

TAX REVENUE AND ECONOMIC GROWTH IN RESOURCE-RICH COUNTRY: EMPIRICAL EVIDENCE FROM AZERBAIJAN

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ABSTRACT

The purpose of the article is to examine the relationship between taxes and economic growth in Azerbaijan, which is rich in oil and gas reserves. The study covers the years 2005-2023. The growth of total and non-oil GDP is included in the model as a dependent variable, and the volume of capital, tax revenues to the budget, changes in oil prices, and total foreign trade are included as independent variable. When calculating quarterly indicators, inflation was taken into account and processed using the ARDLBT model. It has become known that tax revenues in Azerbaijan have a negative impact on the growth of both total and non-oil GDP in the long term. The effects of other independent variables were statistically significant and positive. In the short term, the impact of taxes on overall GDP has not been identified, but a negative impact on the growth of non-oil GDP has been found. Among other indicators, only changes in oil prices have a positive impact on overall GDP in the short term. These results are consistent with modern theories. Limited data on revenues by tax type made it impossible to assess the impact of various tax types on economic growth. The results support the idea of pursuing a policy that reduces the tax burden of this sector in order to increase non-oil GDP. A study of the impact of tax revenues on non-oil GDP growth can provide substantiated arguments for making decisions on the distribution of the tax burden to increase the weights of tax types that do not have a negative impact on economic growth.

Keywords: Tax revenue, tax types, economic growth, non-oil GDP, oil and gas reserves.

JEL kod: E62, H21, O47

INTRODUCTION

Scientific discussions about state intervention in economic processes began with the works of early mercantilists and continued by representatives of physiocracy (François Quesnay and others), classical (Adam Smith, David Ricardo, etc.) and neoclassical theories (A. Marshall, A. Pigou, etc.). With the advent of Keynes's theory, this issue rose to a completely new level and became one of the main subjects of debate between neoliberalists and neo-Keynesians. One of the few points of contact between these mutually exclusive approaches is the undeniable role of the state in the production and maintenance of public goods.

The need to produce public goods, which is accepted as one of the main attributes of welfare in modern theories of economic development, determines the formation of the state's fiscal policy and the use of taxes to create sources of government spending. On the other hand, government spending is one of the important aggregates of the country's gross domestic product, and also has a multiplier effect on other macroeconomic parts of national wealth (consumer spending, investment). In addition to the above, taxes, which are the main source of government expenditure, are also seen as a factor that slows down and impedes economic growth.

In the modern world, the globalization of economic processes and the development of digital technologies have led to a weakening of the economic borders of countries and a significant increase in the mobility of capital, technology and labor. These processes have also brought to the fore the issues of preserving these resources in the country and attracting them from foreign countries. In the current situation, the attractiveness of the tax system for investors, especially in developing countries, has become particularly important. In such conditions, the state's economic policy faces two dilemmas: a) increase the production of public goods to meet the growing demand for them - this leads to an increase in government spending and the need for additional sources of income, including additional tax revenues; b) reduce the tax burden of the economy as much as possible in order to support the development of economic growth factors in the country - this can lead to a relative decrease in state tax revenues. To solve the mentioned problem, numerous studies have been conducted and similar and different empirical results have been obtained. Differences in the level of development of countries, competitiveness, the structure of national wealth, capital and labor intensity of the established economy, the efficiency of markets, innovation systems and other important factors are also reflected in the impact of taxes and government spending on economic growth.

This issue seems more relevant for countries whose economic growth is formed primarily through the export of natural resources, including Azerbaijan. Diversification of the economy, increasing the share of the manufacturing sector and other industries in the structure of national wealth are among the main priorities of the economic policy pursued in our country. In this regard, the study of the relationship between taxes and economic growth in Azerbaijan is adopted as the purpose of the article. The results of the study can provide substantiated scientific arguments for improving state tax policy in terms of supporting economic growth.

LITERATURE REVIEW

Blanchard and Perotti (2002) used a structured VAR model to analyze the dynamic impact of fiscal policy changes on real gross domestic product growth. They found a positive link between government spending and economic output and a negative link between tax revenue and economic growth.

Arnold and co-authors (2011) analyzed the relationship between tax revenue and economic growth using the economic data of 21 countries in the OECD (Organization for Economic Co-operation and Development). They found a negative link between tax revenue and economic growth in long term. They also analyzed how the structure of tax revenue impacts economic growth and they found that increasing the weight of indirect taxes has a positive impact on GDP (Gross Domestic Product) per capita.

Acosta-Ormaechea and Yoo (2012) analyzed the impact of different tax types on economic growth both generally and focusing separately on high and mid-income and low-income countries. The general results show that there is a negative impact of both income tax and social security payments on economic growth, a positive impact of transition from income tax to property tax on economic growth, and a positive impact of decreasing income taxes while increasing indirect taxes on economic growth. The authors found a positive impact of an increase in the weight of consumption and property taxes on economic growth in high-income countries, while they found no statistically significant relationship between an increase in the weight of consumption taxes and economic growth in mid-income countries. The authors found that increasing income and corporate profit taxes in both high and mid-income countries results in lower economic growth. The authors found no statistically significant relationship between different types of tax revenues and economic growth in low-income countries. The absence of any statistically significant links may be due to weak tax administration in less developed lower-income countries.

Castanheira et al. (2012) researched the topic with different approach focusing on the tax reforms implemented in the European Union and found that governments tend to carry out tax reforms in better periods of the economy, not in periods of crisis, and to direct the reforms to narrow goals instead of general goals (for example, general economic growth, etc.). One of the important results of this study is that tax reforms are usually initiated by political factors rather than macroeconomic reasons. This kind of approach may result in procyclical fiscal policy.

Baiardi and colleagues (2017) did further research on the topic, they also found the negative relationship between tax revenue and economic growth, but they didn't find any impact of increasing the weight of indirect taxes on economic growth. Another finding of this research paper was the negative link between the transition from personal income taxes to property taxes on economic growth, contradicting the general results of Acosta-Ormaechea and Yoo (2012).

Matallah and Matallah (2017) analyzed the impact of fiscal policy on economic growth in Algeria over the period of 1970-2015. Besides government spending, they analyzed the relationship between indirect and direct tax revenues and economic growth in both the long and short term. Regarding direct tax revenue, they found a statistically significant negative link between direct tax revenue and economic growth in the long run. Estimating the short-term relationship, the authors interestingly found a positive, but insignificant relationship between direct tax revenue and economic growth.

The reason for this positive relationship in short-term may be the result of the automatic stabilizers effect. Regarding indirect tax revenue, the authors found a statistically significant positive impact between indirect tax revenue and economic growth in long term. Estimating the short-term relationship, the authors interestingly found statistically significant negative relationship between indirect tax revenue and economic growth. The reason for the negative relationship in short term between indirect taxes and economic growth may be the disincentives for consumption created by indirect taxes.

Barro and Wheaton (2019) found that decreasing income taxes and dividend taxes result in an increase in the number of entities preferring a corporate management style. In Nigeria, where oil revenues account for a significant share of the economy, there are studies examining the relationship between different types of taxation and economic growth.

Eneche and Stephen (2021) found a statistically significant positive relationship between corporate income tax and GDP, as well as between VAT and GDP. Adefolake and Omodero (2022) results are in line with Eneche and Stephen (2021) on the relationship between VAT and GDP, but not regarding the relationship between corporate income tax and GDP, they found a statistically significant negative relationship. They also found a statistically significant positive relationship between Nigeria's existing Petroleum Revenue Tax (a tax levied on oil production profits) and GDP.

Using the ARDL model, Abata and co-authors (2023) found a negative relationship between all 3 types of taxes they analyzed (corporate income tax, oil profit tax, excise and customs duties) and gross national product (GNP). The only positive statistically significant relationship Abata et al. (2023) found was between VAT and GNI. Oghogho et al. (2023) found a positive relationship between oil profit tax and property tax and GDP in the long run and a negative relationship between property tax and GDP in the short run.

Kaewsopa et al. (2022) analyzed the relationship between different tax categories and economic growth using the Ordinary Least Squares regression method covering the period between 1999 and 2018 in China and Thailand. They found statistically significant negative links between economic growth and three tax types – personal income tax, corporate income tax and value-added tax in Thailand. Regarding China, they found statistically significant negative links between economic growth and corporate income tax, while contradicting Thailand results as they found statistically significant positive link between economic growth and two tax types – personal income tax and value-added tax.

Aliyev and Nadirov (2016) utilized the ARDL Boundary Tests cointegration model to research the long-term and short-term impacts of government spending and non-transfer government revenues over the non-oil economy of Azerbaijan for the period 2000-2015. They found a statistically significant negative link between government tax revenue and economic growth in the long term. Interestingly, the short-term results of this study indicated a statistically significant positive link between tax revenue and economic growth.

The negative short term relationship between these indicators may be attributed to the automatic stabilizers effect. Aliyev, Dehning, and Nadirov (2016) found that government tax revenues Granger Cause real non-oil GDP and real government spending.

METHOD AND DATA

Autoregressive Distributed Lag Bounds Testing (ARDLBT) presented by Pesaran et al. (2001) is used to analyze the relationships between variables. The advantages of the ARDLBT method include the ability to apply to small samples, I(1) and I(0) series simultaneously and to estimate long-run and short-run coefficients (Oteng et al. 2006; Sulaiman et al.,2010).

We use 2 models in this paper, the purpose of the Model 1 and 2 are to find out the short-term and long-term impact of government spending on general economic growth and non-oil economic growth, respectively. We will use real non-oil GDP growth as a dependent variable in the second model while using total real GDP growth in the first model.

The 3 control variables will be added to the model. Capital formation and trade openness have been used widely in previous research papers (Christie (2012); Mendonca and Caicedo (2014); Asimakopoulos and Karavias (2015); Olaoye et al. (2020)) on this topic as control variables. Additionally, the oil price change variable will be added to the models as oil price changes significantly impact non-oil GDP (Aliyev and Nadirov, 2016) and obviously total GDP in Azerbaijan. The list of variables is presented below:

Table 1: Information on variables

Variable	Symbol	Model inclusion	Definition
Real GDP growth	<i>RGDPG</i>	1	CPI (consumer price index) is used to convert nominal GDP to real GDP
Real non-oil GDP growth	<i>RNOGDPG</i>	2	CPI is used to convert nominal non-oil GDP to real non-oil GDP
Real government revenue	<i>RGOVREV</i>	1,2	CPI is used to convert nominal government expenditure to real government expenditure
Real capital investment	<i>CAPINV</i>	1,2	CPI is used to convert nominal capital investments to real capital investments
Real total trade	<i>RTOTTRADE</i>	1,2	Real total trade is calculated as the sum of imports and exports, CPI is used to convert nominal total trade to real total trade
Oil price change	<i>OILPRCG</i>	1,2,	quarterly data of Brent Crude price (FRED, 2023)
Notes: Real government expenditure, real capital investments, and real total trade variables are included to the Model 1 and 2 in the logarithmic forms.			

Source: Compiled by author

The Augmented Dickey-Fuller test (Dickey and Fuller, 1981) is used to check the stationarity of the variables. Results are presented below:

Table 2: ADF test results

Indicators	I(0)		I(1)	
	Intercept	Trend and intercept	Intercept	Trend and intercept
RGDPG	-1.906*	-2.376	-7.915***	-7.773***
RNOGDPG	-4.764**	-5.559***	-9.214***	-9.312***
RGOVREV	-2.681*	-2.076	-5.498***	-19.950***
RCAPINV	-1.386	-1.109	-4.905***	-5.068***
RTOTTRADE	-3.839***	-3,574**	-4.714***	-4.774***
OILPRCG	-6.909***	-6.874***	-8.374***	-8.310***

Note: ***, ** and * denote statistical significance at 1%, 5% and 10% level, respectively

Source: Compiled by author based on Eviews calculations

The specification of the 2 models are presented below:

$$RGDPG = C_0 + \theta_1rgdpg_{t-1} + \theta_2lrgovrev_{t-1} + \theta_3lcapinv_{t-1} + \theta_4lrtottrade_{t-1} + \theta_5oilprcg_{t-1} + \sum_{i=1}^m \alpha_i \Delta rgdpg_{t-i} + \sum_{i=0}^n \beta_i \Delta lrgovrev_{t-i} + \sum_{i=0}^p \gamma_i \Delta lrcapinv_{t-i} + \sum_{i=0}^q \delta_i \Delta lrtottrade_{t-i} + \sum_{i=0}^r \rho_i \Delta oilprcg_{t-i} + u_t \quad (1)$$

$$RNOGDPG = C_0 + \theta_1rnogdpg_{t-1} + \theta_2lrgovrev_{t-1} + \theta_3lcapinv_{t-1} + \theta_4lrtottrade_{t-1} + \theta_5oilprcg_{t-1} + \sum_{i=1}^m \alpha_i \Delta rnogdpg_{t-i} + \sum_{i=0}^n \beta_i \Delta lrgovrev_{t-i} + \sum_{i=0}^p \gamma_i \Delta lrcapinv_{t-i} + \sum_{i=0}^q \delta_i \Delta lrtottrade_{t-i} + \sum_{i=0}^r \rho_i \Delta oilprcg_{t-i} + u_t \quad (2)$$

While $\theta_i, i = 1, \dots, 6$ represents long term coefficients, $\alpha_i, i = 1, \dots, m$, $\beta_i, i = 1, \dots, n$, $\omega_i, i = 1, \dots, w$, $\gamma_i, i = 1, \dots, p$, $\delta_i, i = 1, \dots, q$, $\rho_i, i = 1, \dots, r$ denote short term coefficients. The symbols m, n, w, p, q, r represents optimal lag lengths chosen using Akaike info criterion (AIC).

EMPIRICAL RESULTS AND DISCUSSION

Optimal lags for the models using AIC criterion are presented in the Table 3.

Table 3: Selection of optimal models

Selected models	
Model 1	ARDL (3,1,0,0,2)
Model 2	ARDL (4,1,0,4,2)

Source: Compiled by author based on Eviews calculations

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Table 4 presents the computed F-statistics from F-bounds tests. Instead of critical values compiled by Pesaran (2001), Narayan (2005) critical values are used as Narayan (2004) argues that Pesaran (2001) critical values are not suitable for small sample sizes. Rejecting the null hypothesis means that there is a cointegration relationship between independent variables.

Table 4: F-bounds test results (Null hypothesis: No level relationship)

Critical value source	Test statistic value	Significance	I(0)	I(1)
Model 1				
Pesaran (2001)	F-statistic = 27.41	1%	3.29	4.37
Narayan (2005)		1%	3.37	4.72
Model 2				
Pesaran (2001)	F-statistic = 14.22	1%	3.29	4.37
Narayan (2004)		1%	3.37	4.72

Source: Compiled by author based on Eviews calculations

As you can see from the table above, all series are cointegrated, thus the long-run coefficients can be estimated. The estimated long-run coefficients are presented in Table 5:

Table 5: Long-run estimate results and robustness check results

Panel A: Long-run estimate results		
Variables	Model 1	Model 2
Dependent variable	Real GDP growth	Real non-oil GDP growth
Constant	-0.67** (-2.45)	-0.58* (-1.69)
LRGOVREV	-0.10*** (-2.97)	-0.16*** (-4.31)
LRCAPINV	0.09*** (3.97)	0.13*** (2.65)
LRTOTTRADE	0.10*** (2.72)	0.11** (2.65)
OILPRCG	0.32*** (3.91)	0.33*** (3.02)
Panel B: Robustness check results		
	Model 1	Model 2
R-squared	0.71	0.72
Adjusted R-squared	0.66	0.68
Observations	69	69
Serial correlation (1 lag)	$X^2_{sc} = 0.42 (0.52)$	$X^2_{sc} = 1.95 (0.16)$
Serial correlation (4 lags)	$X^2_{sc} = 1.12 (0.89)$	$X^2_{sc} = 3.83 (0.43)$
Normality	$JB_N = 71.15 (0.00)$	$JB_N = 0.07 (0.97)$
Notes: ***, ** and * denote statistical significance at 1%, 5% and 10% level, respectively. Numbers in brackets in Panel A represent t-Statistics. Numbers in brackets in Panel B represent P-values.		

Source: Compiled by author based on Eviews calculations

Error Correction Form results are presented below:

Table 6: Model 1 - short-run estimate results

Table 5	
Variable	Model 1
<i>Dependent variable: Real GDP growth</i>	
$CointEq_{t-1}$	-2.22*** (-13.37)
$\Delta RGDPG_{t-1}$	0.66*** (5.47)
$\Delta RGDPG_{t-2}$	0.28*** (4.15)
$\Delta LRGOVREV$	-0.08 (-1.45)
$\Delta OILPRCG$	0.28*** (3.96)
$\Delta OILPRCG_{t-1}$	-0.15* (-1.85)
R-squared	0.89
Adjusted R-squared	0.88
Observations	69

Notes: Numbers in brackets represent t-Statistics.

Source: Compiled by author based on Eviews calculations

According to the Model 1 long-run estimation results (Table 5, Panel A), a 1% increase in government tax revenue results in a 0.16% decrease in real non-oil GDP growth and a 0.10% decrease in real total GDP growth in the long run. This result is in line with the results of Blanchard and Perotti (2002), Arnold et al. (2011), and Aliyev and Nadirov (2016). Long-term estimation results also indicate that there is a statistically significant positive link between capital investments and economic growth (both total and non-oil economy) in Azerbaijan.

The total trade variable is also found to have a statistically significant positive link with real GDP growth, including and excluding the oil sector. Oil price change is found to have a statistically significant impact on both real non-oil GDP growth and real total GDP growth. The statistically significant positive relationship between oil prices and non-oil economic growth in Azerbaijan is in line with Aliyev and Nadirov (2016) results.

The short-term estimation results (Tables 6 and 7) also offer interesting results. Government tax revenue does not seem to significantly impact (there is a weak negative relationship) real total GDP growth in the short term, but there is a statistically significant negative relationship between government tax revenue and real non-oil GDP growth.

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Table 7: Model 2 - short-run estimate results

Table 6	
Variable	Model 2
<i>Dependent variable: Real non-oil GDP growth</i>	
$CointEq_{t-1}$	-2.86*** (-9.67)
$\Delta RNOGDPG_{t-1}$	1.09*** (4.68)
$\Delta RNOGDPG_{t-2}$	0.46** (2.80)
$\Delta RNOGDPG_{t-3}$	0.14 (1.37)
$\Delta LRGVREV$	-0.17** (-2.18)
$\Delta LRTOTTRADE$	-0.37*** (-2.78)
$\Delta LRTOTTRADE_{t-1}$	-0.47*** (-3.43)
$\Delta LRTOTTRADE_{t-2}$	-0.41*** (-2.84)
$\Delta LRTOTTRADE_{t-3}$	-0.16 (-1.56)
$\Delta OILPRCG$	0.19 (1.64)
$\Delta OILPRCG_{t-1}$	-0.39*** (-3.26)
R-squared	0.91
Adjusted R-squared	0.89
Observations	68
Notes: Numbers in brackets represent t-Statistics.	

Source: Compiled by author based on Eviews calculations

The negative link between government tax revenue and economic growth in the short term contradicts the results of Aliyev and Nadirov (2016). It is noteworthy to mention that real total trade and real capital investments variables were not used as control variables in Aliyev and Nadirov (2016), these 2 variables perhaps control to more extent for business cycle impacts and mitigate automatic stabilizers effect. Among control variables, only oil price change is found to have a statistically significant link (positive) with real total GDP growth in the short term. Regarding real non-oil GDP growth, total trade seems to have a statistically significant negative relationship with the non-oil economy in the short-term. The works of Seyfullayev (2020, 2022, 2023) examined the impact of protectionist policies, trade openness, and financial development on the economic growth of the Azerbaijani non-oil sector and found evidence that government regulatory measures have not yet led to the desired results.

CONCLUSIONS

Since 2004, Azerbaijan used oil revenues to finance government expenditure besides tax revenues. Until the sharp decrease in oil prices in 2014-2015, Azerbaijan's economy boomed thanks to oil revenues. Since Azerbaijan's economy experienced a sharp recession and devaluation of currency after a decrease in oil prices, the emphasis has been on diversifying away government revenues from the oil economy and founding fiscal rules. While transfers from SOFAZ (State Oil Fund of Azerbaijan) summed up to average of an 54% of total budget revenues in the period of 2010-2015, this number has been 42% on average since 2015. As the government strategy focuses on decreasing dependency of the economy and budget revenues from the oil sector, the impact of government tax revenue on growth attracts more interest.

We analyzed the impact of tax revenue on economic growth utilizing the ARDLBT approach and found a negative link between government tax revenue and non-oil economic growth in both the short and long run. Regarding total GDP, there is still a statistically significant negative link between tax revenue and total economic growth, but the weak negative link in the short-term.

Combining the findings of a statistically significant negative link between government revenue and non-oil GDP growth in the long run with the focus on government strategy on enhancing non-oil economic growth, raises a crucial concern. Considering the vast literature review on the different economic impacts of various taxes, we think there is need for further research on this topic. Unfortunately, currently, there is no publicly available quarterly data on tax revenues by type. Research on the impact of tax types on economic growth separately would offer important findings for tax policy. By changing the tax revenue structure on behalf of tax types with less harm on economic growth, budget revenue targets may be satisfied without halting economic growth.

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