatory power increase to an acceptable level. That is inevitably requires to take them into account in further analysis. Structurally, there is a unity and stability of evaluates of all models, which also indicate in favor of the reliability obtained models.

Table 3: Results of evaluation models (2) and (3)

Indicator	Specification 2		Specification 3 (spatial effects)	
	R ²	St.Er.	R ²	St.Er.
SaleEuro	0.474482	26574705	0.822491	16074251
SaleEuroCur	0.446882	486777.4	0.828833	281823.2

Source: Authoring

The cluster analysis allowed us to select groups of regions to estimate the impact of external shocks on the purchase and sale of Euro by the population: 1) the Republic of Mordovia, the Kaliningrad, Murmansk and Orel regions; 2) Republic of Karelia, Mari El Republic, Novgorod and Pskov regions; 3) Leningrad and Tula regions. For all groups, the spatial effects are positive. For illustration for each EU-bordering region has been selected an internal region with a similar spatial effect amount. Then were made the charts of the monthly amounts of sale and purchase of the currency by the authorized banks for each regions. Charts were based on both natural units and growth rates.

Figures 3, 4 and 5 show the reaction of the Russian population to the global financial crisis of 2008. The dynamics show that it is the same in all groups: first, there was an increase in purchases of Euro from banks (Fig. 3, 4, 5 Part A), and then – sales growth (Fig. 3, 4, 5 Part B). At the same time, the population of the internal regions more active bought Euro then population of the border regions. In both groups the greatest demand for Euro compared to the pre-crisis period showed the lowest incomes regions. Residents of the same regions actively got rid of Euro after January 2009, when its rate reached the local maximum. In this case, is revealed the factor of the bordering with the EU: local residents initially have a higher demand for Euro, because they need this currency for purchases abroad, and not only as a means of saving.

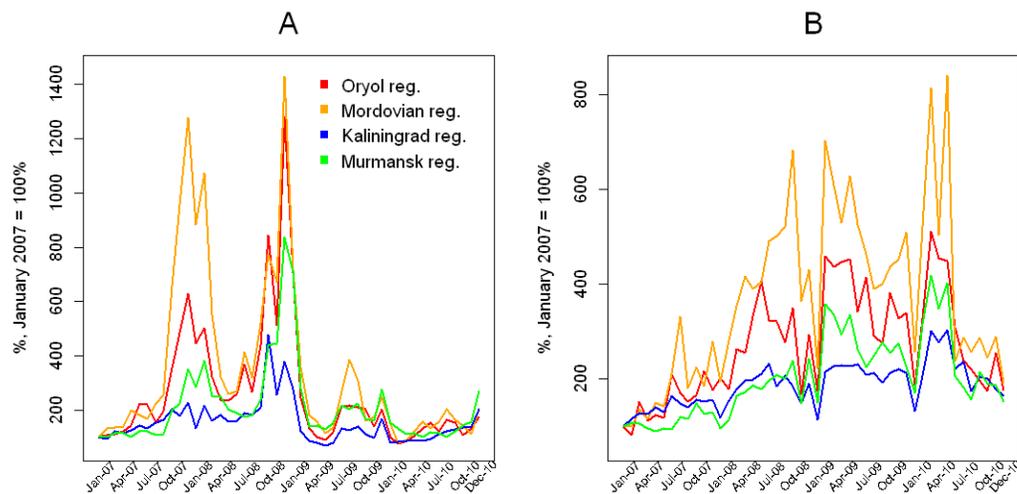


Fig. 3: Group 1 growth rates of Euro sales by authorized banks to individuals in 2007-2010 (part A – sale of currency to the population; part B – purchase currency from the population)

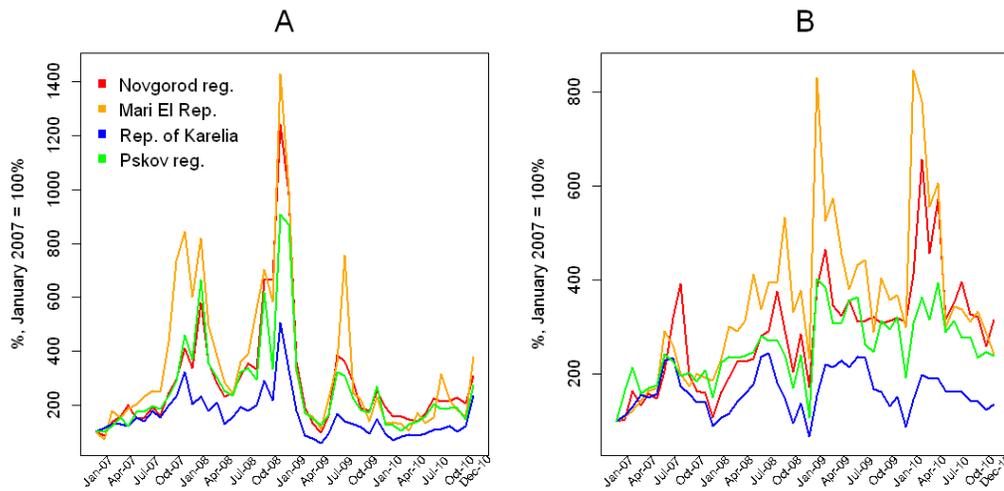


Fig. 4: Group 2 growth rates of Euro sales by authorized banks to individuals in 2007-2010 (part A – sale of currency to the population; part B – purchase currency from the population)

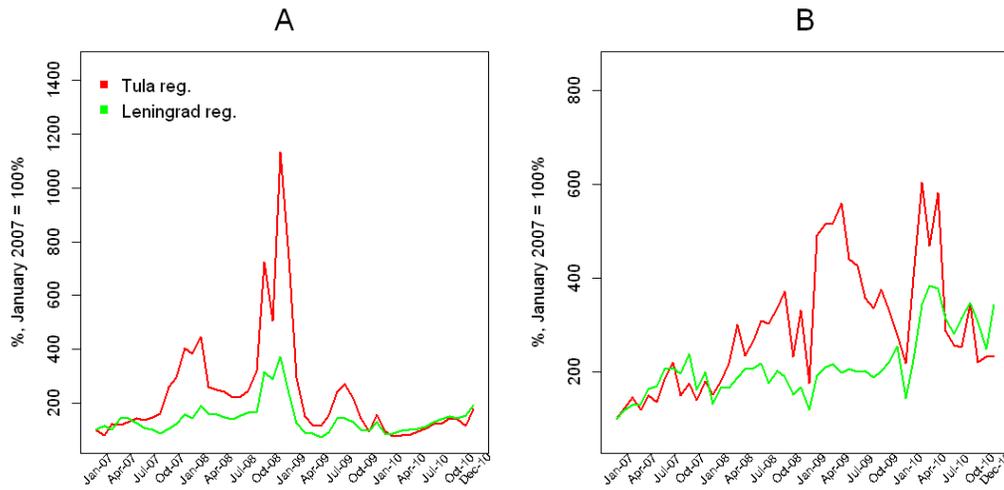


Fig. 5: Group 3 growth rates of Euro sales by authorized banks to individuals in 2007-2010 (part A – sale of currency to the population; part B – purchase currency from the population)

The next crisis in Russia, which occurred in 2014, was associated with the fall in world oil prices and the impose of economic sanctions. It should be noted that, unlike the previous one, this crisis in nature was not global. In this case, there are no clear differences between the response to the crisis of the population of the internal and border regions (Fig. 6, 7, 8). Our previous research on the US dollar, on the contrary, showed the same reaction of the population different types of regions to the global financial crisis. The differences between border and interior regions appeared after the imposition of sanctions when currency differences made CIS citizens go to the Russian Federation for spending their dollar savings and buying durable goods (e.g. cars) (Prokopyev and Roslyakova, 2018). For Euro the political rhetoric in the EU and visa regime did not contribute to a significant influx of EU citizens to Russia, through which would be able to show these effects.

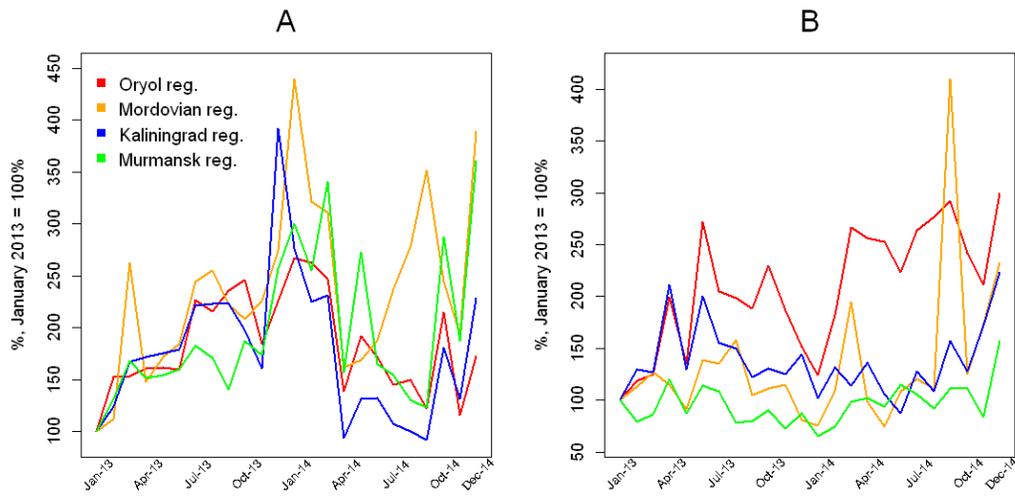


Fig. 6: Group 1 growth rates of Euro sales by authorized banks to individuals in 2013-2014 (part A – sale of currency to the population; part B – purchase currency from the population)

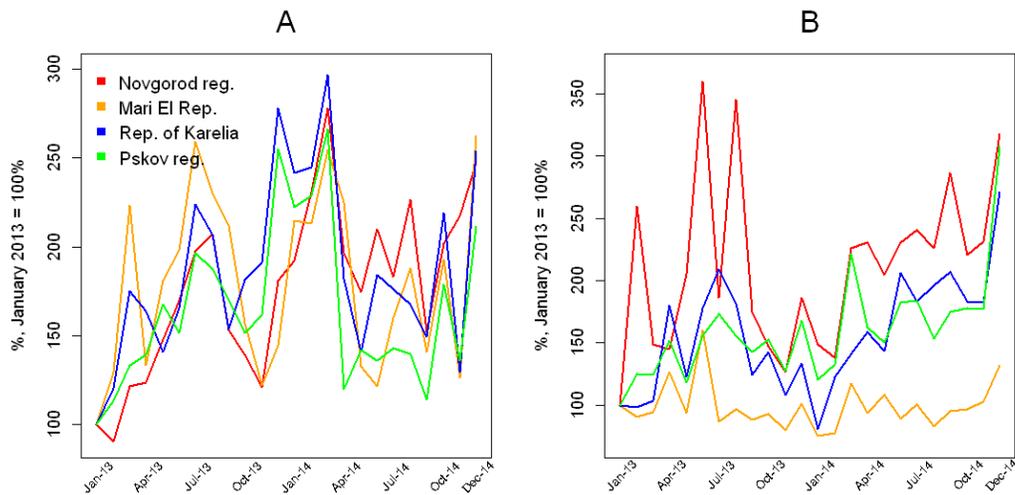


Fig. 7: Group 2 growth rates of Euro sales by authorized banks to individuals in 2013-2014 (part A – sale of currency to the population; part B – purchase currency from the population)

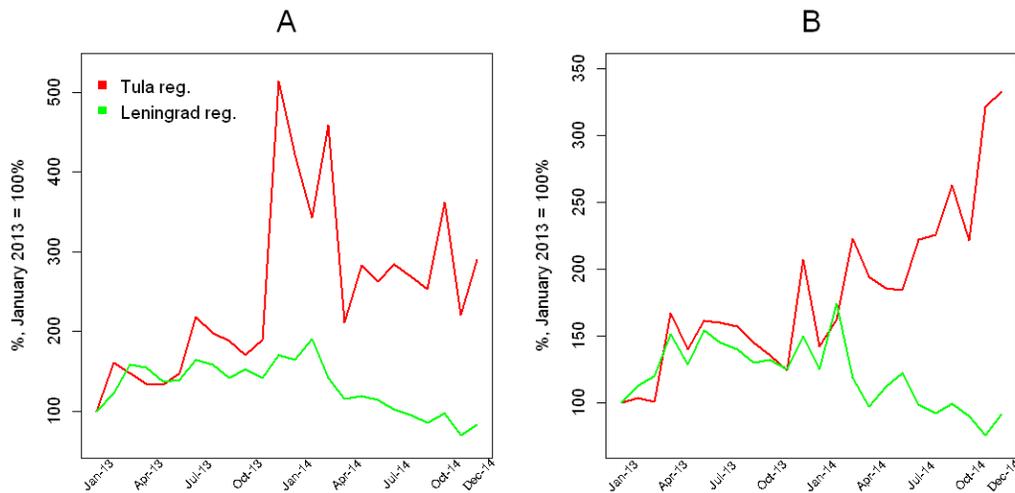


Fig. 8: Group 3 growth rates of Euro sales by authorized banks to individuals in 2013-2014 (part A – sale of currency to the population; part B – purchase currency from the population)

Conclusions

Thus, the data for 2002-2014 showed a direct relationship between the amount of Euro savings and per capita income. However, given that the models designed without spatial effect showed low explanatory power (about 50%), it should be understood that the factors of population size and income level do not sufficiently determine the change in endogenous indicators of the purchasing of Euro by the population. A significant role in the explanation of dynamics and estimation of proportions is played by the difference of regional conditions, since only with the including of spatial effects (cross-sector fixed effect) in the model it became possible to obtain models with significant factors and a sufficiently high explanatory power. At the same time, the impact of external shocks on the purchase and sale of Euro to the population apparently to depend on the nature of the external shock itself. If the crisis is purely economic, the population of the regions bordering the EU purchase Euros from banks with a lower intensity than the population of internally ones. Political reasons that worsen relations between the countries do not contribute to increased contacts in the border regions. Given the unfavorable political situation, even a positive combination of the Ruble and Euro exchange rate did not lead to the inflow of Euro to the regions bordering the EU. Thus, there is no difference in the behavior of the population in purchasing and selling Euros in the internal and border regions.

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