

CORRELATION BETWEEN TAX REVENUES AND GROSS DOMESTIC PRODUCT: EVIDENCE FROM THE DEVELOPING ECONOMY

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Abstract

How to cite this paper: Çollaku, L., Balaj, D., & Hajdini, A. (2023). Correlation between tax revenues and gross domestic product: Evidence from the developing economy. *Corporate & Business Strategy Review*, 4(1), 31–38.
<https://doi.org/10.22495/cbsrv4i1art3>

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ISSN Online: 2708-4965

ISSN Print: 2708-9924

Received: 17.08.2022

Accepted: 18.01.2023

JEL Classification: H20, H30, H61, H62, O11

DOI: 10.22495/cbsrv4i1art3

This paper examines the relationship between tax revenues and the economic growth of Kosovo as a developing country. The paper uses quarterly time series data for 2010:Q1–2021:Q4 collected by the Kosovo Statistical Agency and the Ministry of Finance of Kosovo. The data were analyzed using EViews v10. Augmented Dickey-Fuller (ADF), Johansen cointegration test, vector autoregressive (VAR) model, vector error correction model (VECM) estimation, and Granger causality test was used to analyze the model. The VECM results showed that fluctuations in tax revenues have a negative effect on the gross domestic product (GDP) in the long run. Using data from nine countries, Nguyen and Darsono (2022) demonstrated that tax revenues have an adverse effect on economic growth. Using Granger causality, the results showed that tax revenue growth could cause GDP growth, and GDP growth can cause tax revenue. Okonkwo (2018) recommends that the government tighten tax collection methods and regularly evaluate tax policies to maintain the country's tax revenue. Since taxes boost economic growth and boost taxes in emerging economies, the government should implement effective tax collection measures. The importance of the paper lies in the fact that fluctuations in tax revenues are an important cause of negative changes in GDP in the long run.

Keywords: Tax Revenues, GDP, Fluctuations, Kosovo, Relationship

Authors' individual contribution: Conceptualization — L.Ç. and D.B.; Methodology — L.C. and A.H.; Formal Analysis — L.Ç., D.B., and A.H.; Writing — Original Draft — L.Ç.; Writing — Review & Editing — L.Ç.

Declaration of conflicting interests: The Authors declare that there is no conflict of interest.

Acknowledgements: The Authors want to express gratitude to the Ph.D. candidate Kujtim Hameli for his assistance with empirical analysis.

1. INTRODUCTION

Governments must perform various tasks in the political, social, and economic spheres to increase social and economic welfare. To perform

these tasks and activities, the government needs significant resources. These resources are referred to as public revenues. Taxes and money from administrative activities, such as fines, fees, gifts, and grants, constitute public revenues (Ilyas &

Siddiqi, 2010). The fulfillment of basic governmental functions requires the existence of redistributive procedures. At the same time, government spending, as the primary instrument of economic policy, is limited by the need to finance it, with tax revenues often accounting for the bulk of government budget revenues (Macek, 2014).

Companies, people, and other entities are required by law to pay taxes to help pay for the government's budget. Taxes are mostly used for two main things. Taxes are a big and stable source of money that the government can use to pay for things. Taxes are also used to control the economy. The government controls production and consumption by controlling how businesses and people act (Nguyen, 2019). Taxes, the most important and essential weapon for raising public funds, come in different shapes and sizes (Rimmler et al., 2005). Taxes are used to raise money for government spending, redistribute income, stabilize the economy, minimize externalities, and influence resource allocation by promoting economic growth. To achieve economic development and fiscal consolidation, tax efficiency, especially the tax structure, is critical (Stoilova & Patonov, 2013). A sensible tax policy will boost economic growth, but an excessive tax system will slow down businesses and distort society's spending patterns (Johansson et al., 2008).

Ahmed and Muhammad (2010) argue that fiscal policy, which aligns government revenues and expenditures, is critical to supporting price stability and long-term growth in output, income, and employment, all of which are important economic indicators. Narayan (2005) asserts that all countries strive to increase their financial resources to meet their financial and public commitments and expenditures and to achieve the necessary economic and social development. Looking at the impact of taxes on economic growth, it is clear that the level of taxes on capital and intermediate goods has a significant impact; countries with lower taxes outperform those with higher taxes (Gerson, 1998).

Kosovo's economy finances its budget mainly from tax revenues, both direct and indirect taxes. Therefore, studying this topic will provide important lessons in a developing country context. Although extensive literature examines the relationship between tax revenues and gross domestic product (GDP) growth, there is always a need to track the impact of taxes on economic growth. This paper is the first attempt to study this topic in Kosovo. Therefore, the research question is:

RQ: Is there a significant correlation between tax revenues and the GDP of Kosovo?

To answer this question, we have used a considerable amount of data for ten years, covering 48 observations for tax revenues and GDP.

The remainder of this paper is structured as follows. Section 2 reviews the relevant literature. Section 3 analyses the methodology that has been used. Section 4 presents the results of the empirical study. Section 5 contains the discussion. Section 6 contains the conclusion.

2. LITERATURE REVIEW

The experience of many countries shows that increasing economic taxes affects fiscal policy, which leads economists to conduct further research

to determine whether this has a positive or negative effect on GDP. Various authors have presented their findings about taxes and their impact on economic growth. Among these results, several authors have presented conflicting findings on whether there is a positive or negative relationship between tax performance and economic growth, commonly measured with GDP. Hamza and Milo (2021) show that tax policy can promote economic and human growth and development through macroeconomic and microeconomic policies.

The tax system may have immediate and long-term effects on a country's economic growth. Many authors have examined the relationship between taxes and economic growth, and the results have shown a rather negative impact (Ferede & Dahlby, 2012; Nechaev & Antipina, 2016). The study by Neog and Gaur (2020) shows that capital transaction and property tax have significant positive effects, while the income and goods and services tax have negative effects. Elshani and Ahmeti's (2017) results show that the economic growth of Organisation for Economic Co-operation and Development (OECD) member countries is affected by different variables. Corporate income tax and value-added tax (VAT) positively affect economic growth, while customs, excise, and personal income taxes harm economic growth. While social contributions, property tax, and other tax revenues do not affect economic growth. Similarly, Kalaš et al. (2018) showed that consumption taxes have an adverse effect on GDP as corporate taxes, VAT, and social security contributions in Serbia and Croatia. VAT is the only tax with a statistically significant effect on GDP, as it is the mildest tax in these countries.

An early study by Widmalm (2001) on the relationship between taxes and the rate of economic growth in 23 OECD countries between 1965 and 1990 showed that taxes have a negative effect on economic growth. Dladla and Khobai (2018) used an autoregressive distribution lag approach for 1981–2016 to estimate the relationship between taxes and economic development in South Africa. The empirical results showed that taxes had a detrimental and significant effect on South Africa's economic growth, both in the short and long run. Romer and Romer (2010) studied the impact of tax reforms on U.S. economic performance. Their results are consistent with those of Dladla and Khobai (2018), that reforms significantly affect U.S. economic growth. Al-Agha (2005) studied the effect of taxes on GDP in Sudan from 1981 to 2003 to determine how taxes affect the country's long-term growth. The author used a time series analytical approach to evaluate the study's hypotheses. The study found that Sudan's tax system has a detrimental effect on GDP and led to various tax problems and increased tax evasion rates.

Other studies have demonstrated a positive relationship between tax revenues and GDP. Gashi et al. (2018) proved that taxes positively affect the economy. According to Adhikari (2020), who studied how income tax affects revenue production and collection, taxes are a major source of revenue collection and increase GDP. Odum et al. (2018) examined the impact of income tax on GDP growth using time series data focusing on Nigeria's fiscal policy environment. They found a favorable and statistically significant correlation between income tax and GDP growth. Ofoegbu et al. (2016) examined the impact of tax revenue on Nigeria's economic

development. The results showed that tax revenues significantly and favorably affect economic development. Tax revenue served as a vehicle for economic development in Nigeria. Takumah (2014) found similar results in examining the relationship between tax revenues and economic development in Ghana from 1986 to 2010. He argued that there is a unidirectional causal relationship between tax revenues and economic development, and the causality flow is from tax revenues to economic growth in Ghana. In their work, AL-Tamimi and Bataineh (2021) demonstrated a positive effect of tax revenues on GDP growth in Jordan for the period 2010–2018. Maganya (2020) attempted to identify the drivers of economic growth in Tanzania, given the government’s targeted actions through taxes. The researcher found that domestic taxes on goods and services are positively related to GDP growth, while income taxes, on the other hand, are negatively related to GDP growth.

These results imply that economic growth does not necessarily correlate with increased tax revenues. However, Gurdal et al. (2021) found a long- and short-term bidirectional causal relationship between economic growth and tax revenues. Given the mixed results and direction of effect between these two variables studied in the literature, it is necessary to examine the causal relationship between tax revenues and economic growth.

3. DATA AND METHODOLOGY

This study employs quarterly time-series data about tax revenues and GDP collected from the Kosovo Agency of Statistics (<https://ask.rks-gov.net>) and

the Kosovo Ministry of Finance (<https://mf.rks-gov.net/>). The sample interval ranges from 2010:Q1 to 2021:Q4, including 48 observations, which should be sufficient to capture the short- and long-term connections among the variables in the model, according to Jiyong et al. (2020), who used only 30 observations in their study. Data are analyzed using EViews v10.

The cointegration and error correction modeling (ECM) methodology was employed as the estimation method in this study. The estimation procedure consists of the following steps: first, the unit root test was performed for the stationarity of the variables; second, the cointegration test was performed to test the short and long-run relationship; third, the ECM estimation was used to test the formulated model; fourth, the diagnose of the model was provided regarding the model’s stability, fifth, the Granger causality was performed to check the causality between variables; and finally, the impulse response function showed the visual shocks between variables.

3.1. Unit root test

To perform the stationary test for the tax revenues (X) and GDP (Y) series, the commonly used ADF unit root test is utilized. Table 1 summarizes the results. The ADF results reveal that the two series are non-stationary at the level. However, the stationary condition is achieved after taking the variables into the first difference. Therefore, the tax revenue and GDP series are stationary at the first difference (1).

Table 1. ADF test results

Variables	Level			1st difference		
	ADF	Sig.	Result	ADF	Sig.	Result
X	0.194	0.968	Not stationary	-4.394	0.001	Stationary
Y	-1.153	0.685	Not stationary	-6.121	0.000	Stationary

3.2. Cointegration test

Table 2 shows the results of the Johansen cointegration test at the level of variables using a VAR model. The trace statistic and the maximum eigenvalue show a long-run relationship between tax revenues and GDP. This indicates that the variables have a stable and long-run equilibrium relationship. Assuming that a cointegration relationship exists, VEC modeling can be further conducted.

Table 2. Johansen cointegration test results

No. of CE(s)	Trace statistic	Prob.	Max. eigenvalues	Prob.
None*	105.244	0.000	104.076	0.000
At most 1	1.167	0.279	1.167	0.279

Note: * denotes rejection of the hypothesis at the 0.05 level.

From a vector error correction model (VECM) perspective, the relationship between tax revenues and GDP is formulated as follows:

$$\Delta \ln GDP_t = \sigma + \sum_{i=1}^{k-1} \beta_i \Delta \ln taxrevenues_{t-i} + \lambda_1 ECT_{t-1} + u_{1t} \quad (1)$$

$$\Delta \ln taxrevenues_t = \sigma + \sum_{i=1}^{k-1} \beta_i \Delta \ln GDP_{t-i} + \lambda_2 ECT_{t-1} + u_{2t} \quad (2)$$

where:

- $k-1$ = the lag length reduced by 1;
- β_i = the short-run dynamic coefficient of the model’s adjustment long-run equilibrium;
- λ_i = the speed of adjustment parameter with a negative sign;

- ECT_{t-1} = the error correction term with the lagged value of the residuals obtained from the cointegration regression of the dependent variable on the regressors;
- u = the stochastic error terms often called impulses or shocks.

4. RESULTS

Before running the VECM, we performed a VAR lag order suggested by some criteria in Table 3. Several statistics are used in order to decide for the number

of lags. The lag suggestion using each test is shown with asterisk symbol (*). Using Schwarz criterion (SC) and Likelihood ratios (LR), we set the lag length to five (5).

Table 3. VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-14.77664	NA	0.007771	0.818372	0.901961	0.848811
1	49.70232	119.5220	0.000407	-2.131820	-1.881054	-2.040505
2	65.87973	28.40911	0.000225	-2.725840	-2.307896	-2.573648
3	127.2498	101.7845	1.38e-05	-5.524382	-4.939259	-5.311312
4	158.2903	48.45348	3.71e-06	-6.843431	-6.091131	-6.569485
5	165.8918	11.12408*	3.15e-06	-7.019112	-6.099634*	-6.684289
6	171.4101	7.537166	2.98e-06*	-7.093174*	-6.006519	-6.697474*
7	175.3575	5.006480	3.07e-06	-7.090609	-5.836776	-6.634032

4.1. VECM estimation and analysis

The cointegration analysis demonstrated that tax revenues and GDP have a long-run equilibrium relationship. For this reason, the VECM is used to analyze this dynamic structure.

Table 4 summarizes the results of the cointegration equation. Under the *ceteris paribus* condition, each percentage-point increase in tax revenues will cause a decrease of 37 percentage points in GDP. The cointegration equation is:

$$GDP_{t-1} = -0.369657taxrevenues_{t-1} - 0.003569 \quad (3)$$

Table 4. VECM estimation results

Cointegration equation	Cointegration equation 1
ΔGDP(-1)	1
ΔTAX_REVENUE(-1)	-0.369657 [-4.36677]
C	-0.003569

The data in Table 5 show that the fit of the VEC model R² is greater than 0.50, and the values of the AIC and SC criteria are relatively small, indicating that the model estimate is reasonable.

Table 5. Results of the cointegration equation

Error correction	D(GDP)	D(TAX_REVENUE)
CointEq1	-3.176059 [-3.39949]	-1.473807 [-0.86929]
D(GDP(-1))	2.092720 [2.51688]	2.530775 [1.67727]
D(GDP(-2))	1.490385 [2.29010]	2.948364 [2.49652]
D(GDP(-3))	0.950391 [2.16993]	2.360360 [2.96975]
D(GDP(-4))	0.597604 [2.47277]	1.350779 [3.08002]
D(TAX_REVENUE(-1))	-1.113505 [-3.63452]	-2.047352 [-3.68252]
D(TAX_REVENUE(-2))	-0.865267 [-3.68768]	-2.008153 [-4.71626]
D(TAX_REVENUE(-3))	-0.562984 [-3.47820]	-1.763061 [-6.00239]
D(TAX_REVENUE(-4))	-0.188522 [-1.81950]	-0.549498 [-2.92249]
C	0.013793 [2.10727]	0.007193 [0.60552]
R-squared	0.982034	0.998688
F-statistic	194.3481	2707.222
Log-likelihood	88.72833	63.69997
Akaike (AIC)	-3.748968	-2.557142
Schwarz (SC)	-3.335237	-2.143411

4.2. Model diagnostics

We have performed diagnostics to test the stability of the model. Table 6 shows the results of the autocorrelation Lagrange multiplier (LM) test. For the five lags, the probability values are greater than 0.05, which means that the VECM model is free of autocorrelation. Table 7 shows the results of the normality test for both variables. Based on

the results of Jarque-Bera's, the first variable, i.e., GDP, shows a normal distribution, but the second variable, tax revenue, is not normally distributed. However, the results of the heteroskedasticity test $\chi^2 = 53.521$, $p > 0.05$, show no heteroskedasticity in the model. It is reasonable to assume that our model is stable, as shown in Figure 1, where there are no roots outside the circle.

Table 6. Independence of error terms: LM test

Lag	LRE stat.	df	Prob.	Rao F-stat.	df	Prob.
1	3.561596	4	0.4686	0.902267	(4, 58.0)	0.4687
2	0.506354	4	0.9729	0.124979	(4, 58.0)	0.9729
3	1.352288	4	0.8524	0.336180	(4, 58.0)	0.8525
4	2.939995	4	0.5679	0.740846	(4, 58.0)	0.5680
5	2.869177	4	0.5800	0.722563	(4, 58.0)	0.5801

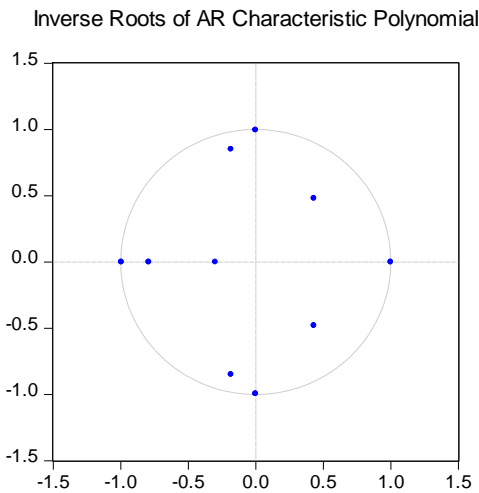
Table 7. Normality test results

Component	Jarque-Bera	df	Prob.
1	1.839203	2	0.3987
2	158.1890	2	0.0000

Table 8. Heteroskedasticity test results

Chi-sq.	df	Prob.
53.52130	54	0.4928

Figure 1. Autoregression (AR) roots



4.3. Granger causality test

Lastly, Table 9 displays the results of Granger causality based on the VECM. The first null hypothesis states that tax revenues do not Granger cause GDP. The $F = 2.693$, $p < 0.05$, show that the null hypothesis cannot be accepted. That is, tax revenues have a causal effect on GDP. Similarly, the null hypothesis that GDP does not Granger cause tax revenues is rejected according to $F = 4.648$, $p < 0.05$.

Table 9. Granger causality results based on VECM

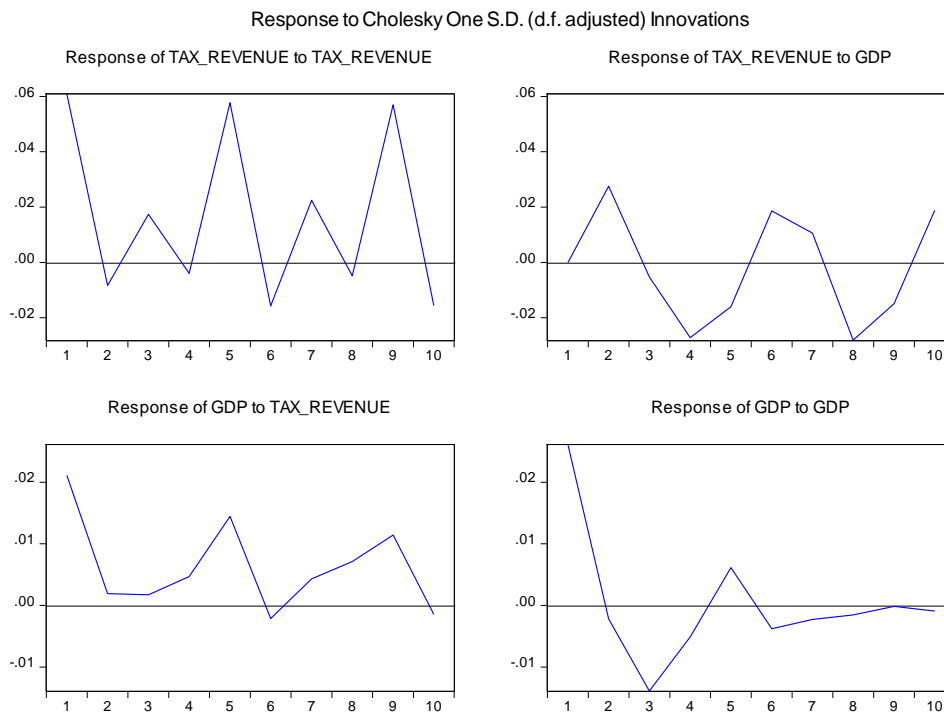
Null hypothesis	F-Stat.	Prob.
TAX_REVENUE does not Granger cause GDP	2.69335	0.0392
GDP does not Granger cause TAX_REVENUE	4.64889	0.0028

4.4. Impulse response function

The impulse response function and variance decomposition based on the VECM is then used to obtain results for ten periods to evaluate the dynamic effects of the model on specific shocks and to see how the effects on the variables are distributed. Figure 2 shows that negative shocks have a larger impact after analyzing GDP on tax revenues. Tax revenues increase from the first period to the third period. However, they decrease significantly and peak in the fourth period, then increase slightly but remain in the negative territory. The increase reaches the positive side and declines significantly until the eighth period. After this period, tax revenues continue to increase. This suggests that GDP has an important influence on tax revenues.

The diagram of the impulse response function of GDP changes caused by tax revenues is shown in the second part of the figure. As seen in Figure 2, positive shocks in tax revenues cause GDP to fall from the first to the third period. Then GDP increases where it peaks in the fifth period, only to fall slightly in the sixth. From this period to the ninth period, GDP responds positively to shocks in tax revenues and negatively until the last period.

Figure 2. Impulse response function results



From the data in Table 10, it can be seen that tax revenues show an increasing trend for each year, except for 2020, which saw an increase in tax revenues in the first quarter, while the trend in tax revenues in the other three periods showed a lower

result compared to the previous year due to the pandemic COVID-19. However, the situation improves in the following year, 2021, and tax revenues are quite positive.

Table 10. The value of Kosovo's tax revenues during 2010–2021 (presented quarterly, billion €)

Years	Quarter 1	Quarter 2	Quarter 3	Quarter 4
2010	161,790	384,030	651,550	893,603
2011	203,610	464,160	765,210	1,057,952
2012	202,440	470,580	781,240	1,093,939
2013	213,230	495,030	811,080	1,104,843
2014	231,460	513,940	831,630	1,157,544
2015	248,340	559,430	1,039,560	1,265,552
2016	291,230	642,500	1,059,490	1,421,132
2017	294,480	662,990	1,090,390	1,495,687
2018	310,940	705,290	1,152,070	1,563,754
2019	342,760	755,120	1,222,040	1,662,043
2020	352,450	683,930	1,078,880	1,506,983
2021	401,770	883,060	1,439,390	1,947,938

Source: Data is taken from the Kosovo Ministry of Finance, Labor and Transfers during the period 2010–2021.

5. DISCUSSION

The objective of this paper was to empirically test the causal relationship between tax revenues and economic growth, as measured by GDP, for Kosovo. A cointegration test, a VECM, and a Granger causality test were used to test this relationship. The results of the ADF test showed that the two variables are stationary in the first difference. The cointegration test showed a long-run relationship between Kosovo's tax revenues and economic growth. This long-run relationship was evaluated using the VECM.

The results showed that fluctuations in tax revenues are an important cause of long-term negative GDP changes. That is, a one-unit increase in tax revenues leads to a 37% decrease in GDP. This means that an increase in tax revenues can amplify GDP growth. Moreover, the Granger causality test has shown a bidirectional causality between tax revenues and GDP. Tax revenues have a significant causal effect on GDP, and GDP has a causal effect on tax revenues. A large body of literature examines the relationship between economic growth and tax revenues. Studies in the literature confirmed the causal relationship between these two variables. For example, Gacanja (2012) examined the relationship between economic growth and tax revenues in Kenya and found a causal relationship between the variables.

Other authors who confirmed the positive correlation between tax revenue and GDP are Popoola et al. (2017), who concluded, based on research, that there is a big difference between the impact of oil and non-oil tax revenue on economic growth in Nigeria. This study found that tax revenues positively affect economic growth in Nigeria, especially in socioeconomics. They confirm a positive and strong correlation between oil and non-oil tax revenues and Nigeria's level of convergence of economic growth.

Economic decisions can be influenced by high tax rates, which can have a negative impact on the country's economy. Abiola and Asiweh (2012) opined that high tax rates increase tax evasion and discourage investment. Ojong et al. (2016) examined the relationship between oil profits tax, non-oil revenue, corporate income tax, and economic growth in Nigeria. They found a significant relationship between oil and non-oil profit tax and economic

development but not between corporate profit tax and gross domestic profit. Ahmad et al. (2016) found a long- and short-term relationship between total tax revenues and economic growth.

In the long run, total tax revenues negatively and significantly affect economic growth. In the short run, the impact of total tax revenues on economic growth is negligible.

6. CONCLUSION

Economists and policymakers want to know how taxes affect economic growth. Unfortunately, there is no consensus on how large this effect is, as various studies have shown a wide range of effects. Our main findings relate to how tax revenues affect economic growth in developing countries such as Kosovo. We recommend that policymakers design appropriate policies that regulate the tax process and whose administration should contribute to tax collection and economic growth. We also recommend that the tax process be reviewed to ensure that it is fair to taxpayers and does not burden them.

It is also recommended that the institutions responsible for tax reduction take action because every tax increase impacts the decline in GDP. Tax revenues can only reach their full potential for the economy if the government adopts tax laws and regulations and tightens the existing ones in line with macroeconomic objectives, curbs tax evasion to minimize corruption, tax evasion, and tax avoidance, and improves the tax administration apparatus with human resources, accountability and transparency of government officials in managing tax revenues. This will increase the tax revenue base. And this will help the economy to become more independent and avoid high debt (Worlu & Nkoro, 2012).

This study has its limitations and shortcomings. The relationship between tax revenues and GDP was studied only for 2010–2021, as it was difficult to find data for earlier years for the quarterly period. It is the responsibility of future studies to analyze and enrich this area of study for earlier periods. In addition, future studies can examine the specific impact of direct and indirect tax revenues on economic growth in Kosovo. The model can also include other macroeconomic variables, such as foreign direct investment, to test the contemporaneous effect on economic growth.

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