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THE IMPACT OF TAX REVENUES ON ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM GEORGIA

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Abstract. *Establishing a rational tax policy is of great importance for stable and effective public governance. This article discusses the impact of changes in tax revenues on economic growth, using the example of Georgia. In the years after independence, significant changes in Georgian tax policy were made several times, which affected the economy of the country and made the issue of tax policy research relevant. Taxation is an important source of state revenues in Georgia. The amount of tax revenues in Georgia has continuously increased over the years, and reached 22.2% of gross domestic product in 2020. In addition, the ratio of revenues collected by direct and indirect taxes in tax revenues and the changes in dynamics are noteworthy. The impact of taxation on economic growth in Georgia is analyzed in this paper using the Autoregressive Distributed Lag (ARDL) model. The results of the econometric analysis suggest the positive and significant impact of indirect taxes as well as the negative impact of direct taxes on economic growth. Thus, tax policy changes are recommended.*

Keywords: *tax revenues, economic growth, budgetary policy, direct and indirect taxes, ARDL model*

Reikšminiai žodžiai: *mokestinės pajamos, ekonomikos augimas, biudžeto politika, tiesioginiai ir netiesioginiai mokesčiai, ARDL modelis.*

Methodology and Data Description

Taxation is a powerful instrument of fiscal policy which can promote consumption and investment. The structure and financing of tax changes are critical to achieving economic growth (Gale and Samwick 2017). Researchers around the world have long been interested in tax policy changes because of the potential they have to affect the overall economy (Gaspar 2015; Kalaš et al. 2017; OECD 2008). Some studies show that increases in average marginal income tax rates have significant negative effects on gross domestic product (GDP) (Barro and Redlick 2011). In order to examine the relationship between GDP and tax revenues in Georgia, an autoregressive distributed lag model (ARDL) was built. This model is best used for data with small sample sizes. In an ARDL model, the dependent variable is a function of its own past lagged values as well as the current and past values of other explanatory variables (Pesaran and Shin 1999). The above-mentioned method allows us to take into account the nature of the variables and the effects they have on themselves. Therefore, we can estimate the dynamic macroeconomic relationship between them and obtain a more realistic outcome.

The data used in this research were collected from the official documents of the Ministry of Finance of Georgia (www.mof.ge), State Treasury (www.treasury.ge) and the National Statistics Office of Georgia (www.geostat.ge). The empirical analysis was based on quarterly data from 2005 to 2020.

Research Results and Discussion

The aim of this study was to investigate the impact of direct and indirect taxes on the economic growth of Georgia. In order to obtain reliable empirical results, the GDP and tax variables were seasonally adjusted and logarithmized. For empirical evaluation, the following model was formulated:

$$LGDP_t = \alpha_0 + \alpha_1 LIT_t + \alpha_2 LDT_t + \varepsilon_t \qquad (1)$$

In the above equation, GDP represents economic growth and is the dependent variable of the model; IT is indirect taxes; DT is direct taxes; α_0 is the constant term; α_1 and α_2 are cointegrating vectors; and ε_t is the error term.

At the first stage of empirical research, it is important to analyze the seasonality of time series. Quarterly time series are often characterized by considerable seasonal variations, which might complicate inter-period comparability. Therefore, such time series are subjected to a seasonal adjustment process in order to remove the effects of seasonal fluctuations. Seasonal adjustment provides a clearer picture of time series. As a result of the analysis, the existence of a seasonal component was confirmed. In order to remove seasonal patterns, the moving average method was used. At the next stage of the study, the statistical characteristics of the variables were assessed (Table 1).

Table 1. *Statistical characteristics of time series*

CHARACTERISTICS	GDP	DIRECT TAXES	INDIRECT TAXES
Mean	5,771	657	900
Median	5,777	682	900
Maximum	7,723	1,341	1,532
Minimum	3,820	118	288
Standard Deviation	1,060	316	344
Skewness	0.045	0.08	0.24

CHARACTERISTICS	GDP	DIRECT TAXES	INDIRECT TAXES
Kurtosis	1.964	2.16	2.18
Jarque–Bera	2.614	1.75	2.19
Probability	0.27	0.42	0.33

Source: *author's own calculations.*

In the course of the research, the time series of the variables were tested for normality using the Jarque–Bera test. It was concluded that all variables were normally distributed, since each of their probabilities exceeded 0.05.

In order to determine the stationarity in the time series, the seasonally adjusted logarithmic values of GDP and both direct and indirect taxes were examined using the augmented Dickey–Fuller test (Table 2).

Table 2. *Augmented Dickey–Fuller test statistics*

			Test-critical values	*T*-statistic	Probability
GDP	LEVEL	Constant	−2.914*	−1.498	0.528
		Constant and linear trend	−3.497*	−4.515	0.004
	1ST DIFFERENCE	Constant	−2.915*	−8.553	0.000
		Constant and linear trend	−3.492*	−8.551	0.000
DIRECT TAXES	LEVEL	Constant	−2.917*	−3.160	0.028
		Constant and linear trend	−3.495*	−2.892	0.173
	1ST DIFFERENCE	Constant	−2.916*	−7.470	0.000
		Constant and linear trend	−3.495*	−6.298	0.000
INDIRECT TAXES	LEVEL	Constant	−2.917*	−1.655	0.448
		Constant and linear trend	−3.497*	−4.560	0.003
	1ST DIFFERENCE	Constant	−2.917*	−4.324	0.001
		Constant and linear trend	−3.495*	−4.420	0.005

Source: *author's own calculations. Note: * indicates a significance level of 5%.*
Akaike information criterion (AIC) was used.

The ARDL approach allows the variables to be stationary at different levels (I(0), I(1)) and the regressors to have different optimal lag lengths. The null hypothesis assumes that the time series is non-stationary or has a unit root (Dickey and Fuller 1979). When the test statistic of a variable is less than its own critical value and the p-value is less than 0.05, we conclude that the time series is stationary. In this case, the test statistic < critical value and $p < 0.05$, so the null hypothesis was rejected. According to the results of the analysis, the variables are stationary at no more than the first difference. Consequently, the danger of spurious regression has been eliminated.

Based on the results of the analysis, the ARDL model of taxes–GDP was built, where the dependent variable is GDP. The optimal lag length was selected automatically using the Akaike Information Criterion (AIC). The optimal ARDL model (1,1,0) was selected from the 100 models evaluated.

Table 3. *Characteristics of the ARDL model*

Variable	Coefficient	Probability
Log(GDP(−‒1))	0.566	0.0000
Log(DT)	0.020	0.3025
Log(DT(−‒1))	−‒0.045	0.0128
Log(IT)	0.122	0.0033
C	3.016	0.0002
TREND	0.003	0.0026

Source: *author's own calculations.*

Based on the data presented in Table 3, it is concluded that most of the regressors are significant at the 5% significance level, since their probabilities are less than 0.05.

At the next stage of the research, in order to detect the presence of a long-term relationship between the variables, a bounds test was conducted, the null and alternative hypotheses of which have the following forms:

$H_0 : \alpha_o = \alpha_1 = \alpha_2 = \alpha_3 = 0$ (there is no cointegration between time series)

$H_1 : \alpha_o \neq \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq 0$ (there is cointegration between time series)

The results of the bounds test for cointegration are presented in Table 4.

Table 4. *F-Bounds test results*

T-statistic	Value	Significance level	I(0)	I(1)
F-statistic	7.44	10%	4.19	5.06
		5%	4.87	5.85
		2.5%	5.79	6.59
		1%	6.34	7.52

Source: *author's own calculations.*

As can be seen from Table 4, the value of the *F*-statistic (7.44) is larger than the upper critical value – the value of I(1)) for 5% significance level (5.85). Accordingly, we can reject the null hypothesis and conclude that there is cointegration between the time series. Cointegration essentially means two time series have a long-run relationship.

Table 5. *ARDL Long Run Form*

Variable	Coefficient	Probability
Log(DT)	−‒0.059	0.1721
Log(IT)	0.283	0.0008

Source: *author's own calculations.*

The long-run coefficients obtained by estimating the ARDL model can be interpreted as follows: the coefficient of direct taxes is equal to −−0.059 and that of indirect taxes is equal to 0.283, which means that a 1% increase in direct taxes in the future will lead to a decrease in GDP of approximately 0.06%, and a 1% increase in indirect taxes will lead to an increase in GDP of 0.28%. However, according to the long-run form of the ARDL model, indirect taxes are a significant variable, while direct taxes are insignificant. Among the regressors, constant and trend are also significant.

Based on the above calculation by integrating the data into the first equation, the following simplified model for the economy of Georgia is obtained:

$$LGDP_t = 0.57*LGDP_{t-1} + 3.02 + 0.28*LIT_t - 0.06*LDT_{t-1} + 0.003*TREND \quad (2)$$

Since cointegration between the time series was confirmed, the study proceeded to determine the characteristics of the error correction model (ECM). This model reflects the long-run equilibrium relationships of variables and includes a short-run dynamic adjustment mechanism which shows how variables adjust when they are out of equilibrium. The ECM allows us to measure long-run equilibrium recovery rate. Therefore, the error correction model makes it possible to estimate both the short-term and long-term effects of the explanatory variables on the dependent variable.

Table 6. *Characteristics of the ECM*

Variable	Coefficient	Probability
C	3.016	0.0000
TREND	0.003	0.0000
D(LDT)	0.020	0.2297
CointEq(−1)	−−0.434	0.0000

Source: *author's own calculations*

The error correction model built on the basis of the data presented in Table 6 has the following form:

$$\Delta LGDP_t = 3.02 + \Delta 0.06*LDT_t + 0.003*TREND - 0.43*CointEq(-1) \quad (3)$$

According to Table 6, the coefficient of the cointegrating equation is −−0.43 and is statistically significant, which indicates that the deviation from the long-run equilibrium of the previous period (quarter in this case) is corrected in the next quarter by approximately 43%. As for differentiated direct taxes, their corresponding coefficient is insignificant.

After specifying the ARDL characteristics, the model was tested for stability with the CUSUM and CUSUMSQ tests. The graphs of CUSUM and CUSUMSQ test statistics lie within the 5% critical bound; therefore, the ARDL model is stable (Figure 1).

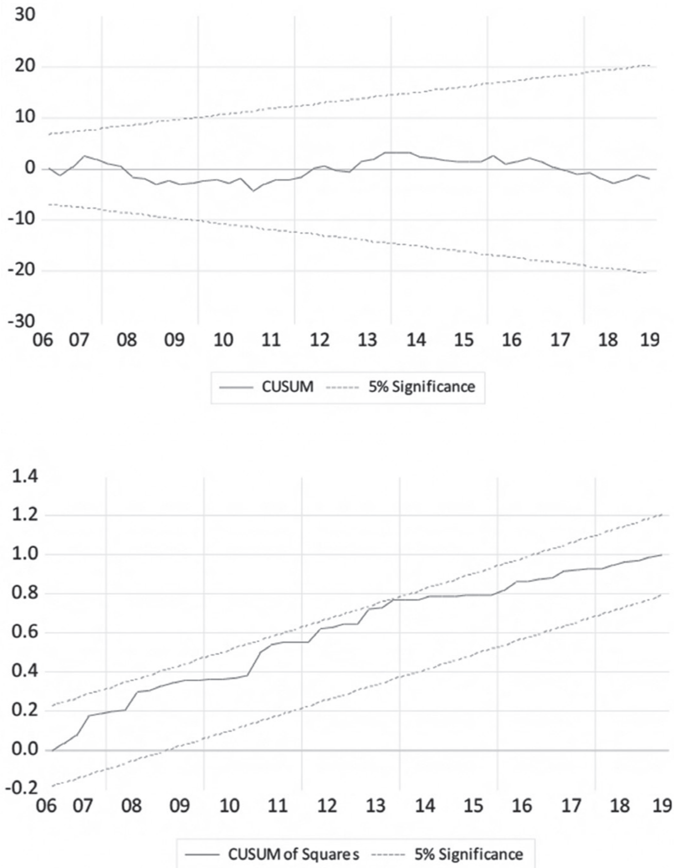

Figure 1. *ARDL model stability test results*

Source: *author's own calculations.*

In order to test for the presence of autocorrelation in the residuals, the Breusch–Godfrey test was performed. As a result, the null hypothesis of no autocorrelation was not rejected (Table 7).

Table 7. *Breusch–Godfrey test results*

F-statistic	2.0065
Probability	0.1628

Source: *author's own calculations.*

At the same time, the model was tested for heteroscedasticity with the White test, and it was found that there is no heteroskedasticity in the residuals (Table 8).

Table 8. *White test results*

F-statistic	1.5041
Probability	0.1411

Source: *author's own calculations.*

According to the results of the model evaluation, the ARDL model built on the example of the Georgian economy is reliable because there is no serial correlation and most of the coefficients of the explanatory variables included in the model are statistically significant. The model is statistically significant, since the estimated coefficient of determination ($R^2 = 0.9895$) and the adjusted coefficient of determination (adjusted $R^2 = 0.9885$) are close to 1. Therefore, we can conclude that the model can be used for long-term forecasting when indirect taxes are included as an independent variable.

Conclusion

The research presented above was motivated by the need for an empirical analysis of the impact of taxes on economic growth in Georgia. Based on the results of the research, it can be concluded that:

1. Indirect taxes have a positive and significant impact on economic growth;
2. Direct taxes have a negative impact on economic growth;
3. Income and profit taxes paid by taxpayers have a negative effect on economic growth, given that they reduce the disposable income of economic agents. Rising profit and income taxes discourages firms and individuals from making investments;
4. Value added tax and excise tax, which are indirect taxes, have a positive effect on economic growth by increasing government revenues.

Thus, the author recommends a decrease in the share of direct taxes in Georgia's total tax revenues at the expense of indirect tax revenues that will significantly contribute to economic growth.

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MOKESČIŲ PAJAMŲ ĮTAKA EKONOMIKOS AUGIMUI: EMPIRINIAI ĮRODYMAI IŠ SAKARTVELO

Anotacija. *Stabiliam ir efektyviam viešajam administravimui daug reikšmės turi racionalios mokesčių politikos kūrimas. Straipsnyje nagrinėjama mokestinių pajamų pokyčių įtaka ekonomikos augimui remiantis Sakartvelo pavyzdžiu. Po nepriklausomybės atkūrimo Sakartvelo mokesčių politika kelis kartus patyrė reikšmingų pokyčių, kurie paveikė šalies ekonomiką ir tapo aktualiu mokesčių politikos tyrimų klausimu. Mokesčiai yra svarbus Sakartvelo valstybės pajamų šaltinis. Mokesčių pajamų dydis Sakartvele bėgant metams nuolat didėjo ir 2020 metais pasiekė 22,2 % BVP (bendrojo vidaus produkto). Be to, verta atkreipti dėmesį į tiesioginių ir netiesioginių mokesčių surinktų pajamų dalį bendroje mokestinių pajamų apimtyje ir jų kitimo dinamiką. Mokesčių pajamų įtaka Sakartvelo ekonomikos augimui analizuojama naudojant autoregresinio paskirstyto atsilikimo (ARDL) modelį. Ekonometrinės analizės rezultatai liudija teigiamą ir reikšmingą netiesioginių mokesčių, taip pat neigiamą tiesioginių mokesčių įtaką ekonomikos augimui. Atitinkamai rekomenduotini mokesčių politikos pakeitimai.*

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