

AN ESTIMATION OF FUNDAMENTALLY SUBSTANTIATED REAL EXCHANGE RATE OF THE RUBLE

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The key factor in the strengthening of the real exchange rate of the ruble in the 2000s was the transformation-based growth of Russia's economy (the Balassa–Samuelson effect) coupled with the improving foreign trade conditions. As can be concluded on the basis of data for Q4 2014, for the ruble's real exchange rate to return to its fundamentally substantiated level, it was to be increased by 6.2%. In view of expectations of inflation in the RF and her trade partners at the rates of 12–14% and 3–4% respectively, the real effective exchange rate of the ruble in 8–11 months will return to its equilibrium level, if the nominal rate remains stable and the fundamental factors do not deteriorate.

The national currency's real effective exchange rate is one of the key macroeconomic parameters determining the competitive capacity of national product. The movement of a real exchange rate can exert a strong influence on the rates of industrial production growth in many sectors. Globalization of world financial markets and increasing volumes of international trade boost the importance of this factor for the economic situations in different countries. In this connection, the study of factors shaping the long-term movement of a real exchange rate appears to be very important.

The current transition to an inflation targeting regime by the Bank of Russia is taking place in a very unfavorable situation shaped by high geopolitical tension, massive capital outflow, and plummeting prices for energy carriers. The switchover to a freely floating foreign exchange rate of the national currency in such conditions is fraught with the risk of a significant departure of its real and nominal exchange rates from the level determined by the effects of fundamental factors: the underestimation of the ruble's value may be further enhanced by the mounting panic among foreign exchange market participants. So an analysis of the degree of deviation of the real exchange rate of the ruble from its fundamentally substantiated long-term trajectory is an urgent task which, once accomplished, can help in assessing further prospects for the exchange rate's movement.

In our study we will focus on the following fundamental factors determining the real effective exchange rate of the ruble: the ratio of Russia's labor productivity index to that of Germany – one of our key trade partners; real price of oil; net foreign assets held by the private sector; and the share of government consolidated budget expenditure in GDP. It is assumed that, due to the Balassa–Samuelson effect, an increasing labor productivity differential was pushing up the ruble's exchange rate in real terms.

Improving trade conditions, through their positive effect on the well-being of economic agents, resulted in increasing domestic demand, rising prices of non-tradable goods and rising real exchange rate of the national currency¹. In face of increasing net foreign assets held by the private sector, the real exchange rate declined due to the shrinking demand for the national currency and its depreciation in nominal and real terms². An increasing government expenditure, when allocated to the sector of non-tradable goods, pushed up their prices and thus strengthens the national currency on real terms³.

The existence of a cointegration relationship between the real exchange rate and the fundamental variables is verified by the Johansen test. The number of lags for the model is determined by applying the Akaike information criterion (AIC) and the Schwarz criterion (SBC).

A vector error correction model (VECM) is presented as follows:

$$\Delta y_t = \Pi y_{t-1} + \Phi D_t + \sum_{j=1}^k \Gamma_j \Delta y_{t-j} + \varepsilon_t \quad (1)$$

where y denotes the vector of variables; D denotes the vector of dummy variables; Γ_j is the matrix of short-

1 Edwards S. Real and Monetary Determinants of Real Exchange Rate Behavior // Journal of Development Economics, No. 29, 1988, pp. 311–341; De Gregorio J., Wolf H., "Terms of Trade, Productivity and the Real Exchange Rate" // NBER Working Paper Series, No. 4807, 1994; Cashin P., Céspedes L.F., Sahay R., "Commodity currencies and the real exchange rate" // Journal of Development Economics, No. 75, 2004, pp. 239–268.

2 P. Trunin, D. Kniazev, E. Kuduykina. Analysis of Fundamental Factors of the CBR's Exchange Rate // Scientific works No 144P. Gaidar Institute for Economic Policy, 2010.

3 Galstyan V., Lane P.T. The Composition of Government Spending and the Real Exchange Rate // CEPR, IIS Discussion Paper, No. 257, July 2008.

term coefficients; $\Pi = \alpha\beta'$ – is matrix describing the system's long-run parameters; (α is matrix describing the velocity of сходимости variables to equilibrium, β' – is the matrix of cointegration vectors). The vector of fundamental variables is as follows: $[reer, rel_prod, tot, gov_spend, cap]'$ – $I(1)$, where *reer* – is real effective exchange rate of the ruble (2010=100%), *rel_prod* is the labor productivity differential between Russia and Germany, *brent* is real price of Brent, *gov_spend* is ratio of government consolidated budget expenditure to GDP, *cap_flow* is net foreign assets held by the private sector (% of GDP). It should be noted that all the variables are seasonally adjusted by applying Census X12, presented as natural logarithms, and are integrals of the first order.

Our tests on VECMs based on different sets of fundamental variables have revealed that from the point of view of formal statistical criteria, in particular the index of retrospective forecast mean absolute percent error (MAPE), the best results are yielded by the cointegration equation based on variables like real effective exchange rate of the ruble, labor productivity differential, and government expenditure (VECM with two lags).

$$reer_t = 1,109 \times rel_prod_t + 0,173 \times brent_t + 0,193 \times gov_spend_t + 2,96 \quad (2)$$

The resulting long-term elasticity estimates of the real effective exchange rate of the ruble based on fundamental factors are compatible with theoretic assumptions and comparable with the results of previously conducted empirical studies¹. The long-term

1 Sosunov K., Ushakov N., *Opređenje real'nogo kursa rublia i otsenka politiki dolgosrochnogo tergetirovaniia real'nogo kursa valiuty* [Determination of the Real Exchange Rate of the Ruble and Estimation of the Poliry of Long-term Targeting of the Real Foreign Exchange Rate] // Journal of the New Economic Association, No. 3–4, 2009, pp. 97–122. P. Trunin, D. Kniazev, E. Kuduykina. Analysis of

values of the real effective exchange rate of the ruble are calculated by applying the cointegration ratio presented in equation (2).

Over the period Q1 1999 – Q4 2014, the annual growth rate of the actually observed real effective exchange rate of the ruble amounted to 5.1%, while the corresponding index for the fundamentally substantiated exchange rate was on the average at the level of 4.4%. The higher growth rate of the real exchange rate of the ruble by comparison with its long-term modeled values can be explained by the pre-crisis underestimation of the real effective exchange rate of the ruble (the high frequency of such episodes in 2002–2007) and its gradual movement towards its equilibrium value, as well as by its post-crisis partial overestimation (Fig. 1). An analysis of the deviations of the real exchange rate from its long-term trajectory has also demonstrated that in Q4 2014 the ruble was underestimated in real terms by 6.2% (Fig. 2).

On the basis of our error dispersion analysis it was found that 43% of the real effective exchange rate's dispersion can be explained by the movement of the real price of oil, 26% – by the labor productivity differential, 10% – by government expenditure.

Thus, the results of our study have confirmed the key role, for the strengthening of the ruble's real exchange rate, of the transformation-based growth of Russia's economy in the 2000s (the Balassa–Samuelson effect), as well as the improving foreign trade conditions.

Over the course of the year 2014, in face of the mounting geopolitical tension, declining oil prices, and increasing capital outflow from the private sector, the real effective exchange rate of the ruble dropped by 27.2%, while its the nominal effective exchange rate dwindled by 32.7%; over the same period, the inflation rate in Russia amounted to 11.4%, while the growth rate of consumer prices in Russia's trade partner countries was on the average at the level of 2.7%. It should be

Fundamental Factors of the CBR's Exchange Rate // Scientific works No 144P. Gaidar Institute for Economic Policy, 2010.

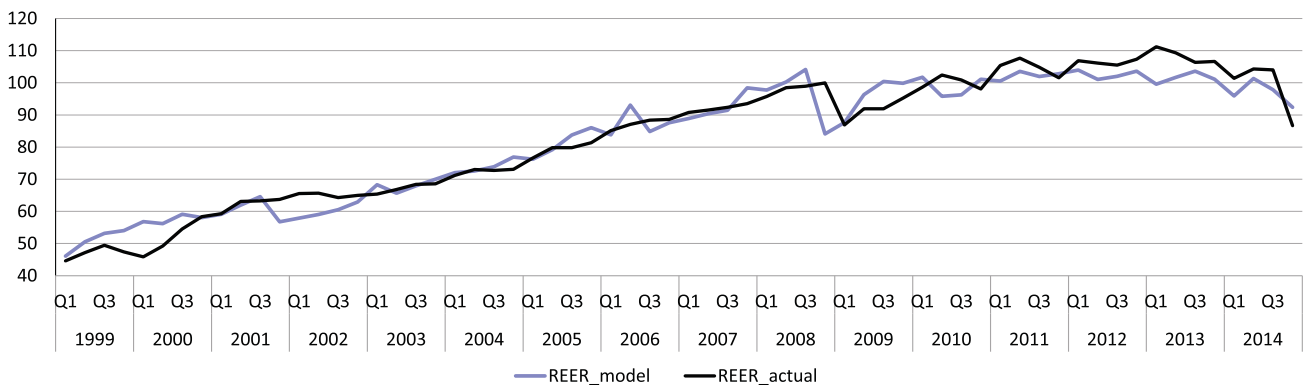


Fig. 1. The Actually Observed and Fundamentally Substantiated Real Effective Exchange Rates of the Ruble

noted that, judging by the available data for Q4 2014, for the real effective exchange rate of the ruble to return to its equilibrium trajectory, it was to be increased by 6.2%. In view of expectations of inflation in the RF and her trade partners at the rates of 12–14% and 3–4% respectively, the real effective exchange rate of the ruble within 8–11 months will return to its equilibrium level, if the nominal rate remains stable. Our estimations also point to the fact that in Q4 2014, the nominal effective exchange rate was below its fundamentally substantiated level by 13.6%. On the whole, if the fundamental factors do not deteriorate, no significant depreciation of the ruble in nominal terms will be required. ●

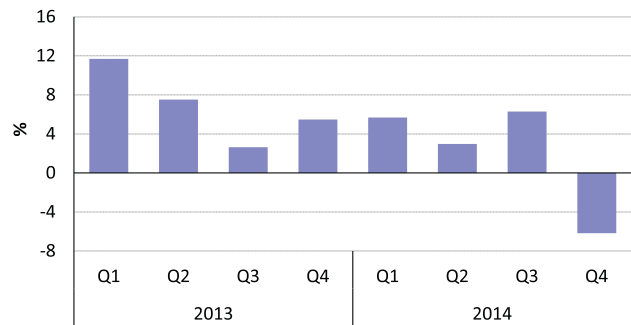


Fig. 2. The Overestimation (+)/Underestimation (-) of the Real Effective Exchange Rate of the Ruble