Bass, Alexander

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Do Institutional Quality and Oil Prices Matter for Economic Growth in Russia: An Empirical Study

Alexander Bass*

Department of Financial Markets and Banks, Financial University under the Government of the Russian Federation, Moscow, Russia. *Email: alexbass1947@gmail.com

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ABSTRACT

In this article we aim to assess the impact of institutional quality and world oil prices on performance of Russian manufacturing sector. Based on the data for the period 1996–2017 for Russia we explore the relationship between institutional quality, measured by the corruption perception index, world oil prices (Brent) and performance of Russian GDP using a VEC framework. For detecting the casual relationship, Granger causality test is applied. The results of the study show that oil prices, institutional quality and economic growth in Russia are cointegrated in the long-run. Yet short-run effects are statistically insignificant. Results of Granger causality test show unidirectional causality running from oil prices and institutional quality to economic growth.

Keywords: Oil Prices, Economic Growth, Institutional Quality, Vector Auto Regression
JEL Classifications: D02, E01, L60, O13, Q41

1. INTRODUCTION

Economic growth, being the primary goal of national development, has various sources. These often include internal and external ones. However, economic growth may be also extensive and intensive in its nature. To achieve stable and pronounced economic growth, national authorities should think of development programs. Yet institutional infrastructure must be one of the main elements in maintaining economic growth. Domestic or external demand are of great importance for achieving the desired results, however, without strong civil and market institutions, economic growth as well as economic development is doomed to fade. Protection of property rights, enforcement of legal obligations, enforcement of contractual obligations, strong judicial systems are of great importance for sustaining economic growth. If the national economy as a whole and economic agents do not feel themselves secure and protected, when there's no expectation that civil or contractual rights and obligations would be protected or enforced by legal institutions, bribery, corruption and collusions come at stage, dampening economic growth and weakening the potential of the national economy. So, quality of national institutions should be the priority objective of the national authorities to achieve economic growth. Unfortunately, in Russian case, the quality of legal institutions is seemed to be weakened by corruption, bribery schemes, which negatively affect national economic growth (Burakov, 2015).

On the other hand, taking into account the nature and the structure of the Russian economy one should also think of the global markets volatility, given that in the long-run, Russian economy is still dependent on the oil prices' volatility (Bass, 2018). That is why, negative oil price shocks must be taken into account when constructing the models of sustainable economic growth in the long-run.

In this paper we aim to explore long- and short-run aspects of the relationship between institutional quality, oil prices dynamics (Brent) and economic growth in Russia as well as to provide evidence for or against the causal relationship between corruption, oil prices shocks and economic growth on the example of Russia.

The remainder of the paper is organized as follows: Section 2 provides an overview of relevant literature; section 3 describes econometric modeling techniques and data used; section 4 presents an analysis of empirical results; section 5 presents the conclusion of the study.

2. LITERATURE REVIEW

To test the stated hypothesis, we refer to the relevant literature on the issue. As can be seen from Table 1, "institutional quality-economic growth" nexus is well tested on different examples, including both developed and developing countries, resources-rich and resources poor countries, transition economies and so on.

As can be seen form Table 1, relevant literature sources may be divided in several groups. One group emphasizes and advocates importance and existence of strong unidirectional impact of institutional quality and oil prices on economic growth in sampled countries. The results of empirical investigations, presented in the second group show that in some cases the impact of institutional quality changes as well as oil prices shocks may be less pronounced. Ambiguity of results in the sampled countries may be explained by institutional and political factors, as well as the status of the country: Net importer or exporter of oil.

Given these results, we use a VEC approach on the Russian data for the period 1996–2017.

3. MATERIALS AND METHODS

3.1. Research Methods

To test the hypothesis about relationship between shocks in world oil prices, institutional quality and economic growth in Russia, we use econometric techniques to analyze time series. The algorithm of the ongoing study is determined by several key stages. First and foremost, one should test sampled variables on stationarity or order of cointegration, since the time series must have the same order, as can be seen from equation (1). Secondly, it is necessary to determine presence/absence of correlation in long term between the variables in the equation. To check this assumption, we use a Johansen cointegration test. In a case of a long-term relationship on the one hand and condition of stationarity of sampled time series in the first order I (1) on the other, it is possible to use VEC model. In case of confirmation of cointegration presence between the variables of the sample, residuals of the equilibrium regression can be used to estimate error correction model. Also based on VEC model it is possible to identify short-term relationships between sampled variables. For this purpose, we would use the Wald test. The final stage of constructing a model is to conduct diagnostic tests to determine validity of the model. These include testing for heteroscedasticity and serial correlation, normality and stability of the model. Another tool for detecting presence or absence of the explored relationship is Pairwise Granger causality test.

3.2. Unit Root Test

For the analysis of long-term relationships between the variables, Johansen and Juselieus (1990) admit that this form of testing is only possible after fulfilling the requirements of stationarity of the time series. In other words, if two series are co-integrated in order d (i.e., $I(d)$) then each series has to be differenced d times to restore stationarity. For $d = 0$, each series would be stationary in levels, while for $d = 1$, first differencing is needed to obtain stationarity. A series is said to be non-stationary if it has non-constant mean, variance, and auto-covariance over time (Johansen and Juselius, 1990). It is important to cover non-stationary variables into stationary process. Otherwise, they do not drift toward a long-term equilibrium. There are two approaches to test the stationarity: Augmented Dickey and Fuller (ADF) test (1979) and the Phillips-Perron (P-P) test (1988). Here, test is referred to as unit-root tests as they test for the presence of unit roots in the series. The use of these tests allows to eliminate serial correlation between the variables by adding the lagged changes in the residuals of regression. The equation for ADF test is presented below:

$$\Delta Y_t=\beta_1+\beta_{2t}+aY_{t-1}+\delta_3\sum\Delta Y_{t-1}+\varepsilon_t \quad (1)$$

Where ε_t is an error term, β_1 is a drift term and β_{2t} is the time trend Δ and is the differencing operator. In ADF test, it tests whether a = 0, therefore the null and alternative hypothesis of unit root tests can be written as follows:

H_o: a=0 (Yt is non-stationary or there is a unit root).

H_1: a<0 (Yt is stationary or there is no unit root).

The null hypothesis can be rejected if the calculated t value (ADF statistics) lies to the left of the relevant critical value. The alternate hypothesis is that a < 0. This means that the variable to be estimated is stationary. Conversely, we cannot reject the null hypothesis if null hypothesis is that a = 0, and this means that the variables are non-stationary time series and have unit roots in level. However, normally after taking first differences, the variable will be stationary (Johansen and Juselius, 1990). On the other hand, the specification of P-P test is the same as ADF test, except that the P-P test uses nonparametric statistical method to take care of the serial correlation in the error terms without adding lagged differences (Gujarati, 2003). In this research, we use both ADF and P-P test to examine the stationarity of the sampled time series.

3.3. Johansen Co-integration Test

To test for presence of cointegration we apply the Johansen test using non-stationary time series (values in levels). If between variables does exist a cointegration, the first-best solution would be using vector error correction method VECM model. An optimal number of lags according to Akaike information criterion for providing Johansen test is determined in VAR space. To conduct Johansen test, we estimate a VAR model of the following type:

$$Y_t=A_1y_{t-1}+\ldots+A_py_{t-p}+Bx_t+\epsilon_t \quad (2)$$

In which each component of y_t is non-reposeful series and it is integrated of order 1. x_t is a fixed exogenous vector, indicating the constant term, trend term and other certain terms. ε_t is a disturbance vector of k dimension.

Table 1: Literature review

Author	Sample	Methodology	Results of the study
Gbadebo and Okonkwo (2009)	Energy consumption-economic growth nexus, Nigeria, 1970–2005	Cointegration analysis	The results show that there exists a positive relationship between current period energy consumption and economic growth. With the exception of coal which was positive, a negative relationship was noted for lagged values of energy consumption and economic growth. The implication of the study is that increased energy consumption is a strong determinant of economic growth having an implicit effect in lagged periods and both an implicit and explicit effect on the present period in Nigeria
Valeriani and Peluso (2011)	Institutional quality - economic growth nexus, 181 countries, 1950–2009	Pooled regression analysis, fixed effects model	The results support the main hypothesis, that is institutional quality do impact in a positive way on economic growth. This is true for all three institutional indicators that were examined. The only difference between how developing and developed countries are affected by institutional quality is in the size of the impact, not in the direction of it
Akpan and Akpan (2012)	Electricity consumption-carbon emissions-economic growth nexus, Nigeria, 1970–2008	Multivariate vector error correction (VECM) framework	Findings show that in the long run, economic growth is associated with increase carbon emissions, while an increase in electricity consumption leads to an increase in carbon emissions. These imply that Nigeria's growth process is pollution intensive, while the negative relationship between electricity consumption (or positive relationship between electricity consumption) and emissions in Nigeria is a clear indication that electricity consumption in the country has intensified carbon emissions. No support was obtained for the hypothesized environmental Kuznets curve. Granger-causality results confirm a unidirectional causality running from economic growth to carbon emissions
Keikha et al. (2012)	Oil prices fluctuations - economic growth - institutional quality, 32 oil rich countries, 1975–2010	Panel cointegration analysis	The result implies that fluctuations of oil prices impact on economic growth of countries depend on institutional quality index so that the impact of fluctuation is avoided by countries with sufficiently good institutions. More ever, the long-run ratio of investment to products effect is negative and small that shows the quality of investment projects is more importance than the quantity of them in the economic growth of these countries. The effect of trade openness on economic growth in the long-run is positive, statistically significant, and economically sizable.

(Contd...)

Table 1: (Continued)

Author	Sample	Methodology	Results of the study
Emmanuel and Ebi (2013)	Institutional quality - petroleum resources - economic growth nexus, Canada, Nigeria, Brazil, 2000–2010	Granger causality test, OLS approach	OLS econometric technique was used to examine the impacts of the differences in oil sector, institutional qualities, and annual inflation on the difference in economic growth between Canada and Nigeria; and Brazil and Nigeria. The Granger causality results shows that, differences in economic growth between Canada and Nigeria is caused by differences in their corruption and that there is a bidirectional causation between difference in corruption and difference in governance effectiveness. While the OLS results reveals that difference in corruption was the most significant cause of the difference in growth performance between Canada and Nigeria; and Brazil and Nigeria
Iyoboyi and Pedro (2014)	Impact of institutional capacity on macroeconomic performance, Nigeria, 1961–2011	Multivariate vector error correction approach	The empirical results confirm co-integration relationship between institutional capacity, fiscal-monetary policy mix and macroeconomic performance. Results of the generalized impulse response functions suggest that one standard deviation innovation on institutional capacity reduces macroeconomic performance in the short, medium and long term, while results of the variance decomposition indicate that a significant variation in Nigeria's macroeconomic performance is not attributable to changes in the capacity of institutions, based on the proxy employed
Ologunla et al. (2014)	Institutional quality - resource curse nexus, Nigeria, 1986–2012	Regression analysis, granger causality test	Results show that there is a negative relationship between strong institution of Nigeria and resource curse with coefficients of 0.003874 between economic freedom index and crude oil export
Nawaz et al. (2014)	Institutional quality-economic growth nexus, 35 Asian countries, 1996–2012	Panel analysis, GMM technique with fixed effects	The empirical results reveal that institutions indeed are important in determining the long run economic growth in Asian economies. However, the impact of institutions on economic growth differs across Asian economies and depends on the level of economic development. The results reveal that institutions are more effective in developed Asia than developing Asia
Edame and Okoi (2015)	Energy consumption-institutional quality - performance of the manufacturing sector nexus, Nigeria, 1999–2013	OLS approach	The results of the study show that industrial sector consumption of electricity, petroleum and gas do not have a significant impact on manufacturing sector performance. The results also indicated that the level of corruption perception has a significant effect on the performance of the manufacturing sector

(Contd...)

Table 1: (Continued)

Author	Sample	Methodology	Results of the study
Burakov (2015)	Institutional quality - energy efficiency nexus, 17 developing economies, 1995–2014	Correlation analysis	Based on cross-country analysis and using channels' approach to estimation of institutions' and market's efficiency we come to conclusion that persistently low energy efficiency in East European countries may be a result of low quality market institutions
Siyakiya (2017)	Institutional quality (economic freedom index, rule of law, regulatory efficiency and market openness) - economic performance (gross value added per capita) nexus, 28 European Union member stated and Turkey, 1995–2014	Panel regression analysis	The results show a positive and significant relationship between economic performance and the quality of institution. Precisely, a 1 per cent improvement in institutional quality is predicted to have an effect of increasing gross value added per capita by 1.092 per cent holding other things constant. However, decomposing countries according to their level of economic development the results reveal that the impact of institutional quality on economic performance is more pronounced in middle income countries than high income countries. Moreover, there is significant evidence that improvement of regulatory efficiency promotes economic performance for all countries and countries at different levels of development
Olayungbo and Adediran (2017)	Oil revenue - institutional quality - economic growth nexus, Nigeria, 1984–2014	ARDL model	The ARDL model employed shows the existence of long-run equilibrium among oil revenue, institutional quality, and economic growth. The short-run analysis indicates that institutional quality measured by corruption index promotes economic growth, while institutional quality retards economic growth in the long run. Also, oil revenue promotes economic growth in the short run and reduces it in the long run, thereby confirming the existence of the resource curse hypothesis in Nigeria. The impulse response analyses further support the ARDL results
Bass (2018)	Oil prices - economic growth nexus, Russia, 1990–2016	VEC approach, granger causality test	The results of the study show that all the sampled variables are cointegrated in the long-run, detecting dependence of the Russian economy on oil. Short-run effects estimation show that the Groningen effect is absent in the Russian economy. pairwise granger causality test confirms absence of the Dutch disease as well

We can rewrite this model as:

$$\Delta y_t = \prod y_{t-1} + \sum_{i=1}^{p-1} V_i \Delta y_{t-1} + Bx_t + \epsilon_t \tag{3}$$

Where,

$$\prod = \sum_{i=1}^{p} A_i - I, V_i = -\sum_{j=i+1}^{p} A_j \tag{4}$$

If the coefficient matrix has $\prod$ reduced rank $r < k$, then there exist $k \times r$ matrices α and β each with rank r such that $\prod = \alpha\beta'$ and is I(0). r is the number of cointegrating relations (the cointegrating rank) and each column of β is the cointegrating vector. The elements of α are known as the adjustment parameters in the VEC model. Johansen's method is to estimate $\prod$ matrix from an unrestricted VAR and to test whether we can reject the restrictions implied by the reduced rank of $\prod$ (Johansen, 1991).

3.4. Vector Error Correction Model

Granger (1988) suggested the application of vector error correction methodology (VECM) in case if the variables are cointegrated in order to find short-run causal relationships. VECM, therefore, enables to discriminate between long-run equilibrium and short-run dynamics. In this sense, we employ following VECMs to estimate causal linkages among the variables:

$$\Delta ln\, l = \begin{array}{l} a_0 + \sum_{i=1}^{k} a_1 \Delta\, lnl_{t-i} + \sum_{i=1}^{n} a_2 \Delta lns_{t-i} + \\ \sum_{i=1}^{m} a_3 \Delta lnr_{t-i} + \lambda ECT_{t-1} + v_1 \end{array}$$

$$\Delta ln\, m = \begin{array}{l} \beta_0 + \sum_{i=1}^{k} \beta_1 \Delta\, lnm_{t-i} + \sum_{i=1}^{n} \beta_2 \Delta lnl_{t-i} + \\ \sum_{i=1}^{m} \beta_3 \Delta lnr_{t-i} + \phi ECT_{t-1} + v_2 \end{array}$$

$$\Delta lnr = \begin{array}{l} \eta_0 + \sum_{i=1}^{k} \eta_1 \Delta\, lnr_{t-i} + \sum_{i=1}^{n} \eta_2 \Delta lnl_{t-i} + \\ \sum_{i=1}^{m} \eta_3 \Delta lnm_{t-i} + \chi ECT_{t-1} + v_3 \end{array}$$

Where l - international oil prices (Brent), m - corruption perception index value, r - gross domestic product. (Granger, 1988).

Providing regression analysis of the sampled variables by modeling VECM allows us to determine the existence of substantial and statistically significant dependence not only on the values of other variables in the sample, but also dependence on previous values of the variable.

However, VEC model must meet the requirements of serial correlation‘s absence, homoscedasticity of the residuals and to meet the requirement of stability and normality. Only in this case the results can be considered valid.

3.5. Materials and Data Processing

We test a hypothesis of relationship between oil prices shocks, institutional quality and economic growth on example of Russian data for the period 1996 to 2017. The base period is one year. Using VECM, we set ourselves a task to determine sensitivity of economic growth in Russia to shocks in international oil prices and quality of institutions.

Data on economic growth measured as GDP is obtained from Federal Service of State Statistics (www.gks.ru). Data on world prices of oil is obtained from the statistical database of NASDAQ (www.nasdaq.com). Data for institutional quality is measured by Corruption Perception Index and obtained from Transparency International (www.transparency.org).

To conduct time-series analysis, all variables are transformed into logarithms. To study sensitivity and causal linkages between the variables in the sample in short-and long-run, we turn to regression analysis, which involves the construction of VEC model of certain type based on stationary time series, testing the model for heteroscedasticity of the residuals, autocorrelation. To test casual linkages between the sampled variables we use pairwise Granger causality test.

4. RESULTS AND DISCUSSION

The first step in testing hypotheses is to test variables for the presence of unit root. For this purpose, we use standard tests - ADF and P-P test. Results of unit root testing are presented in Table 2.

As can be seen from the test results of the variables for the presence of unit root in their differentiation to the first order, we can reject the null hypothesis of unit root in each of the variables. Thus, the condition of stationarity at I (1) is performed, which gives us reason to test variables for cointegration. However, it is necessary to determine the optimal time lag.

Building a VAR model involves determining the optimal number of lags. In our case, the Akaike information criterion equals 1. Consequently, we built a model based using time lag of 1 year to determine the relationship in the short run. The results of the diagnostic testing of VAR model for heteroscedasticity of residuals, autocorrelation, serial cross-correlation, and stability are presented in Table 3. As can be seen from Table 3, the model is stable, heteroscedasticity and serial correlation of residuals in the model are absent.

The model is used to determine the level of sensitivity of control variables to shocks in oil prices and institutional quality changes in the short run and we use it to test for stable long-run relationship, applying Johansen cointegration test. Results of Johansen co-integration test are presented in Table 4.

Johansen test results show the presence of cointegration between a number of equations, which allows presuming the existence of a long-term relationship between them. Starting from the results of the cointegration test, we can proceed to the construction of VEC

Table 2: Results of individual unit root test

Variables	ADF		PP	
	Statistic	Prob.**	Statistic	Prob.**
Levels				
Intercept	11.397	0.864	10.022	0.5892
Intercept and trend	18.942	0.482	20.619	0.2158
First-difference				
Intercept	54.298	0.0000**	63.957	0.0000**
Intercept and trend	29.974	0.0010**	69.153	0.0000**

**Denotes statistical significance at the 5% level of significance. ADF: Augmented dickey and fuller, PP: Phillips-Perron

Table 3: Results of unrestricted VAR model diagnostic testing

Type of test	Results		
	Lags	LM-stat	P-value
VAR residual serial correlation LM test	1	7.2543	0.6831
	2	5.4531	0.8449
Stability condition test	All roots lie within the circle. VAR satisfies stability condition		
Heteroscedasticity (white test)	0,6703*		
VAR residual cross correlation test	No autocorrelation in the residuals		

**Denotes acceptance of null hypothesis (Ho: There is no serial correlation). * denotes acceptance of null hypothesis of homoscedasticity model to reveal presence or absence of long-term and short-term relations between variables.

The results of the model, showing the relationship between the sampled variables are presented in Table 5.

As can be seen from the Table 5, the value of error correction term C (1) is negative in sign and statistically significant. This suggests the existence of long-run relationship between the variables of the sample. In other words, we obtained evidence that Brent oil prices, institutional quality and economic growth in Russia are cointegrated, so that they have similar trends of movement in the long term.

The C (1) shows speed of long run adjustment. In other words, this coefficient shows how fast the system of interrelated variables would be restored back to equilibrium in the long run or the disequilibrium would be corrected. Given statistical significance at 5% level (P-value being <5%) and negative meaning, the system of variables corrects its previous period disequilibrium at a speed of 25.19% in one year (given optimal lag meaning of one year for ECM). It implies that the model identifies the sizeable speed of adjustment by 5.19% of disequilibrium correction in one year for reaching long-run equilibrium steady state position.

Yet, we find no evidence of existence of the short-run effects coming from world oil prices and institutional quality to economic growth in Russia. On the one hand, long-run trends of economic growth and oil prices are cointegrated. And dependency in the long-run exist between them, given the fact that Russian economy is heavily dependent on oil revenue. Yet, short-run effects are absent due to the fact that changes in institutional environment are of prolonged nature to be captured in the short-run analysis.

Overall, the obtained results are consistent with existing empirical and theoretical results of the previous studies (e.g., Bass [2018]), finding no statistically significant short-run impact of oil price shocks on economic growth in Russia.

The final stage of the analysis of the model is to determine the extent of its validity. For this, it is necessary to conduct some diagnostic tests, including tests for heteroscedasticity of the residuals and serial correlation in the model. The results of these tests show that residuals are homoscedastic and serial correlation is absent.

Another test to check for the presence of the Dutch disease is Pairwise Granger causality test. The results of the test are presented in Table 6.

As can be seen from Table 6, results of pairwise Granger causality test confirm that oil price dynamics and changes in institutional quality matter for economic growth in Russia, yet the effects are not well pronounced in the short-run.

5. CONCLUSION

In this paper we aim to explore long- and short-run aspects of the relationship between institutional quality, oil prices dynamics (Brent) and economic growth in Russia as well as to provide evidence for or against the causal relationship between corruption, oil prices shocks and economic growth on the example of Russia.

To test the hypothesis about relationship between shocks in world oil prices, institutional quality and economic growth in Russia, we use econometric techniques to analyze time series. The algorithm

Table 4: Results of Johansen co-integration test

Hypothesized number of CE(s)	Eigenvalue	Trace Statistics	0.05 critical value	Prob.*
None*	0.9487	59.1573	32.1541	0.0001*
At most 1	0.2813	10.2281	16.4284	0.4526
At most 2	0.1542	1.9535	4.5730	0.1459

Trace statistics indicate 1 co-integrating equation at the 0.05 level. *Denotes statistical significance at the 5% level of significance

Table 5: Results of vector error correction model

Coefficient number	Coefficient meaning	Standard error	t-Statistic	Prob.
C (1)	−0.2519	379.115	4.4143	0.0004*
C (2)	−0.1832	0.125	8.7925	0.4509
C (3)	−0. 4901	52.854	11.5352	0.8167
C (4)	748.9842	502.167	2.1984	0.0018

*Denotes statistical significance

Table 6: Results of pairwise granger causality test

Null hypothesis	Observations	F-statistic	P-value
Oil prices dynamics does not Granger cause economic growth	22	4.5721	0.0235*
Economic growth does not granger cause oil prices dynamics	22	2.0782	0.8806
Oil prices dynamics does not granger cause institutional quality	22	0.6298	0.9863
Institutional quality does not Granger cause oil prices dynamics	22	0.4401	0.8039
Economic growth does not Granger cause institutional quality	22	1.4721	0.2585
Institutional quality does not granger cause economic growth	22	5.8649	0.0105*

*Denotes rejection of the null hypothesis of the ongoing study is determined by several key stages. First and foremost, one should test sampled variables on stationarity or order of cointegration, since the time series must have the same order, as can be seen from equation (1). Secondly, it is necessary to determine presence/absence of correlation in long term between the variables in the equation. To check this assumption, we use a Johansen cointegration test. In a case of a long-term relationship on the one hand and condition of stationarity of sampled time series in the first order I (1) on the other, it is possible to use VEC model. In case of confirmation of cointegration presence between the variables of the sample, residuals of the equilibrium regression can be used to estimate error correction model. Also based on VEC model it is possible to identify short-term relationships between sampled variables. For this purpose, we would use the Wald test. The final stage of constructing a model is to conduct diagnostic tests to determine validity of the model. These include testing for heteroscedasticity and serial correlation, normality and stability of the model. Another tool for detecting presence or absence of the explored relationship is Pairwise Granger causality test. Johansen test results show the presence of cointegration between a number of equations, which allows presuming the existence of a long-term relationship between them.

Based on these results we construct a VEC model, where the value of error correction term C (1) is negative in sign and statistically significant. This suggests the existence of long-run relationship between the variables of the sample. In other words, we obtained evidence that Brent oil prices and changes in institutional quality, measured by Corruption Perception Index, and economic growth in Russia are cointegrated, so that they have similar trends of movement in the long term. Yet, we find no evidence of existence of the short-run effects coming from world oil prices or changes in institutional quality to economic growth in Russia. Results of pairwise Granger causality test confirm that oil price dynamics and changes in institutional quality matter for economic growth in Russia, yet the effects are not well pronounced in the short-run.

REFERENCES

Akpan, G.E., Akpan, U.F. (2012), Electricity consumption, carbon emissions and economic growth in Nigeria. International Journal of Energy Economics and Policy, 2(4), 292-306.

Bass, A. (2018), Is groningen effect still present in Russia: A vector error correction approach. International Journal of Energy Economics and Policy, 8(5), 273-280.

Burakov, D. (2015), Energy efficiency in rent seeking economies: Is credit capable of breaking the energy curse? International Journal of Energy Economics and Policy, 5(3), 677-685.

Edame, G.E., Okoi, O.B. (2015), Energy consumption, institutional quality and the performance of the manufacturing sector in Nigeria (1999-2013). International Journal of Energy Economics and Policy, 5(3), 801-804.

Emmanuel, N., Ebi, B.O. (2013), Institutional quality, petroleum resources and economic growth: A difference in differences approach using Nigeria, Brazil and Canada. International Journal of Humanities and Social Science, 3(20), 198-206.

Gbadebo, O.O., Okonkwo, C. (2009), Does energy consumption contribute to economic performance? Empirical evidence from Nigeria. Journal of Economics and International Finance, 1(2), 44-58.

Granger, C.W.J. (1988), Some recent development in a concept of causality. Journal of Econometrics, 39, 199-211.

Gujarati, D. (2003), Basic Econometrics. 4th ed. London: Mc Graw-Hill.

Iyoboyi, M., Latifah, M.P. (2014), Institutional capacity and macroeconomic performance: Empirical evidence from Nigeria. Research in Applied Economics, 6(1), 38-60.

Johansen, S. (1991), Estimation and hypothesis testing of cointegration vectors in gaussian vector autoregressive models. Econometrica, 59(6), 1551-1580.

Johansen, S., Juselius, K., (1990), Maximum likehood estimation and inference on co-integration with applications to the demand for money. Oxford Bulletin of Economics and Statistics, 52, 169-210.

Keikha, A., Keikha, A., Mehrara, M. (2012), Institutional quality, economic growth and fluctuations of oil prices in oil dependent countries: A panel cointegration approach. Modern Economy, 3(2), 218-222.

Nawaz, S., Iqbal, N., Khan, M.A. (2014), The impact of institutional quality on economic growth: Panel evidence. The Pakistan Development Review, 53(1), 15-31.

Olayungbo, D.O., Adediran, K.A. (2017), Effects of oil revenue and institutional quality on economic growth with an ARDL approach. Energy and Policy Research, 4(1), 44-54.

Ologunla, S.E., Kareem, R.O, Raheem, K.A. (2014). Institutions and the resource curse in Nigeria. Journal of Sustainable Development Studies, 7(1), 36-51.

Siyakiya, P. (2017), The impact of institutional quality on economic performance: An empirical study of European union 28 and prospective member countries. World Journal of Applied Economics, 3(2), 3-24.

Valeriani, E., Peluso, S. (2011), The impact of institutional quality on economic growth and development: An empirical study. Journal of Knowledge Management Economics and Information Technology, 1(6), 443-467.