

MEASURING STATISTICAL RELATIONSHIP BETWEEN OIL PRICE AND RUSSIAN RUBLE EXCHANGE RATE

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Will Russian economy be adapted to lower oil prices, and, if so, in what way? Now Russia applying market self-regulation tools for adaptation to the new external conditions. As an example, Central Banks of Russia has switched from the dual currency soft peg to the floating exchange rate in November 2014. Earlier Russian currency was pegged to dual-currency basket with US dollar and Euro, and the Central bank propped up the ruble when the exchange rate against these currencies exceeded its boundaries.

Floating exchange rate as a kind of monetary policy allows the Central bank to don't spend reserves for maintaining the desired exchange rate of ruble, which is adjusted only on the basis of market supply and demand. In turn, the supply and demand for foreign currency derives from the changes in the balance of payments. Market self-regulation reduces the exchange rate of ruble after decrease in exports. That consequently leads to reduction of imports. Thus, the floating exchange rate prevents possible trade and budget imbalances in the period of drastic decline in exports. Use of this kind of monetary policy allowed softening the negative effect of lowering oil prices on the Russian economy.

In the first half of 2014, 68 per cent of commodity exports of Russian Federation were energy resources, including crude oil (32 per cent), petroleum products (23 per cent) and natural gas (13 per cent). In the first half of 2015 exports of energy goods, valued in dollars, fell by 37 per cent, including crude oil – by 41 per cent. Decline in export prices had the main impact on exports decrease, while export volumes increased by 6 per cent. Non-energy exports decreased by 13 per cent, but the share of non-energy goods increased from 32 to 40 per cent of total commodity exports. The trade balance of services reduced from –10 per cent of commodity exports in the first half of 2014 to –7 per cent in the first half of 2015 [1].

Such a drastic decline in exports could be dramatic for the economy if the Central bank applied pegged exchange-rate regime. In fact, Russian foreign trade surplus has not changed significantly due to reduction of commodity imports by 39 per cent. This was happened because real incomes of all sectors of economy were reduced proportionally to drop of exchange rate of ruble, and imports became more expensive compared with domestic goods and services.

The switch to the floating exchange rate made the Russian economy more predictable relatively to its response to the oil price changes. Is there correlation between the oil price and exchange rate of ruble to US dollar?

Russian professor K. Korischenko proposed a simple model: the equilibrium price of oil in 3050 rubles per barrel equals oil price, in USD/Barrel, multiplied by ruble exchange rate, in RUB/USD [2]. Indeed, the predicted oil price of 3050 rubles per barrel is close to the average for the last 5 years. However, detailed analysis identifies certain changes in the ruble price of oil. From the beginning of 2011 to November 2014 there was no correlation between the oil price in US dollars and the ruble to US dollar exchange rate. From November 2014, when the Central bank switched to the floating exchange rate, to January 2016, statistical dependence between these parameters proved to be quite close (See Figure). The dependence of ruble exchange rate (*PER*) on the price of oil (*OP*) can be described by a power function:

$$PER = 656,79 \cdot OP^{-0,6125}, \quad R^2 = 0,80, \quad DW -1,75 \quad (1)$$

<0,001

where *PER* – predicted exchange rate of ruble, RUB/USD;
OP – oil prices, USD/Barrel.

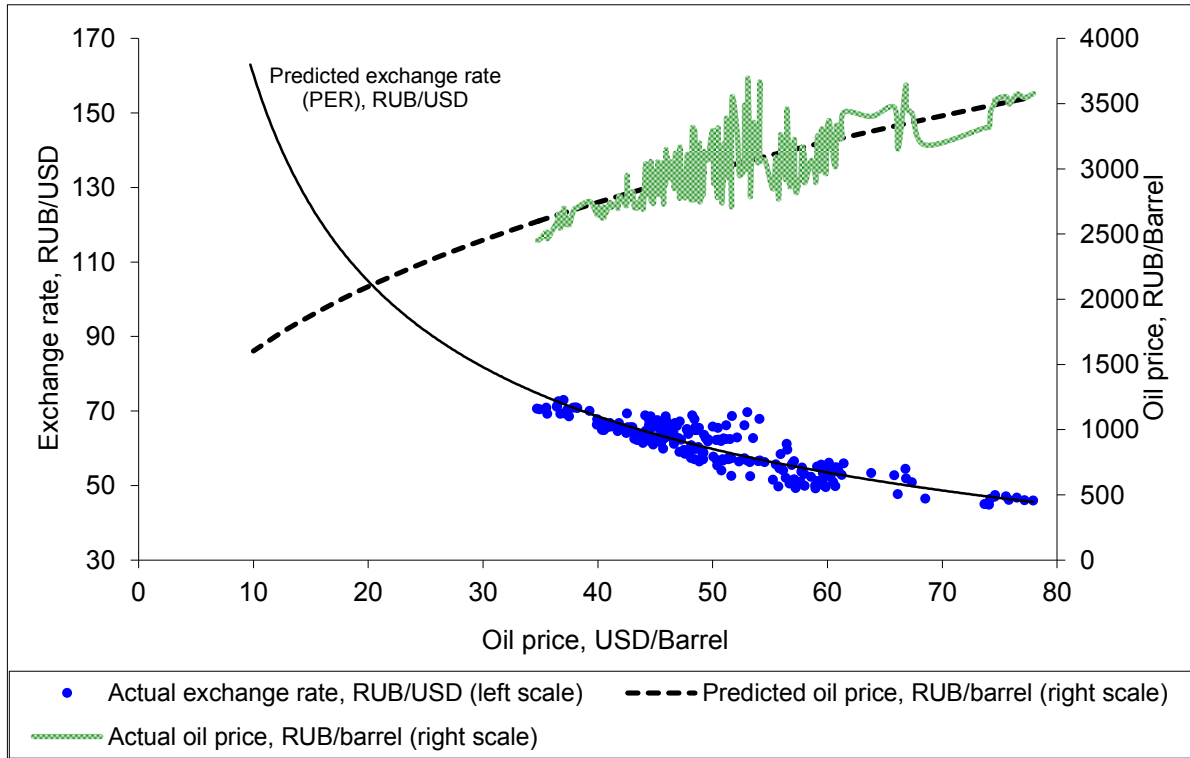


Figure – Statistical dependence between oil price in US dollars and Ruble to US dollar exchange rate in the period from November 2014 to January 2016.

Source: built by authors using data from [3] and [4].

According to the received power regression model, the oil price below 10–15 USD per barrel could be critical for the Russian economy and trigger hyperinflation. Full costs of oil production including taxes for Russian companies vary from 10 to 35 USD per barrel [5] but they can be reduced with the depreciation of ruble against US dollar. It is also noteworthy that the power index in the given model (–0.6125) approximately corresponds to the share of energy exports in total commodity exports and reflects oil price elasticity of the exchange rate of ruble to US dollar.

Comparison of the predicted values of ruble exchange rate to the actual values in January 2016 showed the high accuracy of the model. But the given model is static, like any other regression model. In the dynamics, the balance of payments always changes after the change in the structure of exports. The share of energy exports in total merchandise exports declining due to lower oil prices and higher US dollar to Ruble exchange rate. This reduces the absolute value of the elasticity coefficient, which initially equals –0.6125. The ruble exchange rate becomes less sensitive to decrease in oil prices; therefore at a lower oil price forecasts of the exchange rate are overpriced.

On the other hand, the influence of endogenous factors on the exchange rate of Ruble increases with the rapid decline of oil price. The risk of panic in the market becomes significant and can lead to a sharp depreciation of Ruble against US dollar. In this case, there is a possibility of the Central bank’s switch back to pegged exchange–rate regime.

The growth of ruble price of exported oil has a positive effect on profits of mining companies, as the gap between their dollar revenues and ruble costs increases. Growing profits can then be reinvested to output extension so the overall increase in the ruble price of oil contributes to the expansion of the mining sector of Russian economy. The decline in ruble oil prices reduces profits of mining companies, declining their investments and adversely affecting the mining sector. However, lower oil price evaluated in rubles means reduction of fossil fuels in Russia’s total exports and GDP.

The decline of Russia's GDP in 2015 was 3.6 per cent, and it is too early to say that the peak of the crisis passed. Flexible monetary policy of the Central bank is necessary but clearly not sufficient condition to overcome the crisis and resume economic growth. Russian economy needs to develop non-energy sectors that produce various goods and services. The main objective for the nearest future is transition from resource-based to technology-based model of economic development.

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