Tanzanian Economic Review, Vol. 9 No. 1, 2019: 15–34

The Effect of the Quality of Governance on Tax Revenue in East Africa

Kahunde Rehema,[*] Mukisa Ibrahim[**] & Teera Joweria[§]

Abstract

The East African (EA) countries have run budget deficits for over a decade, implying that the amount of tax is low compared to what is required for the smooth-running of their economies. Although several studies have attempted to explore factors behind low tax revenues, these have overly concentrated on the supply side factors (sectoral contributions to GDP, GDP per capita, and inflation). Moreover, these studies have had conflicting results on the determinants of tax revenue. This study, therefore, seeks to investigate the effect of the quality of governance on the amount of tax revenue in the EA countries (1996 to 2016). The study employs the Panel Autoregressive Distributed Lag model as developed by Pesaran et al. (1999). Empirical evidence from the pooled mean group shows a positive long-run relationship among the variables, implying that an improvement in the quality of governance leads to a long-run increase in tax revenue. Therefore, long-run efforts to increase tax revenue in EA should focus on improvements in the quality of governance. However, the study finds a negative short-run relationship.

Keywords: *tax revenue, quality of governance, panel ARDL, EA*

1. Introduction

Globally, all governments are tasked with an overwhelming role of mobilizing revenues to finance their expenditures on infrastructure investment, social welfare, etc. The revenue collected also plays an important role in shaping the distribution of benefits, as it is the basis for redistribution from those with the highest incomes to those most in need, and allows government to encourage certain activities and discourage others by altering their relative prices. Therefore, taxation is one of the best instruments to boost the potential for public sector performance, finance social insurance program and to repay public debt. Hence, a country's revenue generation primarily depends upon its adequate capacity to tax more in both economic and administrative terms (Ajaz & Ahmed, 2010).

However, the expenditure scenario of the East African economies under study (Uganda, Kenya, Tanzania, Rwanda, and Burundi) reveals dismal improvements in revenue collection against expanding budgetary needs, which are reflected in widening primary deficits from very high public debts. According to World Development Indicators (2017), between 2006 and 2016, tax-to-GDP ratios in the East African region

[*] Makerere University: kahundek@gmail.com
[**] Makerere University: mukisaibrahim@yahoo.com
[§] Makerere University: joweriateera@gmail.com

ranged from 12.9% to 15.0%. Currently, the tax to GDP ratio for the individual countries in the region stand at 14.2%, 12.7%, 16.1%, 14.7%, and 16.3% for Uganda, Tanzania, Rwanda, Burundi, and Kenya, respectively. All the above tax to GDP ratios are still below the World Bank recommendation of 25% tax as a percentage of GDP.

In a bid to increase tax revenues, several tax reforms have been implemented in the different countries over the years. For instance, in Tanzania, a sales tax was introduced in 1969 to offset the decline in import duty revenue caused by an import substitution policy. In the early 1970s an attempt was made to broaden the tax base; and a progressive income and sales tax was widened in 1973 to compensate for the abolition of excise tax. In the early 1980s, tax policies were endogenously changed due to the loss of macroeconomic control. Import duties and sales taxes were raised to reduce escalating fiscal deficits (BoT, 2009). Recently, Tanzania has implemented more tax reforms, including the VAT Act, which, among others, has involved the provision of VAT exemptions on packaging materials to reduce production costs and protect pharmaceutical industries. The introduction of a 'Treasury Single Account', which will be used to collect and pay government funds; and the increase in gaming tax rate from 6 to 10 percent on gross sales in sports betting operations, are some of the new tax reforms that aim at improving the quantity and quality of tax revenue collection.

In Kenya, tax reforms took place from the early 1970s. For instance, in 1973 there was shift of tax burden to consumers through the introduction of sales tax. The sales tax was later replaced with Value Added Tax (VAT) in 1990. Other tax reforms that were implemented include the revision of tariffs and tax rates, expansion of the tax base, and the establishment of the Kenya Revenue Authority in 1995 (Wawire, 2000). According to the Kenya Vision 2030, some of the most recent improvements in the tax collection system in the country include the Integrated Tax Management System (ITMS) that enables large and medium taxpayers to make online filing of returns as well as payments; payment of taxes via mobile money through the Common Cash Receipting System (CCRS), which is a common revenue collection platform; and the revamping of the turnover tax to make it more efficient and easy for the taxpayers to comply (Kenya Vision, 2030).

In Uganda, major tax reforms were implemented in the 1990s aimed at addressing fiscal challenges that were facing the country. The Uganda Revenue Authority was set up in 1991 as a semi-autonomous agency to collect taxes to improve revenue administration. Value added tax was introduced in 1996 to replace sales tax and commercial transactions levy (CTL). In addition, tax identification number (TIN), a tax appeal tribunal, as well as a system of paying taxes through commercial banks were introduced. Recently, different taxes have been introduced, including taxes on mobile money service (0.5 percent on all withdraw transactions), social media tax (a daily charge of 200 UGX): all in a bid to widen the tax base and hence increase tax revenue (AfDB, 2010).

Reforms in Burundi involved the establishment of the Office Burundais des Recettes (OBR), following the naming of the country's tax department as the most corrupt institution (AfDB, 2010). In Rwanda, in the immediate aftermath of the genocide (when tax as a percentage of GDP fell from 8.2% to 3.6%), the government sought to quickly stabilize the economy by implementing a series of tax reforms to increase domestic revenues. In 1997, it established the Rwanda Revenue Authority (RRA), a semi-autonomous revenue authority for revenue collection and enforcement. Other reforms were introduced, including Value Added Tax in 2001. New technologies to computerize the administration processes have also been adopted (Yoriko & April, 2013).

Despite the different reforms stated above, tax revenue in East Africa is still below the World Bank benchmark of 25% tax to GDP ratio, prompting various studies on the issue. However, most of these studies have overly concentrated on supply-side factors such as trade, per capita income, contribution of different sectors of the economy, etc. (Botlhole, 2010; Agbeyegbe et al., 2004; Eltony, 2002). These studies have ignored the impact of tax administration/tax collecting bodies on the amount of revenue collected, which has also limited our knowledge on revenue collection.

According to Bird et al. (2008), the factors of a country's demand-side (quality of governance) play an important role in determining how much is collected in terms of tax revenue. This is an area where East African countries have persistently performed poorly. For instance, in the time period under review, the average rank for the region in terms of control of corruption, government effectiveness, political stability, regulatory quality, rule of law, and voice and accountability ranged from -0.73 to -0.59, -0.61 to -0.52, -0.95 to -0.73, -0.54 to -0.26, -0.71 to -0.42 and -0.75 to -0.54, respectively: all of which are below zero (World Governance Indicators, 2016). Therefore, as a contribution to the literature, this study examines the impact of the quality of governance on tax revenue in the EA countries, specifically isolating the effect of each of the indicators of governance as given by the World Bank. The study uses a unique methodology of Panel Autoregressive Distributed Lag Model, a technique that has not been used in any of the previous related studies.

2. Theoretical Literature

According to the benefit theory, tax levels are automatically determined: taxpayers pay proportionately for the benefits they receive from the government. In other words, an individual who benefits the most from public services pays more taxes. Therefore, the benefit theory relates to government effectiveness in terms of the quality of social services provided by a government. People's decision on whether to pay taxes or not is determined by their perception of what, and how the government spends this revenue. The quality of, say, infrastructure, availability of electricity, and better social services play an important role on people's decision to pay or avoid taxes.

The ability to pay theory of taxation treats government revenue and expenditures separately. Taxes are based on taxpayers' ability to pay. Since there is no immediately visible 'quid pro quo', taxes are seen as a sacrifice by taxpayers, which raises issues of what the sacrifice of each taxpayer should be, and how it should be measured. According to this theory, the total loss of utility resulting from taxation should be equal for all taxpayers; that is, the rich should be taxed more than the poor. There are several theoretical postulations regarding the link between institutional quality/governance and tax revenue. For instance, Besley and Persson (2009) assert that cohesive political institutions provide stronger checks and balances on the executive, leading to improvement in tax systems and proper utilization of taxes in a manner than broadens a tax base. However, they indicate that causal effect of political institutions on tax revenue and fiscal capacity may differ, depending on whether the effect is on the effectiveness dimension or on the impartiality dimension of fiscal capacity. In particular, they argue that political institutions are likely to have a positive impact on the impartiality dimension of fiscal capacity, while its impact on the effectiveness of taxation systems remains ambiguous (ibid.).

Besley and Persson (2014) further argue that in a democratic system, the checks and balance that come with institutional quality may not matter for domestic revenue mobilization. This argument is based on the median voter hypothesis that suggests that there is enough incentive for democratic governments to invest in effective tax systems, so that a ruling party can provide public goods necessary for re-election. Congruently, rational autocrats have strong incentive to invest in an effective taxation system to provide public goods to citizens and to extract some of the revenues for personal benefits (ibid.). Therefore, authoritarian and democratic regimes are equally likely to invest in the effectiveness of taxation systems.

Regarding accountability, Levi (1988) argues that creating mechanisms of accountability and placing constraints on rulers facilitate the existence of a fiscal bargain between citizens and rulers. This reduces the transaction costs of taxing by making compliance 'quasi voluntary', and by building 'tax morale' (Luttmer & Singhal, 2014). With increased accountability, citizens are presumed to be more willing to enter into a fiscal contract with the state since they have more control over its actions and greater belief in its legitimacy (Bates & Da-Hsiang, 1985).

Ricciuti et al. (2016) also argue that a regime with limited checks and balances, and non-transparent tax system, is characterized by higher tax evasion. In such regimes, elites face few constraints in avoiding taxes or in devising a non-transparent tax system that discriminates in their favour. Relatedly, Shleifer and Vishny (1993) argue that greater transparency may reduce the ability of rulers to extract revenues for themselves.

One of the major indicators of institutional quality is corruption. Bird (2008) argues that the complexity of a tax system can breed corruption. Imam and Jacobs (2014) also assert that corruption in revenue administration is a two-way dagger: demand for corrupt actions by companies and individuals, and the supply of corrupt acts by

tax officials. Whatever the case, the effects of corruption on revenue mobilization are grivious. Dreher and Herzfeld (2005) and Bird (2008) explain four major channels through which corruption lowers tax revenues. These include: (i) corroding the tax morality of taxpayers, which in turn damages the possibility of establishing good tax governance; (ii) distorting a tax structure by introducing tax regulations that are favorable to industries with entrenched powers; (iii) increasing the size of the shadow economy by encouraging economic agents to go underground; and (iv) reducing economic growth by decreasing public sector investment.

3. Empirical Literature

Several studies have attempted to explore factors determining tax revenue. However, as mentioned earlier, most of these studies focus on supply-side factors such as per capita GDP, sectoral composition of output, degree of trade and financial openness, ratio of foreign aid to GDP, and ratio of overall debt to GDP. For instance, Leuthold's study (1991) on Sub-Saharan Africa (SSA) using panel data found a positive impact from trade share, but a negative one from the share of agriculture. Agbeyegbe et al. (2004) investigated the relationship between tax revenue, trade liberalization and changes in the exchange rate. and their results suggest that trade liberalization, agricultural share, industrial share, government consumption, and terms of trade exert a positive effect on total tax revenue; while inflation exerts a negative effect. Botlhole's study (2010) on tax revenue and the determinants of tax ratio in SSA revealed that the resource sector generates large taxable surpluses, and therefore countries endowed with natural resources have more tax revenue compared to their counterparts without natural resources. On their part, Drummond et al. (2012) also concluded that the traditional determinants of tax revenue are per capita GDP, sectoral composition of output, degree of trade openness, inflation, external debt, ratio of foreign aid to GDP, current account balance and foreign direct investments. In their analysis of the determinants of low tax revenue in Pakistan, employing time series data over the period 1973-2009, Chaudhry and Munir (2010) found that openness, broad money, external debt, foreign aid, and political stability are the significant determinants of tax efforts in Pakistan.

Studies that have considered the quality of governance as a determining factor of tax revenue include those of Nnyanzi et al. (2016), which analysed the impact of regional integration on tax revenue in the East African Community. The study found a negative and significant relationship between tax revenue and government effectiveness, rule of law and political stability. However, the study employed a weaker methodology (GMM estimation) since it does not consider long-run and short-run effects of the variables.

Bird et al., (2008) analysed tax revenue in developing and high-income countries, and concluded that a more legitimate and responsive state is an essential factor for a more adequate level of tax revenue. This study, however, did not consider all the quality of governance indicators as defined by World Bank. A similar study by Tahseen and Eatzaz (2010) analysed the effect of institutional and structural variables (corruption and governance) on tax revenues using a panel dataset for 25

developing countries during 1990-2005. Its GMM regression results indicated that institutional variables have a significant effect on all taxes, emphasizing that corruption has adverse effects on tax collection; while good governance contributes to better performance in tax collection.

On their part, Amadou and Mariama (2016) used the world governance indicators (WGI) to find out how good governance relates to financing sources in SSA countries. They found that good governance matters in financing development; while corruption among the governance indicators has the highest influence on finance sources for SSA economies. Thus, they concluded that addressing corruption in the region could yield quick and important gains in terms of raising the much-needed financing for development.

This paper builds on the studies by Nnyanzi et al. (2016), and Bird et al. (2008) by using a superior methodology (Panel Autoregressive Distributed Lag), which considers both the long- and short-run effects of the quality of governance on tax revenue. Additionally, the study considers all the six quality of governance indicators as defined by the World Bank, using a most recent dataset.

5. Analytical Framework

To account for the effect of the quality of governance on tax revenue, this study extends the tax model developed by Heller (1975). The public decision-maker's utility function is given by:

$$U = U(Y - T, G, D, F + L) \quad (1)$$

U_{Y-T} and $U_G > 0$

U_D and $U_{F+L} < 0$ if D and $F + L > 0$

U_D and $U_{F+L} > 0$ if D and $F + L < 0$

Where $Y - T$ (equal to GDP, Y; minus tax revenue, T) is the private sector's disposable income; D is the net domestic government borrowing; G is the total government expenditure; and $F + L$ is net foreign financing, consisting of grants (F) and loans (L).

The variables D and $F + L$ can be either positive or negative, and thus the first derivatives of U with respect to D and $F + L$ are either negative [U_D and $U_{F+L} < 0$] or positive [U_D and $U_{F+L} > 0$]. All the variables in the model are in real per capita terms. The budget constraint faced by the decision maker is given by:

$$T + F + L + D = G \quad (2)$$

Expanding on Leuthold's (1991) applied tax model, it is assumed that the actual tax-revenue to GDP ratio (T/Y) is a function of the desired tax revenue to GDP ratio (T/Y)* and the availability of certain tax bases (B), as well as the status of economic policies (E) and the level of corruption (C). That is:

$$\frac{T}{Y} = f\left\{\left(\frac{T}{Y}\right)^{*}, B, E, C\right\} \quad (3)$$

Desired tax revenue is determined by maximizing the utility function subject to the budget constraint. Following Heller (1975), it is assumed that the utility function takes a quadratic form as follows:

$$U = a_1(Y - T - Y_s) - \frac{a_2}{2}(Y - T - Y_s)^2 + a_3(G - G_s) - \frac{a_4}{2}(G - G_s)^2 - a_5(D) - \frac{a_6}{2}D^2 - a_7(F + L) - a_8(F + L)^2 \quad (4)$$

Where the a's are positive constants, and Y_s and G_s are subsistence levels of income and government expenditure, respectively. Empirically, a quadratic utility function is preferable to a log linear one because the terms D and $F + L$ can either be positive or negative.

Since Y_s and G_s are not observable following Leuthold (1991), it is assumed that they are simple linear functions of income as follows;

$$G_s = g_0 + g_1 Y \quad (5)$$

And

$$Y_s = y_0 + \ y_1 Y \quad (6)$$

Maximizing the decision maker's utility function with respect to T, G and D subject to the budget constraint, yields the following reduced form equation for the desired tax revenue to GDP ratio:

$$\left(\frac{T}{Y}\right)^* = \left[\frac{\alpha + a_4 g_0 - \beta y_0}{\beta + a_4}\right]\left[\frac{1}{Y}\right] - \left[\frac{a_4}{\beta + a_4}\right]\left[\frac{F + L}{Y}\right] + \left[\frac{a_4 g_1}{\beta + a_4}\right] \quad (7)$$

Where;

$$\alpha = \left(-a_1 + a_3 - \frac{a_1 a_4}{a_6} + \frac{a_4 a_5}{a_6}\right) \text{and } \beta = \frac{a_2(a_4 + a_6)}{a_6}$$

Combining Leuthold's applied tax model and the reduced form equation for the desired tax revenue to GDP ratio above yields:

$$\frac{T}{Y} = f\left(\frac{1}{Y}, \frac{F + L}{Y}, B, E, C\right) \quad (8)$$

Since β is positive and α could be either positive or negative, (T/Y)*is a negative function of $(F + L)/Y$ and an ambiguous function of the inverse of per capita income $(1/Y)$.

5.1 The Empirical Model

The empirical model is developed by modifying the theoretical model in equation (8) to account for the impact of the quality of governance on tax revenue. Therefore, the study adopts a linear model as specified below:

$$Taxrevenue_{it} = \alpha_0 + \alpha_1 GDPpercapitagrowth_{it} + \alpha_2 Agriculture_{it} + \alpha_3 Manufacturing_{it} + \alpha_4 Trade_{it} + \alpha_5 Service_{it} + \alpha_6' Institutionalquality_{it} + u_{it} \quad (9)$$

$$u_{it} = \mu_i + \varepsilon_{it} \text{and} \varepsilon_{it} \sim iid(0, \sigma^2)$$

Where;

Agriculture is the contribution of the agricultural sector to GDP;
Manufacturing is the share of manufacturing sector in GDP;
Trade is the contribution of the trade sector to GDP;
Service is the share of the service sector in GDP;
GDP per capita growth is the proxy for overall level of development as it measures the growth in individual income levels;
Tax revenue is the tax to GDP ratio;
Institutional Quality in this study is captured by several indicators, and these include: government effectiveness, rule of law, regulatory quality, control of corruption, political stability and absence of violence, and voice and accountability (these variables capture quality of governance);
Government Effectiveness measures the perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies;
Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and especially the quality of contract enforcement, property rights, the police, and the courts; as well as the likelihood of crime and violence;
Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Institutional capacity is, therefore, an average of these variables. A higher value represents stronger institutional quality;
Control of Corruption variable captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as the 'capture' of the state by elites and private interests;
Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism; and
Voice and Accountability measures perceptions of the extent to which a country's citizens can participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

Worth noting is that the estimates for all the quality of governance indicators are measured in units of a standard normal distribution, ranging from -2.5 to 2.5. Moving towards -2.5 indicates poor performance, while a move towards 2.5 indicates improvement in the quality of institutions. Each of these indicators enters the model separately.

5.2 Estimation Procedure

Before estimating the effect of the quality of governance and tax revenue, it is important to analyse the extent of linear relationship between the variables using the pairwise correlation test. This type of analysis also helps to reveal any possibilities of

multicollinearity in the model. If the results indicate that the values of the correlation coefficients between explanatory variables are lower than 0.80, then the model does not suffer from the problem of multicollinearity (Studenmund, 2001).

The study also conducts a panel data unit root test to determine whether the variables are stationary or not since panel data contains both the cross-section and the time components. The study employs two panel unit root tests—that of Levin, Lin and Chu (LLC), which assumes that the autoregressive parameters are common across countries, i.e., it assumes homogeneous coefficients; and that of Im, Pesaran and Shin (IPS), which assumes heterogeneous coefficients of the study variables—to test for panel data stationarity. Both tests have been used for confirmation of the stationarity of variables due to their differences in the alternative hypotheses. Using both tests also solves the power and size problems of each of the tests.

In achieving the objectives of the study, we adopt the Panel Autoregressive Distributed Lag Model (panel ARDL) suggested by Pesaran et al. (1999). The choice of the model is based on the dynamic nature of the quality of governance variables like political instability, which therefore requires a methodology that explicitly separates the short- and long-run effects of these variables on tax revenue. Unlike the traditional panel data methods, the adopted methodology allows for dynamics, which is a well-known feature of governments of the EAC member states, as well as short-run dynamic specification and error variances to differ across countries. Likewise, the model is preferred to the GMM-difference estimator proposed by Arellano and Bond (1991), the GMM system estimator by Arellano and Bover (1995), and that of Blundell and Bond (1998) on grounds that our dataset comprises of a small N (5 countries) and large T (21 years). As argued by Roodman (2006), GMM-difference estimator and GMM system work well when the dataset features many panels (N) relative to the time period (T). Eberhardt (2012) asserts that GMM-difference and GMM system estimators are used to analyse micro panel datasets with large N and small T. However, given that our dataset is composed of small N (N = 4), and large T (T = 21), we therefore adopt the methodology that offers the opportunity to get consistent estimates when N is small and T is large.

Considering the issue of non-stationarity of the series, we adopt a methodology capable of estimating a mixture of both I(0) and I(1) variables. Additionally, this methodology is also capable of estimating both the long- and short-run coefficients given that GMM captures only the short-run dynamics.

Thus, we follow Pesaran et al. (1999)'s dynamic heterogeneous panel data methodology, and specify a panel ARDL (p,q); where p is the number of lags of the dependent variable, and q is the number of lags of the explanatory variables.

$$y_{it=}\mu_i + \sum_{j=1}^{p} \lambda_{ij}\, y_{i,t-j} + \sum_{l=0}^{q} \delta_{il}'\, \chi_{i,t-l} + e_{it} \qquad (10)$$

Where the number of panels i = 1, 2, 3, 4, 5; and time t = 1, 2, 3 .... 21 years; μ_i represents the fixed effects; χ_{it} is a $(k \times 1)$ vector of explanatory variables; λ_{ij} is a scalar; and δ_{il} is a $(k \times 1)$ coefficients vector (coefficients of the regressors).

Equation (10) can be re-parameterized and rewritten in terms of linear combination of variables in levels and first differences to capture both the long- and short-run coefficients:

$$y_{it} = \mu_i + \emptyset_i y_{i,t-1} + \varphi_i' \chi_{it} + \sum_{j=1}^{p-1} \lambda_{ij}^{*} \Delta y_{i,t-j} + \sum_{l=0}^{q-1} \delta_{i,l}' \Delta \chi_{i,t-l} + e_{it} \qquad (11)$$

Where

$$\emptyset_i = -\left(1 - \sum_{j=1}^{p} \lambda_{ij}\right), \varphi_i = \sum_{j=0}^{p} \delta_{ij}\,, \lambda_{i,j} = -\sum_{m=j+1}^{p} \lambda_{i,m}\,, \delta_{i,l} = -\sum_{m=l+1}^{q} \delta_{lm}'$$

With $j = 1,2,\ldots,p-1$, and $l = 1,2,\ldots,q-1$. If we group the variables in levels, this can be re-parameterized as:

$$\Delta y_{it} = \mu_i + \phi_i\left[y_{i,t-1} - \theta_i' \chi_{it}\right] + \sum_{j=1}^{p-1} \lambda_{i,j} \Delta y_{i,t-j} + \sum_{l=0}^{q-1} \delta_{i,l}' \Delta \chi_{i,t-l} + e_{it} \qquad (12)$$

Where $\theta_i = -\phi_i^{-1}\varphi_l$ defines the long-run equilibrium relationship between the variables involved (long-run coefficients); and ϕ_i is the speed of adjustment with which the tax ratio adjusts towards its long-run equilibrium given a change in χ_{it}.

If $\phi_i = 0$, then there is no evidence of a long-run relationship. With the existence of a long-run relationship, the parameter is expected to be negative and statistically significant under the prior supposition that variables indicate a convergence to long-run equilibrium in case of any disturbance.

Equation (12) can also be rewritten as:

$$\Delta y_{it} = \mu_i + \phi_i y_{i,t-1} - \phi_i \theta_i' \chi_{it} + \sum_{j=1}^{p-1} \lambda_{ij}^{*} \Delta y_{i,t-j} + \sum_{l=0}^{q-1} \delta_{i,l}^{*'} \Delta \chi_{i,t-l} + e_{it} \qquad (13)$$

$$\Delta y_{it} = \mu_i + \beta y_{i,t-1} + \alpha \chi_{it} + \sum_{j=1}^{p-1} \lambda_{ij}^{*} \Delta y_{i,t-j} + \sum_{l=0}^{q-1} \delta_{i,l}^{*\prime} \Delta \chi_{i,t-l} + e_{it} \qquad (14)$$

Where $\beta = \phi_i$, $\alpha = -\phi_i \theta_i'$ and the long-run coefficients $\theta_i' = -\frac{\alpha}{\phi_i}$

More specifically, the empirical model adopted for this study is as in equation (15).

$$\begin{aligned} \Delta Taxeffort_{it} = {} & \mu_i + \beta Taxratio_{i,t-1} + \alpha_1 GDPpercapitagrowth_{it} \\ & + \alpha_2 Agriculture_{it} + \alpha_3 Manufacturing_{it} + \alpha_4 Trade_{it} + \alpha_5 Service_{it} \\ & + \alpha_6 Institutionalquality_{it} + \sum_{j=1}^{p-1} \lambda_j \Delta Taxratio_{i,t-j} \\ & + \sum_{l=0}^{q-1} \delta_{1l} \Delta GDPpercapitagrowth_{i,t-l} + \sum_{l=0}^{q-1} \delta_{2l} \Delta Agriculture_{i,t-l} \\ & + \sum_{l=0}^{q-1} \delta_{3l} \Delta Manufacturing_{i,t-l} + \sum_{l=0}^{q-1} \delta_{4l} \Delta Trade_{i,t-l} \\ & + \sum_{l=0}^{q-1} \delta_{5l}' \Delta Institutionalquality_{i,t-l} + e_{it} \qquad (15) \end{aligned}$$

In finding out the relationship between tax revenue and the rest of the regressors as shown in equation (15) above, we use the mean group (MG) and pooled mean group (PMG) estimators suggested by Pesaran and Smith (1995) and Pesaran et al. (1999), since we are interested in both short- and long-run coefficients.

6. Empirical Findings

Table 1 shows the summary statistics of all the variables used in the analysis. It displays the mean, the standard deviation, and the maximum and minimum values of each variable in the study.

Table 1: Summary Statistics

Variable	Obs.	Mean	Std. Deviation	Min.	Max.
Tax ratio	105	13.66	2.571	7.720	19.30
GDP per capita growth	105	2.271	3.099	-9.204	10.44
Share of agriculture	105	35.33	8.728	22.74	60.58
Share of manufacturing	105	8.151	4.812	12.49	14.46
Share of industry	105	16.18	11.78	39.79	27.40
Share of service	105	48.49	8.172	30.15	79.21
Trade as a percentage of GDP	105	42.94	9.798	20.96	64.48
Control of corruption	105	-0.732	0.457	-1.410	0.762
Government effectiveness	105	-0.646	0.381	-1.662	0.107
Political stability	105	-1.061	0.623	-2.524	0.0518
Regulatory quality	105	-0.490	0.424	-1.641	0.246
Rule of law	105	-0.707	0.388	-1.537	0.0701
Voice and accountability	105	-0.738	0.455	-1.579	-0.130

Source: Author's Computation

The summary statistics of the variables was computed for the five EAC countries over the period of 21 years (1996–2016), thus giving a total number of 105 observations. This implies that the panel is strongly balanced. The minimum and maximum values of each of the variables have also been computed, of which, overall, there are no outliers since the minimum and the maximum values of each of the variables is relatively close to its mean. The mean value of each variable represents how each of the variables performs on average. The mean tax to GDP ratio over the sample period was 13.66%. The mean of the different sectors explains how much, on average, each of these sectors contributes to the GDP of these economies. The average contribution of the service sector to the GDP of the countries was higher than the contribution of the rest of the sectors. This is due to the faster rate at which the service sector is growing in the different economies under study. It is important to note that the negative mean values of the quality of governance indicators imply that the countries under study are, on the average, performing poorly in each of the indicators.

6.1 Pair Wise Correlation

The correlation matrix (see Appendix 1) shows that a relationship exists between tax revenue and all the independent variables. None of the correlation coefficients between supply-side variables goes beyond the 0.8 threshold (Studenmund, 2001), which is a good indicator of the absence of multicollinearity between them.

However, there exists a very high correlation between most of the demand-side variables. For example, the correlation between control of corruption and regulatory quality is 97.99%, which is a signal for the presence of multicollinearity. Due to this, each of these variables will appear only once in each regression; implying that six different regressions will be estimated. In fact, this will enable us to find out how each of the quality of governance indicators individually affects tax revenue.

6.2 Panel Unit Root Testing

Before estimation, the application of panel unit root tests is paramount as it verifies whether the variables are stationary or not. Two tests have been employed in this study, which include the LLC test (2002), and the IPS test (2003). Table 2 presents the results from the above tests.

Table 2: Panel Unit Root Results

Variable	LLC	P-value	IPS	P-value
Tax revenue	-4.3561	0.2473	-2.5858***	0.0072
GDP per capita growth	-7.0046***	0.0007	-3.8743***	0.0000
Agriculture	-7.5585***	0.0000	-2.3174*	0.0808
Manufacturing	-2.9799	0.7921	-1.8200	0.2588
Service	-3.6606	0.3141	-1.6967	0.3918
Trade	-1.8583	0.6945	-1.1841	0.7734
Control of corruption	-1.8468	0.7479	-2.2881**	0.0471
Gov't effectiveness	-3.5132	0.5375	-2.4041**	0.0290
Political stability	-3.2582	0.3490	-3.3348***	0.0029
Regulatory quality	-2.4517	0.3221	-2.5939***	0.0088
Rule of law	-2.5910	0.3267	-2.1163*	0.0824
Voice and accountability	-2.5139	0.7032	-2.8903***	0.0018

Note: *p<0.1, **p<0.05, ***p<0.01

Source: Author's Computation

The results from the LLC test in Table 2 confirm all the variables to be non-stationary, except GDP per capita growth and agriculture. On the other hand, the IPS test confirms variables like tax revenue, GDP per capita growth, agriculture, control of corruption, government effectiveness, political stability, regulatory quality, rule of law, and voice and accountability to be stationary since their p-values reject the null hypothesis of a unit root. The inconsistency in the results of the two panel unit root tests is due to the difference in the alternative hypotheses of the tests used (Greene, 2012; Verbeek, 2008).

The alternative hypothesis of LLC is that all panels are stationary, while that of IPS is that some panels are stationary. Therefore, variables that are not stationary in Table 2 when using LLC unit root test, but stationary under IPS, imply that they contain some panels that are not stationary; while variables that are stationary under LLC but not stationary under IPS imply that all their panels do not contain a unit root. Note that only two variables—i.e., agriculture and GDP per capita growth—have been found to be stationary by both tests. Other variables—including manufacturing, service, and trade—are confirmed to be non-stationary by both tests, and therefore, there are no chances or possibilities of rejecting the

null hypothesis of a unit root (hereafter non-stationary). We can conclude that the panel data are stationary at least by using one test, except for manufacturing, service, and trade that have been found to be non-stationary by both tests; but become stationary after the first difference as Table 3 reveals.

Table 3: Unit Root Test Results After First Difference of Non-Stationary Variables

Variable	LLC statistic	p-value	IPS W-stat	P-value
D1Manufacturing	-10.5875***	0.0000	-5.1446***	0.0000
D1Service	-7.7551***	0.0000	-4.7762***	0.0000
D1Trade	-9.7087***	0.0000	-4.3534***	0.0000

Note: *p<0.1, **p<0.05, ***p<0.01

Source: Author's Computations

Therefore, we can confidently use the ADLM since it offers the opportunity to ascertain the long-run relationship between variables with different orders of integration (Pesaran et al., 1999). This would not have been possible with the traditional panel cointegration methods like those used by Pedroni (1999, 2004) and Kao (1999) since these require all the variables to be integrated of the same order if they are to be used in establishing a long-run relationship.

7. Long-run and Short-run Results

Table 4 presents the long-run and short-run dynamics for both PMG and MG.

Table 4: Pooled Mean Group and Mean Group Results

		Model (1)		Model (2)		Model (3)	
LR	Variables						
	Tax revenue	MG_{CC}	PMG_{CC}	MG_{GE}	PMG_{GE}	MG_{PS}	PMG_{PS}
	GDP per capita growth	0.2151	0.0987	0.5150	0.1836**	0.2179	0.2689***
		(0.0023)	(0.0151)	(0.0116)	(0.0121)	(0.0724)	(0.0698)
	Agriculture	-2.2237	0.0888***	0.7478***	0.0629*	0.2799*	0.0568*
		(0.0070)	(0.0161)	(0.0232)	(0.0211)	(0.0405)	(0.0121)
	Manufacturing	-0.6510*	0.2022**	0.3160	0.1072	0.2634	0.1968**
		(0.0212)	(0.0352)	(0.0289)	(0.0282)	(0.0231)	(0.2350)
	Service	-0.1265	0.1741***	0.8114**	0.1303***	0.3967*	0.2107***
		(0.0308)	(0.0434)	(0.0115)	(0.0194)	(0.0226)	(0.0116)
	Trade	0.0673	0.1182***	0.0150	0.1256***	0.0034	0.0189
		(0.0378)	(0.0365)	(0.0421)	(0.0232)	(0.0042)	(0.0717)
	CC	8.4536	3.0642***				
		(0.0501)	(0.0113)				
	GE			9.525602	3.0033***		
				(0.0126)	(0.0103)		
	PS					2.0082	2.0413***
						(0.0042)	(0.1102)
SR	GDP per capita growth	-0.0369	-0.0196	-0.1918***	-0.0188	-0.0840**	-0.0769*
		(0.0107)	(0.0151)	(0.0015)	(0.0220)	(0.0116)	(0.0710)
	Agriculture	-0.1554	-0.4851**	-0.5269***	-0.4149**	0.9791*	-0.5188
		(0.0104)	(0.0102)	(0.0270)	(0.0146)	(0.0010)	(0.2406)
	Manufacturing	0.2980	-0.3683	-0.5363	-0.3693	0.7498	-0.4505
		(0.0501)	(0.0402)	(0.1306)	(0.0102)	(0.0201)	(0.1201)
	Service	-0.2291	-0.5973***	-0.4618***	-0.6150**	0.9666*	-0.6978*
		(0.0021)	(0.0003)	(0.0133)	(0.0101)	(0.0261)	(0.0064)

	Trade	-0.2366	-0.1462	-0.1253	-0.1117	0.0044	0.0309
		(0.0101)	(0.0164)	(0.0421)	(0.0105)	(0.1008)	(0.0147)
	CC	-3.0131	1.1920				
		(0.0193)	(0.0032)				
	GE			-8.4439***	-2.0462***		
				(0.0071)	(0.0201)		
	PS					-1.5804*	-1.1447**
						(0.0031)	(0.0038)
	Constant	-2.0136	54.5328	-38.2573	-0.5733	-9.3320	-0.3938
		(0.0112)	(0.0013)	(0.1217)	(0.0321)	(0.0511)	(0.0071)
	ECT	-0.6845***	-0.5839***	-0.7480***	-0.5430**	-0.8817***	-0.5415**
	Hausman test statistic (p-value)	9.38 (0.1534>0.05)		33.95 (0.0000<0.05)		4.71 (0.5816>0.05)	
LR	Tax revenue	MG_{RQ}	PMG_{RQ}	MG_{RL}	PMG_{RL}	$MG_{V\&A}$	$PMG_{V\&A}$
	GDP per capita growth	0.2259**	0.1981***	-0.2720	0.0788	0.0946	0.2856**
		(0.0201)	(0.4601)	(0.0312)	(0.6442)	(0.0308)	(0.0123)
	Agriculture	0.4974	0.0572**	-0.3320	0.0131	-0.0041	0.0765*
		(0.01)	(0.2318)	(0.0171)	(0.1201)	(0.7621)	(0.071)
	Manufacturing	0.3174	0.2137***	0.0686	0.0708	-0.0504	0.2763***
		(0.0918)	(0.0821)	(0.0112)	(0.0091)	(0.0362)	(0.2311)
	Service	0.5758	0.1719***	-0.0961	0.1296**	0.1848	0.1924***
		(0.1205)	(0.2102)	(0.4120)	(0.1640)	(0.0152)	(0.0392)
	Trade	-0.0155	0.0976***	-0.1531	-0.0369	0.0344	0.0669***
		(0.0320)	(0.0009)	(0.4121)	(0.0123)	(0.0160)	(0.0922)
	Reg quality	2.2188	1.6433**				
		(0.1292)	(0.0128)				
	Rule of law			16.2698	3.4812***		
				(0.3211)	(0.3412)		
	V & A					5.2462*	-0.1497
						(0.0062)	(0.3322)
SR	GDP per capita growth	-0.0897	-0.0330	0.0633	-0.0036	0.0654	-0.0150
		(0.0129)	(0.1203)	(0.0916)	(0.0129)	(0.6212)	(0.0172)
	Agriculture	-0.5721***	-0.2264	-1.2006**	-0.6211***	-0.6650	-0.2133
		(0.0127)	(0.9120)	(0.1006)	(0.2290)	(0.1281)	(0.0123)
	Manufacturing	-0.3340	-0.1309	-0.8226	-0.5079	-0.9239	-0.1642
		(0.1038)	(0.7120)	(0.1208)	(0.0191)	(0.1100)	(0.0112)
	Service	-0.6421***	-0.4508	-1.2682*	-0.7796***	-0.7909	-0.5025*
		(0.2109)	(0.1203)	(0.0191)	(0.0812)	(0.0942)	(0.0292)
	Trade	-0.0988	-0.0224	-0.0984	-0.0867	-0.1008	0.0373
		(0.0131)	(0.6123)	(0.2210)	(0.9102)	(02233)	(0.0822)
	Reg quality	1.1580	-0.2716				
		(0.0002)	(0.9102)				
	Rule of law			-4.8382**	-1.5858**		
				(0.0212)	(0.1902)		
	V & A					-2.5170	-0.6406
						(0.0172)	(0.0002)
	Constant	-31.6312	-1.9367	31.1287	3.6675	14.4808	-2.7468
		(0.1209)	(0.0191)	(0.1163)	(0.2202)	(0.062)	(0.0912)
	ECT	-0.9767***	-0.5202*	-0.9182***	-0.6224***	-0.9249***	-0.5231*
	Hausman statistic	1.42 (0.9648>0.05)		0.29 (0.9996>0.05)		14.66 (0.0230<0.05)	

Note: Observations 105
*p<0.1 , **p<0.05 , ***p<0.01

Given the two competing models (MG and PMG), there is need to choose one with better results using the Hausman test; with a null hypothesis of slope homogeneity (PMG is a better model), implying that failure to reject the slope homogeneity restriction leads to a conclusion of PMG being the preferred model. Since six (6) regressions were estimated with the two models corresponding to the six (6) quality of governance variables, we got six (6) Hausman h-statistics that include: 9.38, 33.95, 4.71, 1.42, 0.29 and 14.66 with p-values; 0.1534, 0.0000, 0.5816, 0.9648, 0.9996 and 0.0230, respectively. Four (4) out of the six (6) p-values of the Hausman statistics are greater than the five percent level of significance as indicated in the results in Table 4. On this basis we cannot reject the null hypothesis of slope homogeneity restriction, but rather accept it and conclude that PMG is the preferred model in explaining the long-run relationship between tax revenue and the different regressors. Therefore, our discussion is entirely based on the results of the PMG.

8. Discussion of Results

From the results above, all the PMG models from the different regressions confirm the existence of a long-run relationship between tax revenue and the regressors. In model (1), for example, the error correction coefficient of 0.5839 (PMG) indicates that 58.39 percent of this disequilibrium is corrected within one year. This can be seen from the significance of the error correction coefficients at different levels of significance. The results also confirm our prior hypothesis that the quality of governance plays an important role in determining tax revenue in East Africa. This can be verified from the high coefficients and high levels of significance of the different quality of governance variables, except voice and accountability.

Specifically, the long-run coefficients of control of corruption, government effectiveness, political stability and absence of violence, regulatory quality, and rule of law are positive and highly significant, which confirms our prior expectations. Therefore, we can clearly confirm that there is a positive long-run relationship between the quality of governance and tax revenue in the East African countries. Particularly, an improvement in the control of corruption by one unit will lead to an increase in the tax to GDP ratio by 3.06 percentage points. An improvement in the effectiveness of government, in terms of improvement in the quality of public services, will lead to an increase in tax ratio by 3.00 percentage points. An improvement by a unit in political stability by of any of the EAC member states will lead to an increase in tax revenue by 2.04 percentage points. An improvement in the quality of regulations imposed on tax collecting agencies will result into a 1.64 percentage points increase in tax ratio. Tax revenue will also increase by 3.48 percentage points with an improvement in the rule of law (an increase in people's obedience to the rules or the constitution governing a state). These results are also consistent with those of Bird et al. (2008), although their study only concentrated on the impact of control of corruption, voice and accountability on tax revenue as the only quality of governance variables.

Given the countries under study, it is not surprising that voice and accountability is the only quality of governance variable that negatively affects tax revenue in the

short-run. This can be attributed to the fact that freedom of the media has created so much awareness to citizens about what is taking place in their countries. For example, the announcement of corruption scandals and the misuse of public funds in Uganda, both on social media and other media houses like televisions and radios, has reduced the morale of taxpayers to pay taxes since they are not satisfied with the way public finances are being handled for the benefit of the majority of the people, instead of being embezzled by particular individuals for private gains.

The negative short-run relationship between tax revenue and the quality of governance variables like government effectiveness, political stability and absence of violence, regulatory quality, rule of law, and voice and accountability is as well consistent with the findings of Nnyanzi et al. (2016).

Looking at the control variables, the significance and direction of the independent variables in explaining tax revenue keeps changing as the quality of governance variables changes in the different regressions. In the PMG model (1), with control of corruption as the quality of governance variable, only agriculture, manufacturing, service, trade, and control of corruption are significant in the long-run (at different levels of significance) in explaining tax revenue; while only agriculture and service are the only significant variables in the short-run. In the MG model, still with the control of corruption being the quality of governance variable, only manufacturing is significant at 10 percent in the long-run, while no variable significantly explains tax revenue in the short-run. Furthermore, looking at the very last $PMG_{V\&A}$ model (6), where voice and accountability is the quality of governance variable, the results reveal that only the service sector contribution explains tax revenue in the short-run at 10 percent, while GDP per capita growth, agriculture, manufacturing, service, and trade are significant in the long-run. The $MG_{V\&A,}$ on the other hand, reveals that only voice and accountability is positive and significant at only 10 percent in the long-run; and agriculture and service are significant in the short-run with negative impacts on the tax revenue.

9. Conclusion

The main objective of this study was to provide empirical evidence on the effect of the quality of governance on tax revenue in East Africa over the period 1996 to 2016. To achieve this objective, the study adopted a panel ARDL methodology as suggested by Pesaran et al. (1999). Using the Hausman test, the PMG model was selected, and the findings confirm the presence of a long-run positive relationship between the quality of governance and tax revenue in the countries under study. The findings show that an improvement in the control of corruption by one unit will lead to an increase in the tax to GDP ratio by 3.06 percentage points. An improvement in the effectiveness of a government, in terms of improvement in the quality of public services, will lead to an increase in tax revenue by 3.00 percentage points. An improvement by a unit in political stability will lead to an increase in tax ratio by 2.04 percentage points. An improvement in the quality of regulations imposed on tax collecting agencies will result into a 1.64 percentage points increase in tax revenue. Tax revenue will also increase by 3.48 percentage points with an

improvement in the rule of law. This implies that, in the long-run, the amount of tax collected will depend on how well a country is governed. However, the study finds a negative short-run relationship between the quality of governance and tax revenue. This is highly expected since any changes in the rule, regulations, and political stability of any country cannot bring about immediate positive effects on tax revenue yields. Additionally, this can also be explained by the creation of an underground economy, and the increase in tax evasion and avoidance when new and strict laws are imposed as a part of tax reforms of a developing economy like the ones under study.

10. Policy Implications

From the findings, there is a positive long-run relationship between the quality of governance and tax revenue. As a policy option, there is need to provide accountability for taxpayer's money, and put in place effective enforcement mechanisms to enhance compliance. In the long-run, the use of regulatory policies and penalties may be the right direction to take after putting in place measures to counter underground economy. Therefore, there is need to redesign individual countries' tax systems and reforms, harmonize domestic taxes, reform tax laws, and introduce procedures to reduce distortions and smuggling. Actions should be taken to reduce corruption, improve services, implement legislative reforms, and widen tax bases. The above measures, if accompanied by a stable macroeconomic environment (for instance, low inflation) would increase the amount of revenue collected. Pro-trade and pro-manufacturing sector reforms, and embarking on policies to commercialize agriculture to make it easier to tax it—e.g., through credit extension to farmers—would also further enhance tax revenue collections. Thus, the complementary nature of policies is emphasized.

References

Agu O. David. 2018. The Effect of Good Governance on Voluntary Payment of Taxes. Available at https://www.academia.edu/38563521/effect_of_good_governance_voluntary_payment_of_taxes

Ajaz, T. & E. Ahmad. 2010. The Effect of Corruption and Governance on Tax Revenues. *The Pakistan Development Review*, pp. 405–417.

Arellano, M. 2003. *Panel Data Econometrics*. Oxford University Press.

Arellano, M. & S. Bond. 1991. Some Tests of Specification for Panel Data: Monte Carlo Evidence and An Application to Employment Equations. *Review of Economic Studies*, 58: 277–298.

Bates R. H. & D. Da-Hsiang. 1985. A Note on Taxation, Development, and Representative Government. *Politics & Society*, 14: 53–70

Bank of Tanzania (BoT). 2009. Bank of Tanzania Annual Report 2008/09. Identity Printers

—. 2016. *Bank of Tanzania Annual Report 2015/2016*. Identity Printers

Bird, R.M., J. Martinez-Vazquez & B. Torgler. 2008. Tax Effort in Developing Countries and High-Income Countries: The Impact of Corruption, Voice and Accountability. *Economic Analysis and Policy*, 38(1): 55–71.

Bird, R. 2008. Tax Challenges Facing Developing Countries. Rotman Working Papers Series No. 12, Rotman Institute for International Business, University of Toronto.

Besley, T. & T. Persson. 2009. The Origins of State Capacity: Property Rights, Taxation, and Politics. *American Economic Review*, 99, 1218–1244.

--. 2014. Why Do Developing Countries Tax So Little? *Journal of Economic Perspectives*, 28(4): 99–120.

Blundell, R. & S. Bond. 1998. Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics*, 87(1): 115–143.

Botlhole, T. D. 2010. Tax Effort and the Determinants of Tax Ratio in Sub-Saharan Africa. *International Conference on Applied Economics*, 2010: 101–113.

Chaudhry, I. S. & F. Munir. 2010. Determinants of Low Tax Revenue in Pakistan. *Pakistan Journal of Social Sciences* (PJSS), 439–452.

Di John, J. 2010. Taxation, Resource Mobilization and State Performance. *Crisis States Research Centre,* (84): 2008–2011.

Dreher, A. & T. Herzfeld. 2005. The Economic Costs of Corruption: A Survey and New Evidence. Halle University, Mimeo.

Drummond, P., N. Srivastava, W. Daal & L. E. Oliveira. 2012. Mobilizing Revenue in Sub-Saharan Africa: Empirical Norms and Key Determinants. IMF Working Papers, 12/108, 42 pages.

Eberhardt, M. 2012. Estimating Panel Time-Series Models with Heterogeneous Slopes. *The Stata Journal*, 12(1): 61–71.

Eltony, M. N. 2002. Determinants of Tax Effort in Arab Countries. Arab Planning Institute, Working Paper No. 207.

Greene, W. 2012. *Econometric Analysis*. 7th Edition, Prentice Hall, Upper Saddle River.

Heller, P.S. 1975. A Model of Public Fiscal Behavior in Developing Countries: Aid, Investment, and Taxation. *The American Economic Review*, pp.429–445.

Imam, P. A. & D. Jacobs. 2014. Effect of Corruption on Tax Revenues in the Middle East. *Review of Middle East Economics and Finance*, 10(1): 2014–0001

Kao, C. 1999. Spurious Regression and Residual-Based Tests for Cointegration in Panel Data. *Journal of Econometrics*, *90*(1): 1–44.

Leuthold J.H. 1991. Tax Shares in Developing Economies A Panel Study. *Journal of Development Economics*, 35(1): 173–185.

Levi, M. 1988. *Of Rule and Revenue*. Berkeley, CA: University of California Press.

Levin, J. 2001. Taxation in Tanzania. *World Institute for Development Economics* (No. 2001/80).

Levin, A. & C.-F. Lin. 2002. Unit Root Tests in Panel Data: New Results, Discussion Paper. Department of Economics, University of San Diego.

Levin, A., C.-F. Lin & S.-S. J. Chu. 2002. Unit Root Tests in Panel Data: Asymptotic and Finite-Sample Properties. *Journal of Econometrics*, 108: 1–24.

Nnyanzi, J. B., P. Babyenda & J. M. Bbale. 2016. Regional Economic Integration and Tax Revenue: East African Community. *Journal of Economic Integration*: 932–967.

Pedroni, P. 2004. Panel Cointegration: Asymptotic and Finite Sample Properties of Pooled Time Series Tests with An Application to the PPP Hypothesis. *Econometric Theory*. 20(3): 597–625.

Pedroni, P. 1999. Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors. *Oxford Bulletin of Economics and statistics*, 61(S1): 653–670.

Pesaran, M. H., Y. Shin & R. P. Smith. 1999. Pooled Mean Group Estimation of Dynamic Heterogeneous Panels. *Journal of the American Statistical Association*, 94(446): 621–634.

Pesaran, M.H. & R. Smith. 1995. Estimating Long-run Relationships from Dynamic Heterogeneous Panels. *Journal of Econometrics,* 68(1): 79–113.

Ricciuti, R. & A. Savoia. 2016. How Do Political Institutions Affect Fiscal Capacity? Explaining Taxation in Developing Economies. *Journal of Econometrics*, 68(1): 79–113. Journal of Institutional Economics 15(2): 351–380.

Roodman, D. 2006. How to Do Xtabond2: An Introduction to Difference and System GMM in Stata. *The Stata Journal*, 9(1): 86–136.

Shleifer, A. & R. W. Vishny. 1993. Corruption. *Quarterly Journal of Economics*, 108: 599–617.

Studenmund, A.H. 2001. *Using Econometrics: A Practical Guide*. Addison Wesley Longman. Inc., New York.

Sy A.N. & M. Sow. 2016. Domestic Resource Mobilisation and External Financing: When Does Governance Matter? Evidence from Sub-Saharan Africa. https://www. brookings. edu/wp-content/uploads/2016/12/global_122116_governance.pdf

Uttmer, E. F. P. & M. Singhal. 2014. Tax Morale. *Journal of Economic Perspectives*, 28(4): 149–168.

Verbeek, M. 2008. *A Guide to Modern Econometrics*. Edward Elgar Publishing Limited

Wawire, N. H. W. 2000. *Determinants of Value Added Tax Revenue in Kenya*.

Appendix 1: Pair Wise Correlation

	TaxEffort	GDPpercapita	Agriculture	Manufacturing	Service	Trade	CC	GE	PS	RQ	RL	V&A
TaxEffort	1											
GDPperecapita	-0.3188*	1										
Agriculture	-0.0411	-0.2530*	1									
Manufacturing	0.5154*	-0.2965*	-0.5108*	1								
Service	-0.2494*	0.3495*	-0.0291	-0.6695*	1							
Trade	0.3072*	0.137	-0.6659*	0.3927*	0.133	1						
CC	-0.2100*	0.4313*	-0.0450	-0.3943*	0.2490*	-0.0680	1					
GE	-0.2688*	0.4787*	-0.5929*	-0.112	0.4040*	0.3754*	0.5914*	1				
PS	-0.2496*	0.4013*	-0.4975*	-0.0253	0.0855	0.4172*	0.3581*	0.7315*	1			
RQ	-0.1942*	0.3002*	-0.7398*	0.165	0.2103*	0.4831*	0.9799*	0.8293*	0.5865*	1		
RL	-0.3094*	0.4486*	-0.5699*	0.0135	0.0420	0.3321*	0.5136*	0.7999*	0.8260*	0.7395*	1	
V&A	0.178	0.0634	-0.6256*	0.4909*	-0.159	0.6320*	-0.8902*	0.8739*	0.3919*	0.8481*	0.8179*	1

Note: CC - Control of corruption; GE - Government effectiveness; PS - Political stability; RQ - Regulatory Quality; RL - Rule of Law; V&A - Voice & Accountability
* indicates the significance at 5%

Source: Author's Computation