East African Community (EAC) And Uganda's Tax Revenue

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Abstract

The aim of this paper is to empirically examine the effect of East African Community (EAC) on Uganda's tax revenue and to explore other determinants of Uganda's tax revenue using secondary time series data from 1980 to 2011obtained from World Bank indicators and previous research publications. The paper utilizes Augmented Dickey-Fuller (ADF), Philip-Perron (PP), Johansen Co- integration procedure and Error Correction models. We find that the EAC integration has no significant effect on Uganda's tax revenue while manufacturing and Openness of the economy positively influence the Uganda's tax revenue and inflation and agriculture negatively affects Uganda's tax revenue. The degree of monetization of the economy does not significantly influence Uganda's tax revenue. The study recommends that the government of Uganda should reform its tax system in order to match with the EAC integration and that more efforts should be place in the manufacturing sector, macro-economic stability, Expansion of export sector, commercialization and modernization of the Agricultural sector if Uganda is to increase its tax revenue generations.

Keywords: Uganda's tax revenue, East African Community (EAC) integration, Manufacturing, Inflation, Openness

1. Introduction

The EAC is an intergovernmental organization which comprises Burundi, Kenya, Rwanda, Tanzania and Uganda numbering to five member countries which is now in its second decade and Arusha, Tanzania is the home of its Secretariat. Originally founded in 1967, collapsed in 1977 and was officially revived on 7th, July 2000. Its membership was expanded in 2007 with the joining of Burundi and Rwanda. The EAC is a potential precursor to the establishment of the EAC federation, a proposed federation of its five members into a single state in 2010; the EAC launched its own common market with a goal of common currency which was agreed upon by the heads of state in 2013 and a full political federation in 2015 (Davood, 2013).

Uganda's tax system has been under revision since the beginning of 1990, mainly due to poor domestic revenue mobilization as a percentage of GDP to public expenditure of 4.2%-17% in 1987. The above deficit forced the government of Uganda to come up with a number of tax reforms like establishment of Uganda Revenue Authority in 1992, restructured the tax system, recruited and trained new workers and motivated them highly, came up with income tax act in 1997, introduced VAT among others. The success of these tax reforms were mostly realized between 1992 and 1997 where GDP grew at an average of 7% to more than 10% annually (Background to the budget 1998/99).

Tax collection as a percentage of GDP grew significantly from 1992 by 1.7%, soon after Uganda Revenue Authority started. Various tax reforms such as reduction of import duties, establishment of revenue protection service which led to a reduction in smuggling of goods across border, tremendous rise in collection of PAYE since enactment of income tax act 1997. Despite the tax reforms introduced such as abolition of taxes on export, introduction of VAT, reduction of import duties, income tax act, tax education, establishment of large tax payer department by Uganda Revenue Authority, 25% of Uganda's budget still being financed by development partners since domestic revenue mobilization has continued to perform poorly, probably the tax reforms had put more emphasis on indirect taxes than direct taxes.

Domestic indirect taxes in Uganda comprises of the following import duty, excise duty, value added tax while direct taxes include employment income tax, corporation tax, withholding tax, taxes on interest. Other revenue items include fees and licenses, donations, aid, borrowings. The major taxes in Uganda include; income tax, import duty, value added tax and excise duty (Holmgren & Kasekende, 1999).

Currently there are mixed views as to whether the EAC integration has led to an increase in tax revenue generated by Uganda Revenue Authority or has instead led to its reduction. This study aims to examine the effect of EAC on Uganda's tax revenue and in addition explore some determinants of tax revenue in Uganda.

2. Literature Review

Factors determining tax revenue in both developing and developed economies either at a country level or regional level has been approached by the economic literature through different perspectives and several factors have been considered as determinants of tax revenues. Variables such as per capita GDP, the sectorial composition of output, the degree of trade and financial openness, ratio of foreign aid to GDP, the ratio of overall debt to GDP, a measure for informal economy, and some institutional factors such as degree of political stability

and corruption have all been identified as potential determinants of revenue performance (Karagoz, 2013).

Gupta (2007) investigated revenue performance for 105 developing countries over the past 25 years. He found that several structural factors like per capita GDP, share of agriculture in GDP and trade openness are significant and strong determinants of revenue performance. He also looked at the impact of foreign aid and foreign debt on revenue mobilization. His findings suggest a strong negative and significant relationship between agriculture share and revenue performance. It is estimated that a one percent increase in the share of agriculture sector could reduce revenue performance by as much as 0.4 percent. The results indicate that although foreign aid improves revenue performance significantly, debt does not. Among the institutional factors, he found that corruption has a significantly negative effect on revenue performance. Political and economic stability are other effective factors, but only across certain specifications. On the other hand, countries that put greater emphasis on taxing income, profits and capital gains, perform better. He also identified a negative relation between indirect taxes and revenue performance, in the sense that overall tax revenue as a share of GDP tends to be lower in the presence of a relatively high level of taxes on goods and services.

Karagoz (2013) studied the determinants of tax revenue in Turkey and found out that tax revenues in Turkey are significantly affected by agricultural and industrial sector share in GDP, foreign debt stock, monetization rate of the economy and urbanization rate whereas the sign of the agricultural sector's share is negative as it was expected. The results also suggested that openness to foreign trade has no significance impact on tax revenues in Turkey. Most of these studies conclusions were in line with the conclusions of the previous studies.

Dioda (2012) examined the structural determinants of tax revenue in Latin America and the Caribbean between 1990 and 2009 using panel data econometric methodologies from 32 Latin American Countries and concluded that among the factors that exert a statistically significant influence on tax revenue are civil liberties, female labor force participation, the age composition of the population, the degree of political stability, the level of education, the population density as well as the size of the shadow economy.

Okech & Mburu (2011) analyzed the responsiveness of tax revenue to changes in National income in Kenya between 1986 and 2009 and found out that Kenyan tax revenue was neither buoyant nor income-elastic despite reforms undertaken over the period since 1986. On the basis of their findings, they recommended the need to re-evaluate the tax policy measures that have been implemented over the years in order to make tax responsive to national income while enhancing tax collection measures.

Using data of the period 1970-2000, Teera (2003) examined the tax system and tax structure of Uganda to investigate the factors effecting tax revenue in the country. His results showed that agriculture ratio, population density and tax evasion affect all type of taxes. GDP per capita showed a surprising negative sign. Tax evasion and openness showed the significant negative impact.

Hisaali & Ddumba (2013) analyzed the tax revenue–aid relationship in Uganda using a framework in which fiscal targets and actual outturns differ. Their results suggested that grants have a negative association with tax revenue but are offset by the positive association of loans to result in some modest increases in tax revenue in the long run. The coefficient on the per capita income variable suggests that the tax system is inelastic. They recommended that Policies that reduce mutation of taxpayers and noncompliance will reduce the country's reliance on aid and its unwanted effects.

Most of the empirical studies reviewed above have examined the determinants of tax revenue in either a set of countries or individual country and found out that variables such as per capita GDP and the degree of openness are positively related to tax revenue but a higher share of agriculture lowers tax revenue; foreign aid, foreign debt, monetization of the economy, population density, urbanization, religion, education, inflation and some institutional variable like corruption, governance and political stability have also been found to be statistically significant and strong determinants of tax revenue. However, regional integration which could be a major determinant of tax revenue has been left out in these studies. Therefore, this study will contribute to existing literature by examining the effect of EAC on Uganda's tax revenue using a time series data over the period 1998 – 2011 and also examine other determinants of tax revenue in Uganda.

3. Methodology

The study uses secondary data obtained majorly from the World Bank Development Indicators (WDI) whereas previous research publications were used to feel in missing values of tax revenues. The dependent variable is tax revenue expressed as a percentage of GDP. The independent variables are GDP per capita expressed in logarithm at constant US $2005 which serves as a proxy for the development of a country, agriculture share in GDP is expressed in logarithms, consumer price index with 2005 being the base year is used as a proxy for inflation, openness is measured as a ratio of the sum of exports and imports to GDP, Monetization of the economy is measured by the quantity of broad money (M2) as a percentage of GDP. M2 is the sum of bank notes and coins outside the banking system, Demand Deposits, Savings and Time Deposits. Finally EAC Integration is a dummy variable taking on 0 or 1 value.

3.1 Model Specification

Chelliah (1971) asserts, the assessment of actual and potential tax performance of any country is a matter of judgment that should be based on a consideration of the stage of development and structure of the economy and should also take account of national traditions and relevant special circumstances. Therefore, to analyze statistically the effect of EAC on Uganda's tax revenue, we estimate a model in which tax revenue is functionally related to EAC integration, economic development and structure of the economy. The empirical model is specified as;

$$y_t = \alpha_0 + \alpha_1 lnPCY_t + \alpha_2 INF_t + \alpha_3 AGR_t + \alpha_4 MAN_t + \alpha_5 OPP_t + \alpha_6 M2_t + \alpha_7 EAC_t + \mu_t$$
$$(1)$$

Where $\mu_t \sim N(0,\sigma^2)$, $t = 1, 2, 3,\ldots\ldots,T$, y_t is Tax revenue expressed as a percentage of GDP, $lnPCY_t$ is GDP per capita, expressed in logarithm which also serves as a proxy for the level of development of a Uganda, INF_t is inflation expressed as consumer price index, AGR_t is the share of Agriculture in GDP, MAN_t is the share of manufacturing in GDP, OPP_t is degree of the openness of the economy, $M2_t$ is the level of monetization of the economy, EAC_t is the EAC integration which is a dummy variable taking on 1 if integration and 0 otherwise, μ_t is the error term.

3.2 Estimation Techniques

To establish normality and stationarity of series some preliminary tests are conducted. Augmented Dickey-Fully (ADF) and Philip-Perron (PP) unit root tests for stationarity, Engle-Granger 2 step Algorithm and Johansen Co-integration procedure for testing co- integration on variables are employed. Using the Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) tests for stationarity, unit root tests are carried out for each variable. The ADF and PP -Test are used on series in level and in the 1st difference. Conclusions about stationarity are made by comparing the ADF or PP Statistic and the P- values. Series that are stationary in levels are integrated of order zero {I(0)} and those stationary after the first difference are integrated of order one {I(1)}. Co integration tests are carried out to verify whether variables that are non-stationary have a long run relationship or whether they are co integrated. After carrying out preliminary tests in line with time series data, and using Ordinary Least Squares (OLS) method, regression equation 1 is run in order to investigate the effect of EAC integration on Uganda's tax revenue and also examine other determinants of Uganda's tax revenue as specified in the empirical model.

4. Empirical Results

The unit root tests show that all variables are unstationary in levels with the exception of manufacturing and openness. This is followed by an OLS regression for variables in their levels. However the stationary variables; manufacturing and openness are also included in the regression but the dummy variable is not included.

The regression results show that there is a relationship between tax revenue and the independent variables since DW statistic is greater than R2. The coefficients of the independent variables; Manufacturing and inflation are statistically significant as shown in Table 1 while the coefficients of Agriculture, Openness, level of monetization of the economy and GDP per capita expressed in logarithm are not significant. The coefficient of Manufacturing is positive while that of inflation are negative just as expected by the economic theory and previous studies.

The adjusted R2 from the results of the regression is 0.9060 which implies that 91% of variation in Uganda's tax revenue is explained by the variables in the model. The F-statistics strongly rejects the null hypothesis that the regression coefficients are jointly equal to zero. This means that all the explanatory variables included in the model are jointly statistically significant at a 1% level of significance and therefore they are important determinants of tax revenue in Uganda. The Durbin Watson (DW) statistic of 1.4991 indicates that the regression does not suffer from problems of autocorrelation. This is also confirmed by the Durbin alternative test for autocorrelation chi2 = 0.935 (Prob> chi2= 0.3336) meaning that we fail to reject the null hypothesis of no auto correlation. Since the DW statistic = 1.4991 is greater than R2 = 0.9250, we suspect that, the variables are co integrated. However, this is confirmed by subjecting the regression residuals to a unit root test.

Table 1 OLS Regression

Variable	Coefficient
Manufacturing	0.5266888[**] (0.2058272)
Openness	2.769539 (5.505139)
Agriculture	-0.0443378 (.0437617)
M2	0.2055983 (.1605884)
Inflation	-0.0219826[***] (0.0074883)
lnPCY	0.4390135 (.7332329)
Constant	1.293021 (4.957101)
p<0.5;*p<0.01 R2-adjusted =0.9060 F-value= 50.80*** DW = 1.499105 Durbin alternative test chi2 = 0.935(Prob> chi2= 0.3336)	

The study went further to employ the Johansen Co integration test which is based on systems of equations with the Vector auto regression model being the starting point.

Table 2 Johansen Cointegration Test Results

Variable	Coefficient
Manufacturing	-2.527946[***] (.4119839)
Openness	-57.29754[***] (10.88484)
Agriculture	0.7646196[***] (0.0881652)
M2	2.720609[***] (0.359519)
Inflation	-0.0730585[***] (0.0145395)
lnPCY	-1.837675 (1.358486)

***p<0.01

The Johansen test shows variables exactly identified and that there are six co integrating equations shown by Parms = 6, chi2 = 294.6724 (P - Value>chi2 = 0.0000). This confirms that all the six variables are co integrated and that the relationship exists between the dependent variable and the independent variables. Johansen normalization restriction imposed on results is shown in the Table 2 where all variables are significant apart from lnPCY.

4.1 Error Correction Model (ECM)

Based on the results from the unit root and co integration tests discussed above we utilize the Granger (1986) Representation Theorem. Where all variables are defined as before, D denotes the error-correction term (lagged once) estimated from the Johansen efficient procedure. The results for the short run ECM are shown in Table 3.

Table 3: Short Run Error Correction Model Results

Variable	Coefficient
DManufacturing	0.2477**
	(0.1251)
DOpenness	10.3403**
	(4.9475)
Dagriculture	-0.0489*
	(0.0278)
DM2	0.0672
	(0.1294)
Dinflation	-0.0097***
	(0.0042)
DlnPCY	-0.2614***
	(0.1021)
EAC	-0.3068
	(0.3696)
Lec	-0.6539***
	(0.2378)
Constant	0.2686
	(0.2442)

*p<0.10**p<0.5;***p<0.01

The coefficient of the lagged residuals is negative and significant at 1% level of significance. This gives the rate at which adjustment is done towards the long run equilibrium model and since it is above 0.5 percent, it means that the speed is very high.

4.2 Dynamic Error Correction Model

The dynamic error correction model is the one where the lag of the dependent variable is included as an independent variable. It is an error correction mechanism model that leads to long run equilibrium relationships between the dependent and the independent variables. Its results are shown in Table 4.

The Durban Watson (DW) statistic of 1.5458 indicates that the regression does not suffer from problems of autocorrelation. The coefficient of error correction term gives the speed of adjustment of each variable towards its long-run equilibrium value, while the sign of the coefficient gives the direction of adjustment towards equilibrium. Since the coefficient of the error correction term is -0.7136 and is significant at 5% level of significance, we can say that 71 percent of the previous errors in the tax revenue are corrected for in the current period t. From Table 4 the short run Tax Revenue equation that leads to long run Total tax revenue is as follows:

Dtax Revenue = 0.2213 +0.1194LDtaxrevenue – 0.0416Dagriculture + 0.0814DM2 – 0.0109Dinflation – 0.3064EAC – 0.7156Lec +0.2664DManufacturing +10.6399DOpenness+ ϵ_t

Where ϵ_t is the disturbance term which captures other variables which are not captured by the Error correction Model and the coefficients of the Error Correction term is statistically significant and negative.

Table 4 Dynamic Error Correction Model

Variable	Coefficient
LDtax revenue	0.1194
	(0.3618)
DManufacturing	0.2664*
	(0.1359)
DOpenness	10.6298***
	(4.0265)
Dagriculture	-0.0416**
	(0.0694)
DM2	0.0813
	(0.1479)
Dinflation	-0.0109***
	(0.0036)
DlnPCY	-0.1517***
	(0.0571)
EAC	-0.3064
	(0.3979)
Lec	-0.7136**
	(0.0004)
Constant	0.2212
	(0.2911)

*p<0.10 **p<0.5;***p<0.01

The coefficient of Openness is statistically significant at 1% level of significance which means that with the openness of the economy, Uganda's tax revenue increases by 10.6 percentage points holding other factors constant. Other statistically significant variables include; GDP per capital and agriculture. Manufacturing is weakly significant at 10% level of significance. The error correction model also implies that the EAC integration has no significant impact on Uganda's tax revenue despite the negative sign of the coefficient. The coefficient of the lag of the first difference of tax revenue is not significant implying that current tax revenue does not significantly depend on the previous tax revenue collections.

The degree of monetization of the economy and EAC regional integration are found to be statistically insignificant. That is the EAC regional integration has no significant effect on Uganda's tax revenue. The insignificant results of monetization could be attributed to underdeveloped financial markets, and large subsistence sector in Uganda.

Agriculture showed a negative effect on tax revenue this is consistent with previous research findings such as Teera, 2003, Gupta, 2007, Stotsky & Mariam, 1997 and Karagoz, 2013. That is a unit increase in the share of Agriculture to GDP reduces Uganda's tax revenue by 0.0416 percentage points. This is basically because Agricultural activities are not ease to tax (Teera, 2003).

Inflation showed negative and significant results at 1% level of significance meaning that a unit increase in inflation rate reduces Uganda's tax revenue by about 0.02 percentage points holding other factors constant. This is consistent with research findings of Teera, 2003, Christian & Nkoro, 2012, Dioda, 2012, and Karagoz, 2013.

The elasticity of per capita income though statistically significant in the error correction model showed a negative unexpected sign but however this is in line with Teera (2003). Hence we conclude that in Uganda, the higher the per capita income, the lower the tax revenue. This could be true since high tax reduces the amount of money per person. GDP per capita is used as a proxy of level of development of Ugandan economy therefore, this implies that the level of development has a negative impact on tax revenue collections. This finding however calls for further research probably with a different methodology and data set in order to obtain a conclusive relationship.

Manufacturing as a share of GDP and Openness of the economy are all significant and positive. This means that Manufacturing and the degree of openness of the economy positively influence Uganda's tax revenue. This is in line with other previous research findings such as (Gupta, 2007; Karagoz, 2013; Teera, 2003 and others). This is true since manufactured goods are easier to tax compared to agricultural products. The manufactured products are easily exported and recorded so it is easier for the tax collectors URA to collect the taxes. On the other hand, Openness of the economy increases the amount of trade in the country hence leading to an increase in the amount of tax collected (Dioda, 2012).

5. Conclusion

The EAC integration does not in any way affect the tax revenue of Uganda. Other variables included such as Agriculture and inflation negatively affects Uganda's tax revenue implying that a unit increase in these variables leads to a reduction in Uganda's tax revenue. On the other hand Manufacturing and Openness of the economy positively affects Uganda's tax revenue while GDP per capita though statistically significant displayed an unexpected sign. Suggested future works include developing a software package to facilitate the WOZIP data input and conversion processes, exploring the use of WOZIP in the other forms of labour-intensive manufacturing (e.g. flow-line production and work-cell assembly), and attaching a costing framework to determine the specific cost of each resource or to help minimise the aggregate cost of production.

The study recommends that Uganda being a member of EAC integration, needs to redesign her tax system in order to increase her tax revenue and positively benefit from the EAC integration. The government can widen the tax bases by introducing new taxes to items or activities that are not taxed. It can raise tax rates where it is appropriate so as to mobilize more tax revenue that can help in to increase tax revenue despite of the EAC integration.

There is need for the Government of Uganda to encourage manufacturing sector and reduce over dependence on agriculture in order to increase its tax revenue since Agriculture had a negative effect on tax revenue meaning that an increase in agriculture reduces tax revenue but an increase in manufacturing increases tax revenue. This is because manufactured goods are easier to tax than agricultural goods and also the manufacturing sector creates more jobs hence increasing on the income tax collected, increases Value added tax, increases exports all leading to an increase in the amount of tax revenue collected.

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Appendix

Unit Root Results of Variables in Levels

Variable	ADF			PP		
	Coeff	P-Value	Order	Coeff	P- Value	Order
Tax Revenue	-2.784	0.2028	I(1)	-2.747	0.2173	I(1)
Inflation	-2.120	0.5350	I(1)	-2.407	0.3757	I(1)
M2	-2.292	0.4384	I(1)	-2.366	0.3976	I(1)
Openness	-3.405[*]	0.0507	I(1)	-3.375[*]	0.0548	I(1)
Agriculture	-2.336	0.4142	I(1)	-2.687	0.2416	I(1)
Manufacturing	-3.645[**]	0.0262	I(0)	-3.622[**]	0.0280	I(0)
lnPCY	-2.218	0.4798	I(1)	-2.504	0.3260	I(1)

Unit Root Results for Variables in Differences

Variable	ADF			PP		
	Coeff	P-Value	Order	Coeff	P- Value	Order
DTax Revenue	-4.883[***]	0.0003	I(1)	-4.577[***]	0.0011	I(1)
Dinflation	-4.507[***]	0015	I(1)	-4.493[***]	0.0015	I(1)
DM2	-4.807[***]	0.0005	I(1)	-4.757[***]	0.0006	I(1)
DOpenness	-4.514[***]	0.0014	I(1)	-4.481[***]	0.0016	I(1)
Dagriculture	-6.516[***]	0.0000	I(1)	-6.667[***]	0.0000	I(1)
DManufacturing	-10.247[***]	0.0000	I(0)	-9.195[***]	0.0000	I(0)
DlnPCY	-4.112[***]	0.0061	I(1)	-4.202[***]	0.0044	I(1)

Unit Root Test for Regression Residuals

ADF			PP		
Coefficient	P-value	Order	Coefficient	P-value	Order
-3.946[***]	0.0105	I(0)	-3.833[***]	0.0149	I(0)

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