NATIONAL RESEARCH UNIVERSITY
HIGHER SCHOOL OF ECONOMICS

Olga S. Kuznetsova, Sofiya R. Ulyanova

THE IMPACT OF A CENTRAL BANK'S VERBAL INTERVENTIONS ON STOCK EXCHANGE INDICES IN A RESOURCE BASED ECONOMY: THE EVIDENCE FROM RUSSIA

BASIC RESEARCH PROGRAM
WORKING PAPERS

SERIES: ECONOMICS
WP BRP 155/EC/2016

Olga S. Kuznetsova[1], *Sofiya R. Ulyanova*[2]

THE IMPACT OF A CENTRAL BANK'S VERBAL INTERVENTIONS ON STOCK EXCHANGE INDICES IN A RESOURCE BASED ECONOMY: THE EVIDENCE FROM RUSSIA[3][4]

This paper analyzes the intraday impact of the Bank of Russia's verbal interventions on the Russian stock exchange indices in 2014-2015. We construct a communication index which summarizes the verbal interventions of the Bank of Russia during this period. We use GARCH-modelling on intraday data on the returns of the RTS and MICEX indices. We also take into account the price of futures contracts on the BRENT oil price as the Russian economy has a strong dependence on oil prices. We show that the verbal interventions of the Bank of Russia have a positive short-term impact on the RTS returns, but do not affect their volatility. These results contradict previous studies, which show that a central bank's communication usually has a strong effect on the volatility of indices, but does not affect their returns. We suggest that this contradiction arises from the fact that we consider the export orientation of the economy, which has not been examined in previous studies.

JEL Classification: E32.

Keywords: the Bank of Russia, verbal interventions, GARCH-modeling, stock exchange indices, RTS index, MICEX index.

[1] National Research University Higher School of Economics. Laboratory for Macroeconomic Analysis. Research Fellow. E-mail: okuznetsova@hse.ru

[2] National Research University Higher School of Economics. Laboratory for Macroeconomic Analysis, Assistant Junior Research Fellow. E-mail: sulyanova@hse.ru

[3] The authors are grateful to Dmitry Borzykh, Boris Demeshev and Sergey Merzlyakov (Higher School of Economics), for their useful advices and comments.

[4] The study was implemented in the framework of the Basic Research Program at the National Research University Higher School of Economics in 2016.

1. Introduction

The impact of central bank communication on stock exchange indices and exchange rates is receiving the growing attention in the academic literature. One of the most popular methods to evaluate these effects is GARCH-modeling. This methodology allows the estimation of the impact of verbal interventions not only on the average values of stock returns and exchange rates, but also on their volatility. For instance, Han (2008) estimates the FIGARCH model and shows that the verbal interventions of the European Central Bank (ECB) increased the volatility of the EUR/USD exchange rate in 1999-2002. Nevertheless, their effect on exchange rate returns was negligible. Beine et al. (2002) estimate a similar model and show that the verbal interventions of the FED and the Central Bank of Germany led to an increase in the volatility of the DEM/USD exchange rate in 1985-1999, but did not affect the returns. Kim et al. (2000) found the same result for the Australian Central Bank's verbal interventions and the AUD/USD exchange rate in 1983-1997. Contrary to previous studies, Goyal, Arora (2012) show that the verbal interventions of the Bank of India influenced not only the volatility, but also the returns of the INR/USD exchange rate in 2005-2008. On average, these verbal interventions lead to a devaluation of the rupee.

The use of intraday data can help to estimate the short-term impact of verbal interventions on the volatility of stock returns and exchange rates. For example, Dewachter et al. (2014) show that in 1995-2009, the verbal interventions of the ECB and the FED had a significant impact on the euro-dollar volatility up to 2-3 hours after interventions. Ranaldo, Rossi (2010) confirm that in 2000-2005, the Swiss Central Bank's communication had a significant impact on the volatility of stock returns and the CHF/USD exchange rate up to 1-2 hours after the interventions. McCredie et al. (2016) also find a short-term effect of the Reserve Bank of Australia's communication on the volatility of stock returns for 5-min data. They show that the verbal interventions of the Reserve Bank of Australia lead to an increase in the volatility of the S&P/ASX 200 Index for 10 minutes after monetary policy announcements.

Many papers in this field test the effects of central bank communication with the help of an information index. For instance, Apergis (2015) and Han (2008) construct a dummy variable, which is 1 if there is news and 0 otherwise. Jansen, De Haan (2005) extend this approach and consider the content of news. They construct several dummy variables, which contain news on a particular topic (for example, monetary policy, economic growth, inflation, etc.). We follow this approach and construct indices which measure the content of the announcements.

There is a large strand of literature which examines the impact of central bank communication on stock exchange indices and exchange rates. Most of these studies show that

verbal interventions of central banks usually affect the volatility of financial markets, while the impact of central bank communication on the returns of exchange rates and stock exchange indices is ambiguous. Moreover, there is evidence that central bank communication has a short-term affect on financial markets.

To the best of our knowledge, there are no studies which consider the export orientation of the economy while examining the impact of central bank communication on financial markets. We suggest that ignoring this feature can lead to incorrect results, as resource-based economies demonstrate a strong dependence on their export prices. Bjørnland (2009) find that oil prices positively influenced the stock returns in Norway in 1993-2005. Muhammad et al. (2011) confirm that an increase in oil prices led to a depreciation of the NGN/USD exchange rate in 2007-2010. Draeger et al. (2016) reveal the significant influence of the BRENT oil price on the USD/RUB exchange rate in 2014-2015.

Our paper fills this gap in the literature and analyzes the short-term effects of the Bank of Russia's verbal interventions on the Russian stock exchange indices. We use intraday data for 2014-2015 because in 2014 the Bank of Russia officially adopted inflation targeting as the basic strategy for monetary policy. This was followed by considerable changes in the way the bank communicated. In particular, they created a whole system of regular and irregular channels through which the monetary authority communicates with the population. This system of communication channels is used to inform society about the policy decisions, their reasoning, and economic forecasts. These changes were intended to improve the central bank's transparency, which is necessary for the successful anchoring of market expectations[6]. Greater transparency and clarity over monetary policy lead to a greater predictability of the central bank's actions and decisions, reducing uncertainty in financial markets and anchoring market expectations. Before 2014, there was no solid communication strategy and so it is worth studying the effects of verbal interventions only after the adoption of the new communication principles.

The structure of the paper is as follows. Section 2 describes the communication index, which we construct to codify the Bank of Russia's verbal interventions in 2014-2015. Section 3 examines the financial data that we use for the model estimation. Section 4 is devoted to the estimation results and their discussion.

2. Data

Information index

[6] Yudaeva K.V., the First Deputy Governor of the Bank of Russia (Yudaeva (2014))

In order to codify the Bank of Russia's verbal interventions, we collected all the verbal interventions, both regular, with specified publication time, and irregular. For this purpose, we use the web site of the Russian News Agency TASS (www.tass.ru) as the primary source of the data. If TASS refers to any other media, we also switch to this media as the source of information about the particular verbal intervention. To avoid double counting, we take into account only the earliest publication. If the intervention occurs outside the Bank of Russia's working hours, we transfer it to the next day.

In 2014-2015, there were 34 regular and 250 irregular verbal interventions by the Bank of Russia. Table 1 contains the detailed classification of the interventions by their authors and types. The two main types of verbal interventions are the official publications of the Bank of Russia's press service and the official press conferences of the Board of Directors of the Bank of Russia. The most of the news was announced by Nabiullina (the Governor of the Bank of Russia) and Yudaeva (the First Deputy Governor of the Bank of Russia).

Tab 1. Classification of the news by types of verbal interventions and by the authors

Number of the news by types of verbal interventions					
Press service publications	Publication of the decision after the Board of Directors meeting	Press conference after the Board of Directors meeting	Press conference	Interview	TV
44	18	8	124	46	24
Number of the news by authors					
Nabiullina	Yudaeva	Shvetsov	Simanovsky	Suhov	Other
68	51	23	20	20	31

We can divide all the announcments by the topic. The six most popular topics in 2014-2015 were exchange rates, exchange rate volatility, inflation, forward guidance signals (or the signals about the future changes in monetary policy), GDP and financial stability. Some examples of classification are provided in Table 2.

Tab. 2. Examples of the classification by topics[7]

[7] TASS, URL: http://tass.ru

Topic	Date	Issuance time	News	Source
Financial stability	27.03.14	11:22	«The Bank of Russia is willing to provide liquidity to banks given the increase in demand for domestic credit.»	Nabiullina E.S. at the Stock Exchange forum in Moscow (TASS)
GDP	14.02.14	15:39	«The Bank of Russia has lowered the forecast for the GDP growth in Russia in 2014 from 3% to 1.5%-1.8%.»	Nabiullina E.S. in an interview (TASS)
Inflation	13.02.15	1:04	«Inflation will begin to decline in the second half of 2015.»	Nabiullina E.S. at the meeting with bankers (TASS)
Exchange rate	1.03.14	9:43	«In the long term (from 6 to 9 months), the ruble is much more likely to strengthen than to weaken.»	Shvetsov S. A. in an interview (TASS)
Volatility of exchange rate	24.02.14	9:35	«The parameters of the rules of our actions in the foreign exchange market during the year will be changed, we will increase exchange rate flexibility.»	Yudaeva K.V. in an interview to the newspaper (TASS)
Monetary policy	18.06.15	19:07	«The Bank of Russia is forced to pursue a tight monetary policy.»	Nabiullina E.S. at the International Economic forum in St. Petersburg (TASS)

Table 3 describes the frequency of different topics in the news. The crisis period of November–December 2014 is characterized by a substantial growth in the number of verbal interventions. The greater part of this growth is due to announcements about financial stability. This topic was mentioned 39 times during these two months but only 13 times in the 3rd quarter of 2014. This increase can be interpreted as the Bank of Russia's desire to prevent the panic and collapse in the banking system. The frequency of mentioning financial stability in verbal interventions remained high during the first half of 2015. Exchange rate volatility was mentioned 11 times during November–December 2014. This frequency is high in comparison with the previous periods and may indicate the desire to clarify the position of the Bank of Russia on the new exchange rate policy. In the first half of 2015, we also can see a slight increase in the number of publications about inflation. This may be interpreted as an attempt to forward inflation expectations.

Tab. 3. Number of publications by topics

	2014					2015			
Subject	Q1	Q2	Q3	Q4	November-December	Q1	Q2	Q3	Q4
Financial stability	11	14	13	5	39	21	26	15	33
GDP	10	6	8	3	4	6	9	7	8
Inflation	14	9	9	3	8	13	14	5	13
Exchange rate	7	2	1	1	8	5	11	4	2
Exchange rate volatility	6	2	3	2	11	4	6	4	6
Monetary policy	7	8	7	2	5	2	7	3	8
TOTAL	55	41	41	16	75	51	73	38	70

All the verbal interventions were coded with a binary variable, which is equal to 1 if there is news on particular topic, 0 if there otherwise. After this encoding, we construct the following communication indices:

1. I_{FS} summarizes all the interventions which mention financial stability;
2. I_{ERV} summarizes all the interventions which mention exchange rate volatility;
3. I_0 summarizes all the news except those which were counted in I_{FS} or I_{ERV}.

These indices have been used to estimate the impact of verbal interventions on the mean and the volatility of the RTS and MICEX indices with the help of GARCH modelling. We include index I_0 in the equation for the mean, while indices I_{FS} and I_{ERV} are used to estimate volatility. The reasoning is straightforward. News on financial stability and exchange rate volatility are likely to affect the volatility of returns, while news about inflation, GDP, the level of the exchange rate and the future monetary policy are more likely to affect the returns of stock exchange indices.

Financial data

We estimate GARCH models for the RTS and MICEX indices, which have different construction methodology. The RTS index is USD-nominated, while the MICEX index is nominated in rubles.

For financial data, we calculate 1-hour returns as follows:

$$R_t = 100 \times \left[ln \frac{X_t}{X_{t-1}} \right]$$

where X_t is the closing price in period *t* and X_{t-1} is closing price in the period *t-1*

Descriptive statistics of stock and oil price returns are given in Table 4. During the

analyzed period, the series of stock returns (RTS and MICEX) are characterized by left-hand asymmetry (negative skewness), which implies that the probability of negative returns was higher than the probability of positive returns. This result is not surprising, given that there was an economic crisis. The returns of oil prices, in contrast, show a right-hand asymmetry.

Tab. 4. Primary analysis of the series of returns of RTS (R_{RTS}), MICEX (R_{MICEX}) and oil prices (R_{Brent})

Variable	R_{RTS}	R_{MICEX}	R_{Brent}
Descriptive statistics			
Sample size	4490	4491	6827
Min	-14,290	-9,964	-4,193
Max	7,485	6,670	5,631
Mean	-0,014	0,004	-0,015
SD	0,765	0,506	0,535
Skewness	-1,710	-1,584	0,238
Kurtosis	47,429	50,938	9,649
JB	$42{,}3 \times 10^{4***}$	$48{,}7 \times 10^{4***}$	$26{,}5 \times 10^{3***}$
Stationarity			
ADF	$-17{,}176^{***}$	$-16{,}264^{***}$	$-18{,}876^{***}$
PP	$-71{,}708^{***}$	$-71{,}285^{***}$	$-82{,}818^{***}$
$KPSS_{Level}$	0,043	0,054	0,174
$KPSS_{Trend}$	0,040	0,037	0,100
Autocorrelation and ARCH effects			
Q_{LB}	$142{,}73^{***}$	$41{,}231^{***}$	$35{,}028^{***}$
Q_{BP}	$142{,}41^{***}$	$41{,}161^{***}$	$34{,}942^{***}$
ARMA	(3,5)	(0,1)	const.+(0,0)
ARCH LM	$323{,}88^{***}$	$157{,}66^{***}$	$477{,}49^{***}$

Notes: JB — Jarque-Bera test (H0: the variable is normally distributed); ADF — augmented Dickey-Fuller test and PP — Phillips-Perron test (H0: time series is integrated of order 1); $KPSS_{Level}$ (H0: time series is stationary) and $KPSS_{Trend}$ (H0: time series is stationary around a deterministic trend) — Kwiatkowski-Phillips-Schmidt-Shin tests; QLB and QBP — Ljung–Box test and Box–Pierce test (H0: the data are independently distributed); ARMA — the optimal order of the AR and MA processes, selected on the basis of information criteria, ARCH LM — Lagrange multipliers test (H0: the absence of ARCH effects).
*, ** and *** statistical significance at 10%, 5% and 1% respectively.

The kurtosis for the stock exchange indices is quite high, indicating the presence of "heavy tails". This can be explained by the fact that a crisis period is usually characterized by significant fluctuations in stock markets.

Based on the Jarque-Bera test, we reject the hypothesis of the normal distribution of returns at 1% significance level. Therefore, we use distributions with heavier tails than the

normal distribution for the errors in the model. These distributions allow us to take into account asymmetry. For MICEX, we use skewed Student distribution (SSTD). For RTS, we use skewed generalized error distribution (SGED).

To test stationarity, we apply the following tests: the Dicky Fuller advanced test (ADF), the Phillip-Perron test (PP), and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) trend and stochastic stationarity tests. All these tests show that returns of stock exchange indices and oil prices are stationary at 1% significance level.

To test for autocorrelation, we apply the Ljung-Box test and the Box-Pierce test. According to which, autocorrelation is significant at 1% level in all the series.

To determine the clustering of volatility, we use the information criteria to find the orders of AR and MA processes, which best describe the underlying processes. Then we test the models for the ARCH effects in the errors with the Lagrange multiplier test (ARCH LM). For all the variables, this test rejects the null hypothesis of the absence of ARCH effects at 1% significance level. This implies that the data are characterized by variability of dispersion and the use of GARCH-models is reasonable.

In the next Section, we present the estimated GARCH model and study the effect of verbal intervention on the stock exchange indices.

3. The impact of the Bank of Russia's verbal interventions on the RTS and MICEX indices

In order to estimate the impact of the Bank of Russia's verbal interventions on the Russian stock exchange indices, we estimate a standard model of conditional heteroscedasticity ARMA(P,Q)-GARCH(1,1), where we include the price of futures contracts on BRENT and the communication indices as explanatory variables. We use the following specification of the ARMA(P,Q)-GARCH(1,1):

$$\begin{aligned} R_t = {} & \mu + \varsigma_1 R_{BRENT,t} + + \varsigma_8 I_{0,t-1} + \varsigma_9 I_{0,t} + \varsigma_{10} I_{0,t+1} + \varsigma_2 x_{MO,t} + \varsigma_3 x_{TU,t} + \\ & + \varsigma_4 x_{WE,t} + \varsigma_5 x_{FR,t} + + \varsigma_6 x_{start,t} + \varsigma_7 x_{end,t} + \\ & + \sum_{j=1}^{P} \theta_j R_{t-j} + \sum_{j=1}^{Q} \varphi_j \varepsilon_{t-j} + \varepsilon_t, \end{aligned} \quad (2)$$

$$\begin{aligned} \sigma_t^2 = {} & \omega + \vartheta_1 I_{ERV,t-1} + \vartheta_2 I_{ERV,t} + \vartheta_3 I_{FS,t-1} + \vartheta_4 I_{FS,t} + \\ & + \beta \sigma_{t-1}^2 + \alpha \varepsilon_{t-1}^2. \end{aligned} \quad (3)$$

Equation (2) is the mean equation, where R_t is the return of a stock exchange index, μ is a constant, $R_{BRENT,t}$ denotes the return of oil prices in period t, $I_{0,t}$ is the communication index of the Bank of Russia, $x_{MO,t}$, $x_{TU,t}$, $x_{WE,t}$ and $x_{FR,t}$ are dummy variables for days of the week

(Monday, Tuesday, Wednesday and Friday, respectively), $x_{start,t}$ and $x_{end,t}$ are dummy variables for the beginning and the end of the trading session. These dummy variables take into account weekly seasonality. P is the order of AR process of returns R_t, Q is the order of MA process, ε_t errors of ARMA(P,Q)-model.

Equation (3) is the variance equation which describes the conditional volatility of the model, σ_t^2. This specification is standard for this class of models, except the index of financial stability $I_{FS,t}$ and the index of exchange rate volatility $I_{ERV,t}$, which we use as explanatory variables.

The study shows that the best fit model for MICEX returns is ARMA(2,2)-GARCH(1,1) and the best model for RTS index returns is ARMA(0,0)-GARCH(1,1). The estimation results are provided in Table 5.

Tab. 5. Quasi-maximum likelihood estimation (QMLE) of ARMA(0,0)-GARCH(1,1) for RTS index and of ARMA(2,2)-GARCH(1,1) for MICEX index

	R_{RTS}	R_{MICEX}
Mean equation		
AR(1)		-0,2716***
AR(2)		-1,0009***
MA(1)		0,2713***
MA(2)		1,0001***
Constant (μ)	-0,0925***	-0,0718
$R_{BRENT,t}$	0,2451***	0,1733***
$I_{0,t-1}$	0,1612***	-0,1018
$I_{0,t}$	0,1286***	0,0171
$I_{0,t+1}$	-0,0612***	0,1067
$x_{MO,t}$	0,0268***	0,0041
$x_{TU,t}$	0,0971***	0,0838
$x_{WE,t}$	0,1438***	0,1594*
$x_{FR,t}$	0,0341***	0,0657
$x_{start,t}$	0,0340***	0,0709
$x_{end,t}$	0,1658***	0,2754***
Variance equation		
Constant (ω)	0,0320**	0,0948***
α	0,0441***	0,0647***
β	0,9441***	0,9283***
$I_{ERV,t-1}$	0,0000	0,0000
$I_{ERV,t}$	0,0000	0,0000
$I_{ERV,t-1}$	0,0000	0,0000

$I_{FS,t}$	0,0000	0,1852
Model performance		
AIC	3,4767	4,3203
BIC	3,5053	4,3546
SIC	3,4767	4,3203
HQIC	3,4868	4,3324
Sign Bias	0,9445	0,6683
Negative Sign Bias	2,6931***	1,8506*
Positive Sign Bias	1,2705	0,4742
Joint Effect	9,0340**	3,6499
LogLikelihood	-7785,218	-9677,314

AIC — Akaike information criterion; BIC — Bayesian information criterion; HQIC — Hannan Quinn information criterion; SIC — Schwarz's information criterion; Sign Bias, Negative Sign Bias, Positive Sign Bias, Joint Effect — test the models for their ability to account for asymmetric reaction of the market using a test proposed by Engle and Ng (1993).
*, ** and *** statistical significance at 10%, 5% and 1% respectively.

For the mean equation of RTS returns, the information index, dummy variables for days of week and start/end of the trading session are significant. There is a positive correlation between returns of oil prices and returns of the RTS index, which shows the strong dependence of the Russian economy on fuel prices. In the variance equation, ARCH effects were significant. However, the information indices of the Bank of Russia are insignificant at 5% level (see Table 5).

To determine the quality of the ARMA(0,0)-GARCH(1,1) model, we conduct several tests, which are listed in Table 5 and Table 6. The Engle and Ng test (1993) tests the hypothesis that there are no additional effects which influence the standardized squares of the model errors. As we can see from Table 5, this hypothesis is rejected — there are some additional effects of asymmetry. However, the other quality tests give good results. According to the weighted Monti (Q_M), the Ljung-Box (Q_{LB}) and the Box-Pierce (Q_{BP}) tests, there is no autocorrelation. According to Lagrange multiplier (ARCH LM) test, there is no heteroscedasticity (see Table 6).

For the mean equation of MICEX returns, returns of oil prices, dummy variables for Wednesday and for the end of the trading session are significant. The information index is insignificant in the mean equation and in the variance equation.

To check the quality of the ARMA(2,2)-GARCH(1,1) model, we conduct several tests. According to the Engle and Ng test (1993), there are no additional asymmetry effects at 5% significance level (see Table 5). According to the weighted Monti (Q_M), Ljung-Box (Q_{LB}) and Box-Pierce (Q_{BP}) tests, there is no autocorrelation. According to Lagrange multiplier (ARCH

LM) test, there is no heteroscedasticity at 5% significance level (see Table 6). These tests show that the estimated model ARMA(2,2)-GARCH(1,1) satisfies all quality criteria.

Tab. 6. Error testing for ARMA(0,0)-GARCH(1,1) model for RTS index and ARMA(2,2)-GARCH(1,1) model for MICEX index

	RTS (TGARCH(1,1))			MICEX (GARCH(1,1)		
Autocorrelatio and ARCH-effects						
	k=1	k=2	k=5	k=1	k=11	k=19
$Q_M\ (z_{t-k})$	0,605	1,195	2,330	0,003	0,974	3,572
$Q_{LB}\ (z_{t-k})$	0,605	1,204	2,406	0,003	0,982	3,569
$Q_{BP}\ (z_{t-k})$	0,604	1,204	2,404	0,003	0,981	3,449
ARCH LM	0,209	2,112	2,798	0,0673	5,969*	7,628*
Errors						
Distribution	SGED			SSTD		
λ	1,0157***			0,9842***		
ν	0,9599***			3,5374***		

Q_M — weighted Monti test, Q_{LB} — weighted Ljung-Box test, Q_{BP} — weighted Box-Pierce test, ARCH — weighted ARCH LM test.
*, ** and *** statistical significance at 10%, 5% and 1% respectively.

In general, our findings indicate that the verbal interventions of the Bank of Russia had a significant short-term impact on the RTS returns, but did not affect the MICEX returns. This difference in the impact on the two indices can probably be explained by the different methodology which is used for these indices. Moreover, we find no impact of the Bank of Russia's verbal interventions on the volatility of RTS and MICEX indices. In more detail, we get three main results:

1. there are positive jumps in the RTS returns for approximately an hour before the news release and around the release time. For an hour after the release, the reaction of the RTS returns to news is negative, but close to zero. This means that the Bank of Russia's verbal interventions have a short-term influence on the stock exchange indices;
2. we find a positive correlation between oil returns and returns of the RTS and MICEX indices, which shows the strong dependence of the Russian economy on fuel prices in 2014-2015;
3. in line with other papers, we find a significant impact of days of the week and the start/end of the trading session on the stock exchange indices.

4. Conclusion

This paper analyzes the intraday influence of the Bank of Russia's verbal interventions on the Russian stock exchange indices in 2014-2015. We provide evidence, for 60-min-frequency data of stock exchange indices, which shows that the verbal interventions of the Bank of Russia had a significant short-term impact on the RTS returns, but did not affect the MICEX returns. Moreover, we find no impact of the Bank of Russia's verbal interventions on the volatility of RTS and MICEX indices. Our findings suggest that the Bank of Russia communication triggers the positive jumps in the RTS returns around the release time, but almost does not affect the RTS returns after the announcement. This means that the Bank of Russia has a positive short-term influence on the stock exchange indices. In this paper verbal interventions were obtained from free sources. Traders usually use commercial sources such as Reuters and Bloomberg. Thus, positive jumps before the news release can be probably explained by lag of the release time between commercial and free sources.

The contribution of our paper is as follows. This research considers the export orientation of the economy, which has not been taken into account before. This shows that in a resource based economy central bank's verbal interventions have a short-term impact on the returns of stock exchange indices, but do not affect their volatility. This results contradict previous studies, which show that a central bank's communication usually affects the volatility of exchange rates and stock exchange indices, but does not always affect their returns. We suggest that this contradiction arises from the fact that we consider the export orientation of the economy.

In this paper we focus on the analysis of the stock exchange market reaction to the Bank of Russia communication policy. Future research could be devoted to the impact of the Bank of Russia's verbal interventions on the currency exchange market. It could also be of interest to construct a similar information index for the government and to compare the simultaneous and the individual effects of different authorities on the Russian stock exchange and currency exchange markets.

References

Beine, M., Bénassy-Quéré, A., & Lecourt, C. (2002). Central bank intervention and foreign exchange rates: new evidence from FIGARCH estimations. *Journal of International Money and Finance, 21*(1), 115-144.

Bjørnland, H. C. (2009). Oil price shocks and stock market booms in an oil exporting country. *Scottish Journal of Political Economy, 56*(2), 232-254.

Dewachter, H., Erdemlioglu, D., Gnabo, J. Y., & Lecourt, C. (2014). The intra-day impact of communication on euro-dollar volatility and jumps. *Journal of International Money and Finance, 43*, 131-154.

Dreger, C., Kholodilin, K. A., Ulbricht, D., & Fidrmuc, J. (2016). Between the hammer and the anvil: The impact of economic sanctions and oil prices on Russia's ruble. *Journal of*

Comparative Economics, *44*(2), 295-308.
Égert, B., & Kočenda, E. (2014). The impact of macro news and central bank communication on emerging European forex markets. *Economic Systems*, *38*(1), 73-88.
Engle R., Ng V. (1993) Measuring and testing the impact of news on volatility. *Journal of Finance*, *48*(5), 1749-1778.
Goyal, A., & Arora, S. (2012). The Indian exchange rate and Central Bank action: An EGARCH analysis. *Journal of Asian Economics*, *23*(1), 60-72.
Han, Y. W. (2008). Intraday effects of macroeconomic shocks on the US Dollar–Euro exchange rates. *Japan and the World Economy*, *20*(4), 585-600.
Jansen, D. J., & De Haan, J. (2005). Talking heads: the effects of ECB statements on the euro-dollar exchange rate. *Journal of International Money and Finance*, *24*(2), 343-361.
Kim, S. J., Kortian, T., & Sheen, J. (2000). Central bank intervention and exchange rate volatility – Australian evidence. *Journal of International Financial Markets, Institutions and Money*, *10*(3), 381-405.
Muhammad, Z., Suleiman, H., & Kouhy, R. (2012). Exploring oil price – exchange rate nexus for Nigeria. *OPEC Energy Review*, *36*(4), 383-395.
McCredie, B., Docherty, P., Easton, S., & Uylangco, K. (2016). The channels of monetary policy triggered by central bank actions and statements in the Australian equity market. *International Review of Financial Analysis*, *46*, 46-61.
Ranaldo, A., & Rossi, E. (2010). The reaction of asset markets to Swiss National Bank communication. *Journal of International Money and Finance*, *29*(3), 486-503.
Yudaeva K.V. On the Opportunities, Targets and Mechanisms of Monetary Policy under the Current Conditions. *Voprosy Economiki*, *9*, 4-12. (in Russian).
Zakoian, J. M. (1994). Threshold heteroskedastic models. *Journal of Economic Dynamics and control*, *18*(5), 931-955.

Olga S. Kuznetsova
National Research University Higher School of Economics (Moscow, Russia). Laboratory for Macroeconomic Analysis. Research Fellow.
E-mail: okuznetsova@hse.ru

Sofiya R. Ulyanova
National Research University Higher School of Economics (Moscow, Russia). Laboratory for Macroeconomic Analysis, Assistant Junior Research Fellow.
E-mail: sulyanova@hse.ru