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How Fiscal Policy Affects Non-Oil Economic Performance in Azerbaijan?

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Abstract *The role of fiscal policy in promoting economic growth has been subject to many studies since its suggestion by Keynes who stated expansionary/contractionary impact of public expenditures/taxes. In this context, effectiveness of fiscal policy use to develop non-oil sector in resource rich economies should be studied. This paper investigates short- and long-run effects of budget expenditures and tax-related budget revenues (direct transfers from oil fund excluded) over non-oil GDP while controlling for oil price volatility and oil production in case of Azerbaijan. Autoregressive Distributed Lag Bounds Testing (ARDLBT) Approach to co-integration is employed for data covering 2000Q1-2015Q2. Estimation results theoretically consistent and statistically significant long-run effects of both budget expenditures and tax-related budget revenues. However, in the short-run, the effects are contrary to the theoretical expectations. Findings are useful for Azerbaijan fiscal policy makers especially in the current complicated nature of economic processes in the economy due to oil related challenges.*

Key words Fiscal policy, non-oil GDP, budget expenditures, tax revenues, Azerbaijan

JEL Codes: E62

1. Introduction

Despite of economic transition from centrally planned to market economy, the role of governments in economies still maintain its importance to stimulate the economic growth. In the Keynesian economic theory public spending or government purchases is emphasized as crucial to rescue economies in time of observed downward business cycles. Public spending's role in encouraging economic growth has been hot subject in modern studies. As an essential variable, it affects the sustainability of public finances through the influence over fiscal balances and government debt (Afonso and Furceri, 2008). Nevertheless, increasing government size is not always supporting the economic growth as Afonso and Jalles (2011) higher government size decreases the optimal level of private consumption as well as of output per worker, and therefore worsens economic performance. There are vast amount of literature discussing the relationship between the government size and economic performance (Barro, 1991; Tanzi and Zee, 1997; Bajo-Rubio, 2000; Friedman, 1997; Afonso et al., 2005, 2011, among others). Existence of threshold level of government size where after that the effect becomes negative is supported by the empirical studies (Tanzi and Zee, 1997).

Due to the issues such as government inefficiencies, excess burden of taxation, crowding-out effects, distortion of the incentives systems and interventions to free markets, government size may negatively influence economic growth (Afonso *et al*., 2005, 2011) while the effect can be positive because of the development of a legal, administrative and economic infrastructure, beneficial externalities in addition to interventions in order to offset market failures (Ghali, 1998; Dalagamas, 2000). Therefore, allocation and use of budget expenditures, and following optimal tax policy is a matter of discussions which could be joint under fiscal policy of a government.

The studying subject of this research is investigating fiscal policy effectiveness of Azerbaijan government after 2000. Above mentioned factors are added to Azerbaijan's special case of becoming resource rich country which really has been key determinant of budget policy after 2005. Note that after regaining its independence in 1991, the country's economic development historically was separated as recession period (1991-1994), restructuring period (1995-2005), and oil boom period (after 2005) (Aliyev and Suleymanov, 2015). As stated by Sturm *et al.* (2009) and Weykman-Linn and Selm (2002), higher level of natural resource exports accompanied by increased price of natural resources lead to massive foreign reserves inflow causes high fiscal spending behavior in natural resource-based economies.

This article aims to investigate the effectiveness of Azerbaijan's fiscal policy in terms of either expenditure and tax side for the development of non-oil sector of the economy. Employing ARDLBT co-integration approach, it is intended to determine long-run and short-run impact of budget expenditures, and non-transfer budget revenues over non-oil GDP for the period 2000Q1-2015Q2.

2. Literature review

Following Great Depression in 1930s, fiscal policy suggested by Keynes has been actively used by the governments to stimulate the economies. Since several decades ago, relationship between government expenditure and economic growth are studied empirically and has been a subject of debate among scholars (Laudau, 1986; Barro, 1991; Cooray, 2009; Foster and Henrekson, 2001, among others). In this context, two theoretical statements are noteworthy to mention here. One is so called "Wagner's Law" justifies public expenditures as an endogenous factor as an outcome of national income aggregates, not as the cause of economic growth (Henrekson, 1993). Second, public expenditure is treated as exogenous factor could be used for policy purposes in Keynesian propositions (Afonso and Furceri, 2008). More precisely, causality is from national income to public expenditures under Wagner's Law framework while opposite through domestic demand channel within the latter one.

While taking resource rich economies into consideration, it is noteworthy to remember possible negative impacts of injecting resource revenues into the economy through fiscal channels, especially for developing countries such as weak institutional development (Sala-i-Martin and Subramanian, 2003; Gylfason, 2004), Dutch Desease (Krugman, 1987; Auty, 2001a) etc. Studies present lower economic growth in resource-rich countries in comparison with resource-poor ones (Sachs and Warner, 2001; Auty, 2001a, 2001b).

Considering that the biggest source of Azerbaijan's government budget revenues is direct transfers from SOFAZ, it is expected that expansionary fiscal policy throughout the years has not leaded significant tax distortions in non-oil sectors of the economy. However, demand side effect is expected under Keynesian framework. Beyond these two frameworks, Lucas (1988) underlines significant positive impact of public investments in education over long-run economic growth via increasing the human capital. Barro (1990) justifies the role of government public infrastructure expenditure in stimulating economic growth. Romer (1990) emphasizes the importance of research and development (R&D) expenditures.

Empirical studies investigating the effects of public expenditure over economic growth yields conflicting results. Several studies (Landau, 1986; Scully, 1989) supports existence of negative effect to the economic growth while others found positive effect (Ram, 1986), no significant relationship (Kormendi and Meguire, 1985; Diamond, 1989) or different effect based on economic development level (Sattar, 1993). While analyzing the separate effects of public expenditure units, it is concluded that public sector consumption does not stimulate economic growth (Diamond, 1989; Grossman, 1990; Barro, 1991; Easterly and Rebelo, 1993).

Employing OLS to estimate the panel of 43 developing countries for the period 1970-1990, Deverajan *et al.* (1996) reveals positive and statistically significant effect of current expenditures but negative impact of capital expenditures on economic growth. Deverajan *et al.* (1996) interpret these results as "*misallocating public expenditures in favor of capital expenditures at the expense of current expenditures*". However, these are contrary to the findings by Bose et al. (2007). Recently, taking the period 1970s and 1980s, Bose *et al.* (2007) concludes with insignificant effect of the share of government current expenditures in GDP on economic growth for a panel of 30 developing countries while that of government capital expenditures is positive and statistically insignificant.

Taban (2010) applies bounds testing approach and Granger causality test for 1987Q1-2006Q4 data to study impact of government spending on economic growth in case of Turkey, and finds the existence of is a long-run negative association between. While separating government expenditure into general administration and community, and social services in case of Nigeria for the period 1961-2007, Ighodaro and Okiakhi (2010) also concludes negative impact of public expenditure on economic growth. However, Sojoodi *et al.* (2012) finds significant positive impact of investments to telecommunication infrastructure, railways and roads on the economic growth from autoregressive distributed lag (ARDL) model for the period 1985-2008 in case of Iran. For Gulf countries, Fasano and Wang (2001) conclude with ambiguous effects of public spending rise over the non-oil GDP.

Igve *et al.* (2015) examines effects of fiscal variables over economic growth in case of Nigeria for 1970-2012 by using VECM. They conclude with statistically significant and positive impact of both capital expenditure and recurrent expenditure but significant negative effect of income tax over economic growth in the long run.

In case of Azerbaijan, fiscal policy issues are studied in several studies (Koeda and Kramarenko, 2008; Sabiroglu *et al.,* 2011; Bashirli and Sabiroglu, 2013; Hasanov and Alirzayev, 2012; Hasanov, 2013; Aliyev, 2013). However, to our best knowledge there are only a few studies investigates effects of fiscal policy over the economic growth in the non-oil sector.

Hasanov (2013a) investigates the role of budget expenditures in the development of Azerbaijan's non-oil sector by using single equation-based, Autoregressive Distributed Lags BoundsTesting (ADLBT) approach developed by Pesaran *et al.* (2001), and system-based cointegration approach by Johansen (1988) and Johansen and Juselius (1990) for the period 1998Q4-2012Q3 and reveals positive long run impact of budget expenditures as 0.55 in terms of elasticity. Similar finding is obtained in Hasanov and Alirzayev (2012) in case of Azerbaijan for 2001Q1-2012Q4 period. Hasonov (2013b) results in a "spending effect" created by budget expenditures while examining Dutch disease symptoms in Azerbaijan economy. Aliyev (2013) also conclude with existence of significant effect from total public expenditures and/or its components to the economic growth in oil-exporting countries which analyses Azerbaijan as well.

Novelty of this study is that firstly, it takes the latest time period which is accompanied with challenges due to oil price volatility and decrease in amount of oil production. Secondly, the study controls tax-side effect of fiscal policy by including non-transfer budget revenues, and contribution of oil-related factors adding oil prices and oil production variables into the model.

3. Methodology of research

3.1. Data

Used data is quarterly based and covers the period 2000Q1-2015Q2 period. Variables are presented below:
Real non-oil GDP (RGDPN) is inflation adjusted sum of the value added, measured in million manat which was produced in the economy excluding the oil sector. Quarterly data is announced by the Central Bank of Azerbaijan (CBAR) and State Statistical Committee of Azerbaijan. We use the data from the statistical bulletins of CBAR which could be reached online at http://www.cbar.az/pages/publications-researches/statistic-bulletin/.
Real budget expenditures (RBE) is sum of total government expenditures from the central budget, adjusted for inflation, and measured in millions of manat. Quarterly data is obtained from CBAR database.
Real non-transfer budget revenues (RBRN) are the sum of budget revenues out of direct transfers from the SOFAZ. Quarterly total budget revenues is taken from CBAR database. From SOFAZ quarterly statements, quarterly direct transfers to the state budget was obtained and subtracted from quarterly total budget revenues, and adjusted for inflation.
Oil production (OPrn) is the statistics of Azerbaijan's quarterly oil production, thousands barrels per day in average. The data is obtained from Trading Economics database in monthly basis (retrieved from http://www.tradingeconomics.com/azerbaijan/crude-oil-production) and converted to quarterly data.
Oil price (OPrc) 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.
For inflation adjustment, Consumer Price Index (CPI) method is used. Table 1 tabulates descriptive statistics of the variables.

Table 1. Descriptive statistics of the variables

Whole period: 2000Q1-2014Q4						
Variable	Obs. No.	Mean	Maximum	Minimum	Std.Dev.	Sum
RGDPN	62	1730.487	3445.780	515.0000	848.1341	107290.2
REXPEC	62	994.9966	2914.850	141.5800	728.5674	61689.79
RBRN	62	566.8955	985.4600	149.3900	267.6687	35147.52
OPrc	62	64.96968	121.1000	19.30000	31.33389	-
OPrn	62	670.8065	1066.000	274.0000	293.6110	41590.00

Source: Authors' own completion

Based on employed quarterly real data, time profile of the logs of variables is provided in figure 1, below.

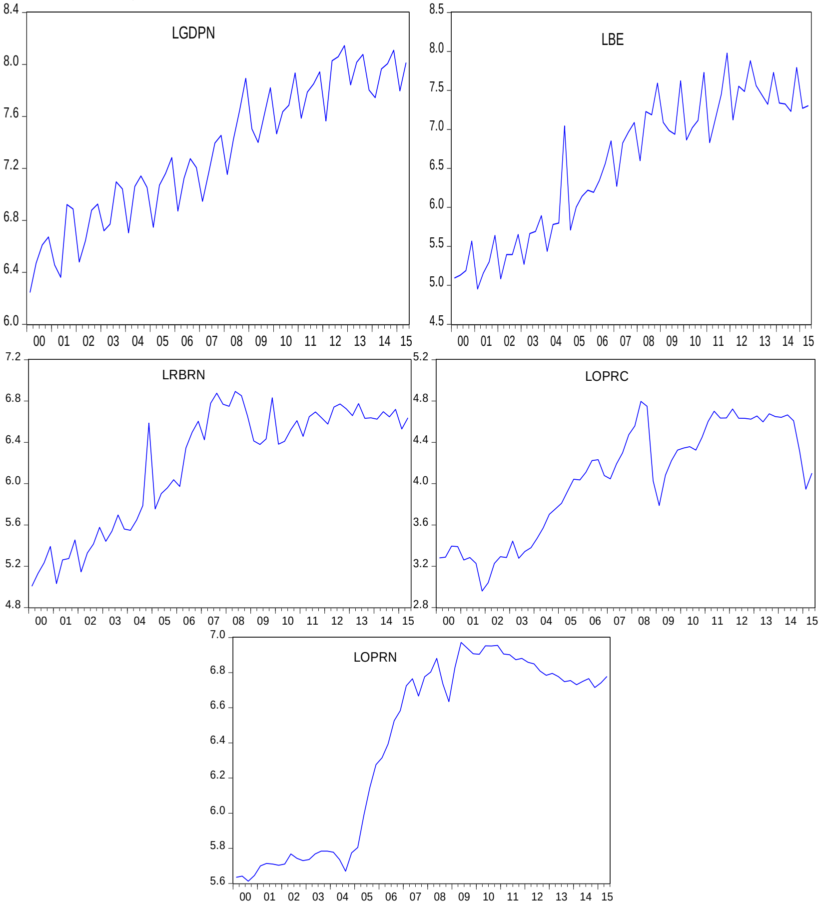

Figure 1. Time profile of the logs of variables

Here, we employ Autoregressive Distributed Lag Bounds Testing (ARDLBT) Approach to co-integration method to estimate long run relationship and short run dynamics between fiscal policy indicators and non-oil GDP. Before conducting the approach, the order of integration of all included variables should be determined by using Augmented Dickey-Fuller (ADF hereafter) unit root tests which tests nonstationarity in a given time series (see Dickey et al. 1981). That is why it is better to overview ADF unit root tests shortly before discussing the methodology of ARDLBT approach to co-integration.

3.2. Unit root test

For a time series variables which is expressed as y, the regression below provides ADF statistics value as the *t*-ratio on b_1.

$$\Delta y_t = b_0 + \psi trend + b_1 y_{t-1} + \sum_{i=1}^{k} \alpha_i \Delta y_{t-i} + \varepsilon_t \quad (1)$$

Here, b_0 is a constant term, and Δ is first difference operator. Number of lags is denoted by *k*. *trend* shows linear time trend while *i* is the lag order. As the last one, ε_t is white noise residuals. Due to space limitation, we do not discuss the test with details.

3.3. Autoregressive Distributed Lag Bounds Testing (ARDLBT) Approach

This method is given in Pesaran *et al.* (2001) as an alternative approach to the co-integration. In comparison with alternatives, ARDLBT approach is preferred due to some advantages such as applicability in small samples easily by using Ordinary Least Squares (OLS) without any endogeneity problem with both I(1) and I(0) series or combination of them, and simultaneously estimating long-run and short-run coefficients (Pesaran *et al.* 2001, Oteng *et al.* 2006, Sulaiman *et al*. 2010). Because of relatively small number of observations, and when ADF unit test results are considered, this approach is more compatible to employ for this research as well. Following stages constitute the application of ARDLBT approach (Pesaran *et al.* 2001):

1. Construction of an Unrestricted ECM.

$$\Delta y_t = c_0 + \theta y_{t-1} + \theta_{yxx} x_{t-1} + \sum_{i=1}^{n} \varpi_i \Delta y_{t-i} + \sum_{i=0}^{n} \varphi_i \Delta x_{t-i} + u_t \quad (2)$$

Here, y is the dependent, and x is the independent variable while *u* represents white noise errors. c_0 denotes the drift coefficient where θ_i represents long-run coefficients, and $\overline{\omega_i}$ and φ_i are short-run coefficients.

2. Testing existence of co-integrating relationship by using Wald-test (or the F-Test) on θ_i the coefficients.

After constructing an Unrestricted ECM, we should test for the null hypothesis of "there is no integration" which is defined as H_0: $\theta_1 = \theta_2 = \ldots = \theta_n = 0$ while the alternative hypothesis is the opposite expression.
Note that we can reject the null hypothesis if the value of computed F-statistic from the sample is higher than the highest level of the critical value under a given significance level. If the value is below than the lowest level of the critical level corresponding to a level of significance, we can fail to reject the null hypothesis. The test results will be inconclusive if computed F-statistic value from the sample is between lowest-and-highest bands of the critical value.
However, F-statistics in the ARDLBT co-integration test have non-standard distribution unlike usual F-statistics. Therefore, researchers should employ the critical values of F-distribution calculated by Pesaran and Pesaran (see: Pesaran *et al.* 1997 or Pesaran *et al*., 2001), not the conventional critical values of F-distribution.
3. If there is co-integrating relationship among the variables, we can estimate/calculate the long-run coefficients.
Note that these coefficients can be calculated from the equation (2) by implementing Bewley transformation (Bewley 1979) which means manually setting $c_0 + \theta y_{t-1} + \theta_{yxx} x_{t-1}$ to zero and finding *y* as:

$$y = -\frac{c_0}{\theta} - \frac{\theta_{yxx}}{\theta} x + u \quad (3)$$

4. Testing stability of the co-integration relationship.
In order to test the stability of co-integration relationship, we can calculate long-run residuals from the equation (3) and employ it in the equation (2) while removing level variables and related coefficients:

$$\Delta y_t = c_0 + \sum_{i=1}^{n} \varpi_i \Delta y_{t-i} + \sum_{i=0}^{n} \varphi_i \Delta x_{t-i} + \gamma\, ecm_{t-1} + u_t \quad (4)$$

Where

$$ecm_t = y_t - \frac{c_0}{-\theta} - \frac{\theta_{yxx}}{-\theta} x_t \quad (5)$$

If the value of γ is between -1 and zero which is also statistically significant then the inference is in the favor of stability of the co-integration relationship. In other words, stability implies temporariness characteristics of the short run deviations from the long-run equilibrium path which correct towards the latter one.

3.4. Small Sample Bias Correction in ARDLBT Approach

Existing literature includes different views related to the validity of critical values of F-distribution in the cases of small and large size samples. Despite of calculation of the upper and lower critical values of F-distribution by Pesaran and Pesaran (1997) by employing sample sizes of 500 and 1000 even 20 000 and 40 000 replications respectively, these values are challenged to be applicable for small sample sizes in Narayan (2005). Narayan (2004, 2005) argues that critical values by Pesaran and Pesaran (1997) are not for small sample sizes. In order to justify his argument, Narayan has compared his own critical values on 31 observations with the critical values in Pesaran *et al.* (2001), with four regressors and at the 5% level of significance. The results supported Narayan's argument. That is why critical values in Narayan (2005) will be also employed in our ARDLBT co-integration test in order to avoid the issues due to relatively small sample size.

4. Empirical estimations

4.1. Unit root test results

Table 1 reports ADF unit root tests results with-and-without trend. Test results reveal that variables are always I (1) without including the trend. However, RGDPN, RBRN, and OPrc are I(0) when the trend is added to the regression. Because ARDLBT approach can be estimated by using combination of I(0) and I(1) variables, we can proceed the analysis to the next estimation stage.

Table 1. ADF unit root test results

Variables	Intercept		Trend and intercept	
	I (0)	I (1)	I (0)	I (1)
Non-oil GDP (RGDPN)	-0.04	-13.17***	-7.78***	-13.07***
Budget expenditures (RBE)	-0.71	-16.33***	-1.25	-16.20***
Non-transfer budget revenues (RBRN)	1.69	-10.83***	-3.313*	10.79***
Oil prices (OPrc)	-1.51	-6.99***	-3.65**	7.00***
Oil production (OPrn)	-1.14	-6.41***	-0.81	-6.53***

*Note: *, ** and *** denote significance level of 10%, 5%, and 1% levels, respectively. Lag length is defined automatically based on Schwarz information criteria (SIC) of 10 maximum lags. P-values are one-sided MacKinnon (1996) values.*

4.2. The Results from the ARDLBT Approach

In this research, we have four independent variables. Note that we coded non-oil GDP, budget expenditures, non-transfer revenues, oil prices, and oil production as

RGDPN, RBE, RBRN, OPrc, and OPrn, respectively. Therefore, equation (2) is modified below in this case:

$$\Delta y_t = c_0 + \theta y_{t-1} + \theta_{yx} x_{t-1} + \theta_{y\delta}\delta_{t-1} + \theta_{y\vartheta}\vartheta_{t-1} + \theta_{y\kappa}\kappa_{t-1} + \sum_{i=1}^{n}\alpha_i \Delta y_{t-i} + \sum_{i=0}^{n}\beta_i \Delta x_{t-i} + \sum_{i=1}^{n}\gamma_i \Delta\delta_{t-i} + \sum_{i=1}^{n}\pi_i \Delta\vartheta_{t-i} + \sum_{i=1}^{n}\phi_i \Delta\kappa_{t-i} + \omega_1 D1 + \omega_2 D2 + \omega_3 SEAS(1) + u_t \quad (6)$$

Where, y_t - Non-oil GDP (RGDPN), x_t - Budget Expenditures (RBE), δ_t -non-transfer budget revenues (RBRN), ϑ_t - Oil Prices (OPrc), and k_t Oil Production (OPrn). D1, and D2 are dummies used to control outliers in the dependent variable. SEAS(1) controls seasonality effect of winter term.

Table 2. Statistics for choosing optimal lag size for ARDL

k	AIC	SBC	X^2_{SC} (1)	X^2_{SC} (4)
0	-0.724726	-0.482495	1.490354 [0.2276]	4.014914 [0.0067]
1*	**-0.848790**	**-0.429921**	**1.246771 [0.2698]**	**0.723829 [0.5804]**
2	-0.752558	-0.153945	11.23955 [0.0017]	2.979970 [0.0310]
3	-1.210648	-0.429101	1.164870 [0.2878]	4.792520 [0.0038]
4	-1.184415	-0.216654	7.711524 [0.0095]	5.938564 [0.0016]

Note: k is a lag order while AIC and SBC are Akaike and Schwarz information criteria respectively. X^2_{SC} (1) and X^2_{SC} (4) are LM statistics for testing no residual serial correlation against lag orders 1 and 4 respectively. Probabilities are in brackets.

At first stage, we should determine optimal lag length which will result minimum value for the lag selection information criteria with non-correlated residuals. For this purpose, equation (6) is estimated with different lag lengths ranging from zero to four. Table 2 provides the results of optimal lag search process.

From the table 2, it may be easily seen that only lag order of one can be preferred. Thus, remaining models suffer the problem of serial correlation of residuals at lag orders one or four, or in both cases. Because our data is quarterly, it is important not to have serial correlation problem at lag orders one and four. Therefore, lag order of one is optimal to estimate the equation (6). Following table provide estimation results and diagnostics test statistics.

Residuals diagnostics test results reported in Panel B show that the estimated specifications do not suffer from serial correlation, heteroskedasticity, non-normal distribution of the residuals and functional form misspecification problem.

Table 3. ARDL Specification and Residuals Diagnostics tests results

Panel B: The estimated final ARDL Specification			
	Coefficient	Standard Error	p-values
$lrgdpn_{t-1}$	-0.534220	0.144214	**0.0006**
$lrbe_{t-1}$	0.292034	0.136430	**0.0376**
$lrbrn_{t-1}$	-0.237820	0.122262	**0.0579**
$loprc_{t-1}$	0.154078	0.096719	**0.1180**
$loprn_{t-1}$	0.089059	0.096140	0.3591
$\Delta lrgdpn_{t-1}$	-0.088286	0.125256	0.4845
$\Delta lrbe_{t-1}$	-0.098726	0.103078	0.3432
$\Delta lrbrn_{t-1}$	0.224484	0.138161	**0.1110**
$\Delta loprc_{t-1}$	-0.055159	0.131585	0.6770
$\Delta loprn_{t-1}$	-0.544435	0.270266	**0.0498**
D1	0.054200	0.133779	0.6873
D2	0.043312	0.123476	0.7274
@SEAS(1)	-0.417346	0.052153	**0.0000**
Intercept	2.418758	0.735403	**0.0019**

Panel B: Statistics and Residuals Diagnostics tests results

σ=0.117111; $\chi^2_{SC}(4)$=0.528931 [0.7151]; $\chi^2_{ARCH}(4)$=1.509919 [0.2132];

χ^2_{HETR} = 1.198728 [0.3107]; JB_N = 1.556028 [0.45931]; F_{FF}= 1.854099 [0.1801]

Notes: Dependent variable is $lrgdpn_t$; σ is standard error of regression; x^2_{SC}, x^2_{ARCH} and x^2_{HETR} denote chi-squared statistics to test the null hypotheses of no serial correlation, no autoregressive conditioned heteroscedasticity, and no heteroscedasticity in the residuals; JB_N and F_{FF} indicate Jarque-Bera and no functional form mis-specification statistics to test the null hypotheses of normal distribution and no functional miss-specification respectively; Probabilities in brackets; Method: Least Squares; Estimation period: 2000Q1-2015Q2.

In accordance with the methodological stages in ARDLBT application, existence of co-integrating relationship among the variables is tested in the next stage. Wald test results are presented in table 4, below.

According to the table, F-statistic value obtained from the sample is greater than the upper bound critical values calculated by Narayan (2005) at 5%, and Pesaran *et al.* (2001) at 10% level of significance. Therefore, the null hypothesis of no co-integration is rejected at the 5% significance level when we take small sample size case into consideration.

Table 4. F-statistic for testing an existence of co-integration in ARDLBT approach

The sample F-statistic	Significance level	Pesaran *et al.* (2001) critical values		Narayan (2005) critical values	
		Low bound	Upper bound	Low bound	Upper bound
	Null hypothesis: $\theta = \theta_{yx} = \theta_{y\delta} = \theta_{y\vartheta} = \theta_{y\kappa} = 0$				
F_W = 3.424155	1%	3.65	4.66	3.451	4.764
	5%	2.79	3.67	2.589	3.683
	10%	2.37	3.20	2.204	3.210

Notes: F_W is the F-value of testing the null hypothesis that θ_i=0 in the Wald Test.Critical values are taken from the combination of 5 lagged level regressors, restricted intercept and no trend (See: Pesaran *et al.,* 2001, pp. 300) and 60 observations (Narayan, 2005, pp. 1987).

Because test results provided evidence for existence of co-integrating relationship in the equation (6), long-run coefficients or elasticity can be estimated. Equation (7) presents long-run coefficients normalized for *lrgdpn* in the model.

$$lrgdpn_t = 4.527 + 0.546 * lrbe_t - 0.445 * lrbrn_t + 0.288 * loprc_t + 0.166 * loprn_t + u_t \quad (7)$$

As the last stage, in order to test stability of the co-integration relationship, final ARDLBT-ECM specification (equation (4)) is estimated which is simply replacing lagged level regressors with the one-lagged error correction term or ect_ardlbt_{t-1} in the equation (6). Here, error correction term is defined according to the equation (5). Table 5 reports the results.

Table 5. Final ARDL Specification and Residuals Diagnostics tests results

Panel A: The estimated final ARDL Specification			
Regressors	Coefficients	Standard Error	p-values
ect_ardlbt_{t-1}	-0.533988	0.123790	**0.0001**
$\Delta lrgdpn_{t-1}$	-0.088647	0.108190	0.4165
$\Delta lrbe_t$	-0.098268	0.084839	0.2523
$\Delta lrbrn_{t-1}$	0.223941	0.121645	**0.0716**
$\Delta loprc_{t-1}$	-0.055136	0.112074	0.6249
$\Delta loprn_{t-1}$	-0.544923	0.248359	**0.0329**
Intercept	0.005462	0.037990	0.8863
D1	0.054644	0.122829	0.6583
D2	0.043847	0.117251	0.7100
@SEAS(1)	-0.417349	0.048186	**0.0000**

Panel B: Statistics and Residuals Diagnostics tests results
σ=0.112330; $\chi^2_{SC}(4)$=0.579254 [0.6791]; $\chi^2_{ARCH}(4)$=1.541896 [0.2041];
χ^2_{HETR}=1.007232 [0.4469]; JB_N=1.596378 [0.4501]; F_{FF}=1.766751 [0.1899]
Notes: Dependent variable is $lrgdpn_t$; σ is standard error of regression; x^2_{SC}, x^2_{ARCH} and x^2_{HETR} denote chi-squared statistics to test the null hypotheses of no serial correlation, no autoregressive conditioned heteroscedasticity, and no heteroscedasticity in the residuals; JB_N and F_{FF} indicate Jarque-Bera and F statistics to test the null hypotheses of normal distribution and no functional form mis-specification respectively; Probabilities in brackets; Estimation period: 2000Q1-2015Q2.

The coefficients from the estimated final ARDL-ECM equation are statistically significant and the model fulfills the required conditions and passes successfully the tests for the residuals diagnostics and stability. These results are not quite expected as this specification is the ARDL specification tabulated in table 3.

5. Interpretations of the Empirical Results

This section provides interpretations of the estimated long- and short-run coefficients from the equation (7). Results confirm the contribution of oil related factors over Azerbaijan's non-oil sector. Thus, findings reveal that non-oil GDP in Azerbaijan is positively correlated with the oil price changes in addition to the oil production amount per day.

After implementing Bewley (1970) transformation, equation (8) provides the evidence that 1% increase in oil prices result in nearly 0.29% rise in non-oil GDP while holding remaining variables fixed. On the other hand, 1% rise of average daily oil production leads to increasing of non-oil GDP by 0.17%. Detailed investigation of the statistical significance is reported in the table 3. In the long-run, the impact of average daily oil production change as thousands barrels per day is statistically insignificant. However, non-oil GDP is highly sensitive to the oil price changes in the long-run as its coefficient is statistically significant at 12% level of significance. Considering sharp oil price fall since the end of 2014, it is expected that Azerbaijan's non-oil sector will be influenced negatively in the following time path.

Because this article strictly takes impact of fiscal policy indicators on non-oil GDP growth, coefficients of remaining two variables is much more crucial to consider. According to Keynesian fiscal policy framework, budget expenditure is expected to be positively correlated with the non-resource sector. Hasanov's (2013b) also found supporting evidence in this context while investigating Dutch disease syndrome in case of Azerbaijan. Our finding is also consistent with this theoretical expectation and findings in previous studies. According to equation (8), 1% increase in budget expenditures causes increasing of non-oil GDP amount by 0.55 percent in the long-run. This impact is statistically significant at 5% level in addition to economically significance when we consider the magnitude of the effect. 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 statistically significant long-run coefficient at 10% level. Equation (8) provides the fact that 1% increase in amount of revenues which implies increasing tax amount decreases non-oil GDP by approximately 0.45%.

Short-run effects of oil-related factors and fiscal policy changes are worthwhile to consider for a resource rich country. In contrast to the strong belief in public society, it is found that oil price volatility does not significantly matter for the non-oil sector production. Although sign of the coefficient is negative, it is statistically insignificant which supports the previous sentence. On the other hand, estimation of the equation (7) reveals statistically and economically significant negative effect of the growth in daily oil production amount over the non-oil GDP growth rate. Because oil production is declining gradually, this is crucial for fiscal policymakers to consider. More precisely, short-run elasticity of non-oil GDP growth to oil production growth -0.54 can be explained as slowing effect of oil production over the non-oil GDP growth as symptoms of Dutch disease syndrome. In fact, our finding supports of Hasanov (2013b) who reveals "relative de-industrialization" in Azerbaijan's non-oil tradable sector as well as harmful effects of foreign direct investments inflow to the oil sector for non-oil exports which makes oil dependence more severe.

For the fiscal policy indicators impact, model reveals contrary results with the theoretically expected ones in the short-run. Hence, contribution of higher growth of budget expenditures is negative for the growth temp in non-oil GDP. However, the impact is neither statistically nor economically strong. On the other hand, non-transfer revenue growth in government budget is found as "encouraging" non-oil sector producers in the short-run. This positive contribution is also statistically significant at 11.1% significance level. So that, 1% higher growth rate in amount of non-transfer revenues to the state budget seems to accelerate non-oil GDP growth speed by 0.22%.

Note that estimated speed of adjustment obtained from the ARDLBT approach presents the fact that short-run disequilibrium is quickly corrected towards long-run equilibrium path within two quarters. In order words, non-oil GDP is highly sensitive to the long-run equilibrium path.

6. Conclusions

Since 2005, Azerbaijan economy experiences boom period thanks its rich oil reserves in the Caspian Sea. This period is accompanied by significant fiscal expansion as increasing budget expenditures especially. Until 2015, sustainability of fiscal expansion continued. Nevertheless, due to sharp decrease of world oil prices accompanied with gradually expected fall in daily oil production send a message of coming "post-oil boom" period. And now, development of non-oil sector gains much more weight. This brings the question what government can do under the fiscal policy framework. The government chose fiscal contraction and decreased government expenditures by approximately 3.2 billion AZN with additional 1.7 billion AZN deficits.

For this purpose, we analyzed the short- and long-run effects of fiscal policy indicators (budget expenditures and non-transfer budget revenues) over the non-oil GDP by employing ARDLBT approach to co-integration. Including oil related key factors into the model strengthened the power of analysis when the current processes are taken into consideration. Model provided theoretically consistent and statistically and economically significant long-run effects of fiscal policy indicators while short-run effects are contrary to the theory and public belief.

The question how much productive is the budget expenditures is still open to discussions and further researches. However, it is noteworthy to review the composition of budget expenditures in this context. Azerbaijan government sharply expanded the state budget in the following years after the oil boom allocated as public infrastructure spending (around 40% of total), social and cultural activities (around 23-25% of total), other expenditures (around 24-26% of total) while the share of expenditures for scientific purposes has been just around 0.5-0.6% of total.

For fiscal policy makers, this research provide robust suggestions if development of non-oil sector is a matter for discussions. Decreasing of budget expenditures is expected lead to non-oil sector contraction, but is not too dangerous unless the expenditures must be productively used. Therefore, the efficiency of budget expenditures must be increased in order to achieve development of non-oil sector of the economy in the long-run. Moreover, increasing budget revenues from tax related resources will also demotivate non-oil sector producers in the long-run. Government might provide much more suitable business environment to minimize tax distortions. In addition, government officials must consider short- and long-run effects coming from oil production and oil price changes while forecasting future non-oil sector production.

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