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Article

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How Oil Price and Exchange Rate Affect Non-oil GDP of the Oil-rich Country – Azerbaijan?

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ABSTRACT

Identifying the economic factors that affect economic growth is an important issue for each economy. It is a matter of debate to determine the building blocks of non-oil Gross Domestic Product (GDP) growth, especially in oil-rich countries, such as Azerbaijan. Using the Fully Modified Ordinary Smallest Square approach between 2005 and 2019, this study aims to investigate the relationship between real non-oil GDP growth of Azerbaijan and exchange rate and oil prices. Zivot-Andrews unit root test is applied to deal with structural breaks in data and the Gregory-Hansen (GH) test for robustness. While conventional unit-root tests decision that the series are not stationary at their level, the Ziwot-Andrews test decision that the series is stationary with structural break. According to the GH test result, there is a structural break date in the long-run relationship between the real non-oil GDP growth and the oil price and the USD/AZN exchange rate in early 2009. According to Fully Modified Ordinary Least Squared results, the increase in oil price increases real non-oil GDP growth, and the increase in USD/AZN exchange rate has a decreasing effect on it. This study contains considerable information for future economic policies for oil-rich countries that want to develop the non-oil sector.

Keywords: Oil Price, Non-oil Gross Domestic Product, Exchange Rate, Fully Modified Ordinary Smallest Square Approach, Cointegration Analysis, Azerbaijan

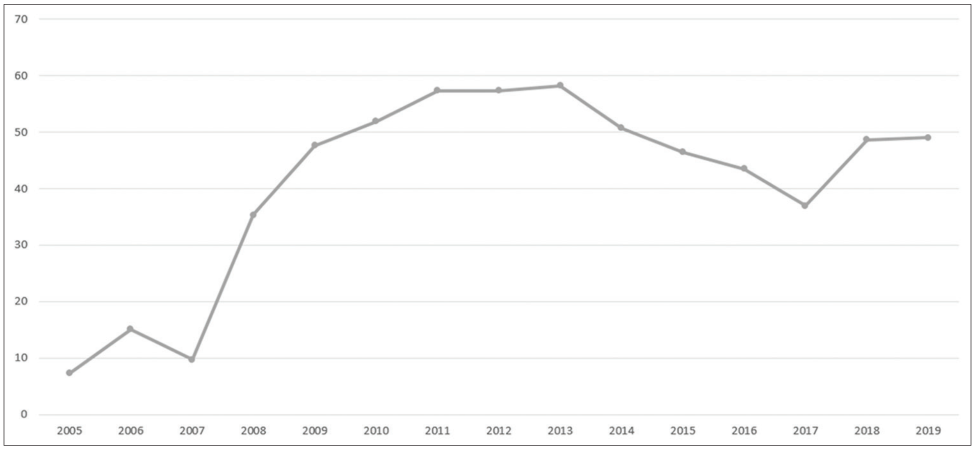
JEL Classifications: C22, E32, E37, Q43

1. INTRODUCTION

According to data in the BP Statistical Review of World Energy 2019 Azerbaijan produces 795 bin barrels oil daily. The report also shows that Azerbaijan has 0.4% of the world petroleum reserves, even if this figure seems small, the Azerbaijani economy is largely dependent on the oil sector (British Petroleum, 2019). Namely, when we examine the macroeconomic indicators of Azerbaijan, we can see the effect of oil industry more clearly Figure 1. shows the share of oil revenues within the state budget revenues of Azerbaijan since 2005. These revenues are manifested as transfers from the State Oil Fund[1]. As it can be seen from the chart, especially after 2009, a large part of the state budget consists of oil revenues. In addition, when we examine the international trade statistics of Azerbaijan, we see that the largest share in export items falls on oil (Figure 2). As it can be seen from the chart, oil exports representing 97% of exports since 2008 have been around 90% of total exports after this date. Based on these data, it is possible to say that Azerbaijan economy is a country dependent on oil. It is also clear that the increase in demand for oil, and therefore the increase in oil prices, will positively affect the economy of Azerbaijan. But, how will the change in oil prices affect the non-oil sector of Azerbaijan? Moreover, how will the change in the exchange rate of USD/AZN, the main currency of the oil trade, affect the non-oil sector? In this article, the effects of both of these facts, namely the nominal oil prices and the nominal exchange rate of USD/AZN, on the non-oil Gross Domestic Product (GDP) growth of Azerbaijan are tried to be examined.

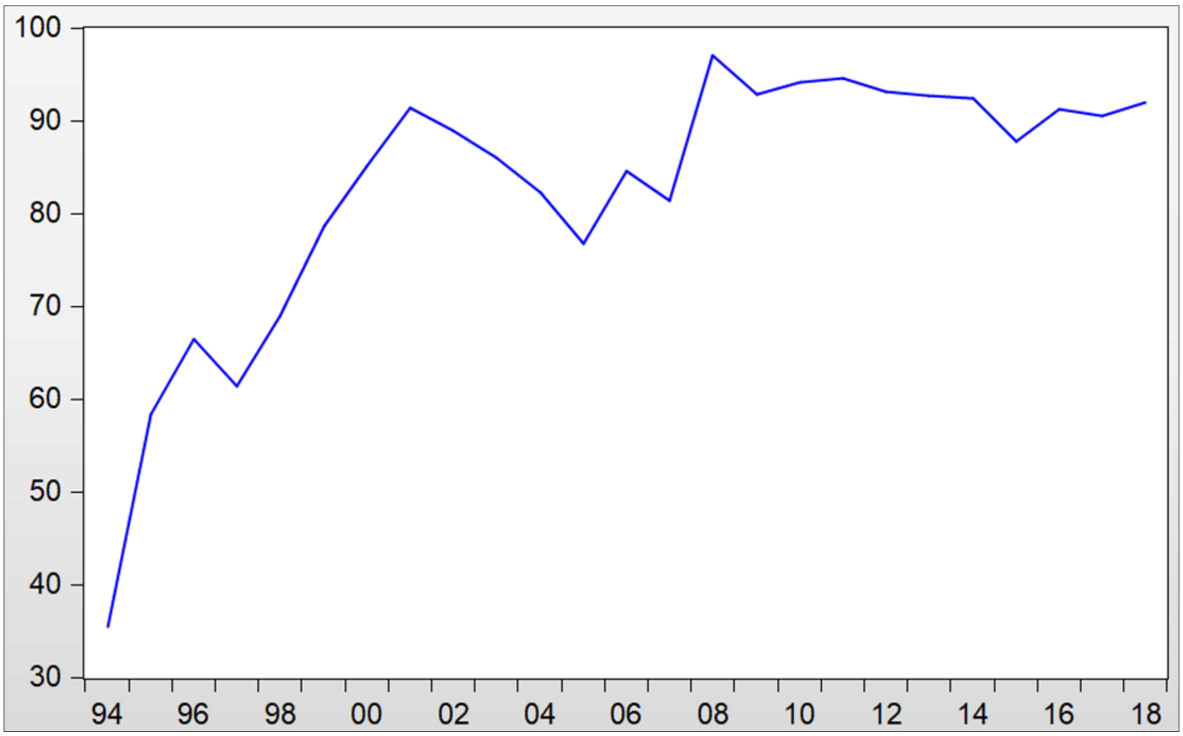
1 Oil revenues were included in the Azerbaijan State Budget revenues until 2017, under the item "Transfers from the State Oil Fund of the Republic of Azerbaijan". After 2017, this item was changed as "Transfers from the Organizations (Institutions) Determined by the Relevant Government Agency".

Figure 1: Share of direct oil revenues in state budget (%)



Source: Analysis of the Execution of Budget Incomes and Expenses, Ministry of Finance of the Republic of Azerbaijan, 2020

Figure 2: Share of oil export in total export (%)



Source: The Foreign Trade Statistics of Azerbaijan, The State Statistical Committee of the Republic of Azerbaijan, 2020

Over the past few decades, oil prices have been one of the economic indicators driving the world economy. It is stated in the economic theory that the increases in oil prices hinder economic growth, and if we elaborate on this assumption, it is possible to state that oil prices have a negative effect on the economy of the oil importing countries and a positive effect on the economy of the exporting countries. In short, oil prices cause an exchange of income between oil importing and exporting countries.

One of the other important variables that affect the economies of countries is known as the exchange rate. In the theory of economics, there is a general belief that the increase in the exchange rate will lead to a decrease in imports and an increase in exports, thereby increasing the total output within the country. A number of studies, however, show that this assumption is not always true at all. However, the relationship between exchange rate and economic growth is still a matter of debate among economists. Namely, there may be a number of factors that shape this relationship, such as the size of the country's economy, the level of diversity of economic activities, and an economic system based on natural resources. Moreover, if we consider that the exchange rate policy implemented in Azerbaijan is the fixed exchange rate regime, it is seen that exchange rate volatility only occurs during certain crisis periods, which poses a threat to economic growth. Namely, as Arratibel et al. (2011) stated, countries with more flexible exchange rate regimes perform better than countries with fixed exchange rates during the financial crisis periods.

2. LITERATURE REVIEW

In the literature, there are a lot of investigations about the relationship between oil prices, exchange rate and economic growth, and the direction of this relationship. The principle that we take as a basis when we examine these researches is whether oil prices affect the economy of countries that import and export oil in the same or different way, and how the exchange rate volatility and the appreciation in the exchange rates affect economic growth. Based on this, the researches on the relationships between exchange rates and economic growth below, oil prices and the economy of oil exporting and importing countries are evaluated under separate headings.

2.1. The Impact of Oil Prices on Economic Growth: Through Oil Importing Countries

When we examine the first research on the relationship between oil price and economic growth, Darby (1982) research shows that the effects of oil prices on macroeconomic variables reveal that a significant effect is observed between oil price and macroeconomic variables, but he made recommendations for re-testing of this relationship through analysis, in which data from the 1980s were also taken into consideration. Hamilton (1983) stated that oil prices had an important effect in all the periods of stagnation in the USA in his research on the US economy and oil prices, which is known as one of the countries that import oil based on data between 1949 and 1973. Burbidge and Harrison (1984) concluded that oil prices had a negative impact on industrial production in their studies covering 5 OECD countries - USA, Canada, Japan, England and Germany.

Some researchers state that the effects caused by increases in oil prices are different from those determined by oil drops. This situation, which was first identified in Mork (1989) study, was later supported by other researches to test whether the relationship between oil prices and economic growth is asymmetric. One of these researchers, Ferderer (1996), in his research on oil price mobility and macroeconomic indicators, concluded that there is an asymmetrical relationship between oil price changes and total output, while at the same time, he found that oil price increases had a negative impact on industrial production. Jiménez-Rodríguez and Sánchez (2005) explains the asymmetrical relationship between oil prices and economic growth as follows; The increase (decrease) in oil prices will cause a decrease (increase) in the amount of output in the sectors that use oil in the production process. Furthermore, the ascent (decline) in oil prices would lead to the expansion (downturn) of energy-efficient sectors opposed to energy-intensive industries. However, given that the short-term cost of reallocating resources among sectors is high, the oil shocks that mean rearrangement between energy-efficient and energy-intensive sectors would result in total losses in production. This loss will intensify the economic contraction when oil prices increase, and will limit economic expansion when oil prices fall, thereby causing an asymmetrical effect.

In his study on 31 Third World countries, Nunnenkamp (1982) shows that the increase in oil prices does not reduce economic growth for developing countries in the long term. Namely, although the negative impact of the first oil price shock in 1973/74 manifested itself in the short term, this situation was limited in time.

2.2. The Impact of Oil Prices on Economic Growth: Through Petroleum Exporting Countries

Idrisov et al. (2015) tried to explain the positive effects of oil prices on the Russian economy, which is the oil-rich country, based on the theoretical approach, explains the mechanism by which the increase in oil prices encourages economic growth based on the Keynesian model. He states that at first, the inreasing oil prices will ascend the income of the actors in the economy, these increases in income will increase the demand for both domestic goods and services and imported products, as well as investments in the economy will increase, and all this will enhance total output.

A number of studies support this theory and include findings related to the existence of a positive relationship between oil prices and economic growth. Eltony and Al-Awadi (2001) investigated the Kuwait economy and examined that oil prices affect macroeconomic indicators by affecting state expenditures. Ayadi et al. (2000), who investigated Nigerian economy and Berument et al. (2010), who analyze effects of oil price on the economies of Algeria, Iran, Iraq, Kuwait, Libya, Oman, Qatar, Syria and UAE countries get findings that the increase in oil prices causing an increase in total output of the stated countries. The results obtained by Ghalayini (2011) based on the data of G7, OPEC countries and Russia, India and China economies show that oil prices have a positive (negative) effect on economic growth for oil exporting (oil importing) countries. Emami and Adibpour (2012) stated that the increase (decrease) in oil revenues had a positive (negative) effect on the growth in total output in the study in which they examined the Iranian economy. However, the researchers concluded that the effect of the decrease in oil revenues is greater than the increase in oil revenues. Studying the effect of oil prices on the Russian economy, Rautava (2004) found that a 10% increase (decrease) in oil prices will cause a 2.2% increase (decrease) on Russian GDP in the long run.

Studying the causality relationship between oil price, GDP and exchange rate within economies of Azerbaijan and Kazakhstan, Dikkaya and Doyar (2017) indicated that the results of the study revealed a one-way causality relationship from oil prices to GDP for both countries and the increase in oil prices have positive effect on economic growth.

In conclusion, the literature review gives us information about positive effects of increasing oil price on the economic growth of the oil-exporting countries and negative effects of increasing oil price on the economic growth of the oil-importing countries.

2.3. Exchange Rate and Economic Growth

When we examined the researches to test the relationship between exchange rate and economic growth, researches were conducted in line with the effects of exchange rate volatility on economic growth, which results in different findings from each other.

Namely, although Jin (2008) gains evidence that the appreciation of the real exchange rate has positive effects on Russian GDP and negative effects on Japan and China GDP, Rautava (2004) stated that in the above mentioned literature, a 10% appreciation of the ruble (has obtained findings related to the fact that its depreciation leads to a 2.7% decrease (increase) on GDP in the long term. In the above-mentioned study of Dikkaya and Doyar (2017), findings were obtained with the determination of one-way causality relationship from GDP to exchange rate in terms of Azerbaijani economy and from exchange rate to GDP in terms of Kazakhstan economy. Hasanov and Samadova (2010), on the other hand, obtained results regarding that the real effective exchange rate had a negative effect on non-oil exports of Azerbaijan.

Arratibel et al. (2011), find results about negative relationship between exchange rate volatility and economic growth in the study which covers 9 CEE countries - Bulgaria, Estonia, Latvia Lithuania, Czech Republic, Hungary, Poland, Romania and Slovakia. However, Akpan and Atan (2011) concluded that the volatility in the real exchange rate in the Nigerian economy did not have a remarkable effect on economic growth.

As a result, it is impossible to say a clear idea about the effect of exchange rate on economic growth. Namely, the difference of the exchange rate systems of the countries as well as the difference in their economic structure lead to different results for each country.

3. DATA, VARIABLES AND METHODOLOGY

In order to investigate the factors affecting the growth rate of Azerbaijan's non-oil gross GDP, the monthly real non-oil GDP growth rate (NoilRGDP), nominal USD/AZN exchange rate (USD/AZN) and nominal oil prices (OilPrice) between 2005m01 and 2019m12 time period from. We gather data of real non-oil GDP growth of Azerbaijan and USD/AZN exchange rate from Central Bank of Azerbaijan Monthly Bulletins (Central Bank of the Republic of Azerbaijan), Brent oil price datas from U.S. Energy Information Administration (U.S. Energy Information Administration, 2020). The natural logarithm was taken the USD/AZN and OilPrice data to the same order, but no logarithm was required because NoilRGDP was shown as a percentage change. Since the collected data had a monthly frequency, it was possible that there is a seasonal effect. Therefore, the data were tried to be seasonal adjustment with the TROMA-SEAT method, but since there was no significant seasonal effect, the data were used in the next phase of the analysis in non-seasonal form.

Zivot and Andrews (1992) test is applied to test the static properties of the data. This method can handle structural breaks in data at various points (Perron, 1989). Argued that traditional methods can produce ambiguous results about stationary structures in case of structural break of data. Alternatively, the breaking points are not known in this test, which is an advanced form of the Perron test. Therefore, this test produces precise estimates for the break series. The mathematical form of this test is described as follows:

$$\Delta x_t = b + bX_{t-1} + ct + bDT_t + \sum_{j=1}^{k} d_j \Delta X_{t-j} + u_t \quad (1)$$

$$\Delta x_t = c + cx_{t-1} + dDU_t + dDT_t + \sum_{j=1}^{k} d_j \Delta X_{t-j} + u_t \quad (2)$$

DU_t specifies dummy variables used for mean shift with time breaks for a given point; whereas DT_t is used for time breaks in the series. For unit root test break dates, the null hypothesis shows that the series has a unit root with an unknown structural break date or c = 0. In other case states the series is stationary where c < 0. This test reflects all feasible break points and calculates them continually. It does not include the end sample points during break point selection. To test the co-integration among all variables, this article uses the Gregory-Hansen (GH) approach which is an addition of the available predictable tests. This test uses a general hypothesis of no cointegration and is useful in case of possible regime shift. This approach can identify the link among variables in the presence of a break in intercept and slope coefficients. For such cases, the conventional Augmented Dickey-Fuller (ADF) test is not a suitable choice (Gregory and Hansen, 1996a; 1996b). The three unique models with several assumptions are: level shift (3), level shift (4) with trend and regime shift (5). The common mathematical forms of three models, correspondingly, are as follows:

$$y_t = \mu_1 + \mu_2 f_{tk} + \beta_1 t + \alpha_1 x_t + \varepsilon_t \quad (3)$$

$$y_t = \mu_1 + \mu_2 f_{tk} + \beta_1 t + \alpha_1 x_t + \alpha_2 x_t f_{tk} + \varepsilon_t \quad (4)$$

$$y_t = \mu_1 + \mu_2 f_{tk} + \beta_1 t + \beta_2 t f_{tk} + \alpha_1 x_t + \alpha_2 x_t f_{tk} + \varepsilon_t \quad (5)$$

This test framework is used to determine the possible breaks and the break dates in the data. The test uses the highest absolute ADF test value for break selection. The calculated value is compared against the critical value to decide the status of a series. In the econometric model, Y is the dependent and X is an independent variable and k represents the break date in a data series.

This research uses the Fully Modified Ordinary Least Squared (FMOLS) method developed by Phillips and Hansen (1990) to inspect the impact of exchange rate and oil price on non-oil Real GDP in Azerbaijan. The general form of regression model can be defined as supports:

$$\text{NoilRGDP} = \beta_0 + \beta_1 \text{ Ln (USD/AZN)} + \beta_2 \text{ Ln (OilPrice)} + \varepsilon_t \quad (6)$$

where ε_t denotes an error term and β_0 denotes to the intercept. The NoilRGDP is the dependent variable and Ln(USD/AZN) and Ln(OilPrice) are used as independent variables. The FMOLS is an expanded version of Ordinary Least Squares (OLS) to offer more specific results and efficiency in some features. The adjustments in the OLS can be used to determine the essential empirical effects of this new version. The FMOLS utilizes the standard Wald test based on an asymptotic Chi-square statistical interpretation. Commonly, this method gets endogeneity and serial correlation into respect. It offers more options for researchers to discover the differences between both techniques as it suggests unbiased estimators of co-integrating regression models with a single equation.

4. DISCUSSION

4.1. Decsriptive Statistics

Before starting analysis of the relationship between real non-oil GDP growth, nominal oil price and nominal exchange rate of USD/AZN it is essential to understand descriptive features of the datas in order to interpret them properly. Descriptive statistics about the data was given in Table 1.

Table 1 shows descriptive statistics about variables and is calculated the average increase in NoilRGDP of Azerbaijan is 6.2% (106.02), the average oil price is 76.402 USD and the USD/AZN exchange rate is 1.067 USD/AZN. Although the highest NoilRGDP increase in Azerbaijan during the period 2005m01-2019m12 was about 16.3% (106.022), it was experienced a 7% (93.000) decrease in some periods. Despite the highest price of oil was around 132.7 USD, the lowest price was observed as 30.7 USD. Although the highest price of USD/AZN was determined as 1.818, its lowest price went down to 0.78 between 2005 and 2019 years. OilPrice is the highest standard deviation among the variables (Std. Dev. =24.953), and the least is the USD/AZN exchange rate (Std. Dev. =0.378).

4.2. Stationarity and Unit-Root Test Results

Stasionarity of the relevant variables should be tested before determining the long-term relationship between the variables. If the variables are cointegrated of same order, then long-term relation regression model is not superios and possible to interpret the model. To compare with Ziwot and Andrews (1992) unit root tests, ADF (Dickey and Fuller, 1979) and Phillips and Perron (1988) tests from traditional time series unit root tests were applied to dataset and the results are presented in Table 2.

Table 1: Descriptive statistics

Statistics	NoRGDP	Oil price	USD/AZN
Mean	106.022	76.402	1.067
Median	106.800	70.905	0.854
Maximum	116.300	132.720	1.818
Minimum	93.000	30.700	0.784
Std. Dev.	4.703	24.953	0.378
Skewness	-0.622	0.413	0.974
Kurtosis	3.650	1.961	2.097

Table 2 shows the unit-root test results of the related series with the help of ADF and Phillips-Perron (PP) tests. Table 2 shows the test values and prob. values of ADF and PP unit root tests for the constant and constant + trend model and to choose the maximum lag of the regression. According to the ADF and PP unit root test results of all variables, do not reject the I(0) null hypothesis at the 5% level. Therefore, it is possible that the average and trend of NoilRGDP, Ln(OilPrice) and Ln(USD/AZN) series depending on time and these series follow random walk process. But when the first difference of the series follows white-noise process and reject the I (1) null hypothesis at the 1% level (prob. <0.01). Consequently, variables in the analysis had unit root at the level and were stationary at I(1).

The choice of unknown structural break unit root tests avoids the false rejection problem caused by unit root tests (Perron test) that allow ADF type structural breaks. Ziwot-Andrews (ZA) test stated that if there is one break in the series examined, the strength of the test may decrease. For ZA unit root test, we used Model A, allowing for a break in the level, and model C, allowing for a break in both level and trend. Results for model A and model C are given in Table 3.

The results of the ZA unit root test, which determines the structural change, are given in Table 3. In the ZA test, the null hypothesis for model A was "H_0: Series has a unit root with a structural break in intercept" and hypothesis is 10% significance level for the NoilRGDP series, 5% significance level for the Ln(OilPrice) series and 1% significance level for Ln (USD/AZN) series, null hypothesis is rejected. As a result, we can be said that the break dates of 2015m08, 2014m10 and 2015m02, which was found respectively for the series, was statistical significant and when these break dates into to model for dummy variable, the series

Table 2: ADF and PP unit root test results

Model	NoilRGDP		Ln (Oil price)		Ln (USD/AZN)	
	t-stat	Prob.	t-stat	Prob.	t-stat	Prob.
ADF						
Constant	−2.572	0.110	−2.745	0.069	−1.388	0.587
Constant+trend	−3.195	0.088	−2.844	0.184	−2.384	0.386
PP						
Constant	−2.483	0.121	−2.257	0.106	0.123	0.966
Constant+trend	−3.248	0.079	−2.638	0.264	-1.614	0.784
Model	**D (NoilRGDP)**		**DLn (Oil price)**		**DLn (USD/AZN)**	
	t-stat	**Prob.**	**t-stat**	**Prob.**	**t-stat**	**Prob.**
ADF						
Constant	−15.599	<0.01	−9.554	<0.01	−8.963	<0.01
Constant+trend	−15.554	<0.01	−9.548	<0.01	−8.957	<0.01
PP						
Constant	−15.660	<0.01	−9.572	<0.01	−8.673	<0.01
Constant+trend	−15.613	<0.01	−9.568	<0.01	−8.680	<0.01

Maximum number of lags is 12 and choosing maximum lag criteria is SCH. Using Bartlett kernel spectral estimation method for PP test and Bandwidth method is Newey-West

Table 3. Zivot-Andrews structral break unit-root test results

Series	Model A				Model C			
	k	TB	ZA test stat.	cv %1, %5, %10	k	TB	ZA test stat.	c.v %1, %5, %10
NoilRGDP	5	2015m08	−4.610*	−5.34	5	2015m08	−4.784*	−5.57
Ln (OilPrice)	1	2014m10	−4.935**	−4.93	1	2014m10	−4.773*	−5.08
Ln (USD/AZN)	2	2015m02	−8.527***	−4.58	2	2015m02	−5.678***	−4.08

k-optimal lag length, TB-estimated break date, ZA test stat - test statistics of ZA unit-root test. Critical values for test statistics was taken from Zivot and Andrews (1992). *%10; **%5; ***%1 is significance level

Table 4: Cointegration test results

k	Test statistics	Break Date	Test-values	c.v at 1%	c.v at 5%	c.v at 10%
Model A						
0	ADF	2009m01	−4.99**	−5.44	−4.92	−4.69
	Z_t	2009m01	−4.71**			
	Za	2009m01	−47.24**	−57.01	−46.98	−42.49
Model C						
0	ADF	2009m01	−5.43	−5.97	−5.50	−5.23
	Z_t	2009m01	−5.16			
	Za	2009m01	−46.36	−68.21	−58.33	−52.85

Lag lengths (k) are selected according to the t ratio for the GH ADF test. Critical values for the G–H tests are from Gregory and Hansen (1996a, 1996b).*%10; **%5; ***%1 significance level

Table 5: FMOLS cointegration model with level shift

NoilRGDP=f(LnOilPrice$^+$, LnUSD/AZN)	Coef.	Newey-West Std. Error	t. stat	Prob.
constant	83.973	5.617	14.950	<0.01
Ln(OilPrice)	5.840	1.339	4.362	<0.01
Ln(USD/AZN)	−5.045	1.439	−3.505	<0.01
$BT_{2009m01}$	−3.994	0.863	−4.627	<0.01

R^2=0.639. FMOLS: Fully modified ordinary least squared

has not unit root in I(0) level, so these series were stasionar with intercept break.

In the ZA test, the null hypothesis for model C was "H_0: Series has a unit root with a structural break in intercept and slope" and hypothesis is 10% significance level for the NoilRGDP series, 10% significance level for the Ln(OilPrice) series and 1% significance level for Ln (USD/AZN) series, null hypothesis is rejected. As a result, we can be said that the break dates were statistical significant and the series has not unit root in I(0) level, so these series were stasionar with intercept and slope breaks.

4.3. GH Structural Break Cointegration Test

In order to determine the cointegration relationship between variables, variables need to stationarity at the same level. The NoilRGDP, Ln (OilPrice) and Ln (USD/AZN) series can be said to be stationary (Table 3) at the same level – I (0). If the series were stationary with structural break, cointegration tests as Engle and Granger (1987) and Johansen (1991) Cointegration test would not give reliable test results. In this paper, the most used Gregory and Hansen (1996b) Cointegration test, which considers one unknown structural break, is used. GH structural break cointegration test results are given in Table 4.

Table 3 shows the results of both GH one structural break cointegration tests for Non-Oil RGDP growth of Azerbaijan. According to the GH cointegration test results, for the level shift model (Model A) the null of no cointegration is rejected at the 5% significance level by ADF, Zt and Zα tests. The results for the regime shift model (Model C) the null of no cointegration is not rejected by the ADF, Zt and Zα tests. Overall, the results in Table 4 offer favourable evidence for cointegration under structural change in level.

The estimated FMOLS cointegration model with a structural break for non-oil GDP growth of Azerbaijan are reported in Table 4.

Table 5 shows that FMOLS cointegration model with level shift and the mean of real non-oil GDP growth (NoilRGDP) of Azerbaijan is 83.973 before structural change time (2009m1), the growth mean decrease by −3.994 after structural change, Constant of model and structural break in level are statistical significant at %1 (prob. <0.01). 1% increase in oil price increases real non-oil GDP growth of Azerbaijan by 0.0584% (5.840/100), and vice versa, 1% increase in USD/AZN exchange rate reduces it by 0.0504 (5.045/100). Independent variables are statistically significant at 1% (prob. <0.01). Standard Error is Newey-West robust standard error. Goodness-of-Fit of model is about 64% (R^2 = 0.639). This value indicates that 64% of the variance in NoilRGDP can be predicted from the variables Ln(USD/AZN) and Ln(OilPrice).

5. CONCLUSION

In the literature, there are a lot of studies on the impact of oil prices and exchange rate volatility on GDP of countries that import and export oil. On the other hand, in this context, there is a lack of literature in studies conducted specifically on the Azerbaijani economy. Moreover, if we consider that this research focuses on the non-oil sector, the research results provide important information for the economies of oil-dependent countries. Namely, the results will play an important role in the future economic policies for countries that want to reduce the dependence on oil and support the non-oil sector.

As mentioned above the main purpose of the study is to investigate whether and how nominal oil price and nominal exchange rate of USD/AZN affect real non-oil GDP growth of Azerbaijan. In order to answer this question, we use Fully Modified Ordinary Smallest Square approach between 2005 and 2019. ZA unit root test is applied to deal with structural breaks in data and the GH test for robustness. Thus, conventional unit-root tests conclude that the series are not stationary at their level, the ZA test determination that the series is stationary with structural break. According to the GH test result, the long-run relationship between real non-oil GDP growth and oil price and the exchange rate of USD/AZN at the beginning of 2009 has a structural break date. The incidence of unit root in the data and its removal offers the basic platform to use the FMOLS. For this reason, NoilRGDP is the dependent variable including some independent variables to validate the impact of USD/AZN exchange rate and Oil price on Real Non-oil RGDP growth of Azerbaijan. The results indicate that oil price is a significant contributor of Non-oil RGDP as the Oil price coefficient is positive and significant for Azerbaijan. The coefficient of USD/AZN exchange rate a negative association with Non-oil RGDP showing that exchange rate has significant effect on Non-oil RGDP in Azerbaijan.

We have two different recommendations for those who are thinking about conducting research on this topic in the future; (1) To improve the research by using the panel data analysis method to examine the effects of oil prices on the non-oil sectors of other oil-rich countries, (2) To further develop the model used in the research by including other factors that are possible determinants of the non-oil sector of Azerbaijan.

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