



SELINUS UNIVERSITY
OF SCIENCES AND LITERATURE

INFLUENCE OF FISCAL FACTORS ON ECONOMIC GROWTH IN EAST AFRICA COMMUNITY

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A DISSERTATION

Presented to the Department of Economics
program at Selinus University

Faculty of Business & Media
in fulfillment of the requirements
for the degree of
Doctor of Philosophy in Economics

December, 2021

DECLARATION

The thesis titled “INFLUENCE OF FISCAL FACTORS ON ECONOMIC GROWTH IN EAST AFRICA COMMUNITY” submitted for the award Doctor of Philosophy in Economics at Selinus University of Sciences and Literature, Faculty of Business and Media; is my original work.

I do hereby attest that the work reported therein has been carried out by me and all sources of information have been specifically acknowledged by means of references.

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Dedication

I dedicate this thesis to my father and mother and all my teachers at various levels who encouraged me to set high goals in life.

ACKNOWLEDGEMENT

First I would like to thank the Almighty God for the strength and good health He has granted me in the course of writing this thesis. I also thank the following people who in one way or another have contributed to the writing of the proposal of this thesis. I am grateful to Prof. Salvatore Fava and Dr. Adriana Nifosì of Selinus University for supporting me in completing this thesis. Lastly my dear wife; Josephine and children Levi, Gift, Baby Shammah and lovely daughter Pretty-Elsie Mureka for their understanding, love and all necessary moral support.

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Table of Contents

	Page
Declaration -----	ii
Dedication -----	iii
Acknowledgement -----	ivii
Table_of Contents -----	viii
Abbreviations and Acronyms-----	vii
Operational Definition of Terms -----	Errore. Il segnalibro non è definito.
CHAPTER ONE: INTRODUCTION -----	1
1.0 Introduction-----	1
1.1 Background of the Study.....	1
1.2 Statement of the Problem.....	13
1.3 Objectives of the Study.....	14
1.4 Hypotheses of the Study.....	15
1.5 Significance of the Study.....	15
1.6 Scope of Study.....	16
1.7 Theoretical Framework.....	16
CHAPTER TWO: LITERATURE REVIEW -----	20
2.0 Introduction-----	20
2.1 Theoretical Literature.....	20
2.2 Empirical Literature.....	27
2.3 Summary of Literature -----	32
CHAPTER THREE: RESEARCH METHODOLOGY -----	34
3.0 Introduction-----	34
3.1 Research Design.....	34
3.2 Area of Study.....	35

3.3	Target Population and Sampling Design.....	35
3.4	Data Collection.....	36
3.5	Data Analysis	36
3.6	Specification of the Model	36
3.7	Definition of Variables.....	Errore. Il segnalibro non è definito.
	Errore. Il segnalibro non è definito..8 Methods of Estimation	39
3.9	Panel Data Estimation Technique	39
3.10	Diagnostic Tests	Errore. Il segnalibro non è definito.
CHAPTER FOUR: EMPIRICAL FINDINGS AND DISCUSSION		48
4.1	Introduction	458
4.2	Descriptive Statistics	458
4.3	Panel Data Unit Roots Tests	50
4.3	Diagnostic Tests	52
4.3	Pooled OLS Regression Model	57
4.3	Interpretation and Discussion of Study Results	59
CHAPTER FOUR: SUMMARY, CONCLUSION AND POLICY IMPLICATIONS --		34
5.0	Introduction	62
5.2	Summary of the Study.....	62
5.3	Conclusion.....	3464
5.4	Policy Implication and Reccomendation	3464
	References	3466

List of Tables

Table 4.1 Results of Descriptive Statistics	454
Table 4.2 Results of Panel Unit Root Test	458
Table 4.3 Results of Hausman Test	459
Table 4.4 Results of Langrage Multiplier Test	50
Table 4.5 Results of Multicollinearity Test	54
Table 4.6 Results for Heteroskedascity Test	51
Table 4.7 Results of Normality Test	55
Table 4.6 Results of Pooled OLS Regression Model	56

List of Charts

Chart 1.1 EAC Economic Growth Rate Trends -----	45
Chart 1.2 EAC Government Expenditure as % of GDP -----	5
Chart 1.3 EAC Public Debt as % of GDP Trends -----	8
Chart 1.4 EAC Gross Domestic Investments as % Ratio of GDP -----	9
Chart 1.5 EAC Domestic Savings Ratio -----	11
Chart 1.6 EAC Taxation Rate -----	12

List of Maps

Map 1: East Africa Community Countries

Abbreviations and Acronyms

ADF Augmented Dick Fuller

EAC East Africa Community

ECOWAS Economic Community of West African States

FC Fiscal Factors

FEM Fixed Effects Model

GDP Gross Domestic Product

IMF International Monetary Fund

OECD Organization for Economic Co-operation and Development

SSA Sub Saharan Africa

REM Random Effects Model

R&D Research and Development

UNDP United Nations Development Programme

ABSTRACT

Economic growth of East Africa Community (EAC) region has remained low over the years for the region to attain the middle level economic status by 2030. High government expenditures in the region have increased demand for public debt since these expenditures are more than the tax generated revenues. This generated interest to study the influence of these factors on the economy. General objective of the study was to examine the influence of fiscal factors on economic growth in East Africa community. Specific objectives of the study were to: investigate the influence of government expenditure on economic growth, determine the influence level of tax revenue on economic growth, examine the influence of savings level on economic growth and determine the influence public debt level on economic growth in East African community. Theoretical framework of the study was the Solow Swan growth model. The research design of the study was the correlational design. The study targeted the five countries of East Africa Community which consists of Kenya, Uganda, Tanzania, Rwanda and Burundi from 2005 to 2020. The study used panel data obtained from World Bank development indicators database and yearly economic abstracts by the relevant countries' bureau of statistics. Stationary tests were carried to stabilize the data. Public debt, gross domestic savings and tax were stationary at level while economic growth, government expenditure and gross domestic investment were stationary at first difference. All variables were regressed at first difference for uniformity. Hausman test and Langrage Multiplier (LM) tests showed that pooled OLS regression model was the most appropriate to estimate the parameters and conduct the inference. Diagnostic tests results showed that the data had no problem of multicollinearity, heteroskedasticity and serial correlation. The study results showed in East Africa Community, government expenditure had a positive but insignificant effect on growth with a p-value of 0.273 at 0.05 significance level. Gross domestic investment had a positive significant influence on GDP with a coefficient of 0.3094 and p-value of 0.012 at 0.05 level of significance. Public debt had a negative significant effect on GDP with coefficient of 0.0335 and p-value of 0.003 at 0.05 level. Taxation had a negative but significant effect on GDP with a p-value of 0.000 at 0.05 significance level and a coefficient of 0.4308 while saving had insignificant effect on the GDP with p-value of 0.069 at 0.05 significance level. This Study concluded that gross domestic investment has a positive and significant influence on the economy while public debt and taxation have a negative significant effect on economic growth of EAC. Government expenditure and domestic

savings have an insignificant influence on the GDP in EAC region. The study recommends that the countries of EAC region should adopt robust fiscal policies that encourage domestic investments and reduce public debts and taxation rates in their economies.

CHAPTER ONE INTRODUCTION

1.0 Introduction

In this chapter, the background to the study is presented. It also presents the statement of the problem, objectives, hypotheses statements, significance, scope and lastly theoretical framework will be stated.

1.1 Background of the Study

Economic growth is the increase in the amount of the goods and services produced in an economy over time (Barro, 2003). Economic growth is measured as the percent rate of increase in real GDP per annum. A growing economy therefore is one that gets bigger, not necessarily better (Poulson, 2008; Ostadi, 2014). A Report by Africa Development Bank (2019) shows that the East Africa Community (EAC) region recorded a growth rate of about 5.7 percent on average in the last decade. This growth trend is not high enough to achieve middle-income status before the end of this decade which is the ambition of governments in this region (McAuliffe, 2012).

Empirical studies that have been done indicate that economic growth of growing economies is influenced by fiscal factors (Ibrahim, 2015; Kwoba, 2015;). The influence of fiscal policies on economic growth has generated several disagreements from the researchers and policy makers. While some indicate that fiscal factors have positive influence on economic growth, others conclude that these effects are negative and insignificant (Ibrahim, 2015; Kwoba, 2015; Basu, et al., 2000)

Fiscal policy entails government deliberate actions by the government in its expenditure and taxation to influence macro-economic variables in a desired direction to achieve a sustainable economic growth and development. According to Keynesian economists, an economy needs active government intervention that should influence the level of demand in the economy. When governments increase their expenditure by providing more public goods, social services, infrastructure development and targeted intervention such as subsidies would lead to increased aggregate demand, supply and employment of resources which ultimately causes growth in the economy (Keynes, 1936; Lin, 1994).

According to Ibrahim (2015) reduced economic growth for Sub-Saharan Africa countries is caused by insufficient revenue collected from taxes and high public debt which leads to increased interest rates on loans, high exchange rates, high debt repayment costs and increased uncertainty on investments (Ibrahim, 2015). Neo classical economists argue that increased government expenditure leads to government borrowing both in the domestic and world market as an option to supplement fiscal deficits of their national budget (Kwoba, 2015). Public borrowing in the domestic market leads to competition for available loanable funds between the public and private sector leading to higher interest rates in the economy which increases the cost of capital available for investment in the economy. Increased cost of financing will obstruct private investments hence reduced economic growth (Blejer and Khan 1981).

According to Scandizzo and Sanguinetti (2009) and other economists increase in government expenditure in capital investment that have a long period of productive life and development of physical infrastructure such as transport network, energy generating plants, government

buildings, water and sanitation networks leads to sustainable economic growth (Scandizzo and Sanguinetti, 2009).

Taxation is the main source of revenues which governments use to fund both their recurrent and development expenditures (Egbunike, et al., 2018). However taxes raise the investment cost and lowers return on investment hence becoming a deterrent to earning taxable income and reducing disposable income and savings which will slow economic growth (Newberry & Stern, 1987).

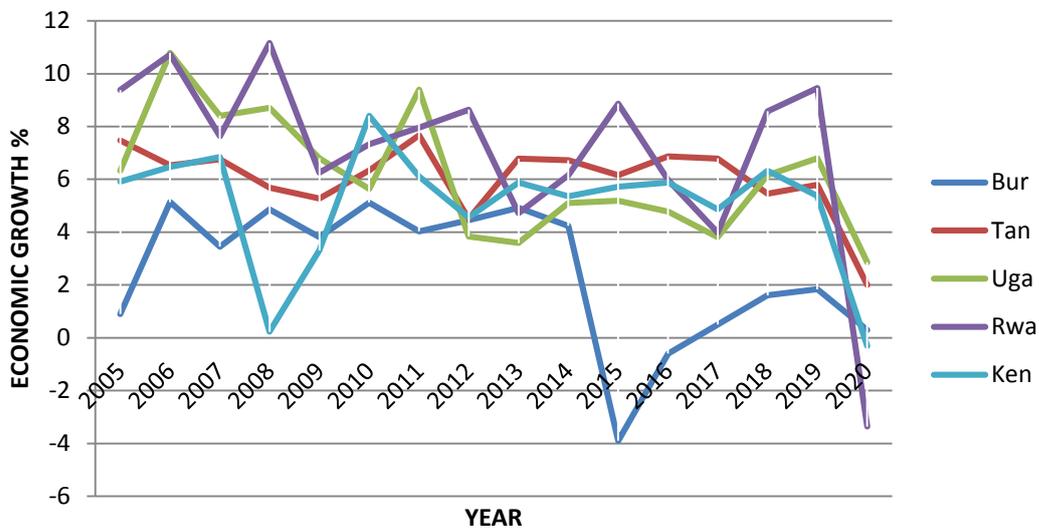
Domestic saving is a vital economic growth variable of any economy because it enhances capital formation, increases public and private investments. Differences in the rates of saving and investment bring about disparity in the growth performance between countries. A country's economic growth and investment is determined by its own domestic saving. For a country to achieve economic growth, and sustained development, a strong saving performance has to be attained (Nwachukwu , 2009: Adewuyi, 2007)

1.1.2 Economic Growth for EAC

The East Africa community (EAC) is made up of Kenya, Tanzania, Uganda, Rwanda, and Burundi. The main aim of this regional economic block which started in 2007 was to widen and deepen cooperation among the member states politically, economically and socially for the mutual benefit of its citizens (Manyinsa, 2014; EAC, 2013).

The average economic growth rate of the EAC region in the last decade was 5.7 percent. Rwanda had the highest growth averaging at 7.2, followed closely by Tanzania at 7.0. Uganda’s annual growth rate for the decade average was 6.7 percent while Kenya was at 4.6 percent, with Burundi having the lowest growth rate in the region with an average of 3.4 percent (World Bank 2019). Economic growth rate trends are shown in chart 1.1 below

Chart 1.1: EAC Economic Growth Rate Trends for the Period 2005 to 2010



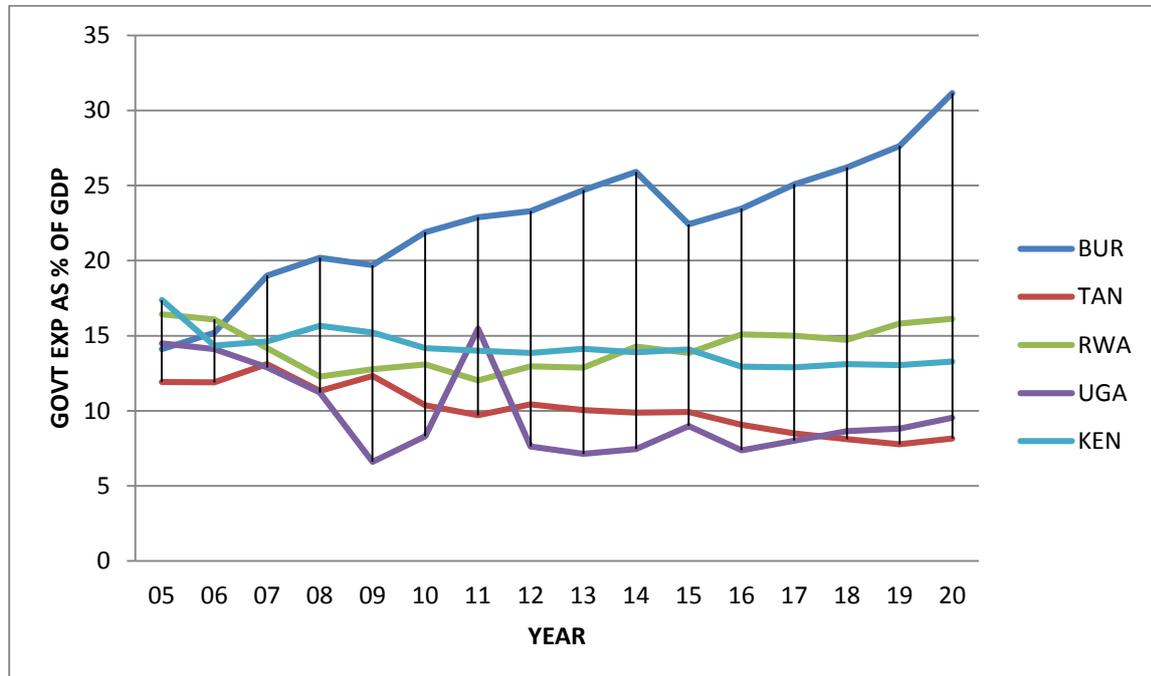
This growth rate is low compared with the worlds’ fastest growing economies of Asian Tigers of Singapore, Taiwan, South Korea and Hong Kong that recorded a sustained rate of above 7.8 percent for the same period or other SSA countries such as Ghana and Ethiopia who recorded a growth rate of above 8.5 percent in 2018. If the ambition of the EAC to achieve middle-income status before the end of this decade is to be attained, then the regional average growth should be sustained at more than 7 percent yearly (Nyongesa, D. et al. 2017).

1.1.3 Government expenditure in EAC

Expenditure of EAC governments has remained high compared to the GDP for the last 15 years. A part from Tanzania whose spending in relation to GDP has shown a down ward

trend, the rest of the EAC spending trends show increased government activities on expenditure. This trend is not healthy for the economy of the region. Burundi's spending gone up from 14 in 2005 to a high of above 30 percent of the GDP in 2020. Uganda's spending also has shown a significant rise from 9.59 to 12.09, with Rwanda rising by 0.85 percent to 14.9 in 2018. Kenya's spending shows a declining rate from 14.17 in 2010 to 12.91 in 2018; however this rate is still high. The trends of Tanzania are now at a single digit after deliberate steps by the government to curb its expenditure in relation to its GDP (World Bank 2019). The average Government expenditure rate to GDP in the EAC region is high with an average growth rate of 14.92 in comparison to other more developed SSA countries such as Nigeria with a rate of 4.4 in 2017. EAC government expenditure as % of GDP trends are shown in chart 1.2 below.

Chart 1.2: EAC Government expenditure as % of GDP Trends



1.1.4 Public Debt in EAC

In the last one and half decades, the regions demand for government debt has more than doubled by these governments to fill their fiscal deficits as tax generated revenues are lower than the approved budgets. The situation seems to worsen with the current health pandemic of COVID 19 since the start of 2020 which has had a significant influence on the fiscal and debt positions as the countries' economies have gone through economic shock (IMF, 2021). On average the region public to debt ratio in 2010 stood at 54.2 percent with Burundi as the most indebted country in the region at around 70 percent of its GDP.

Kenya's public debt reduced from 48.1 percent from 2005 to a low of 36 percent in 2008 and as from 2009 this trend changed as the country's debt ration began to steadily increase. The increased demand for public debt was due to high government spending compared to tax generated income as the country rolled out its strategic plan to be industrialised by 2030 called 'vision 2030' (Mureka, 2017). Kenya's public debt to GDP stands at 62 percent in 2020, surpassing the threshold ratio of 50 percent set by the IMF.

Tanzania's public debt ratio to GDP has grown from 21 percent in 2008 to 38 percent in 2020 representing an annual growth of 1.4 percent. According to Salyungu and Mutasa (2019); the low public debt ratio is due the economic recovery programs that were implemented in 1990s that has led the country to avoid high expansionary fiscal policies and external debt cancellation from which the country benefited.

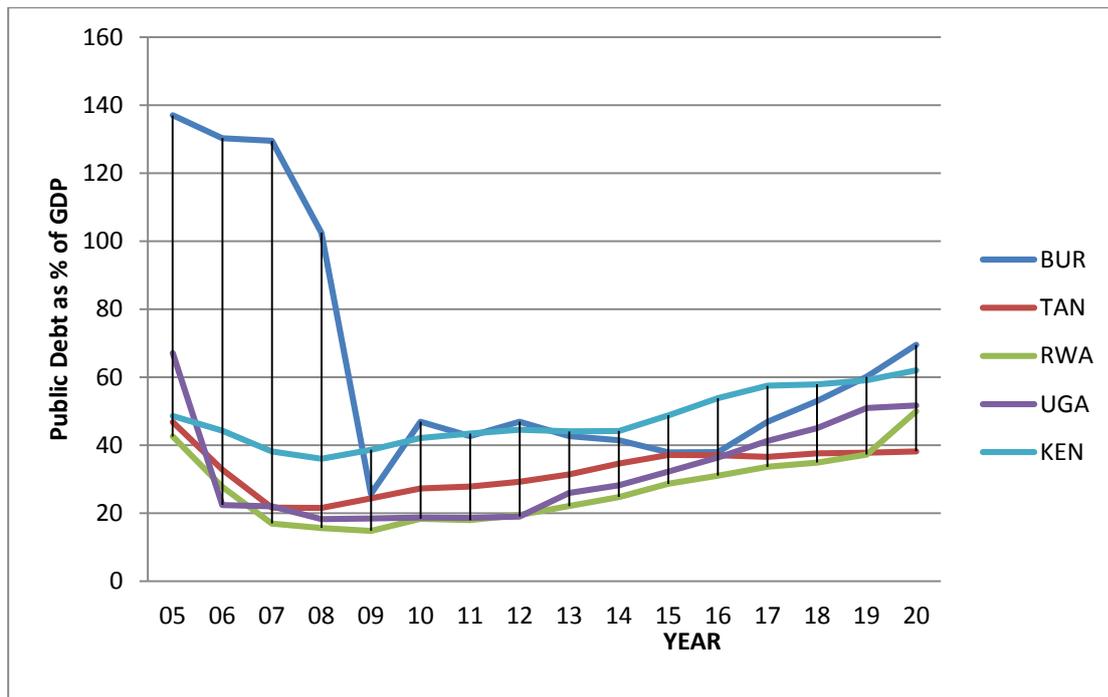
Rwanda's debt was 42 percent of its GDP in 2005 which reduced to a lowest of 14 percent 2009 before starting to increase to reach 37 percent in 2019 representing 23 percent increase

in the decade. This led to the lawmakers in Rwanda raising concerns if the country had the ability to service the increased loans (Ogwuma, 2013).

Uganda's debt ratio increased from 22.4 in 2010 to 51.7 percent 2020 representing an average annual growth of about 3 percent and reaching the recommended threshold of 50 percent. Uganda's need for debt to fill in the fiscal deficits is caused by the country's ever increasing need to upgrade its infrastructure network that is much needed for more economic development.

Burundi with its continued civil strife had its debt at 137 percent to the GDP by 2005. The debt ratio started to reduce courtesy of debt cancellation from her international creditors and implementation of sound fiscal policies to reach a low of 25 percent in 2009. Since then the country's debt - GDP ratio has steadily increased to a high of 69 percent in 2020, becoming the most indebted country in the EAC region. The trend for increased debt should be worrying to the policy makers and economists of these countries since its servicing may not be attainable by an economy that is expanding at a slower economic growth rate. The EAC public debt as % of GDP trends are shown in chart 1.3 below

Chart 1.3: EAC Public Debt as % of GDP Trends for the Period 2006 to 2010



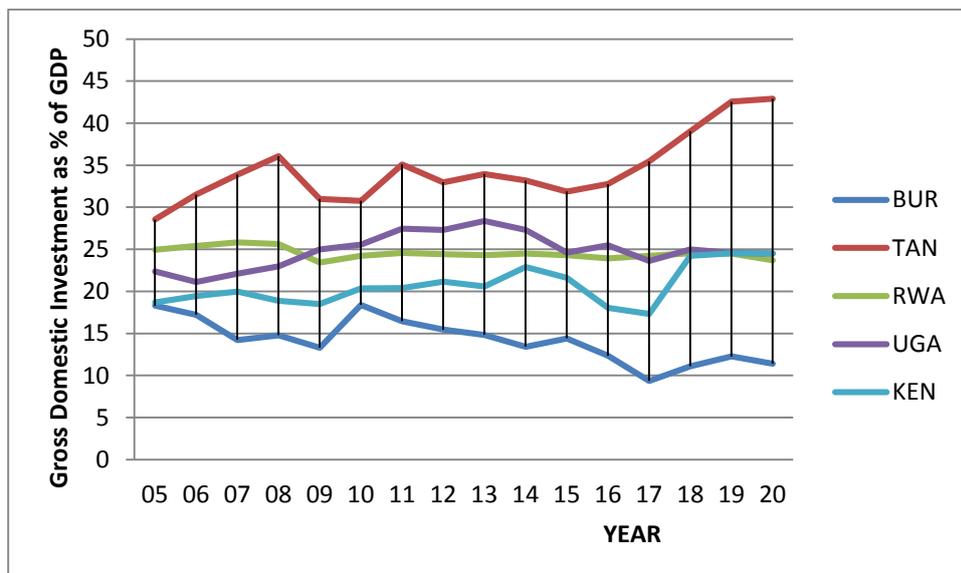
1.1.5 Gross Domestic Investment in EAC

Domestic investment on fixed assets such as land improvements, machinery, and equipment purchases, construction of roads, railways, schools, offices, hospitals and both public commercial and industrial buildings is still low despite their influence on economic growth. Gross Domestic Investment in the region averaged at 22 percent in 2005 and increased to 25 percent in 2020 which was an annual average growth of 0.2 percent. Investment in fixed assets and machineries in Kenya was 18 percent in 2005 and grew to 22 percent by 2014 before the trend reduced to 17 percent in 2017 when the country held its general election. This rate increased steadily to reach a high of 24.5 in 2020 averaging at 20 percent per year in the period of the study.

Tanzania’s domestic investment on fixed assets has been higher compared to the other countries in the region to have an annual average of 35 percent to the regions average of 26 percent. In 2005 the investment in fixed assets for Tanzania was 28.55 and it kept on rising up to a high of 36 percent in 2009 before the trend slowed down in 2010. In 2017 this trend started again to increase to the highest of 42 percent in 2019.

In Rwanda investment in fixed assets between 2005 and 2020 oscillated between 23 percent and 26 percent reaching a high of 25.8 in 2017 averaging at 24.5 within the study period. Investment in fixed assets in Uganda since 2005 to 2020 ranged between 23 percent and 26 percent reaching its highest at 25.8 in 2006 and a low of 23.7 in 2020. The country’s average in the 15 year period was 24 percent. Gross domestic investment trends for EAC countries are shown in chart 1.4

Chart 1.4: EAC domestic investment as % ratio of GDP



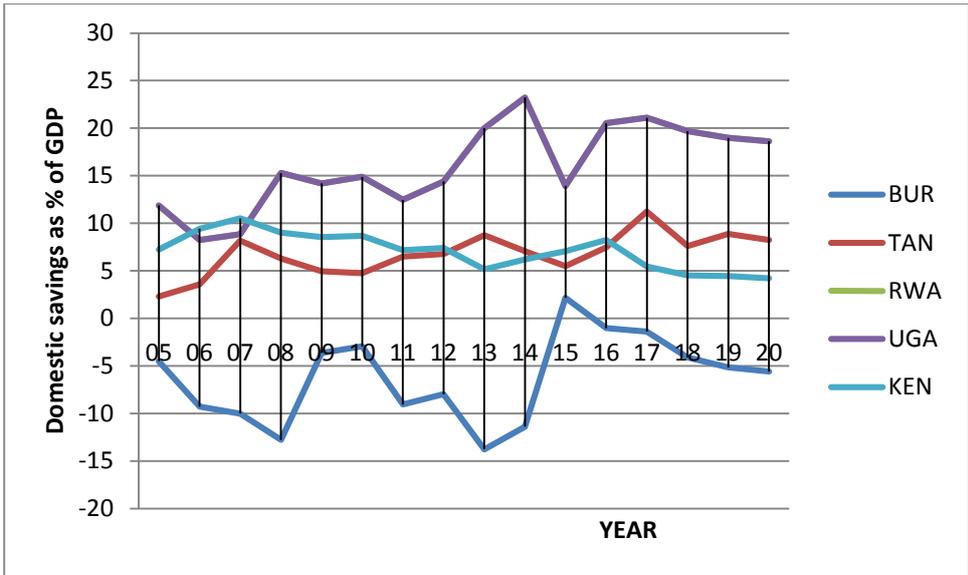
1.1.6 Domestic Savings

This entails the part of income that is not consumed but set aside for investment purposes. Ratio of savings on GDP shall be used to measure level of domestic savings in the economy. Savings annual rate in EAC economies averaged at 10 percent within the period of study. Domestic savings in Kenya have remained lower than the average of the region at 7 percent reaching a high of 10 percent in 2007 and the lowest of 4.2 in 2019. Since 2016 savings in Kenya has been below 5 percent according to the data obtained from World Bank.

Tanzania's domestic savings has been on an upward trend since 2005 when it was 22 percent to GDP reaching a high of 34 percent in 2019. The annual growth rate for this EAC country was at an average of 0.8 percent due to the country implementing policies that encourage domestic savings and investments to spur increased economic growth in the economy.

Rwanda's savings have been rising steadily from an average of 2 percent in 2015 to 8.24 percent in 2019 reaching a high of 11 percent in 2016. With an average of 6 percent the country's savings rate is much way below the region's average rate of 10 percent.

chart 1.5: EAC domestic savings as % ratio of GDP

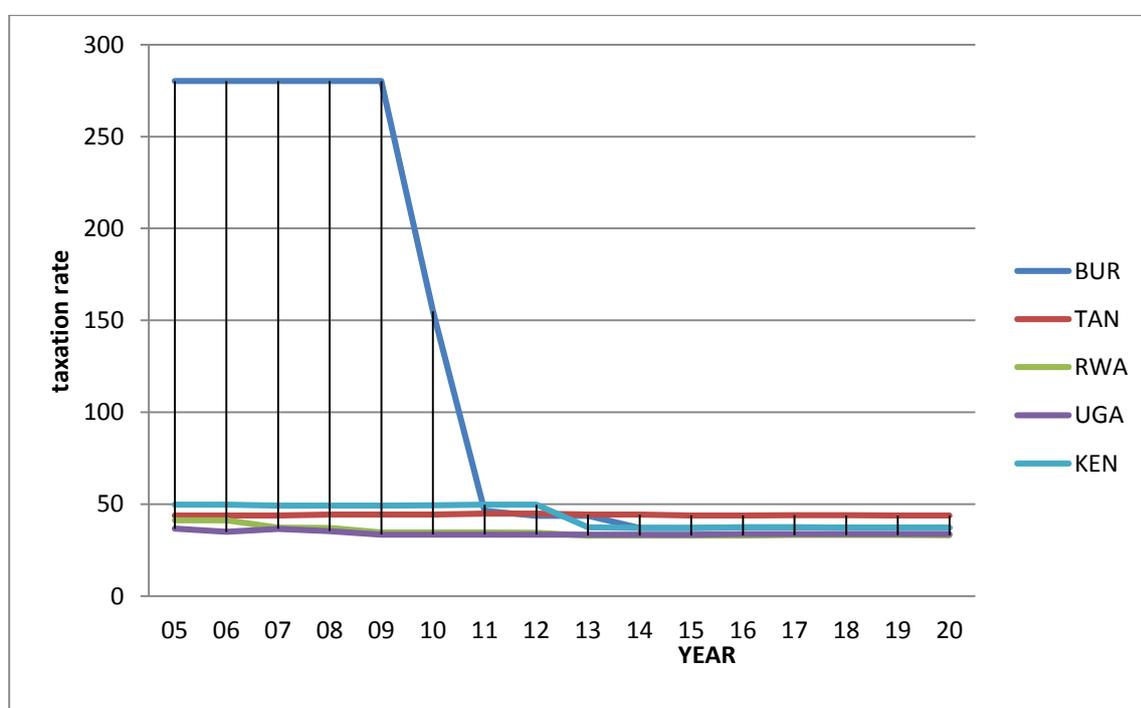


1.1.7 Taxation in EAC

The government of EAC rely heavily on taxation to generate revenue which is used to fund their various projects and provide public goods and services which are not efficiently supplied by the private sector. The average taxation rates payable by businesses after accounting for allowable deductions and exemptions as a share of commercial profits for the region in 2005 was 62 percent with the exception of Burundi whose rate was a high of 280.2 percent during that year. These taxation rates have been on the decline; averaging at 37 percent in 2020 for all the five countries in the region he region.

Kenya’s taxation on business people in 2005 stood at 49 percent which declined to 37 percent by 2020 after the government deliberately enacted policies to create a more competitive and conducive business environment for the entrepreneurs and investors. Uganda reduced the taxation rate from 36 percent to 33.5 percent in 2009. The country has maintained this rate up to 2020 when it increased its rate by just 0.3 percent to raise more revenue for its government operations in the COVID pandemic period after a shrink in her revenues.

Rwanda which is known as the best investment designation in the region taxed the businesses at 41 percent in 2005. This tax rate reduced steadily to 33 percent by 2012 until 2017 when the government raised the taxation rate again to 33.5 percent to increase her domestic collected revenue. According to data from the World Bank, Tanzania's tax rate oscillates between 43.8 to 44.9 after every two years for the period from 2005 to 2020. Taxation of businesses in Burundi was the worst in the region in 2005 at 280 percent. With the implementation of economic recovery policies the government of Burundi reduced this rate to 154 percent by 2010 and reasonable rate of 46 percent in 2011. Since then the government has maintained this legal rate declining to a low of 37.2 percent in 2020.



Different studies which have been done to examine the impacts that fiscal factors have on economic growth used different variables and methodologies have yielded results that are inconclusive. For instance studies by Chude (2013) using ECM technique, Njuguna (2009) employing the OLS estimation techniques, Moreno-Dodson (2008) employed OLS and GMM econometric methods to analyse the data conclude that public expenditure has a positive significant influence on economic growth. However, some other studies such as that of Korman and Brahmairene (2007) employing Granger causality tests showed that government expenditure has no influence on economic growth. Results from these studies may not be applicable for EAC region since none used the panel estimation techniques on developing countries.

Studies by Georgiev (2012); Boboye and Ojo (2012) using OLS regressions concluded that external debt has negative influence on economic growth. While Panizza and Presbitero (2014) using the panel estimation techniques found that public debt has no influence on economic growth of OECD countries. Gacanja (2012); Lee and Gordon (2005) and Dahlby et.al., (2012) using various methodologies for estimation found that increased taxation has negative impact to economy while Worlu (2012) and Nkoro (2012) conclude that increased tax income supports economic growth significantly. These results are therefore inconclusive on whether public debt has an influence on economic growth, creating need for more studies to be done for the EAC region to fill the gap in literature.

1.2 Statement of the Problem

The EAC countries ambition to achieve middle-income status before the end of this decade can only be attained if the economy of the region should grow at more than 7 percent yearly.

Despite the EAC governments' robust macroeconomic policies to spur higher economic growth, the growth rate in the region has remained averagely low at 5.4 percent in the last fifteen years. Governments' expenditure in the region is high compared with GDP. Public debt demand by these governments to meet their fiscal deficits is on the increase and has gone beyond the recommended rates as tax generated revenues are lower than the approved budgets. Domestic savings has remained low in the region leading to low capital formation and investments in fixed goods which are a prerequisite for production of goods and services in any economy while taxation of businesses and individuals is very high which has been a deterrent to investments.

Existing empirical studies on the influence of fiscal factors have on economic growth show inconclusive results and most of them are focussed on developed economies. Majority of the researches have been done on individual countries using time series data and may therefore fail to explain the influence public expenditure, gross domestic investments, savings and taxation level have on economic growth of EAC region. This research was therefore developed to investigate and fill this gap in the literature on to what extent these factors have on economic growth of developing countries of East Africa Community using panel data estimation techniques.

1.3 Objectives of the Study

The general objective of the study is to investigate the influence of fiscal factors on economic growth in East Africa.

The specific objectives of the study are to:

- i. Investigate the influence of government expenditure on economic growth in East Africa Community.
- ii. Examine the influence of gross domestic investment on economic growth in East African Community.
- iii. Determine the influence of government debt on economic growth for East Africa Community.
- iv. Examine the influence of domestic savings on economic growth in East Africa Community.
- v. Determine the influence of tax level on businesses on economic growth for East Africa Community

1.4 Hypotheses of the Study

H₀₁: Government expenditure has no influence on economic growth for EAC.

H₀₂: Gross domestic investment has no influence on economic growth for EAC.

H₀₃: Government debt has no influence on economic growth for EAC.

H₀₄: Domestic savings have no influence on economic growth for EAC.

H₀₅: Tax level on businesses have no influence on economic growth for EAC.

1.5 Significance of the Study

Results from this research shall be of significant importance to the various governments of the East African countries in their policy formulation and implementation towards economic growth. Findings on the influence of government expenditure, public debt, level of gross domestic investment on capital goods, domestic savings and level of taxation on businesses; on economic growth shall be used by the policy makers of the respective governments in reassessing their policies on these issues.

The international community and the development partners of countries in the region will find the results of the study of great significance. The World Bank, the IMF and other financial institutions will use the recommendation in assessing whether to disburse the ever increasing demand for aid and loans by the current governments in the region.

This research will be of value to scholars and researchers by adding new knowledge to the existing literature on to what extent government expenditure, gross domestic investments, domestic savings and taxation level influence economic growth of developing economies of EAC. Scholars and researchers shall find these findings of importance on the current economic growth trends for developing countries.

1.6 Scope of Study

The study used panel data as from 2005 to 2020 for the countries of East Africa community; Kenya Uganda, Tanzania, Rwanda and Burundi. Information on economic growth rates, government expenditure, public debt, domestic investments, savings rates and taxation rates was considered in the analysis.

Theoretical Framework

Endogenous growth theory consists of models that stress the importance of several other factors apart from labour and capital in promoting sustainable economic growth such as the Solow – Swan growth model (Kariuki, 2006). According to Solow (1957) output growth

model, apart from capital and labour output depends also on technological progress. The model assumes constant returns to scale, substitutability between capital and labour and diminishing marginal productivity. Solow's output production growth function is of the form:

$$Y = A K^\alpha L^\beta \dots\dots\dots (i)$$

Where:

Y is the output,

K is capital

L is labour

A is technological progress

According to the model, output change is caused by changing the quantities of capital and labour inputs. In the production process capital must be employed to produce any quantity of output. Capital also improves the efficiency of labour and provides valuable services directly. The model has incorporated technological advances in the production function so that increase in output may be caused by improvement in technology, even if capital and labour may not have changed.

Empirical studies indicate that other factors that may influence growth should also be included in the model as total factor productivity to have the aggregated Solow Model of production (Kaldor, 1977; Ichwara, 2003). These studies have identified the influence of these factors on economic growth by considering output to be a function of production factors of capital, labour and total factor productivity:

$$Y = f (K^\alpha L^{1-\alpha} z) \dots\dots\dots (ii)$$

z - Total factor productivity (TFP)

TFP will capture all the other factors that determine output apart from capital and labour input. Other variables indentified by empirical studies to affect economic growth in developing economies that should be incorporated in this model may include; government expenditure, exchange inflation, revenue from taxations, domestic savings and consumption expenditure, both domestic and external debt levels, foreign aid, corruption, financial development, population growth and life expectancy (O'Connell and Ndulu; 2000, Anaman; 2004 and Kogid at. el.; 2010).

O'Connell (2000) conclude that economic performance for African countries is hindered by lack of trade openness, high risk environment, low capital formation, poor infrastructure and poor performance in governance factors. Several studies have adopted this framework in their research to explain regional and country economic performance. In studying the influence of fiscal factors on the economy of East Africa economic block, fiscal factors that were used as independent variables were represented by total factor productivity while the dependent variable will be captured by the economic growth. Therefore the model to be used was of the form:

$$Y_t = A K^{\beta_1}_{it} L^{\beta_2}_{it} FC^{\beta_3}_{it} \dots\dots\dots (iii)$$

Where

Y – Output

K – Capital

L – Labour

A - Technological progress

FC- Fiscal factors

t- Represents time

i- Represents specific country.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The chapter presents theoretical literature, empirical literature and lastly overview of the empirical literature is presented.

2.1 Theoretical Literature

2.1.1 The Keynesian Theory

According to the Keynesian theory, governments should use fiscal policies to correct imbalances in the economy and boost economic growth. During period of recession the government should adopt expansionary measures such as increased public expenditure can be undertaken to raise aggregate demand on the factors of production and goods and services produced hence boost the economy.

When the government increases its activities in provision of essential utilities to the citizens and on development projects in the economy, it's spending increase which leads to increased employment of factors of production in all sectors of the economy. When more factors of production are demanded, the economy shall experience more output produced, employment rate will raise, income and profits of businesses rise while households increase their aggregated demand for goods and services from firms. This would result in the firms hiring more factors of production to meet the increased demand of goods and services needed by the government and households. This leads to increased production and wealth generation hence growth in GDP. However, the greatest limitation of this theory is that it does not address the problem of inflation, misallocation and inefficiencies in allocation of resources brought about by increased government spending (Kurihara, 2012).

According to Metwally and Tamaschke (1994), there is no real burden associated with public debt and therefore public debt has no influence on economy of a country (Metwally and Tamaschke, 1994). Accordingly unlike external debt, domestic public debt does not add to the real resource base in the economy since such resources are already present in the economy.

From Keynesian, policy makers should consider the effects of fiscal policies on taxation since such policies may disturb private consumption, savings and investment rates in the economy. Reduction in taxation rates would boost consumption by availing more disposable income for both household and firms. This leads to increased general demand for goods and services hence production.

2.1.2 Endogenous Growth Theory

Endogenous growth theory was proposed by Paul Romer and Robert Lucas (1990) where economic growth is explained as an endogenous variable and is a function of capital, labour and innovation capacity on capital accumulation by the production process. According to the endogenous growth models policy measures that affect investment, capital stock, education and research and development usually have a significant influence on the long-run economic performance of any country. The long term persistent increase in domestic output is therefore influenced by the system controlling the production process and not any other factors outside that system (Smith and Todaro, 2009)

In the production function; endogenous growth theory defines capital more broadly to include spillovers of knowledge which is taken to be having a constant or increasing rate of returns on factors of production. Output from the production process is assumed therefore to depend on

government actions, which include government expenditure, taxation policies, savings and investment policies, policies on intellectual property rights and management on financial markets (Stegarescu, 2013; Gacanja, 2012; Mankiw, 2000; Barro, 2003).

2.1.3 Solow- Swan Economic Model

The model was discovered and propagated by Solow and Swan (1956) when they relaxed the assumption of fixed proportions in production between labour and capital as assumed by the earlier Harrod Domar model. The Solow- Swan economic growth model decomposes output growth into inputs of production as capital, labour and technological progress in the aggregate production.

The theory postulates that in the short term, economic equilibrium in the production process is a result of varying amounts of labour and capital (Corporate Finance Institute, 2021) provision of more capital for each worker leads to increased output per worker. According to the model, increase in the amount of labour which is caused by an expansion in population growth rate for some time had negative influence on the economy. This is because a bigger fraction of saving has to keep the capital-labour ratio constant. In the short-run equilibrium state can be attained since it's assumed that labour and capital are perfectly substitutable an within the production function.

For the long-run, the main conclusion of this theory is that accumulation of capital and labour does not account for vast changes in output per unit labour or capital. Therefore technological progress is what is predicted to determine most of the increase in the output

both for short and long-run. This model will then be assumed to have an output relationship of the form:

$$Y = AF(K,L) \dots\dots\dots (v)$$

Where:

K represents capital

L represents labour.

A- Represent level of technology and efficiency of capital and labour.

Since the relationship between labour and technology is dynamic, the country's production function will be expressed in the form of:

$$Y = F(K, AL) \dots\dots\dots (vi)$$

$$\frac{dY}{Y} = \alpha \frac{dk}{K} + (1 - \alpha) \frac{dL}{L} + \frac{dA}{A} \dots\dots\dots (vii)$$

Where

Y represents growth in *GDP*,

K represents capital stock,

L represents labour

dY represents economic growth rates

dK represents changes in capital

dL is changes in labour

$\frac{dA}{A}$ Represents total factor productivity

Total factor productivity explains for the increase or decrease in productivity which is not explained by changes in factor inputs of capital and labour.

From this equation technological progress which grows at an exogenous rate is what causes a sustained growth rate in the output when the economy is operating in equilibrium state (Solow, 1956). Therefore the source of long term growth in the model is technical change. Barro (2003) acknowledges that when technology in the economy does not continue to improve for long periods of time, the economy will eventually cease grow.

Corporate Finance Institute (2021) pointed out that improvement in technology is not only just as a result of exogenous independent scientific developments within and from other economies but it's also influenced by government policies for promotion of endogenous innovation in the economy that support sustainable economic growth. Such policies include intellectual property laws and high investment in research and development. Thus with technological progress, increase in output is caused by changes in units of capital, labour and factor productivity which causes improvement in efficiency in the factor inputs. Its therefore this technological progress that causes balanced economic growth in the long-run. An aggregated Solow-Swan growth model that satisfy Inada conditions for an economy will then be expressed in a production function of the form:

$$Y = F(K, N) = Nf(k) \dots\dots\dots (viii)$$

$$\frac{dK}{dt} = s(\theta, \cdot)Y - \delta(\mu)K \dots\dots\dots (ix)$$

$$\frac{dL}{dt} = nL \dots\dots\dots (x)$$

$$\frac{dT}{dt} = \alpha(\chi, \xi, \omega, \mu)K/L + \lambda T \dots\dots\dots (xi)$$

$$N = TL \dots\dots\dots (xii)$$

$$K = \frac{K}{N} \dots\dots\dots (xiii)$$

Where

Y - Real GDP

K - Capital stock

N - Labour (man hours in efficiency units)

L - Population (man hours), technical change

k - Ratio of capital stock to labour

s - Ratio of real saving to GDP

δ - Depreciation of capital

α - Learning coefficient

n - Population growth rate

X - Change in ratio of foreign trade to value of GDP

ξ - Growth rate of real government expenditures on education and health

ω - Growth rate of real government expenditures on social security and housing

μ - Growth rate of real government expenditures on operations and maintenance

θ - Ratio of government deficits to GDP

λ - Rate of exogenous labour-augmenting technical change

$d(\cdot)/dt$ - Time derivative.

From this model, government fiscal policies that influence GDP must be taken into account. Policies that influence savings and investment, government expenditures and maintenance of fiscal deficits caused by increased public borrowings from the domestic market which affects interest rates hence the cost of credit.

Empirical studies indicate that in the aggregated Solow - Swan model of production, some of the determinants of technological progress for African countries are fiscal policies, trade openness, political environment, poor infrastructure and governance factors (Kaldor, 1977; Ichwara, 2003; Mankiw, 2000; O'Connell and Ndulu, 2000). Fiscal policies that increase physical capital and development of human capital (such as provision of education and health) have a long term effect on growth through transitional economic growth effects. These policies increase government expenditure and may lead to fiscal deficits that cause public borrowing. According to Nassali (2018), to raise more income to repay the accumulated public debt the government will increase taxation in the economy. Increased taxation in the economy reduce domestic savings, raise the investment cost and lowers return on investment hence becoming a deterrent to economic growth.

Solow-Swan Model forms the basis of this study which proposes that apart from capital and labour stocks, the other fiscal factors that may determine economic growth of EAC are

government expenditure, public debt, domestic investments, savings levels in the economy and taxation rates.

2.2 Empirical Literature

2.2.1 Government Spending and Economic Growth

Studies on the influence of fiscal factors on the economy show mixed results. Chude (2013) studied on how public spending influence economic growth rate for Nigeria. Using ECM technique in examining both long and short run influence, the results showed that government spending influences positively economic growth for Nigeria.

Ocran (2009) examined the effect of fiscal policy variables on economic growth for South Africa between 1990 and 2004, by employing vector regressive modelling technique and impulse response functions in the estimation. The study indicated that government consumption expenditure; fixed capital formation and tax receipts had a positive effect on economic growth. However, fiscal deficits have insignificant impact on economic growth.

Njuguna (2009) studied effects of public expenditure on economic growth for Kenya between 1963 and 2006. By assuming Keynesian theory on public spending and economic growth rate and employing the OLS estimation techniques the results showed that increased government spending on productive sectors have a positively significant impact on economic growth.

Moreno-Dodson (2008) carried out an empirical analysis of how public spending contributes to growth on fastest growing economies of developing countries using panel data. The study

employed OLS and GMM econometric methods to analyse the data. The results show that public spending has a significant positive impact on GDP growth.

Korman and Brahmaasrene (2007) did a study on the influence of government expenditure on economic growth of Thailand employing Granger causality tests. The results showed that government expenditures has no influence on economic growth and are not co-integrated.

2.2.2 Public Debt and Economic Growth

Georgiev (2012) examined the impact that public debt and investments had on the economic growth in seventeen European countries by making use of panel data regressions between 1980 and 2012. Results from the study showed that public debt had a negative impact on economic growth.

Boboye and Ojo (2012) did a study to find out what influence external debt has on economic growth in Nigeria employing the OLS regressions. Results of the research showed that external debt impacts negatively on economic performance. Increased debt levels led to devaluation of the country's currency, retrenchment of workers and regular industrial strikes which impacted negatively to economic growth and development.

Cassimon and Campenhout (2007) did a study on the effects of fiscal response on debt relief in 28 highly indebted poor countries between 1991 and 2004. By employing the panel VAR

model the study concluded that debt relief increases revenues collected by the government which increased the countries' GDP.

2.2.4 Gross Domestic Savings and Economic Growth

Anastassiou and Dritstaki (2005) did a study to establish the relationship between tax revenues and gross savings on economic growth on the Greek economy between 1965 and 2002 using Granger causality tests. The results of the study showed that both tax revenue and gross saving have a significant influence on the economy. The study concluded that governments should reduce direct taxation so that to attract capital formation and technology development in the economy.

Lean (2008) analysed if there is a relationship between domestic savings and growth of the economy in China by employing Johansen cointegration and granger causality methodologies. The results from the study show that in the long-run growth granger cause savings growth. However there was no evidence to suggest that savings granger cause economic growth.

Budha (2014) examined the effects that domestic savings and investment has GDP on the growth of Nepal's economy using data from 1974 to 2010 for the study. Using autoregressive distribute lag (ARDL) method the empirical results of the study showed that both domestic savings and investment has positive significant impact on GDP of Nepal.

Ribaj and Mexhuani, (2021) did a study to establish what exists relationship exists between savings level and growth for Kosovo between 2010 and 2017 employing the Ganger Causality tests. The results showed that savings significantly stimulate investment, production and employment hence impacts the economy positively.

Dhanya, (2015) did a study which was to establish what effects savings had on economic growth in Botswana by employing Harrod –Domar growth model from 1980 to 2013. Using DOLS approach the study identified that there exist along run co integration between economic output and savings. The study concluded that savings had a significant relationship with GDP for Botswana.

2.2.5 Taxation and Economic Growth

Gacanja (2012) did a research on Kenya to investigate the effects of tax revenue on economic growth using the OLS estimation method. The results indicated that tax revenue had positively significant effect on GDP. These results suggest to the government to desist from increasing tax rates and should use a tax structure that enhances the taxation base, improve taxation system, eliminate fraud, evasion and corruption to increase the tax revenue to improve GDP growth rate.

Worlu and Nkoro (2012) did a study on tax revenue and economic development for Nigeria from 1980 to 2007 using a macro econometric approach. By employing the three stages least square estimation technique in analysis of data, the study concluded that tax revenue stimulates economic growth through provision of infrastructure in the economy However

governments should come up with fiscal laws and legislations to curb tax offenders, minimize corruption, evasion and tax avoidance. The study concluded that increasing tax revenue base, improvement in the tax administration, accountability and transparency in revenue management will result in increased GDP growth.

Dahlby et.al., (2012) did a study to find out how tax rates affect the growth of the economy for Canada from 1977 to 2006 using secondary panel data. The results from the study indicated that when tax rate is increased, the level of investment is slowed which reduces economic growth significantly.

Lee and Gordon (2005) did a study to examine the effect of tax revenue and economic growth of the United States of America from 1970 to 1997 using cross-country data. The study concluded that increased rate of corporate taxes have a negative impact on the economy.

2.3 Summary of Literature

In summary, empirical literature on influence of fiscal factors on economic growth has shown mixed results. Studies by Chude (2013); Njuguna (2009); Ocran (2009) and Moreno-Dodson (2008) conclude that government expenditure has a significant influence on economic growth. While studies by Korman and Brahmairene (2007) show that the level of government expenditures has no significant influence on economic growth.

Studies by Boboye and Ojo (2012); Georgiev (2012); Panizza and Presbitero (2014); Cassimon and Campenhout (2007) concluded that public debt has negative impact on economic growth. Dhanya, (2015), Budha (2014), Anastassiou and Dritstaki (2005); Ribaj and Mexhuani (2021) concluded that savings have a positive influence on the economy while studies by Lean and Song (2008) show that domestic savings does not granger cause economic growth.

Worlu and Nkoro (2012) conclude that increased tax income supports economic growth significantly while studies by Dahlby et.al., (2012); Gacanja (2012); Lee and Gordon (2005) conclude that increased taxation has negative impact to economic growth

Finally the underlying argument is that sound fiscal policies are capable of enhancing economic growth for both developed and developing countries and regions in both in the short and long run.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter discusses the research design, area of study, target population and data collection, data analysis, specification of the model, methods of estimation and presentation

3.1 Research Design

This research will use correlation research design. A correlational study is a quantitative method of research in which two or more quantitative variables from the same group of subjects are taken through series of computations to determine if there is a relationship (or covariance) between variables (Asomoah, 2012). Correlational research also known as associational research aims at measuring the nature and degree of association among two or more variables under study without any attempt to manipulation them. Therefore the main focus of this research design is to asses if there exists covariance in naturally occurring variables (Asomoah, 2014)

Correlation design is a quantitative research method in the positivism paradigm that is designed to discover relationships among variables that can be used to predict future events from the past and current occurrence of the events (Anderson and Arsenault, 1998; Asamoah, 2014). The study aims at establishing the influence of fiscal factors on economic growth for the East Africa countries.

3.2 Area of Study

This research was conducted on the East Africa Community (EAC) countries as a region which is made up of Kenya, Uganda Tanzania, Rwanda and Burundi with its headquarters in Arusha, Tanzania. The region is located on the equator between latitude 23° North and 12° South and longitude 22 ° E and 51 ° E with a population of 177 million citizens on a land mass of 2.5 million square kilometres (United Nations Statistics Division, 2020).



Map 1: East Africa Community Countries (Source: UN Statistics Division, 2020)

3.3 Target Population and Sampling Design

The study targeted the eleven Eastern African Countries: Kenya, Uganda Ethiopia, Eretria, Djibouti, South Sudan, Tanzania, Rwanda, Burundi, Somali and Somaliland (UN Statistics Division, 2020). The researcher sampled out the five East Africa Community states which are

Kenya, Uganda, Tanzania, Rwanda and Burundi. The East Africa Community is a regional economic block is made up of countries that share similar macroeconomic and social characteristics (Nyongesa, et. al., 2017).

3.4 Data Collection

Secondary data from the yearly economic abstracts from the relevant countries’ statistic Bureaus and the World Bank database for the five selected countries from 2005 to 2020 was used in the study. The research therefore considered eighty observations for the sixteen year period under study.

3.5 Data Analysis

Data obtained was analyzed by econometric panel data techniques in examining the influence of government expenditure, public debt, domestic investment in fixed assets, level of savings and taxation on economic growth.

3.6 Specification of the Model

The model to be analysed is a dynamic econometric panel that combines time series and cross section data. The study adopted and modify the aggregated Solow growth model in determining what influence fiscal factors have on economic growth for EAC. Therefore the functional model to be estimated by this study is specified as:

$$Y_{it} = GEX_{it}^{\beta_1} GDI_{it}^{\beta_2} DEB_{it}^{\beta_3} SAV_{it}^{\beta_4} TAX_{it}^{\beta_5} F_{it}^{\beta_6} \gamma_i \epsilon_{it} \dots\dots\dots(vii)$$

Equation (vii) can be linearized by inserting natural logarithms in the equation to obtain equation (viii). The coefficients found will represent the output elasticity of each respective independent variable.

$$\text{Ln GDP}_{it} = \alpha + \beta_1 \text{Ln GEX}_{it} + \beta_2 \text{Ln GDI}_{it} + \beta_3 \text{Ln DEB}_{it} + \beta_4 \text{Ln SAV}_{it} + \beta_5 \text{Ln TAX}_{it} + \gamma_i + \mu_t \dots\dots\dots \text{(viii)}$$

Where:

GDP represents annual GDP percentage growth rate.

GEX represents government expenditure percentage rate of GDP

GDI represents rate of gross domestic investment

DEB represents Public debt as percentage of GDP

SAV represents level of domestic savings rate

TAX represents total tax rate on businesses

Ln represents natural logarithm

γ_i represents country unobserved heterogenous variables (presence of sea port, devolution rate in governance and demographic characteristics)

μ_t represents the error term

β_i - Slope Coefficients and t - Represents the index of time.

3.7 Measurement of Variables

Variable used in the model were measured as follows

3.7.1 Economic Growth

Economic growth is measured as percentage change in economic output of a country over successive periods of time. It is the annual GDP percentage change rate.

3.7.2 Government/public expenditure:

This is the spending of money by the government on the various activities it undertakes. The study used the ratio of annual government expenditure to the GDP

3.7.3 Gross Domestic Investment

Gross domestic investment consists of outlays on additions to the fixed assets of the economy. Fixed assets include land improvements, machinery, and equipment purchases; and the construction of roads, railways, and buildings for both domestic and commercial use. The study used annual expenditure on fixed assets by both the public and private sector as a ratio to the GDP.

3.7.4 Public debt

This is the amount of income the government borrows from both domestic and foreign sources. Annual public debt ratio on GDP was used to measure public debt for each country.

3.7.5 Domestic Savings

This entails the part of income that is not consumed but set aside for investment purposes. Aggregate deposits in fixed accounts ratio to GDP per year was used as a proxy of the level of domestic savings in the economy.

3.7.6 Taxation rate

Total tax rate measures the amount of taxes payable by businesses was used to measure taxation rate in the economy for each country

3.8 Methods of Estimation

The study used pooled OLS regression model to determine correlation among the variables to be considered in the study. The research aims at establishing what influence fiscal variables; government expenditure, public debt, taxation level and gross domestic savings have on the economy of EAC region using the panel data estimation techniques.

3.9 Panel Data Estimation Technique

This study used panel data estimation techniques for determining the influence government expenditure, tax revenue, public debt and level of savings have on economic growth using data from EAC region. Panel data estimation technique makes it possible to study time series (different periods) and cross-sections (different countries) simultaneously, each with one dependent with several independent variables (Mose, et. al. 2014). Panel time series refers data collected from selected individual countries in different time periods. This type of data considers the same individuals in each cross-section and hence causing a repetition of same countries at different time periods (Ghazi, 2014).

For each country there are usually some omitted variables which are time invariant and panel estimation techniques are used to control for such unobserved time invariant variables every year (Ghazi, 2014). This estimation technique therefore leads to more efficient estimates than when cross-section or time-series data are used for analysing variables in research. Panel data estimation technique has greater flexibility when coming up with a model for that takes care the differences in behaviour among countries to be studied thereby enabling the researcher to control for unobserved heterogeneity of these time invariant variables and has less multicollinearity (Manyinsa, 2014; Baltagi, 2008; Hsiao, 2003). The correlations of these variables with error terms cause either fixed effects or random effects.

3.9.1 Panel-Fixed Effects Model

The FEM assumes that the unobserved heterogenous variables called individual fixed effects variables are correlated with the independent variables. The individual fixed effects dummy variables are important since they represent the unique economic behaviour of individual countries and can therefore be used in controlling one country from the other since they are constant over time. If these unobserved heterogenous variables are omitted then the coefficients of explanatory variables will be biased. The unobserved time invariant variables in this study are; presence of sea port, devolution rate in governance and demographic characteristics of individual countries (Ghazi, 2014; Manyinsa, 2014). The empirical fixed effect model that was used in this study is of the form:

$$Y_{it} = \alpha_i + \beta X_{it} + (\gamma_{it} + V_{it}). \dots\dots\dots (ix)$$

Y_{it} is the explanatory variable observed over time and is represented by economic growth in this study.

X_t represents the observable individual independent variables that vary over time. In this study these are the fiscal factors.

i represents individual countries

t stands for the number of observations,

γ_i represents each individual fixed effects (dummy variables)

These individual fixed effect variables are unobservable, heterogeneous and vary from country to country. For this study they include presence of sea port, devolution rate in governance and demographic characteristics that influence the economy and may have a strong correlation with the independent variables.

If the OLS have to be unbiased and inconsistent then, $E(X_{it}, \varepsilon_{it}) \neq 0$ and this residual (ε_{it}) has to be split into two components represented by V_t and γ_i .

$$(\varepsilon_{it}) = (\gamma_i + V_t) \dots\dots\dots (x)$$

Then this OLS cannot be used to estimate these dummy variables.

Fixed effects can either be one-way or two-way fixed effects. The Chow Test was employed to determine if one-way or two-way fixed effects specification is appropriate for the study.

3.9.2 Random Effects Model

The REM model assumes that individual unobserved heterogeneous variables (dummy variables) are not correlated with the independent variables. Because of this the dummy variables that are meant to control for the differences among countries are omitted. There

omission in the analysis will not therefore lead to any biasness in the coefficients estimated of the independent variables (Baltagi, 2008). For empirical random effect model for unobserved heterogeneous variables, the following equation is used;

$$Y_{it} = \beta X_{it} + (\alpha_i + \varepsilon_{it}) \dots\dots\dots (xi)$$

Where α_i represents the unobserved heterogeneous variables.

Also for all individual observations then:

$$E(X_{it} \varepsilon_{it}) = 0 \dots\dots\dots (xii)$$

The individual fixed effects (α_i) become part of the error term, therefore the error terms are no longer independent (Woodridge, 2002). The assumption is that these unobserved heterogeneous variables in the model, which vary among the countries, are not related to the independent variables considered. In order to choose whether to use the random effects model or fixed effects model, the Hausman test will be employed.

3.9.3 Hausman Test

The Hausman tests checks if the unique errors are related with independent variables or not (Greene, 2008). This test is therefore applied to determine whether the research should adopt fixed effect models or random effect models. The model to be tested is;

$$Y_{it} = \alpha_i + \beta X_{it} + \gamma_i + v_t, \dots\dots\dots (xiv)$$

The null hypothesis of Hausman test is that there is no correlation between γ_i and variables in X_{it} , which is as follows:

$$H_0: E(u_{it}/X_{it}) = 0. \dots\dots\dots (xv)$$

If Chi-Sq. df is less than Chi-Sq Statistic, then the null hypothesis (random effect) is rejected.

3.9.4 Pooled OLS Regression Model

According to Akbar et al.(2011); while it is assumed that all coefficients are constant across time and individual countries; however if these individual effects are neither significant country nor significant temporal effects, all the data is pooled and Ordinary Least Squares (OLS) regression model is regressed. The pooled regression model that was run in this study was of the form:

$$\text{Ln GDP}_{it} = \alpha + \beta_1 \text{Ln GOV}_{it} + \beta_2 \text{Ln GDI}_{it} + \beta_3 \text{Ln DEB}_{it} + \beta_4 \text{Ln SAV}_{it} + \beta_5 \text{Ln TAX}_{it} + \gamma_i + \mu_t$$

..... (xvi)

The Lagrange Multiplier (LM) test was carried out to determine whether to use the individual effects regression or a pooled OLS regression model

3.9.5 Lagrange Multiplier (LM) Test

The Breusch–Pagan LM statistic test was used to test the null hypothesis that the pooled OLS estimator is adequate against the individual effects alternative. The specific hypothesis under investigation is the following.

$$H_0: \delta_T = 0$$

$$H_0: \delta_T \neq 0$$

The LM Statistics to be tested is of the form

$$LM = \frac{nT}{L(T-1)} \left[\frac{\sum_t (\sum e_{it}^{\wedge})^2}{\sum_i \sum_t e_{it}^{\wedge 2}} - 1 \right]^2 \sim \chi^2$$

3.9.4 Test for Panel Unit Roots

When non stationary panel data is used for analysis it will result into invalid parameter estimates because the obtained estimates from this type of data shall have non constant mean and variance. To find out for stationarity in the data unit root tests are used. A process is said to be stationary if its probability distribution remains unchanged as time proceeds since the data generation process does not change. If the series are intergrated of the same order and cointegrated, then estimate results and statistical inferences would be non spurious (Granger, 1988).

The Levin and Lin (1992) tests as proposed by Chen (2013) model test shall be used in testing these variables for presence of unit roots. This model will is preferred because Levin and Lin developed the model to allow fixed effects, individual determinant trends and heterogeneous correlation errors in series. Their model assumed that both the number of horizontal sections (N) and the length of time (T) in the panel data series are infinite. However, when the ratio of N/T goes to zero, T goes to infinite in higher ratio when compared to N. The Levin, Lin and Chu model is unique since it considers the asymptotic features of the estimators. This study adopted Levin and Lin (1992) tests as proposed by Chen (2013) which is given by;

$$Y_{it} = P_i Y_{it-1} + z_{it} \gamma + \varepsilon_{it}$$

z_{it} is the deterministic component

ε_{it} = stationary process

$$I = 1, \dots, N, \text{ and } t = 1, \dots, T$$

Levin and Lin assumed that $P = P_i$ for all i and are to test the hypothesis such that when

$H_0: P = 1$ There exists a unit root

Stationary was determined by testing the significance of P , non-stationarity is to be accepted when P is significantly equal to 1 hence the variables are further to be differenced until existence of unit root is no longer accepted

3.10 Diagnostic Tests

Due to time series component of the data, the study performed diagnostic tests based on the basic assumptions of OLS were done to validate the parameter estimates yielded.

3.10.1 Test for Autocorrelation

Autocorrelation occurs in time series observations if when ordered there is a relation between them and their error terms are related

$$U_t = \rho u_{t-1} + v_t; \dots\dots\dots (xx)$$

Where; u_t and u_{t-1} are successive error terms,

v_t is the noise which obeys the usual assumptions.

Error terms should be independent of each otherwise autocorrelation will occur in the data against the standard assumptions in the regression model that error terms should be uncorrelated i.e.

$$\text{Cov}(U_t, u_{t-1}) = 0 \dots\dots\dots (xxi)$$

Presence of Correlation among the error term suggests that some more information in the data has not been captured in the current model (Gujarati, 2004; Mukras, 1993).

This study used the Durbin-Watson statistic Test to determine if there exists correlation among the error term to check for autocorrelation in regression analysis.

3.10.2 Testing for Homoscedasticity Assumption

Due to time series component in panel data, errors must have equal variances or else they will not behave well (Gujarati, 2004; Mukras, 1993). The study explored the presence of constant or unknown variances of the error terms across all the data panels using the residual plot method.

3.10.3 Test for the Normality Assumption

One of the basic assumptions for the authenticity of analysis of variance to hold is for normality assumption to exist (Gujarati, 2004, Mukras, 1993). In this study, the usual Jarque Bera normality test was employed to carry out the analysis to determine if the residuals under consideration are normally distributed.

3.10.4 Test for the Existence of Multicollinearity

Multicollinearity occurs when there is the presence of linear relationships among explanatory variables. This means that two or more explanatory variables do not tend to move together in the same pattern and are therefore dependent on each other. If the explanatory variables are perfectly linearly correlated, the parameters become indeterminate. At the other extreme if the explanatory variable are not inter correlated at all the variables are called orthogonal and

there are no problems concerning the estimates of the coefficients, as far as multicollinearity is concerned (Gujarati, 2004; Mukras, 1993).

The Variance Inflation Factors (VIF) were used to check for multicollinearity in the data

Usually when the variance inflation factors values are greater than 10, then the presence of multicollinearity is confirmed (Nachtsheim, 2004). VIF values are calculated as shown below.

$$\text{VIF} = \frac{1}{1-R^2}$$

Where

VIF Represents variance inflation factor

R^2 represents coefficient of determination

$\frac{1}{\text{VIF}}$ is tolerance

CHAPTER FOUR

EMPIRICAL FINDINGS AND DISCUSSION

4.1 Introduction

This chapter discusses on the nature of the panel data, panel unit root tests, selection, model regression, diagnostic tests and discussion of findings. The chapter consists of data presentation, analysis and interpretation of the data based on the panel data model developed in chapter three.

4.2 Descriptive Statistics

The descriptive statistics reveal the salient features of the variables used in the study. The descriptive statistics for variables used in this analysis are line graphs, measures of central tendency and measures of dispersions. The study variables under investigation included economic growth, government expenditure, gross domestic investment, public debt, gross domestic savings and tax.

Table 4.1 Results of descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	80	2.54175	2.518642	-3.9	5.14
GEX	80	22.68062	4.277574	14.1	31.16
GDI	80	14.19938	2.520761	9.36	18.38
DEB	80	65.68688	36.23111	25.7	137
SAV	80	-6.283125	4.4205	-13.78	2.16
TAX	80	121.9	110.9464	37.1	280.2

Source: Constructed from the study data

From Table 4.1, the mean of economic growth was 2.54 meaning that the economy in EAC has been growing at a rate of 2.54 percent. The standard deviation of economic growth was 2.52. The maximum and minimum for economic growth were 5.14 and -3.9 respectively. These results reveal that, the spread of each of the 80 observations from the true mean (2.54) of the same observations as measured by the standard deviation (2.52) is greater than as envisaged in the normal curve distribution. This means that, the economic growth variable observations in this study has greater variability from their true mean.

The mean of government expenditure was 22.68 with a corresponding standard deviation of 4.28. The maximum government expenditure and minimum government expenditure across the 80 study observations was established at 31.16 and 14.10 respectively. The standard deviation of government expenditure is far greater than one, implying that the variability of government expenditure across the East African Community countries is greater.

Gross domestic investment mean was established to be 14.20. The standard deviation of gross domestic investment was found to be 2.52. The maximum, minimum and the range was established to be 18.38 and 9.36 respectively. These results reveal that, the spread of each of the 80 observations from the true mean (14.20) of the same observations as measured by the standard deviation (2.52) is far greater than as envisaged in the normal curve distribution.

Public debt mean was established to be 65.69. The standard deviation of the public debt variable was found to be 36.23. The maximum and minimum was established in the study to be 137 and 25.7 respectively. These results reveal that, the spread of each of the 80

observations from the true mean (65.69) of the same observations as measured by the standard deviation (36.23) is far greater than as envisaged in the normal curve distribution.

The mean for gross domestic savings was established be -6.28. The standard deviation of the gross domestic savings was found to be 4.42. The maximum and minimum were 216 and -13.78 respectively. From these results, the study standard deviation was established at 4.42 which is far greater than the heuristic (+/ - 1σ) standard deviation for normal curve distributions. The maximum and minimum were 2.16 -13.78 respectively. These results reveal that, the spread of each of the 80 observations from the true mean (-6.28) of the same observations as measured by the standard deviation (4.42) is far greater than the expected in the normal curve distribution.

The mean of tax was 121.9. The standard deviation of the government effectiveness variable was 110.95. The maximum and minimum were 280.2 and 37.1 respectively. These results reveal that, the spread of each of the 80 observations from the true mean 121.9 of the same observations as measured by the standard deviation 110.95 is far greater than as envisaged in the normal curve distribution. This means that, the tax variable observations in this study has far greater variability from their true mean. The range of 243.1 shows that the difference between the maximum and minimum of the 80 study observations substantial.

4.3 Panel Unit Root Properties Test

Before estimation and interpretation of the results various time series properties were conducted. This was to ensure that spurious results would not occur (Gujarati, 2009). The

study employed Levin, Lin and Chu (2002) to affirm stationarity of variables under study.

The findings of the test are shown in table 4.2

Table 4.2 Results for panel unit root test

Variable	Form of test	Test statistics	P-Value	Conclusion
	Unadjausted t	-7.4193	0.0025	1 st
				Difference
Economic growth	Adjusted t	-2.8017		
	Unadjausted t	-7.8765	0.0001	1 st
				Difference
Government expenditure	Adjusted t	-3.8634		
	Unadjausted t	-8.3361		1 st
				Difference
Gross Domestic Investment	Adjusted t	-5.551		
Public Debt	Unadjusted t	-6.1023	0.0004	Level
	Adjusted t	-3.3278		
Gross Domestic Savings	Unadjusted t	-6.2994	0.0002	Level
	Adjusted t	-3.5033		

Tax	Unadjusted t	-4.2894	0.0014	Level
	Adjusted t	-2.9898		

Source: Constructed from the study data

From the findings of the stationery results shown in table 4.2; the study rejected the null hypothesis of presence of unit root at level in some variables. The study concluded that public debt, gross domestic savings and tax were stationary at level or integrated of order zero I (0). Economic growth, government expenditure and gross domestic investment were non-stationary at level but became stationary at first difference, hence integrated of order one, I(1). All variables were regressed at first difference for uniformity.

4.4 Diagnostic Test Results

Key diagnostic tests were conducted so as to provide a justification for using pooled OLS regression model. The diagnostics tests conducted included: multicollinearity test, serial correlation test, heteroskedasticity test, Hausman test and Langage Multiplier (LM) test.

4.4.1 Hausman Test Results

The study performed the Hausman tests on the panel models in this study in order to ascertain the most appropriate model and method of estimation between; Fixed Effects Model (FEM) and Random Effects Model (REM). The Hausman test compares the fixed effects to the random effects models by testing the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. The test verifies whether the unobserved countries effects are correlated with the regressors. The null hypothesis is not rejected when the Hausman statistic, which

asymptotically follows a chi-square distribution, is statistically insignificant implying that the random effects model is the most appropriate. The model summary of the results are presented in table 4.3

Table 4.3 Results of Hausman Test

Var	Fixed	random	Difference	S.E.
GEX	.1086666	.1086666	-7.67e-15	.0182706
GDI	.2771757	.2771757	-2.44e-15	.0197568
DEB	-.031359	-.031359	-1.11e-16	.001351
SAV	-.4208779	-.4208779	4.44e-16	.0087074
TAX	.0122432	.0122432	-2.19e-16	.0006173

Source: Constructed from the study data

From the results of table 4.3 on Hausman Test the study failed to reject the null hypothesis since Hausman statistic was statistically insignificant with a p-value of 1.000. This implied that there was insignificant random effect in the panel data and the individual level effects are best modelled using the random effects method than fixed effect model.

4.4.2 Langrage Multiplier (LM)

Langrage Multiplier (LM) tests were done to examine if individual specification variances are zero. The test contrasts a random effect model and pooled OLS model and helps in deciding between random effects regression and a simple pooled OLS regression model. The test was necessary since the Hausman test results suggested random effect model as the most appropriate.

Table 4.4 Results of Langrage Multiplier (LM) Test

	Var	sd = sqrt(Var)
GDP	6.343558	2.518642
E	1.600397	1.265068
U	0	0
Test: Var(u)		0
	chibar2(01)	0.00
	Prob > chibar2	1.0000

Source: Constructed from the study data

The null hypothesis of the test is that variances across entities are zero. That is, there is no significant difference across units (no random effect). From the results, the study failed to reject the null hypothesis (p-value = 1.000) and concluded that there was insignificant random effect in the panel data and therefore random effect model was not appropriate in dealing with heterogeneity better than pooled OLS regression model. Meaning variability of the variables across the EA countries were not very different from each other.

4.4.3 Multicollinearity Test

A variance of inflation (VIF) was used to determine the degree of correlation between variables so as to avoid multicollinearity which can adversely affect the reliability of the study estimates. If there is high multicollinearity between independent variable, confidence intervals for coefficients will tend to be very wide and t-statistics will be very small.

Coefficients will have to be larger in order to be statistically significant; hence it will be harder to reject the null hypothesis when multicollinearity is present. A commonly given rule of thumb is that VIFs of 10 or higher (or equivalently, tolerances of 10 or less) may be an

indication of the problem of multicollinearity (Williams, 2015; Joseph, William, Black, Babin & Anderson, 2014). The results of mean VIF are given in table 4.4

Table 4.5 Results for Multicollinearity test

Variable	VIF	1/VIF
GEX	5.58	0.179278
TAX	4.28	0.233456
GDI	2.26	0.441501
DEB	2.19	0.457044
SAV	1.35	0.739112
Mean VIF	3.13	

Source: Constructed from the study data

The study results show that there is no multicollinearity problem. This is because the correlation results in table 4.4 show that all the variables had a variance inflation factor of less than 10 and a tolerance statistic greater than 0.10.

4.4.4 Heteroskedasticity Test

The study used panel data and so it was most likely that the assumption of constant error variance does not hold due to cross-sectional data. In the presence of heteroskedastic disturbances, more weight is placed on observations with larger error variances and less weight is placed on observations with small error variances. The result is that the estimates are unbiased and consistent but they are not efficient (Pindyck & Rubinfeld, 1998).

Table 4.6 Results of Heteroskedasticity Test

Ho:	Constant variance	
Variables:	fitted values of D.GDP	
chi2(1)	=	0.0500
Prob > chi2	=	0.8319

Source: Constructed from the study data

The study conducted the tests of heteroskedasticity for each model specification by use of Modified Wald Test for group wise heteroskedasticity for panel models and Breusch-Pagan-Godfrey Test for income inequality models. The null hypothesis of the test is that the error term has got a constant variance (homoskedastic). The null hypothesis is rejected when the Chi-Square statistic is statistically significance hence there is no problem of heteroskedasticity.

4.4.5 Serial Correlation Test

According to Torres (2010) serial correlation tests applies to macro panels with long panels of 20 to 30 years but it is not a problem with short micro panels. This study used a short panel data of 16 years. However, since the statistical package used in the estimation of the study model, usually reported the Durbin-Watson (DW) statistics, which tests the first order autocorrelation the study reported the Durbin Watson (DW) statistic for all estimated models to check for possible autocorrelation. The value of Durbin Watson statistic always lies between 0 and 4. If the Durbin Watson statistic is substantially less than 2, there is evidence of positive serial correlation while if Durbin Watson is less than 1, implies positive autocorrelation and when Durbin Watson is greater than 3 is an indication of negative autocorrelation (Bhargava, Franzini & Narendranathan, 1982). The reported DW for the

study model was within the acceptable range of no serial correlation. This indicates that the estimated models were free of serial correlation problems.

4.4.6 Normality Test

The Shapiro Wilk test was used to test whether the residuals were normally distributed. **The** null hypothesis that the error terms are normally distributed will be tested against the alternative. The results for the normality test are shown in table 4.7 below

Table 4.7 Results of Normalty Test

Variable	Observations	W	V	Z	Prob>Z
Residual	80	0.6261	15.847	4.752	0.0000

Source: Constructed from the study data

From table 4.7 the probability value is significant at 0.005 significance level which led the null hypothesis to be rejected that the residuals are not normally distributed. The study had to correct this by adopting the log linear model

4.5 Pooled OLS Regression Model

In order to determine the influence of government expenditure, public debt, domestic savings and taxation has on the economic growth of East Africa Community; pooled OLS regression analysis model was employed. The results for the pooled OLS regression model are as shown in table 4.8

Table 4.8 Results of Pooled OLS Regression Model Output

GDP	Coef.	Std. Err.	t	P> t 	[95% Conf. Interval]	
GEX	-.1158981	.1690532	1.11	0.273	-.1503617	.524142
GDI	.3093714	.1195704	2.59	0.012	.0708349	.5479079
DEB	-.0333508	.0107315	-3.11	0.003	-.0547595	-.0119421
TAX	-.4308136	.0538842	-8.00	0.000	-.5383096	-.3233175
SAV	.0108481	.0058666	1.85	0.069	-.0008555	.0225518
Cons	-.1158981	.3061467	-0.38	0.706	-.7266441	.4948479
R-squared	0.6188	Adj R-squared	0.5912	Prob>F	0.0000	

From the Results of the Pooled OLS Regression, the model output shows a probability greater than F statistics being significant at 0.000 at 0.05 level. Further the model output shows an R-squared of 61.88% meaning the variables explain the model well as shown in table 4.8.

According to this model, economic growth among the five countries in EAC region can therefore be expressed as;

$$\text{GDP} = -0.1158981 + -0.1158981\text{GEX} + 0.3093714\text{GDI} + -0.0333508\text{GEB} + -0.4308136 \text{ TAX} + 0.0108481\text{SAV}$$

4.6 Interpretation and Discussion of Study Results

4.6.1 Influence of Government Expenditure on Economic Growth in East Africa.

The first objective aimed at determining the influence of government expenditure on economic growth in East African. From the pooled OLS regression model government expenditure has a positive but insignificant effect on growth with a p-value of 0.273 at 0.05 significance level. These results are in line with the study done by Korman and Brahmašre (2007) that employed Granger causality tests which also showed that government spending is not significant to economic growth. This could be due to the fact that a bigger ratio of the government expenditure in the EAC region is allocated to recurrent expenditures than in development of human capital, technology and capital accumulation projects and misallocation, misappropriation and rampant corruption incidences in the EAC region.

4.6.2 Effect of Gross Domestic Investment on Economic Growth in East Africa

From the study results Gross domestic investment was significant with a p-value of 0.012 at 0.05 significance level. The variable has a positive effect on GDP with a coefficient of 0.3094. This means unit percentage change in gross domestic investment causes a positive significant change of 0.309 rate of change on economic growth in EA countries. This is in line with the priori expectation that increased investments in an economy creates more goods and services hence leading to high economic growth rate.

4.6.3 Effect of Public Debt on economic growth in East Africa

The third objective was to determine the influence of public debt on GDP of the countries. The model reveals a negative significant effect with a p-value of 0.003 at 0.05 significance level. The model shows further a coefficient value of -0.0335 meaning a negative effect

whose unit change causes a 0.0335 negative rate of change on GDP. This is attributed to the fact that the funds borrowed by these governments are spend on recurrent expenditure, misallocation and corruption. By the fact that these lowly developed countries have problems in generating income for government spending, repayments of the borrowed money eats up into the same revenues affecting allocation in development projects.

4.6.4 Influence of Gross Domestic Tax on Economic Growth in East Africa

The study further tested the effect of tax on GDP in East African countries. The study reveals a negative effect with a p-value of 0.000 at 0.05 significance level. The effect is a magnitude of 0.4308 implying that a unit change in tax causes a 0.431 negative rate of growth in the countries. This is because high taxation of businesses, discourage entrepreneurs and investors in investing in the economies of EA countries. The results of the study are in agreement with those of Gacanja (2012), Lee and Gordon (2005) who also concluded that increased taxation has negative impact to economic growth.

4.6.5 Effect of Savings Rate on Economic Growth in East Africa

The results of the study shows that savings has an insignificant effect on the GDP but with a positive effect. The p-value of 0.069 at 0.05 level of significance and a coefficient of 0.0108481. this implies that a unit increase in saving in EAC, will lead to a corresponding increase of 0.0108481 on economic growth. According to the prior expectation, Savings should have a significant influence on the growth of the economy, however in the EAC, though positive the influence is not significant because the levels of savings are so low to make any significant influence to the economy. The results of the study are in line with those of Lean and Song (2008) show that domestic savings does not granger cause economic growth when the saving levels are very low.

CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

5.1. Introduction

This chapter discusses the summary of findings from chapter four, conclusion and policy recommendations.

5.2. Summary of the Study

The general objective of this study was to investigate the influence of fiscal factors on economic growth in East Africa. The specific objectives of this study were to investigate the influence of government expenditure, domestic investment, government debt, domestic savings and taxation on economic growth in East Africa Community.

To achieve the objectives of the study, yearly panel data for the period 2005 to 2020 was collected from the World Bank data base and publications from National Bureau of Statistics (NBS) of respective countries on the various variables considered in study. Stationary tests were carried out to stabilize the data. Public debt, gross domestic savings and tax were stationary at level or integrated of order zero $I(0)$ while economic growth, government expenditure and gross domestic investment were stationary at first difference, hence integrated of order one, $I(1)$. All variables were regressed at first difference for uniformity. Hausman test concluded that random effect model was to be adopted in analyzing the panel data while Lagrange Multiplier (LM) tests showed that pooled OLS regression model was appropriate to estimate the parameters and conduct the inference. The diagnostic tests results

showed that the study data has no problem of multicollinearity, heteroskedasticity and the estimated models were free from serial correlation. The normality tests showed that the data was not normally distributed and hence the study had to use the log model form to solve this problem.

The results from the study showed that in East Africa Community, government expenditure has a positive but insignificant effect on growth with a p-value of 0.273 at 0.05 significance level and a coefficient of -0.1158981. Gross domestic investment has a positive and significant influence on GDP with a p-value of 0.012 at 0.05 level of significance, and coefficient of 0.3094.

Public debt has a negative significant effect on GDP with a p-value of 0.003 at 0.05 level of significance and coefficient value of -0.0335. The study results also reveals that taxation has a negative effect on GDP with a p-value of 0.000 at 0.05 significance level and a coefficient magnitude of 0.4308 implying that a unit change in tax causes a 0.431 negative rate of growth in the East African countries while saving has an insignificant effect on the GDP with a positive effect of 0.0108481 with p-value of 0.069 at 0.05 significance level.

The R-squared results show that about 61.88 of the variation in economic growth in EAC region is explained by government spending, gross domestic investment, savings and tax as per the model of this study.

5.3. Conclusion

On the basis of empirical results, the study concluded that, government expenditure has a positive but insignificant influence on GDP while Gross domestic investment has a positive and significant influence on the economy. Public debt and taxation has a negative significant effect on GDP while domestic savings has an insignificant effect on the GDP in EAC region.

From the results, the study also concluded that Gross domestic investment, Public debt and taxation can be used to predict economic growth in EAC region. The results also reveal that government expenditure and domestic saving have insignificant effect on the GDP of the region.

The study therefore rejected the hypothesis that Gross domestic investment, Public debt and taxation have no impact on the economic growth of EAC. Also the hypotheses that government expenditure and domestic saving have no impact on the economic growth of EAC are accepted. Finally the pooled OLS regression model done on the economies of EAC support Solow-Swan Model that apart from capital and labour stocks, the other fiscal factors that may determine economic growth of EAC are public debt, domestic investments and taxation rates.

5.4 Policy Implications and Recommendations

The findings of this study have important policy implication for economic growth in EAC region. The study finding revealed that gross domestic investment; Public debt and taxation rates are significant determinants of economic growth in the region. Based on these findings therefore, the governments of this region should formulate policies that promote gross

domestic investments by creating a conducive and enabling economic and legal environment that will encourage domestic investments in their economies.

The study findings have shown that public debt has a significant negative influence on the growth of the economy. Governments in the region should come up with policies that discourage increased government spending especially on recurrent expenditures and increase their budgetary allocations on developmental sectors. The fight against corruption should be intensified to ensure that the borrowed funds do not end up being misappropriated or wasted

From the findings of the study, taxation has a significant negative influence on economic growth. Therefore the policy makers should carefully formulate tax policies that do not affect investors and businesses negatively. There is need to reduce tax rates and broaden the tax base to increase government revenue. Reduction in tax rates should also be accompanied by reduced government spending to avoid the fiscal deficits in their budgets.

The study recommends that the government should allocate more of its resource in their budgets on development of human capital, technology, infrastructure development and capital accumulation projects. There should be political goodwill to fight misallocation, misappropriation and rampant corruption in the EAC by setting policies that control these vices.

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