Effects of Taxes on the Development of the Non-Oil Industry Sector: The Case of Azerbaijan

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Abstract: - A panel analysis of the relationship between corporate tax rates and GDP per capita, economic growth rate, total capital formation, and non-oil product volume proves that these variables' dependency on corporate tax rates is weaker. The main finding of the study is that there is a negative relationship between the volume of non-oil industrial products and taxes in Azerbaijan. Based on the results of the research, it can be argued that neither corporate taxes nor general taxes have a significant impact on the production volume of non-oil industrial products in Azerbaijan in the short term. However, there is a negative relationship between taxes and the volume of production of non-oil industrial products in the long run.

Key-Words: - taxes, corporate tax rates, economic growth, total capital formation, non-oil products

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1 Introduction

The history of state intervention in the economy almost coincides with the history of economic theory. Since the 18th century, there have been different approaches regarding the necessity or harm of such intervention. However, depending on the trend of economic development, the investigation of this problem and the obtained results were different. The return to the problem of state intervention in the economy in any period was related to the existing problems in the economy in that period. As a result of this, the economic crisis that occurred in the 30s of the last century made the discussion of the state's intervention in the economy more relevant. J.M. Keynes justified the importance of state intervention in the economy within certain limits. Although the

application of Keynes's theory in the formation of new economic policy ensured rapid development in various countries, especially in developed countries, in the late 20th century, the tendency of the state to interfere in the economy was reinforced by neo-classicists. However, the financial crisis of 2008 made it more urgent to examine the state's intervention in the economy at a certain level.

An analysis of a large number of studies conducted on state intervention in the economy suggests that no economist insists that the state should be absolutely outside the economy. No researcher claims that it is possible to carry out economic activity without any state intervention, e.g., without the emission of money. The classics, who claimed the absence of state intervention in the economy, did not question the existence of money in economic activity. However, if the state prints money, the state already intervenes in the economy to a certain extent. It is more important not to discuss whether the state "interferes" or "does not" in the economy, but it is important to examine "how much" and "in what forms" it intervenes. That is, is the intervention through taxes, or intervention in the form of increasing the level of state entrepreneurship, public purchases, public investments, price regulation, licensing restrictions, and other forms more effective? Similar questions can be greatly increased.

The intervention of the state in the economy through taxes is very old in its history. It can be said that there is enough information about the collection of taxes in kind in the history of almost all countries. However, the types and amounts of taxes have always been different from country to country. Each state has changed its tax policy regularly. Even after the formation of economic science, discussions about the type and volume of taxes have always been the subject of serious scientific research. As we mentioned above, the fact that taxes are the focus of attention as an object of research is because it is the main source of income for the state. Collected taxes allow the state to perform its functions, for example, defense, development of education, health care, provision of living for the elderly population, disabled people, etc.

The fact that the revenues collected from taxes have a major share in government spending, at first sight, suggests that the more such revenues, the greater the financial capacity of the state to perform its functions. However, considering that tax revenues come from individuals or business entities engaged in economic activity, and if the number of entities is not increased, increasing such revenues reduces the profits of economic entities. This may indirectly create new problems for the development of the economy. Such dual nature of taxes is widely analyzed in economic theory and empirical studies.

The studies that conduct a cross-country comparative analysis on the relationship between taxation and economic growth, [1], [2], [3], [4], [5], allow us to conclude that income and corporate taxes are important instruments in the country's economic development.

2 Literature Review

Both in economic theory and in empirical research on the problem, the macroeconomic effects of taxes, especially the effects on economic growth, give different results. Thus, the mechanism and result of the effects of taxes on economic growth are different in the theory of exogenous and endogenous growth. The results of empirical studies performed in different countries vary from country to country.

According to the Solow-Swan model, which is the main model of exogenous growth theory, taxes do not affect the equilibrium level of the economy. In the long run, the effects of taxes on economic growth are neutral. In the Solow model, the main determinant of economic growth is technological development, and taxes do not affect growth. However, taxes affect the level of production volume. Thus, according to the Solow model, taxes have an output level effect rather than an output growth effect. Considering that the Solow model of economic growth is the most widespread model related to this problem, we can note that the economic theory does not take into account the two poles of the impact of taxes on the economy. The bipolarity in the essence of any economic indicator means that there is an optimal value of this indicator for economic growth or state of well-being. The optimal value for two opposite poles should be chosen so that the dual nature of this indicator can be used most effectively. The fact that macroeconomic models related to taxes still cannot fully cover the real economy once again confirms that the economic system is extremely complex and any model can cover only a limited number of elements of this complex system. Of course, research in this field is continuously conducted and the obtained results are developed. According to the approach of some researchers, such as, [6], [7], [8], [9], and others, taxes can have a negative effect on the economy because they reduce the income at the disposal of individuals and business entities. In, [10], the authors claim that taxes not only have an effect on economic growth but also distinguish five mechanisms by which such effects are realized: 1) a

decrease in the propensity to invest; 2) a reduction in the labor supply; 3) decrease in growth productivity; 4) decrease in the marginal productivity of capital; 5) decrease in efficiency of human capital use.

As we mentioned above, taxes have a dual nature, unlike some forms of government intervention. Its increase allows the government to obtain the necessary funds to perform its functions. On the other hand, the increase in taxes reduces the profits of businesses and businesses and creates other negative effects. Some researchers believe that the positive effects of taxes, including the implementation of infrastructure projects by the state from tax revenues, the expansion of the use of such revenues for the development of education and health care, and other issues indirectly create a positive effect on the economy.

According to the Romer model, which is considered one of the main models of endogenous growth theory, taxes can affect economic growth in the long term. In, [11], the authors argue that taxes 1) strengthen the sustainability of economic growth and the global competitiveness of the economy; 2) ensure fiscal stability and allow the collection of funds important for social as well as physical infrastructure; 3) reduce dependence on assistance for the long term; 4) strengthens government accountability and encourages good governance.

Theoretical issues of the effects of taxation on economic growth and output have also been explored by, [12]. The main conclusion of this study is that taxation does not affect economic growth. According to the theory of endogenous growth, the effects of taxation on economic growth have been studied by, [13], [14]. The results of these studies are that taxation mainly affects the level of savings of households and investments directed to human capital and production through these mechanisms. In, [15], the authors show that taxation has a significant impact on the investment and innovation decisions of business structures. Differences in taxation policies between countries have some effect on the differences between investments in physical and human capital in firms belonging to these countries.

Note that the variety of taxes is characterized by their impact on economic growth at different levels. The effects of some taxes on economic growth may be felt more strongly than others. On the other hand, the effects of taxes on economic growth also depend on the economic situation in the country.

In the last 20 years, important steps have been taken towards the liberalization of the economy in Azerbaijan. Liberalization of foreign trade, [16], banking sector, [17], [18], agricultural sector, [19], service sector, and non-oil industrial sector has greatly improved the business environment in the country. However, the tax burden in Azerbaijan is still high and creates certain difficulties for the development of small and medium-sized businesses.

2.1 Empirical Results Regarding the Effects of Taxes on Growth in the Non-Oil Industrial Sector

Both theoretical and empirical studies prove that the effects of corporate and capital taxes on economic growth are stronger and more negative. Thus, the increase in taxes hinders the development of capital flow and innovation. Some studies, such as the study by, [20], prove that reducing labor tax and increasing VAT positively affect economic growth in European Union countries.

A study conducted by, [21], assessed the effects of tax policies on economic growth in Latin American countries. They conclude that there is no evidence that the effects of tax policy on economic growth are positive, comparing the studies conducted in the example of Latin America. In the study, the effects of personal income tax, corporate income tax, sales tax, value-added tax, and other taxes on economic growth were evaluated econometrically. As a method in the study, the autoregression method was used, as well as a panel analysis covering Argentina, Brazil, Mexico, and Chile. The main conclusion obtained is that the effects of personal income tax on economic growth in Latin America are not only negative but even absent. As the main reason for this, researchers explain that personal income taxes are very low and the amount of collection is not high. On the other hand, for some countries, the negative impact of corporate income tax on economic growth was included in the study. The effects of consumption taxes on economic growth are positive.

In the study performed by, [22], the effects of tax burden on economic growth were studied in the example of European Union countries. In the study, the effects of consumption, labor, and capital taxes on economic growth in the 24 member states of the EU in the period 1995-2010 were evaluated by panel analysis. As a methodology, panel analyses and Granger causality tests were used. The results of empirical research on the positive effects of consumption taxes on economic growth are consistent with the theory. Also, the negative effects of labor taxes on economic growth are empirically confirmed. On the other hand, the relationship between consumption tax and GDP is Granger and

bidirectional causality. However, the relationship with the labor tax is one direction.

In the study conducted by, [23], in the case of Nigeria, data covers the period 1994-2009. White's test, Ramsey RESET test, Breusch Godfrey test, Jacque Berra test, Augmented Dickey-Fuller test, Johansen test, and Granger Causality test were used during evaluations. The main conclusion of the study is that the tax policy implemented in Nigeria during the period 1994-2009 had a positive effect on economic growth. Researchers believe that the implemented tax policy not only increased the government's income, but also caused an increase in GDP, and then had a positive effect on the improvement of the social condition of the population in the country.

In the research, [24], the authors tried to evaluate the effects of taxes on economic growth in the long-term period 1980-2018, in addition to conducting a comparative analysis of studies that provide different results for Jordan. Based on the available empirical results, they conclude that the results of the studies performed in the example of this country are inconclusive. Thus, in some studies, positive results were obtained between taxes and economic growth, and in some studies, negative results were obtained. Achieving such different results is most likely due to the methodologies chosen for the study. In, [24], the authors used the Autoregressive Distribution Lagged (ARDL) method in their research. The conclusion is that there is cointegration between economic growth and taxes in the long run for Jordan. At the core of such co-integration is the negative relationship between these indicators.

A study by, [25], assessed the relationship between oil revenue tax and economic growth in the Nigerian economy, as well as the effects of corporate income tax on economic growth and non-oil revenue efficiency. The main data and quantitative indicators used in the study were taken from the statistical bulletin of the Central Bank of the country, but some data were obtained by the survey method. Multivariable regression analysis was used during the evaluations. Estimates show that for the Nigerian economy, there is a strong correlation between tax on oil profits and economic growth. There is also a strong relationship between non-oil revenues and economic growth. However, there is no relationship between income tax and economic growth. The researchers suggest that the government should improve tax administration and try to increase the level of employment to expand the tax base.

In, [26], the authors studied the effects of direct and indirect taxes on economic growth in 27 member states of the European Union. The research covered the period 1995-2010. During the research, the tendency of tax burden distribution in the member states was studied for 15 years. Then, the effects of tax collection on economic growth were investigated through regression analysis. The main conclusion of the study is that it is more favorable to use direct taxes in terms of supporting economic growth.

A study by, [27], analyzed the effects of tax policy on economic growth in the Republic of South Africa. At this time, the Autoregressive Distribution Lag (ADRL) model was used for the long-term period covering the years 1981-2016. In this study, it is empirically confirmed that the increase in taxes in the example of South Africa has a negative effect on economic growth. During the econometric calculations, along with the economic growth indicator, trade openness, and capital indicators were also included in the model. Empirical analysis shows that economic growth, taxes, capital, and trade openness indicators are cointegrating indicators. Considering the results obtained, the researchers note that fiscal policy is important for sustainable economic growth in South Africa.

In the study conducted by, [28], OECD countries were taken as the object. The data for analysis covers the years 2000-2011. In the study, the effects of individual taxes on economic growth were analyzed using the multivariable regression method. In addition to economic growth and taxes, capital accumulation, investment, human capital, and technology indicators were also included in the model. The neoclassical growth model was used as a model. Using the panel analysis method, the researcher empirically proves that corporate taxes seriously hinder economic growth. Personal income taxes also have a negative impact on economic growth. The effects of property tax on economic growth are not statistically significant. Considering these results, the researcher suggests that OECD countries should reduce corporate taxes and personal income taxes. The loss of budget revenues as a result of tax reduction can be compensated through indirect taxes.

In the study conducted by, [29], the effects of taxes on economic growth were empirically analyzed in the example of Nigeria. At this time, data covering the years 1980-2013 was used. The long-term relationship between taxes and economic growth was analyzed by both the Engle-Granger cointegration test and the VEC model. The VEC model was used for the relationship between these

indicators for the short-term period. Autocorrelation and heteroskedasticity diagnostic tests were also performed to check the adequacy of the model. The obtained results confirm that there is a long-term relationship between taxes and economic growth. However, in the case of Nigeria, it is impossible to confirm the existence of such a relationship for a short-term period.

A study conducted by, [30], examined the relationship between the marginal income tax rate and economic growth. By conducting a panel analysis based on data from 1965-2009 for 18 countries that are members of the Organization for Economic Cooperation and Development, the authors determined the existence of a relationship between tax and economic growth.

Thus, a comparative analysis of the economic literature related to empirical studies suggests that the effects of taxes on economic growth are of different natures in different countries. However, the effects of direct taxes on economic growth are negative for the long term in almost all countries. Unfortunately, the study of this problem in the example of Azerbaijan has not been carried out.

3 Methodology

Since oil rent is an important part of economic growth in oil-rich countries, the impact of taxes on the development of this sector is not noticeable. The production and export of oil mainly take place based on "production sharing agreements" or other types of agreements signed between oil-rich countries and multinational companies, and the terms of such agreements are not affected by tax administration or tax rate policies in local countries. Therefore, in our study, we will involve non-oil-rich countries in a panel analysis to determine the general trend to determine the impact of taxes on economic growth. The results obtained as a result of such an analysis can allow the assessment of the effects of taxes on the non-oil sector. We will get the information related to the non-oil industrial sector for such countries from the official database of the World Bank, [31]. Information on corporate tax rates will be obtained from the official website of the Tax Foundation research group, [32]. To estimate the effects of total tax rates and corporate taxes on economic growth, as well as the volume of non-oil industrial products, we will use double regression equations:

$$Y_{it} = \beta_1 + \beta_2 \times X_{it} + u_{it} \quad (1)$$

Here Y_{it}- 1) GDP volume per person by country ($GDPPC_{it}$); 2) economic growth by country ($GDPPCG_{it}$); 3) total capital formation by countries (GCF_{it}); 4) The volume of non-oil products by country will be taken as ($NO\dot{I}NDUS_{it}$). X_{it} − 1) total tax rate ($Taxburden_{it}$); 2) will be charged as corporate tax ($corptax_{it}$).

In total, a) per capita GDP volume, b) economic growth rate, c) total capital formation, and d) production of non-oil industrial products 1) from total taxes; 2) it is important to determine the dependence on corporate tax rates and find optimal tax rates for ensuring sustainable development in the non-oil sector. To make such assessments, we will use multivariate regression equations between the indicators we mentioned:

$$GDPPC_t = \beta_1 + \beta_2 \times Totaltax_t + \beta_3 \times corptax_t + u_t \quad (2)$$

$$GDPPCG_t = \beta_1 + \beta_2 \times Totaltax_t + \beta_3 \times corptax_t + u_t \quad (3)$$

$$GCF_t = \beta_1 + \beta_2 \times Totaltax_t + \beta_3 \times corptax_t + u_t \quad (4)$$

$$NO\dot{I}NDUST_t = \beta_1 + \beta_2 \times Totaltax_t + \beta_3 \times corptax_t + u_t \quad (5)$$

We will use equations (6) and (7) to model the short-run and long-run effects of total taxes and corporate taxes on the production volume of non-oil industrial products.

$$NO\dot{I}NDUST_t = \beta_1 + \beta_2 \times totaltax_t + u_t \quad (6)$$

$$NO\dot{I}NDUST_t = \beta_1 + \beta_3 \times corptax_t + u_t \quad (7)$$

It should be noted that the information on the total tax rate was taken from the official website of the World Bank, [33]. Gross tax rate refers to the amount of taxes and mandatory payments payable by businesses after taking into account deductions and exemptions allowed as a share of commercial profits. Other taxes that are withheld (such as personal income tax) or collected and remitted to tax authorities (such as value-added taxes, sales taxes, or goods and services taxes) are not included in this indicator. The study included former Soviet countries without oil reserves. The main logic of such a choice is that GDP in these countries is generated from non-oil sectors and may depend to one degree or another on the tax rate.

First, let's try to quantify the effects of the total tax rate on the volume of GDP, economic growth, total capital formation, and the volume of non-oil industrial production in the non-oil-rich former Soviet republics. For this purpose, we will use (1) a simple panel analysis. 1) total tax rate for these countries; 2) corporate tax rate; 3) GDP volume; 4) economic growth; 5) total capital formation and 6) non-oil industrial products volume indicators will be used. Despite the fact that these countries involved in the study lived in the same economic and political system for decades, the economic paths they chose during the years of independence were completely different. However, despite the fact that there are serious differences with each other, a general trend towards the reduction of taxes is also observed. In all the countries involved in the study, both total taxes and corporate taxes decreased significantly in the period between 1996 and 2021. In that period, the volume of GDP per capita has an increasing trend in almost all of these countries. However, it is noteworthy that the volume of GDP in the Baltic countries is much higher than in other countries. In the period covered by the research, the general growth trend in the dynamics of the volume of non-oil products is noticeable. To determine the dependence of both the volume of GDP per capita and the volume of production of non-oil products, among other factors, on the tax rate.

3.1 Performing Unit Root Testing

It should be noted that it is important to check whether the regression relationship between the indicators is real. Thus, the rejection of the hypotheses $H_0: \beta_i = 0$ (i=$\overline{2,11}$) in the 1st regression equation or $H_0: \alpha_i = 0$ (i=$\overline{2,11}$)in the 2nd regression equation and " to avoid introducing spurious" regression relationships into the model, we need to check for time series stationarity of both the dependent and independent variables. We will perform the stationarity test using the Dickey-Fuller test. At this time, all three options, i.e. 1) without intersection and trend ($\Delta Y_t = \gamma \times Y_{t-1} + \varepsilon_t$); 2) where there is an intersection but no trend ($\Delta Y_t = \beta + \gamma \times Y_{t-1} + \varepsilon_t$); 3) variants with both the cross-section and the trend ($\Delta Y_t = \beta + \lambda \times t + \gamma \times Y_{t-1} + \varepsilon_t$) will be considered. At this time, t_{cr} values calculated by, [34], will be taken as critical values for t-statistics.

If the dependent and independent variables are stationary, then the satisfaction of the hypothesis $H_1: \beta_i \neq 0$ (i=$\overline{2,11}$) for the regression relationship between them will give us a reason to accept that the relationship between them is not "deceptive". In this case, the short-term adequacy of the connection can be continuously checked with other tests. If the stationarity of the dependent and independent variables is confirmed, it is appropriate to check the stationarity of their first variable (ΔY_t) Alternatively, testing for cointegration of the dependent and independent variables may be appropriate. The stationarity check for (ΔY_t) is realized by the procedure we mentioned above for Y_t

If the dependent and independent variables are non-stationary, i.e. non-stationarity at level I(0), and if their first variables are stationary, i.e. stationarity at level I(1), rewrite equations (1), (2), and (3) for the first variables it is more appropriate to build. If there is no stationarity between I(0) and I(1) or if the goal is to check the results of the research for a long period, then it is more appropriate to check the cointegration between these variables. In this case

1) absence of intersection and trend ($Y_t = \gamma \times x_t + \varepsilon_t$); 2) where there is an intersection, but no trend ($Y_t = \beta + \gamma \times X_t + \varepsilon_t$); 3) variants with both the cross-section and the trend ($Y_t = \beta + \lambda \times t + \gamma \times X_t + \varepsilon_t$) will be considered. At this time critical values t_{kr}calculated, [35], are used as critical values for t-statistics.

The cointegration test requires that the stationarity of the time series $\hat{\varepsilon}_t$ be confirmed according to the regression equation $\hat{\varepsilon}_t = \gamma \times \hat{\varepsilon}_{t-1} + \nu_t$ for all three regression models given in the first column of Table 2. If such stationarity exists, then we will argue that there is cointegration between $Y_t$and X_t and that these two-time series are in regression dependence for the long run.

After checking the stationarity of the indicators at the I(0) or I(1) level, as well as the presence of cointegration between the dependent variable and the independent variables, we will check the autocorrelation of the independent variables with the Durbin-Watson test, and if there is autocorrelation, we will perform the necessary operations to eliminate it in the model.

Depending on the purpose of the study, one or two-way Granger causal relationships will then be tested.

4 Results

A panel analysis of the relationship between total tax rates and per capita GDP volume, economic growth rate, total capital formation, and non-oil product volume is presented in Table 1. It can be seen from the table that total tax rates have a positive effect on GDP per capita. Of course, such a dependence model is not as simple as in the double regression equation (1). Thus, in this model, the autocorrelation of the GDP per capita indicator is

large, and without eliminating it, an adequate model cannot be imagined. At the same time, the effect of the total tax rate on the per capita economic growth indicator is also positive. However, this relationship is not so strong. The effect of total taxes on total capital formation is also not strong. Even the coefficient of determination is at the level of 0.04. That is why the dependence of total capital formation on total taxes can be considered weak. Such a weak dependence is also observed between the total tax rates and the volume of non-oil industrial products. Although the relationship between these indicators

Hypothesis H_0 is not satisfied for both β_1 and β_2 coefficients. However, the very small coefficient of determination means that the relationship is not at a significant level.

The fact that GDP volume, economic growth, total capital formation, and volume of total non-oil products do not depend on total tax rates leads to the conclusion that taxes do not play a significant role in the production function in these countries. On the other hand, the positive β_2 coefficient in the obtained results claims that the total tax rates are less than optimal.

A panel analysis of the relationship between corporate tax rates and per capita GDP volume, economic growth rate, gross capital formation, and non-oil product volume is presented in Table 2. It can be seen from the table that the logarithm of GDP volume per capita, economic growth, total capital formation, and the volume of non-oil industrial products depend on corporate tax rates.

According to the results of the balanced panel analysis based on equation (1), the coefficient of determination in the dependence of "volume of non-oil industrial products" on "corporate taxes" is at the level of $R^2 \approx 0.153$. Although this indicator is small, it shows that there is a certain level of connection. However, for the model to be adequate, it is necessary to eliminate autocorrelation.

After gaining independence, Azerbaijan began to rapidly integrate into the world market. In accordance with the requirements of globalization, the integration processes were accompanied by the improvement of the business environment for the transition from the liberalization of the internal market to market relations. The dynamics of indicators on the total tax rate in Azerbaijan (%) are presented in Figure 1. Similarly, the dynamics of corporate tax rate indicators in Azerbaijan (%) are presented in Figure 2.

Table 1. Total tax rates ($Taxburden_{it}$) with a) GDP volume per capita; b) economic growth rate; Panel analysis of the relationship between c) total capital formation and d) volume of non-oil products

	$GDPPC_{it}$	$GDPPCG_i$	GCF_{it} GCF_i	$NOINDUST_i$
R^2	0.960551	0.017145	0.040060	0.023148
Country number	11	11	11	15
sampling period (year)	15	15	15	10
Number of observations	165	165	165	150
β_1				
coefficient	5124.405	2.740372	5.13E+09	6.28E+09
Standard error	422.3635	0.881922	1.59E+09	2.05E+09
t-statistics	12.13269	3.107272	3.225959	3.065517
P-value	0.0000	0.0022	0.0015	0.0026
β_2				
coefficient	21.81968	0.026979	75286942	67381232
Standard error	8.255854	0.016000	28866275	35980195
t-statistics	2.642935	1.686225	2.608128	1.872731
P-value	0.0092	0.0937	0.0099	0.0631
F-statistic	135.3822	2.843353	6.802332	
Durbin-Watson coefficient	0.519747	1.387739	0.199849	0.101795

Note: calculated by the authors using the eViews software package

Table 2. Corporate tax rates ($corptax_{it}$) with a) GDP volume per capita; b) economic growth rate; Panel analysis of the relationship between c) total capital formation and d) volume of non-oil products

	$logGDPPC_{it}$	$GDPPCG_{it}$	GCF_{it}	$NOINDUST_{it}$
R^2	0.063416	0.000079	0.037427	0.152901
Country number	9	9	9	8
sampling period (year)	15	15	15	15
Number of observations	135	135	135	120
β_1				
coefficient	7.876420	4.328899	-	21.59846
Standard error	0.236035	1.488158	-	0.261742
t-statistics	33.36973	2.908897	-	82.51827
P-value	0.0000	0.0043	-	0.0000
β_2				
coefficient	0.040603	-0.008769	6.06E+08	0.070646
Standard error	0.013530	0.085306	44990011	0.015308
t-statistics	3.000903	-0.102799	13.47094	4.615081
P-value	0.0032	0.9183	0.0000	0.0000
F-statistic	9.005416	0.010568	-	21.29897
Durbin-Watson coefficient	0.063418	1.340679	0.25178	0.088580

Note: calculated by the authors using the eViews software package

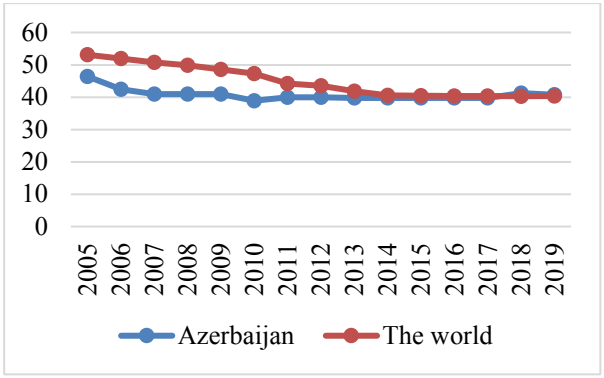

Fig. 1: Dynamics of indicators on the total tax rate in Azerbaijan (%)
Source: [33]

One of the most important indicators of a favorable business environment is related to the reduction of the tax burden and the reduction of administrative processes. As the process of globalization covers all countries, the average indicator of business environment favorability also tends to decrease. The total amount of taxes worldwide decreased by 13 percentage points in 2019 (40.38%) compared to 2005 (53.1%). In Azerbaijan, this process had a decreasing dynamics in the period 2005-2019, except for some years (Figure 1).

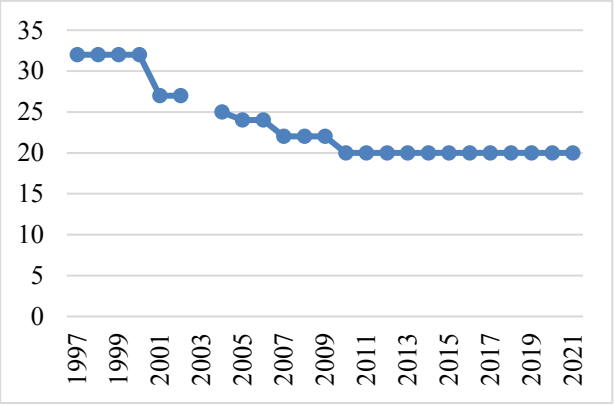

Fig. 2: Dynamics of corporate tax rate indicators in Azerbaijan (%)
Source: [32]

One of the important types of taxes characterizing the favorable business environment is corporate taxes. Such reduction of taxes can play a stimulating role in the development of non-oil industries. However, it cannot be denied that the impact of corporate taxes is imperceptibly small in cases where the effects of other factors affecting the non-oil industrial sector are strong. In Azerbaijan, starting in 1996, the trend of decreasing corporate tax rates attracted attention (Figure 2). However, after 2011, the corporate tax rate was kept at 20%. It is not found in the economic literature to prove how optimal such a tax rate is by scientific methods. However, the main fact that attracts attention is that there was no continuous increase in the volume of non-oil industrial products during that period. Thus, although the growth was continuous until 2015, the sharp decrease that occurred as a result of the devaluation of the manats (the national currency of Azerbaijan) was observed with continuous growth again in the following years. However, in all cases, the reduction of corporate taxes can be considered an important step toward improving the business environment in the country. Determining the optimal rate for corporate taxes is more important. Thus, the increase in taxes, besides having a negative effect on the business environment, can also provide an increase in budget revenues in the short term. But for the long term, due to the weakening of the business environment, the activity of taxpayers, as well as budget revenues, may decrease faster. On the other hand, reducing corporate taxes more than the optimal level hurts economic activity. Therefore, to increase the impact of corporate taxes on the economy, especially on non-oil industries, determining its optimal rate has important scientific and practical importance. The dynamics of GDP per capita indicators (US dollars) are presented in Figure 3. Similarly, the dynamics of Economic Growth İndicators (%) are presented in Figure 4.

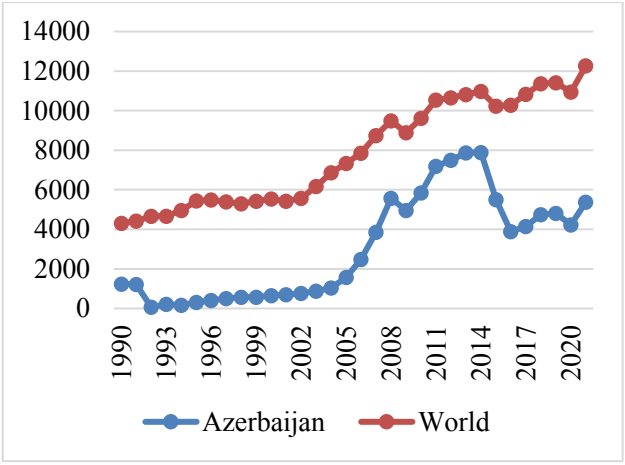

Fig. 3: Dynamics of GDP per capita indicators (US dollars)
Source: [31]

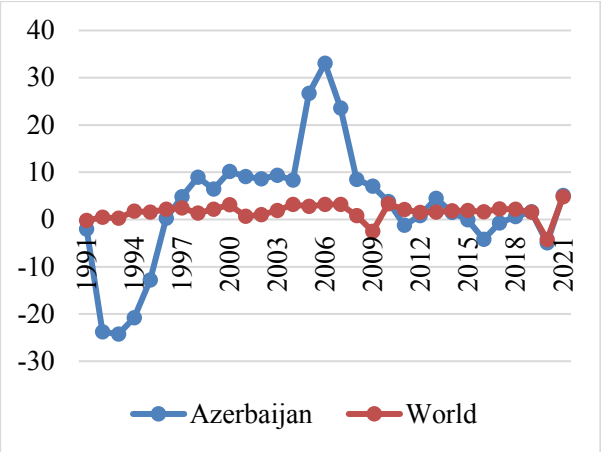

Fig. 4: Dynamics of Economic Growth İndicators (%)
Source: [31]

According to the Figure 3, the volume of GDP per person in Azerbaijan increased more than 4 times in 2021 compared to 1990 (1234.5 US dollars) and was 5384.03 US dollars in current US dollars. However, until the 2015 devaluation, this difference was much larger (about 6 times). The dependence of GDP per capita on oil revenues is due to the important share of oil revenues in the economy of Azerbaijan. According to the data of the World Bank, the share of Azerbaijan's oil rent in the GDP was close to 39.68% in 2006. Although this number decreased significantly in the following years, the share of oil rent is much higher. According to the data of the World Bank for 2020, according to the share of oil rent in GDP, Azerbaijan ranked 10th among the countries of the world with an indicator of 15.28%. The previous 9 places were shared by Iraq and other oil-rich countries. Oil-rich Norway's oil rent is only 4% of GDP. It is important to stimulate the development of the non-oil sector in Azerbaijan, especially the non-oil industries, based on the experience of oil-rich developed countries. The development of non-oil industries in the background of the decrease in oil revenues can create conditions for reducing the import volume of industrial products necessary for the country's economy and ensuring the export of some products in the future. It is important to create more favorable conditions for businesses working in this field to achieve a constant increase in the volume of GDP due to the development of non-oil industries. One such condition is tax incentives. The dynamics of total capital formation indicators (US dollars) are presented in Figure 5. Similarly, the dynamics of indicators on the volume of non-oil industrial products (US dollars) are presented in Figure 6.

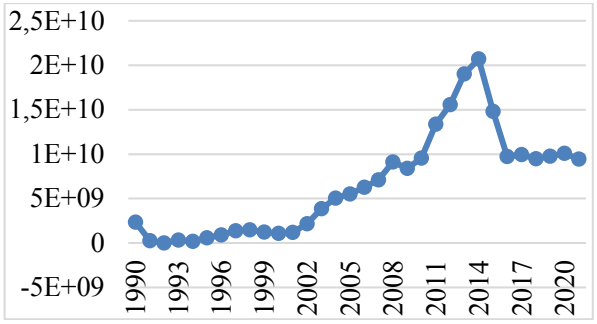

Fig. 5: Dynamics of total capital formation indicators (US dollars)
Source: [31]

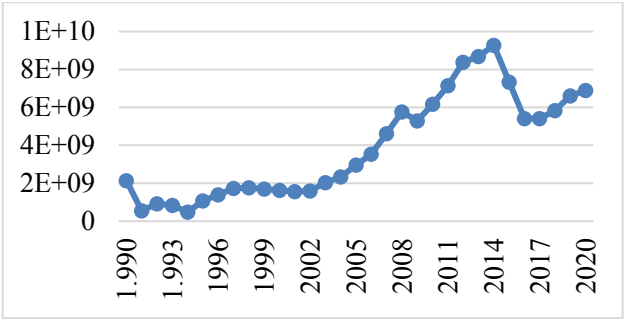

Fig. 6: Dynamics of indicators on the volume of non-oil industrial products (US dollars)
Source: [31]

The dependence of Azerbaijan's economy on oil revenues also manifests itself in the dynamics of the economic growth rate. Thus, the change of oil in the world market in any direction or the increase of oil production does not affect the economic growth rate in Azerbaijan. For example, in 2005, with the opening of the Baku-Tbilisi-Ceyhan export pipeline, the economic growth rate increased as a result of the sharp increase in the export volume of Azerbaijani oil. During the devaluation of 2015, the growth rate decreased sharply (Figure 4). That is why the change of taxes in any direction cannot affect the change of the economic growth rate. However, what we said are only assumptions and they need to be clarified by econometric calculations.

During the last 30 years, the dynamics of total capital formation (total domestic investment) in Azerbaijan had an increasing tendency until the 2015 devaluation. Although this indicator decreased sharply as a result of devaluation, it remained somewhat stable in the following years (Figure 5). The dependence of the total domestic investment volume on the business environment in the country is strong. However, since investments directed to the oil sector have an important weight within this indicator, its dependence on tax rates raises certain doubts. Approximately similar dynamics are characteristic of the volume of non-oil products

(Figure 6). This indicator also had an increasing dynamic until 2015. Although there was a sharp decrease as a result of devaluation, the increase was observed again in the following years.

Table 3. Time series stationary of some macroeconomic and tax rate indicators

	I(0)			I(1)		
	There is no intercept or trend	There is an intersection but no trend	There is an intersection and a trend	There is an intersection but no trend	There is an intersection but no trend	There is an intersection and a trend
$GDPPC_t$	-	-	-	+(***)	+(**)	+(*)
$GDPPCG_t$	+(*)	-	-	+(***)	+(***)	+(***)
$NOINDUST_t$	-	-	-	+(***)	+(***)	+(**)
GCF_t	-	-	-	+(***)	+(**)	+(**)
$Totaltax_t$	-	+(***)	-	+(*)	-	+(***)
$Corportax_t$	-	+(*)	-	+(**)	+(**)	+(***)

Note: calculated by the authors using the eViews software package

Based on equations (2) - (5), we need to check the stationarity of the time series of these indicators before looking for the regression relationship between these indicators. Table 3 shows the results of calculations based on the unit root test (Dickey-Fuller test) for checking stationarity. Here, "-" indicates no stationarity, and "+(*)", "+(**)" and "+(***)" indicate stationarity of 10%, 5% and 1%, indicates presence in the confidence interval, respectively.

From the data in Table 3, it is clear that the time series consisting of the first differences of almost all of the indicators involved in the study is stationary in different confidence intervals. The time series $Totaltax_t$ and $Corportax_t$ are stationary at intervals of 1% and 10%, respectively, even when there is a cross but no trend. Thus, based on equations (2), (3), (4), and (5), we can analyze the regression relationship between these indicators. At this time, we accept this as a hypothesis H_0 that $\beta_2 = 0$ and $\beta_3 = 0$. The result of the calculations is given in Table 4. Note that during the calculations, data for the period covering the years 2005-2019 were used.

The double regression analysis calculated according to equations (6) and (7) in Table 4 proves that there is a negative relationship between the volume of non-oil industrial products and taxes. However, we need to test the adequacy of this model for two reasons. The first reason is that both the dependent and independent variables are not stationary from degree I(0) according to the results given in Table 3. Therefore, the result obtained in Table 4 can be "misleading". In this case, we must be sure of the stationarity of the residuals. The test of the stationarity of the residuals for both regression analyses is given in Table 5.

Table 4. The main results of calculations are based on equations (2)-(5).

	$GDPPC_t$	$GDPPCG_t$	GCF_t	$NOINDUST_t$
R^2	0.543948	0.861964	0.420456	0.606769
Number of observations	15	15	15	15
β_1				
coefficient	32189.49	-128.2850	5.58E+10	2.90E+10
Standard error	8973.032	29.63665	2.42E+10	7.93E+09
t-statistics	3.587360	-4.328594	2.307459	3.662255
p-value	0.0037	0.0010	0.0397	0.0033
β_2				
coefficient	-406.0393	-0.619626	-1.67E+08	-1.62E+08
Standard error	358.3087	1.183443	9.66E+08	3.17E+08
t-statistics	-1.133211	-0.523579	-0.173390	-0.510602
p-value	0.2793	0.6101	0.8652	0.6189
β_2				
coefficient	-499.4663	7.670054	-1.80E+09	-7.78E+08
Standard error	427.2268	1.411069	1.15E+09	3.77E+08
t-statistics	-1.169089	5.435632	-1.566232	-2.060840
p-value	0.2651	0.0002	0.1433	0.0617
The F-statistic	7.156398	37.46707	4.352975	9.258217
Durbin-Watson coefficient	0.788870	1.887775	0.710699	0.827740

Note: calculated by the authors using the eViews software package

Table 5. Checking the stationarity of variances from degree I(0) according to equations (6) and (7).

	There is no intercept or trend	There is an intersection but no trend	There is an intersection and a trend
$NOINDUST_t$- totaltax	+(***)	-	-
$NOINDUST_t$- corportax	+(**)	-	-

Note: calculated by the authors using the eViews software package

The obtained results prove that the residuals are stationary in the absence of intercepts and trends. Therefore, we can accept that the obtained result is valid for a long period and the production volume of non-oil industry products has a negative dependence on taxes:

$$NOINDUST_t = \underset{(8.37E+09)}{3.44E+10} \cdot \underset{(2.05E+08)}{6.93E+08} \times totaltax_t \quad (8)$$

$$NOİNDUST_t = \underset{(1.58E+09)}{1.64E+10} \cdot \underset{(6.5E+7)}{4.97E+08} \times corptax_t \quad (9)$$

A second important reason for checking the adequacy of the model obtained through regression equations (6) and (7) is the presence of autocorrelation in the model. So, according to the results obtained in Table 4, the Durbin-Watson coefficient of the double regression dependence of the dependent variable $NOİNDUST_{it}$ on the independent variable $Corportax_t$is 0.75, and the Durbin-Watson coefficient of the double regression dependence on the independent variable $totaltax_t$ is 0.88. Therefore, the analysis of the pairwise regression relationship between these indicators after eliminating the autocorrelation for the adequacy of the models for the short-term period is given in Table 6.

Table 6. Regression analysis of the dependence of the volume of non-oil industrial products ($NOİNDUST_{it}$_it) on taxes for the short-term period

	$Corportax_t$	$Corportax_t - p_1 \times Corportax_{t-1} = Ctax_t$	$Ctaxt - p_2 \times Ctax_{t-1}$	$totaltax_t$	$totaltax_t - p \times totaltax_{t-1}$
R^2	0.714942	0.325667	0.001132	0.467596	0.011841
Müşahidələrin sayı	25	24	23	15	14
β_1		$\beta_1 * (1-\rho_1) = \gamma_1$	$\gamma_1 * (1-\rho_2) = \alpha_1$		$\beta_1 * (1-\rho_1) = \gamma_1$
coefficient	.64E+10	4.34E+09	3.53E+08	3.44E+10	4.03E+08
Standard error	1.58E+09	7.70E+08	1.75E+08	8.37E+09	6.74E+09
t-statistics	10.39227	5.639510	2.015398	4.112407	0.059708
p-value	0.0000	0.0000	0.0568	0.0012	0.9534
β_2		β_2	β_2		β_2
coefficient	-4.97E+08	-2.80E+08	-16199341	-6.93E+08	1.46E+08
Standard error	65468576	85800686	1.05E+08	2.05E+08	3.84E+08
t-statistics	-7.595092	-3.259575	-0.154280	-3.378989	0.379199
p-value	0.0000	0.0036	0.8789	0.0049	0.7112
The F-statistic	57.68542	10.62483	0.023802	11.41756	0.143792
Durbin-Watson coefficient	0.746616	0.862493	2.027082	0.879751	1.062359

Note: calculated by the authors using the eViews software package

Based on the results obtained in Table 6, we can claim that neither corporate taxes nor general taxes have a significant impact on the production volume of non-oil industrial products in Azerbaijan in the short term. However, there is a negative relationship in the long run. The increase in taxes has a negative effect on the volume of production of non-oil industrial products.

5 Discussion

A comparative analysis of the effects of taxes on the production volume of non-oil industrial products in the example of different countries, including Azerbaijan, suggests that the nature of the effects of taxes varies from country to country. Separate taxes, as well as total taxes, are government interventions in the economy. Such interventions reduce the favorable business environment. Non-oil sector in Azerbaijan is dominated by private enterprises. However, the main part of the products produced in such enterprises falls on the share of medium and large enterprises. Although the number of micro and small enterprises is large, their share in production is small. Therefore, the increase in taxes has an immediate negative impact on the activities of such entrepreneurs. However, medium and large enterprises compensate for their losses in the short term as they put tax costs on the product cost. In the long term, medium-sized enterprises also suffer from a high tax burden. The results obtained on the example of Azerbaijan are compared with the results obtained on the example of other countries, including on the example of Nigeria, [29], the example of the OECD countries, [28], the example of the 27 countries of the European Union, [26], on the example of Jordan, [24].

6 Conclusion

Neither corporate taxes nor general taxes have a significant impact on the production volume of non-oil industrial products in Azerbaijan in the short term. However, there is a negative relationship in the long run. The increase in taxes has a negative effect on the volume of production of non-oil industrial products.

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- Hasanova A.- Writing - original draft
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