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EVALUATION OF FISCAL POLICY IMPACT ON ECONOMIC GROWTH: THE CASE OF AZERBAIJAN

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ABSTRACT

This research investigates the impact of fiscal policy on non-oil economic growth in case of Azerbaijan. Authors apply Johansen Cointegration test and Vector Error Correction Model (VECM) over the period of 2000Q1-2017Q3 for estimating impact of budget revenues and expenditures on non-oil economic growth. Our results suggest that there is negative impact of budget revenues on GDP. However, Positive relationship was found between budget expenditures and GDP. Results coincide with findings obtained from other researches and can be used for different purposes by researchers and policy-makers.

Key words: Fiscal policy, budget revenues, budget expenditures, Johansen cointegration test, Vector Error Correction Model (VECM)

1. Introduction

Impact of fiscal policy and its components including government revenues and expenditure is researched by vast of researches. However, despite of high number of such studies findings are controversial. In other words there is no theoretical and empirical consensus on the impact of fiscal policy on economic growth. For example, while Easterly and Rebelo (1993), Lindh and Ohlsson (1997), Gemmell, Kneller and Sanz (2011) found weak or non-robust link between fiscal policy and economic growth, scholars such as Bose, Osborn and Emranul (2007), Agenor (2010) Wu, Tang and Lin (2010) detected vice-versa relationship between fiscal policy and economic growth.

Azerbaijan as a post-Soviet country which regained its independence in 1991 faced with hard economic circumstances during the first years of independence as a result of transition from central planned system to market economy. Though all the negatives, country could enter the development period with the support of oil revenues after 1994. This process especially accelerated after 2005 with the launch of oil boom period which lasted until the ends of 2014. After this period by the decline of oil price in international markets country Azerbaijan government directed all his efforts to develop the non-oil sector. As a result, characteristics of fiscal policy also changed towards to support non-oil economic growth.

As it noted above, relationship between fiscal policy components and non-oil economic growth in Azerbaijan gained popularity especially by the launch of post-oil period. It is not surprising that most part of the existing researches on this topic were done after 2014. Regardless to research methods and ways almost all investigations found positive impact of fiscal policy on economic growth for case of Azerbaijan. Authors such as Bashirli and Sabiroglu (2013), Aliyev, Dehning and Nadirov (2016), Aliyev and Mikayilov (2016), Aliyev and Nadirov (2016), Hasanov, Mikayilov, Yusifov and Aliyev (2016), Hasanov, Mammadovand Al-Musehel (2018), Abbasov and Aliyev (2018), Mukhtarov and Rustamov (2018) investigated the link between fiscal policy and economic growth from different perspectives with various empirical approaches.

This research analyzes the impact of fiscal policy on economic growth for case of Azerbaian by using Vector Error Correction Model over the period of 2000Q1-2017Q3. For determining the cointegration relationship between variables Johansen cointegration method was employed. In the research fiscal policy is represented by budget revenues and budget expenditures, while economic growth is measured by non-oil GDP.

We are testing two hypotheses in this research: 1) Budget expenditures positively impact the non-oil economic growth, 2)Budget revenues negatively impact the non-oil economic growth in Azerbaijan.

The rest of the paper is organized as follows: Section 2 reviews the literature on the relationship between fiscal policy and economic growth. Section 3 covers the information about data and methodology. Obtained results and discussions are given at section 4. Section 5 presents the conclusions.

2. Literature Review

Impact of fiscal policy on economic growth in countries with different characteristics had been focused by vast of researches with conflicting results. Paper by Ding, McQuoid and Karayalcin(2018) investigated the relationship between fiscal decentralization, fiscal reform and economic growth for case of China empirically. According to results, new Tax Sharing System

positively impacted the economic outcomes in China. Another paper revealing weak, but positive relationship between fiscal policies and economic growth is presented by Nijkamp and Poot(2004) on the sample of 93 published studies with 123 meta-observations by using several meta-analysis tools. Another research, obtained similar results was presented by Alfonso and Jalles in the case of 155 countries covering the time period 1970-2010 (Alfonso and Jalles, 2014). Main feature of the research by Yushkov (2015) in case of Russia for 2005-2012 period is that it was investigated the relationship between fiscal policy and economic growth for the sample of regions and obtained binary outcome. It was found out that there is positive link between fiscal transfers and economic growth, while negative relationship between excessive expenditure and economic growth.

Relationship between government expenditure as one of the main components of fiscal policy and economic growth is also investigated separately by number of scholars for sample of various countries. Paper by Saez, Alvarez-Garcia and Rodriguez (2017) found no clear link between government expenditures and economic growth in European Union countries for time period 1994-2012 by using regression and panel techniques. Differently from above mentioned authors Lupu and Asandului (2017) traced out positive impact of public spending on economic growth for 8 Eastern-European countries within time period 1995-2014 by using ARDL model. This result also was supported by Chan, Ramly, and Zaini (2017).As a result, it became clear that government spending efficiency promotes economic growth in 115 sample countries. Similar outcome also was obtained by Katrakilidis and Tsaliki (2009) for case of Greece in 1958-2004 time period by using Wagner's law and Keynesian hypothesis.

Not only developed countries, but also developing states were on center of attention by scholars in terms of relationship between public expenditure and economic growth. For example, paper by Quy (2009) investigates the role of public expenditures in economic growth at a provincial level in case of Vietnam during the 2013-2015 time periods. Results reveal that there is direct and proportional relationship between government expenditure and GDP growth. More precisely, positive link between development investment and economic growth was found.

Resource rich countries as objects with special characteristics are also on center of attention in terms of relationship between government expenditure and economic growth. It is known that, GDP growth can be negatively influenced from determinants of fiscal policy in countries which are vulnerable to Dutch disease. From this point of view, it is not surprising to detect negative relationship between fiscal policy variables and economic growth for this type of countries. Paper by Babatunde (2018) covering the time period 1980-2016 for case of Nigeria also proves this fact. According to found outcomes, there is negative link between spending on agriculture, natural resources infrastructure and economic growth. Inverse relationship was determined for case of expenditures on transport and communication, education and health sectors. Kuwait as another resource abundant country was investigated by Merza and Alhasan (2016). According to results there is only causal relationship between development expenditures and economic growth.

Because Azerbaijan is the main focus of the paper it is necessary to review the researches on impact of fiscal policy on economic growth in the case of Azerbaijan. Though there is vast of investigations on fiscal policy in Azerbaijan, but number of researches studying the impact of fiscal policy and its components separately on economic growth is limited. It should be also noted that number of such papers especially increased after the end of oil boom period in Azerbaijan in 2014. Another important fact is that, most part of the investigations generally focused on impact of fiscal policy on non-oil economic growth.

Paper by Bashirli and Sabiroglu (2013) tested the Wagner's law in case of Azerbaijan by using bound testing approach and autoregressive distributed lag techniques. According to research results validity of Wagner's law in Azerbaijan economy was supported. Additionally, short and long run causality between public expenditure and economic growth was found.

Wagner's law also was applied by Abbasov and Aliyev (2018) for case of 9 post-Soviet countries –Estonia, Latvia, Lithuania, Uzbekistan, Azerbaijan, Georgia, Kyrgyz Republic, Moldova and Ukraine. Differently from Bashirli and Sabiroglu authors also tested the Keynesian hypothesis for case of above mentioned countries by using short and long run causality and ARDL approach. Results support the validity of Wagner's law for Latvia, Lithuania, Uzbekistan, Georgia, Kyrgyz Republic and Ukraine and Keynesian hypothesis for Estonia, Uzbekistan, Azerbaijan, Kyrgyz Republic and Moldova in the long run. In addition, it was found that there is short-run causality in all countries, excluding Lithuania and Kyrgyz Republic in the short run.

Hasanov, Mammadov and Al-Musehel (2018) analyzed the fiscal policy effects on non-oil economic growth in Azerbaijan. For obtaining robust results they benefited from number of tests and estimation methods. Empirical findings reveal significant positive effect of fiscal policy on non-oil sector in short run and as well as in long run.

Similar results also were obtained by Aliyev and Nadirov (2016). By using ARDLBT method for quarterly period of 2000-2015 authors found statistically significant long-run effects of budget expenditures and tax-related budget revenues. On the contrary, short-run effects don't support the theoretical expectations.

Another research authored by Hasanov, Mikayilov, Yusifov and Aliyev (2016) was focused on the relationship between fiscal decentralization on non-oil economic growth in Azerbaijan. By using Autoregressive Distributed Lag Bounds Testing approach for the quarterly period of 2002-2013 authors found negative relationship between share of local expenditures and revenues in total and non-oil GDP.

Aliyev, Dehning and Nadirov(2016) analyzed the impact of public expenditures and tax revenues on non-oil growth in Azerbaijan for the quarterly period of 2000-2015 by employing OLS, ARDL, FMOLS, DOLS, CCR and Granger Causality techniques. According to empirical findings there is significant positive link between public expenditure and non-oil sector growth. Additionally, it was traced out that tax revenues slow down the non-oil economic growth in the long run.

In another research Aliyev with Mikayilov (2016) investigated the role of budget expenditure composition over the non-oil economic growth in Azerbaijan by employing ARDLBT method for the quarterly period of 2000-2014. Differently from above mentioned papers authors divided the public spending into groups such as capital, social and other expenditures. Empirical results reveal that there is long-run relationship between variables. Moreover, it was traced out insignificant negative impact of capital expenditures and significant negative impact of other expenditures over non-oil economic growth. Differently from other group of expenditures social spending has significant positive impact on dependent variable.

For summarizing the results of above mentioned studies, we can conclude that research results generally coincide with each-other indicating that there is positive relationship between fiscal policy and non-oil sector economic growth.

3. Data and Methodology

We use quarterly data for the period 2000Q1-2017Q3 for empirical analysis. All data set have been taken from CBAR (https://www.cbar.az/) and The State Statistical Committee of the Republic of Azerbaijan (https://www.stat.gov.az/).Economic growth (RNGDP) is measured by the real non-oil GDP. Real non-oil GDP is inflation adjusted sum of the value added, measured in million manat which was produced in the economy excluding the oil sector. Moreover, this paper considers uses Real budget expenditures (RBE) and Real non-transfer budget revenues (RNTBR) as a proxy for tools of fiscal policy.Real budget expenditures (RBE) is sum of total government expenditures from the central budget, adjusted for inflation, and measured in millions of manat. Real non-transfer budget revenues are the sum of budget revenues out of direct transfers from the SOFAZ. From SOFAZ quarterly statements, quarterly direct transfers to the state budget was obtained and subtracted from quarterly total budget revenues, and adjusted for inflation. All the variables have been transformed into natural logarithmic form for consistent and reliable empirical results.

We analyze impact of fiscal policyon economic growthusingthe cointegration and vector error correction modeling framework in this study. First, we will check non-stationarity characteristics of variables. We will use the Augmented Dickey Fuller unit root test for this exercise (Dickey and Fuller, 1981). Since this test is widely used one, we do not describe it here. Interested readers can refer to Dickey and Fuller (1981) inter alia.

Second, if the orders of integration of the variables are the same, then we will check whether they are cointegrated using a cointegration test. In order to be on the safe side, we will follow the latter option and hence, use the Johansen test (Johansen, 1995) as it is the only test can produce proper results in the case where more than two variables are tested for cointegration. If between variables does exist one cointegration, the first-best solution would be using VECM model. After confirming the presence of cointegration between the variables, we will apply the VECM method. Since VECM is widely used model in the applied work, we will not explain it here. Interested readers can refer to Johansen (1988) and Johansen and Juselius (1990), inter alia.

4. Empirical Results and Discussion

The first step in testing hypotheses is to test variables for the presence of unit root. For this purpose, we used Augmented Dickey-Fuler (ADF) unit root test. Results of unit root testing are presented in Table 1. We found that the variables are non-stationary at their levels but they arestationary at first difference, being integrated of order one, *I(1).* We thus conclude that our variables are non-stationary in levels but stationary in their first differences. In other words, they follow integrated of order one, I(1), processes. Our conclusion that the variables are I(1) allows us to proceed to the cointegration test.

Table 1: Results of unit root tests

Variable	Panel A: Level		Panel B: 1st difference		Result
	k	Actual value	*K*	Actual value	
RNGDP	4	-0.627435	3	-4.983307***	I(1)
RBE	4	-1.228809	3	-4.933360***	I(1)
RNTBR	4	-1.488879	3	-3.589721***	I(1)

Notes: Maximum lag order is set to four and optimal lag order (k) is selected based on Schwarz criterion in the ADF test; *, ** and *** accordingly indicates rejection of null hypothesis at 10%, 5% and 1% significance levels; critical values are taken from the table prepared by MacKinnonun (1996). Time period: 2000Q1-2017Q3.

To apply the Johansen procedure, the optimal lag number should first be chosen. A Vector Auto Regressive (VAR) model was initially specified with the endogenous variables of *NGDP*, *RBE*and*NTBR*, and exogenous variables of oil price[2].The details of this test were presented in table 2. The lag selection criteria and lag exclusion tests statistics propose that a lag of order four is optimal.

Table 2: Lag Interval Tests

		Information Criteria				
Lag	LogL	LR	FPE	AIC	SC	HQ
0	37.23713	NA	0.00009	-1.811065	-0.383870	-0.629193
1	78.95409	74.30833	0.00003	-1.801007	-1.102682	-1.531997
2	87.63222	14.64434	0.00003	-2.047571	-0.789030	-1.402338
3	104.5223	26.91851	0.00002	-3.02249*	-0.732001	-1.529301
4	144.7198	60.29633*	0.00001	-0.788660	-1.403332*	-2.384624*

Note: LR: sequential modified LR test statistic (each test at 5% level). FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion. * indicates lag order selected by the criterion

Panels A through D in Table 3 report that the VAR has good properties as it is stable, its residuals have no issues with serial correlation and heteroscedasticity problem and residuals are normally distributed.The Johansen cointegration test results from the transposed version of the VAR, which is the VECM with 3 lag, are presented in Panels E and F of Table 3.

Table 3: VAR residual diagnostics, stability and cointegration tests results

Panel A: Serial Correlation LM Test [a]

Lags	LM-Statistic	P-value
1	10.2911	0.327
2	10.1504	0.338
3	10.3190	0.325
4	13.5309	0.140

Panel B: ,Normality Test [b]

Statistic	χ^2	d.f.	P-value
Jarque-Bera	8.5107	6	0.203

Panel C: Heteroscedasticity Test [c]

White Statistc	χ^2	d.f.	P-value
	187.68	174	0.226

Panel D: Stability Test [d]

Modulus	Root
0.8305	0.8039 - 0.2087i
0.8305	0.8039 + 0.2087i
0.7880	0.0972 - 0.7820i
0.7880	0.0972 + 0.7820i

Panel E: Johansen CointegrationRank Test (Trace)

Null hiphthesis	Eigenvalue	Trace statistics	0.05 Criticial value	P-value
None *	0.3793	52.438	42.915	0.0043
At most 1	0.2149	22.392	25.872	0.1277
At most 2	0.1072	7.1465	12.517	0.3295

Panel F: Johansen CointegrationRank Test (Maximum Eigenvalue)

Null hypothesis:	Eigenvalue	Max-Eigen Statistic	0.05 Criticial value	P-value
None *	0.3793	30.045	25.823	0.0130
At most 1	0.2149	15.246	19.387	0.1806
At most 2	0.1072	7.1465	12.517	0.3295

Notes: [a] The null hypothesis in the Serial Correlation LM Test is that there is no serial correlation at lag of order h of the residuals; [b] The Normality Test is the Urzua (1997) system normality test with the null hypothesis of the residuals are multivariate normal;

[c] The White Heteroscedasticity Test takes the null hypothesis of no cross terms heteroscedasticity in the residuals; [d] VAR stability test results show that no roots of characteristic polynomial are outside the unit circle; χ^2 is the Chi-square distribution; d.f. stands for degree of freedom.

[2] *Oil price is the quarterly world average price of one barrel oil taken from index mundi database. Originally, the data is monthly which was converted to quarterly frequency by using simple average method.*

Both the trace and the max-eigenvalue test statistics indicate one cointegration relationship among the variables. Therefore, we conclude that there is a cointegrating relationship among the variables.Finally, we estimate numerical values of the long-run relationship between energy consumption, income and financial development using VECM method. VECM results are reported in Table 4.

Table 4: Long-run coefficients from the VECM method

Regressor	Coef.	Std. Er.	t-statistics
RBE	0.535***	0.046	-11.557
RNTBR	-0.157**	0.054	2.864
Panel B: Residuals diagnostics tests results and Speed of Adjustment Coefficient			
SoA	-0.7114[0.006]		
LM_{SC}	5.4399 [0.794]		
χ^2_{HETR}	187.65[0.452]		
JB_N	6.5015[0.369]		

Notes: Dependent variable is EC_t; Coef. and Std. Er. denote coefficient and standard error; *, ** and *** indicate significance levels at 10%, 5% and 1%; Probabilities are in brackets; SoA = Speed of adjustment; LM_{SC} = Lagrange multiplier statistic of serial correlation test; χ^2_{HETR} = Chi-squared statistic for heteroscedasticity test; JB_N = Jarque-Bera statistic for testing normality; In VECM, Jarque-Bera statistic was taken from the option of Orthogonalization: Residual Correlation (Doornik-Hansen).

As it can be seen from the Table 4 the long-run coefficients from the VECM technique are statistically significant. Additionally, the residuals of the estimated specifications successfully pass the residuals diagnostics tests which are another indication of the robustness of the estimation results.

Table 4 reports the impact of budget expenditure and non-transfer budget revenues on economic growth in long run. We find that RBE has a positive and statistically significant impact at 1% level on economic growth. Results reveal that a 1% increase in budget expenditures increases non-oil GDP amount by 0.54%. On the other side, the theory expects negative relationship between non-transfer budget revenues which are constituted from taxes with the dependent variable. This expectation is also confirmed in our case with non-transfer budget revenues appears to be statistically significant at 5 % level and it is negatively linked with non-oil GDP. This implies a 1% increase in amount of revenues reducesnon-oil GDP by approximately 0.16%.

In addition, Table 4 shows that theerror correction term coefficient (ECT) is negative and statistically significant at the 1% confidence level for Azerbaijan. This value indicates that any deviation from the short-run disequilibrium among the variables is corrected in each period to return to the long-run equilibrium level.

5. Conclusion

The study analyses the impact of fiscal policy (budget revenues and expenditures) on economic growth. After testing variables for unit root, the results showed their stationarity at first differenced form; hence the variables can be tested for common long-run trend. Johansen trace and maximum eigenvalue tests concluded one cointegration relationship among the variables. This implies that there is a long run relationship between economic growth, budget expenditure and non-transfer budget revenues in Azerbaijan. The Johansen VECM is used to estimate the long run relationship among these variables. We also find that budget expenditure, increasenon-oil GDP in Azerbaijan in the long-run. But non-transfer budget revenuesdecreasenon-oil GDP. Thus,1% increase in budget revenueandnon-transfer budget revenues increases and decrease non-oil GDP by 0.54% and 0.16% respectively.

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