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Tax revenue and economic growth in developing country: an autoregressive distribution lags approach

Abstract
Tanzania, like most other developing countries, faces numerous economic challenges in striving to achieve sustainable economic growth and development through taxation. In the literature, the debate on how effective taxes are as a tool for promoting economic growth and economic development remains inconclusive, as various research have reported mixed effects of tax on economic growth. This article investigates the effect of taxation on economic growth in Tanzania using the recently developed technique of autoregressive distributed lag model (ARDL) bounds testing procedure for the period from 1996 to 2019. Various preliminary tests were conducted including stationary tests as well as the pair-wise Granger causality test. According to the results obtained, domestic goods and services (TGS) taxes are positively related to GDP growth and are statistically significant at 1% level. Income taxes, on the other hand, were found to be negatively related to GDP growth and to be statistically significant at 5% level. The pair-wise Granger causality results indicated that there is bidirectional Granger causality between TGS and GDP growth at 1 % significance level. The government should aim at growing, nurturing and sustaining tax base to positively drive economic growth even further.

Keywords
taxation | economic growth | foreign direct investment | domestic investment | ADF test | autoregressive distributive lags model

JEL Codes
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1 Introduction

Economic growth can generally be defined as an increase in the productive capacity of the country, as measured annually. Meanwhile, taxes are a proportion of income of a country's population collected by the government for which no explicit reciprocal benefit is provided to the tax payer. From an empirical point of view, many researchers investigate whether there is a long run relationship between economic growth and taxation. The studies carried out based on this motivation differed, in terms of data usage, across countries, the methodologies applied, as well as the different time frames either being conducted in developed or developing countries (Egbunike, Emudainohwo, & Gunardi, 2018).

In the real-world phenomena, taxes can raise the capital cost and reduce people's incentives to invest, to the extent where high rates of tax deter domestic and foreign direct investments, thereby adversely affecting the long-term growth of the economy. Because of its effect on disposable income, taxes often impact household decisions to spend less and save more, supply less labour and invest in human capital. Individual households typically substitute high-taxed activities for activities that are taxed at relatively lower rates by the government a high tax rate causes individuals to reduce working hours and prefer more leisure to work, engage in less productive economic activity or at some point may decide to completely exit the market for labour, resulting in a lower growth rate of the country's economy (Ferede and Dahlby, 2012).

Taxation is the key to not only promoting sustainable growth but also reducing poverty in developing countries. It will provide those countries with a stable and predictable much-needed fiscal environment to promote growth and also to finance social and physical infrastructure required for sustainable development. Combined with economic growth, a high tax base should be able to reduce the long-term dependency of

those countries on aid and ensure good governance by promoting the accountability of states to their citizens and attaining macroeconomic stability. Availability and mobilisation of fiscal resources is the key factor that an economy can control and operate. Tax revenue, regardless of prevailing economic system, is a very important instrument for the government to meet planned expenditures and helps to achieve set growth targets over the years. The nature of existed direct or indirect taxes in an economy can help forecasting a growth pattern for future planning and policy implementation. The overall tax burden is significant in explaining variations in economic growth (Romer and Romer, 2010).

The impact of taxation on economic growth is not only a major concern of the policy makers and tax specialists but over the years been of interest to researchers and academicians as well. From practical point of view, tax policy is used for the social and economic purposes, such as resource allocation through higher savings generated internally, stable prices, controlling the production and consumption level indirectly through sales taxes, and increasing growth of the economy. Over the decades, economists have been interested in investigating factors causing different countries to grow at different rates and achieve different levels of wealth accumulation. However, several economists agree is that taxation is one of the significant factors that determines the productive capacity of the country (Stoilova, 2017).

In the literature, most of the empirical studies conducted on the effects of taxation on economic growth are mainly cross-country studies, for example Seward (2008); Dackehag and Hansson (2012); Macek (2014); Saibu (2015); Ugwunta and Ugwuanyi (2015); Stoilova (2017); Babatunde, Ibukun, and Oyeyemi (2017); Egbunike et al. (2018); Kalas, Mirovic, and Milenkovich (2018) whose findings cannot be directly applied to Tanzania since these findings may not accurately and adequately reflect the Tanzanian experience. Moreover, the study of this area in the Tanzanian context is inspired by the fact that these countries often differ in their exposure to economic problems and in their experience of stabilising policies. Most importantly, they differ greatly not only in their institutional, financial, political, economic structures but also in their reactions to external shocks. As a contribution to the literature on this subject of interest, this article employs a country-specific approach to investigate the effect of tax revenue on economic growth in Tanzania by using the most recent technique of autoregressive distributed lags approach (ARDL). Due to superiority of this approach over those previously employed, the findings of this article are expected to be more robust with strong policy implications and recommendations to the revenue authority of the country, thus accelerating economic growth with a wider understanding of the contribution of taxes to growth.

2 Literature Review

2.1 Theoretical framework

In the literature, there are various theories and frameworks that are used and are being discussed by various academicians and researchers to investigate the relationship between taxation and economic growth. Three main theories, namely, optimal taxation theory, exogenous growth theory and endogenous growth theory, are briefly discussed below.

Optimal taxation theory involves designing and undertaking a tax that lowers distortion and inefficiency in the market equilibrium under certain economic conditions. The fundamental theory of optimal taxation comprises choosing the tax that will maximise welfare function of the society considering a given set of constraints. In addition, if the first best outcome is not feasible and you have to seek for the second best then the design and implementation of the optimal tax requires knowing how to increase the number of outcome from a heterogeneous population using socially optimal way (Mankiw, Weinzierl, & Yagan, 2009).

In the literature, exogenous growth theory is also known as neoclassical theory to evaluate the correlation between taxation and growth. This theory is the mirror image of the endogenous growth theory to be discussed shortly, also known as the new growth theory. Solow model is one of the examples of exogenous theory and the pioneer of this theory is Robert Solow (1956). According to this theory, fiscal policy action by the government will not have any effect on the long-term growth of the economy, but it implies that any changes in economic growth will be caused by the key factors of production such as labour, capital and technological progress that are being determined outside of the model (Solow, 1956). However, in the neoclassical framework, taxes imposed by the government can have an impact on

growth in the transition to a new steady state if they affect the rate of savings and consequently investment level.

Endogenous growth models (EGMs) consist of a diverse body of theories that model economic growth through the medium of technological discoveries and progress that emerged during the 1980s. In the neoclassical growth model as it has been described, economic growth is determined by the rates of savings and capital accumulation. In this growth model, technological progress is taken as exogenous, meaning taken as given and being determined outside the model. In the EGM, technology progress is seen as the key determinant of long-term economic growth which the neoclassical growth model could not account for. Hence, technological progress becomes endogenous in endogenous growth models. As the matter of fact, it is the effect of diminishing returns in the neoclassical growth model that limits the expansion of output and economic growth. To overcome this limitation to economic growth, EGM inculcates increasing returns to scale (Barro, 1990). The classical Cobb Douglas production function exhibits constant returns to scale to the factor inputs say labor and capital. This leaves no reward or incentive for individuals to engage in economic activities that encourage technological innovations. Therefore, any theory that endogenises technological progress cannot be based on a competitive equilibrium where factors of production are being rewarded according to their marginal products. As far as the role of fiscal policy is concerned, this theory speculated that the state spending and taxation should have both a temporary and permanent effect on the growth of the economy. Tax will cause inefficiency and distortion in the product and labour markets, and the productive expenditure will affect the growth rate in the long-term (Barro, 1990).

In developing economies, the government has to play an active role in achieving sustainable economic growth. Therefore, fiscal policy is a very crucial instrument of government in promoting economic growth (Babatunde et al., 2017). An important part of the fiscal policy is taxation apart from government expenditure. Many economists believe that tax revenue is one of the most significant factors that contribute to a country's growth. For years, it has provided developing countries with a stable and predictable fiscal environment to promote growth and to finance the needed social and physical infrastructures. In Tanzania, for instance, the economy is highly dependent on tax revenue as a source of government expenditure for developmental purposes (Kweka & Morrissey, 2000). Combined with economic growth, tax revenue reduces long-term reliance on aid and ensures good governance by promoting openness and accountability of governments to their citizens (Romer and Romer, 2010).

2.2 Empirical evidence

In Tanzania, taxes on domestic goods and services (mainly VAT and excises) were the largest tax base from 1999 to 2008. From 2001, however, revenues from direct taxes (personal and corporate) in percent of GDP have gradually increased even though they are still below indirect taxes. From 2005, onwards, the same applies for trade taxes (tariff). Therefore, by 2008, indirect taxes (4.6%), direct taxes (4.5%) and trade taxes (4.1%) contributed with almost the same tax share of GDP. Trade tax revenues declined from 4% of GDP in 1996 to 2.6% in 2005, before increasing to 4.1% in 2008 (Fjeldstad & Heggstad, 2011). Non-tax revenues are mainly user fees, charges from various ministries and dividend from government institutions and have been kept relatively stable as a share of GDP throughout the period under study.

2.2.1 Taxes on domestic goods and services and economic growth

Immanuella (2016) investigated the contribution of VAT to the GDP growth using data obtained from Nigeria. The multiple regression analysis was used to show that VAT revenue and GDP growth are positively related and statistical significant. The study also found that VAT and the total tax revenue are positively related and statistical significant in the Nigerian context. In a similar study, Hakim, Karia, and Bujang (2016) investigated the effect of taxes on goods and service on the GDP growth in various developed countries. The study found that commodity tax and GDP growth were statistically significant and positively related in selected developed countries.

In the case of selected developing countries, a study by Kolahi and Noor (2016) investigated the impacts of VAT on GDP growth and its sources in developing countries. Panel data on 19 selected developing countries were analysed in which the generalised moment's method (GMM) was employed. Variables that were analysed include VAT, productivity growth,

capital accumulation growth, and GDP growth. The study found that VAT revenue and GDP growth had a positive relationship, but VAT had a negative effect on capital accumulation growth.

Simionescu and Albu (2016) analysed the effect of standard VAT rate on GDP growth in five Central and Eastern European countries (CEE-5). Different types of panel data models, such as random effect model, fixed effect model and dynamic panel, were analysed. The findings suggest that VAT and GDP growth are positively related. Bilateral Granger causality was found between GDP growth and VAT rate.

Similarly, a study by Hassan (2015) examined the relationship between VAT revenue and GDP growth in the Pakistani context. Time series data were employed on macroeconomic variables such as income tax revenue, VAT and GDP growth. The results the multiple regression technique conducted suggest a strong and positive relationship between VAT revenue and the GDP growth. Afolayan and Okoli (2015) used the same statistical and analytical methods and similar variables, which found that VAT and GDP growth in Nigeria were not significant in their study.

Njogu (2015) uses secondary time series data in Kenya consisting of VAT rates, consumer price indices, unemployment rate, and GDP growth rates. Multiple regression analysis was used and with regard to the relationship between VAT rates and GDP growth rate, the findings suggested that a percent change in the GDP incident rate is an increase of 7% for every unit decline in VAT. Therefore, it follows that there exists a significant negative relationship between VAT rates and GDP in Kenya.

In a study based on theoretical and empirical evidences, Jalata (2014) analysed the impact of VAT on GDP growth of Ethiopia. Time series macro-economic data were employed on VAT, total tax revenue excluding VAT, non-tax revenue, revenue from foreign sector and GDP growth. Multiple regressions and descriptive statistics were employed to analyse obtained time series data. The study found that as compared to sales tax, VAT boosts the general GDP growth of the Ethiopian economy but the issue of regressively resembling to sales tax continues to operate.

In the case of Tanzania, Chimilila (2018) examined the long-term effects of domestic resource mobilisation (DRM) on economic growth. This study was conducted by estimating the autoregressive distributed lag (ARDL) model, error correction model (ECM) and impulse response functions (IRFs). Findings of the study indicate that DRM has a significant positive long-term effect on economic growth implying that increased DRM enhances government ability to finance its budget for an enhanced growth. Moreover, the short-run effect was found to be negative and statistically significant which indicate distortionary effects of taxes in the short run.

2.2.2 Taxes on income and economic growth

Odum, Odum, and Egbunike (2018) investigated the impact of income tax on GDP growth with the main focus on the Nigerian fiscal policy framework while employing time series data. In the study the data set was analysed using Granger Causality test, Pearson Coefficient Correlation, OLS method of regression, Johansen Cointegration test and Error Correction Model (ECM). The results obtained indicated that income tax and GDP growth were positively related and statistically significant at 5% level. Using different data set obtained from different economic environment, Dackehag and Hansson (2012) analysed how tax on income impact upon GDP growth. More specifically, they studied how statutory tax rates on personal income and corporate income influence GDP growth by using panel data for 25 rich OECD countries. The findings reveal that both taxation of personal and corporate income negatively influence GDP growth. However, the correlation between corporate income tax (CIT) and GDP growth was found to be more robust.

Andrasic, Kalas, and Mirovic (2017) provided an empirical approach to economic growth and taxes using data from the United States. Based on diagnostic tests conducted, a regression model was adequately formulated where basic econometric techniques were employed. Findings from the study suggest that social security contributions and personal income tax are weakly related to GDP growth. Regression results show a significant effect of tax revenue growth and social security contributions, while corporate income tax and personal income tax do not have a significant impact on GDP growth. As the matter of fact in the US, personal income tax as the main tax form in the tax structure has no significant effect on GDP growth compared to social security contributions which percentage share is lower. Using the same spirit and provided arguments, Kalas et al. (2018) investigated an empirical analysis of taxes and GDP growth in the Serbian and Croatian context. To sufficiently identify

the effect of tax forms on GDP growth and their relationship, a panel regression approach was used, where GDP is the regressand, while corporate income tax and social security contributions are explanatory variables. The results of random effect model have shown that corporate income tax and social security contributions have a positive and statistically significant effect on GDP growth.

Etale and Bingilar (2016) investigated the effects of firms' income tax on GDP growth in Nigeria. Three variables were used in the study, namely VAT, CIT and GDP. The analysis of the study involves the use of multiple regression technique. The study found that CIT and GDP growth are positively related in Nigeria. In addition, the study proposed that state should strengthen administration of tax system to broaden the tax income in ensuring voluntary compliance of tax. Similarly, Dehghan and Nonejad (2015) examined the effect of tax rates on GDP growth in the Iranian context. The study covered several macroeconomic variables such as GST, population growth, trade openness, corporate income tax, inflation rate, business tax revenue, and GDP. Analyses were done using the auto regressive distributed lags method and findings suggest that goods and services tax (GST), corporate income tax (CIT), and business tax revenue had a negative and statistically significant effect on GDP growth of Iran.

Macek (2014) evaluated the effect of individual forms of taxes on GDP growth by employing regression analysis on the OECD. Findings of the study suggest that corporate income taxes followed by personal income taxes are the most harmful for growth of the economy, which implies that negative relationship with GDP growth was found. Following the same spirit, Hunady and Orviska (2015) aimed at verifying an assumed nonlinear impact of corporate tax rates on economic growth. Using a panel data fixed-effects model, empirical evidence for a non-linear relationship was found between nominal and effective corporate income tax rates and GDP growth. The data used in the study comprises annual series for the period of 1999–2011 for EU selected member states.

3 Methodology

3.1 Data

This study on the effect of taxation on economic growth employs secondary data obtained from published sources, that is, second-hand type of information obtained from secondary sources from 1996 to 2019. The variables of interest selected in this study based on the availability and reliability of data in which five variables (income tax, taxes on domestic goods and services, FDI, domestic investment (DI), inflation and real GDP) are being included. The data were obtained from Tanzania National Bureau of Statistics (NBS) and Tanzania Revenue Authority (TRA).

3.1.1 Economic growth

Economic growth is generally defined as the increase in country's productive capacity. In this study, the growth rate of GDP per capita, at constant prices, is used to measure economic growth and is chosen because per capita income is easy to understand and because it says something meaningful about the economic health of the state. Higher growth in income per capita means a state is growing more affluent on average, lower growth or decline means a state's residents are getting poorer.

3.1.2 Income tax

Income tax is a tax paid by individuals or entities depending on the level of earnings or gains during the financial year. In this study, income tax comprises the total direct tax paid by households and firms in a year and is being measured in Tanzania Shillings as provided by Tanzania Revenue Authority (TRA).

3.1.3 Taxes on goods and services

Taxes on domestic goods and services or simply indirect taxes are those which are paid by households and firms when they engage in spending, such as sales tax and Value Added Tax (VAT). In this article, taxes on domestic goods and services are calculated in Tanzania Shillings as provided by Tanzania Revenue Authority (TRA) for the given financial year.

3.1.4 Foreign direct investment

Foreign direct investment (FDI) is an investment made by a firm or individual in one country, say Tanzania, into business interests located in another country, say the UK or the US. In general, FDI takes place when an investor establishes foreign business operations or acquires foreign business assets in a foreign company. In this article, FDI is being measured in Tanzania Shillings on annual basis as provided by National Bureau of Statistics (NBS).

3.1.5 Domestic investment

Gross domestic investment DI is addition in a country's capital stock that does not include deductions for depreciation of capital that may have been produced previously. In this article, DI is being measured in Tanzania Shillings on annual basis as provided by National Bureau of Statistics (NBS).

3.1.6 Inflation rate

Inflation rate is the rate at which the average price level of a basket of selected goods and services in an economy increases over time. It is the persistence increase in the general price level where a unit of currency effectively buys less than it did in previous periods. Annual inflation rate is being used in this article as provided by National Bureau of Statistics (NBS) in Tanzania.

3.2 Model specification

The econometric literature makes clear that the estimates of ordinary least squares (OLS) are biased in nature and that they are inconsistent especially when using time series data. The reason is that the OLS estimates are affected by the presence of endogeneity, for that reason, they are unable to promise stable and robust forecasting (Messaoud & Teheni, 2014). This study applies autoregressive distribution lags (ARDL) approach to deal with these shortcomings.

The inclusion of inflation in the empirical model of this study is informed by the advice of Taylor (1994) that to be able to rise GDP growth, cost-oriented anti-inflation programmes have to be supported by high transfers from outside the country. There exist recursive relationship between tax revenue and economic growth accruable to the government. The relevance of foreign direct investment (FDI) apart from DI in the model is supported by the two-gap model of Chenery and Strout (1966) which showed that developing countries are constrained with low level of foreign exchange earnings and domestic savings. The expectation is that, in combining with other variables, foreign direct investment provides an optimal avenue to break the circle of poverty, solve the two gaps simultaneously and increase growth of the economy. The functional relationship is expressed as:

$$\mathrm{GDP} = \mathrm{f}\left(\mathrm{YTAX},\ \mathrm{TGS},\ \mathrm{FDI},\ \mathrm{DI},\ \mathrm{INF}\right) \tag{1}$$

where *GDP* is the growth rate of real gross domestic product per capita; *YTAX* is the income tax of households and firms, *TGS* is taxes on domestic goods and services, *FDI* is the foreign direct investment; *DI* is the domestic investment; and *INF* is the rate of inflation.

The generalised ARDL (ρ, q) model is specified as follows:

$$Y_t = \alpha_{0j} + \sum_{i=1}^{\rho} \delta_j Y_{t-1} + \sum_{i=0}^{q} \beta'_j X_{t-1} + \varepsilon_{jt} \tag{2}$$

where Y'_t is a vector and the variables in $(X'_t)'$ are allowed to purely $I(0)$ or $I(1)$ or cointegrated. β and δ are coefficients, $j = 1, \ldots\ldots, k$; α is a constant. ρ and q are optimal lag orders; ε_{jt} is a vector of the error term, unobservable zero mean white noise vector process (serially uncorrelated or independent). The dependent variable is a function of its lagged values, the current and lagged values of other exogenous variables in the model.

4 Results and Discussion

4.1 Unit root test

Since time series data are being used, it is imperative to test if they are stationary to avoid spurious regression results. This is also important to ensure that no variable of interest is integrated of order two or higher. The Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root test results show that all the variables are integrated of either order 0 or 1 (see Tables 1 and 2). The result presented in Table 2 shows that all the series were stationary at first difference since their

Tab. 1. Unit root test results (variables at level)

Series	ADF-Fisher chi-square		PP-Fisher chi-square		Equation specification
	t statistic	Probability	t statistic	Probability	
GDP	3.389	0.0155	10.555	0.0062	Intercept
YTAX	2.012	0.6730	2.407	0.5377	Intercept
TGS	1.617	0.7587	5.256	0.6943	Intercept
FDI	−1.267	0.0765	−1.473	0.1025	Intercept
DI	−0.464	0.6195	−0.196	0.4117	Intercept
INF	−2.963	0.0906	−3.503	0.1208	Intercept

Source: Author's computation (2020).

Tab. 2 Unit root test results (variables at first difference)

Series	ADF-Fisher chi-square		PP-Fisher chi-square		Equation specification
	t statistic	Probability	t statistic	Probability	
GDP	1.644	0.0000	2.227	0.0000	Intercept
YTAX	−1.782	0.0004	−3.572	0.0003	Intercept
TGS	−0.750	0.0002	−1.667	0.0002	Intercept
FDI	−4.284	0.0000	−8.030	0.0000	Intercept
DI	−4.745	0.0107	−4.529	0.0074	Intercept
INF	−5.776	0.0000	−6.328	0.0000	Intercept

Source: Author's computation (2020).

respective probability values were less than the 5% significance level.

4.2 ARDL test for cointegration

The ARDL bound test for cointegration and the result for the series model are being presented in Table 3. When GDP is the dependent variable, the test results indicated that F_{GDP}(YTAX, TGS, FDI, DI, INF) = 43.944; for YTAX model, F_{YTAX}(GDP, TGS, FDI, DI, INF) = 11.949; for TGS model F_{TGS} (GDP, YTAX, FDI, DI, INF) = 13.629; for FDI model, F_{FDI}(GDP, YTAX, TGS, DI, INF) = 4.496; for DI model F_{DI} (GDP, YTAX, TGS, FDI, INF) = 3.016 and for INF model, F_{INF}(GDP, YTAX, TGS, FDI, DI) = 3.544. The results indicated that there is a long-run relationship among the variables when GDP, YTAX, TGS, FDI, and INF are dependent variables, while for the DI, the null hypothesis of no cointegration was not rejected. For models that were found to have long-run relationship, the F-statistics were found to be higher than the upper bound critical value at 1% significance level. These obtained results suggested that the variables share a long-run relationship; therefore, we can proceed with the estimation of a long-run and short-run ARDL model, while for the model with DI as a dependent variable only short-run relationship is being estimated.

4.3 Long-run and short-run analysis

The long-run coefficients for the cointegrated models estimated are presented in Table 4. With GDP as the dependent variable, the results illustrated that income tax (YTAX) has a negative significant relationship with economic growth at 5% level. This implies that a 1% increase in income tax will result into about 5875 times decrease in GDP. Taxes on domestic goods and services (TGS) and DI were found to be positively related with GDP and statistically significant at 1% level. More specifically, 1% increase in DI will result into about 1.09% increase in GDP. With income tax

Tab. 3. Cointegration test results

Equation model	F stat.	AIC lag length criteria	Bound critical values		Decisions
			I(0)	I(1)	
F_{GDP}(YTAX,TGS, FDI, DI, INF)	43.944*	(2, 2, 0, 2,2,2)	2.26	3.35	Cointegrated
F_{YTAX}(GDP,TGS, FDI, DI, INF)	11.949*	(2, 2, 0, 2,2,2)	2.26	3.35	Cointegrated
F_{TGS}(GDP,YTAX, FDI, DI, INF)	13.629*	(2, 2, 2, 2,2,2)	2.26	3.35	Cointegrated
F_{FDI}(GDP,YTAX, TGS, DI, INF)	4.496*	(1, 2, 2, 2,2,2)	2.26	3.35	Cointegrated
F_{DI}(GDP,YTAX, TGS, FDI, INF)	2.016	(2, 2, 0, 2,2,0)	2.26	3.35	No cointegration
F_{INF}(GDP,YTAX, TGS, FDI, DI)	3.554*	(2, 0, 0, 1,2,0)	2.26	3.35	Cointegrated

*Denotes statistical significant at 1% level.

Tab. 4 Long-run estimated coefficients

Equation Model	GDP_t	$YTAX_t$	TGS_t	FDI_t	DI_t	INF_t	R^2
GDP_t	-	−5875.75**	12019.7*	0.3344	1.087*	−9.3e+07	0.97
$YTAX_t$	−0.00036**	-	1.0799*	0.0001	0.0004	−320.94	0.97
TGS_t	0.00509*	0.7383*	-	−0.084	−0.0048	3704.50	0.93
FDI_t	0.01440	718.455	−828.099	-	0.1592	−5909.04	0.75
INF_t	−7.38e−09	−5.38e−07	0.000125	−1.9e−09	1.2e−09	-	0.51

*Denotes statistical significant at 1% level.

**Denotes statistical significant at 5% level.

as a dependent variable, GDP and TGS were found to be statistically significant at 5% and 1%, respectively.

Regarding TGS model, GDP and income tax were found to be positively related with TGS and significant at 1% level. More specifically, 1% increase in GDP will result into about 0.5% increase in TGS. On the other hand, for the FDI and inflation model, all the variables were found not be statistically significant at any level of significance, hence accepting null hypothesis for all regression coefficients in these two last two models.

Table 5 provides the ARDL short-run coefficients among the estimated parameters. The results indicated that the lag value of GDP and the current value of YTAX have a negative effect on economic growth in the short-run at 1% of statistical significant. For the case of income tax, lagged value of income tax, GDP and FDI were found to be statically significant. GDP and inflation were found to positively cause changes on TGS and to be statistically significant at 1 % and 10%, respectively. Moreover, just like in the long-run estimation when the variable INF is dependent variable, all other variables were found not to be statistically significant.

The ECM_{t-1} for the five cointegrated models found to be negative and statistically significant at different levels of significance. This adjustment coefficient shows how quickly short-term disturbances return to the long-run equilibrium. For GDP model, the value of −0.53 indicated that the short-run deviations for the long run were corrected about 53 % each year. While for FDI, the ECM_{t-1} value of −0.51 indicated that the short-run deviations for the long-run were corrected about 51%. Regarding the YTAX model, the value of −0.57 indicated that the short-run deviations for the long run were corrected about 57% each year. With the same implication for TGS, the ECM_{t-1} value of −0.87 indicated that the short-run deviations for the long run were corrected about 87%. These models pass the diagnostic tests for heteroscedasticity and serial correlation, Durbin-Watson, Breusch-Godfrey and White tests were applied and results are presented in Table 5.

Tab. 5. ARDL short-run estimation results

Equation model	GDP_t		$YTAX_t$		TGS_t		FDI_t		INF_t	
GDP_t	-		−0.00011*		0.00009*		−0.3355		−8.64e-10	
GDP_{t-1}	−1.1181*		-		-		-		-	
$YTAX_t$	−309.34*		-		0.9021*		−2122.15		3.24e-06	
$YTAX_{t-1}$	-		0.9178*		-		-		-	
TGS_t	-		1.1427*		-		2800.89		5.91e-06	
TGS_{t-1}	-		-		−0.2333		-		-	
FDI_t	-		0.00015**		−0.00021		-		3.44e-09	
FDI_{t-1}	−0.5379*		-		-		0.5181		-	
INF_t			−9381.882		7918.4***		-3.53e+07		-	
INF_{t-1}			–		-		-		0.4865	
ECM_{t-1}			-0.5782*		−0.8717*		−0.5131**		−0.5228**	
Diagnostic tests	**T**	**Prob**	**T**	**Prob**	**T**	**Prob**	**T**	**Prob**	**T**	**Prob**
Dwatson	d=2.4080		d=2.4080		d=2.4080		d=2.4080		d=2.4080	
BGodfrey	1.929	0.1649	0.832	0.3618	5.197	0.2260	0.455	0.5002	23.67	0.5530
White test	21	0.3971	21	0.3971	21	0.3971	21	0.3971	21	0.3971

*Denotes statistical significant at 1% level.

**Denotes statistical significant at 5% level.

***Denotes statistical significant at 10% level.

Tab. 6. Granger causality test results

Dependent variable	c^2-statistics						Direction of causality
	ΔGDP	$\Delta YTAX$	ΔTGS	ΔFDI	ΔDI	ΔINF	
ΔGDP	-	3.1529	14.097*	0.2417	34.03**	12.7*	$\Delta TGS \rightarrow \Delta GDP$ $\Delta DI \rightarrow \Delta GDP$ $\Delta INF \rightarrow \Delta GDP$
$\Delta YTAX$	2.6375	-	0.4284	0.3065	3.2138	0.534	
ΔTGS	6.515**	18.271*	-	11.23*	23.589*	1.119	$\Delta GDP \rightarrow TGS$ $\Delta YTAX \rightarrow TGS$ $\Delta FDI \rightarrow TGS$ $\Delta DI \rightarrow TGS$
ΔFDI	2.1306	6.650**	2.9373	-	16.706*	8.4**	$\Delta YTAX \rightarrow \Delta FDI$ $\Delta DI \rightarrow \Delta FDI$ $\Delta INF \rightarrow \Delta FDI$
ΔDI	16.263*	1.2518	2.9657	7.85**	-	1.365	$\Delta GDP \rightarrow \Delta DI$ $\Delta FDI \rightarrow \Delta DI$
ΔINF	4.5416	0.01002	0.8330	3.6530	1.8359	-	

*Denotes statistical significant at 1% level.

**Denotes statistical significant at 5% level.

4.4 Pair-wise Granger causality test

Following the cointegration analysis and the fact that some of the models were found to be cointegrated give raise to determine pair-wise Granger causality to see the direction of the causality between the variables. In any case, if cointegration exists, it has to be either bidirectional, unidirectional or neutral causality between the variables. The results are obtained by using the pair-wise with Granger causality and Wald test. The Wald chi-square statistics of the variables indicated the short-run causality effects. The obtained results indicate that there is bidirectional Granger causality between GDP and taxes on domestic goods (TGS) at 1% significance level. The same results were obtained between GDP and DI, that is, they Granger cause each other. On the other hand, the chi-square statistics demonstrated that at 1% level, there is unidirectional Granger causality between GDP and inflation. The results also indicated that FDI Granger causes TGS. The findings also suggest that for case of income tax and inflation, there are no significant causality effects from any of the variable chosen in this study as presented on Table 6.

5 Conclusion

Being one of the recent studies that empirically investigated the extent which tax revenue engenders economic growth in developing countries, this article has attempted to determine the drive(s) of economic growth in Tanzania given deliberate government actions through taxation. This study investigated empirically on the effect of taxation on economic growth in Tanzania between 1996/97 and 2019/20. In this article, pre-estimation test was conducted that includes unit root tests and ARDL bound test for cointegration. The ARDL approach involves estimations of short-run relationship for models which were found not have long-run relationship, while for cointegrated models error correction model (ECM) was estimated. Findings of this study confirm the significant positive influence of domestic taxes on goods and services on GDP. The finding is consistent with the Ibn Khaldun's theory of taxation, which approves the positive impact that lower tax rate have on performance of the economy. On the other hand, income taxes were found to be negatively related to GDP growth and were statistically significant at 5% level. The pair-wise Granger causality results indicated that there is bidirectional Granger causality between TGS and GDP growth at 1% significance level. From FDI and DI to TGS, unidirectional causality was observed. It is being recommended from the results of the study that the taxation regime should be more oriented on individual taxpayers based on the benefit theory of taxation as elaborated by Cooper (1994), according to the benefit conferred on them. In effect, the more benefits an individual receives from the activities of the government, the more he or she should pay the government, so it is expected that explicit reciprocal benefit will subsist. For the economic growth, the structure of the tax system is as important as the total tax revenue a country is able to generate. Normally countries that are able to mobilise tax revenue through a broader tax structures accompanied with more efficient and effective administration are in a better position to attain faster and sustainable economic growth. As the matter of fact, the design of the tax system is likely to exert greater influence on long-term, sustainable growth rates. The findings obtained in this study, which focuses on the Tanzanian context, can also be generalised to other developing countries with similar institutional arrangements and legal frameworks.

References

Afolayan, S. M., & Okoli, M. N. (2015). The impact of value added tax on Nigerian economic growth (1994–2012): An investigation. *European Journal of Business and Management, 7*(9), 226–235.

Andrasic, J., Kalas, B., & Mirovic, V. (2017). Estimating the impact of taxes on the economic growth in the United States. *Economic Themes, 55*(4), 481–499.

Babatunde, A., Ibukun, O., & Oyeyemi, G. (2017). Taxation revenue and economic growth in Africa. *Journal of Accounting and Taxation, 9*(2), 11–22.

Barro, R. J. (1990). Government spending in a simple model of endogeneous growth. *Journal of Political Economy, 98*(5), 103–125.

Chenery, H., & Strout, A. (1966). Foreign assistance and economic development. *American Economic Review, 56*(4), 679–733.

Chimilila, C. (2018). Domestic resource mobilization and long term economic growth in Tanzania. *African Journal of Economic Review, 6*(1), 142–159.

Cooper, G. (1994). The benefit theory of taxation. *Australian Tax Forum, 11*, 379.

Dackehag, M., & Hansson, A. (2012). Taxation of income and economic growth: An empirical analysis of 25 rich OECD countries. *Working Paper No 6*, Lund University, Department of Economics.

Dehghan, M., & Nonejad, M. (2015). The impact of tax rates on economic growth of Iran in the years 1981–2010. *Journal of Finance and Accounting, 3*(6), 220–226.

Egbunike, F. C., Emudainohwo, O. B., & Gunardi, A. (2018). Tax revenue and economic growth: A study of Nigeria and Ghana. *Signifikan: Jurnal Ilmu Ekonomi, 7*(2), 213–220.

Etale, L. M., & Bingilar, P. F. (2016). The impact of company income tax and value added tax on economic growth: Evidence from Nigeria. *European Journal of Accounting, Auditing and Finance Research, 4*(7), 106–112.

Ferede, E., & Dahlby, B. (2012). The impact of tax cuts on economic growth: Evidence from the Canadian provinces. *National Tax Journal, 65*(3), 563–594.

Fjeldstad, O. H., & Heggstad, K. K. (2011). *The tax systems in Mozambique, Tanzania and Zambia: Capacity and constraints*. CMI Report, 2011(3), Chr. Michelsen Institute (CMI).

Hakim, T. A., Karia, A. A., & Bujang, I. (2016). Does goods and services tax stimulate economic growth? International evidence. *Journal of Business and Retail Management Research, 10*(3), 137–146.

Hassan, B. (2015). The role of value added tax (VAT) in the economic growth of Pakistan. *Journal of Economics and Sustainable Development, 6*(13), 174–183.

Hunady, J., & Orviska, M. (2015). The non-linear effect of corporate taxes on economic growth. *Timisoara Journal of Economics and Business, 8*(1), 14–31.

Immanuella, O. (2016). Evaluation of the contribution of value added tax to the Nigeria economy. *EPRA International Journal of Economic and Business Review, 4*(2), 32–46.

Jalata, D. M. (2014). The role of value added tax on economic growth of Ethiopia. *Science, Technology and Arts Research Journal, 3*(1), 156_161.

Kalas, B., Mirovic, V., & Milenkovich, N. (2018). The relationship between taxes and economic growth: Evidence from Serbia and Croatia. *European Journal of Applied Economics, 15*(2), 17–28.

Kolahi, S. H., & Noor, Z. B. (2016). The effect of value add tax on economic growth and its sources in developing countries. *International Journal of Economics and Finance, 8*(1), 217–228.

Kweka, J. P., & Morrissey, O. (2000). Government spending and economic growth in Tanzania, 1965 – 1996. *CREDIT Research Paper, No. 00/6.* The University of Nottingham, Centre for Research in Economic Development and International Trade (CREDIT), Nottingham.

Macek, R. (2014). The impact of taxation on economic growth: Case study of OECD countries. *Review of Economic Perspectives, 14*(4), 309–328.

Mankiw, N. G., Weinzierl, M., & Yagan, D. (2009). Optimal taxation in theory and practice. *Journal of Economic Perspectives, 23*(4), 147–174.

Messaoud, B., & Teheni, Z. E. G. (2014). Business regulations and economic growth: What can be explained? *International Strategic Management Review, 2*(2), 69–78.

Njogu, L. M. (2015). The effect of VAT on economic growth in Kenya. *International Academic Journal of Economics and Finance, 1*(5), 10–30.

Odum, A. N., Odum, C. G., & Egbunike, F. C. (2018). Effect of direct income tax on GDP: Evidence from Nigeria fiscal policy framework. *Indonesian Journal of Applied Business and Economic Research, 1*(1), 59–66.

British Journal of Economics, Finance and Management Sciences, 1(1), 11–29.

Romer, C. D., & Romer, D. H. (2010). The macroeconomic effects of tax changes: Estimates based on a new measure of fiscal shocks. *The American Economic Review, 100*(3), 763–801.

Saibu, O. M. (2015). Optimal tax rate and economic growth: Evidence from Nigeria and South Africa. *Euro Economica Issue, 34*(1), 41–50.

Seward, T. (2008). The impact of taxes on employment and economic growth: Evidence from the industrialized countries. *MPRA Working Paper Series*, No: 16574.

Simionescu, M., & Albu, L. (2016). The impact of standard VAT on economic growth in CEE-5 countries: Econometric analysis. *Technological and Economic Development of Economy, 22*(6), 850–866.

Solow, R. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics, 70*(1), 65–94.

Stoilova, D. (2017). Tax structure and economic growth: Evidence from the European Union. *Contaduriay Administracion, 62*(3), 1041–1057.

Taylor, L. (1994). Gap models. *Journal of Development Economics, 45*(1), 17–34.

Ugwunta, O. D., & Ugwuanyi, U. B. (2015). Effect of distortionary and non-distortionary taxes on economic growth: Evidence from sub-Saharan African countries. *Journal of Accounting and Taxation, 6*(7), 106–112.