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Article

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The ruble between the hammer and the anvil: The impact of oil prices and economic sanctions

By Christian Dreger and Konstantin Kholodilin

The Russian economy is tightly woven into the global economy, and is therefore highly dependent on the development of exchange rates. Since 2014, the ruble has fallen by more than 50 percent against the U.S. dollar. The devaluation goes hand in hand with the Western sanctions that were imposed due to the political tensions between Russia and Ukraine. At the same time, the decline in oil prices may also have contributed to the ruble's depreciation. The study at hand examines the relative importance of the different factors influencing the ruble's exchange rate. It turns out that the devaluation is mostly due to the falling oil prices, while the sanctions are playing a rather subordinate role.

The economic development of Russia is strongly impacted by the ruble's exchange rate, primarily due to the country's heavy dependence on commodity exports, foreign investment, and the import of consumer goods. Since 2014, the value of the ruble against the U.S. dollar has dropped by more than half (Figure 1). The fall of the ruble could partly due to the economic sanctions against Russia that were imposed by several Western countries; the deterioration of international trade relations and the associated economic downturn, in particular, are also likely due to the sanctions. The measures were intended to make Russia abandon its support of pro-Russian forces in the Ukraine conflict. As well, the Russian economy is to a large extent resource-dependent. A decline in international commodity prices therefore worsens the growth prospects of Russia and increases the uncertainty of many market participants. This leads to stronger demand for the U.S. dollar and the euro. In addition, the country's attractiveness to international investors decreases. This likely contributed to the decline of the ruble.

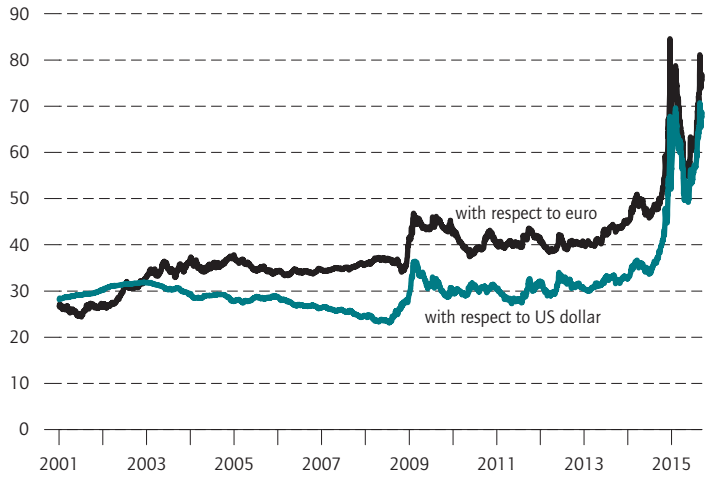
The decline in commodity prices (especially for oil; see Figure 2) is connected to the weak development of the global economy. In addition, supply-side factors have played an important role, as have the OPEC decision to maintain a high level of production and the non-OPEC countries' steady increase in oil production due to technological innovations. The relative importance of the political and economic factors affecting the ruble exchange rate will be examined in this weekly report.[1]

Russia is a major supplier of oil and gas in the world economy. At the same time, its industrial diversification is not sufficiently developed: Two-thirds of exports and more than 50 percent of the public sector revenues are dependent on oil and gas, which makes the country

1 This work is a summary of Christian Dreger, Jarko Fidrmuc, Konstantin Kholodilin, Dirk Ulbricht (2015): "The Ruble between the Hammer and the Anvil: Oil Prices and Economic Sanctions." DIW Discussion Paper #1488.

Figure 1

Exchange rate of ruble

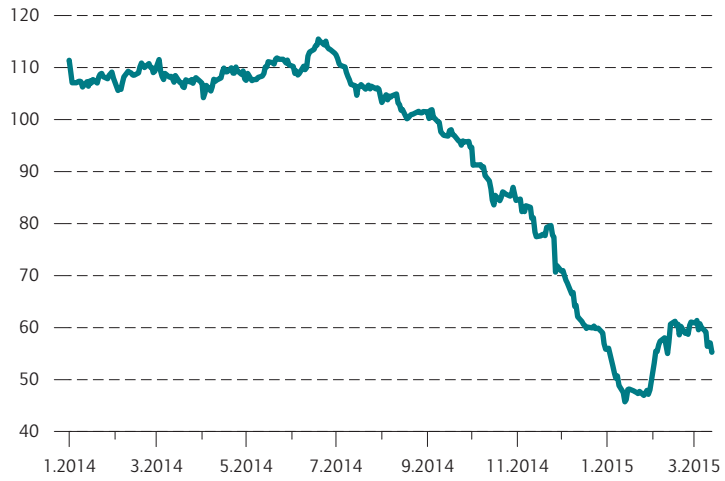


Source: Central Bank of Russia.

The recent devaluation of ruble exceeds that during the 2009 crisis.

Figure 2

Oil price dynamics
In US dollar per barrel



Source: Datastream.

Since mid-2014, the oil price fell dramatically.

extremely vulnerable to shifts in world market prices. The devaluation means that the decline in oil prices is hardly burdening the government revenues in rubles, because the price of oil is traded in dollars. The higher inflation in the wake of rising import prices, however, reduces purchasing power and thus the real tax revenues, as well. Sanctions—especially those that impede Russian banks' access to capital markets—may aggravate the downturn even more. Restrictions aimed at the technology transfer in the energy industry are compromising the ability for Russian companies to develop new oil fields.

Russia's international reserves, which bulked up significantly when the oil business was booming, are now being used by the central bank to support the currency. From December 2013 until December 2014, Russia's international reserves dropped by a quarter, from 506 to 385 million U.S. dollars—the most significant decline since 2009. If the oil price remains low and the sanctions are maintained, a serious erosion of the reserves is expected to occur. The Central Bank of Russia increased its key interest rate several times to curb inflation and capital outflows—but the rate hikes are dampening consumer and investment demand, which is worsening the economic situation all over again.

Economic impact of sanctions

Diplomatic sanctions, such as the withdrawal of ambassadors and the suspension of international negotiations, are considered the lowest level of sanctions. The next level includes measures against individuals and companies, such as travel bans, asset freezes, the termination of development aid, and restricted access to international credit. Sanctions against specific industrial sectors, such as trade restrictions and embargoes, constitute the highest level. Since the annexation of Crimea, all levels of sanctions have been implemented by Western governments.

The economic effects of sanctions are not clear-cut. Trade restrictions, for instance, can have deleterious effects not only on target country, but also on the sanctioning country. Growth prospects decline in countries with close economic ties, in particular. While some studies have found that "smart sanctions" are effective,[2] others have found that only harsh measures may trigger a significant impact on policy.[3] Moreover, the nature of the

2 Cortright D., Lopez G.: *The Sanctions Decade: Assessing UN Strategies in the 1990s*. Lynne Rienner Publishers, Boulder, (2000).

3 Hufbauer G.C., Oegg B.: "The Impact of Economic Sanctions on US trade: Andrew Rose's Gravity Model." Peterson Institute for International Economics, International Economics Policy Briefs, PB03-04 (2003).

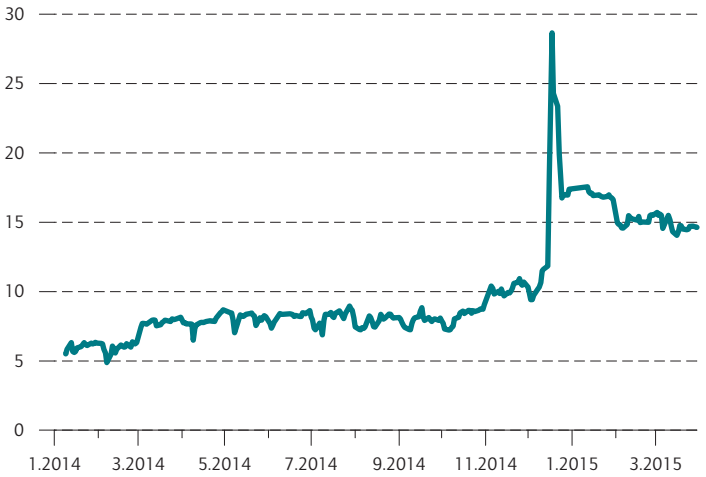
sanctions are influenced by stakeholders, which may reduce their effectiveness.

An examination of a large set of sanctions revealed that roughly one third of them were successful.[4] This proportion is on the high side, however, because sanctions rarely fully achieve their original objectives. The success rate sinks overall when the sanctions' objectives are more ambitious. Larger and more self-sustaining national economies are better able to cope with sanctions than are smaller national economies.[5] Economic sanctions can have a negative impact on international trade, particularly when they are implemented within the framework of multilateral agreements.[6] The success of the sanctions is positively correlated with the strength of trade relations between the sanctioning country and the sanctioned country, and negatively correlated with the size of the target country and its political stability.[7]

Based on the existing evidence, it can be assumed that Western sanctions are not significantly harming the Russian economy in the short term. But because Russian companies are highly dependent on technology and equipment imported from the West, the growth prospects are likely to be weakened in the long term.

Figure 3

Short-term interest rate RUONIA
In percent



Source: Central Bank of Russia.

The short-term interest went up drastically in response to the key rate increase.

Oil prices matter, sanctions matter less

To investigate the effects, an econometric model is specified. It includes the exchange rate against the U.S. dollar; the price of oil; and composite indicators pertaining to the sanctions imposed on and by Russia. The Russian sanctions have, as a general rule, been imposed in response to the Western sanctions. They include travel bans and import restrictions on agricultural products. The sanction indices of both sides are based on the actual decisions. In addition, a news-based index of unanticipated sanctions is constructed (see box).

Because the Central Bank of Russia tightened its monetary policy several times in order to counteract the devaluation of the ruble, a short-term interest rate (RUONIA) is also included (see Figure 3). All variables are reported on a daily basis, with the observation period beginning January 1, 2014 and ending March 31, 2015.

The results show that in equilibrium, a rise in oil prices and an increase in the RUONIA interest rate will lead to an appreciation of the ruble against the U.S. dollar.[8] The Western sanctions are causing more of a depreciation, while the Russian sanctions against the West compensate for this effect.

A one-percent increase in oil prices is followed, in equilibrium, by a revaluation of the ruble by more than one percent. This underscores the critical impact that the oil price has on Russian currency. By contrast, the influence of other variables seems to be significantly smaller; the sanctions, in particular, are only marginally significant. The coefficients of the adjustment to equilibrium are significant and imply that the short-term deviations from the equilibrium are gradually being eliminated. It takes three weeks before the original deviation has decreased by half. The ruble and the interest rate bear the brunt of adjustment. The oil prices are determined on international commodity markets largely independent-

4 Hufbauer, G.C., Elliot K.A., Oegg, B., Schott, J.J.: "Economic Sanctions Reconsidered." Peterson Institute for International Economics, 2007.

5 Kaempfer W.H., Lowenberg A.D.: "The Political Economy of Economic Sanctions." Handbook of Defense Economics, 2007, Vol 2, Chapter 27.

6 Caruso, R.: "The Impact of International Economic Sanctions on Trade: An Empirical Analysis." Peace Economics, Peace Science and Public Policy 9.2, Milan.

7 Jing, C., Kaempfer, W.H., Lowenberg, A.D.: "Instrument Choice and the Effectiveness of International Sanctions: A Simultaneous Equations Approach." Journal of Peace Research 40, 2003, 519-535.

8 This connection was estimated based on the cointegration relationship.

Box

Methods and data

The cointegrated vector autoregressive model (VAR)[1] includes macroeconomic variables as well as indicators pertaining to the actual sanctions and the corresponding discussion in the press. Macroeconomic variables include the nominal exchange rate of the ruble against the U.S. dollar; the oil price per barrel of Brent Crude in U.S. dollars; and short-term interest rates on the Russian interbank market, for which the RUONIA (Ruble Overnight Index Average) is used. Data are reported on every workday. Oil prices have been declining since mid-2014. The RUONIA remained stable for most of the observation period, and stood at around eight percent. On December 16, 2014, the Central Bank of Russia drastically increased its key interest rate to counteract the ruble's weakness. In response, the RUONIA rose in the short term to about 25 percent, and has since leveled off at around 15 percent.

To measure the sanctions, two composite indicators are constructed (see Figure 4):

$$(1) \qquad S_t^w = \sum_{\tau=1}^{t} s_\tau^w \quad , \quad S_t^r = \sum_{\tau=1}^{t} s_\tau^r$$

Here, w denotes the Western sanctions and r denotes the Russian sanctions. The indices are the sums from binary variables that represent the individual sanctions. The latter values are equal to 1 beginning on the date when a sanction is implemented and from then onward, and 0 before it is implemented.

To quantify the unanticipated component of the sanctions, a media index was developed that indicates the frequency of certain words or phrases ("Russia" and "sanctions") in the international press. For this index, media coverage from eight different countries (France, Germany, Italy, Russia, Spain, Ukraine, the United Kingdom, and the United States) was evaluated. In the media index, the number of phrase occurrences is aggregated and divided by the sum. Since the annexation of Crimea in March 2014, media coverage has intensified significantly (see Figure 5). Two spikes occurred: in March (Crimea) and July (when the Malaysian aircraft flying above Ukraine was shot down). At these points in time, major sanctions were imposed. The index is used in cumulative form in order to be consistent with the index of the actual sanctions.

The media index encompasses the discussion on the ongoing sanctions and the assessments regarding possible further measures. From this, an unanticipated component is derived by regressing the index on future values of an indicator pertaining to sanctions:

$$(2) \qquad C_t = \beta_0 + \sum_{l=1}^{L^w} \beta_l S_{t+l}^w + \sum_{l=1}^{L^r} \theta_l S_{t+l}^r + u_t$$

Here, u denotes an interference process that fulfills the classic characteristics. The inclusion of subsequent sanctions (L^w and L^r) arises based on information criteria. If the sanctions were correctly anticipated by the press, the adjustment of the equation is perfect. The residuals can therefore be interpreted as a measure of media distortion.

Lastly, the conditional volatility of the variable is collected using a so-called multivariate GARCH model.[2] This model is applied to the residuals of the individual equations of the cointegrated VAR-model.

1 Juselius, K. (2007): "The cointegrated VAR-Model," Oxford University Press.

2 Bauwens, L.; Laurent, S.; Rombouts, J.V.K.: (2006): "Multivariate GARCH models: A survey," Journal of Applied Econometrics 21, 79–109.

ly of the development in Russia, while the sanctions are determined in the political process.

The impulse responses show the reaction of each variable to a one-time shock in a specific variable. These correspond to the dynamic multipliers that arise over time. While an increase in oil prices and of the RUONIA cause an appreciation of the ruble that is still noticeable even 45 business days later, the currency remains largely resistant to the effects of sanctions. Moreover, a devaluation of the ruble leads to a rise in interest rates, which is broadly in line with the actual monetary policy of the Central Bank of Russia. The sanctions have only a minor effect on the other variables of the system. Most notable are the relationships among the various sanctions, such as the fact that Western sanctions bring about Russian sanctions. An escalation spiral is not visible, because the West has not yet reacted to the Russian sanctions.

Although the sanctions will not affect the value of the ruble significantly, they tend to increase its volatility. This is likely to be the case primarily when the sanctions are not anticipated by the actors. We therefore evaluated the international media coverage of the sanctions and extracted an "unanticipated component" (see: Box).

During times when the ruble is particularly volatile, uncertainty among the market participants regarding its future development is especially high. The uncertainty may become even more pronounced if the imposed sanctions do not conform to the media's expectations. However, the results show that this unanticipated component has no direct impact on the ruble's volatility. Rather, such assessment errors by the media lead to a higher volatility in oil prices in the short term. This may inhibit the development of the global economy. The political decisions regarding the sanctions should therefore be made as transparent as possible in order to avoid shocks. In addition, the unanticipated component has a positive impact on the sanctions when its various effects over time are taken into account. If the media anticipates tougher sanctions than those that actually come into effect, the probability of further sanctions is high. In this sense, the media coverage creates a self-fulfilling prophecy.

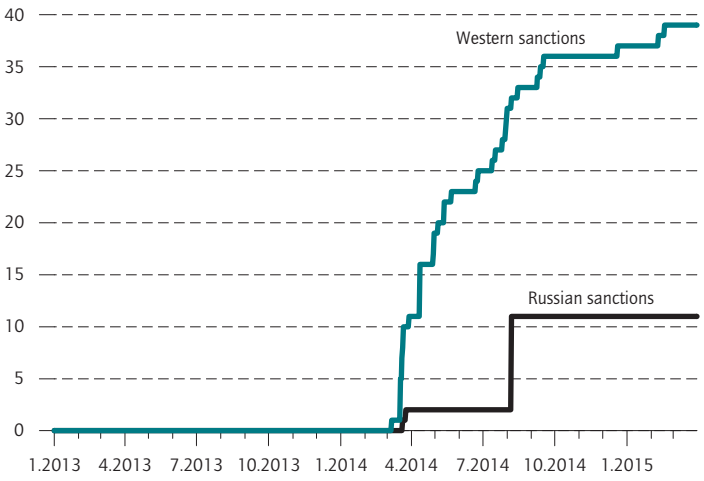
Conclusion

The analysis shows that the recent devaluation of the ruble is due in large part to the declining oil prices. The sanctions are only playing a rather subordinate role. Due to the lack of short-term economic effects, the sanctions do not seem suited to influencing Russian politics; this does not imply, however, that the Russian economy will remain unaffected by Western sanctions.

Should the sanctions be maintained for several years, they are extremely likely to weaken Russia's economic growth. For example, Russian companies are very much dependent on Western imports. Experience shows, however, that long-term sanctions do not necessarily lead to a political about-face.

Figure 4

Russian and Western sanctions
Index (no sanctions = 0)

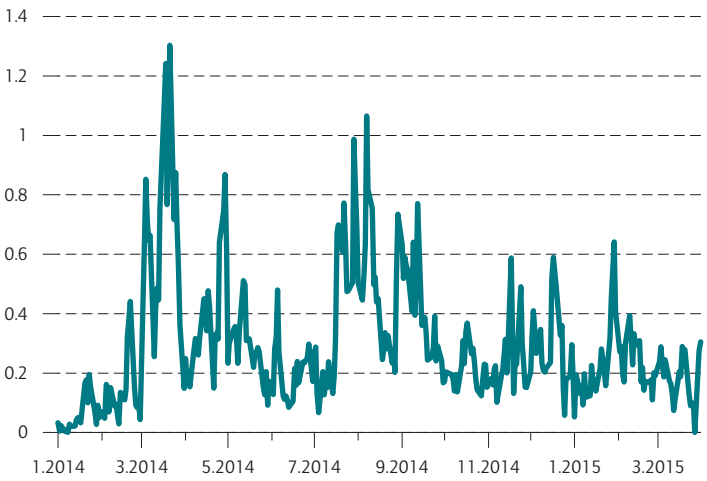


Source: Own calculations.

Since March 2014, there have been multiple sanctions tightenings.

Figure 5

Media index



Source: Own calculations.

Since March 2014, the number of media reports about Russia-related sanctions has been ever increasing.

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