The Bank of Russia's Policy in the face of economic sanctions: a step forward or two steps back?

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Keywords

Inflation targeting, the Bank of Russia, currency band, exchange rate, monetary policy transmission, vector autoregression.

Abstract

In this paper, we investigate the problem of regulation of the monetary policy conducted by the Bank of Russia in economic conditions of 2014-2015. This research contributes to the improvement of the monetary policy effectiveness in the current economic conditions. In turn, this will facilitate overcoming the crisis and entering the path of economic growth. In addition, a sharp decline in international reserves of the Russian Federation makes the monetary policy a key tool to stimulate the economy.

The aim of the work was to determine the degree of the monetary policy impact on the short-term economic growth during the current economic crisis. For that purpose, we built a vector autoregression model which identified qualitative and quantitative relationships between economic indicators.

The work revealed that the changing policy of the Bank of Russia in 2014 (the transition to a floating ruble exchange rate and an increase of the interest rate) has led to a greater drop in key economic indicators than in case of the continuing policy of the currency band. At the same time the degree of the negative effect of inflation on the short-term growth rate was identified as being the evidence in favor of the inflation targeting policy, which is now the main priority of the Bank of Russia.

Introduction

Russia is a resource-based country which economic prosperity depends on oil prices. It is obvious that such a situation cannot provide a long-term stable growth, as well as the stability of the economy in the context of high volatility of oil prices. The current crisis is the evidence of this statement. In 2015, because of political events and declining oil prices, budget revenues decreased by 2.6 trillion (from 15.1 to 12.5), which is about 17%[1]. However, it is necessary to consider two following topics in more details: a sharp drop in oil prices and Western sanctions against Russia.

Firstly, it is important to mention the shale gas revolution in the USA, which, unlike other factors of oil price fall (such as, for example, the policy of Saudi Arabia and the slowdown of the Chinese economy), cannot be considered as a temporary phenomenon. Thus, the production of oil in the United States in 2014 grew at a rate of 1.5 million barrels (the highest rate since 1983[2]). So, the basic paradigm of the oil market (the supply is unable to cover the constantly growing demand) fell, while the US turned from an importer into an exporter of oil, thereby contributing to the downfall of the world oil market entire model.

Hydrocarbons are no longer the main source of energy. They are displaced from the market by renewable energy sources. This happens due to the fact that the cost of electricity

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[1] Authors' calculations on Rosstat data
[2] Source of data and details: vedomosti.ru/library/articles/2014/12/15/kak-ssha-perekroili-mirovoj-neftyanoj-rynok

production from renewable energy sources (RES) is rapidly declining and is already equal to the cost of electricity generation using hydrocarbons. In 2014, in the EU 79% of newly launched electro-generating capacity was renewable energy and all of the net increase in power generation was provided exclusively by renewable energy. According to IEA scenario published in 2014, solar energy will probably be the main producer of electricity in the world by 2040, and according to Deutsche Bank forecast, the solar power will account for 30%[3] of the global electricity market by 2050.

Secondly, the sanctions cut off Russia from one of the major trading partners - the EU, first of all concerning technology and equipment, applied in the oil industry as well. It is important to note that the European Union does not reduce the consumption of Russian oil and gas. Thus the nature of the sanctions is seen as purely technological limitations for Russia.

As a result, the Russian economy heavily depends on the highly volatile oil industry, where a significantly different price equilibrium is being formed. Additionally, in the global energy market there is a tendency to the reduction of the hydrocarbons share. It should be also noted that Russia has occurred in conditions of technological isolation. In the arsenal of Russia there is a very limited set of measures to overcome the current crisis, and *the monetary policy* is considered to be the main of them.

Foreign-exchange reserves of Russia decreased by 25.3%[4] in March 2015 compared to March 2014 (the period when the crisis experienced a peak). Moreover, according to the forecast[5] of the Bank of Russia (November 2014) in mid-2017 Russia's Reserve Fund will run out as well as the National Welfare Fund by the end of 2018. It can be concluded that the monetary policy is the key tool in the process of economic stabilization in Russia.

The article aims to determine the impact of the monetary policy of the Bank of Russia on the main indicators of the economic conjecture in today's crisis (in terms of low prices for hydrocarbons and Western sanctions). It is necessary to find out the *degree of timeliness* of the Central Bank measures (how timely or untimely they were) and the *degree of impact* on the main macroeconomic indicators.

Taking into account the nature of the Russian economy (the high dependence on oil prices and consequently the high volatility of the economy), it is possible to conclude that the Bank of Russia should focus on the medium-term inflation, without concentrating on the short-term deviations from the target due to conjecture fluctuations in the oil market (Goryunov, Drobyshevskiy, Trunin 2015). However, there are situations in which these fluctuations can become large scale. In such cases, the Central Bank should definitely pay attention to the short-term inflation fluctuations.

According to some economists, it is necessary to oblige the Central Bank of the Russian Federation to take measures to "create the conditions for economic growth, increased investment and employment" (Glazyev, 2014). This practice can be found in cases of central banks of developed countries (Nekipelov, Ivanter, Glazyev, 2013). However, goals and methods of the monetary policy in developed and developing countries vary, sometimes considerably. The inherent volatility of emerging economies and rising inflation (relatively to developed economies) requires appropriate adaptation of the monetary policy. On this basis we can

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[3] Source: International Energy Agency «Technology Roadmap: Solar Thermal Electricity», 2014 // URL: http://www.iea.org/publications/freepublications/publication/technology-roadmap-solar-thermal-electricity---2014-edition.html
[4] Source: authors' calculations on central bank data
URL:http://www.cbr.ru/hd_base/default.aspx?Prtid=mrrf_m
[5] Source: cbr.ru/analytics/wps/bulletin_15-02.pdf

assume that inflation targeting plays a significant (in the peaks of the crisis even decisive) role in the task of smoothing conjecture fluctuations of the Russian economy.

2. The fall in prices for hydrocarbons: a comparative analysis of the oil exporting countries

The sharp decline in world prices for hydrocarbons affected obviously not only the Russian economy. A number of countries with a similar economic structure (in fact, oil exporters) faced similar problems, the main of which was a sharp decline in the budget revenues.

For most countries such an external shock was not a surprise. If we consider the exchange rate, we can see that the situation in Russia is very different from the situation in other countries. Russia is facing the sanctions by Western countries together with the falling prices of oil, which created a significant additional pressure on the Russian economy. The situation is shown in more detail in Figure 1. According to the figure, at the end of 2014 the exchange rate of the Russian currency index was about 1.7 to 1 at the beginning of 2014. At the same time the majority of the presented countries kept their exchange rate at the level of 1.0-1.2 at the end of 2014, compared with 1 at the beginning of the same year.
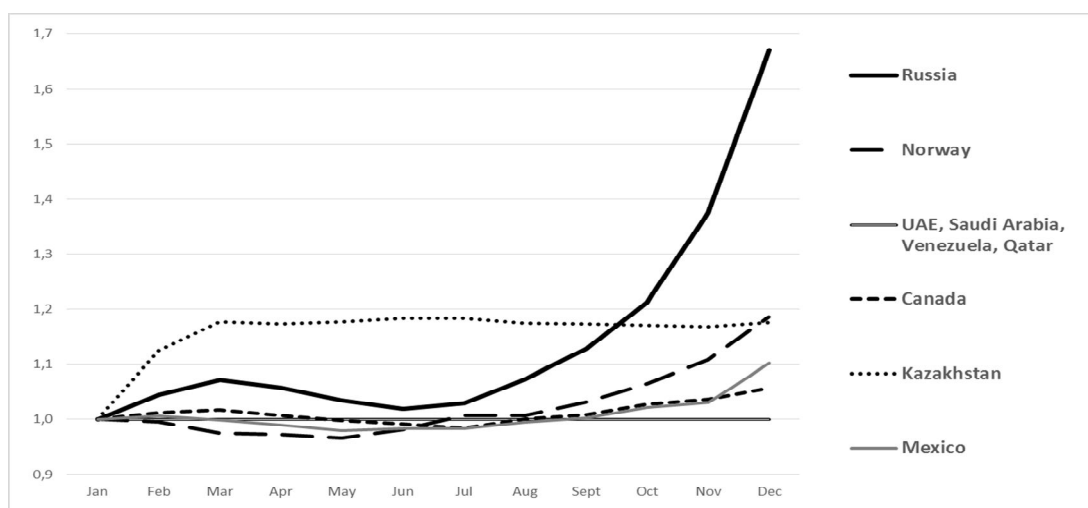

Fig. 1. Dynamics of average monthly exchange rates indices of oil exporting countries in 2014 (January 2014 = 1)
Source: Authors' calculation on data of x-rates.com/average/

It can be concluded that the cumulative effect of sanctions and falling oil prices put Russia into a much more serious situation than the majority of oil-exporting countries. A close relationship of these two shocks makes it impossible to distinguish between their effect on the Russian economy, and quantitative comparison of Russia with other countries becomes problematic.

However, we also consider such an indicator as inflation, particularly during the pre-crisis period of 2010-2013. Inflation in this period was in the range from 6% to 6.5%, and these values were the lowest in Russia for an extensive period of time. However, even such a success of monetary regulation, in particular the inflation targeting, remains significantly weaker than the average inflation rate for the emerging markets in the same period - about 4% (Goryunov, Drobyshevskiy, Trunin, 2015).

Thus, even without the economic crisis the Bank of Russia's monetary policy was less effective than the policies of the countries with comparable economic conditions. The crisis of 2014 increased this gap.

Measures taken by the Bank of Russia for the purpose of inflation targeting, were reinforced in 2014, with the beginning of anti-Russian sanctions. Monetary policy became more restrictive. These measures allowed the country to avoid an increase in the inflation rate, which increased to approximately 13% at the end of 2015 compared with 11.3% at the end of 2014. As mentioned earlier, in 2011-2013 inflation varied from 6% to 6.5%.[6]

It is believed that the policy of the Central Bank of the Russian Federation was purely of a formal nature, due to the formal goals of the monetary policy, established long before the current crisis. Having lost the access to many previously available sources of capital, CBR in turn restricted an access to the national currency, raising the interest rate from 10.5% to 17% in December 2014. In fact, such measures deprived the economy of money of the Central Bank of Russia, but quite opposite measures to support and stimulate the economy (facing external constraints) were supposed to be more logical, according to the position described here. The ongoing economic processes are easily illustrated by the classical model IS-LM-BP (a detailed description of the model can be found in classical coursetbooks on macroeconomics (Blanchard, 2013).

3. The economic crisis of 2014-2015 illustrated by using IS-LM-BP model

At the beginning of 2014 the GDP growth can be noted, but its rate is lower than in previous years. Investment growth has the effect of «cheap money», which affects the growth of consumption, and it leads to a decrease in net exports NE since most of consumed goods are imported. The need in currency for transactions leads to an increase in the ruble exchange rate. However, the government manages to secure demand for the currency, but it becomes more difficult to keep it at a certain level. Thus, in December 2014 the Bank of Russia made a decision to set a floating ruble exchange rate in order to save foreign exchange reserves. The changes of the major economic indicators are presented in Tables 1 and 2, based on Rosstat data.

After the currency band policy was rejected, the interest rate became the main instrument of the monetary policy. It is possible to judge about the economic situation in the country according to frequency and value of key interest rate changes. The dynamics of the key interest rate is presented in Table 3. The key interest rate returned to the level of December 2014 only on June 14, 2016 (10.5% before a dramatic increase on December 16, 2014).

Indicators	Abbreviation	2014	2015	Δ
Gross domestic product, bln. RUB.	GDP	63049.2	60687.1	↓
Investments, mln. RUB.	I	13527683.7	13450238,2	↓
Government procurement of goods and services	G	13932.4	15513.0	↑
Export, mln. USD.	E_x	497763	340349	↓
Import, mln. USD.	Z	308026	194088	↓

Table 1. Changes in the main indicators affecting the IS curve

The actions of the Russian government should be considered in more details. BP curve moves to the left due to the sanctions in 2014, which resulted in the negative AD shock caused by the change in net exports.

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[6] Consumer price indices for goods and services in the Russian Federation in 1991-2016 // URL: gks.ru/free_doc/new_site/prices/potr/I_ipc.xlsx

Indicators	Abbreviation	2014	2015	Δ
Net export, bln. RUB.	NE	189,7		↑
Net export of capital, bln. RUB.	NEK			↓
Oil price, USD/barrel		52,52	35,67	↓

Table 2. Changes in the main indicators affecting the BP curve

The possible ways out of this situation can be:

1) a sharp increase in export of high-tech products. In Russia such a role can be applied to military production;

2) a sharp decline in import through stimulating domestic production and implementing import substitution programs;

3) further reduction of the key interest rate (see Table 3).

Date	Interest rate	Date	Interest rate
13 September 2013	5.5%	2 February 2015	15%
3 March 2014	7%	16 March 2015	14%
28 April 2014	7.5%	5 May 2015	12.5%
28 July 2014	8%	16 June 2015	11.5%
5 November 2014	9.5%	3 August 2015	11%
12 December 2014	10.5%	14 June 2016	10.5%
16 December 2014	17%		

Table 3. The dynamics of the key interest rate

Source: banki.ru/wikibank/klyuchevaya_stavka/

In order to avoid increasing M0 (according to international requirements, the proportion of M0 to GDP should not exceed the recommended level), the government increases the key interest rate to attract public money (savings) while the refinancing rate remains unchanged (8.25%, see Table 4). This could make it possible to slow down the fall in investment. These measures cover the distance S in Figure 2.

Indicators	Abbreviation	2014	2015	Δ
Money supply, bln. RUB.	M_2	31404.7	32110.5	↑
The refinancing rate at the end of the year,%		8.25	8.25	Const
Interest rate, %		11	7	↓

Table 4. Changes in the main indicators affecting the LM curve

By the end of 2015, the Russian government managed to stabilize the situation in the domestic market mostly by using the tools of monetary policy, but the external equilibrium has not been achieved.
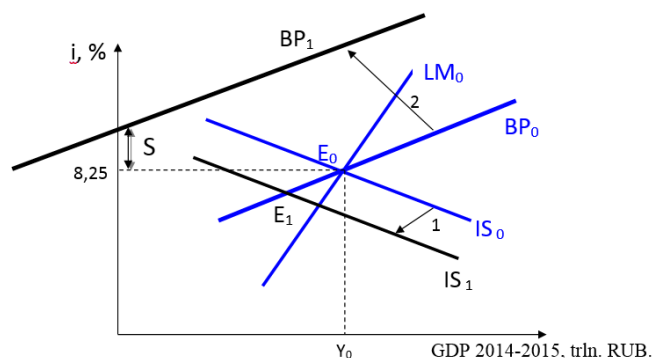

Fig 2. A significant shift in the BP curve to the left according to the sanctions in 2014

According to the theory, the internal equilibrium of the economy is always on the intersection of IS and LM curves. However, in some cases (as it happened in 2014) it is possible that the external equilibrium is not achieved, and external equilibrium is outside the BP curve (see. Fig. 2).

Thus, we can assume that GDP will continue to fall (Point E2 is an estimated equilibrium point, Fig. 3) in 2016. Point E2 corresponds to a lower level of GDP than in 2015, so it is logical to expect an impact on the IS curve in order to shift it to the right.

In conclusion, we can say that in estimating the actions of the Government of the Russian Federation in the period of 2014-2015, the main peculiarity can be distinguished: the budget deficit was not covered in 2015 due to the net exports growth, but the monetary policy (especially the exchange rate policy) made it possible to stop cheap import and, as a result, to prevent a recurrence of the situation of 2008-2009.
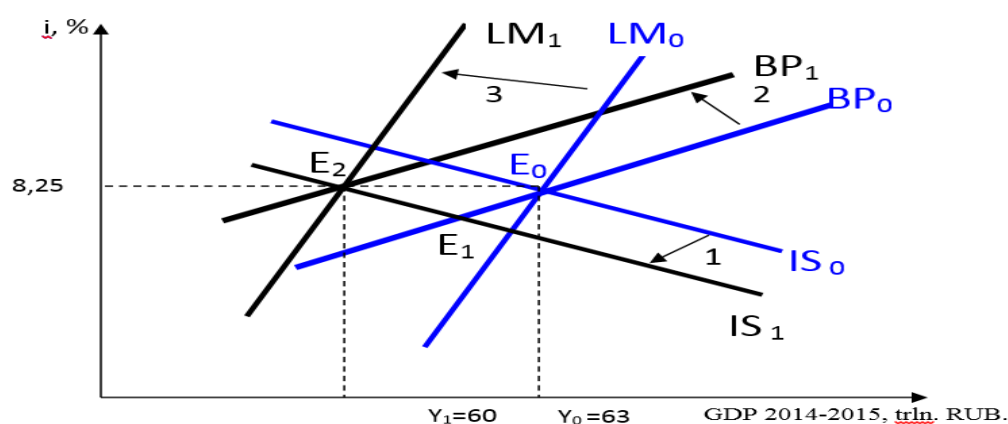

Fig 3. The period of 2014-2015 years

4. Modelling the impact of Russian monetary policy in 2014-2015 on the main macroeconomic indicators

Continuing qualitative reasoning, which is presented in the second section of the paper, we move to the quantitative one, based on the analysis of the monetary policy of the Bank of Russia by using vector autoregression modelling.

Economic indicators selected for the model (the time series of quarterly dynamics in the period of 2000-2015 can be divided into three groups: macroeconomic indicators which Central Bank has a direct impact on (money supply[7],the market interest rate[8] on loans[9], international reserves[10]), time series which are dependent on external factors, but at the same time are

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[7] Source: cbr.ru/statistics/?PrtID=ms&Year=2015

[8] Here we are talking about the indicator: The average interest rate on loans granted by credit institutions to non-financial organizations in rubles. This figure also includes changes in the interest key rate of the Bank of Russia

[9] Source: CBR website data // URL: cbr.ru/statistics/?PrtId=int_rat (2000-2012: cbr.ru/statistics/print.aspx?file=b_sector/interest_rates_12.htm&pid=int_rat&sid=itm_3428; 2013: cbr.ru/statistics/print.aspx?file=b_sector/rates_cr-no-r_13.htm&pid=int_rat&sid=ITM_60399)

[10] Source: CBR website data // URL: cbr.ru/hd_base/default.aspx?Prtid=mrrf_m

the performance indicators of the economy (the oil price[11], the ruble/dollar exchange rate[12], direct investments in the Russian Federation[13], imports and exports[14]), and the third group - the resulting indicators of the Russian economy (inflation[15] and GDP[16]).

The selected time series were tested for the presence of cointegration relations. The aim of this test is to determine the type of model for further analysis: VECM (vector error correction model) if there is cointegration relations, VAR - in the opposite case (for more details see any classical works, see eg.: Magnus, Katishev, Peresetsky, 2007).

The test and all subsequent simulation was carried out by using Eviews software package, when the test determined the presence of 6 cointegration relations, which contributed to the choice in favor of the VECM model (see Table 6).

Sample (adjusted): 4 63
Included observations: 60 after adjustments
Trend assumption: Linear deterministic trend
Series: CREDIT_RATE DOLLAR GDP EXP01 IMP INFLATION INVEST MONEY OIL RESERVE
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.907057	462.8251	239.2354	0.0000
At most 1 *	0.789571	320.2789	197.3709	0.0000
At most 2 *	0.670291	226.7623	159.5297	0.0000
At most 3 *	0.550486	160.1897	125.6154	0.0001
At most 4 *	0.502588	112.2145	95.75366	0.0023
At most 5 *	0.406097	70.31432	69.81889	0.0456
At most 6	0.309072	39.05191	47.85613	0.2582
At most 7	0.167566	16.86871	29.79707	0.6497

Trace test indicates 6 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 6. Results of cointegration relations test

Thus, in order to establish the impact of the monetary policy on GDP and other key economic indicators VECM vector autoregression model was implemented.

VECM model includes the volume index of GDP (VI GDP) as the dependent variable, and such macroeconomic indicators as the international reserves of Russia, the price of oil, the ruble/dollar exchange rate, money supply, interest rate, direct investment in the Russian economy, the inflation rate as well as indicators of import and export.

The main measure of quality of the model was on its level of $R^2 = 76,5\%$.

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[11] Source: ru.investing.com/commodities/brent-oil-historical-data
[12] Source: ru.investing.com/currencies/usd-rub
[13] Source: CBR website data // URL:
cbr.ru/statistics/credit_statistics/direct_investment/dir_inv_sec.xlsx
[14] Source: CBR website data // URL: cbr.ru/statistics/credit_statistics/trade/trade.xls
[15] Source: Rosstat website data // URL: gks.ru/free_doc/new_site/prices/potr/I_ipc.xlsx
[16] Source: Rosstat website data // URL: gks.ru/free_doc/new_site/vvp/kv/tab6.htm

Interpretation of the model was implemented through the analysis of impulse functions by introducing artificial shocks (also known as impulses or innovations). This enables us to establish the relationship between the variables of the model. The dynamics of this relationship over time makes it possible to set lags and the degree of reaction between parameters. In our model the period for analysis equals 6 quarters or 1.5 years.
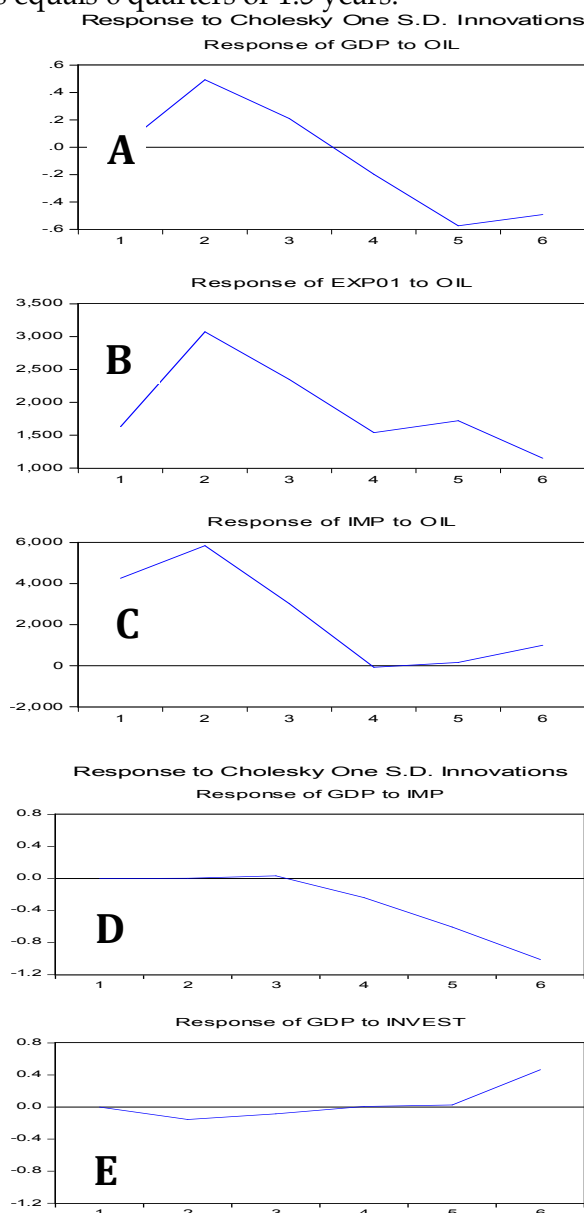
Response to Cholesky One S.D. Innovations

Response of GDP to OIL

Response of EXP01 to OIL

Response of IMP to OIL

Response to Cholesky One S.D. Innovations

Response of GDP to IMP

Response of GDP to INVEST

Fig 4. Shocks in indicators which are exogenous for the Russian economy

Also for the VECM model, a set of tests took place to determine the adequacy of the suggested model. Thus, autocorrelation test up to 8th lag showed an absence of autocorrelati With the help of the corresponding test it is stated that the remains of the model have norr distribution. It can be concluded that a number of formal parameters were met by the model. The detailed tables with the test results are given in Annex 1.

Next, we consider the most significant results of the simulation (from the authors' point of view).

The first of the negative external factors that have a significant impact on the Russian economy is the price of oil. In case of a shock in this indicator positive effects on the Russian economy are obvious: there is not only speedup of the growth rate, but also a significant increase in both exports and imports in Russia for 3-4 quarters (with the peak in all three cases in the second quarter). It should be noted that all three indices have a similar predicted dynamics (see Fig. 4A, 4B and 4C).

This, in turn, proves that the Russian economy is largely dependent on the oil industry. Not only does the Russian oil industry provide a flow of hydrocarbons abroad, contributing to the inflow of foreign currency and the replenishment of the budget of the Russian Federation, but also creates a significant demand for foreign high-tech equipment which is necessary to develop new and maintain the existing oilfields.
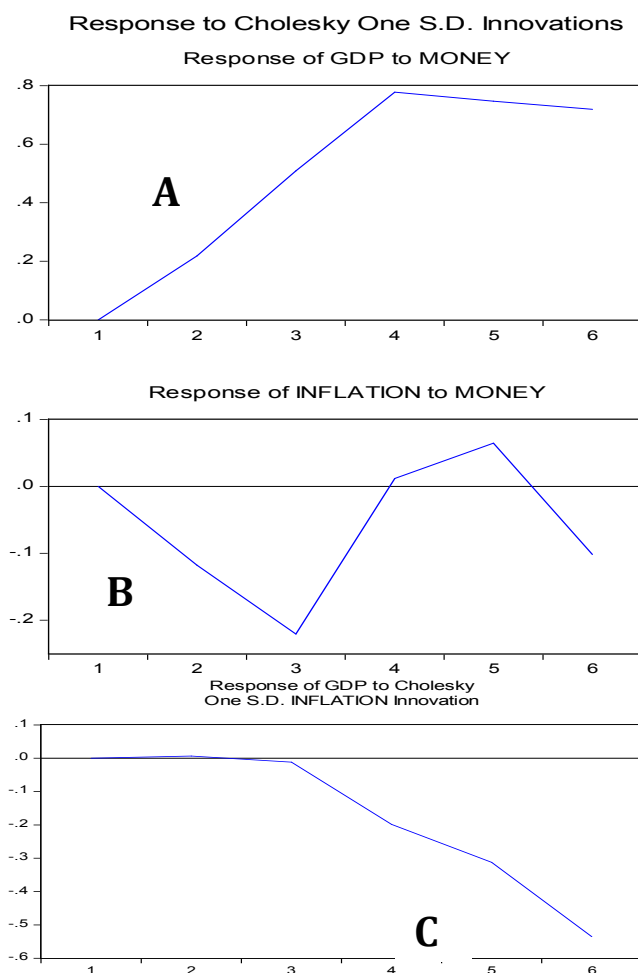

Fig 5. Shocks in indicators which the Bank of Russia is able to influence

The second negative factor is the sanctions that contributed to the economic and political isolation of Russia. The economic sanctions had the greatest impact on such indicators as investment and imports of the Russian Federation. Therefore we simulate shocks of investment and import and evaluate their influence on the GDP growth rate. Theoretically, it is possible to interpret such a shock of investments or import, not in case of canceling sanctions, but in case of «big deal» (for example, with China) or any other major international economic event with the participation of Russia.

Paradoxically, the import impulse cannot lead to an acceleration in GDP growth rate during 1.5 years, while the investment impulse is able to provide a positive effect only in about a year (in 4-5 quarters). Thus we can conclude that in order to overcome the impact of the sanctions some time is required even after their repeal (Figure 4D and 4E).

A different group of indicators is presented in Figure 5. These are inflation and money supply, which the Bank of Russia is able to influence. We discuss in more detail each of these indicators hereinafter.

In case of a shock in inflation a negative effect on GDP growth is obvious: the growth rate slowed down by up to 0.5 percentage points and the effect persists for 5-6 quarters. More details are shown in Figure 5C.

Turning to the analysis of money supply it can be noted that in the model the increase in money supply is positively related to GDP growth rate. There has been a steady increase in growth rate during the year, and then it stabilized at a new level (+0.8 percentage points). The increase in money supply leads to a slight decrease in inflation during 2-3 quarters (0.1-0.2 percentage points). However, after this inflation stabilizes at a new level, which is higher than the original one by 0.05-0.1 percentage points (see Figure 5A, 5B).
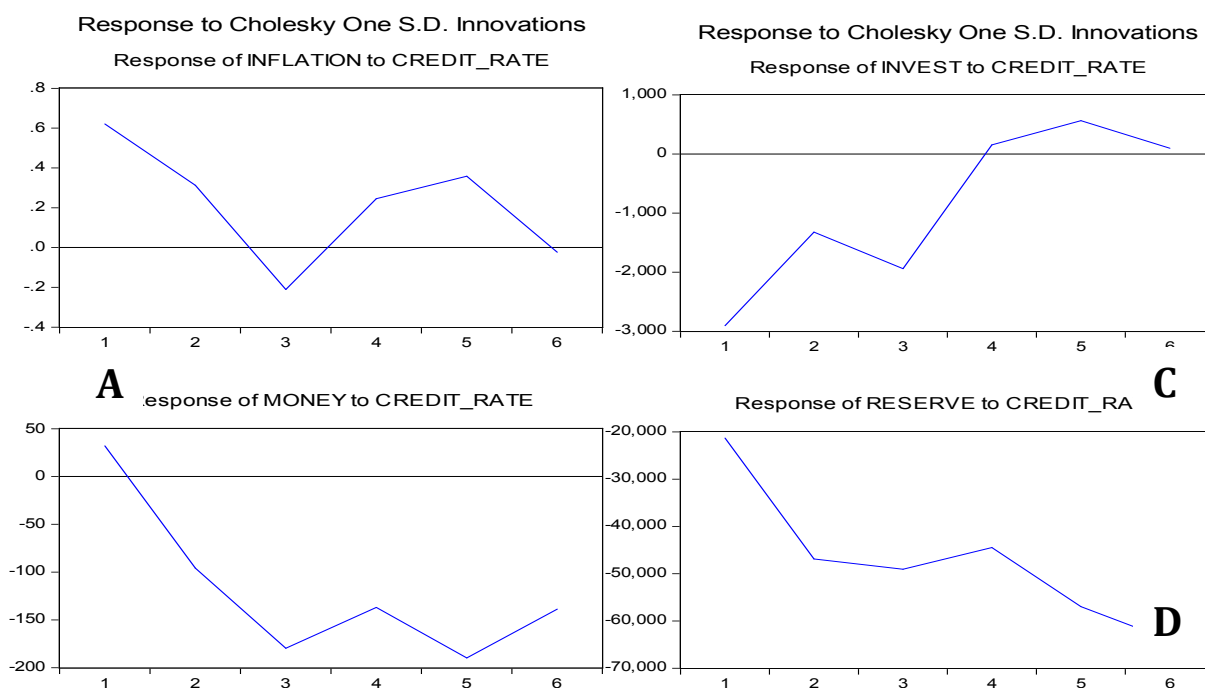

Fig 6. The shock in interest rate and its impact on the economic performance of the Russian Federation

Therefore, we can conclude that manipulating money supply has both positive effects (on GDP) and negative ones (on inflation), while the inflation targeting policy has a significant impact on the economy of Russia - restricting inflation makes it possible to accelerate GDP growth rate.

The interest rate, which is one of the main instruments of financial market regulation, has the following effects on the economy (see Figure 6). Money supply and reserves decrease over a 1.5 year period. At the same time the increase in the interest rate has a negative impact on both inflation and the investments during the period of 4-5 quarters.

We now consider the effect of changes in the ruble/dollar exchange rate on VI GDP and other indicators, as well as compare them with the previous results (see Figure 7). There is a

much smaller decline in investment and a comparable reduction of reserves. Pressure on inflation is lower in case of exchange rate shocks rather than in case of interest rate fluctuations.

Thus, the policy of the Bank of Russia (a floating exchange rate and a sharp increase in the interest rate) had a negative impact in terms of investments (which are also affected by Western sanctions), in comparison with the policy of the currency band. Shocks in the interest rate as well as in the exchange rate have accelerated inflation. This had a negative effect on the inflation targeting policy, which had a significant impact on the economic situation in the current economic environment. According to the model, the reduction of the international reserves of Russia in the conditions of the policy change has not changed.
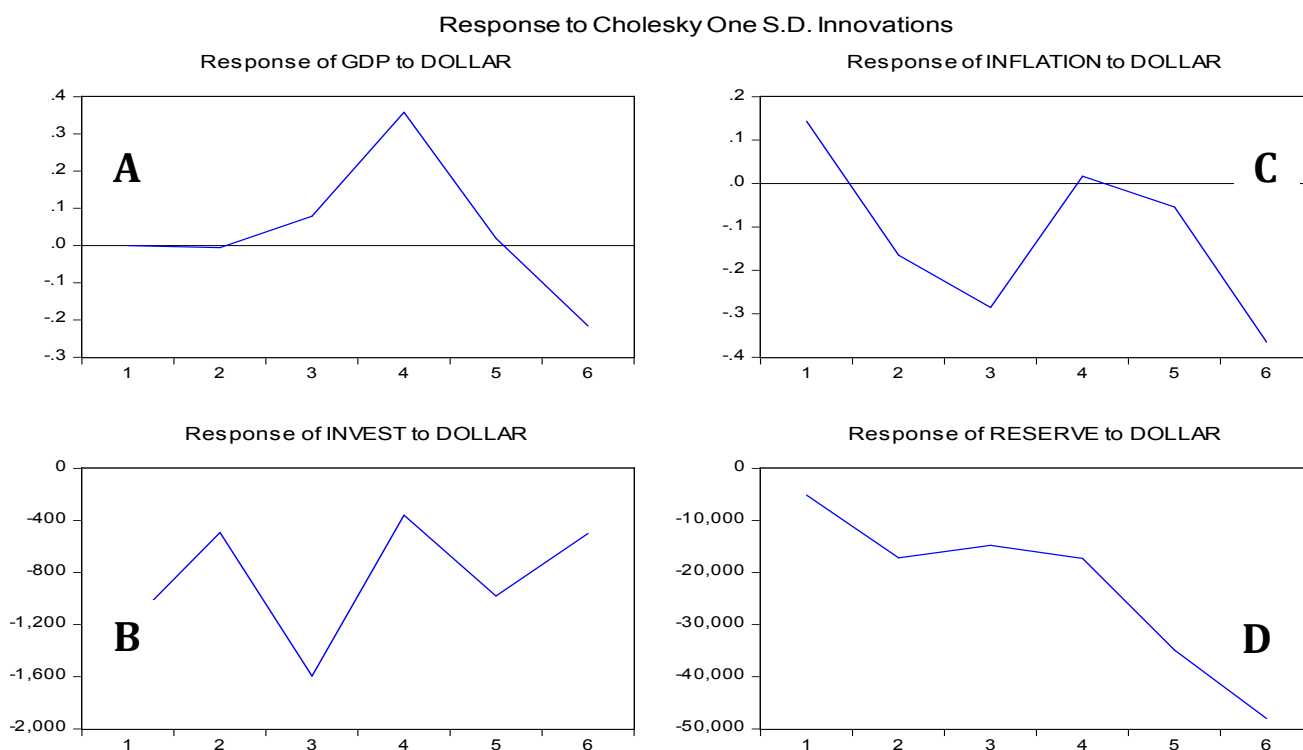
Response to Cholesky One S.D. Innovations

Figure 7. *The shock of the ruble/dollar exchange rate and its impact on the economic performance of the Russian Federation*

5. Conclusion

The analysis in this paper consists of three main interconnected parts.

The first part deals with the comparative analysis of the monetary policy in oil-exporting countries, which found that Russia is in much poorer conditions than the countries with a similar economic structure (a comparable share of oil export). This is largely due to the fact that apart from the fall in world oil prices Russia faces the economic sanctions by Western countries.

In the second part we study the period of 2014-2015. The occurring processes are illustrated by using IS-LM-BP model. The main qualitative features of the monetary policy in Russia in this period were detected.

The third part covers an issue of the quantitative analysis that aims to answer the question concerning the impact of the monetary policy on economic conjuncture, primarily on short-term changes in the GDP growth rate.

Based on the analysis of external influence it can be concluded that the Russian economy faces serious constraint in the process of implementing its monetary policy. This is due to a

significant impact on the economy by external factors (the oil price, first of all) which cannot be influenced by the monetary policy.

However, even in such circumstances, the monetary policy is likely to have a significant regulatory impact on the economy. Here we are talking about the necessity of inflation targeting. This is explained by one of the model which found that inflation has a significant impact on short-term growth of the Russian economy. Therefore in the current crisis it is the key direction to overcome it.

The main economic indicators, one of which is direct investment in Russia, "dipped" with the current CBR policy deeper than in case of the continuing currency band policy (rejected by the Bank of Russia in 2014). The shocks in inflation and the exchange rate contributed to the acceleration of inflation, which negatively affected the growth rate of the Russian economy. Such instability of the economy leads to a comparable reduction in international reserves.

Finally, it is possible to say that the inflation targeting policy should obviously be continued because its effect on the Russian economy is definitely positive, in contrast to the change of the policy in 2014, which had a rather negative effect.

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Annex 1

Autocorrelation test:

Lags	Q-Stat	Prob.	Adj Q-Stat	Prob.	df
1	1.859620	NA*	1.900945	NA*	NA*
2	7.285960	0.2952	7.573936	0.2710	6
3	8.962353	0.5357	9.367288	0.4976	10
4	11.37894	0.6560	12.01402	0.6052	14
5	12.41935	0.8248	13.18132	0.7807	18
6	16.53589	0.7884	17.91533	0.7110	22
7	17.83455	0.8817	19.44709	0.8170	26
8	19.45608	0.9299	21.40999	0.8746	30

Residuals normal distribution test:

Component	Jarque-Bera	df	Prob.
1	4.934050	2	0.0848
2	0.551974	2	0.7588
Joint	5.486023	4	0.2410