ESSAYS ON PUBLIC SPENDING AND ECONOMIC GROWTH IN KENYA

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DECLARATION

This thesis is my original work and has not been presented for a degree award in any other University.

GIDEON KIMWELE MUKUI DATE

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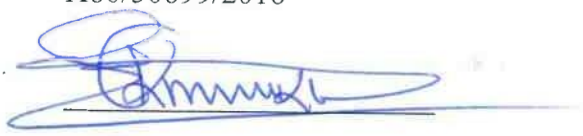

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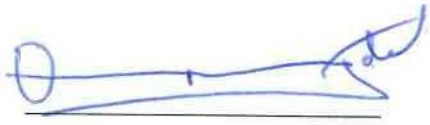

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DEDICATION

To my wife, Juliet and sons, Ethan and Nathan

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Notwithstanding all this good assistance, I would like to state that the opinions in this thesis belong exclusively to the author and not for any of the mentioned institution (s) or person (s).

ABSTRACT

Government spending and its consequence to the economic growth have pre-occupied policymakers in many countries because high level of government expenditure hinders economic growth. Nevertheless, the debate has not been settled and there is limited evidence in Kenya which makes it an important policy discourse for empirical investigation. Again, public investment and its effect in the economy are also paramount since it affects private sector investment. While different fiscal policies have various macroeconomic consequences, the issue has been ignored in the empirical literature. Therefore, there is need for an empirical analysis to determine how government expenditure financed through various methods influence economic growth.

This thesis comprises of three interrelated, yet independent essays. The first essay explored how government expenditure affects economic growth. Also, the essay examined the expenditure-growth nexus with a view to understanding the causal effect between the two variables. The second essay investigated the consequence of government investment on private investment while the third essay determined how the expenditures financed using debt and tax affects economic growth in Kenya. Granger causality, Autoregressive Distributed Lag (ARDL) and Vector Error Correction Models were used for the analysis using annual time series data from 1970 to 2020.

The study established that development spending and infrastructure expenditures significantly promote economic growth. Also, it was found that education and health expenditures had no significant effect on economic growth. The finding also showed investment in the public sector had a positive influence on private investment. As for funding methods, the results showed that expenditures funded through debt and revenue promotes economic growth. Debt-driven consumption expenditure has a negative impact on economic growth. The study therefore recommends government to increase the allocation of funds to the infrastructure development. This study further recommends strong public investment policies to enhance private investment. The thesis also recommends the government to use debt to finance public investments rather than using domestic tax revenues. Moreover, debt should be used to finance public investment instead of financing government consumption expenditure.

Key words: Economic growth, Government expenditure, Public investment, Private Investment,

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS AND ACRONYMS

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criterion
MUF	Money in Utility Function
ARDL	Auto Regressive Distributed Lag
CRRA	Constant Relative Risk Aversion
DF-GLS	Dickey-Fuller Generalized Least Squares
ECO	Economic Cooperation Organization
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
KPSS	Kwiatkowski–Phillips–Schmidt–Shin
KNBS	Kenya National Bureau of Statistics
MTP	Medium Term Plan
PP	Philips and Perron
SBIC	Schwatz Bayesian Information Criteria
SIC	Schawtz Information Criteria
SSA	Sub-Saharan Africa
VAR	Vector Autoregressive
VECM	Vector Error Correction Model

DEFINITION OF TERMS

Real GDP: The total value of goods and services produced in a country in a given year.

Expenditure by the government: This is total spending minus transfers.

Exchange rate: Refers to the price of one currency in terms of another.

Foreign direct investment (FDI): Refers to a portfolio of investments made by foreign investors that are under the direct control of the investors.

Private consumption: The market value of goods and services purchased by the households.

Unemployment: The proportion of unemployed people in the labor force.

Domestic credit to the private sector: The amount of money that financial institutions lend to the private sector.

CHAPTER ONE

INTRODUCTION

1.1 Background

The link between government expenditure and its consequences in the economy are strongly contested during policy debate because it is believed that excessive government stifles economic growth (Christie, 2011; Gemmell et al. 2001). Growth theory raises a fundamental question as to whether an increase in government spending promotes economic growth (Dudzevičiūtė *et al*., 2018; Alshahrani and Alsadiq, 2014). On one hand government expenditure raise labor productivity while in contrast increased government expenditure level impedes economic growth if it leads to increased taxation and borrowing (Kunofiwa and Odhiambo, 2018; Barro, 1991). This has prompted supporters of small government size to seek interventions to scale down the activities of the government by pursuing fiscal consolidation policies especially those geared towards reducing government outlays. However, during fiscal adjustments and consolidation, the shares of government spending, which in essence are affected, are those associated with productive expenditures.

Theoretical literature presents divergent views in respect to the way in which government spending influences the economy. According to the neoclassical growth paradigm, fiscal policy is ineffective in accelerating economic growth (Agénor and Montiel, 2015). According to this view, exogenous factors among them population and improvement in technology enhance the rate of growth while all the other control variables have transitory effect only. The theory entails a continuous improvement in capital and labor productivity to maintain a sustainable growth rate.

Contrary to the neoclassical, the endogenous theory postulates that fiscal policy affects the economy by enhancing variables endogenously defined in the model (Romer, 1986). The work of Barro (1990), King and Rebelo (1990) in this field led several scholars to examine how tax and spending policies affect economic growth. The endogenous growth theory contends that advancement in technology influences the long-term growth and, therefore, fiscal policy improves resource allocation and increases labor force and physical capital output (Barro, 1990).

Another strand of literature including Temple and Rodrik (2003) identified trade, institutions, and geography as fundamental factors that influence the economy. The authors argued that public spending tends to influence most of these factors and/or their effects. For example, public spending directed towards the improvement of infrastructure networks as well as spending on public health programs may overcome problems associated with poor geography. Institutions raise the investment potential of both human and physical capital which influences economic growth (Bose et al, 2007).

The economic growth effect of government spending occurs through different channels and it varies on whether the expenditures are productive or not (Ntembe *et al*., 2017). Productive expenditures may positively influence economic growth. For example, capital goods expenditure adds to the existing resources and reduces supply-side bottlenecks thereby stimulating real output (Kandil, 2016). Government consumption expenditure may depress economic growth through inflationary pressure due to increases in purchasing power (Barro, 1990; Kandil, 2016).

Essentially, consumption spending enhances utility while reducing productive spending would cause growth to decline regardless of the level of the total spending. Besides, government spending may directly promote growth of the GDP by raising the amount of physical and human

capital stock especially when public and private capital complement each other (Mitchel, 2005; Blattman and Miguel, 2010). Paparas *et al.* (2015) argued that infrastructure investment, human development, and targeted intervention such as export promotion enhance private sector productivity. Investment in health and education improve labor productivity while infrastructure such as roads, telecommunication and energy boost the rate of private sector investment thereby fostering economic growth (Younsi et al., 2021; Ofori et al., 2022; Pescatori et al., 2014).

Public investment and its effect to the private investment is widely documented but with ambiguity on how the two affects each other (Sineviciene and Vasiliauskaite, 2012; Mallick, 2006). Moreover, the effectiveness of public spending in enhancing economic growth depends on its impact on private investment (Dzhumashev, 2014; Akkina and Celebi, 2002). When the government expenditure increases, it exerts pressure on the economy's scarce resources available to the private sector (Buiter, 1977). This, in turn increases borrowing cost thereby crowding-out the private sector activity (Kandil, 2013). Conversely, interventions by the government geared towards correcting the failures in the market promote private sector investment and improves productivity by influencing the allocation of private inputs. In addition, externalities and efficiency associated with infrastructure spending play an important role in promoting private investment (Landau, 1985).

Aschauer (1988) postulated that public capital accumulation fosters investment level more than what rational agents prefer and this decreases private investment. Nevertheless, when public capital stock improves, private capital returns also improve which further increases the accumulation of the private capital (Agénor and Yilmaz, 2017). Moreover, the availability of facilities such as common public goods enhances business environment, which in turn increases

private sector output (Rahman *et al*., 2016). This underscores the argument that energy and telecommunications networks enhance private investment (Pereira, 2001).

Government taxation and borrowing to finance public spending imposes an excessive burden to the private sector thus diminishing the incentives to save and to invest. High interest rate due to higher government internal borrowing reduces credit availability consequently crowding-out private investment (Cashin and McDermott, 2002; Barro, 1990; Musgrave, 1989). The way in which the government finances the spending, for example, by using taxes and borrowing from the domestic market or from abroad as well as through monetization determines the outcome of fiscal policy (Kandil, 2006). Higher public debt raises borrowing cost and adversely effects private sector activity (Minea, 2009).

The macroeconomic consequence of fiscal deficit is a major issue for developed and emerging economies most of which have had a rising public debt (Minea, 2009). Deficit brings about high tax rates which in essence decreases productivity. However, deficit spending is justified because it complements business investment hence stimulating economic performance (Okah, 2019). Turnovsky (1991) pointed out that any government that increases its expenditure must decide the means of raising the necessary revenue.

Public expenditure is mainly financed using tax revenue, seigniorage, and public borrowing. These different forms of financing have diverse effects to the economy. Tax-financed public spending may have an impact on welfare and growth if taxes are distortionary. The impact depends on the differences in tax rates among different goods and incomes (Alloy et al., 2002). Moreover, debt-financed public expenditure affects economic growth because it increases interest payment on debt. Increasing public deficit and then financing the same by using debt

instrument reduces private investment or deteriorates current account depending on how public deficit alters private sector saving behavior (Durlauf and Blume, 2008)

When the rate of income tax increases it decreases private returns which adversely affects economic growth (Mallick, 2013; Ahmed and Miller, 2000). Since different budget policies have diverse macroeconomic consequences, it becomes important to investigate how the economic consequences of the various methods of financing government expenditure.

Linnemann (2005) asserted that the effect that government expenditures has on the economy are qualitatively the same for a strict balanced-budget policy and for a policy that allows accumulation of debt levels to finance additional expenditures. However, the speed at which future deficits are adjusted to return to the real value of government to its steady-state has important implications. The government expenditure in Kenya increased tremendously from 1970 to 2020 compared to economic growth as shown in figure 1 and 2.

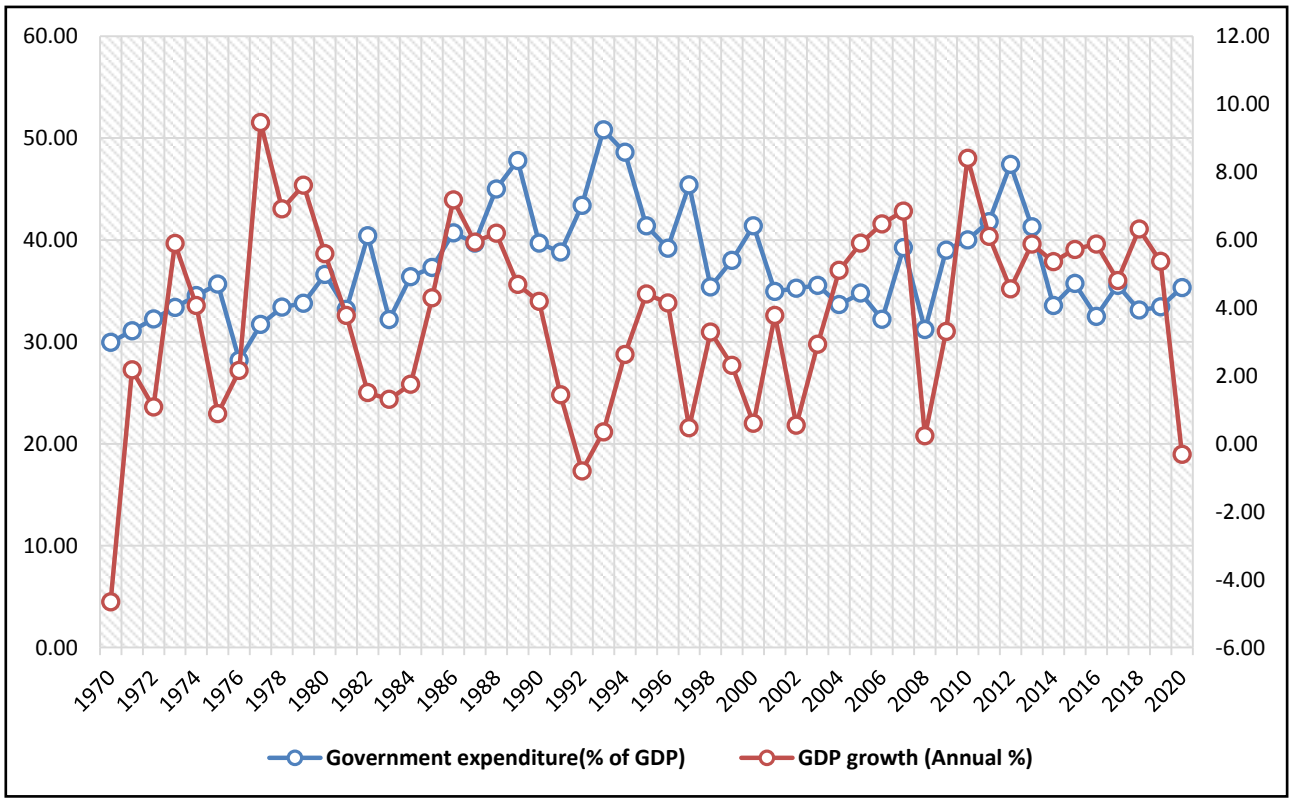


Figure 1: Trends of government expenditure and GDP growth

Source: Author's own computation

According to figure 1, the lowest government expenditure was recorded in 1970 while 1993 recorded the highest government expenditure of 50.8 percent. Similarly, 1970 had the lowest economic growth of negative 4.7 percent while the highest economic growth was recorded in 2010 at 8.4 percent. Figure 2 gives the average expenditure and economic growth from 1970 to 2020.

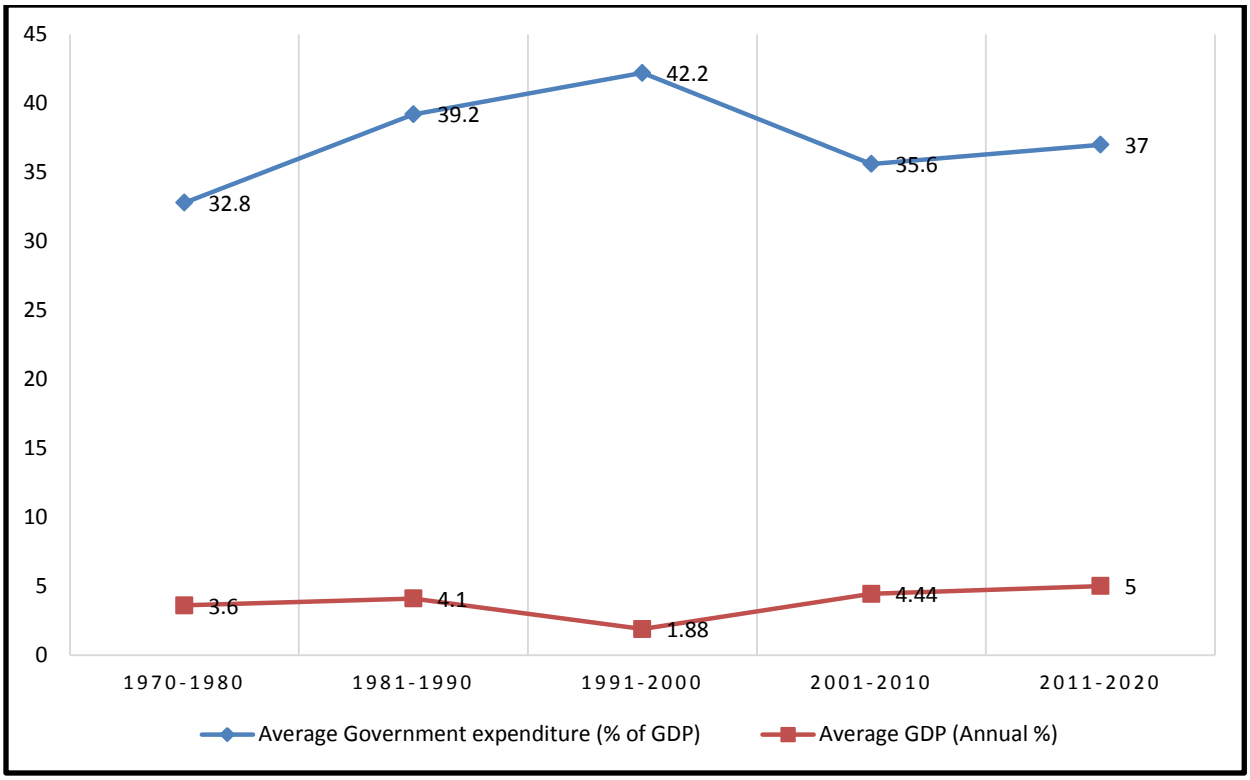


Figure 2: Average government expenditure and economic growth
Source: Author's own computation.

From to 1980 government expenditure averaged 32.8 percent while the average economic growth was 3.6 percent over the same period. From 1981 to 1990 the average government expenditure increased by 6.4 percent to reach 39.2 percent. During the same period, economic growth on the other hand increased by 0.5 on average to 4.1 percent. Government expenditure continued to increase to an average of 42.2 percent from 1991 to 2000 while the average economic growth declined from 4.1 to 1.88 percent. This was attributed to the government intervention to cushion the people from the adverse effects drought, high fuel and food prices. However, the average government expenditure declined to 35.6 percent from 2001 to 2010 whereas economic growth increased from 1.88 to 4.4 percent.

Government expenditure averaged 37 percent between 2011 and 2020 while economic growth rose marginally to 5.0 percent during the same period. The government adopted expansionary fiscal policy beginning 2010 which caused increased spending. This aimed at overcoming the challenges of achieving high levels of economic growth, create employment, improve food security and reduce poverty (Republic of Kenya, 2010). This was to be achieved through prudent public spending in infrastructure, energy development as well as improvement in health and education.

The government also developed various policies aimed at promoting economic growth. These initiatives included the fiscal framework aimed at meeting various sectoral public spending programmes from tax revenues while minimizing deficit by reducing the overall government spending. Figure 3 gives an overview of expenditure allocation**.**

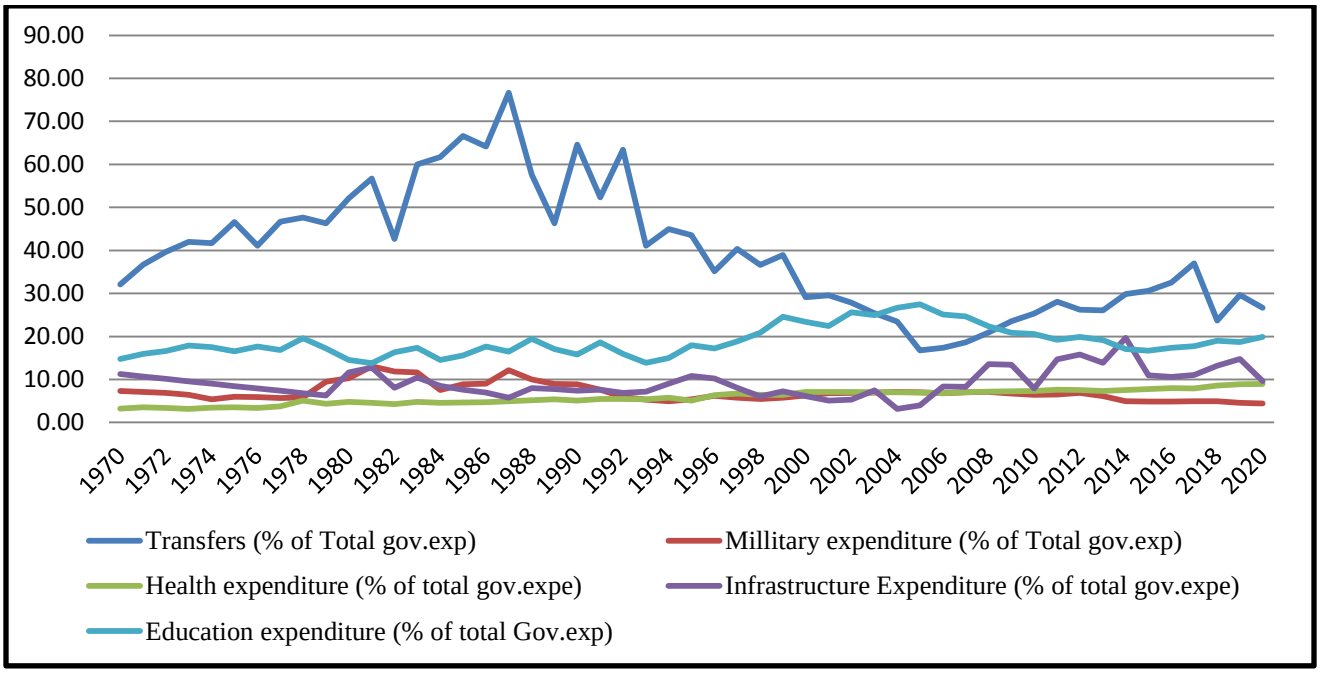


Figure 3: Allocation of government expenditure
Source: Author's own computation.

Figure 3 shows transfers took the largest share of government expenditure. These transfers comprised of subsidies, grants, and other social benefits such as social security. There was an increase in transfer expenditure between 1970 and 1987 which was meant to cushion the population from the adverse effects of a rise in oil prices. Increased transfer expenditure was also attributed to a rise in channeling of the resources to the state owned corporations (Republic of Kenya, 1976; Republic of Kenya, 1985)

The transfer expenditure declined beginning 1994 as most of the state corporations were privatized. The implementation structural adjustment policies led an increased in education expenditure between 1981 and 1991 which aimed at providing essential services (Republic of Kenya, 1993). The expenditures on health, infrastructure and military remained quite low over the period of analysis. However, most of the infrastructure expenditure was used in to improve civil aviation infrastructure, construction of roads, energy and telecommunication infrastructure development Republic of Kenya, 2018).

The government also embarked on the implementation of monetary policy decision aimed at constraining the inflation to a single digit level, maintaining positive interest and exchange rates, and promoting savings and investment. These macro-economic policies also emphasized the importance of domestic financing of public spending to reduce excessive reliance on external financing. In spite of these initiatives, economic growth remains very low accompanied by rising poverty and unemployment.

Although government expenditure affects economic growth (Ramirez, 2010; Schaltegger and Torgler, 2001; Wahab, 2004), there is paucity in the literature about its economic growth effect in Kenya. A number of studies, for example Erden and Holcombe (2005) and Adeosun et al.,

(2020) analyzed how public investment relates to investment. However, most of the empirical evidence involves cross-country studies from developed economies with limited country-specific studies. Against this background, this thesis aims at analyzing the extent to which government expenditures contribute to the economic growth and determines the effectiveness of public capital in stimulating or crowding-out the private investment. Since the expenditures must be financed using either tax revenue or borrowing, which may in turn lead to different outcomes in the economy, the thesis also investigates how economic growth responds to expenditure financed using tax revenue and debt.

1.2 Statement of the Problem

Achieving high and a sustainable economic growth is the primary goal for the policymakers in Kenya. Most of the government development plans emphasize the importance of economic growth as a key parameter in realizing development objectives. This is because improved economic growth can lead to unemployment and poverty reduction in Kenya. At the forefront of economic reforms is the realization that rapid and sustained economic growth can be achieved through increased productivity in agriculture, increased value-added in the manufacturing and service sectors, and growth of non-farm activities. However, Kenya's economic performance has been slow with the annual GDP growth rate averaging 3.8 percent. The dismal performance can partly be explained by the weak government expenditure structure that has favored consumption spending as opposed to public investment.

Realizing the slow economic growth and high poverty rates the government of Kenya developed various budgetary rationalization and reforms aimed at enhancing economic growth by minimizing unproductive public spending. Specifically, the government has put in place mechanism to restructure the budget allocation in favor of the development expenditure such as

construction of roads, energy, railways, water and sanitation, health and education. Despite these attempts, Kenya's vision to achieve a sustainable economic growth remains elusive.

The existing empirical evidence offers a spectrum of conclusions about how government expenditure affects economic growth. Yasin (2011) and Attari and Javed (2013) established a positive effect while Selvanathan *et al*., (2021) and Nurudeen and Usman (2010) established that government expenditure impacts economic growth negatively. Nyasha and Odhiambo (2019) reviewed the literature with regards to whether the effect is positive, negative or insignificant without necessarily conducting an empirical investigation.

The empirical studies in Kenya for example (Maingi, 2010; Jerono, 2009) have also not yielded convincing results. Therefore, the literature available provides no consensus about the subject matter and policy options. Moreover, evidence of a cross-country study is not convincing because of different country characteristics such as unique policies and institutional environment that influence economic outcomes. The period of study also tends to influence economic growth effect of government spending (Nyasha and Odhiambo, 2019). Growth effect of public spending where particular country characteristics are taken into consideration has not been sufficiently investigated.

Studies including Magableh and Ajlouni (2016), Oyinlola et al. (2013), Maitra and Mukhopadhyay (2012) also looked into private investment and its effect to the economy However, there is insufficient evidence on how government investment affects private. Public spending has increased both in the aggregate and at the sectoral level and therefore an analysis to establish how it affects private investment is important to policymakers. Another thing that has been left out in the literature is how economic growth responds to various expenditure financing methods. The effect that government activities have on the economy may be influenced by the

method of financing the expenditures. Larger government size may have two opposing effects depending on whether expansionary fiscal policy is financed either by income tax or debt. Information on how the economy responds to different expenditure financing methods is vital for policy formulation in Kenya.

1.3 Research questions

i. How does government spending affect economic growth in Kenya?

ii. What is the effect of public investment on private investment in Kenya?

iii. What are the economic growth effect of using taxes and debt to finance government spending in Kenya?

1.4 Objectives of the study

The overall objective is to analyze the relationship between government spending and economic growth in Kenya, determine whether public investment complements private investment in Kenya, and the economic growth effect of government budget financing.

The specific objectives are:

i. To analyze the effect of the composition of public spending on economic growth in Kenya.
ii. To investigate the effect of public investment on private investment in Kenya.
iii. To determine the economic growth effect of using taxes and debt to finance government expenditure in Kenya.

1.5 Significance of the Study

There have been significant policy changes relating to budgetary and expenditure allocations in different sectors of the economy aimed at promoting economic growth in Kenya. This thesis provides an understanding of the expenditure-growth nexus in Kenya. More precisely, the thesis will provide useful information on how different components of public spending contribute to economic growth, which is relevant for policy analysis and for assessing the sustainability of public finance in Kenya. The information will assist policymakers in efficient allocation of public expenditures in various sectors. The study will further provide a framework for assessing the expenditure and the economic policies in general.

The importance of the private investment in any given country cannot be overemphasized. Analysis of whether public sector investment complements private investment or acts as a substitute is very critical because it affects other macroeconomic variables.

This study, therefore, contributes to the subject matter by providing useful information about the linkage between public and private investment. This information will be important because it will assist policymakers to pursue optimal public investment policies, which have positive bearing on the private investment.

In addition, the sources of financing government expenditures have been a concern in many countries. This is because increased government spending is detrimental to growth due to the disincentive effects of increased taxation and debt. This study equips decision-makers with the knowledge to help them choose the best method (or methods) to finance public expenditures. To sum up the overall contribution, this thesis used a dynamic endogenous growth framework to show how government expenditure could affect economic growth. Since government's decision have intergenerational effect, a theoretical framework based on overlapping generation model was used to analyze the economic growth effect of financing expenditures using tax and debt.

1.6 Conceptual Framework

The theoretical foundation shows that education and health spending enhances human capital development and labor productivity thereby promoting economic growth (Gashti et al., 2012). Similarly, infrastructure spending on roads and energy reduces transport and production cost in the private sector. In addition, public capital is essential for private sector investment, which further contributes to economic growth. Moreover, the methods of financing public spending using tax and debt have important implication on economic growth. These linkages are given in figure 4.

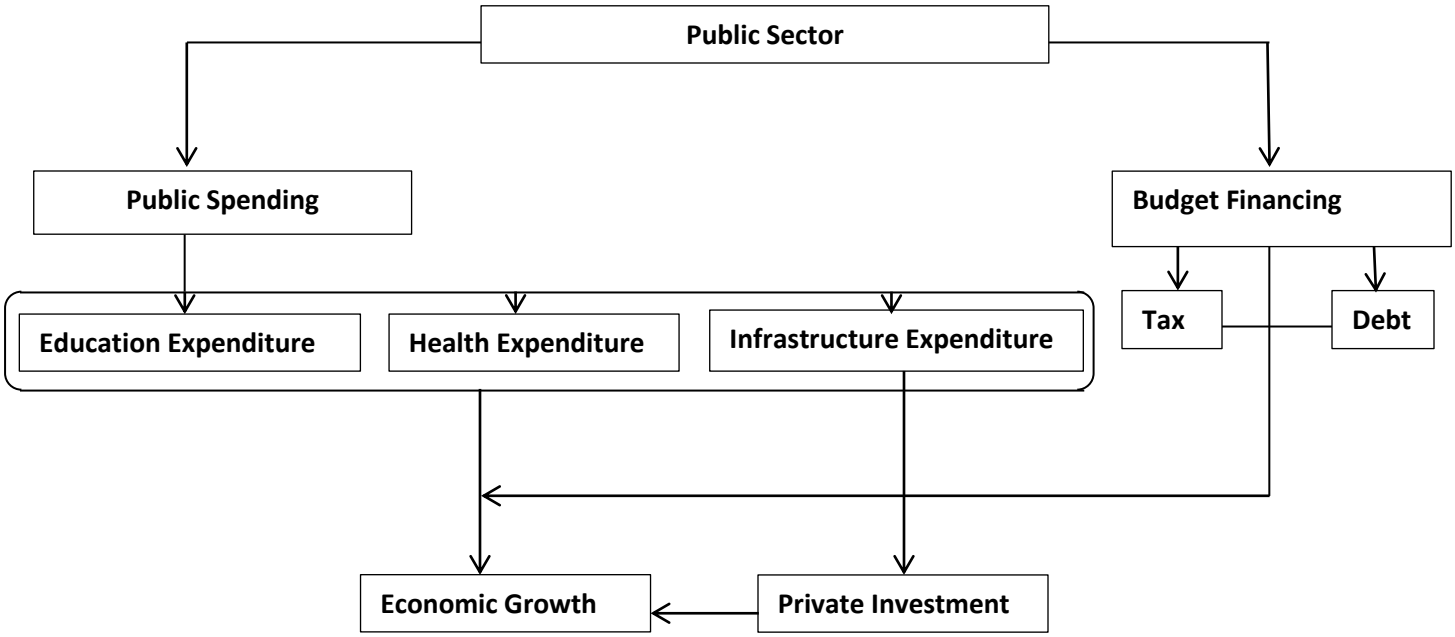


Figure 4: Linkages between Public spending, Budget financing, and economic growth
Source: Author's own construction

As indicated in figure 4, the way in which government mobilize the necessary resources to finance public programmes is important for growth. Taxes for example are considered to be regressive and at times distort the private sector incentives thereby lowering aggregate investment and growth. Domestic or external borrowing presents another option to the government to finance its spending. The inter-temporal budget constraint, however, limits borrowing to the amount that a country might repay using primary surpluses (Paternostro *et al*., 2007). The expenditure composition could influence growth but high and unsustainable debt level has adverse effect on GDP growth. While acknowledging that there are different types of government spending, this study broadly classifies the expenditures into education, health, and infrastructure spending.

1.7 Scope of the study

The work was limited to Kenya and time series data from 1970 to 2020 were used for analysis. Data availability justified the study time frame.

1.8 Organization of the Thesis

After the introduction chapter, the second chapter covers the first essay, which examines how government expenditure affects economic expansion. Chapter three contains the third essay on the impact of public investment on private investment while chapter four provides the third essay which explores the expenditure financing methods and their effects on economic growth. Chapter five concludes the thesis and offers proposals for future study areas.

CHAPTER TWO

EFFECT OF PUBLIC SPENDING ON ECONOMIC GROWTH IN KENYA

2.1. Background

The role of fiscal policy and its long-term impact on economic growth is a highly controversial issue in policy debates (Gemmell et al. 2001). Over the years, countries have used fiscal policy instruments mainly government expenditure to accelerate their economies and this has intensified the debate among policy makers about its growth effect (Dudzevičiūtė et al., 2018). The central government makes transfers during economic downturns to encourage economic growth in areas that are economically underperforming. Marica (2015) noted that public finance has since turned its focus to the national expenditures as a result of the fact that public spending has been increasing overtime in nearly all the countries.

Nonetheless, how government expenditure affects economic growth is still unclear. The question at hand is whether or not raising government spending results in a more rapidly economic growth. In order to prevent public spending from increasing faster than output, policies that would reduce government spending and activity are recommended (Christie and Rioja, 2012). However, fiscal policy is vulnerable to trade-off because of the difficulties in evaluating government budget constraint (Bleaney et al., 2001).

Economic theory gives divergent views regarding the subject matter. Keynes (1936) emphasized the prominence of government outlay as a tool to correct disequilibrium faced by the economy. According to the Keynesian economics, growth in public expenditure will cause national income to increase due a rise in aggregate demand. However, understanding how the composition

of public spending impacts the economy should be the driving force (Molonko and Ampah, 2018).

Public expenditure can be either productive or non-productive. Barro (1990) argued that productive public spending enhances private sector productivity while consumption spending increases the households' utility. For example, provision of infrastructure promotes production and distribution network thereby enhancing the overall growth. Physical infrastructure contributes directly as well as indirectly to the economy (Chaudhry et al., 2016).

Physical infrastructure improves communication network, health and education outcomes which ultimately lead to the improvement in labor productivity. Similarly, infrastructure development provides people with life-enhancing services such as water and electricity (Seitz and Licht, 1995). Besides, infrastructure expenditure on roads, energy, and communication are associated with a reduction in the production costs and it increases the profitability of firms thereby enhancing economic growth (Dash and Sharma, 2008; Cooray, 2009). Insufficient infrastructure, on the other hand, becomes an obstacle to achieving sustainable growth and poverty reduction.

Education is an important factor that explains economic growth through its effect on labor productivity (Aghio et al., 2009). This is because an educated labor force will imitate technological innovations faster and therefore, facilitate growth (Nelson and Phelps, 1966). When the government commits to increase public spending towards educating its population, leads to a higher growth of national income (Aghio et al., 2009). Education affects long-term growth because a population that is well equipped with the necessary educational skills will increase the overall human capital of the labor force. The amount of the resources allocated to

the education sector is, therefore, very important in determining the formation of human capital (Kuipers, et al., 1998).

It is a common knowledge that health is a priority area of government activities. Countries allocate a substantial amount to the health sector to improve health facilities and health outcomes. Improving health globally is important from a social perspective because it guarantees better and longer lives to millions of people (Acemoglu et al., 2006). Improving health services has a huge indirect pay-offs because it accelerates economic growth (Sachs et al., 2001), while the harmful effect of poor health and disease prevalence slows down economic development (Ackah et al, 2014; Sachs et al., 2001).

Basic health services especially to the poor contribute to poverty reduction (Husni and Hussain, 2007). Improved health services leads to an increase in productive efficiency, life expectancy, creative, and learning capacity, which contribute to productivity growth. Moreover, health and economic growth hypothesis argue that good health signifies improved productivity of workers and therefore, investing in health enhances economic growth (Forte and MagazGazino, 2011). The empirical literature currently available provides conflicting views about the impact of government spending on economic growth. The results differ substantially due to differences in the econometric model used and how the expenditures are measured. The results also differ significantly depending on the period and the country of study hence there is no consensus established so far.

Kenya's macroeconomic strategy relies heavily on public expenditure because it helps to finance consumption, investment, and the country's expanding need for social services. However, little research has been done on how public spending affects economic growth. According to

economic classification, public spending falls into two main categories: current and development expenditure. Current expenditure is considered to be unproductive while development expenditure is believed to be productive and, therefore, it enhances economic growth. Figure 5 gives the trend of development and current expenditures in Kenya from 1970 to 2020.

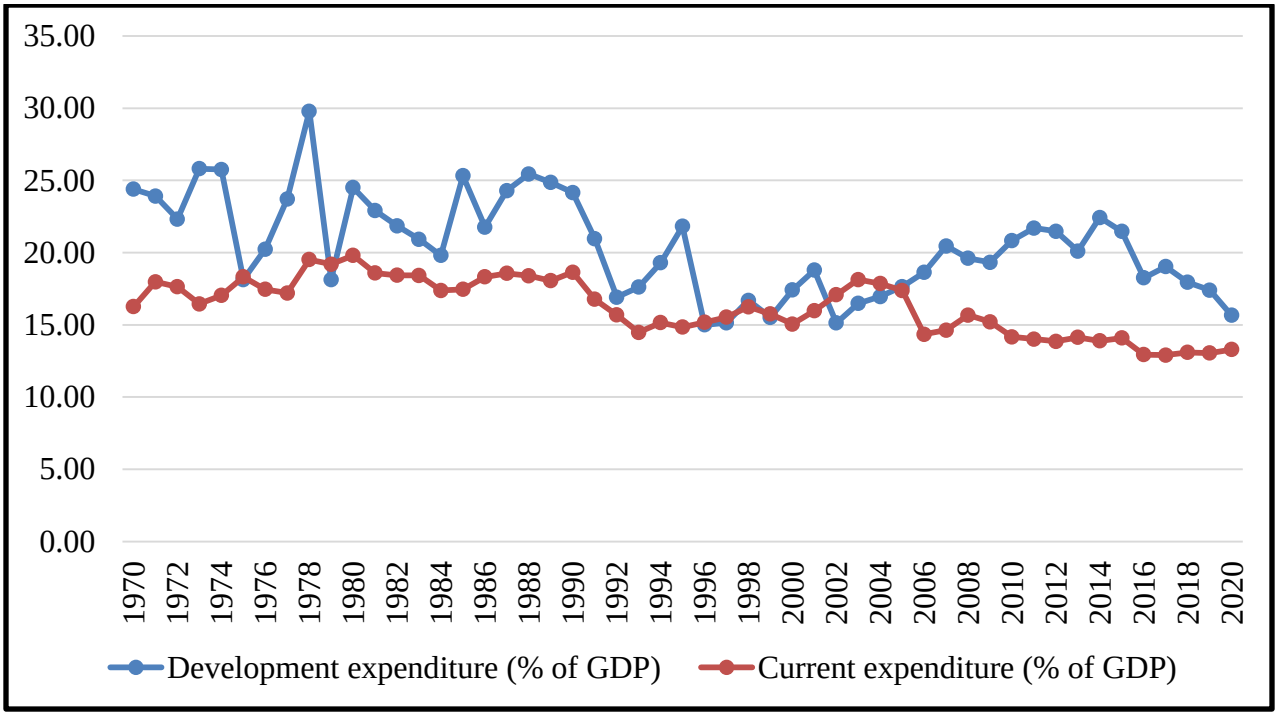


Figure 5: Trends in current and development expenditure
Source: Author's own computation

As shown in figure 5, current expenditure remained steady over the years with minimal fluctuation compared to development expenditure. The current expenditure averaged 17.2 percent from 1970 to 2000 and 14.7 percent from 2001 to 2020.

Government inefficiency, corruption, overstaffed government agencies, and too many lawmakers are some of the reasons why current spending has increased in recent years. As a result, more government funding was allotted for public servant compensation. On the other hand, development investment increased by 18.9 percent from 2001 to 2020 and 21.4 percent from

1970 to 2000. Beginning in 2002, development spending grew steadily as a result of the realization that infrastructure was essential for lowering production and operating costs thus boosting the country's competitiveness. The development of the road network, its repair and extension, the expansion of the energy and water supplies, and the information communication and technology were all included in the infrastructure component which led to a sharp increase in development spending. However, there was a slight drop in development spending from 2015 to 2020, primarily as a result of rationalization of spending across all sectors.

Government spending is functionally categorized depending on the major economic sectors including public security, transfers, health, education and infrastructure. The sectors contribute to the economy in various ways. Security sector is regarded as an enabler to other sectors of the economy because safety provides a suitable environment for investment to take place hence contributing to the overall economic growth (Garidzirai and Muzindutsi, 2020). The economic growth contribution of government transfers such as social benefits and pensions payment is ambiguous since most of the transfers are non-repayment and grants to other public entities.

This study focuses on the education, health and infrastructure sectors because of their greater economic impact. In addition, the sectors form the core of government priorities in expenditure allocation aimed at maximizing productivity and also offer services that benefit the poor most while contributing to the overall economic growth.

Figure 6 gives a general view of Kenya's budget allocation in the sectors of infrastructure, health, and education from 1970 to 2020.

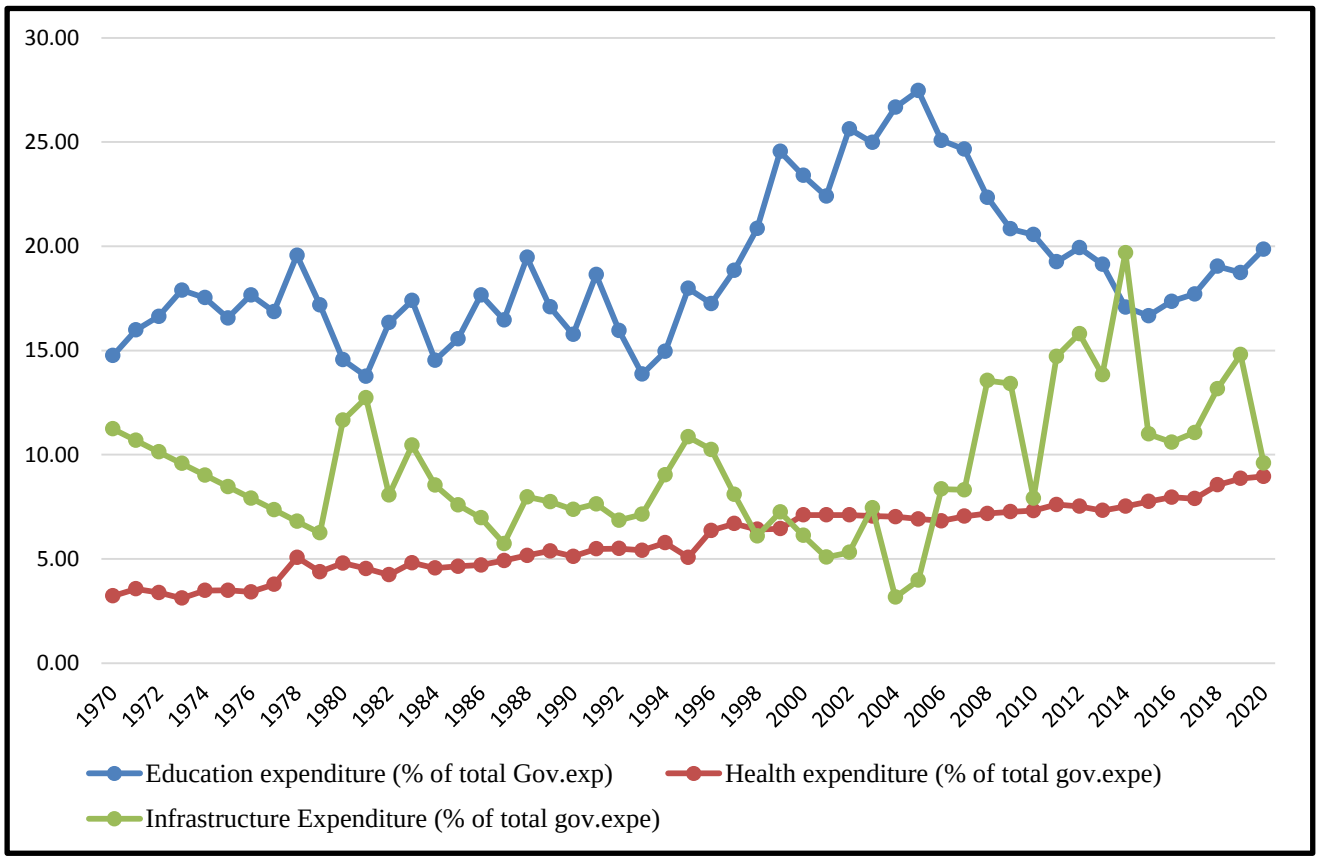


Figure 6: Trends of selected government spending by function (% of Total expenditure)
Source: Author's own computation

Kenya invests large sums of financial resources each year in its physical infrastructure, the advancement of health and educational systems, as well as in economic services like the mining and agriculture industries. Economic theory stipulates that spending on these sectors promotes economic growth. Health expenditure remained relatively the same from 1970 to 1990 before increasing marginally from 6 percent in 1995 to 9.6 percent in 2020. For the period under analysis, education expenditure had the largest share of central government expenditure.

Education expenditure averaged 15 percent from 1970 to 1991and thereafter rose steadily to reach 27.5% in 2006 before declining to 19.9% in 2020.

Beginning the year 1970, government expenditure on infrastructure declined from about 11% in 1970 to about 6.3 percent in 1980. Thereafter, infrastructure expenditure remained unstable averaging 7.5 percent in 2004. The infrastructure expenditure remained above 10 percent from 2010 to 2018 mainly due to a number of ongoing infrastructure projects in the country.

To finance education and investment initiatives such as expansion of the national electricity grid, expansion and rehabilitation of the country's infrastructure also led to a substantial resource allocation in these sectors (Republic of Kenya, 2015).

2.1.1 Problem statement

Economic literature emphasizes the importance of the fiscal policy in enhancing the long run economic growth. Government interventions in the market, however, might result in higher taxation, which would further distort the economic incentives. The intervention enhances property rights and addresses externalities thereby promoting growth. The existing empirical literature on how government expenditure affects economic growth is inconclusive with most of the studies being a cross-country analysis. Therefore, an empirical study for a single country is poised to give a reliable conclusion compared to a cross-country study.

Government spending has increased in Kenya’s economic sectors. The average government spending is about 50 percent of GDP for the period under analysis. Moreover, the government has over the years put in place measures and restructured public spending allocation. Economic growth, has, however, lagged behind despite the increase in expenditure. The size of public

spending in relation to economic growth underscores the need of looking at this relationship as well as the implications of the different expenditure components.

The empirical investigations conducted in Kenya such as Maingi (2010), Jerono (2009) and Muguro (2017) produced conflicting findings. Furthermore, their findings do not indicate whether the effect is short term or long term. The methodology used by Muguro (2017) was not clear since the study indicated that VECM and ARDL models were used to analyze the data. A closer look of the unit root of the time series variables used showed all the variables were I(0). Also, the VECM could not give consistent results since the variables were I(0) which is against the requirement that the variables in a VECM model be I(I).

In addition, Muguro (2017) focused on development and current expenditure while this study investigated both economic classification and sectoral allocation of expenditures. Maingi (2010) on the other hand used VECM while the current study applied ARDL model since the variables are I(0) and I(I). This is the justification for ARDL as the preferred model for the analysis. This study aimed at addressing this gap by first establishing the causal association between total spending and economic growth as opposed to past studies. Second, the study evaluates both the short- and long-term effects of public spending on economic growth to account for the lag period associated with government programmes. Thirdly, in contrast to the earlier studies, the estimation techniques are robust and a longer data period was used for the analysis compared to Maingi (2010), Jerono (2009) and Muguro (2017).

2.1.2 Research Questions

i. Does Government expenditure and economic growth have any relationship in Kenya?

ii. How does public spending affect economic growth in Kenya?

2.1.3 Objectives of the study

i. To analyze the relationship between government expenditure and economic growth in Kenya

ii. To analyze the effect of public spending on economic growth in Kenya

2.1.4 Significance of the Study

The study sought to determine the expenditure growth nexus and the contribution of the disaggregated expenditure based on functional classification to economic growth. Economic literature stipulates that various component of public spending do not have the same level of importance hence increasing certain components may affect long-run growth. The contribution of expenditure is of great importance for policymakers because it can aid to determine the expenditure composition so as to promote economic growth.

Another contribution is that this study is modeled in an endogenous growth framework where the factors determining economic growth are endogenously determined. Government policy, in this case, public spending adjusts growth effect of the economy. The information will assist policymakers in determining whether policies undertaken by the government are beneficial or have an adverse effect to the economy. Another contribution of this study is that it does not categorize public spending into productive or nor-productive instead it allows the estimated results of various components of the expenditure to show which are productive and which are unproductive.

2.2 Literature review

2.2.1 Growth theory

(a) Neoclassical Growth Theory

Modern economic growth process can be traced to Solow and Swan (1956) growth model whereby the output is determined by the capital, labor, and technology. According to this model, changes in output over time occur only if there are changes in inputs to the production in the presence of technological progress. The output produced is divided into two components; consumption and investment, with a fraction of output being invested to yield a flow of new capital. The amount of output produced is positively influenced by the saving rate. Depreciation and population growth negatively influences the output level. In this economy, growth is driven by technological progress (Reinert et al., 2009).

In the neoclassical growth theory exogenous factors influence economic growth hence government interventions are negligible (Kneller *et al*., 1999). The theory postulates that fiscal policy, therefore, determines the output level. Equally, population and technological innovation cause steady-state growth rate while fiscal policy affects the transition path to the steady-state (Handa, 2002). Moreover, Bergh and Henrekson (2011) and Smith (2006) postulated that distortionary taxes and government expenditure under the neoclassical framework will impose loss of efficiency and reduce the aggregate output. However, if the interventions by the government could affect investment, savings or labor supply then change in taxes and public spending could influence growth.

(b) The Endogenous Growth Theory

Following the empirical difficulties in policy implications associated with the neoclassical growth model, other models were developed that attempted to endogenize the growth process. The new approach sought to eliminate the fixed factor constraints associated with the Solow model by explicitly endogenizing technological change and modeling addition of new technologies. The factors that influence economic growth as argued by the endogenous growth theory are generated in the system rather than exogenously explained outside the system (Castaño, 2007).

The notable contribution to modern endogenous growth is associated with Romer (1986). Romer conceptualized an economy in which the inputs to the production, among them human capita, research and development (R and D), exhibit increasing marginal productivity. According to Romer, underinvestment in knowledge production in competitive profit-maximizing firms may constrain economic growth. This will be the case if knowledge produced by one firm will spill-over to other firms causing positive externality on their production possibilities. In this case, policies pursued by the government such as subsidizing education or R and D will account for the external benefits arising from knowledge creation thereby leading to a higher long-run economic growth.

Rebelo (1991) demonstrated that capital is linearly related to output in which the production function is $Y = AK$ where K comprises of physical and human capital. The author argued that it was possible for capita output to increase in absence of exogenous technological change. The utility function the consumer maximizes has a constant relative risk aversion (CRRA) which produces perpetual growth rate $= (A - \rho)/\sigma$. In this case, an economy with more patient

consumers (low ρ) and willing to substitute over time (low σ) will grow faster. Growth in this economy is sustained by the factors that affect the marginal product of capital.

Lucas (1988) postulated that sustained growth would be possible if there is a linear production of human capital producing sector. Accordingly, the externality to human capital explains the observed international capital flows. The productivity of individuals would improve if investment in human capital not only enhances education and development of skills but also it improves the productivity of other workers who have accumulated human capital. Government expenditure on schooling improves human capital, a key element for achieving higher economic growth (Joshua, 2015).

(C) New institutional economics theory

According to the views of the new the institutional economics, North and Thomas (1973) argued that economic system efficiency is key to economic growth. Effective governance structures enhance efficient functioning of the market. Market-based institutions provide means through which information is transmitted efficiently and enforcement of property rights determines the incentives to participate in a market (De Haan et al., 2006). Rodrik *et al*. (2004) claimed that institutional quality can have a direct effect on income levels by first minimizing the problem of information asymmetry. Secondly, since institutions define and enforce property rights it lowers various types of risks such as the behavior of self-interested politicians (Del Bo and Florio, 2012).

2.2.2 Theories of Public Expenditure Growth

(a) Musgrave Theory

Musgrave (1964) proposed the theory where a change in income per capita will trigger a change in demand for public services. This theory posits that when per capita income is low there will be

less demand for public services since much of the income will be used on basic needs. Similarly, as per capita income rise, so will the population's demand for services such as health, education, and infrastructure will also go up. As a result, the government increases expenditure to provide these services to the public. However, per capita income would increase to high levels to the point where most of the basic wants are satisfied thereby leading to a decline in public sector growth.

(b) Political Constraint Model

Peacock and Wiseman (1961) looked at the public expenditure trajectory which focused on displacement effect and political constraint model between the government and the taxpayers. The political constraint model is founded on the grounds of the political theory of government expenditure determination. According to this theory, the government wishes to spend more while the taxpayers are unwilling to remit taxes. The government is obliged to consider the demands of the taxpayers. As income grows tax revenue will increase at a given constant tax rate thereby leading to the growth in public expenditure in line with Gross National Income (GNP).

During the period of upheavals such as war and famine, the equilibrium between the government and taxpayers is suspended permitting the government to increase expenditure. However, the level of expenditure remains high after the upheaval because the taxpayers become used to the high levels of spending. The spending also remains high since public debts incurred during the upheaval have to be paid off in addition to fulfilling the promises made to taxpayers.

(c) Bureaucracy and Excessive Government Theory

Bureaucrats are traditionally viewed as benevolent motivated by the desire to do and serve a common good by conducting government business efficiently without political or personal bias. However, the desire of the bureaucrats is to maximize their private utility. Niskanen (1971)

developed a model of the budget bureaucrat where the bureaucrat is in charge of an agency that has a monopoly on the public goods that the government offers. The government relies on the bureaucrat to provide information relating to the agency's output and production cost. In the analysis, the bureau's output is observable by the government and it allocates the bureau a budget to produce the output at a certain cost.

However, the bureaucrat is fully aware of the production process and the cost involved while the government does not. The only thing that restrains the bureaucrat from overspending is the requirement that the allocated budget is sufficient to cover the production cost. The bureaucrat would therefore choose an output to maximize the budget taking into account the requirement that the budget is sufficient to cover the costs. However, instead of choosing efficient output the bureaucrat will choose less output which is not efficient. Thus, the pursuit of personal objectives by the bureaucrat leads to excessive size of the bureaucracy. Adding together all government bureaus result in excessively large public sector.

(d) Wagner's Law

According to this theory, when per capita income grows it causes the public sector to expand because of the need by the state to ensure law, order, and expand administration, to meet distributional needs. Government size then expands to reflect the changes in the society and economy as the government continues to make decisions beneficial to the taxpayers. The expansion of the state functions leads to the growth of administration expenditures and those directed towards regulating the economy. As a result, public expenditure will tend to grow more than income which leads to the expansion of the public sector (Haini and Wei, 2021).

2.2.3 Public Spending and Economic Growth Nexus

The new classical hypothesis holds that when government expenditure rises, taxes also tend to rise which leads to distortions and lowers economic growth. According to the New-Classical school of economic thought, economic agents can reach equilibrium in the economy that produces the socially desired result by making rational decisions regarding market supply and demand (Shiller et al., 2008). They contend that specific policy goals cannot be achieved through the employment of government policy instruments.

The Keynesian theory, conversely, considers public spending as a policy instrument for promoting economic growth. A high level of consumption expenditure increases aggregate demand, which boosts investment and employment and raises output through a series of multiplier effects. According to the endogenous growth concept, as technology advances, productive resources are used more efficiently, leading to economic expansion. In contrast to unproductive spending, productive public spending, according to Barro (1990), encourages economic growth. Investments in health and education are thought to improve economic growth through boosting workforce productivity.

Devarajan *et al*. (1996) argued that the economic growth effect of public spending depends on the productivity of the categories of the expenditures and their initial shares. For example, changing expenditure composition raises the economy's growth rate. Further, the author postulated that increasing current expenditure raises aggregate demand which positively impacts economic growth.

Another factor that enhances economic growth is human capital (Greiner and Fincke, 2015). The human capital and improved health systems are important in promoting sustainable growth

(Schultz, 1961; Welch, 1970; Mincer, 1974; Becker, 1964). The tenets of human capital theory, according to Jorgenson and Fraumeni (1992), are that, like physical capital, acquired skills accrue future advantages. The quality of education provided by a nation's educational system will determine the productivity of its human capital (Conrad, 2011). Public investment on education is a sign of the creation of human capital, which boosts worker productivity and promotes economic growth (Nketiah-Amponsah, 2009). Education significantly improves employees' productivity by introducing innovation that improves efficiency (Becker, 1962).

Investing in infrastructural development promotes productivity in the private sector as argued by Aschauer (1989) and Barro (1990). Aschauer (1989) attributed productivity slowdown in the United States to insufficient infrastructure investment at the time. Increasing public capital stock will positively have an impact on capital and labor inputs (Pradhan and Bagchi, 2013). This causes production to decline and cause the level of private production to increase. Because of the standard accelerator effect, the scale effect will cause private investment to increase thereby raising production capacity and hence long-run growth.

Straub (2008) postulated that increasing the stock of the infrastructure enhances the efficacy of other production factors which eventually raise the steady-state growth rate. For example, opening up remote areas by providing access roads and bridges make private investment possible. Likewise, the provision of telecommunications and electricity to the entrepreneurs as part of infrastructure networks attracts private investment. Further, the author noted that improving infrastructure influences labor productivity because of the reductions in the time wasted commuting to work. Infrastructure connectivity enables firms to access markets for their goods thereby enhancing economic growth.

Mushkin (1962) viewed health care spending as an important component for improving economic growth. Health investment, which is capital by itself leads to the overall economic growth (Tsen, 2006). Health expenditure may directly influence economic growth because healthy people work better (Agénor (2012). In addition, improvement in health indirectly affects the level of output because health provides the incentive to acquire schooling. Reduction of mortality rate may act as an inducement for saving for retirement which ultimately raises physical capital investment (Weil, 2007). Poor health on the hand adversely affects productivity leading to underdevelopment (Cole and Neumayer, 2006).

Bloom and Canning (2000) argued that economic growth effect of health spending occurs via its effect on human capital accumulation because the productivity of healthy workers is higher compared to those suffering from a particular disease or sickness. In addition, healthy people have more incentives to invest in knowledge and skills development. The authors further stressed that a healthy population may save more and increase the accumulation of physical capital because improved health will lower both infant and child mortality thereby increasing the populations' work force. As a result, higher savings eventually increases investment and hence higher economic growth.

2. 2.4 Empirical Literature Review

There exists vast research about the growth effect of government spending. However, the studies give inconclusive or conflicting results. One side of the empirical research supports the positive effect of government spending (Kunofiwa and Odhiambo, 2018), While some research indicates that government spending impacts economic growth negatively (Taloba and Bhattarai, 2018).

Al-Fawwaz (2015) used the OLS method to examine whether government expenditure had any growth impact in Jordan between 1980 and 2013. The findings indicated that current expenditures had a huge impact on economic expansion. Shioji (2001) used income convergence equations to determine whether public capital had any impact on output. The equations were estimated using disaggregated panel data from the Japanese and American regions. The infrastructure component had a considerable positive impact, according to results from both countries.

Using data from 1981 to 2001 for both state and local government in Switzerland, Schaltegger and Torgler (2006) sought to determine whether expenditure affects growth. The findings indicated expenditure and economic growth had a negative association.

Connolly and Li (2016) evaluated the expenditure growth nexus using panel data from 34 OECD countries spanning the years 1995 to 2011. Using the (GMM) estimating technique, they looked at how consumption expenditure, government spending, and capital investment affects economic growth. The outcome showed that increasing social spending did not support economic growth.

In order to identify crucial spending areas for fostering either short- or long-term economic growth in Egypt, Kandil (2013) employed autoregressive modeling, taking into consideration a long time horizon to discover the presence of cyclical impacts on GDP. The results showed that various forms of expenditure ratios had generally negative effect on economic growth.

Hatemi-J (2014) investigated the expenditure growth nexus in Sweden whereby the results indicated innovation in government spending had no significant response to GDP. The

conclusion was also supported by variance decomposition hence implying the possibility of the validity of Ricardian equivalence theorem in the case of Sweden.

Nketiah-Amponsah (2009) analyzed aggregate and disaggregated expenditures in Ghana over the period 1970-2004 using OLS to determine the economic growth effect from various types of expenditures. The results revealed aggregate government expenditure slowed growth. Health and infrastructure enhance growth but no significant impact from education expenditure.

In South Africa, Nyasha and Odhiambo (2019) conducted expenditure and economic growth literature review. The authors found no conclusive evidence about how government expenditure affects economic expansion. Additionally, the literature analysis revealed that the impact is influenced by the methodology, the time period, and the size of the sample used.

Muguro (2017) examined the expenditure growth effect in Kenya from 1963 to 2017. The components of public expenditure comprised of development and recurrent expenditure. The data were analyzed using the ARDL and VECM. The study found neither recurrent nor development expenses had a significant effect on Kenya's economic growth.

Maingi (2010) investigated the effect of governmental expenditure composition on economic growth in Kenya from 1963 to 2011. The study used expenditures on security, infrastructure, health and education using a VECM. The outcome showed Kenya's economic growth is not much impacted by education spending. However, the study did not offer a conclusion regarding the economic growth impact of health and infrastructure expenditures.

2.2.5 Literature overview

The theoretical literature gives mixed views about the expenditure-growth nexus. To the Neoclassical, fiscal policy is ineffective in influencing the economic activity while to the Keynesian, fiscal policy influences the economy. Similarly, the New classical are of the view that growth is driven by the exogenous factors (Ahmad, 2012) while the endogenous growth theory asserts that it is influenced by the factors endogenously defined in the model. The debate is far from conclusion if the empirical literature is anything to go by.

Some of the empirical studies support the positive hypothesis that public spending enhances economic growth (Al-Fawwaz, 2015; Shioji, 2001) while others find government spending as ineffective tool for enhancing economic growth (Gashti et al., 2012; Schaltegger and Torgler, 2006). In addition, the majority of the studies are cross country studies from Asian and western countries (Nekarda and Ramey, 2011) with few studies on a specific country (Nketiah-Amponsah, 2009).

We note from this discussion that the issue of government spending has been looked at in different countries but the economic growth effect of public spending is still inconclusive. This is because the authors do not give consistent findings. Moreover, most of the studies are cross-country with few that are country-specific. Cross-country studies do not give reliable results because of the general conclusion for all countries analyzed in the study. In general, cross-country studies face several shortcomings especially in the methodology that include the problem of dealing with heterogeneity among countries such as technology, institutions, and preferences.

Further, cross-country studies do not give robust results and therefore give ambiguous policy implications. Panel data regressions suffer from unforeseen country-specific effects (Gupta et al.,

2005; Calderón et al., 2003). Because of the problem associated with cross country studies Greiner and Gong (2005; Saboori et al., 2012) argued that utilizing data for a single country could be more useful in designing development strategies. This underscores the need for a country-level study using a single country data. This dissertation seeks to advance the existing literature by investigating the economic growth effect of the components of public spending using ARDL model.

2.3 Theoretical model

This study is anchored on Devarajan *et al*. (1996) theoretical model. In the model, capital stock defined as k and two types of government expenditure defined as g_1 and g_2 augment the aggregate production function formulated as constant elasticity of substation. The production function is stated as;

$$y = f(k, g_1, g_2) = \left[\alpha k^{-\zeta} + \beta {g_1}^{\zeta} - \gamma {g_2}^{\zeta}\right]^{-1/\zeta} \quad (1) \qquad (1)$$

Where

$\alpha > 0; \beta \geq 0;\ \gamma \geq 0; \alpha + \beta + \gamma = 1; \zeta \geq -1$

According to Barro (1990), it is believed that the government levies a flat rate income tax τ to pay for its expenditures.

$$\tau y = g_1 + g_2 \qquad (2)$$

The share $\emptyset(\emptyset \leq 1 \leq 0)$ of total government expenditure devoted towards $g_1$is given by

$$g_1 = \emptyset g_1 \text{ and } g_2 = (1 - \emptyset)\tau y \qquad (3)$$

The decision of the government on τ and $\emptyset$ remain unchanged and, therefore, a representative agent will choose c as consumption and k as capital to maximize the welfare;

$$u = \int_0^{\infty} u(c) e^{-\rho t} dt, \qquad (4)$$

Subject to

$$\dot{k} = (1 - \tau)y - c \qquad (5)$$

ρ is the time preference rate while

$$u(c) = \frac{c^{1-\sigma}}{1 - \sigma} \qquad (6)$$

Substituting equation (6) into 4 and maximizing subject to equations (1) (2), (3) and (5) yields the growth rate of consumption equation given by;

$$\frac{\dot{c}}{c} = \frac{\alpha(1-\tau) + \left\{\alpha + \left({}^{g}/_{k}\right)^{-\zeta}\left[\beta\phi^{-\zeta} + \gamma(1-\phi)^{-\zeta}\right]\right\}^{-\left({}^{1+\zeta}/_{\zeta}\right)} - \rho}{\sigma} \tag{7}$$

Equation (7) describes the constant growth rate of consumption and its denoted by λ. Based on the Devarajan, et al. (1996) analysis, the steady state growth path of tax τ and hence ${}^{g}/_{y}$ is constant. It then follows that ${}^{g}/_{k}$is also constant. Manipulation of equations (1)-(3) provides the ratio, ${}^{g}/_{k}$,which is given by;

$$\frac{g}{k} = \frac{\left\{\left[\tau - \phi^{\zeta} - \gamma(1-\phi)^{\zeta}\right]\right\}^{1/\zeta}}{\alpha} \tag{8}$$

Substituting equation (8), the ratio, ${}^{g}/_{k}$, into (7) gives the economy's growth rate, λ, given by

$$\lambda = \frac{\alpha(1-\tau)\left\{\alpha\tau^{\zeta}/\left[\tau^{\zeta} - \beta\phi^{-\zeta} - \gamma(1-\phi)^{\zeta}\right]\right\}^{-(1+\zeta)/\zeta} - \rho}{\sigma} \tag{9}$$

Differentiating equation (9) with respect to $\emptyset$, we get equation (10) which relates the steady-state growth rate and expenditure share allocated to g_1. That is

$$\frac{d\lambda}{d\phi} = \frac{\alpha(1-\tau)(1+\zeta)\left[\alpha\tau^{\zeta}\right]^{-(1+\zeta)/\zeta[\beta\phi-(1+\zeta)]} - \gamma(1-\phi)^{1+\zeta}}{\sigma\left[\tau^{\zeta} - \beta\phi^{\zeta} - \gamma(1-\phi)^{-\zeta}\right]^{-1/\zeta}} \tag{10}$$

Equation (10) makes it possible to define productive government expenditure where an increase in such expenditure raise growth rate. The implication of equation (10) is that the share of the allocated expenditure g_1 will be productive if $\frac{d\lambda}{d\phi} > 0$. If the steady-state rate in equation (9) is non-negative then the right-hand side of equation (10) will also be positive if;

$$(1+\zeta)\left[\beta\phi^{-1(1+\zeta)} - \gamma(1-\phi^{-1(1+\zeta)}\right] > 0 \quad (11)$$

Since $\zeta \leq -1$,the implication of equation (11) is that $^{d\lambda}/_{d\phi} > 0$ if

$$\frac{1}{1-\phi} < \left(\frac{\beta}{\gamma}\right)^{\theta} \quad (12)$$

Where $\theta = \frac{1}{1+\zeta}$ is the elasticity of substitution.

Equation (12) implies that the effect of the share of the composition of the expenditure to the economy depends not only on the composition of the expenditure shares but also on the initial allocations. Therefore, shifts in the share of the expenditure such that $\beta > \gamma$ may not affect economic growth if the initial share is too high.

Similarly, if $\zeta = 0$ while $\theta = 1$, the equation (12) implies that

$$\frac{1}{1-\phi} < \frac{\beta}{\gamma} \quad (13)$$

Where β and γ are output elasticities.

Equation (13) indicates the expenditure share allocated to g_1 and g_2 is less than the output elasticities. As a result, shifting the composition of spending in favor of $g_1$will boost economic growth over time. In addition, if the elasticities of the two goods are positive implying that the expenditure complements private production and if equation (13) still holds, transferring resources from $g_1$to $g_2$increases the steady-state growth rate.

2.3.1 Empirical model specification

Devarajan et al. (1996) theoretical model is useful for analyzing the various components of government expenditure which are ideally more than two components as described in the model. This study applies the theoretical framework described to empirically investigate how Kenya's different government spending components effect economic growth. In this case, the government expenditure comprise of economic and functional classification. The economic classification consists of development and current expenditure while the functional classification comprise of education, health and infrastructure expenditures. The empirical model is therefore specified as

$$Y = f(CE, DE, ED, HE, IE) \quad (14)$$

Where *Y* is real GDP growth, *CE* is current expenditure, *DE* is development expenditure, *ED, HE,* and *IE* are expenditure on education, health and infrastructure. Following Cheteni (2013), the study recognizes that economic growth is influenced by domestic savings, inflation, exports and unemployment. The econometric specification of the equations to be estimated is derived from equation (14) as follow;

$$GDP = \beta_0 + \beta_1 CE + \beta_2 DE + \beta_3 SAV + \beta_4 INF + \beta_5 EXP + \beta_6 UN + \varepsilon \quad (15)$$

Where $GDP = economic\ growth$
$CE = Current\ expenditure$
$DE = development\ expenditure$
$SAV = savings$
$INF = inflation$
$EXP = exports$
$UN = unemployment$
$\beta_0 = constant\ term$
$\beta_1 \ldots, \beta_6 are\ the\ coeffcients\ of\ the\ independent\ variable$
$\varepsilon = error\ term$

Equation (15) provides the economic growth impact of various expenditures based on the two main economic classifications as either productive or unproductive. The empirical model used to estimate the economic growth effect of the functional classification of expenditure is given as:

$$GDP = \beta_0 + \beta_1 ED + \beta_2 HE + \beta_3 IE + \beta_4 SAV + \beta_5 INF + \beta_6 EXP + \beta_7 UN + \varepsilon \quad (16)$$

Where $GDP = economic\ growth$
$ED = education\ expenditure$
$HE = health\ expenditure$
$IE = infratsructure\ expenditure$
$SAV = savings$
$INF = inflation$
$EXP = exports$
$UN = unemployment$
$\beta_0 = constant\ term$
$\beta_1 \ldots, \beta_7\ are\ the\ coeffcients\ of\ the\ independent\ variable$
$\varepsilon = error\ term$

2.3.2 Estimation methodology

2.3.3 Unit root test

The Augmented Dickey Fuller (ADF) and Kwiatkowski-Philips-Schmidt-Shin (KPSS) were used to conduct unit root. The ADF model according to Dickey and Fuller (1979) is fitted by OLS and by setting $\alpha = 0$ or $\delta = 0$ as follows:

$$y_t = \alpha + p y_{t-1} + \delta t + \mu_t \quad (17)$$

However, Dickey-Fuller regression equation (17) is prone to serial correlation problem hence ADF is preferred. The regression equation is;

$$\Delta y_t = \alpha + \beta y_{t-1} + \delta_t + \sum_{j=1}^{p} \psi_j \Delta y_{t-j} + \varepsilon_t \quad (18)$$

Where;

Δy_{t-j} = the lagged difference term.

In ADF test, the series has a unit root while in KPSS the series y_t is trend-stationary where the regression is based on a langrage multiplier (LM) statistics defined as:

$$LM = \sum_t S(T)^2 / (T^2 f_0) \quad (19)$$

Where f_0 is residual estimator at zero frequency while $S(T)$ is a cumulative residual function defined as:

$$S(T) = \sum_{r=1}^{t} v_t$$

2.3.4 Lag selection

The formulae for the two lag selection models are given by;

$$AIC = T \ln(sum\ of\ squared\ residuals) + 2n$$

$$SBIC = T \ln(sum\ of\ squared\ residuals) + n \ln(T)$$

Where; n = number of parameters estimated

T = number of observations.

The Akaike Information Criteria works better with a small sample size compared to SBIC. However, it would be more appropriate if the two models select the same number of lags. This study, therefore, will perform lag selection criterion and choose the appropriate lags for inclusion in the ARDL model.

2.3.5 Granger Causality

The study examined the relationship between economic development and government spending using a four-step technique created by Engle and Granger in 1987. Utilizing a unit root test, the initial step entails determining out the variables' integration order.

The conventional granger causality will be used to examine the relationships between the two variables if the variables are stationary using the following equations:

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta GDP_{t-i} + \sum_{i=1}^{n} \alpha_{2i} \Delta AGOVEXP_{t-i} + \varepsilon_t \quad (20)$$

$$\Delta AGOVEXP_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta \mathrm{A} GOVEXP_{t-i} + \sum_{i=1}^{n} \beta_{2i} \Delta GDP_{t-i} + v_t \quad (21)$$

Where GDP_t and GDP_{t-i} is current and past values of economic growth while $AGOVEXP_t$ and $AGOVEXP_{t-i}$ is the current and past values of government expenditure. ε_t and v_t are serially independent error terms. According to equations (20) and (21), each variable is stated in the first difference form and is regressed on both its own past values and the past values of the other variable, which is the causality variable.

Step two involves estimating the long run relationship if cointegration is confirmed in step one. A test for the residuals' sequence of integration would be necessary such that stationarity of the residual sequence implies the variables are cointegrated. In this case, a dynamic error correction models given in equations (22) and (23) will be used for the analysis.

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta GDP_{t-i} + \sum_{i=1}^{n} \alpha_{2i} \Delta AGOVEXP_{t-i} + \delta_1 ECM_{t-1} + \varepsilon_t \quad (22)$$

$$\Delta AGOVEXP_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta \mathrm{A} GOVEXP_{t-i} + \sum_{i=1}^{n} \beta_{2i} \Delta GDP_{t-i} + \delta_2 ECM_{t-1} + v_t \quad (23)$$

Where;

GDP_t, GDP_{t-i}, $AGOVEXP_t$, and $AGOVEXP_{t-i}$ are previously defined in equations (20) and (21).

ECM_{t-1}= error correction term

ε_t and v_t = independently distributed white noise disturbances.

From equation (22) expenditure granger causes economic growth if past values of government expenditure have explanatory power on current economic growth. There is no causality from government expenditure to economic growth if $\alpha_1 \ldots = \alpha_n = \delta_1 = 0$. Similarly, from equation (23) there is no causality from economic growth to government expenditure if $\beta_1 \ldots = \beta_n = \delta_2 = 0$. The last step according to Engle and Granger (1987) is to assess model adequacy. This study conducted diagnostic checks among them serial correlation, normality and heteroscedasticity to determine whether the residual of the error correction equations approximate the white noise.

2.3.6 Cointegration Approach

The Pesaran et al. (2001) ARDL bounds cointegration method was used to analyze the data. The ARDL technique presupposes that the variables are both *I (0) and I(1).* The ARDL has the advantage of being a more advanced analytical methodology over other cointegration techniques put forth by Johansen and Juselius (1990). The traditional cointegration techniques are likely to suffer from endogeneity while the ARDL avoid the problems associated with serial correlation and endogeneity thus generating unbiased and efficient estimates. The ARDL model is represented as:

$$\Phi(L,P)yt = \sum_{i=1}^{k} \beta_i\,(L,q_i)x_{it} + u_t \qquad (24)$$

Where;

$\Phi(L,P)yt = 1 - \Phi_1 L - \Phi_2 L^2 - \cdots - \Phi_p L^p$

$\beta_i(L,q_i)x_{it} = 1 - \beta_{i1}L^2 - \beta_{i2}L - \cdots - \beta_i q_i L^{qi}, i = 1,2 \ldots, k$

Where

y_t= dependent variable

x_{it} = Independent variables,

L = lag operator

u_t= the error term.

The conditional ARDL model representation for the estimated econometric equation (15) is specified as:

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i}\, \Delta GDP_{t-i} + \sum_{i=0}^{n} \alpha_{2i}\, \Delta CE_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta DE_{t-i} + \sum_{i=0}^{n} \alpha_{4i}\, \Delta SAV_{t-i} + \sum_{i=0}^{n} \alpha_{5i} \Delta INF_{t-i} + \sum_{i=0}^{n} \alpha_{6i} \Delta EXP_{t-i} + \sum_{i=0}^{n} \alpha_{7i} \Delta UN_{t-i} + \beta_1 GDP_{t-1} + \beta_2 CE_{t-1} + \beta_3 DE_{t-1} + \beta_4 SAV_{t-1} + \beta_5 INF_{t-1} + \beta_6 EXP_{t-1} + \beta_7 UN_{t-1} + \varepsilon_t \quad (25)$$

Where the variables are defined in equation (15),

Δ = difference factor,

α_0= Constant,

$\alpha_1 \_ \alpha_7$= short run dynamics

$\beta_1 - \beta_7$= long-run dynamics

ε_t= white noise

n = lag length.

Similarly, the estimated conditional ARDL model representation for equation (16) is specified as:

$$\Delta GDP_t = \delta_0 + \sum_{i=1}^{n} \delta_{1i}\, \Delta GDP_{t-i} + \sum_{i=0}^{n} \delta_{2i}\, \Delta ED_{t-i} + \sum_{i=0}^{n} \delta_{3i} \Delta HE_{t-i} + \sum_{i=0}^{n} \delta_{4i}\, \Delta IE_{t-i}$$
$$+ \sum_{i=0}^{n} \delta_{5i} SAV_{t-1} + \sum_{i=0}^{n} \delta_{6i} \Delta INF_{t-i} + \sum_{i=0}^{n} \delta_{7i} \Delta EXP_{t-i} + \sum_{i=0}^{n} \delta_{8i} \Delta UN_{t-i}$$
$$+ \phi_1 GDP_{t-1} + \phi_2 ED_{t-1} + \phi_3 HE_{t-1} + \phi_4 IF_{t-1} + \phi_5 SAV_{t-1} + \phi_6 INF_{t-1}$$
$$+ \phi_7 EXP_{t-1} + \phi_8 UN_{t-1} + \upsilon_t \qquad (26)$$

Where the variables are defined in equation (16);

δ_0=constant term

Δ= difference factor

$\delta_1 - \delta_8$= short run coefficients

ϕ_1-ϕ_8 =long-run coefficients

υ_t= error term.

Estimation of equations (25) and (26) using ARDL bounds approach involves two steps where the first step is to compute the Wald or F-statistics to test the joint significance of the coefficients of the lagged level variables. The null and alternative hypothesis hypotheses are;

$H0$: $\beta_1 = \beta_2 = \cdots = \beta_7 = 0$; against the alternative $\beta_1 \neq \beta_2 = \cdots \neq \beta_7 \neq 0$

And $\phi_1 = \phi_2 = \cdots = \phi_8 = 0$ against $\phi_1 \neq \phi_2 \neq \cdots \neq \phi_8 \neq 0$. Following Narayan and Singh (2007) the study also computed the t-statistics where the null hypothesis is $\beta_1 = 0$ and $\phi_1 = 0$ against the alternatives $\beta_1 \neq 0$ and $\phi_1 \neq 0$. The calculated F and t-statistics were then evaluated against the provided critical values.

Error correction representation is used to estimate equations (25) and (26) if the variables are cointegrated. The associated error correction models are specified as:

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i}\,\Delta GDP_{t-i} + \sum_{i=0}^{n} \alpha_{2i}\,\Delta CE_{t-i} + \sum_{i=0}^{n} \alpha_{3i}\Delta DE_{t-i} + \sum_{i=0}^{n} \alpha_{4i}\,\Delta SAV_{t-i} + \sum_{i=0}^{n} \alpha_{5i}\Delta INF_{t-i} + \sum_{i=0}^{n} \alpha_{6i}\Delta EXP_{t-i} + \sum_{i=0}^{n} \alpha_{7i}\Delta UN_{t-i} + \beta_1 GDP_{t-1} + \beta_2 CE_{t-1} + \beta_3 DE_{t-1} + \beta_4 SAV_{t-1} + \beta_5 INF_{t-1} + \beta_6 EXP_{t-1} + \beta_7 UN_{t-1} + \lambda_1 ECM_{t-1} + \varepsilon_t \quad (27)$$

$$\Delta GDP_t = \delta_0 + \sum_{i=1}^{n} \delta_{1i}\,\Delta GDP_{t-i} + \sum_{i=0}^{n} \delta_{2i}\,\Delta ED_{t-i} + \sum_{i=0}^{n} \delta_{3i}\Delta HE_{t-i} + \sum_{i=0}^{n} \delta_{4i}\,\Delta IE_{t-i} + \sum_{i=0}^{n} \delta_{5i} SAV_{t-1} + \sum_{i=0}^{n} \delta_{6i}\Delta INF_{t-i} + \sum_{i=0}^{n} \delta_{7i}\Delta EXP_{t-i} + \sum_{i=0}^{n} \delta_{8i}\Delta UN_{t-i} + \phi_1 GDP_{t-1} + \phi_2 ED_{t-1} + \phi_3 HE_{t-1} + \phi_4 IF_{t-1} + \phi_5 SAV_{t-1} + \phi_6 INF_{t-1} + \phi_7 EXP_{t-1} + \phi_8 UN_{t-1} + \lambda_2 ECM_{t-1} + \upsilon_t \quad (28)$$

Where;

ECM_{t-1}= error correction term.

2.3.7 Stability and Diagnostic test

To evaluate the model's suitability and decide whether the error correction model was appropriate, diagnostic tests serial correlation, model misspecification, and heteroscedasticity were carried out. According to Bwon et al. (1975), stability test is ascertained by use of CUSUM and CUSUMSQ.

2.3.8 Definitions and Measurement of Variables

Economic growth is the dependent variable measured using real GDP. Expenditures on infrastructure, infrastructure development, and current expenditures are all employed as

independent variables. Inflation, domestic savings, and trade openness are additional explanatory variables that are considered. An overview of the variables measurements is found in Table 1.

Table 1: Description and Measurement of Variables

Variable	**Abbreviations**	**Definition and measurement**	**Expected Sign**	**Unit of Measurement**
Variable	**Abbreviation**	**Definition and measurement**	**Expected sign**	**Unit of measure**
Economic growth	GDP	The total value of goods and services produced in a country in a given year.	Dependent variable	Annual percentage growth
Total government expenditure	AGOVEXP	The development and recurrent expenditures less transfers.	Negative	Percentage of GDP
Development expenditure	DE	Expenditure used to acquire assets.	Positive	Percentage of GDP
Current expenditure	CE	Expenditure on goods and services.	Negative	Percentage of GDP
Education expenditure	ED	The share of government spending on education.	Positive	Percentage of total government expenditure.
Health expenditure	HE	The sum of government spending on health sector.	Positive	Percentage of total government expenditure
Infrastructure expenditure	IE	Government spending on capital expenses, which includes spending on transportation, communication, and power.	Positive	Percentage of total government expenditure
Exports	EXP	The value of all exported goods and services.	Positive	Percentage of GDP
Inflation	INF	Increase in price level of goods and services over a certain period of time.	Negative	Rate
Unemployment	UN	The proportion of the labor force not employed.	Negative	Rate
Domestic savings	SAV	Private plus public sector savings.	Positive	Percentage of GDP

Source: World Bank data base

2.3.9 Type of data and the source(s)

The study used time series data from 1970 to 2020. The data for total government expenditure and infrastructure expenditure was sourced from the Kenya National Bureau of Statistics (KNBS) official publications such as economic surveys and statistical abstracts. Data on development, current, education and health expenditure was obtained from World Bank data base for Kenya. Data on the inflation, unemployment, and domestic savings was also sourced from the World Bank database for Kenya.

2.4 Empirical results and discussion

Before the actual analysis, the quality of the data used was ascertained by conducting various diagnostic tests among them the unit root test and multicollinearity.

2.4.1 Descriptive Statistics

Table 2: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Total expenditure	51	37.275	5.127	28.2	50.8
Education expenditure	51	18.841	3.45	13.76	27.47
Savings	51	13.319	7.054	4.2	27.15
Economic growth	51	3.806	2.739	-4.66	9.45
Inflation	51	11.505	8.012	1.55	45.98
Development expenditure	51	20.468	3.391	15	29.79
Current expenditure	51	16.266	1.96	12.9	19.8
Health expenditure	51	5.898	1.623	3.12	8.96
Infrastructure expenditure	51	9.263	3.213	3.16	19.69
Exports	51	24.534	6.062	11.260	38.904
Unemployment	51	10.539	1.9	6.5	16.5

Source: Author's own computation

In summary, table 2 indicates that all the variables had 51 observations. The result shows that the variables had minimal dispersion from their mean values as indicated by the magnitude of the standard deviations. Specifically, the mean for the economic growth is 3.8 and the total government spending is 37.3. Moreover, the mean for development expenditure is 20.5 and the mean of current expenditure is 16.3.

The maximum values for the economic growth, total government spending, development, and current expenditure are 9.5, 50.8, 29.79 and 19.8 respectively. Development expenditure remained high compared to current spending giving an indication that much of the resources accrued to the government is mainly used for development. However, economic growth does not seem to be in tandem with the increases in development spending. Health expenditure had the lowest average growth, an indication that public spending on health, a critical sector for economic growth and development is still very low.

Table 3: Correlation matrix

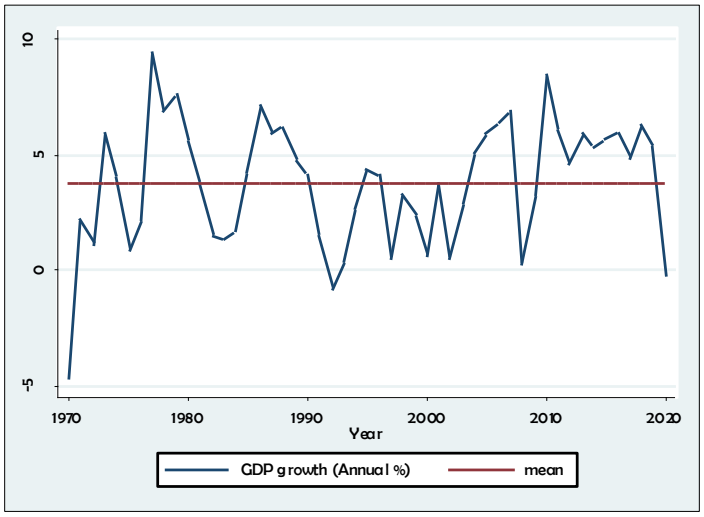
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Development expenditure	1.000								
(2) Current expenditure	0.431	1.000							
(3) Education expenditure	-0.441	-0.155	1.000						
(4) Health expenditure	-0.554	-0.723	0.516	1.000					
(5) Infrastructure expenditure	0.148	-0.477	-0.308	0.264	1.000				
(6) Savings	0.645	0.573	-0.634	-0.866	-0.189	1.000			
(7) Inflation	0.037	0.113	-0.254	-0.200	-0.145	0.373	1.000		
(8) Exports	0.297	0.231	-0.282	-0.463	-0.061	0.450	0.412	1.000	
(9) Unemployment	0.478	0.572	-0.501	-0.738	0.043	0.600	0.042	0.406	1.000

Source: Author's own computation

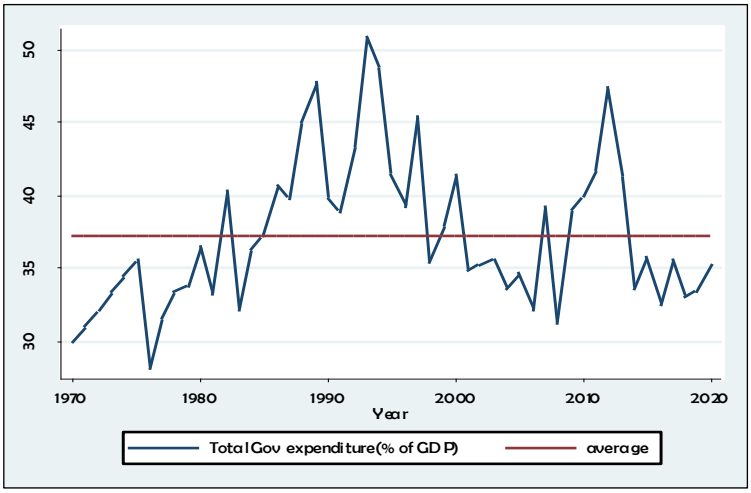
Table 3 presents results for multicollinearity conducted using correlation matrix which shows the association between the independent variables. The severity of multicollinearity is detected if the correlation coefficient is greater than 0.8. The correlation coefficient in table 3 is less than 0.8 for all the variables implying the absence of severe multicollinearity.

2.4.2 Time series plots and unit root Test

Before the conducting the analysis, the study presents time series plots of key variables in panels (a) to (g) to determine whether the variables are trending or not.

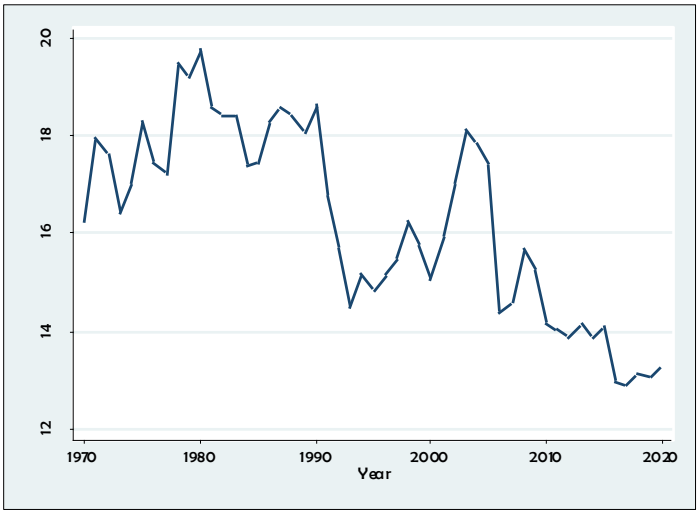


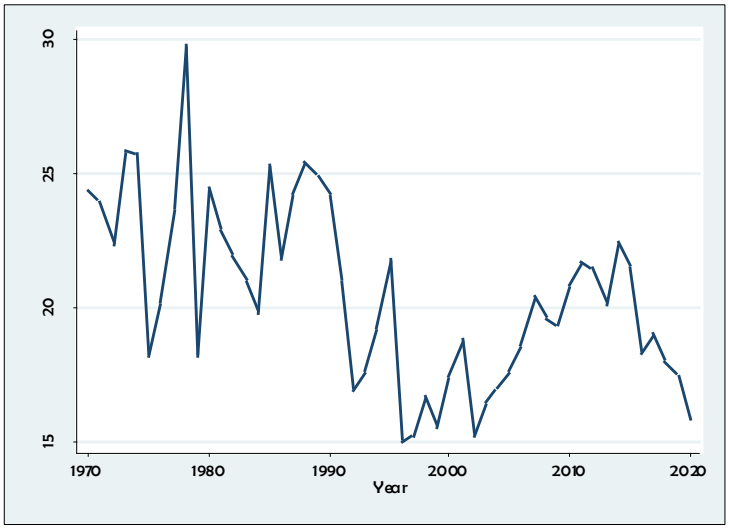
Panel (a): GDP



Panel (b): Total government expenditure

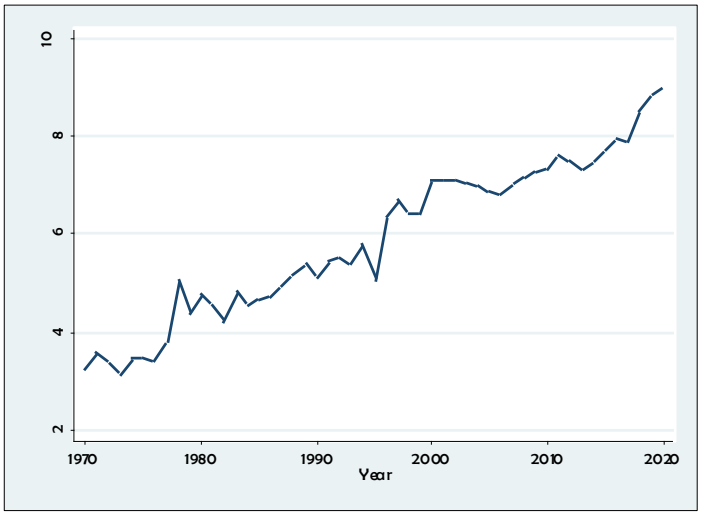
Panels (a) and (b) show that despite the random shocks in economic growth and the total government expenditure the series fluctuates around their means. The positive extreme of economic growth is indicated to be in 1977 and 2011 with GDP of about 9% and 8% respectively. Similarly, the extreme negative of economic growth is recorded in 1970 and 2020 with annual GDP of -0.4% and -0.3% respectively.

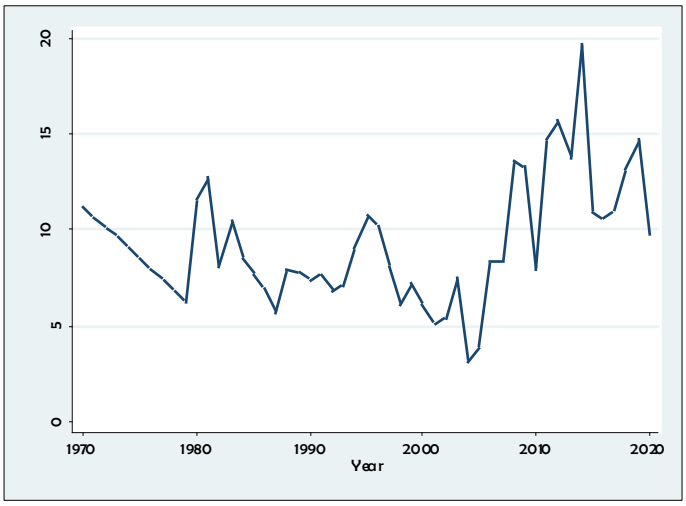




Panel (c): Current expenditure Panel (d): Development expenditure

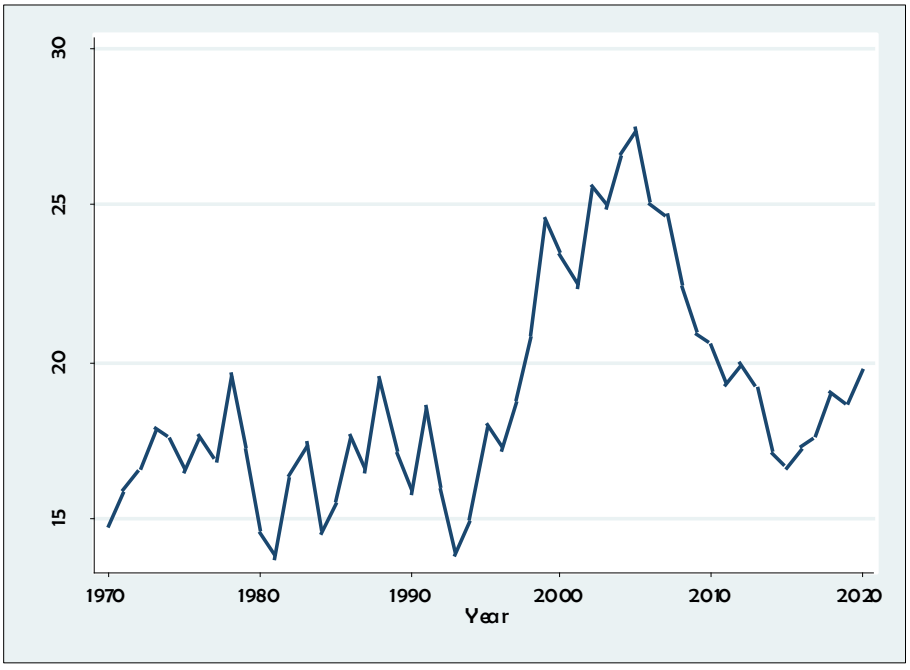
Panels (c) and (d) indicate that the series are trend stationary. This implies that although the series grows over time, the variables fluctuate around constant time trend.





Panel (e): Health expenditure Panel (f): Infrastructure expenditure

Panel (e) shows the series is non-stationary since it does not revert to its mean and that its shocks have a permanent impact on the series. Panel (f) on the other hand shows the series fluctuates around its mean.



Panel (g): Education expenditure

Panel (g) indicates despite the stochastic shocks the series fluctuates around its mean.

Table 4: Unit root Test

Augmented-Dickey Fuller (ADF)		
Variables	**Variables in levels**	**Variables in first difference**
GDP	-5.100***	
Aggregate Expenditure	-3.657***	
Development Expenditure	-3.669***	
Current expenditure	-1.318	-7.079***
Infrastructure Expenditure	-0.484	-9.141***
Education Expenditure	-2.052	-7.548***
Health Expenditure	-0.558	-9.944***
Unemployment	-2.677*	
exports	-1.368	-6.825***
Inflation	-3.996***	
Savings	-1.862	-7.719***
Kwiatkowski-Philips-Schmidt-Shin (KPSS)		
GDP	0.123**	
Aggregate Expenditure	0.529	0.018***
Development Expenditure	0.276	0.0186***
Current expenditure	0.277	0.0411***
Infrastructure Expenditure	0.462	0.0261***
Education Expenditure	0.448	0.0541***
Health Expenditure	0 .12**	
Unemployment	0.12**	
Exports	0.293	0.0297***
Inflation	0.195***	
Savings	0.24	0.0256***

*Note: ***,**,* denotes stationarity at 1%, 5%, and 10% respectively.*
Source: Author's own computation

The ADF unit root test indicate GDP, total government expenditure, development expenditure, unemployment and inflation are I(0). Current expenditure, infrastructure expenditure, education expenditure, health expenditure, savings and exports are I(1). The KPSS unit root test indicate that GDP, health expenditure, inflation as well as unemployment variables are I(0) while total expenditure, development expenditure, current expenditure, infrastructure expenditure, education expenditure savings and exports are I(1) variables.

2.4.3 Cointegration-Bounds testing Approach

The unit root test produced both *I(0)* and *I(1)* variables when tested using ADF and KPSS. The study determined the maximum lag lengths using the appropriate lag criterion for equations (25) and (26).

Table 5: Lag selection (equation 25)

Sample: 1974 - 2020 Number of obs = 47

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-811.259				3.1e+06	34.8195	34.9232	35.0951
1	-679.848	262.82	49	0.000	95892.5*	31.3127	32.1422*	33.5171*
2	-635.303	89.09	49	0.000	133098	31.5023	33.0577	35.6356
3	-582.576	105.45	49	0.000	168040	31.3437	33.6249	37.4059
4	-507.514	150.13*	49	0.000	135094	30.2346*	33.2417	38.2257

Endogenous: gdpgrowth developmentexpenditure currentexpenditure exports savings inflation unemployment

Exogenous: _cons

Source: Author's own computation using STATA

Table 6: Lag selection criteria (equation 26)

Selection-order criteria
Sample: 1974 - 2020 Number of obs = 47

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-856.324				1.3e+06	36.7797	36.8982	37.0947
1	-661.387	389.87	64	0.000	5131.98*	31.208	32.2745*	34.0422*
2	-606.978	108.82	64	0.000	9772.27	31.6161	33.6307	36.9697
3	-527.701	158.55	64	0.000	10273.5	30.966	33.9286	38.839
4	-407.18	241.04*	64	0.000	5258.21	28.5609*	32.4715	38.9532

Endogenous: gdpgrowth educationexpenditure healthexpenditure infrastructureexpenditure exports savings inflation unemployment
Exogenous: _cons

Source: Author's own computation

From the table 5 and 6 both HQIC and SBIC suggests a single lag as the optimal number of lag length for estimating equations (25) and (26). The AIC on the other hand suggests 4 lags. Estimating a model with lagged variables involves loss of some observations and therefore this study used lag (1) as suggested by HIQC and SBIC to prevent loss of some the information as a result of penalizing the observations.

After identifying the optimal lags, the bound approach to cointegration was conducted only for equations (25) and (26) since the variables in equations (20) and (21) were found to be I(0) and therefore, the standard Granger causality method is used to determine the expenditure growth causality. Table 7 and 8 reports the bounds approach to cointegration results.

Table 7: Bounds F-test for cointegration; Equation 25

Ho: no level relationship

Dependent variable	**Function**		**F-statistics**		**t-statistics**	
GDP	$F(GDP/DE, CE, EXP, SAV, INF, UN)$		7.871*** ,**,*		-4.050***,**	
Pesaran et al. (2001), p.300 Table CI (iii) Case III. K=6	**Asymptotic Critical Values** 1%		5%		10%	
	I(0)	I(1)	I*(0)*	I(1)	I(0)	I(1)
F-critical values	3.15	4.43	2.45	3.61	2.12	3.23
t-critical	-3.43	-4.99	-2.86	-4.38	-2.57	-4.04

*Accept if F < critical value for I(0) regressors; reject if F > critical value for I(1) regressors; accept if t > critical value for I(0) regressors; reject if t < critical value for I(1) regressors; ***, **denotes significance at 1% and 5% respectively.*

Source: Author's own computation

Table 7 indicates rejection of no cointegration since the calculated F- is greater than the upper bound critical values while the calculated t-value is smaller than the t-critical value for I(1) regressors at 1% and 5% respectively. Once the null hypothesis is rejected the long run ARDL error correction representation is estimated.

Table 8: Bounds F-test for cointegration; Equation 26)

Ho: no level relationship

Dependent variable	**Function**		**F-statistics**		**t-statics**	
GDP	$F(GDP/ED, HE, IE, EXP, SAV, INF, UN)$		6.093***		-5.023***	
Pesaran et al. (2001), p.300 Table CI (iii) Case III. K=7	**Asymptotic Critical Values**					
	1%		5%		10%	
	I(0)	I(1)	I*(0)*	I(1)	I(0)	I(1)
F-critical values	2.96	4.26	2.32	3.50	2.03	3.13
t-critical values	-3.43	-5.19	-2.86	-4.57	- 2.57	-4.23

*Accept if F < critical value for I(0) regressors; reject if F > critical value for I(1) regressors; accept if t > critical value for I(0) regressors; reject if t < critical value for I(1) regressors; *** denotes significance at 1% level.*

Source: Author's own computation using STATA

The null hypothesis of no level association in table 8 is rejected at at all significance level for the F-value.

Results for objective 1: Government expenditure and economic growth nexus

The standard granger causality method was used to determine the nexus between the two variables since they were found to be stationary. The equations were previously stated as follows:

$$GDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta GDP_{t-i} + \sum_{i=1}^{n} \alpha_{2i} \Delta \mathrm{A} GOVEXP_{t-i} + \varepsilon_t \quad (20)$$

$$AGOVEXP_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta \mathrm{A} GOVEXP_{t-i} + \sum_{i=1}^{n} \beta_{2i} \Delta GDP_{t-i} + v_t \quad (21)$$

Where GDP_t and GDP_{t-i} is present and past values of economic growth while $AGOVEXP_t$ and $AGOVEXP_{t-i}$ is the present and past values of government expenditure. The ε_t and v_t are the error terms. Table 9 gives the results.

Table 9: Granger causality Wald test:

Equation	Excluded	F	Df	df_r	Prob > F
Economic growth	Government expenditure	0.53682	1	47	0.4674
	ALL	0.53682	1	47	0.4674
Government expenditure	Economic growth	0.02185	1	47	0.8831
	All	0.02185	1	47	0.8831
$H0_1$: lagged value of aggregate government expenditure does not granger cause economic growth; $H0_2$: lagged value of economic growth does not granger cause aggregate government expenditure.					

Source: Author's own computation

The results demonstrate lack of a direct relationship between economic growth and government expenditure as confirmed by the probability of the F-statistics values that are greater than 5% critical values. The findings also show that government size is unrelated to economic expansion. The null hypotheses are therefore accepted in both scenarios.

Post-estimation

The study used langrage-multiplier to test for autocorrelation and the Eigenvalue to determine model stability.

Table 10: Langrage-Multiplier test for autocorrelation

Lag	chi2	Df	Pro>chi2
1	2.9556	4	0.56529
2	1.7029	4	0.79019
H0: no autocorrelation at lag order			

Source: Author's own computation using STATA

The null hypothesis in table 10 cannot be rejected as indicated by the probability of the chi square value which is greater than 0.05 hence no serial correlation. Model stability is given in figure 7 in which all the eigenvalues are inside the unit circle.

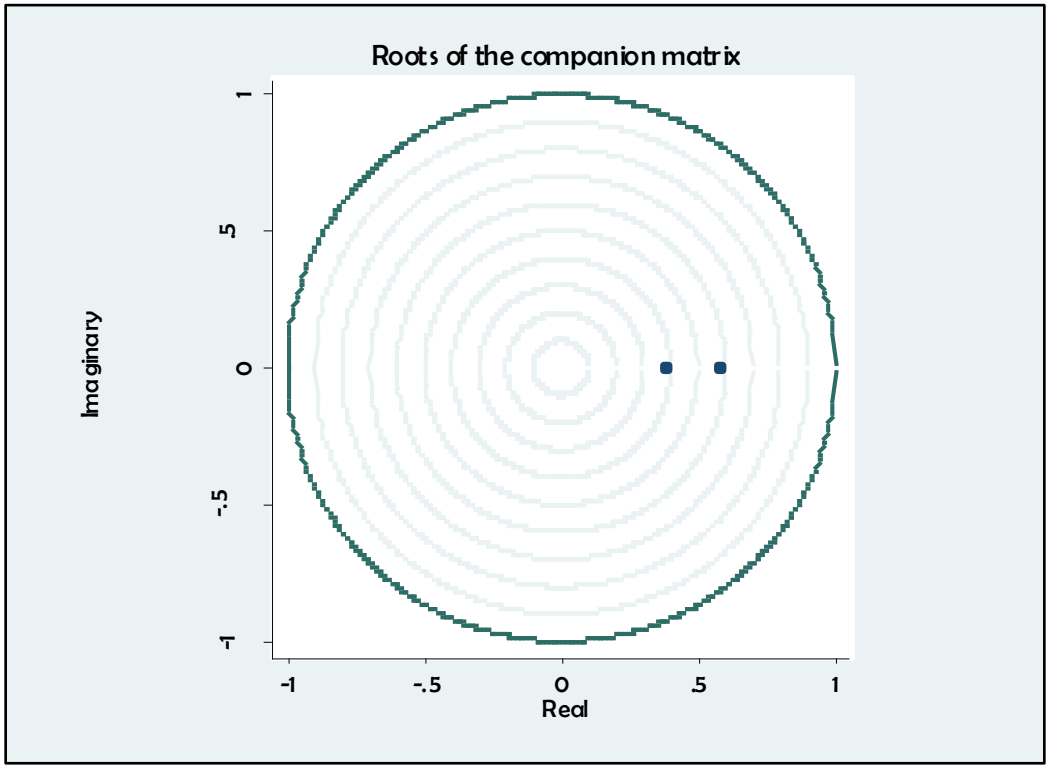


Figure 7: Stability condition

Results for objective 2: Effect of the composition of public spending on economic growth in Kenya

The second objective is to estimate ARDL-ECM model equations (27) for the development and current expenditure and (28) for education, health, infrastructure expenditures. The equations are given as

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i}\,\Delta GDP_{t-i} + \sum_{i=0}^{n} \alpha_{2i}\,\Delta CE_{t-i} + \sum_{i=0}^{n} \alpha_{3i}\Delta DE_{t-i} + \sum_{i=0}^{n} \alpha_{4i}\,\Delta SAV_{t-i} + \sum_{i=0}^{n} \alpha_{5i}\Delta INF_{t-i} + \sum_{i=0}^{n} \alpha_{6i}\Delta EXP_{t-i} + \sum_{i=0}^{n} \alpha_{7i}\Delta UN_{t-i} + \beta_1 GDP_{t-1} + \beta_2 CE_{t-1} + \beta_3 DE_{t-1} + \beta_4 SAV_{t-1} + \beta_5 INF_{t-1} + \beta_6 EXP_{t-1} + \beta_7 UN_{t-1} + \lambda_1 ECM_{t-1} + \varepsilon_t \quad (27)$$

$$\Delta GDP_t = \delta_0 + \sum_{i=1}^{n} \delta_{1i}\, \Delta GDP_{t-i} + \sum_{i=0}^{n} \delta_{2i}\, \Delta ED_{t-i} + \sum_{i=0}^{n} \delta_{3i} \Delta HE_{t-i} + \sum_{i=0}^{n} \delta_{4i}\, \Delta IE_{t-i}$$
$$+ \sum_{i=0}^{n} \delta_{5i} SAV_{t-1} + \sum_{i=0}^{n} \delta_{6i} \Delta INF_{t-i} + \sum_{i=0}^{n} \delta_{7i} \Delta EXP_{t-i} + \sum_{i=0}^{n} \delta_{8i} \Delta UN_{t-i}$$
$$+ \phi_1 GDP_{t-1} + \phi_2 ED_{t-1} + \phi_3 HE_{t-1} + \phi_4 IF_{t-1} + \phi_5 SAV_{t-1} + \phi_6 INF_{t-1}$$
$$+ \phi_7 EXP_{t-1} + \phi_8 UN_{t-1} + \lambda_2 ECM_{t-1} + \upsilon_t \qquad (28)$$

The results are presented in table 11 and 12.

Table 11: Regression results (Equation 27: Economic classification)

ARDL (1,1,1,1,1,1,1) regression
Sample: 1971 - 2020

Number of obs = 50
R-squared = 0.6945
Adj R-squared = 0.5842
Log likelihood = -92.216534
Root MSE = 1.8033

Dependent variable: D.GDP	**Coeff..**	**Std. Err.**	**T**	**P-values**
ECM-1	-0.850	0.140	-6.050	0.000***
Long run Coefficients				
Development expenditure	0.560	0.174	3.220	0.003***
Current Expenditure	-0.212	0.260	-0.820	0.420
Exports	0.200	0.113	1.770	0.085*
Savings	0.021	0.113	0.180	0.856
Inflation	-0.215	0.079	-2.710	0.010***
Unemployment	-0.943	0.269	-3.500	0.001***
Panel B: Short run Coefficients				
Development expenditure				
D1.	-0.128	0.125	-1.020	0.315
Current expenditure				
D1.	-0.386	0.354	-1.090	0.283
Exports				
D1.	-0.101	0.111	-0.910	0.368
Savings				
D1.	0.110	0.110	1.000	0.324
Inflation				
D1.	0.045	0.048	0.930	0.360
Unemployment				
D1.	0.750	0.277	2.710	0.010***
constant	2.837	3.956	0.720	0.478

Diagnostics

Durbin-Watson d-statistic	(14, 50) = 2.122052		
Breusch-Godfrey LM test for autocorrelation:	chi 2	df	Prob > chi2
	1.080	1	0.2988
Ramsey RESET	F(3, 33) = 0.14		
	Prob > F = 0.9370		
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity:	chi2(1) = 0.04		
	Prob >ch2 = 0.8466		

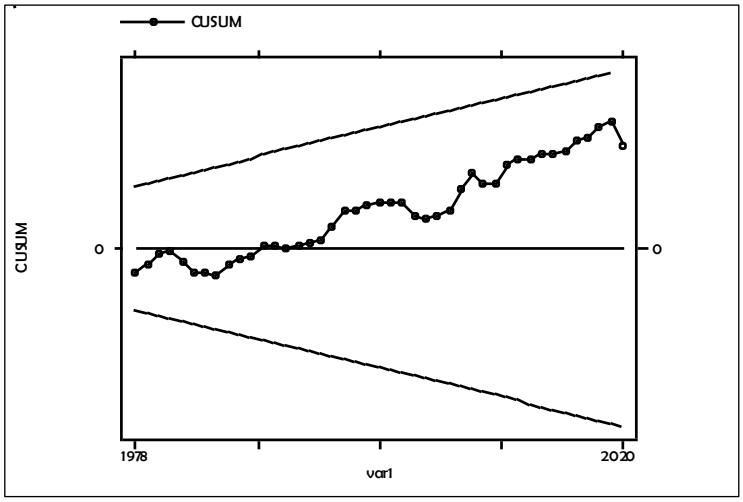
Source: Author's own computation using stata; ***p<0.01,*p<0.1

The results in table 11 show that 69 percent of the fluctuation in economic growth is determined by the development and current expenditure, alongside other explanatory variables exports, savings, inflation, and unemployment. According to the predicted long-run coefficients in panel A, current spending is insignificant in explaining economic growth, whereas development spending does since it is significant. Exports, inflation, and unemployment rates explain changes in economic growth because they are significant, whereas domestic savings has no impact on it. The panel B error correction results show that all variables are inconsequential, with the exception of unemployment. The long-term outcomes demonstrate a positive and significant coefficient of development spending which suggests that increasing development expenditure by one percent boosts economic growth by 0.56 percent.

The exports coefficient is significant and positive, which means that increasing export by a percentage point economic growth increases by 0.2 percent. Additionally, the inflation coefficient is negative and significant indicating that increasing inflation by 1 percent leads to a decline in economic growth by 0.22 percent. Additionally, a one percent increase in the unemployment rate slows economic growth by 0.943 percent over the long term.

The short run economic growth dynamics show that only the unemployment is significant. A one percent change in unemployment increases economic growth by 0.750 percent. The ECM-1 is significant at 1%. The error correction term coefficient of 0.85 suggests a moderate pace of adjustment to the equilibrium at 85 percent in case of a previous period's shock to the economic growth.

In the post-estimation diagnostic tests, the Durbin Watson statistics of 2.122 shows no serial correlation, which is supported by the Breusch-Godfrey outcome of 0.2988. Similarly, the results show there is no omitted variable and the model does not suffer from heteroscedasticity. The CUSUM and CUSUMSQ plots in figure 8 indicate that the model is stable.



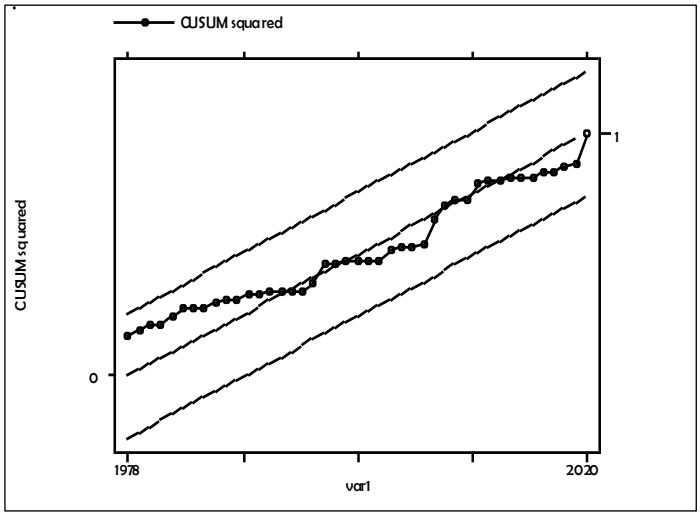


Figure 8: CUSUM and CUSUMSQ

Table 12: Regression results (Equation 28: Functional classification)

ARDL(1,1,1,1,1,1,1,1) regression
Model: ARDL-EC
Sample: 1971 - 2020 Number of obs = 50
R-squared = 0.6847
Adj R-squared = 0.5456
Log likelihood = -93.00912 Root MSE = 1.8853

Dependent variable: D.GDP	**Coef.**	**Std.Err.**	**T**	**P-values**
ECM-1	-0.788	0.143	-5.52	0.000***
Long run Coefficients				
Education expenditure	0.201	0.165	1.220	0.231
Health expenditure	0.162	0.931	0.170	0.863
Infrastructure expenditure	0.660	0.291	2.270	0.030**
Exports	0.261	0.158	1.660	0.107
Savings	0.449	0.161	2.800	0.008***
Inflation	-0.327	0.102	-3.210	0.003***
Unemployment	-0.732	0.368	-1.990	0.055*
Short run Coefficients				
Education expenditure				
D1.	-0.139	0.208	-0.670	0.508
Health expenditure				
D1.	-0.214	0.914	-0.230	0.816
Infrastructure expenditure				
D1.	-0.400	0.339	-1.180	0.247
Exports				
D1.	-0.093	0.121	-0.770	0.447
Savings				
D1.	-0.067	0.119	-0.570	0.574
Inflation				
D1.	0.080	0.061	1.320	0.196
Unemployment				
D1.	0.659	0.345	1.910	0.065*
Constant	-4.054	8.337	-0.490	0.630

Source: Author's own computation; ***p<0.01, **p<0.05, *p<0.1

Post estimation diagnostics

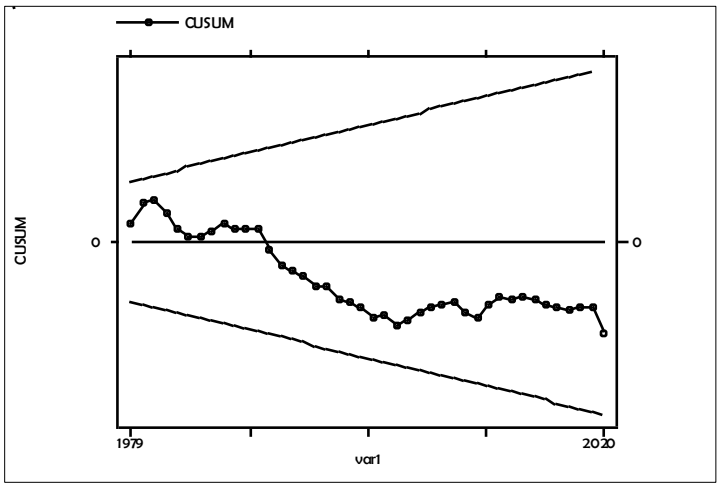
Durbin-Watson d-statistic	(14, 50) = 1.961642
Breusch-Godfrey LM test for autocorrelation	chi 2 df Prob > chi2 0.529 1 0.4670
Ramsey RESET	F(3, 31) = 0.57 Prob > F = 0.6377
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	chi2(1) = 0.01 Prob >chi2 = 0.9389

Source: Author's own computation using STATA

The estimated long run regression results in table 12 show that education, health expenditure and exports have positive but insignificant effect on economic growth. Infrastructure, domestic savings, inflation and unemployment are significant. Increasing infrastructure spending by one percent will result in 0.66 percent increase in economic growth. Similarly, increasing savings by one percent will result in 0.449 increases in economic growth. Inflation and unemployment have negative effect in the long run.

The short-term results show that spending on infrastructure, health care, and education have negative and insignificant impact on economic growth. Exports, savings, and inflation were also found to be non-significant factors. However, unemployment has a favorable impact on economic growth in the short term. In contrast to economic theory, an increase in the unemployment rate resulted in an increase in economic growth of 0.659 percent. A moderate rate of adjustment to the equilibrium at 78.8 percent is shown by the (ECM-1) coefficient.

All the post-estimation tests in table 12 show the model is free from serial correction as given by the Durbin Watson statistics of 1.961642 and Breusch-Godfrey test results of 0.4670. The Ramsey reset test shows the model has no omitted variable. The model is also stable as given by the CUSUM and CUSUMSQ plots in figure 9.



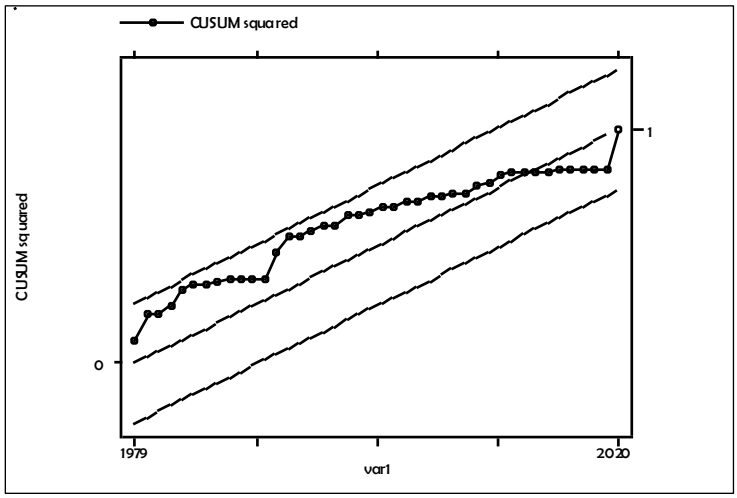


Figure 9: CUSUM and CUSUMSQ

2.4.4 Discussion of the Results

Since the probability of the F-statistics values were found to be greater than 5 percent crucial values, the granger causality suggested absence of causality from either economic growth or government expenditure. The results demonstrate that government size is unrelated to economic expansion. The empirical findings are at odds with those of Katrakilidis and Tsaliki (2009), who established a long-term link between the two variables. The long- run findings in Table 11 show that investing on development promotes economic growth. This emulates the theoretical claim that capital formation is essential in the production, which explains its favorable correlation with economic growth.

The outcome demonstrates a negative but insignificant current expenditure coefficient indicating that increasing the resources allocated to support current spending will be bad for Kenyan economic growth. The conclusion was also supported by (Hokmeng and Moolio, 2015). Essentially, current spending is ineffective, and, therefore more resources should be go to financing development (Barro, 1990; Rebelo et al, 1988). However, the conclusions are at odds

with empirical research by Al-fawaz (2015), whose results showed that current spending encourages economic growth.

The study also established that in the long run, education and health expenditure are insignificant. However, their positive coefficients show that health and education enhances human capital which in turn improves economic (Fauzel et al., 2015). The conclusion is backed by the theoretical premise that investing in education promotes human capital development and it increases workers' productivity (Lucas, 1988; Seetanah et al., 2015).

The findings showed that a one percent increase in expenditure directed towards infrastructure increases economic growth by 0.66 percent. The positive contribution of infrastructure spending to economic growth supports the argument that governments must invest in infrastructure networks if they want to experience sustainable economic growth. Infrastructure improvement lowers transportation costs and boost productivity in the private sector (Aschauer, 1989)

The results also indicated exports are important in explaining economic growth. Embracing trade liberalization has the potential of creating new markets for domestic exports thereby raising the production capacity of manufactured and other related exports. Macroeconomic stability as captured by the negative sign on inflation variable is harmful to economic growth. High inflation affects other macroeconomic variables for example exchange and interest rates which in turn affect economic growth through price changes.

Domestic saving is positive and significant. This confirms the important role played by domestic resource mobilization in financing development activities meant to increase the economy's production capacity. The findings indicated that increasing domestic saving by one percent causes economic growth to increase by 0.449 percent. The negative effect of unemployment is

partly attributed to the increasing youth unemployment in Kenya. In addition, Kenya being abundant labor, country increases in the unskilled and low productivity labor force is unlikely to cause significant increases in output growth. Failure for many educated and skilled youth to find meaningful employment has had negative consequences on economic growth due to lost productivity.

2.5 Conclusions and Policy Implications

2.5.1 Conclusions

The essay determined the impact of government spending on Kenya's economic growth. The Granger results indicated neither economic growth nor government spending had a causal effect indicating that there is no direct relationship between economic growth and government size as measured by total expenditure outlays. The empirical findings from ARDL modeling of the economic growth effect showed that while development expenditure had a short-term negative impact, its long term effect is positive. Expenditures on current, education and health had insignificant effect on economic growth.

The positive effect of infrastructure expenditure implies that capital formation is a key production component. This gives a clear evidence of the potential that capital investment would have in accelerating economic performance. Unemployment had a negative long run growth effect indicating the rate of unemployment is unlikely to increase output level. The results also showed that savings, as a way of domestic resource mobilizations including exports are important in promoting economic growth while inflation impacts economic growth negatively.

2.5.2 Policy Implications

The ARDL regression results showed that infrastructure spending encourages economic expansion. The positive coefficient of infrastructure spending shows that increasing resources allocated to the infrastructure growth improves Kenya's economic growth. Additionally, reducing the transportation costs will raise productivity of the private sector. Despite the insignificant effect of education expenditure, the government may explore boosting resources allocated to the sector and pursuing strategies that would increase the sector's efficiency for the development of skills and human capital.

In order to achieve development objectives like reducing unemployment and poverty, capital formation is absolutely essential. As a result, policies should be created that will increase public investment in order to increase domestic enterprises' productivity. The government should in this case ensure most of the resources are used for investment rather than consumption expenditures.

Consequently, policymakers should seek to improve the quality of investment, particularly, on physical infrastructure in order to attract additional foreign direct investment (FDI) which can foster positive economic growth.

The economic effect of health spending was ambiguous. This outcome is contrary to the expectation that health is very critical for human productivity. In order to improve people's health and decrease mortality rate, the government should put in place mechanisms to ensure resources allotted to the health sector are used wisely.

In addition, there is a need for the government to strengthen measures and create decent employment opportunities for the growing number of unemployed persons to minimize the negative effects of unemployment. In this regard, the government could emphasize on work-

related training to improve the skills of unemployed youth. In addition, the government should consider improving outcomes for youth through suitable youth employment and social policies that are important to support economic growth.

Exports were also found to be important component in promoting economic growth. The government could consider a review of trade regulatory policies to support market openness thereby promoting economic growth. The empirical results also indicated domestic savings are associated with increased economic growth. Savings may cause an inflow of foreign capital and importation of equipment that are used in private sector production and thus increases the overall level of the country's GDP growth.

To promote public saving policymakers could focus on fiscal consolidation and reforms including ensuring the efficiency of public enterprises. Private savings could also be enhanced through increased investment in infrastructure and reduced regulatory requirement for small enterprises. These measures could possibly lead to domestic resource mobilization that could be directed to investments thereby enhancing the economy's future production capacity.

2.5.3 Limitations of the Study

This study used health and education expenditures measured as a proportion of GDP. The study could not, therefore, determine the share of the recurrent or development expenditures in these sectors. Moreover, data on recurrent or development spending on either education or health was not available. The second limitation of this study is that data on infrastructure was derived from the shares of government spending on energy, transport and communication spending only. Whereas there are, other infrastructure components, government expenditure on the sectors used to aggregate infrastructure variable directly affects the economy. Despite these limitations, the study was guided by theory and used the recommended data measurements to present the results without compromising on the quality.

2.5.4 Suggestions for further Research

.One possible way to extend the research is by using sectoral data disaggregated into recurrent and development expenditures. This would possibly provide further evidence on the contribution of education and health expenditures to economic growth based on the shares of recurrent and development expenditures of the sectors. Another possible way in which the study can be extended is by utilizing government expenditures on other infrastructure components instead of relying on the mainstream capital overheads. For example, the share of government spending on provision of water would be of great importance in determining its effect in the economy.

CHAPTER THREE:

EFFECT OF PUBLIC INVESTMENT ON PRIVATE INVESTMENT IN KENYA

3.1 Background

The main driver of sustainable development in any economy is the private sector investment (Forni and Sessa, 2009). Studies have also revealed that growth driven by the private sector rather than the state sector has more positive impact to the economy (Levine and Renelt, 1992). This assertion is premised on the private sector efficiency in resource utilization compared to the public sector, something which has led to the development of public policies to increase private investment (Hermes and Lensink, 2001).

However, it is still unclear how public investment affects private investment (Karagol and Ozdemir, 2006). In addition, research on how government spending affects private investment, particularly in developing nations, has become a hot topic in policy discussions (Mallick, 2019; Ahmad et al, 2009). Infrastructure spending encourages private investment (Zou, 2006; Mohanty, 2020). Even so, economic literature suggests that excessive government borrowing substitute private investment eventually crowding it (Mallick, 2019).

The economic theory about public and private investment gives inconsistent and mixed results as to whether the former compliments or crowds-out the latter (Mallick, et al., 2018). Investment is important because it boosts technological development and the adoption of new practices that foster industrial expansion, which enhances the economy's capacity for production (Ahmad *et al*., 2008). Several factors determine investment and that during business cycle; the investment volatility is a significant factor that causes fluctuation of GDP (Thirlwall, 2015; Dornbush, 1999). The classical economists believed that market forces alone may bring about national

wealth and prosperity, negating the need for government intervention in the economy. On the other hand, Keynes (1936) argued for governmental involvement to control society's saving and investing habits.

Several mechanisms have also been identified by which public investment may influence private investment. For example, development investment influences private investment positively through a reduction in production cost (Rahman et al., 2016). Infrastructure related investment complements private investment and improves productivity. This, therefore, increases the demand for output and other related services, which in turn supports resource availability by increasing total output and saving (Mallick et al., 2018; Rahman et al., 2016).

In addition, government consumption spending boosts aggregate demand which benefits private investment, but it has a negative impact on investment due to rising budget deficits (Alfred and Sagales, 2001). Moreover, the source of financing public investment whether by the use taxes or debt also reduce the available resources to the private sector (Khan, 2022; Obeng et al., 2018; Aswata et al., 2018; Mallick, 2006; Nyamongo *et al*., 2012).

Public capital spending is important because it lowers transport costs and plays a critical role in increasing private returns. In this view, public capital increases the output generated by the private factors and in so doing affects growth significantly (Fujita and Thisse, 2002). However, the private sector will be crowded out if the government resorts to heavy domestic borrowing. In the end the effect will depend on strength of the opposite forces hence it is not impossible to guarantee their substitutability or complementarity (Mallick *et al*,.2018).

Private investment enhances the overall macroeconomic development in an economy (Mbaye, 2014). Increasing the share of the private investment is poised to cause increase in economic growth and employment (Tyce, 2020). To restrain government expenditure and lower the budget deficit, policymaker have pursued fiscal consolidation strategies which have sparked discussion over the role that public investment plays in encouraging or crowding out the private sector (Thanh,*et.al.*, 2020). This is due to the possibility that public expenditure depletes resources available for private sector investment, raising interest rates in the process and lowering overall levels of private investment. Private investment has been erratic in Kenya throughout the years. Public investment was 24 and 15 percent in 1970 and 2020 in that order while during the same period; private investment was 4 percent and 14 percent respectively.

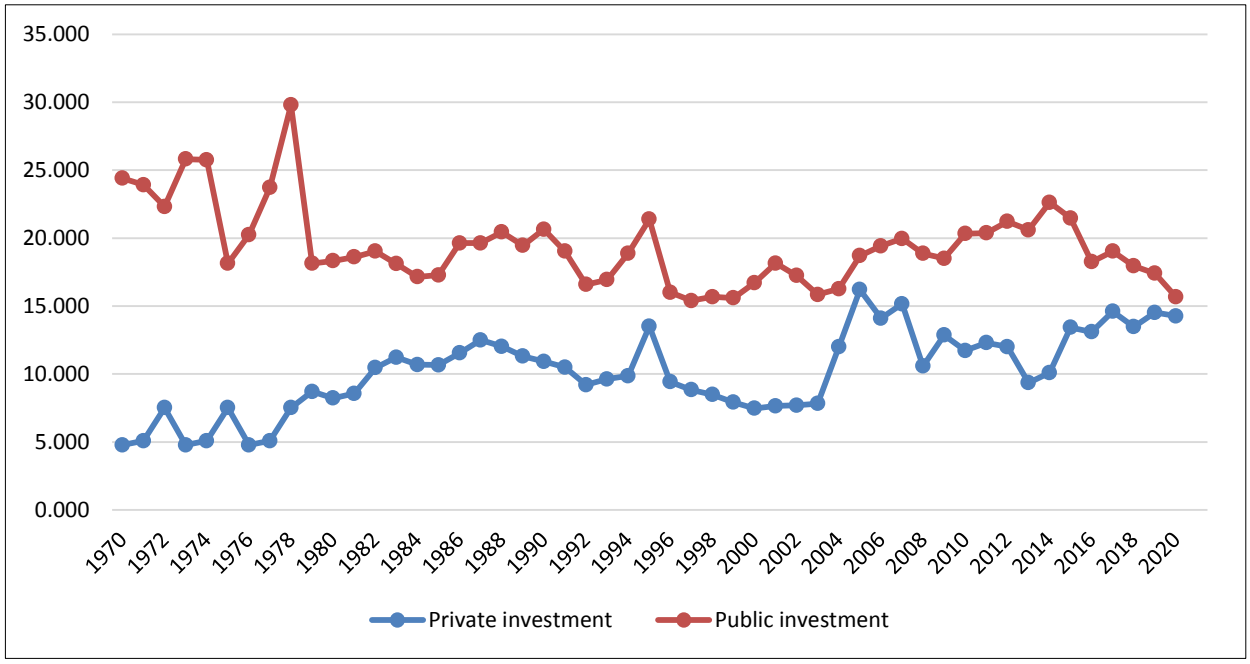


Figure 10: Public and Private Investment (1970-2020)
Source: Author's computation

Towards the end of 1990 and early 2000, there was a sharp decline in private investment attributed to unfavorable event that affected private investment negatively. The political

polarization of 1997 made the investment environment unfavorable and most of the investors relocated to other countries. In addition, the El- Nino rains of 1997 caused destruction of major infrastructure affecting the provision of essential services like power, transport and communication network (Republic of Kenya, 2003).

Upward trends were again experienced in 2003 with public investment increasing while private investment fluctuated downward from one period to another an indication of a possible crowding-out effect. Public investment showed a downward trend from 2014 to 2020 while private investment indicated upward trend over the same period. Private investment is also influenced by efficient financial sector through the mechanism of transforming deposits into financial assets (Hamida and Aziz, 2019).

Private sector development is reflected in the growth of credit from the financial institutions (Cecchetti et al., 2011). The financial institutions provide credit to the investors thus enhancing private sector investment (Agénor and Montiel, 2015). Figure 11 provides the trends of domestic credit from 1970 to 2020.

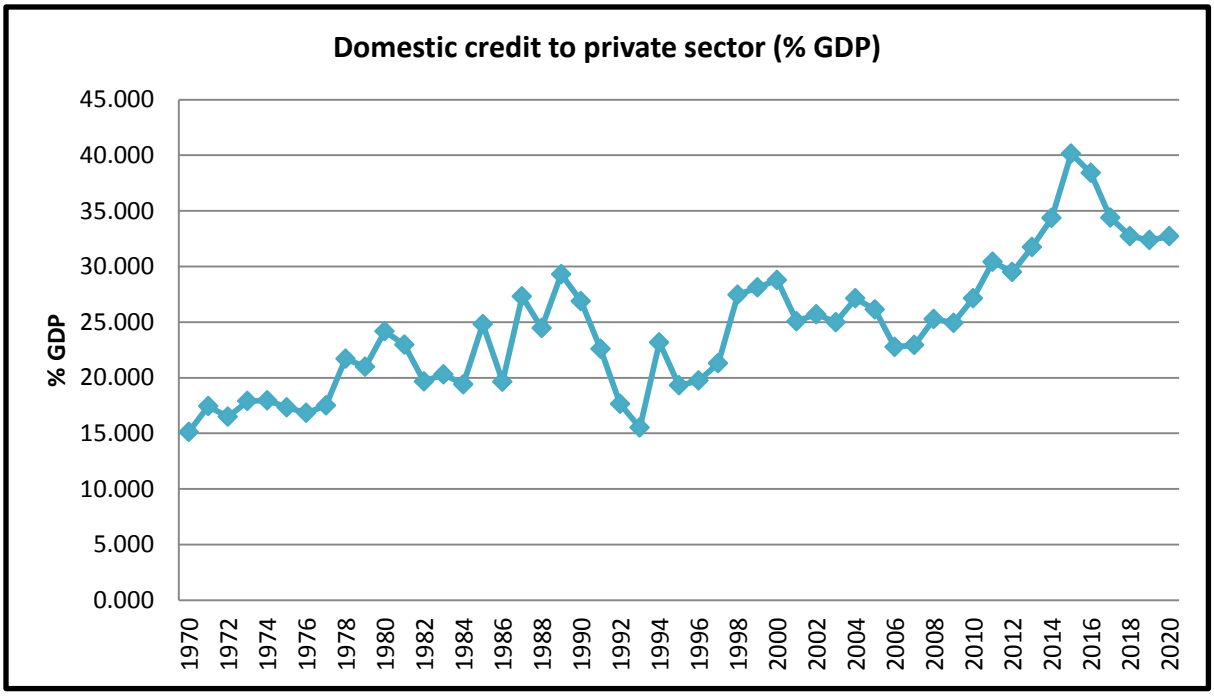


Figure 11: Trend of domestic credit to private sector
source: Author's own computation

Domestic credit rose from 17 percent in 1970 to 29 percent in 1989 mainly due to increased commercial banks liquidity ratios. Between 1991 and 1993, the domestic credit declined to about 15 percent due to quantitative credit controls introduced on commercial banks and the cash ratio requirement of 6 percent which caused commercial banks to cut back lending to the private investors (Republic of Kenya, 1994).

Between 1995 and 2012 domestic credit was, however, unstable with an average of 25 percent. This was mainly due to a number of challenges that included high inflation and the "twin crisis" comprising of the ripple effects of the global financial crisis and the Eurozone crisis (Republic of Kenya, 2012). The increase in credit to the national government led to a rise in domestic credit between 2014 and 2015. The reversal or removal of interest rate capping in 2019 led to a decline in domestic credit. Figure 12 gives interest rate trends from 1970 to 2020.

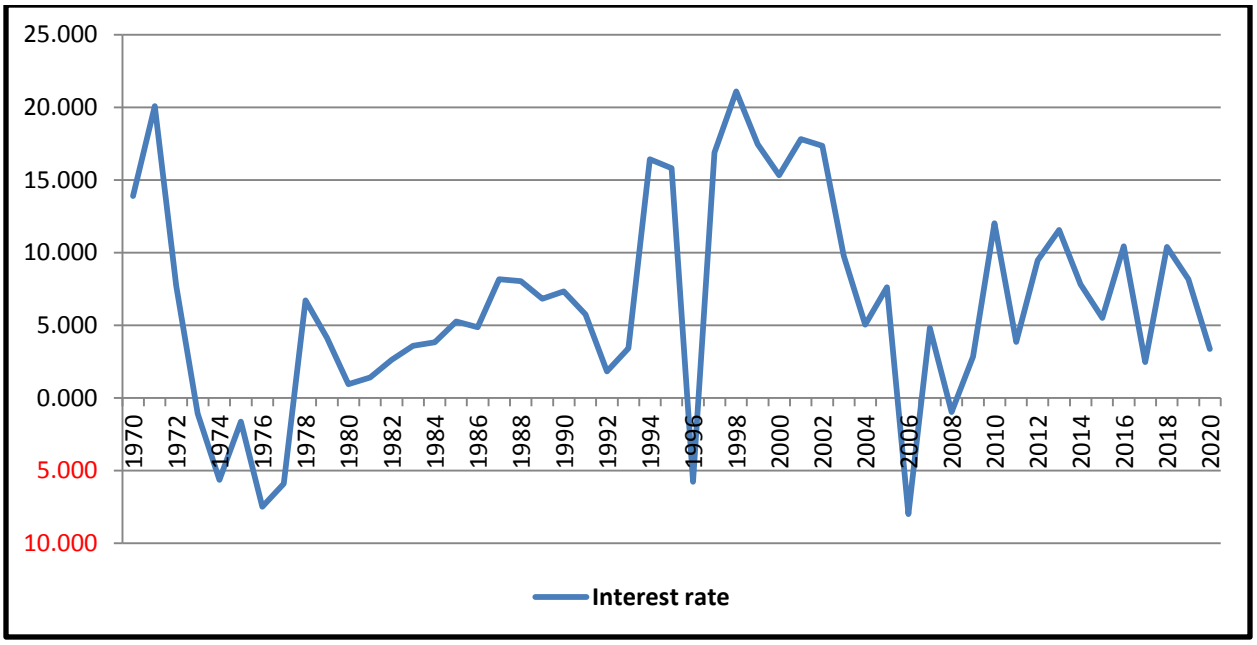


Figure 12: Trend of interest rate
Source: Author's own computation

The interest rate averaged 6.5 percent from 1970 to 2020. The interest recorded an all-time high in 1971 and 1998 at 20.1 and 21.1 percent respectively due increased government borrowing to meet the budget deficit. Despite the government effort to allocate substantial resources for public capital formation, which should ultimately complement private investment, this has not been forthcoming. Further, the public sector investment and its impact to the private sector has not received much attention in Kenya.

3.1.1 Statement of the Problem

Public investment largely influences the socio-economic development of a country despite inefficiency concerns. A strong private sector would cause growth of the economy due to the efficient management of the resources compared to an economy dominated by the public sector. Nevertheless, public spending patterns influence the economic activities such as social welfare dynamics of a country. Public investment enhances private investment by providing supporting

infrastructure and other complementary services needed for private investment to thrive (Agénor and Montiel, 2015). However, high levels of government activities curtail or could replace private investment due to the competition for the scarce financial resources in the economy (Abbas et al., 2022).

Private investment in Kenya is characterized by unsteady trend. Private investment averaged 10.6 percent of GDP from 1970 to 2020, whereas public investment increased to roughly 19.5 percent of GDP during that time. Numerous empirical studies have been conducted on the topical issue albeit mixed results. A number of studies established that public investment crowds out private investment (Nguyen and Trinh, 2018; Mohanty, 2019; Singh 1992; Kochin, 1974; Cebula, 1978; Feldstein, 1980; Karras, 1994. Other studies have examined output growth arising from public investment (Hong and Ahmed, 2009; Ahmed and Qayyum, 2007).

Previous studies in Kenya have also provided inconclusive results regarding public and private investment linkages (Mbaye, 2014; Nyang'aya, 2019; Wawire et al.,, 2014). The key observation from these studies is that the findings differ significantly from each other due data and the methodology used for the analysis. This study uses a longer period and a recent time series data covering 1970 to 2020 to contribute to the existing literature. It also employs a robust methodology for the analysis as opposed to the previous studies.

3.1.2 Research Questions

i. What is the effect of public investment on private investment in Kenya?

ii. Does public investment complement private investment in Kenya?

3.1.3 Research objectives

(i) To analyze the effect of public investment on private investment in Kenya.

(ii) To determine whether public investment complements private investment in Kenya.

3.1.4 Significance of the study

First, the complementarity of the two investments is important from a policy perspective since it has a bearing on a number of macroeconomic indicators in the economy and therefore, the finding provides useful information about government investment interventions. This is important because it will assist policymakers to pursue optimal public investment policies that would influence private investment positively.

Secondly, the theoretical framework is founded on the flexible accelerator framework to effectively capture the interaction between the two types of investment. Thirdly, in addition to using VECM model that gives robust results to cointegrating variables, the study will establish the strength of shocks to the private investment attributed to the other macroeconomic variables and their relevance in explaining private investment in Kenya.

3.2 Literature review

3.2.1 Theoretical Literature

The mechanisms by which investment occurs in an economy are explained by a number of hypotheses that have developed over time. Keynes (1936) argues that the driver of investment is the anticipated returns investors expect from new investment. Keynes also argued that investment fluctuates due to shifts in demand curve and not its movement. The investment may be volatile since it depends in part on the firm's expectations of the profits the investment would provide, which is a compelling argument for how the business cycle is explained.

The Keynesian method is followed by the accelerator theory of investment, which maintains the fixed-price supposition. Samuelson (1939) applied the principle of acceleration by postulating a linear correlation between investment and output. The theory assumes that investment is enough to maintain the equality of actual and the required capital stock.

Tobin (1969) Q-theory of investment is one of the longstanding theories of investing. Investments are made, according to Tobin, up to the point where the value of the investment is the same as the cost of replacing it. The main tenet of Q-theory is that it emphasizes measuring changes in capital stock. Tobin also proposed that a firm's investment level is determined by Tobin's q, a ratio between the installed capital's current worth and its replacement cost. Additionally, firms' capital stocks will rise if q is greater than one and fall if q is lower. A higher marginal return than the marginal cost implies investment is worth undertaking. If $q>1$, businesses invest more in capital goods because they anticipate making more money which raises the overall investment level. If $q<1$, firms will try to cut back on planned investments since the expenditure incurred is more than the present value of the earnings they will make from additional investment.

Jorgenson's (1963) macroeconomic theory of investment is based on the optimization problem for a firm's profits which is stated as;

$$Y(t) = AK^{\alpha}L^{1-\alpha}$$

The representative firm aims to maximize profit, which depends on capital, output and labor costs. This theory's fundamental premise is K(t) adjusts to K*(t), which implies that capital is immediately adjusted to the appropriate capital stock. According to Jorgenson's (1963) theory of investment, a corporation would behave optimally in terms of investments when it can quickly adjust its capital stock to stay on the right course.

There are several avenues that link public and private investment (Batool and Godlman, 2021). Public investment, according to Erenburg and Wohar (1995), raises national output, which improves the economy's physical and financial resources. A decrease in the cost of manufacturing may result from investments in physical infrastructure including roads, railways, energy, and water systems.

Other significant theories that attempt to elucidate the behavior of private investment are the crowding in and crowding out hypotheses. According to the crowding out theory, the short run disequilibrium in the economy occurs due to the imbalance between aggregate demand and supply which lead to underemployment of output (Shvets, 2020; Sørensen and Whitta-Jacobsen, 2010). The theory also claims that because of the extra capacity the interest rate affects both savings and investment (Sineviciene and Vasiliauskaite, 2012).

In light of this, an expansionary fiscal policy, such as a tax cut, will increase income for individuals and, as a result, encourage private sector investment, which in turn will increase income. According to Keynes, the fiscal multiplier effect will likely cause expansionary fiscal

policy which will boost the private sector market and its products (Sineviciene and Vasiliauskaite, 2012; Gerrard, 1996).

The view of the crowding out hypothesis is that when the economy is in full employment in the long run, the interest rate influences savings and investment (Sineviciene and Vasiliauskaite, 2012). According to this theory, increased government participation in the economy through expansionary fiscal policy will increase domestic borrowing to fund budget deficits. Thus, interest rate will rise and the firms' after tax profit income and profits will decline. In this regard, the positive impact of government intervention will be temporary and its fiscal policy ineffective (Mohanty, 2019; Gerrard, 1996).

3.2.2 Empirical Literature

Using a panel data from 1980 to 1997, Erden and Holcombe (2006) examined the causal link between public and private investment using the cointegration approach. The findings indicated that government investment programmes influences private investment.

Fatima and Waheed (2011) sought to examine how Private investment in Pakistan was influenced by government expenditure among other macroeconomic factors. The findings showed that although government purchases hindered private investment, development expenditures boosted it. Additionally, it was clear from the findings that uncertainty in an economy resulted in macroeconomic instability, which lowers private investment.

Bucci and Del Bo (2012) analyzed how public capital effects economic growth in endogenous growth framework. In the analysis, government expenditure considered to be productive was specified as stock-variable while public capital was partly used as a factor of production to produce output. The results indicated that given the degree of complementarity government expenditure impacts economic growth positively.

Munthali (2012) tested the crowding in-out hypothesis by conducting a dynamic panel analysis linking governmental and private investment using South African data. The empirical result did not support the evidence of crowding-in. However, the study did reveal that uncertainty and a lack of capital were the primary obstacles to South Africa's private investment.

Celebi and Akkina (2002) analyzed the determinants of private investment and whether there was any relationship regarding public and private capital using VAR model. The results supported the crowding-out hypothesis.

Using the vector autoregressive approach, Wawire et al. (2014) analyzed the private investment-expenditure nexus in Kenya from 1963 to 2012. The findings showed consumption and expenditure spurs private investment. The findings also demonstrated reforms to public spending discouraged activities in the private sector.

Using the Johansen Cointegration approach, Hassan and Salim (2011) evaluated the factors influencing private investment in Bangladesh. The flexible accelerator theory was confirmed by the empirical findings. The outcomes also showed that national income had a long-term impact. The empirical results revealed that whereas using monetary policy during a recession was ineffective, government spending was a viable instrument to lift the economy out of a slump.

Omojalaibi et al. (2016) used annual data from 1993 to 2014 to investigate how fiscal policy affects investment in West African nations. Fixed effect modeling and the method of ordinary least squares were used in the investigation. The findings indicated there was a considerable crowding in effect on government capital spending. The findings also demonstrated that private investment was pushed out by non-tax earnings and recurrent expenses. Across all of the nations, the accelerator effect on output growth was negligible.

Ahmed and Miller (2000) Ahmed and Miller (2000) investigated how government spending affected private investment. The study focused on government budget constraints and its effects on private. The results showed that government expenditure affects private investment positively. Specifically, it was evident that expenditures on social security worsened private investment. Further, the results revealed crowding out effect was more significant among the sample of the developing countries.

3.2.3 Overview of the Literature

The literature review point to a number of controversies. Some of the studies show positive relationship (example; Ahmed and Qayyum, 2007; Erden and Holcombe, 2006), while other studies support crowding-out hypothesis (Celebi and Akkina, 2002; Munthali, 2012; Leopodis, 2001). In addition, other studies found mixed results of crowding in/out (Omojalaibi et.al, 2016).

The strength of this study is that it incorporates a number of key macroeconomic variables expected to influence private investment in Kenya. Moreover, few studies have been done in Kenya on the issue. The existing studies in Kenya (Mbaye, 2014; Nyang'aya, 2017; Wawire et al., 2014; Tyce, 2014) give mixed results. Therefore, this study contributes to the ongoing debate by providing empirical evidence in Kenya using a longer period time series data and a robust estimation methodology.

3.3 Theoretical Framework

The modified flexible accelerator model developed by Blejer and Khan (1984) serves as the foundation for this study as opposed to the neoclassical investment model of Jorgenson (1967) and Hall et al., (1977). The model expresses the functional relationship between public policy instruments, in this case public investment and private capital accumulation. According to the model, the expected output Y, which relies on the level of capital, is:

$$K^*_{pt} = \alpha Y^e_t, \quad (3.1)$$

Where K^*_{pt} is optimal private sector capital stock in period *t*, while αY^e_t, is expected output. However, installation of new capital would take time, and, therefore, to address the adjustment process we introduced an adjustment cost function as follows:

$$\beta(K_{pt} - K^*_{pt})^2 + (1-\beta)(K_{pt} - K_{p,t-1})^2 \quad (3.2)$$

K_{pt} is private capital stock. In equation equation (3.2), the first term depicts the disequilibrium cost, whereas the second term indicates the adjustment cost. The disequilibrium cost is minimized with respect to K_{pt} to derive adjustment equation (3.3) given as follows:

$$K_{pt} - K_{pt-1} = \beta\left(K^*_{pt} - K_{pt-1}\right)\ 0 \leq \beta \leq 1 \quad (3.3)$$

where β =adjustment coefficient.

Equation (3.3) indicates adjustment between required stock of capital in time *t* and the previous one. This study used gross private investment expressed as:

$$PI_t = \left(K_{pt} - K_{pt-1}\right) + \delta K_{pt-1} \quad (3.4)$$

δ= Depreciation rate

PI = Gross private investment

Rearranging equation (3.4) gives (3.5)

$$PI_t = [1 - (1 - \delta)L]K_{pt} \quad (3.5)$$

The capital adjustment is specified as:

$$PI_t = PI_{t-1} = \beta(PI^*_t - PI_{t-1}) \quad (3.6)$$

The core of this study's contribution is Equation (3.6) which is modified by assuming that public investment affects the short term adjustment of the existing private investment.

Thus, β is stated as:

$$\beta = \alpha_0 + [1/(PI^*_t - PI_{t-1})](\gamma_1 GI_t + \gamma_2 X_t) \quad (3.7)$$

Where, α_0= Constant

GI=Gross public investment

X_t=Other macroeconomic factors.

Plugging (3.7) into (3.6) and rearranging gives equation (3.8) as:

$$PI_t - PI_{t-1} = \alpha_0(PI^*_t - PI_{t-1}) + \gamma_1 GI_t + \gamma_2 X_t \quad (3.8)$$

The steady state of equation (3.4) is given as:

$$PI^*_t = [1 - (1 - \delta)L]K^*_{pt} \quad (3.9)$$

Putting (3.1) into (3.9) and then what we get put it into (3.8) gives (3.10).

$$PI_t = a_0[(1 - \delta)L]\alpha Y^e_t + \gamma_1 GI_t + \gamma_2 X_t + (1 - a_0) + PI_{t-1} + \varepsilon_t \quad \text{……..…….. ..(3.10)}$$

The coefficient Y^ecaptures the accelerator effect. Equation (3.10) is a reduced-form gross private investment.

3.3.1 Empirical model specification

In this study, crowding out occurs indirectly through the rate of adjustment rather than directly by altering the targeted real private investment level. Interest rate also influences private investment through credit cost adjustments (Laopodis, 2001). Private consumption has an impact on domestic private investment through increased purchasing power brought on by an increase in household demand for commodities. Exchange rate policies affect private capital inflow by increasing or decreasing funds availability to the private sector (Blejer and Khan 1984). The estimated equation is given as follows based on the aforementioned justifications and taking into account the previously mentioned macroeconomic variables:

$$PI=f(GI, RIR, EXR, PC) \quad (3.11)$$

Where,

PI = Private fixed investment

GI=Government investment

RIR=Real interest rate

PC = Private consumption

EXR= Effective exchange rate

3.3.2 Estimation methodology

The reviewed literature showed that public investment is not the only variable that may influence private investment but also other macroeconomic indicators could also have a bearing on private investment. Both economic theory and empirical evidence fall short of providing adequate and clear information about private and public investment interaction. Given this shortcoming, this study applied VECM in line with Sims (1972) and Sims (1980). The justification for using VECM is that all variables are considered endogenous. Secondly, the model shows how the

variables gradually evolve from their common starting point in time (Verbeck, 2000; Wesselhoft, 2013).

The starting point of VECM is a general VAR model with p number of lags. A VAR(p) with exogenous variables X is expressed as;

$$Y_t = X_0 + A_1 Y_{t-1} + \cdots + A_p Y_{t-p} + B_0 X_t + B_1 X_{t-1} + \cdots + B_s X_{t-s} + \varepsilon_t \qquad (3.12)$$

Where;

Y_t= vector of *K* variables

X_t= exogenous parameters.

If the VAR is stable, it is represented as a moving average as follows:

$$y_t = \mu + \sum_{i=0}^{\infty} D_i X_{t-i} + \sum_{i=0}^{\infty} \emptyset_i \mu_{t-i} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (3.13)$$

Equation (3.13) is a type of VAR represented as vector moving average (VMA where all the past values of y_t are substituted out. Matrix D_i is a dynamic multiplier function. The coefficient $\emptyset_i$ is the impulse-response functions (IRFs) at horizon *i*. Other diagnostic tests such as residual autocorrelation and normality test were conducted to ensure the VAR model is stable. The estimation of parameters using VAR model presupposes the variables are I(0). VAR models have problems when applied to non-stationary series. If the variables are I(1) or become stationary after differencing, they can be modeled in a VECM as follows:

$$\Delta y_t = \alpha_1 + \gamma_1 ecm_{1t-1} + \sum_{i=1}^{n} \beta_1 \Delta y_{t-i} + \sum_{i=1}^{n} \delta_1 \Delta x_{t-i} + \varepsilon_{1t} \qquad (3.14)$$

$$\Delta x_t = \alpha_2 + \gamma_2 ecm_{2t-1} + \sum_{i=1}^{n} \beta_2 \Delta y_{t-i} + \sum_{i=1}^{n} \delta_2 \Delta x_{t-i} + \varepsilon_{2t} \qquad (3.15)$$

Where,

β_1, β_2, δ_1, δ_2 =short run coefficients

γ_1 andγ_2= error correction term coefficients

ε_{1t} and ε_{2t}= residuals.

3.3.3 Unit root test

The study applied KPSS and DF-GLS method to check unit root. The regression equation for KPSS is a langrage multiplier (LM) statistic defined as:

$$LM = \sum_{t} S(T)^2 / (T^2 f_0) \quad (3.16)$$

Where;

f_0= estimator of the residual at zero frequency

$S(T)$= cumulative residual function defined as:

$$S(T) = \sum_{r=1}^{t} v_t$$

The Elliot et al. (1996) suggested DF-GLS unit root test is essentially an ADF test. However, DF-GLS test has a notably higher power than the ADF test. The regression equation is analogous to the ADF and is specified as

$$\Delta y_t = \alpha + \beta y_{t-1} + \delta_t + \sum_{j=1}^{p} \psi_j \Delta y_{t-j} + \varepsilon_t \quad (3.17)$$

where Δy_{t-j} is the lagged difference term, p is the lag order.

3.3.*4* Co-integration

The Johansen test for cointegration (Johansen and Juselius, 1990) was used to identify the cointegrating vectors which is specified as;

$$\Delta y_t = \alpha_0 + \pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + \varepsilon_t \quad (3.18)$$

Where π and Γ= coefficient matrixes

Δ= difference operator

P= lag order

ε_t= error term.

The Johansen's methodology uses trace test and the maximum eigenvalues to obtain the number of cointegrating vectors as given in equations (3.19) and (3.20).

$$\hat{\lambda}_{trace}(\mathrm{r}) = -T \sum_{i-r+1}^{n} \ln\left(1 - \hat{\lambda}_i\right) \quad (3.19)$$

$$\lambda_{max}(\mathrm{r}, \mathrm{r}+1) = -T ln\left(1 - \hat{\lambda}_{r+1}\right) \quad (3.20)$$

Where

$\hat{\lambda}$ = estimated eigenvalues

T= number of observations.

Trace tests in equation (3.19) determines *r* cointegrating vector against the alternative *n* cointegrating vectors while the maximum Eigenvalue tests in equation (3.20) investigates *r* cointegrating vectors against *r+1* (Dasgupta, 2016).

3.3.5 Vector error correction model

The long-run equilibrium is examined by applying the VECM.

The econometric equations derived from equation (3.11) are specified as follows:

$$\Delta PI = \alpha_1 + \sum_{i=1}^{k-1} \beta_i \, \Delta PI_{t-i} + \sum_{j=1}^{k-1} \varphi_j \Delta GI_{t-j} + \sum_{n=1}^{k-1} \phi_n \, \Delta \mathrm{EXR}_{t-n} + \sum_{m-1}^{k-1} \gamma_m \, \Delta RIR_{t-m} + \sum_{p=1}^{k-1} \delta_p \, \Delta PC_{t-p} + \lambda_1 ECT_{t-1} + \varepsilon_{1t} \quad (3.21)$$

$$\Delta GI = \alpha_2 + \sum_{i=1}^{k-1} \beta_i \, \Delta PI_{t-i} + \sum_{j=1}^{k-1} \varphi_j \Delta GI_{t-j} + \sum_{n=1}^{k-1} \phi_n \, \Delta \mathrm{EXR}_{t-n} + \sum_{m-1}^{k-1} \gamma_m \, \Delta RIR_{t-m} + \sum_{p=1}^{k-1} \delta_p \, \Delta PC_{t-p} + \lambda_2 ECT_{t-1} + \varepsilon_{2t} \quad (3.22)$$

$$\Delta EXR = \alpha_3 + \sum_{i=1}^{k-1} \beta_i \, \Delta PI_{t-i} + \sum_{j=1}^{k-1} \varphi_j \Delta GI_{t-j} + \sum_{n=1}^{k-1} \phi_n \, \Delta \mathrm{EXR}_{t-n} + \sum_{m-1}^{k-1} \gamma_m \, \Delta RIR_{t-m} + \sum_{p=1}^{k-1} \delta_p \, \Delta PC_{t-p} + \lambda_3 ECT_{t-1} + \varepsilon_{3t} \quad (3.23)$$

$$\Delta RIR = \alpha_4 + \sum_{i=1}^{k-1} \beta_i \, \Delta PI_{t-i} + \sum_{j=1}^{k-1} \varphi_j \Delta GI_{t-j} + \sum_{n=1}^{k-1} \phi_n \, \Delta \mathrm{EXR}_{t-n} + \sum_{m-1}^{k-1} \gamma_m \, \Delta RIR_{t-m} + \sum_{p=1}^{k-1} \delta_p \, \Delta PC_{t-p} + \lambda_4 ECT_{t-1} + \varepsilon_{4t} \quad (3.24)$$

$$\Delta PC = \alpha_5 + \sum_{i=1}^{k-1} \beta_i \, \Delta PI_{t-i} + \sum_{j=1}^{k-1} \varphi_j \Delta GI_{t-j} + \sum_{n=1}^{k-1} \phi_n \, \Delta \mathrm{EXR}_{t-n} + \sum_{m-1}^{k-1} \gamma_m \, \Delta RIR_{t-m}$$

$$+ \sum_{p=1}^{k-1} \delta_p \, \Delta PC_{t-p} + \lambda_5 ECT_{t-1} + \varepsilon_{5t} \qquad (3.25)$$

Where; *PI* = private fixed investment

GI= Public investment

PC = Private consumption

RIR=real interest rate

EXR= exchange rate

K-1 = lag length which is reduced by 1

ECT_{t-1}= lagged error correction term.

$\beta_i, \varphi_j, \phi_n, \gamma_m \; and \; \delta_p$ = short run coefficients

λ_1, λ_2, λ_3 λ_4 and λ_5= Speed of the adjustment parameter

ε_{1t} ε_{2t} ε_{3t} ε_{4t} and ε_{5t}= error terms.

3.3.6 Impulse Response Analysis (IRF)

The estimated coefficients were used to derive impulse responses. The IRFs were used to regulate the magnitude of the shocks in private investment attributed to the macroeconomic variables. Computation of IRF requires the VECM to be stable. Therefore, the stability of the model was performed before computing the IRF.

3.3.7 Data sources and measurement

The study used time series data derived from the World Bank database from 1970 to 2020. Table 13 offers variable description and measurements.

Table 13: Description and measurement of the variables

Variable	Abbreviation	Description	Unit of Measurement
Private investment	PI	The amount spent by the private sector to add to fixed assets. Fixed capital formation is used as proxy for private investment.	% of GDP
Public investment	GI	This includes plant, machinery, construction of roads, railways. Gross fixed capital formation is used for the analysis.	% of GDP
Exchange rate	EXR	The price of one currency in terms of another.	Measured as a local currency unit relative to the U.S. dollar.
Real interest rate	RIR	The interest rate adjusted for inflation as measured by the GDP deflator.	Annual percentage
Private consumption	PC	Is the market value of all goods and services purchased by the households.	% of GDP

3.4 EMPIRICAL RESULTS AND DISCUSSION

This section presents the empirical findings and a detailed discussion of the results.

3.4.1 Descriptive statistics

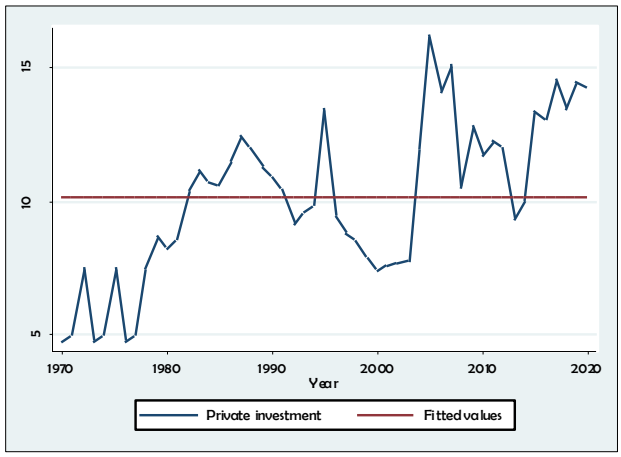
Table 14: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Private investment	51	10.129	2.97	4.77	16.206
Public investment	51	19.423	2.955	15.388	29.789
Real Interest rate	51	7.975	5.422	0.943	21.096
Exchange rate	51	49.049	35.306	7.000	106.451
Private consumption	51	70.302	7.959	55.648	82.496

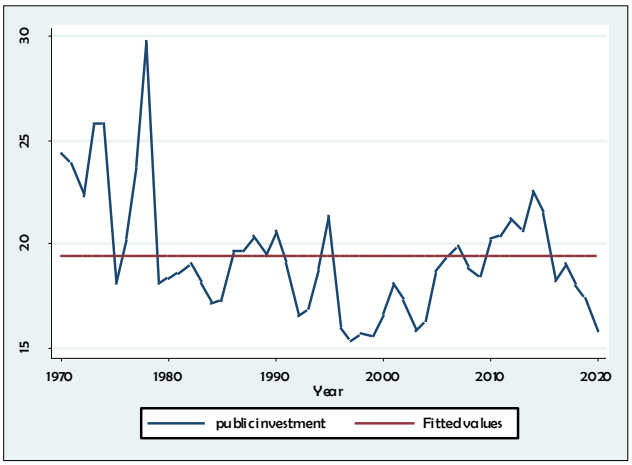
Source: Author's own computation

As a summary statistic of table 14, the mean value for private investment is 10.64 while the standard deviation is 2.97. The minimum and maximum values for this variable are 4.77 and 16.206 respectively. The mean value for public investment was 19.42 with a standard deviation of 2.96. The minimum value for this variable is 15.39 and the maximum is 29.79. The implication is that for the period under analysis, public investment had been higher while at the same time private investment had been low. Exchange rate and private consumption had a mean of 49.049 and 70.30 respectively while the standard deviation is 35.306 and 7.96 in that order.

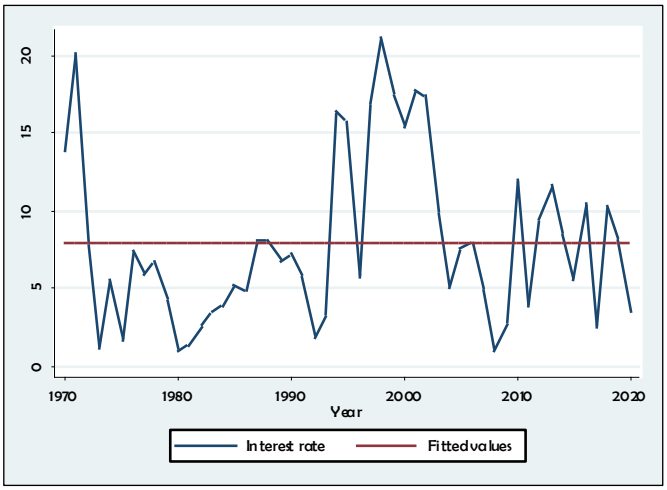
3.4.2 Time series plots



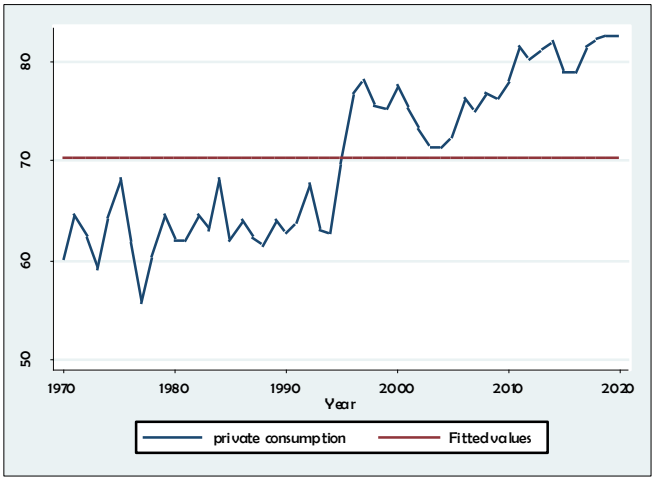
Panel (a) private investment



Panel (b) public investment



Panel (c) Interest rate



Panel (d) private consumption

Panels (a) indicates that private investment exhibits non-stationary behavior with deviations from the mean from 1970 to 2009. However, from 2000 the variable exhibits stationarity around the mean. Public investment in panel (b) has minimum deviations from the mean except the initial years from 1970 to 1980. Interest rate on panel (c) shows the variable does not have a trend and that it oscillates around the mean while private consumption in panel (d) shows it's not stationary.

3.4.3 Unit Root test

The results for unit root are provides in table 15.

Table 15: Unit root test

Stationarity of variables in levels			**Stationarity of variables in first differences**	
Kwiatkowski–Phillips–Schmidt–Shin (KPSS) (5%) H0: the series is trend stationary				
Variable	**Without trend**	**With trend**	**Without trend**	**With trend**
Private investment	1.38	0 .233	0.0415**	0.0378**
Public investment	0 .71	0.294	0.0335**	0.0298**
Real interest rate	0.38**	0.275	0.0334**	0.0335**
Private consumption	2.31	0.155	0.0281**	0.0244**
Exchange rate	2.54	0.216	0.134**	0.0859**
Dickey-Fuller Generalized Least Squares (5%) H0: the series has a unit root				
Private investment	-1.110	-2.789	-5.863**	-5.843**
Public investment	-1.418	-2.519	-7.494**	-7.618**
Real Interest rate	-2.586**	-2.730	-5.252**	-6.722**
Private consumption	-0.602	-2.486	-4.956**	-6.544**
Exchange rate	0.814	-1.902	-4.717**	-4.917**

*Source: Author's own computation using Stata: **p<0.05 significance level*

The unit root test shows the variables are *I(I*) except interest rate whose outcome is ambiguous. Interest rate shows that the variable is stationary without trend but non-stationary with trend in both KPSS and DF-GLS.

3.4.3 Cointegration Analysis

The unit root test showed that the variables including interest which was not trend stationary are are I(I). The study, therefore, performed co-integration analysis on these variables. The study used Johansen technique of maximum likelihood procedure, which is more advanced as opposed to a single equation. The approach makes it possible to estimate the number of cointegrating relationships and explores every kind of information available concerning interactions of the variables. Before estimation the maximum order of lags were determined as given in table 16.

Table 16: Lag order selection

Selection-order criteria
Sample: 1974 - 2020 Number of obs = 47

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-709.291				1.1e+07	30.3954	30.4694	30.5922
1	-558.247	302.09	25	0.000	51503.1*	25.0318	25.4762*	26.2127*
2	-533.238	50.017	25	0.002	53435.4	25.0314*	25.8461	27.1965
3	-512.406	41.665	25	0.020	70323.1	25.2088	26.3938	28.3579
4	-487.136	50.539*	25	0.002	84700.9	25.1973	26.7527	29.3306

Endogenous: privateinvestment publicinvestment exchangerate interestrate privateconsumption
Exogenous: _cons

Source: Author's own computation using Stata

Table 16 shows HQIC and SBIC selects one lag to be used in the analysis while AIC selects 2 lags. However, this study used two lags in the model as suggested by AIC because it penalizes the data less compared to other lag selection criterion. Also, using 2 lags is justified on the basis that VECM estimation is performed under k-1 lag, a criteria which is inbuilt in Stata where k is the maximum lag order included in the model.

Table 17: Johansen tests for cointegration; H0: No cointegration

Max Rank	H_0	H_1	Test statistic	5% critical value
(a) Trace statistics				
0	$r = 0$	$r = 1$	88.3164	68.52
1	$r \leq 1$	$r = 2$	50.6157	47.21
2	$r \leq 2$	$r = 3$	19.9677*	29.68
3	$r \leq 3$	$r = 4$	8.7441	15.41
4	$r \leq 4$	$r = 5$	0.0093	3.76
5	$r \leq 5$	$r = 6$	-	-
(b) Maximum eigenvalue statistics				
0	$r = 0$	$r = 1$	37.7006	33.46
1	$r \leq 1$	$r = 2$	30.6481	27.07
2	$r \leq 2$	$r = 3$	11.2235*	20.97
3	$r \leq 3$	$r = 4$	8.7349	14.07
4	$r \leq 4$	$r = 5$	0.0093	3.76
5	$r \leq 5$	$r = 6$	-	-

Source: Author's computation using Stata; No. of lags included=2; trend: constant

Since the trace statistics of 88.3 is greater than 5% critical value, the null hypothesis of zero cointegration equation is rejected. Similarly, one cointegration equation is rejected since the trace statistic is higher than the critical value at 5%. A maximum of two cointegrating equations can be identified in the model, according to the asterisk on the trace statistics. The maximum statistic is also larger than the 5% critical value hence zero and one cointegrating equation is rejected.

3.4.5 Regression Results

Table 18 provides the regression results.

Table 18: VECM results

Dependent/Independent Variables	(1) D. Private investment	(2) D. Public investment	(3) D. Exchange rate	(4) D. Interest rate	(5) D. Private consumption
L. ECT	-0.252***	-0.164	0.00301	-0.856***	0.0974
	(0.0937)	(0.124)	(0.268)	(0.202)	(0.167)
LD. Private investment	-0.0981	-0.134	-0.620	0.280	0.120
	(0.143)	(0.190)	(0.411)	(0.310)	(0.256)
LD. Public investment	0.210**	-0.248*	-0.0364	0.405*	0.384**
	(0.106)	(0.141)	(0.305)	(0.230)	(0.190)
LD. Exchange rate	-0.0229	-0.0285	0.0761	0.354***	-0.0195
	(0.0574)	(0.0761)	(0.164)	(0.124)	(0.102)
LD. Interest rate	0.121**	0.0253	-0.0540	0.0660	0.0231
	(0.0576)	(0.0764)	(0.165)	(0.125)	(0.103)
LD. Private consumption	0.0790	-0.411***	0.226	0.272	-0.0286
	(0.0866)	(0.115)	(0.248)	(0.187)	(0.155)
Constant	0.546*	0.255	1.885**	-0.165	0.336
	(0.306)	(0.406)	(0.878)	(0.662)	(0.547)

Source: Author's computation: standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The first row of table 18 has the dependent variables while the first column has the independent variables. The regression results show presence of long run causality at the private investment and interest rate equations as indicated by the negative lagged error correction term coefficients that are significant at one percent. The lagged ECT at the public investment equation is, however, insignificant. The ECT at the exchange rate and private consumption equations are positive and also insignificant implying absence of long run correlation for the two equations.

In the short run, a one percent increase in public investment increases private investment by 0.21 percent and causes the previous public investment to decline by 0.25 percent. In addition, a percentage increase in public investment cause 0.41 and 0.39 percent increase in real interest rate and private consumption respectively.

The short run coefficients also show that a one percent exchange rate revaluation causes interest rate to go up by 0.35 percent. A one percent increase in interest rate is associated with 0.12 percent increase in private investment. It is evident that an increase in private consumption leads to 0.41 percent decrease in public investment. The constant values at private investment and interest rate are also significant at 10 and 5 percent respectively.

The study also evaluated post-estimation of the VECM to determine whether the estimated eigenvalues are less than one. The stability result is given in table 19.

Table 19: VECM stability condition

Eigenvalue stability condition

Eigenvalue	Modulus
1	1
1	1
1	1
1	1
.01663544 + .5804681*i*	.580706
.01663544 - .5804681*i*	.580706
-.1069263 + .3481786*i*	.364227
-.1069263 - .3481786*i*	.364227
-.3414038	.341404
.3225392	.322539

The VECM specification imposes 4 unit moduli

Source: Author's own computation using STATA

The outcome of stability test shows the VECM is stable since the remaining r eigenvalues are less than one. This is also confirmed by the outcome in figure 13 about the stability of the model.

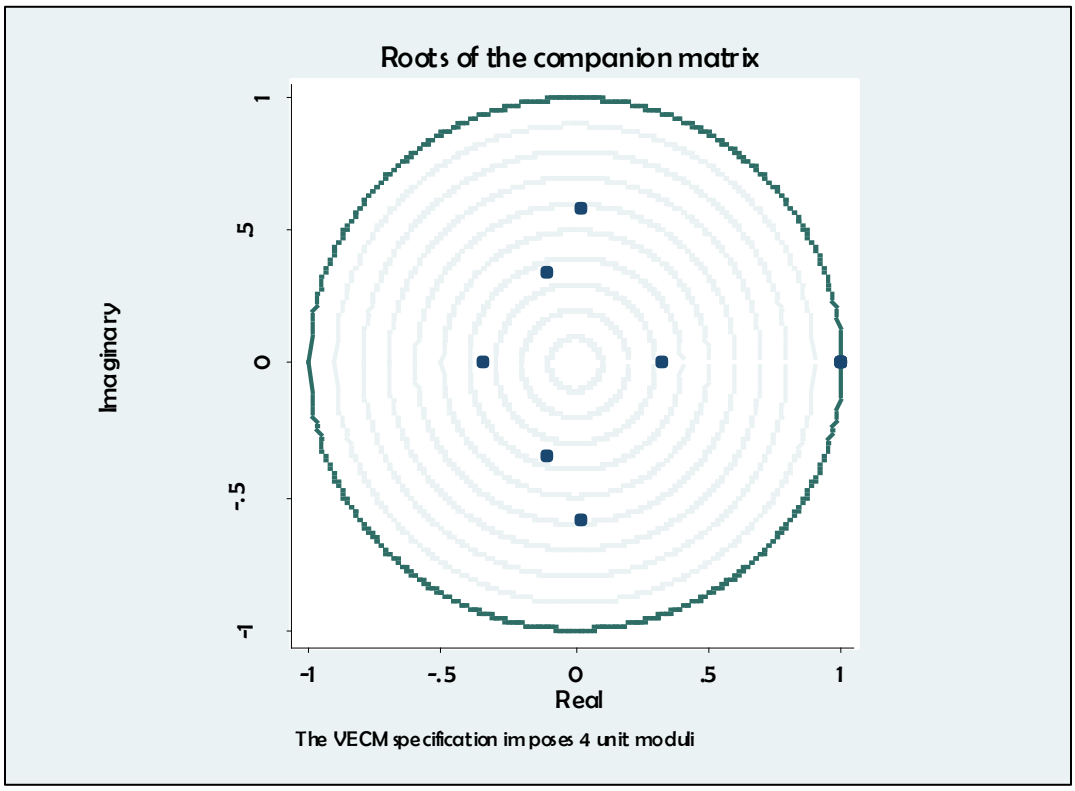


Figure 13: VECM stability condition

The eigenvalues meet the stability condition.

3.4.6 Impulse response functions (IRF)

IRFs were used to further ascertain a dependent variable's responsiveness to a shock in an independent variable. A shock to an I(0) variable will only be temporary, whereas a shock to an I(I) variable may both be permanent and temporary. Figure 14 shows the findings from the IRFs.

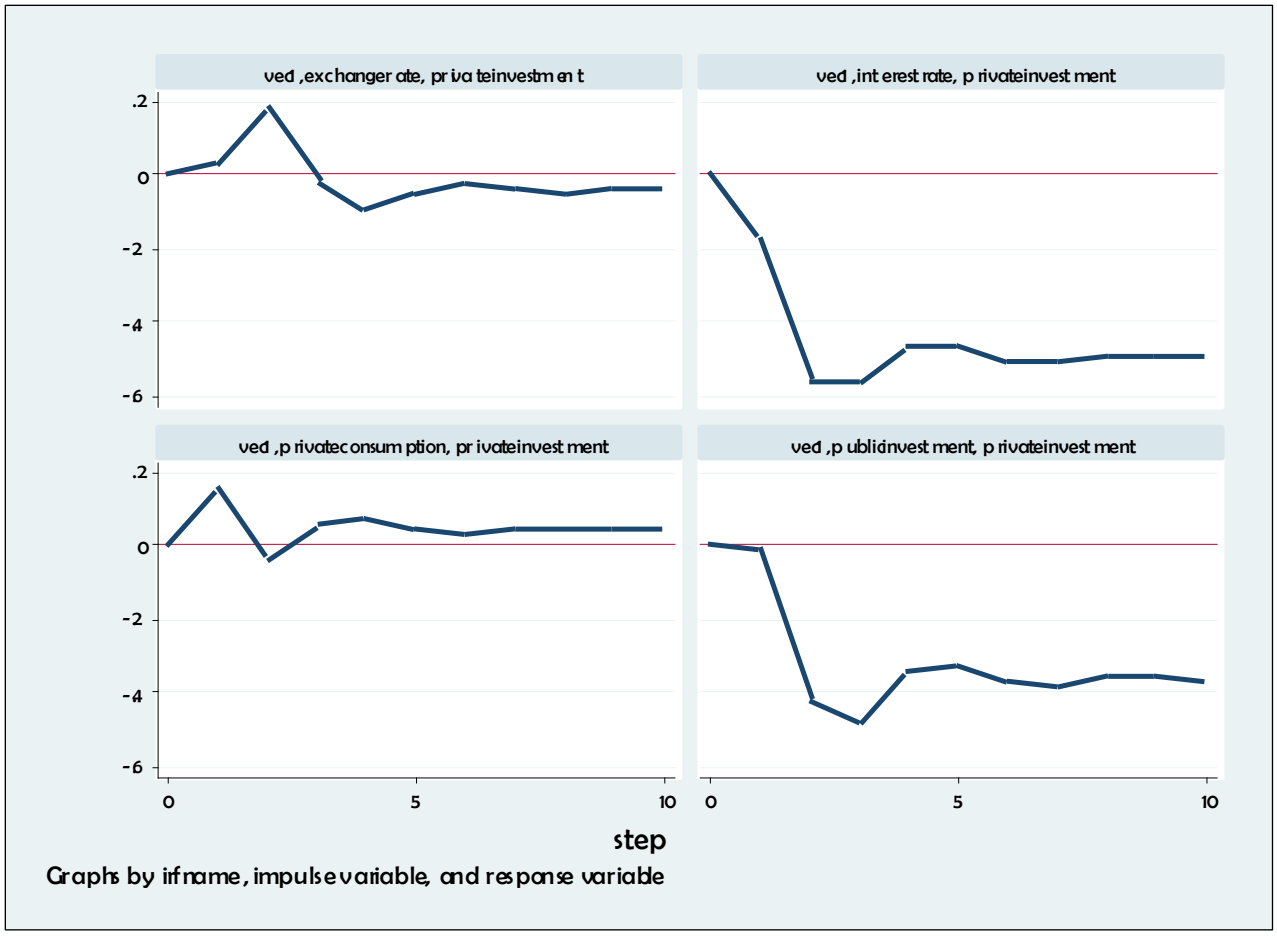


Figure 14: Impulse response functions

Figure 14 shows that an orthogonalized shock to the exchange rate and private consumption has a transitory effect on private investment while an orthogonalized shocks to the public investment and interest rate have a permanent effect on private investment. According to this model, unexpected shock to the exchange rate and private consumption will have a transitory effect on private investment. Similarly, unexpected shock to the public investment and interest rate will have permanent effect to the private investment in Kenya.

3.4.7 Discussion of the Results

The result in table 18 showed public investments has a positive effect on private investment. Economic theory holds that public sector investment increases private sector productivity. The correlations between the two variables point to the importance of a well-targeted public investment projects in minimizing bottlenecks and promoting private investment. The results are comparable to Erden and Holcombe (2006) who demonstrated that public capital influences private investment favorably. The outcomes further corroborate Ahmed and Qayyum's (2007) empirical conclusion that private capital in Pakistan complements public capital. The findings, however, are contrary to Salim and Hasasan (2011) empirical finding that state investment crowds out private investment.

The positive effect of real interest on private investment is contrary to theoretical expectation that high nominal interest rate charged by financial institutions on borrowed loans increases the cost of investment. High interest rate reduces investors' expected returns thereby reducing private investment. A Reduction in investment incentives decreases private investment (Buiter, 1977; Erenburg and Wohar, 1995). Also it is contrary to the empirical findings of Munthali (2012) who reported a negative effect of interest rate to private investment. A Reduction in investment incentives decreases private investment (Buiter, 1977; Erenburg and Wohar, 1995).

Although exchange rate is insignificant, its effect is negative in the short run which implies that investors are likely to consider the exchange rate instability when making investment decision. Private consumption has insignificant positive affect on private investment in the short term.

3.5 Conclusions and Policy Implications

3.5.1 Conclusions

The empirical results demonstrated that, over time, public sector investment complements private sector investment. The empirical results also revealed a favorable relationship between real interest rates and private investment. The results showed a positive long run relationship between private consumption and private investment, with no significant short-term effects. The negative short-term impact of the exchange rate on private investment suggests that exchange rate fluctuation is unpredictable, particularly in developing nations like Kenya.

3.5.2 Policy Implications

The empirical result supports the claim about government investment in enhancing private investment. The government should therefore, continue to enhance and pursue investment policies in many economic sectors that might encourage more private investment. Kenya is one of the developing nations that should develop strategies and policies to get rid of the bottlenecks brought along by limited physical capital.

The possibility of public sector to enhance private investment is anchored on the success of new capital formation in promoting private sector productivity. Moreover, maintaining a stable interest rate is important for enhancing private investment. The government should adopt policies that reduce the cost of investment credit thereby enabling investors to venture into diverse investment opportunities. Financial sector liberalization and licensing additional domestic banks to venture in the market could reduce the cost of borrowing. This may, in turn, encourage firms and individuals to take up credit to finance additional investment spending.

The results also showed that the short-term effect of exchange rate on private investment is negative. The policy implication is for the government to adopt measures that would stabilize exchange rate in order to minimize costs incurred due to currency depreciation.

Finally, the empirical finding indicated that in the short-term private consumption has a positive but insignificant effect on private investment. The policy implication is that increasing the household's purchasing power increases private consumption spending. The government should implement policies that will reduce inflationary pressure and hence stimulate private consumption. In addition, well-targeted government spending programs may also be used as a tool to promote private consumption spending because this will enhance demand for domestic goods. Increases in demand for domestic goods would trigger an increase in sales and hence profits which can be ploughed back for investment to increase firms' production capacities.

3.5.3 Limitations of the Study

First, it was impossible to determine the effectiveness of each type of infrastructure capital in enhancing private investment. Secondly, it was impossible to establish the optimal public capital investment necessary to stimulate private investment. Thirdly, since public capital is subject to depreciation, data on the rate of depreciation was unavailable and therefore the study did not consider depreciation of capital stock during the analysis. In principal, the study acknowledges the overall effect of increasing public investment depends on the magnitude and the condition of public infrastructure investment.

2.5.4 Suggestions for further Research

Since efficiency of public investment is very important in the economy, more research is needed to determine the effectiveness of public capital in the economy. This can be achieved by creating the public investment efficiency index and utilizing it to calculate the impact of public

infrastructure on private investment. In addition, the study could also be extended by analyzing the optimal public investment required to enhance investment in the private sector taking into account depreciation of the capital stock.

CHAPTER FOUR

EFFECT OF TAX AND DEBT-FINANCED GOVERNMENT EXPENDITURE ON ECONOMIC GROWTH IN KENYA

4.1 Background

The rise in public debt is a significant factor in public sector development (Van and Sudhipongpracha, 2015). Because the legislative branch of government is the only one with the capacity to increase the money supply and increase income taxation, fiscal shortfalls have frequently been compensated through issuing bonds (Wang, 2009). The government accomplishes social and economic performance via a variety of budgetary tools. However, a certain budgetary policy would have a varied impact on economic performance (Van and Sudhipongpracha, 2015).

One of the budgetary tools frequently employed by the policymakers to alter the behavior of the economy is the government expenditure. Due to budgetary restrictions, acquisition of financial resources to fund government programmes has proven to be one of the biggest problems the government is currently confronting (Chatterjee and Turnvosky, 2005). It thus appears that the influence of a specific expenditure category on economic growth is contingent to how the expenditures are financed (Blanchard and Leigh, 2013). According to Serven et al. (2007), each country has a different optimal approach for funding its expenditures, and is depended upon revenue mobilization strategies.

Tax increases, borrowing, or seigniorage are the most used strategies to fund government spending (Kandil, 2006). The unsolved question is, however, whether economic growth differs

according to the financing strategy. Fiscal authorities could also use money growth to finance government expenditure (Kandil, 2013). The Central Bank therefore, will increase the monetary base to account for rising spending by issuing more currency or loosening restrictions to the amount of credit that is accessible (Kandil, 2013). A larger government could affect economic growth if an expansionary fiscal approach is implemented through either taxation or debt financing (Ghali, 2003).

The economic impact of a taxation and debt is a topic of controversy (Rioja and Christie, 2011). The equivalence theorem postulates that government purchases rather than the choice of how to finance the government affects long-run growth. The Ricardian hypothesis states that agents are more likely to save more money because they anticipate paying higher taxes to pay off the growing national debt. This causes private consumption to decline and thereby counteract the favorable effect of expansionary fiscal policy in the economy (Saleh and Harvie, 2005).

The Keynesian hypothesis postulates that increasing tax rate to pay for permanent increases in government expenditure results in permanent increases in both output and consumption. Agénor and Neanidis (2011), Kneller et al., (1999), Wang (2005), and Agénor and Neanidis (2011) all point out that income taxes are distorting and discourage saving, investing, and working. Economic growth is negatively impacted by a rise in governmental spending that is financed by the issuance of more debt (Gu, 2022; Agénor and Neanidis, 2011). Due to the government budget restrictions, any changes to one magnitude must be balanced out by similar adjustments elsewhere (Wahab, 2011).

Blankenau and Simpson (2004) claim that employing distortionary taxes to finance government expenditure has a detrimental impact on economic growth. Miller and Russek (1997) suggest that

financing increases in government spending using taxes leads to a higher growth. This is attributed to higher positive public investment externalities compared to the harmful effects of high taxes. Nonetheless, growth rate would decline if the negative effect of taxes dominates which suggests that financing public spending by imposing high tax rate is detrimental to growth.

In addition, higher taxes are poised to generate additional distortions on capital accumulation which affects economic growth (Ghura, 1995). When the tax rate is above a certain threshold level the economy reaches the slopping side of the growth Laffer curve and causes a negative correlation between taxes and economic growth (Ehrhart et al., 2014).

Divergent opinions are expressed regarding debt-driven public spending. Turnovsky (1995) suggested that raising government debt-financed investment accelerates economic growth. The hypothesis ignores the feedback impact of debt servicing and treats debt as a flow variable. Nevertheless, public investment finance by has the ability to spur economic growth.

Public debt may affect economic growth through savings and investment (Baaziz, 2015). High public debt levels impose negative effects to domestic savings and crowds-out private investment (Ncanywa and Masoga, 2018). The effect of debt could also occur through the various sources of growth such as capital accumulation channel because huge external debt lowers the investors' expectations about the returns due to the anticipation of increased distortionary taxation which discourages investment thereby slowing down capital stock accumulation (Lopes da Veiga et al., 106; Abbas et al., 2022; Pattillo et al., 2004).

The other method through which the government finances its expenditures is seigniorage. Seigniorage refers to the revenue generated by the creation of reserve money (McPherson, 2000).

It is the excess of the face value over the cost of production of the currency (Bang, 1998). The government in most cases changes the monetary base of the economy to finance its deficit. The amount of money generated through seigniorage is the difference between its production cost and face value of the currency produced in a given period (Buiter, 2007). Therefore, the real value of seigniorage generated is the amount of resources earned by the government through this action.

Mundell (1963) and Tobin (1965) postulated that seigniorage stimulates capital accumulation while Sidrauski (1967) argued that the long run stock of capital is independent of money growth. Marquis and Reffett (1995) assert that money has a neutral effect to the economy when consumption is subject to cash in advance constraint. The impact of seigniorage to economic growth can also occur via its impact on interest rate since money supply affects interest rate movement. The movement of interest rate due to changes in real money balances affects investment which in turn causes changes in output (Blanchard, 2004).

The empirical research primarily focuses on examining how variations in the budget affect economic growth while presuming that variations that occur in other areas of the budget have no growth-effects. Therefore, regardless of whether the budget is funded by raising taxes or via deficit financing, increases in economic growth is expected to remain invariant (Adam and Bevan, 2001). The link between debt and economic growth is non-linear because there is a debt level at which debt begins to adversely affect economic growth (Pattillo, 2004).

Checherita et al. (2012) poised that debt should only be used to fund investment and that the optimal public debt is determined by the ratio of public to private investment that maximizes economic growth. Seigniorage financing has a less distorting effect on growth than tax financing

(Leshoro, 2017; Yip, 1995). Previous studies have looked at tax revenue and changes in the distribution of productive and unproductive spending, but they have paid little attention to how these changes in the financing of these expenditures and the ways that public debt affects economic growth would have impact to the economy. That is the subject of this essay.

Kenya's fiscal policy aims to ensure sustainable debt levels and quick and inclusive economic growth (Republic of Kenya, 2015). Over the years, the financing of government expenditure has mainly been through both direct and indirect taxation. Although the aggregate government expenditure rose significantly averaging 37% of GDP from 170 to 2020, the performance of revenue as share of GDP remained relatively low with an average of 15% of GDP. Figure 15 shows trend of government revenue and expenditure.

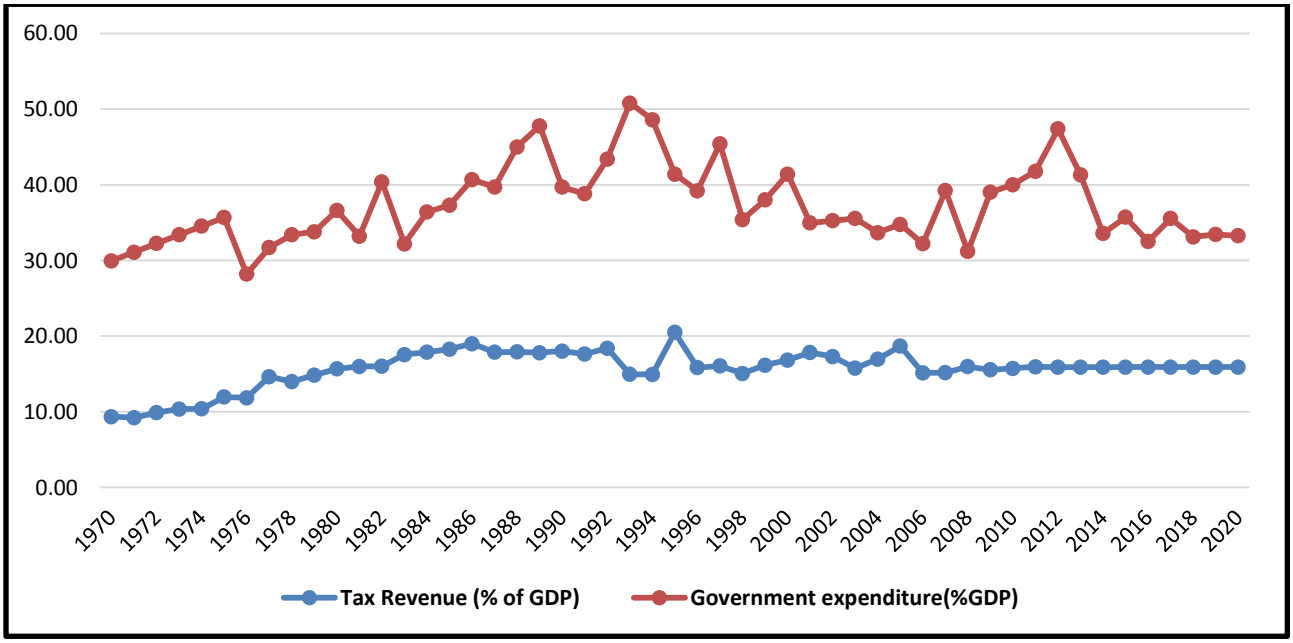


Figure 15: Trends of government expenditure and tax revenue
Source: Author's own computation

Figure 15 shows that tax revenue increased steadily from 1970 to 1990 mainly driven by increased indirect taxation as a result of broadening the tax base. The increase in revenue was however, offset by the increased expenditure (Republic of Kenya, 1990). From 1991 and 1994

expenditure went up due to an increase in recurrent and administrative services expenditure. Thereafter, government expenditure declined to about 32 percent of GDP with an exception in 2012 in which it reached 47 percent.

The increase was attributed to the appropriation of outlays related to the implementation of the new constitution 2010 that provided for fiscal decentralization as well continued financing of human capital development and infrastructure development. In addition, funding the 2013 general election also led to a significant increase in government spending. Despite the increase in government expenditure the share of revenue in GDP remained almost the same averaging about 15 percent which necessitated government borrowing from both domestic and external market. Figure 16 gives the trends of government debt in Kenya from 2000 to 2020.

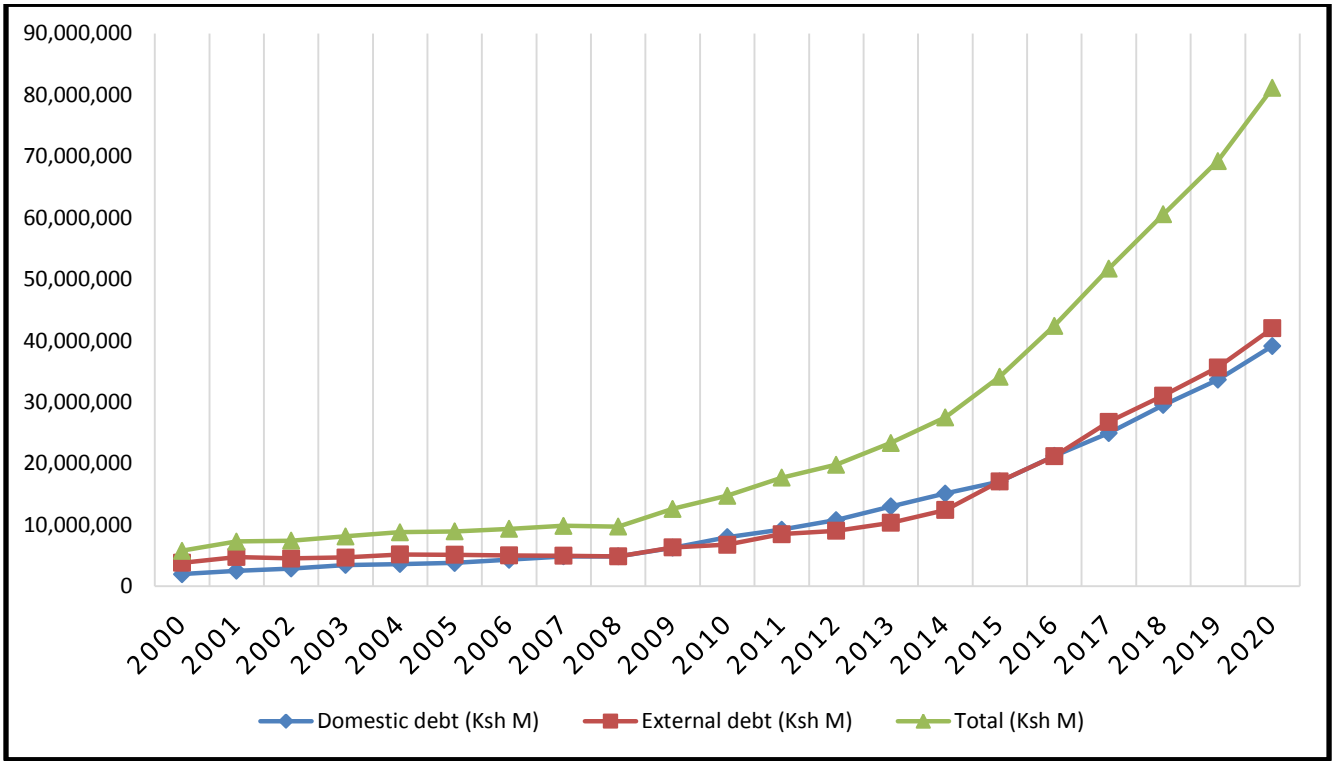


Figure 16: Trends in public debt (Ksh M)
Source: Author's own computation

The total public debt increased tremendously from Ksh 1.9 trillion in 2000 to 8.1 trillion in 2020. The external debt contributed the largest share in total public debt compared to domestic debt. However, from 2010 to 2015 domestic debt took the largest share in total public debt compared to external debt. This was mainly due to increased government borrowing from the domestic market compared to external borrowing. The decrease in external debt was also due to the government effort to constrain foreign borrowing in favor of domestic borrowing that comes with lower costs and risks (Republic of Kenya, 2016).

External borrowing, however, increased over the period 2015 to 2020 as a result of Eurobond in the internal market. The increase was also driven by the continued bilateral engagement in infrastructure development initiatives in the country. Further analysis of domestic and external debt is given in figure 17.

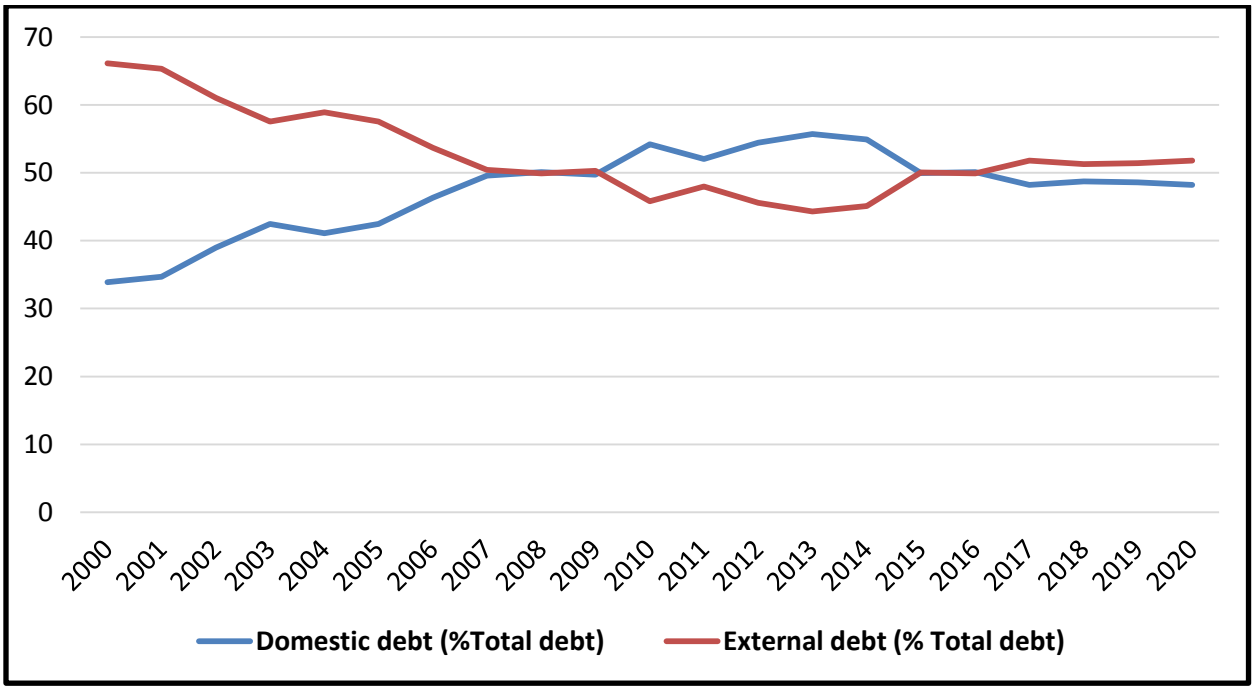


Figure 17: Trends of domestic and external debt (% of total debt)
Source: Author's own computation

Initially the external debt decreased between 2000 and 2007 while the share of domestic debt rose over the same period to about 50 percent in 20007 before further rising above the external debt between 2010 and 2015. External debt service has also risen as provided in figure 18.

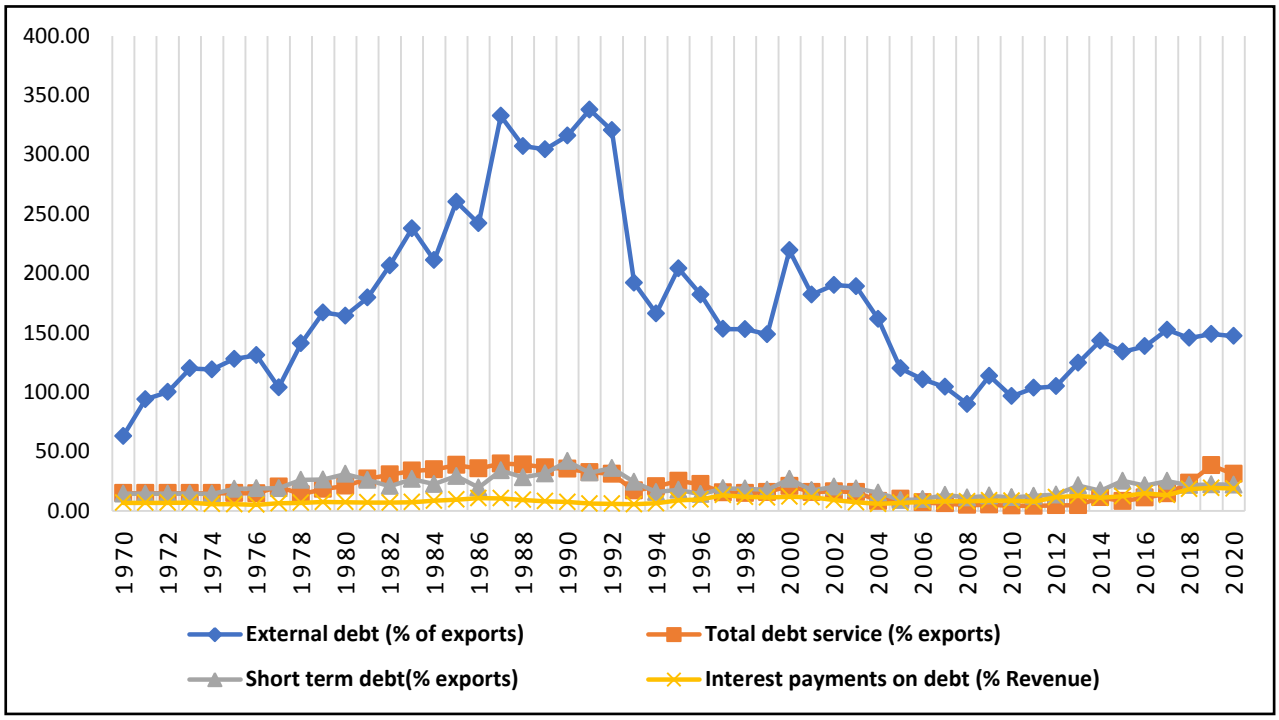


Figure 18: External debt service and interest payment
Source: Author's own computation

Figure 18 shows a significant increase in Kenya's external indebtedness over the period 1977 to 1987 which signals increased external borrowing. This period coincided with the first and the second oil crisis. The short-term debt also rose steadily over the same period. From 1991 to 1996, external debt declined significantly partly attributed to negative debt repayment and aid embargos which led to no new external debt.

The accumulation of domestic and external debt by the government to finance the ever-rising expenditure can affect economic growth. The limited growth in revenue also implies that the government either will increase borrowing, taxation or resorts into seigniorage all of which affect economic growth.

4.1.1 Problem Statement

The growth effect of fiscal policy continues to elicit a considerable debate among policymakers. On one hand, cutting back the activities of the government is supported because of low inefficiency associated with government spending and high welfare cost of taxation. The contrary opinion posits that government interventions in the economy are important in enhancing economic development (Baidoo et al., 2021; Eltejaei, 2015). Despite these important observations and the scholarly great desire to examine the impact of public spending, empirical studies have not attempted to analyze changes in economic growth brought about by different government budget financing strategies.

The existing studies such as (Rioja and christie, 2017; Rother and Checherita, 2010) have focused on developed economies. Other studies such as Ghani and ul Husnain (2010) have used a single equation to determine economic growth effect of debt which may lead to serial correlation among the two fiscal variables. In addition, the existing studies in Kenya focused on the external debt and its consequences to economic growth (Were, 2001). Moreover, the methodology used to analyze the data is not robust enough and therefore the results cannot be relied upon. The insufficiency of the available empirical evidence in this field indicates that most of the studies have not considered how economic growth changes when expenditures are financed using debt and tax revenue. Therefore, this analysis focuses on Kenya to examine this issue, whose budget is mostly funded by taxes and debt. The methodology used to analyze the data is also robust as opposed to the previous studies.

4.1.2 Research Question

i. What is the effect of tax-financed government spending on economic growth in Kenya?

ii. What is the effect of debt-financed government expenditure on economic growth in Kenya?

4.1.3 Research Objectives

i. To analyze the effect of tax-financed government spending on economic growth in Kenya

ii. To analyze the effect of debt-financed public spending on economic growth in Kenya

4.1.4 Significance of the study

The study contributes to the literature in four ways: First, it examines the issue at hand taking into account the sources of financing the expenditures. In this regards, a dynamic overlapping generation (OLG) macroeconomic model is used to bring out a clear understanding about the comparative significance of the source of financing government expenditure. This is useful to policymakers in making appropriate decisions with respect to the efficient option of financing government activities.

Secondly, by incorporating deficit financing, this study explores the changes in economic growth arising from various methods of expenditure financing. This information is also important to policymakers due to the large fiscal deficit of about 8 percent. Thirdly, the information on the economic effect of expenditures financed using external debt will be useful to policymakers because it will assist them in choosing the optimal debt structure. Fourthly, the theoretical model incorporates deficit financing as opposed to the basic balanced government budget constraint.

This allows examination of the extent to which long-run growth varies given the source of financing.

4.2 Literature review

4.2.1 Theoretical literature review

Even while tax-financed increases in unproductive expenditure can raise an individual's welfare if they directly affect the utility function; economic theory claims that they do so through slowing down economic development. An increase in grants might promote growth if it is utilized to lower taxes and debt. However, if grants are used to pay for wasteful expenses, their impact on economic growth will be insignificant. Additionally, having too much debt reduces growth-boosting effects of taxes (de Oliveira, 2013). Although there are differing views on their respective benefits, it is generally agreed that employing taxation and seigniorage to fund government programmes causes distortions.

Greiner and Semmler (2000) hypothesized that bonds and tax can finance expenditure if it is manageable. According to the authors, the interactions between households, businesses, and the government make up the economy. The households are the same and provide the firms with labor while obtaining utility from their own private consumption. The government must pay off all of its debt before the end of each term on the assumption that there is no Ponzi scheme.

De Gregorio (1993) claimed that if bond returns are responsive to fluctuations in inflation, financing public expenditures through money growth is growth enhancing compared to tax financing. Blankenau and Simpson (2004) argued financing government expenditure by taxing capital and labor produces unfavorable outcome of the economy. Since public sector investment will generate more positive externalities than negative disincentives from higher tax rates at low expenditure levels, increasing productive spending will result in higher growth. However, when spending reaches its ideal level, the impact of increasing taxes will be counterproductive, which

will be detrimental to economic growth (Rebelo, 1990; Chen, 2006). Spending that is productive complements the manufacturing process and hence increases output (Chatterjee and Turnovsky, 2005). Unproductive government expenditure doesn't directly affect production, but it must be paid, which uses up resources in the economy. Allocating funds from wasteful to productive expenditures is a key component of the best possible government spending.

Elmendorf and Mankiew (1999) stated that one major way that debt financed government spending affects growth is through its effect on the interest rate. Potential output growth is constrained by high long-term interest rate. As a result, rising yields on sovereign debt will boost the government's demand for financing, which in turn will enhance investor demand for government bonds (Sen and Kaya, 2014).

4.2.2 Empirical Literature Review

Ghani and ul Husnain (2010) used a panel data from 1975 to 2008 to investigate the expenditure-growth nexus. The study sought to determine if the sources of financing have a bearing to the nexus. Taxes, debt, and seigniorage were all sources of funding that were taken into account simultaneously. The findings demonstrated that debt-financed governmental spending hindered economic expansion. The results also showed that seigniorage and tax financing of governmental expenditures had a detrimental impact on growth. Even while all three approaches had a detrimental impact, seigniorage-financed expenditures were largely responsible for it.

Focusing on taxation and debt, Rioja and Christie (2017) investigated the extent to which the structure of expenditure and sources of financing impact economic growth in Latin America from 1990 to 2008. The findings demonstrated that raising tax rates to raise more funds to pay public investments stimulates economic growth when tax rates are already low. However, if tax

rates are high, reorganizing public spending rather than relying on taxes to finance it will promote economic growth. Ghali (2003) investigated the connection between budget deficits and economic growth in Tunisia using VECM. According to the study, economic growth is boosted when government spending is funded by taxes rather than borrowing.

Villieu and Minea (2009) examined the impact of debt on public investment where the objective was to ascertain whether fiscal deficit affects long-term growth and wellbeing. The findings demonstrated that a long-term fiscal deficit delays the path to balanced growth. Greiner and Semmler (2000) indicated that using debt in the execution of government projects affects public investment negatively.

Using panel data, Ndjokou (2013) investigated how fiscal policy affected the economy of West African Nations. The study specifically assessed the impact of public spending and revenue on growth in these economies. The findings showed that while rising revenues were linked to higher GDP growth, increased government spending had a negative impact on economic growth. The results also showed that indirect taxes had a considerable positive impact while the impact of income taxation on economic growth was negative.

Using forecast errors in public investment, Abiad et al. (2015) estimated the causation effect of government investment for OECD countries between 1985 and 2015. The findings demonstrated that output increases when investment is funded with debt. However, it was discovered that funding public investments with tax income was detrimental to economic growth. Were (2001) evaluated how Kenya's external debt affected economic performance from 1970 to 1995 using VECM. The results showed that government posed a negative effect on investment and economic growth.

4.2.1 Overview of the Literature

The literature reviewed presents divided opinions with regards to how the economy responds as a result of using debt or tax revenues to finance expenditures. Bose et al., (2007) and Palivos and Yip (1995) argued that income tax financing is harmful to economic growth as opposed to seigniorage. Holman and Neanidis (2006) on the other hand postulated that public expenditures that are financed using seigniorage reduce growth. Pecorino (1997) argued that it is important to have both tax and seigniorage as methods of budget financing.

Most of the empirical literature reviewed also focused on how expenditures financed using debt affect economic growth without giving attention to the impact that tax-financed public spending has on GDP (e.g., Elmendorf and Mankiew, 1999; ul Husnain and Ghani, 2006). Moreover, the reviewed studies share common shortcoming in that none has separately considered the impact of tax revenue, seigniorage or debt on economic growth. The results could be different if the sources of finance are considered separately.

4.3 Theoretical Framework

The theoretical model is anchored on Diamond (1965) simple Overlapping- Generation (OLG) model. The government taxes output to prevent the possible effect of tax shifting. Government expenditure can be allocated into either productive use or it can go straight to the utility bills of the people, with no impact on output. In the study, taxes, seigniorage, and public debt are used to finance the government's unbalanced budget. The model is dynamic and includes interactions between households, firms, and the government.

The households

Instead of having a constant number of households with an unlimited lifetime, this model assumes that individual live for two periods. That is, there is a population turnover in which the young are continuously born and the aged continuously pass away. The individuals supply labor in period one and consume in both periods. The labor force, which is essentially represented by population growth, expands by n. The household utility is given by:

$$u = blnc_1 + (1-b)lnc_2 \quad (4.1)$$

where;

c_1 and c_2= consumption in period one and 2

b= preference.

Production

The production is of a representative firm is given by;

$$y_i = A^{\alpha+\beta} l_i^{1-\alpha} k_i^{\alpha} \left(\frac{K}{L}\right)^{\beta} \left(\frac{G_p}{L}\right)^{1-\alpha-\beta} \quad (4.2)$$

Where;

i= index of firms

A= productivity characteristics

G_p= supply of public capital

α *and* β= output elasticities.

The competitive market levies a tax rate τ. Differentiating (4.2) with respect to k gives equation (4.3) which is returns to capital investment denoted by *r*.

$$r = (1-\tau)\frac{\partial_i}{\partial_k} = \alpha A^{\alpha+\beta} \left(\frac{k_i}{l_i}\right)^{\alpha-1} \left(\frac{K}{L}\right)^{\beta} \left(\frac{G_p}{L}\right)^{1-\alpha-\beta} \quad (4.3)$$

Where

τ= tax rate on a firm's output.

Let $\gamma_p = {}^{G_p}/_{L}$, the aggregate production of the economy is then given by:

$$Y = A^{\alpha+\beta} K^{\alpha+\beta} G_p^{1-\alpha-\beta} = AK\gamma_p^{(1-\alpha-\beta)/(\alpha+\beta)} \quad (4.4)$$

The representative firm's investment in (4.3) is then given by:

$$r = (1-\tau)\alpha A\gamma_p^{(1-\alpha-\beta)/(\alpha+\beta)} \quad (4.5)$$

The government

The government finances both productive and unproductive spending and all of its actions are quantified in relation to GDP. There is a tax on output which is collected by the government denoted by a_e. There is also a public debt issued by the government where D_{dt} is the total amount of existing domestic debt at the beginning of period t and is paid off in the future. The total amount of new debt in the second period is D_{dt+1}. There is interest charged during period t, denoted by r_{dt}.

The amount of total debt is thus given by ${}^{D_{dt+1}}/_{Y_t} = \Delta_{dt+1}$, while the initial debt-GDP ratio is:

$$\frac{D_{dt}}{Y_t} = \frac{D_{dt}}{Y_{t-1}} \frac{Y_{t-1}}{Y_t} = \frac{\Delta_{dt}}{(1+g_t)} \quad (4.6)$$

The expenditure can also be financed using eigniorage amounting to ${}^{\Sigma_t}/_{Y_t} = \sigma_t$.

Thus, the government deficit is given by:

$$\delta_t Y_t = \Sigma_t + (D_{dt+1} - D_{dt}) + (D_{et+1} - D_{et}) \quad \text{where;} \quad (4.7)$$

D_{dt} = domestic debt

D_{et}= external debt.

The budget constraint given by:

$$\tau_t = \gamma_{pt} + \gamma_{ut} - a_{et} + r_{dt}\Delta_{dt} + r_{et}\Delta_{et} - \delta_t \quad (4.8)$$

Where,

γ_{pt} and γ_{ut} = productive and unproductive expenditures.

Alternatively, substituting (4.8) into equation (4.7) becomes:

$$\tau_t = \gamma_{pt} + \gamma_{ut} - a_{et} + \left[\frac{(1+r_{dt})}{(1+g_t)}\Delta_{dt} - \Delta_{dt+1}\right] + \left[\frac{(1+r_{et})}{1+g_t}\Delta_{et} - \Delta_{et+1}\right] \quad (4.9)$$

The savings from the young generation is are used to by the firms to generate new capital formation in period $t-1$ in addition to repaying debt incurred by the government while the rest is invested in new working capital. Taking into account inflation, the working capital generated in period t is given by:

$$K_t/_{I_t} = \phi(\pi_t) = \phi \quad (4.10)$$

From (4.1), the saving rate in period t is given by:

$$S_t = (1-b)W_t = (1-b)(1-\alpha)(1-\tau_t)Y_t \quad (4.11)$$

Therefore, from (4.9), capital stock in $t+1$ is;

$$K_{t+1} = \phi_{t+1} = \phi_{t+1}(S_t - D_{dt+1}) \quad (4.12)$$

Hence, output growth rate between period $t\ and\ t+1$ is;

$$g_{t+1} = \frac{Y_{t+1}}{Y_t} - 1 = \frac{AK_{t+1}\gamma_{pt+1}^{\frac{1-\alpha-\beta}{\alpha+\beta}}}{Y_t} \quad (4.13)$$

Substituting (4.1) and (4.12) into (4.13) we obtain output growth rate as:

$$g_{t+1} = A\phi_{t+1}[(1-b)(1-\alpha)(1-\tau_t) - \Delta_{dt+1}]\gamma_{pt+1}^{(1-\alpha-\beta)/(\alpha+\beta)} \quad \text{..... (4.14)}$$

Equation (4.14) shows tax rate and other macroeconomic variables such debt, price level and expenditure determine the growth rate of the economy. The budget constraint is simply represented as;

$$\tau_t = \gamma_{pt} + \gamma_{ut} - a_{et} + \left[\frac{(1+r_{dt})}{(1+g_t)}\Delta_{dt} - \Delta_{dt+1}\right] + \left[\frac{(1+r_{et})}{1+g_t}\Delta_{et} - \Delta_{et+1}\right] \quad \text{..... (4.15)}$$

Equations (4.14) and (4.15) is the basis for empirical model specification.

4.3.1 Model specification

The model is specified as:

$$Y_t = f(X_t, W_t) \quad (4.16)$$

Where;

Y_t= economic growth at time *t*

X_t= public investment, public consumption, domestic credit, unemployment and exchange rate.

W_t= government budget constraint.

The study assumes there is also seigniorage addition to tax and debt finance. Thus the budget constraint is written as:

$$GOV_{exp} = TR_t + D_t + M_t \quad (4.17)$$

Where

GOV_{exp} = total government expenditure

TR_t= tax-financing

D_t= debt financing

M_t= seigniorage

The analysis excludes money financing of government expenditure because there is no evidence that Kenya prints money to finance budget deficits. Also, data for seigniorage is not available for Kenya. Taking into account the financing methods specified in equation (4.17) in exclusion of seigniorage, the econometric model is specified as;

$$Y = f(TR, TDS, PI, PC, UN, EXR, DC) \quad (4.18)$$

Where *Y* = economic growth

TR = tax revenue

TDS = total debt service to represent the burden of high debt level

PI = investment expenditure

PC = consumption expenditure

UN = unemployment

DC= domestic credit to the private sector

EXR = exchange rate

Since the budget constraint is an identity Ahmed and Miller's (2000) methodology suggests that adding all three budget constraint financing variables to the regression equation (4.18) will result in the multicollinearity issue. By leaving out one fiscal variable from the regression equation during estimate, this issue is eliminated. Due to its versatility, the omitted variable serves as the implicit financing strategy. Using the variables for this study, and by first excluding debt financing and then tax finance, the equations to be estimated are specified as:

$$GDP = \beta_0 + \beta_1 PI + \beta_2 PC + \beta_3 UN + \beta_4 EXRATE + \beta_5 TR + \beta_6 DC + \varepsilon_t \quad (4.19)$$

$$GDP = \alpha_0 + \alpha_1 PI + \alpha_2 PC + \alpha_3 TDS + \alpha_4 UN + \alpha_5 DC + \mu_t \quad (4.20)$$

Where

GDP = economic growth

TR = tax revenue

TDS = total debt service

PI = public investment expenditure

PC = public consumption

UN = unemployment

EXR = exchange rate

DC= domestic credit to the private sector

$\beta_0 and\ \alpha_0$ = are constant terms

$\beta_1 - \beta_6$ and $\alpha_1 - \alpha_5$= the estimated coefficients

$\varepsilon_t and\ \mu_t$ = error terms

4.3.2 Description of the Variables

This study used time series data from 1970-2020 sourced from the World Bank database. Table 20 provides the variable names and their measurements.

Table 20: Description and measurement of the variables

Variable	Abbreviation	Description	Unit of Measurement
Economic growth	GDP	The total value of goods and services produced in a country in a given year.	Annual percentage
Public investment expenditure	PI	Gross fixed capital, which includes things like machinery, buildings for roads and railroads, among others.	Percentage of GDP
Public consumption expenditure	PC	The amount spent by the government on consumption-related goods and services.	Percentage of GDP
Tax revenue	TR	Tax revenue includes money the government receives from corporate, consumption, and income taxes.	Percentage of GDP
Total Debt service	DS	The sum of principal repayments and interest paid on long and short term debt.	Percentage of gross national income
Domestic credit to private sector		Financial resources provided to the private sector by financial corporations.	Percentage of GDP
Exchange rate	EXR	The nominal effective exchange rate is the price of one currency in terms of another	Measured in local currency unit relative to the U.S. dollar.
Unemployment	UN	The number of unemployed persons over total labor force.	Rate

Source: Author's own computation

4.3.3 Estimation methodology

The study used ARDL bounds testing procedure for the analysis. The empirical model for equations (4.19) for GDP response to debt-financed expenditure is specified in ARDL as follows:

$$\Delta GDP_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i}\,\Delta GDP_{t-i} + \sum_{i=0}^{n} \beta_{2i}\,\Delta PI_{t-i} + \sum_{i=0}^{n} \beta_{3i}\Delta PC_{t-i} + \sum_{i=0}^{n} \beta_{4i}\,\Delta UN_{t-i} + \sum_{i=0}^{n} \beta_{5i}\Delta EXR_{t-i} + \sum_{i=0}^{n} \beta_{6i}\Delta DC_{t-i} + \sum_{i=0}^{n} \beta_{7i}\Delta TR_{t-i} + \delta_1 GDP_{t-1} + \delta_2 PI_{t-1} + \delta_3 PC_{t-1} + \delta_4 UN_{t-1} + \delta_5 EXR_{t-1} + \delta_6 DC_{t-1} + \delta_7 TR_{t-1} + \varepsilon_t \quad (4.21)$$

Similarly, the ARDL representation of equation (4.20) for changes in economic growth due to tax financed expenditure is give as;

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i}\,\Delta GDP_{t-i} + \sum_{i=0}^{n} \alpha_{2i}\,\Delta PI_{t-i} + \sum_{i=0}^{n} \alpha_{3i}\Delta PC_{t-i} + \sum_{i=0}^{n} \alpha_{4i}\,\Delta TDS_{t-i} + \sum_{i=0}^{n} \alpha_{5i}\Delta UN_{t-i} + \sum_{i=0}^{n} \alpha_{6i}\Delta DC_{t-i} + \gamma_1 GDP_{t-1} + \gamma_2 PI_{t-1} + \gamma_3 PC_{t-1} + \gamma_4 TDS_{t-1} + +\gamma_5 UN + \gamma_6 DC_{t-1} + \mu_t \quad (4.22)$$

The variables are as previously defined in equations (4.19) and (4.20).

Δ is the first difference operator, $\beta_0\ and\ \alpha_0$are the constant terms, $\beta_1 \_ \beta_7\ and\ \alpha_1 - \alpha_6$ are the short run dynamics of the models while $\delta_1 - \delta_7$ and $\gamma_1 - \gamma_6$ are the long-run dynamics of the models, ε_t and μ_t are the error terms while n are the lags.

The exclusion of debt variable from the equation (4.21) becomes the implicit expenditure financing method since it can freely be changed while other financing method is unchanged. This implies that the estimated coefficients $\beta_2 and\ \beta_3, \delta_2\ and\ \delta_3$ measure the short and long-term growth effect of debt financed increase in investment and consumption expenditure. Similarly,

the exclusion of tax revenue in equation (4.22) becomes the implicit method of financing government expenditure. Therefore, the estimated coefficients $\alpha_2 and\ \alpha_3$, $\gamma_2$and $\gamma_3$measure the short run and long run changes to economic growth resulting from tax financed increase in government expenditure.

If the variables are cointegrated, equations (4.21) and (4.22) are estimated with an error correction term specified as:

$$\Delta GDP_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i}\, \Delta GDP_{t-i} + \sum_{i=0}^{n} \beta_{2i}\, \Delta PI_{t-i} + \sum_{i=0}^{n} \beta_{3i} \Delta PC_{t-i} + \sum_{i=0}^{n} \beta_{4i}\, \Delta UN_{t-i} + \sum_{i=0}^{n} \beta_{5i} \Delta EXR_{t-i} + \sum_{i=0}^{n} \beta_{6i} \Delta DC_{t-i} + \sum_{i=0}^{n} \beta_{7i} \Delta TR_{t-i} + \delta_1 GDP_{t-1} + \delta_2 PI_{t-1} + \delta_3 PC_{t-1} + \delta_4 UN_{t-1} + \delta_5 EXR_{t-1} + \delta_6 DC_{t-1} + \delta_7 TR_{t-1} + \lambda_1 ECM_{t-1} + \varepsilon_t \quad (4.23)$$

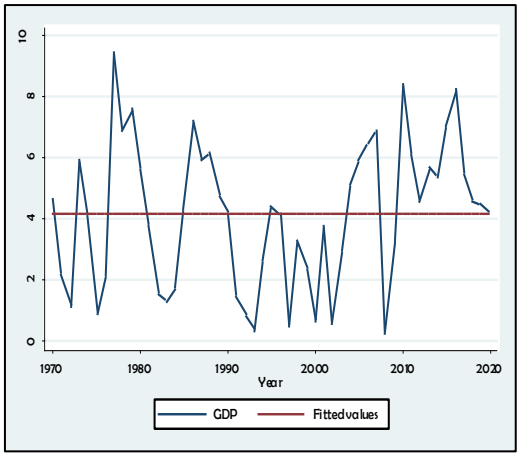
$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i}\, \Delta GDP_{t-i} + \sum_{i=0}^{n} \alpha_{2i}\, \Delta PI_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta PC_{t-i} + \sum_{i=0}^{n} \alpha_{4i}\, \Delta TDS_{t-i} + \sum_{i=0}^{n} \alpha_{5i} \Delta UN_{t-i} + \sum_{i=0}^{n} \alpha_{6i} \Delta DC_{t-i} + \gamma_1 GDP_{t-1} + \gamma_2 PI_{t-1} + \gamma_3 PC_{t-1} + \gamma_4 TDS_{t-1} + +\gamma_5 UN + \gamma_6 DC_{t-1} + \lambda_2 ECM_{t-1} + \mu_t \quad (4.24)$$

ECM_{t-1}, is the error correction term. The ECM coefficients (λ_1 and λ_2) shows the rate at which the cointegration system corrects its previous period's disequilibrium to restore the long-run relationship. Before estimation of equations (4.21) and (4.22) the study conducted a unit root test to determine the order of integration since ARDL is not suitable when some variables are I(2) (Kunofiwa and Odhiambo, 2014).

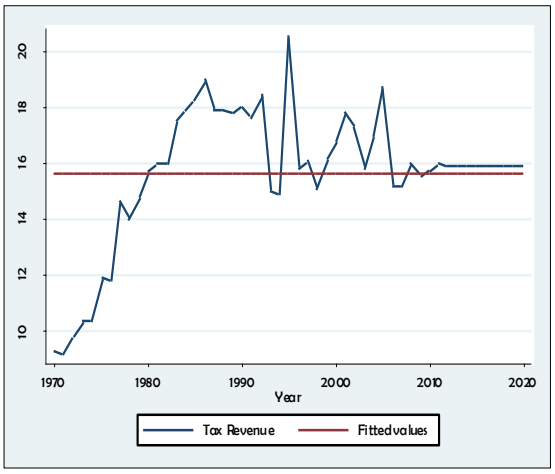
4.4 EMPIRICAL ANALYSIS

4.4.1 Time series plots

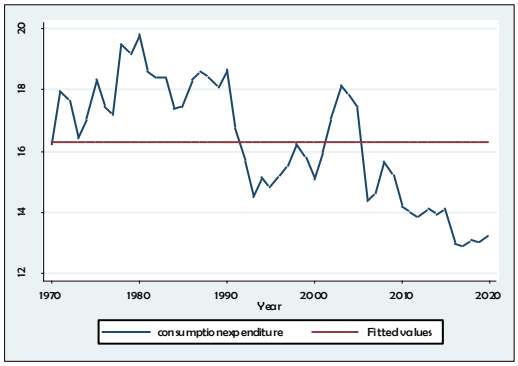
Time series plots of the variables of interest are given in panel (a) to (f).



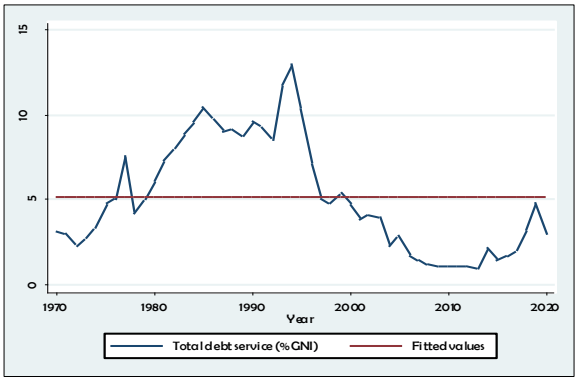
Panel (a) GDP



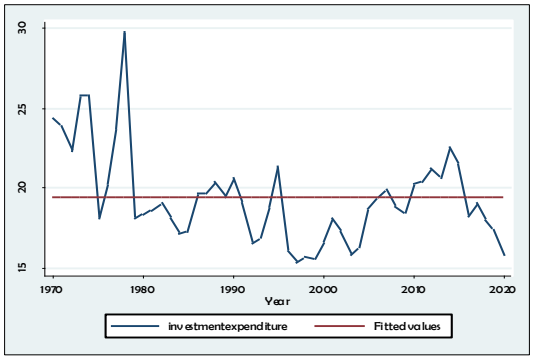
Panel (b) Tax revenue



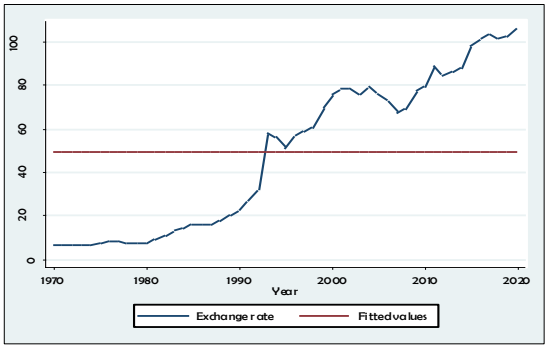
Panel (c) Consumption



Pane (d) Total debt service



Public investment



Exchange rate

The time series plots show that GDP and tax revenue and investment expenditure are stationary around the mean. Consumption expenditure and total debt service exhibits non-stationary behavior but without trend. Exchange rate indicates the variable has a trend and is non-stationary in level.

4.4.2 Unit Root Test

The finding of unit root test is given in table 21

Table 21: Unit root test

Stationarity of variables in levels			**Stationarity of variables in first differences**	
Kwiatkowski–Phillips–Schmidt–Shin (KPSS) (5%) H0: the series is trend stationary				
Variable	**Without trend**	**With trend**	**Without trend**	**With trend**
GDP	0.233**	0.142**		
Investment expenditure	0.71	0.294	0.0335**	0.0298**
Consumption expenditure	1.79	0.166	0.0994**	0.0411**
Tax revenue	0.813	0 .465	0.223**	0.0483**
Total debt service	1.01	0.442	0.181**	0.0988**
Domestic credit	2.1	0.26	0.0406**	0.0399**
Exchange rate	2.54	0.216	0.134**	0.0859**
Unemployment	1.67	0.0811**	0.037**	0.0357**
Dickey-Fuller Generalized Least Squares (5%) H0: the series has a unit root				
GDP	-4.337**	-4.383**		
Investment expenditure	-2.282**	-3.453**		
Consumption expenditure	-1.529	-2.556	-3.039**	-4.833**
Tax revenue	-1.040	-1.640	-7.629**	-8.169**
Total debt service	-1.391	-1.684	-4.853**	-5.071**
Domestic credit	-0.372	-2.733	-4.519**	-5.309**
Exchange rate	0.818	-2.007	-4.716**	-4.916**
Unemployment	-1.226	-4.150**	-5.619**	-6.190**

Source: Author's own computation using STATA; ** significance at 5% level

The unit root test using KPSS show that GDP and unemployment are trend stationary implying that the variables are I(0) while consumption expenditure, tax revenue, total debt service, domestic credit and exchange rate are not stationary in levels hence these variables are I(I). The unit root test using DF-GLS show that GDP, investment expenditure and unemployment are

stationary in levels hence the variables are I(0) while consumption expenditure, tax revenue, total debt service and exchange rate are I(I).

4.4.3 Bounds F-test to cointegration

The F-test was conducted on equations (4.21) and (4.22). In the ARDL framework, the null hypothesis of the long run relationship between the variables is $(\delta_1 = \delta_2 = \cdots = \delta_7 = 0)\ and (\gamma_1 = \gamma_2 = \cdots = \gamma_6 = 0)$.The alternative hypothesis is $(\delta_1 \neq \delta_2 \ldots \neq \delta_7 \neq 0\ ) and\ \gamma_1 \neq \gamma_2 \ldots \neq \gamma_6 \neq 0)$. The study applied AIC to determine the maximum number of lags to be included in the model for each variable.

Table 22: Results of bounds F and t-test to cointegration for equation (4.21) and (4.22)

	Max. No. of Lags included	**F-statistic**	**1% critical values**		**5% critical values**		**10% critical values**	
			I(I)	I(0)	I(I)	I(0)	I(1)	I(0)
f_y(GDP/ PI, PC, UN, EXR, DC, TR)	(2,3,4,4,1,2,4)	6.263**	4.43	3.15	3.61	2.45	3.23	2.12
f_y(GDP/PI, PC, TDS, UN, DC)	(4,3,3,3,1,0)	6.744**	4.68	3.41	3.79	2.62	3.35	2.26
		t-statistic						
f_y(GDP/ PI, PC, UN, EXR, DC, TR)	(2,3,4,4,1,2,4)	-5.250	-4.99	-3.43	-4.38	-2.86	-4.04	-2.57
f_y(GDP/PI, PC, TDS, UN, DC)	(4,3,3,3,1,0)	-4.425***	-4.79	-3.43	-4.19	-2.86	-3.86	-2.57

Source: Author's own computation using STATA; ** and **** denote significance at 5% and 1% respectively

The outcome in table 22 shows that the F-statistics 6.263 and 6.744 are greater than the upper bound critical values given at 5% which implies rejection of the null hypothesis of no cointegration. The t-statistics accepts the null hypothesis for equation (4.21) since the calculated t-statistics -5.250 is greater than the given critical values at all significance levels. That notwithstanding, the result for the F-test prevail. However, the t-statistic -4.425 is significance at

1% level since it is less than -4.79. This confirms the finding of the F-test for equation (4.22) implying existence of a long run association among the variables.

Since the bounds F-test procedure established cointegration among the variables, we estimate the long run ARDL model as given in equation equations (4.23) and (4.24) for debt and tax financed government expenditure respectively. Tables 23 and 25 show the results, respectively.

Table 23: Results for debt-financed government expenditure

ARDL(2,3,4,4,1,2,4) regression
Sample: 1974 - 2020

Number of obs = 47
R-squared = 0.8743
Adj R-squared = 0.7110
Log likelihood = -60.077758
Root MSE = 1.3318

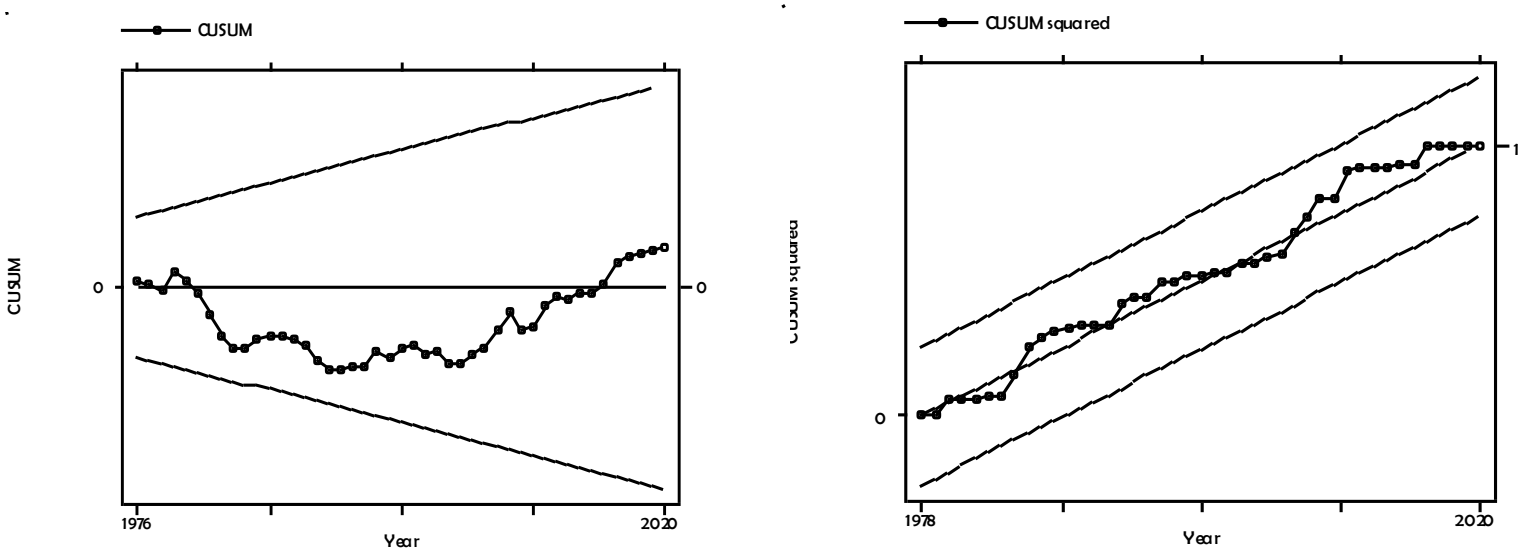
Dependent variable: D.GDP	Coef.	Std. Err.	t	P-value
ECM-1	-0.959	0.183	-5.250	0.000***
long run Coefficients				
Investment expenditure	0.484	0.266	1.820	0.084*
Consumption expenditure	-0.142	0.417	-0.340	0.738
Tax revenue	0.161	0.235	0.690	0.500
Unemployment	-0.700	0.347	-2.020	0.057*
Exchange rate	-0.035	0.032	-1.090	0.287
Domestic credit	0.203	0.135	1.510	0.148
Short run Coefficients				
GDP				
LD.	0.214	0.142	1.500	0.148
Investment expenditure				
D1.	-0.006	0.249	-0.020	0.981
LD.	0.248	0.212	1.170	0.256
L2D.	-0.353	0.140	-2.520	0.021**
Consumption expenditure				
D1.	-0.412	0.374	-1.100	0.284
LD.	0.027	0.401	0.070	0.947
L2D.	0.894	0.364	2.450	0.023**
L3D.	-0.482	0.369	-1.300	0.207
Tax revenue				
D1.	0.141	0.244	0.580	0.569
LD.	-0.368	0.284	-1.300	0.209
L2D.	0.191	0.250	0.760	0.454
L3D.	0.543	0.247	2.200	0.040**
Unemployment				
D1.	0.888	0.269	3.290	0.004***
Exchange rate				
D1.	-0.069	0.062	-1.120	0.278
LD.	-0.086	0.055	-1.550	0.136
Domestic credit				
D1.	-0.483	0.167	-2.890	0.009***
LD.	0.048	0.165	0.290	0.773
L2D.	0.249	0.159	1.570	0.133
L3D.	-0.331	0.139	-2.390	0.027**
Constant	-0.652	10.852	-0.060	0.953

Source: Author's own computation using STATA; ***p<0.01, **p<0.05, *p<0.1

Table 24: Post estimation diagnostics

Test method	H0:	Chi	Prob>Chi2
Durbin's alternative test for autocorrelation	No serial correlation	chi2=4.046	0.1322
White's test	Homoskedasticity	chi2(46) =47	0.4313
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	Constant variance	chi2(1) = 0.00	0.9914
Ramsey RESET test	Model has no omitted variables	F(3, 17) = 0.63	0.6068

Source: Author's own computation



The R-squared value of 0.87 in Table 23 regression results show that the explanatory variables account for 87 percent of the variation in economic growth depending on the mode of financing government expenditures. The long run regression shows that public investment funded with debt significantly boosts economic growth. Economic growth increases by 0.48 percentage points for every one percent increase in investment spending financed by borrowing. The results demonstrate, even though debt-financed consumption expenditure is insignificant in the long-run, a one percent increase in consumption expenditure funded by debt results in a 0.14 percent loss in economic growth.

In the long-run, unemployment has a detrimental impact on the economy. Economic growth is reduced by 0.7 percent for every one percent increase in unemployment.

Investment expenditure's first difference and first lag of first difference have insignificant short-term effects on economic growth. However, the second lag of an increase in debt-financed investment expenditures has a short-term negative impact on economic growth. Economic growth is significantly impacted by the second lag of the first difference of consumption spending. Debt financed consumption spending increases of one percent translates to 0.89 percent increase in economic growth. Domestic resource mobilization as indicated by the coefficient of the tax revenue, unemployment rate and domestic credit also affect economic growth in the short run.

The post estimation diagnostics given in table 24 show the model has no serial correlation, has constant variance and it has no omitted variable. The model is also stable as indicated by the CUSUM and CUSUMSQ plots.

Table 25: Results for tax-financed government expenditure

ARDL (4,3,3,3,1,0) regression
Sample: 1974 - 2020

Number of obs = 47
R-squared = 0.8073
Adj R-squared = 0.6717
Log likelihood = -70.129156
Root MSE = 1.4195

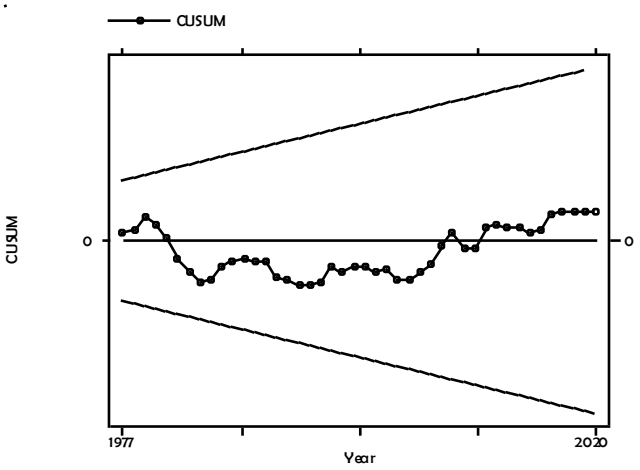
Dependent variable:D.GDP	Coef.	Std.Err.	t	p-value
ECM-1	-0.867	0.196	-4.420	0.000***
Long run Coefficients				
Investment expenditure	0.326	0.157	2.080	0.047**
Consumption expenditure	0.285	0.330	0.870	0.394
Total debt service	0.002	0.114	0.020	0.984
Unemployment	-0.826	0.376	-2.190	0.037**
Domestic credit	0.086	0.093	0.920	0.365
short run Coefficients				
GDP				
LD.	0.234	0.170	1.380	0.180
L2D.	0.161	0.148	1.090	0.284
L3D.	0.337	0.135	2.500	0.019**
Investment expenditure				
D1.	-0.034	0.152	-0.230	0.823
LD.	0.152	0.144	1.060	0.299
L2D.	-0.291	0.120	-2.430	0.022**
Consumption expenditure				
D1.	-0.188	0.320	-0.590	0.562
LD.	-0.339	0.350	-0.970	0.340
L2D.	1.064	0.319	3.340	0.002**
Total debt service				
D1.	0.304	0.208	1.460	0.156
LD.	0.029	0.221	0.130	0.896
L2D.	0.656	0.221	2.970	0.006***
Unemployment				
D1.	0.721	0.244	2.950	0.006***
Constant	-0.148	6.741	-0.020	0.983

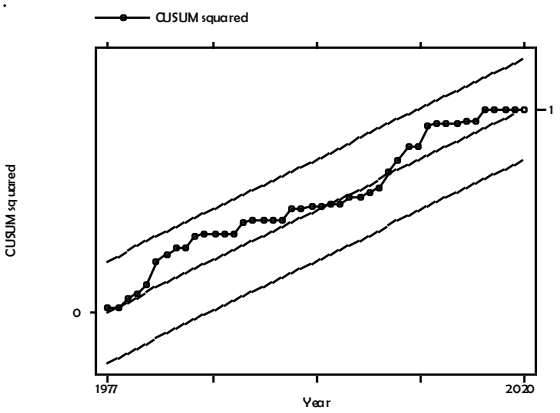
Source: Author's own computation; ***p<0.01, **p<0.05, *p<0.1 [significance at 1%, 5% and 10% respectively.

Table 26: Post estimation diagnostics

Test method	**H0:**	**Statistic**	**Prob>Chi2**
Durbin-Watson	No serial correlation	d-statistic(20, 47) = 1.65	-
Breusch-Godfrey LM test for autocorrelation	No serial correlation	Chi2= 2.142	0.1433
White's test	Homoskedasticity	chi2(46) = 47.00	0.4313
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	Constant variance	chi2(1) = 0.91	0.3411
Ramsey RESET test	No omitted variables	F(3, 24) = 0.14	0.9353

Source: Author's own computation





The long-term results presented in Table 25 demonstrate that economic growth increases by 0.31 percent for every one percent increase in investment spending that is financed by domestic resource mobilization. However, using tax revenue to finance consumption expenditures has a short-term insignificant impact on economic growth. Long-term economic effect of unemployment is negative.

The second lag of the investment expenditure is significant and negative. This shows that a 1% increase in investment spending funded by taxes causes 0.29 percent decline in economic growth. The consumption expenditure's second lag is positive and significant. The second lag of the consumption expenditure is positive and significant which implies that a one percent increase in the consumption expenditure financed by tax revenue causes economic growth to increase by more than one percent. The short run effect of the second lag of the total debt service is positive and significant implying that in the short run, debt is not harmful to economic growth. Contrary to theoretical expectation, the short run effect of unemployment to economic growth is positive. The error correction term shows a moderate rate of adjustment to the equilibrium at 87 percent if there is a shock to the economic growth in the previous period. The post estimation diagnostics in

table 26 show that the model passed all the post estimation diagnostics. The model is also stable as indicated by the CUSUM and CUSUMSQ plots.

4.4.5 Discussion of the results

The results in Tables 23 and 25 show that using debt to finance public investment has a positive long-term but negative short-term impact on economic growth. The outcome is consistent with Turnovsky's (1995) empirical conclusion that financing investment through the issuance of debt boosts growth rate. The results, however, are at odds with Greiner and Semmler (2000) findings which showed that debt financed investment, has a detrimental economic growth effect. The findings also showed that the long run effect of debt financed consumption expenditure on economic growth is negative. This supports the theoretical claim that public borrowing should not be used to finance public consumption expenditures but instead should be used to finance productive investments.

Using tax revenue to fund public consumption spending has positive growth effect both in the short run and in the long run. The long-term impact is, however, is insignificant. Tax revenue financing of public investment has a positive but significant impact on economic growth. The results are consistent with those of Barro (1990), Cashin (1995), and Simpson (2004). Although the results suggested that investment spending has a positive impact when it is financed by taxes and debt, the effects of the two can be compared. The weight of the coefficient associated with public investment spending is taken into consideration when ranking. In this sense, public investment financed by debt boosts economic growth more than those supported by tax income.

Public consumption expenditure funded by using debt hampers economic growth. The benefits of tax-financed public spending on economic growth are both long- and short-term, suggesting

that policymakers can cut the deficit by making sure the tax system is efficient, which will generate more money to pay for expenditures. Due to the detrimental impact of debt on consumer spending, the government should limit its reliance on external borrowing because it will stifle future economic growth.

4.5 Conclusion and Policy Implications

4.5.1 Conclusions

The study used ARDL model to investigate the economic growth effect when tax revenue and debt are used to finance government budge using ARDL model. The regression results demonstrated that using tax revenue and debt to fund public investment spending promotes economic growth over the long term.

However, financing investment using debt has a negative effect on economic growth during the second period. Also, in the long run debt has a negative but insignificant effect on economic growth when used to fund consumption expenditures. The short run effect of debt-financed consumption expenditure is positive during the second period. However, its effect is negative in the first and the third period implying the detrimental effect of using debt to finance government purchases expenditure. The findings showed that, as opposed to government consumption, boosting public investment spending would significantly increase economic growth.

The results also indicated that, despite the positive effects of the two public investment financing options, tax-financed investment had less influence on economic growth than debt-financed investment.

4.5.2 Policy Implications

The essay derives the following key policy implications:

First, the study was able to prove that financing public investments with debt and taxes fosters economic growth over the long term. In contrast to tax-financed public investment, debt-financed public investment had a greater overall influence on economic growth. In this sense, it is advised that Kenya's fiscal authorities pursue a strategy of funding public investments through debt rather than tax income.

Second, the study suggests using debt to finance investments rather than government consumption due to the detrimental effects of debt-financed public consumption. Given the negative consequences of huge debt buildup on growth performance, domestic revenue mobilization is key to fund government programmes. Tax-financed government consumption has a positive impact on economic growth. The government can increase revenue through expanding the tax base to include the informal sector, implementing an effective tax system, and reducing tax evasion and tax avoidance.

Thirdly, in order to promote economic growth, policymakers must embrace fiscal restraint, which includes responsible debt management, effective use of domestic revenue, and an effort to reallocate limited resources.

2.5.3 Limitations of the Study

The legislative arm of the government, which has an effect on public debt and taxation levels, and ultimately welfare distribution, mostly influences financing government budget. In this regard, the study did not take into account political decision making which normally distorts public policies and investment in public goods necessary for improving economic growth.

2.5.4 Suggestions for further Research

To better understand the implications of debt and tax-financed government budget it would be advisable to incorporate political decision making in a dynamic general equilibrium model since policies are assumed not to be made by a benevolent planner by the legislature. Further, a theoretical analysis based on tax smoothing approach to fiscal policy can provide a better synthesis on the linkage between public spending, taxation and debt dynamics.

Finally, this study excluded seigniorage from the analysis and therefore, further research can also look into the effect of seigniorage on output growth if the data is available.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, POLICY IMPLICATIONS

5.1 Thesis summary

This thesis sought to investigate the effect of government spending on economic growth in Kenya using time series data from 1970 to 2020. Another goal of the thesis was to ascertain how government investment affected private investment. Additionally, specific attention was paid to how different public spending financing alternatives would affect economic development, particularly how switching between tax- and debt-financed public spending would affect the economy.

The first chapter presented the general background focusing on the linkage between spending and growth. This chapter basically formed the basis that anchored all the essays. The first essay used ARDL model to analyze the effect of the composition of public spending on economic growth. The results showed development expenditure promotes economic growth in the long run while consumption expenditure has no significant effect on economic growth.

The results further showed that infrastructure expenditure is an important driver of economic growth. However, expenditure on health and education had positive but insignificant effect on economic growth in Kenya. Domestic savings had a positive influence on economic growth while inflation rate coupled with rising unemployment impacts economic growth negatively.

The second essay determined how public investment affects private investment taking into consideration volatility of the investment. The theoretical framework for this essay was based on flexible accelerator model, and a VECM for the analysis. The findings indicated public investment enhances private investment. The results further indicated the error correction

coefficient was significant with the correct sign as predicted by theory. The error correction coefficient indicated roughly 25 percent of the private sector's disequilibrium is corrected if the system happens to be out of balance due to a shock in private investment.

The third essay sought to analyze the implications of sources of financing government spending on economic growth in Kenya. The estimated results indicated that funding public investment using debt and tax revenue accelerates economic growth in the long run. However, the results indicated that using debt to finance consumption expenditure affects economic growth negatively while consumption funded using tax revenue enhances growth. In addition, the findings showed the positive effect on economic growth from financing public investment using debt was higher than when financed using taxes.

5.2 Conclusions

Three things were examined in this study: the composition of public expenditure and its impact on economic growth; the impact of public investment on private investment; and the effects of public spending funding sources on economic growth in Kenya. To achieve these objectives, ARDL and VECM models were used for the analysis. This study had three main conclusions. First, development expenditure, expenditure on education, health and infrastructure promote economic growth.

Second, public investment influences private investment. Thirdly, financing public investment using debt is more growth enhancing than using tax revenue. Further, debt has a negative effect on economic growth if it used to fund consumption expenditure while government consumption expenditure financed using tax revenue influences economic growth. Therefore, it is imperative that productive, non-productive as well as the sectoral expenditure composition is important in

promoting economic growth in Kenya. In addition, public capital complements private investment which is important since it enhances private sector productivity (Belloc and Vertova, 2006). The method of financing government budget is also important because it affects economic growth due to high debt levels and deficits.

5.3 Policy Implications

The coefficient of development expenditure was found to be statistically significant implying it is a crucial determinant of economic growth in Kenya. Therefore, policies oriented to improving public investment in order to increase domestic firms' productivity are advocated for. The government should direct most of the resources to finance public investment rather than government consumption. This can be achieved through reallocation of government expenditure from recurrent to development expenditure and monitor absorption capacity of development spending in all government agencies.

Although expenditure on education and health had insignificant effect in enhancing the long run effect on economic growth, the positive effect cannot be ignored. Policies, should therefore, be directed towards allocating additional resources in the education and health sectors to enhance human capital development.

Unemployment influenced economic growth negatively. The government should develop policies and strengthen measures that create decent employment opportunities for unemployed persons to minimize the undesirable effect of unemployment on GDP growth. This can be done by emphasizing work-related training such as internships to college graduates in order to improve the skills of unemployed youth who are the majority. Further, the government should promote industrial growth and development in order to absorb the unemployed persons.

Domestic savings coefficient had a positive and was significantly associated with economic growth. To promote domestic saving, effort should be directed on policies that ensure fiscal consolidation and reforms as well as ensuring the efficiency of public enterprises. In addition, policies that promote private savings through increased investment in infrastructure and reduced regulatory requirement for small enterprises are also advocated for. Such policies would possibly lead to domestic resource mobilization that could be directed to investments thereby enhancing the economy's future production capacity.

Public investment showed to positively enhance private investment as confirmed by the coefficient of the public investment which is quite significant. The findings indicated the significance of public capital in invigorating private investment in Kenya. The government should, therefore, implement investment policies in various sectors of the economy to promote private investment. This can be done by articulating strategies and policies intended to remove bottlenecks associated with the shortage of physical capital and reduce transaction costs.

Real interest rate coefficient was positive and significant. This implied that the cost of investment as captured by credit cost has been on the decline possibly due to increased financial surveillance by the Central Bank which has to improved transparency in the financial sector. Therefore, it is important the government continue upholding the enacted financial sector regulatory policies to reduce credit cost. Lowering credit cost will enable investors to venture into diverse investment opportunities. Financial sector liberalization, creating competition by licensing more domestic banks to venture in the market can play a significant role in further reducing the cost of credit.

The cost of living as measured by increases in inflation leads to a reduction in private consumption spending. Policies should be designed to reduce inflationary pressure in order to

stimulate private consumption. In addition, well-targeted government spending programs could also promote private consumption spending and therefore enhance demand for domestic goods. These policies would ensure increased demand for domestic goods, increase in sales and hence profits which can be ploughed back for investment to increase firms' production capacities.

The study established that although both methods of financing were found to promote economic growth, debt-financed investment had a larger impact in terms of magnitude on economic growth compared to tax-financed investment. The policy implication is therefore for the government to use debt to finance public investment rather than using tax revenues. Moreover, the study recommends debt to be used to finance public investment instead of government consumption due to its negative effect on economic growth.

Since high debt accumulation has a negative impact on economic growth the government should put more emphasis on mobilizing domestic resources to finance expenditures. The government can increase revenue through expanding the tax base to include the informal sector, implementing an effective tax system, and reducing tax evasion and tax avoidance. In addition, fiscal discipline such as prudent debt management and efficient use of domestic resources can positively boost economic growth.

5.4 Contribution to Knowledge

The study used the endogenous growth framework to analyze the growth effect of government spending in contrary to the classical approach applied by most of the previous empirical work. In this case, government policy in terms of spending allocation was allowed to alter the growth effect of the economy by indicating whether the expenditures are productive or unproductive.

The findings supported the importance of fiscal policy in stimulating economic growth in Kenya especially by improving investment in infrastructure and social spending.

This study also contributes to knowledge by investigating the complementarity or substutability of public and private investment under the flexible accelerator model. Moreover, other than using the traditional determinants of private investment, the study introduced public capital in the model. The findings ruled out crowding-out effect of private investment affirming the importance of public investment in the economy.

Additionally, the study contributed to knowledge by determining how tax and influences economic growth. To this end, a dynamic overlapping generation (OLG) macroeconomic model was used to effectively inform policymakers on the appropriate option of financing government activities. To illustrate the actual situation of the majority of countries the study considered unbalanced government budget constraint by introducing deficit financing in the analysis.

The financing decision between tax revenue and debt was introduced in the government budget constraint to determine how variations between the two alter the long-run growth. The findings supported the theoretical assertion that financing government consumption using debt is detrimental to economic growth. In addition, the findings reinforced the popular notion that public investment would be beneficial to the economy when financed using debt as opposed to increasing taxation measures.

5.5 Limitations of the Study

The limitation of the study emanated from data compilation. Specifically, data on aggregate infrastructure spending was not available from Kenya National Bureau of Statistics and had to be aggregated from different types of infrastructures among them electricity, transport and

communication. The data was carefully collated and put together before carrying out the analysis. In spite of this challenge, it is believed the data used to carry out the analysis provided credible and reliable results for informing policy and recommendations about the response to economic growth resulting from public spending. Another limitation was that the study excluded seigniorage as a method of financing government expenditure due to unavailability of data on money financing of government expenditure in Kenya.

5.6 Areas for Further Research

Future work can be extended to incorporate production elasticities of public capital in a dynamic model. Another important extension would be to look into tax financing of government expenditure by incorporating tax evasion which tends to reduce tax revenue. In addition, further research could also be extended by incorporating seigniorage in the model.

Further, with the availability of data analyzing the crowding-in-out effect by sector to test the robustness of the effect at micro level is another avenue for future research. This will provide an understanding of which type of public investments has more impact on private investment. Important consideration ought to be on the institutional reforms to establish their effect on private investment.

Since the legislature is always at the center of government policies and that most of the public policy choices are made by the political class, this study can therefore be extended by incorporating the political economy theory to account for the economy-wide effect of pork barrel spending which gives rise to inefficiencies in legislative decision making.

Finally, the welfare effect of government expenditures, public debt, and taxation policies is also another way to extend the study.

REFERENCES

Abbas, A., Abbas, Z., and Mustifa, G. (2022). An empirical analysis of sector-wise private investment for a small open economy. *Development Studies Research*, *9*(1), 21-35.

Abiad, M. A., Furceri, D., and Topalova, P. (2015). *The macroeconomic effects of public investment:* Evidence from advanced economies. International Monetary Fund.

Acemoglu, D., Aghion, P., and Zilibotti, F. (2006). Distance to frontier, selection, and economic growth. *Journal of the European Economic association*, *4*(1), 37-74.

Ackah, I., Adu, F., and Takyi, R. O. (2014). On The demand dynamics of electricity in Ghana:

Adam, C. S., and Bevan, D. L. (2001). Fiscal policy design in low-income countries.

Agénor, P. R. (2012). Public capital, growth and welfare. In *Public Capital, Growth and Welfare*. Princeton University Press.

Agénor, P. R., and Montiel, P. J. (2015). Development macroeconomics. In *Development Macroeconomics*. Princeton university press.

Agénor, P. R., and Neanidis, K. C. (2011). The allocation of public expenditure and economic growth. *The Manchester School*, *79*(4), 899-931.

Agénor, P. R., and Yilmaz, D. (2017). The simple dynamics of public debt with productive public goods. *Macroeconomic Dynamics*, *21*(4), 1059-1095.

Aghio, P., Boustan, L., Hoxby, C., and Vandenbussche, J. (2009). The causal impact of education on economic growth: Evidence from U.S. Unpublished paper.

Ahmad, I., Qayyum, A., and Salam, A. (2008). Dynamic modeling of private investment in agricultural sector of Pakistan [with Comments]. *The Pakistan Development Review*, 517-530.

Ahmad, R. (2012). *Growth and investment: empirical evidence at macro and firm level*. Doctoral dissertation, University of Southampton.

Ahmed, H., and Miller, S. M. (2000). Crowding-out and crowding-in effects of the components of government expenditure. *Contemporary Economic Policy*, *18*(1), 124-133.

Ahmed, I., and Qayyum, A. (2007). Do public expenditure and macroeconomic uncertainty matter to private investment? Evidence from Pakistan. *The Pakistan Development Review*, 145-161.

Akkina, K. R., and Celebi, M. A. (2002). The determinants of private fixed investment and the relationship between public and private capital accumulation in Turkey. *The Pakistan Development Review*, 243-254.

Alam, K. M., Li, X., Baig, S., Ghanem, O., and Hanif, S. (2021). Causality between transportation infrastructure and economic development in Pakistan: An ARDL analysis. *Research in Transportation Economics*, *88*, 100974.

Al-Fawwaz, T. M. (2015). The impact of government expenditures on economic growth in Jordan (1980-2013). *International Business Research*, *9*(1), 99.

Alfred, P.M., and Sagales, O.R. (2001). Infrastructure and private sector performance in Spain. *Journal of policy modeling*, 23(4), 371-384.

Ali, A. O., Mohamed, J. M., and Mohamed, M. O. (2022). Fiscal policy and economic growth

Alshahrani, M. S. A., and Alsadiq, M. A. J. (2014). Economic growth and government spending in Saudi Arabia*: An empirical investigation*. International Monetary Fund.

Aschauer, D A (1989): 'Is Public Expenditure Productive?' *Journal of Monetary Economics*, 23, 177-20.

Aschauer, D. A. (1988). *Does public capital crowd out private capital?*.Research department, Federal Reserve Bank of Chicago.

Aswata, M. B., Nnyanzi, J. B., and Bbale, J. M. (2018). Debt, corruption and investment in East Africa: A panel ARDL Analysis. *Modern Economy*, *9*(12), 2012-2038.

Attari, M. I. J., and Javed, A. Y. (2013). Inflation, economic growth and government expenditure of Pakistan: 1980-2010. *Procedia Economics and Finance*, *5*, 58-67.

Baaziz, Y. (2015). Does public debt matter for economic growth? Evidence from South Africa. *Journal of applied business research*, 31(6), 2187–2196.

Baidoo, S. T., Duodu, E., Kwarteng, E., Boatemaa, G., Opoku, L., Antwi, A., and Akomeah, R. A. (2021). Does government debt promote economic growth? New empirical evidence from Ghana. *International Journal of Public Sector Performance Management*, *7*(2), 192-216.

Bang, K. (1998). Central bank independence, budget deficits, seigniorage and inflation. University of Missouri-Columbia.

Barro, R. J. (1990). Government spending in a simple model of endogeneous growth. *Journal of political economy*, *98*(5), 103-125.

Barro, R. J. (1991). Economic growth in a cross section of countries. *The quarterly journal of economics*, *106*(2), 407-443.

Barro, R. J., and Sala-i-Martin, X. (2004). Economic Growth: MIT Press. *Cambridge, Massachusettes*.

Batool, I., and Goldmann, K. (2021). The role of public and private transport infrastructure capital in economic growth. Evidence from Pakistan. *Research in Transportation Economics*, *88* (10)38-86.

Baumol, W. J. (1967). Macroeconomics of unbalanced growth: the anatomy of urban crisis. *The American economic review*, *57*(3), 415-426.

Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *Journal of political economy*, *70*(5, Part 2), 9-49.

Becker, G.S. (1964). Human capital: *A theoretical and empirical analysis with special reference* to education. New York: Columbia University Press.

Belloc, M., and Vertova, P. (2006). Public investment and economic performance in highly indebted poor countries: An empirical assessment. *International Review of Applied Economics*, *20*(2), 151-170.

Bergh, A., and Henrekson, M. (2011). Government size and growth: a survey and interpretation of the evidence. *Journal of Economic Surveys*, *25*(5), 872-897.

Blanchard, O. J., and Leigh, D. (2013). Growth forecast errors and fiscal multipliers. *American Economic Review*, *103*(3), 117-20.

Blankenau, W. F., and Simpson, N.B. (2004). Public education expenditure and growth. *Journal of development economics,* 73(2), 583-605.

Blattman, C., and Miguel, E. (2010). Civil war. *Journal of Economic literature*, *48*(1), 3-57.

Bleaney, M.F, Gemmell, N.,. and Kneller, R. (2001). Testing the endogenous growth model: public expenditure, taxation, and growth over the Long Run. *Canadian Journal of Economics*, 34 (1), 36-57.

Blejer, M. I., and Khan, M. S. (1984). Government policy and private investment in developing countries. *Staff papers*, 31(2), 379-403.

Bloom, D. E., and Canning, D. (2000). The health and wealth of nations. *Science*, *287*(5456), 1207-1209.

Bose, N., Haque, M. E., and Osborn, D. R. (2007). Public expenditure and economic growth: A disaggregated analysis for developing countries. *The Manchester School*, *75*(5), 533-556.

Bose, N., Holman, J. A., and Neanidis, K. C. (2007). The optimal public expenditure financing policy: Does the level of economic development matter?. *Economic Inquiry*, *45*(3), 433-452.

Bucci, A., and Del Bo, C. (2012). On the interaction between public and private capital in economic growth. *Journal of Economics*, *106*(2), 133-152.

Buiter, W. H. (1977). Crowding out and the effectiveness of fiscal policy. *Journal of public economics*, 7(3), 309-328.

Buiter, W. H. (2007). Seigniorage. National Bureau of Economic Research Online. Available from: http://www.nber.org/papers/w12919.pdf.

Calderón, C., Easterly, W., and Servén, L. (2003). Infrastructure compression and public sector solvency in Latin America. *The Limits of Stabilization: Infrastructure, Public Deficits, and Growth in Latin America. Stanford University Press and the World Bank*, 119-38.

Cashin, P. (1995). Government spending, taxes, and economic growth. *Staff Papers*, *42*(2), 237-269.

Cashin, P., and McDermott, C. J. (2002). The long-run behavior of commodity prices: small trends and big variability. *IMF staff Papers*, *49*(2), 175-199.

Castaño, M. S. (2007). The influence of socioeconomic factors on economic growth. *International Advances in Economic Research*, *13*(2), 139-145.

Cavallo, E., and Daude, C. (2011). Public investment in developing countries: A blessing or a curse? *Journal of Comparative Economics*, *39*(1), 65-81.

Cebula, R. J. (1978). An empirical analysis of the "crowding out" effect of fiscal policy in the United States and Canada. *Kyklos*, *31*(3), 424-436.

Cecchetti, S. G., Schoenholtz, K. L., and Fackler, J. (2006). *Money, banking, and financial markets* (Vol. 4). McGraw-Hill/Irwin.

Chatterjee, S., and Turnovsky, S. J. (2005). Financing public investment through foreign aid: Consequences for economic growth and welfare. *Review of International Economics*, *13*(1), 20-44.

Chaudhry, I. S., Ameer, G., and Rizvi, S. A. A. (2016). Public Spending and Macroeconomic Performance in Pakistan: An Empirical Analysis. *Review of Economics and Development Studies*, *2*(2), 103-116.

Chen, B.L. (2006). Economic growth with an optimal public spending composition. *Oxford economic papers*, 58(1), 123-136.

Chen, S. T., and Lee, C. C. (2005). Government size and economic growth in Taiwan: A threshold regression approach. *Journal of Policy Modeling*, *27*(9), 1051-1066.

Cheteni, P. (2013). Transport infrastructure investment and transport sector productivity on economic growth in South Africa (1975-2011). *Mediterranean Journal of Social Sciences*, *4*(13), 761.

Christie, L. and Tamoya, A. (2012). Government expenditures, financing and economic growth in Cape Verde. *Journal of economic development studies*, 2(4), 1-19.

Christie, T. A. (2011). Essays on Fiscal policy and economic growth.

Christie, T. A., and Rioja, F. K. (2012). Debt and taxes: Financing productive government expenditures. *Job Market Paper*, 1-35.

Coen, R. M. (1971). The effect of cash flow on the speed of adjustment. *Tax incentives and capital spending*, 131-96.

Cole, M. A., and Neumayer, E. (2006). The impact of poor health on total factor productivity. *The Journal of Development Studies*, *42*(6), 918-938.

Connolly, M., and Li, C. (2016). Government spending and economic growth in the OECD countries. *Journal of Economic Policy Reform*, *19*(4), 386-395.

Conrad, D. A. (2011). The level-specific effects of education on economic growth: Evidence from four Caribbean countries. *The journal of developing areas*, 45(l), 279-290.

Cooray, A. (2009). Government expenditures, governance and economic growth. *Journal of comparative economic studies*, 51(3), 401-418.

Dasgupta, R. (2016). Integration and dynamic linkages in international stock markets in Light of the recent Us Financial Crisis-An Introspect. *Journal of economics and economic education research*, 17(2), 29.

De Gregorio, J. (1993). Inflation, taxation and long-run growth. *Journal of monetary economics*, 3(1), 271-298.

De Haan, J., Lundström, S., and Sturm, J. E. (2006). Market-oriented institutions and policies and economic growth: A critical survey. *Journal of Economic Surveys*, *20*(2), 157-191.

de Oliveira, M. F. A. F. (2013). Optimal debt adjustment in a nonlinear endogenous growth model.

Del Bo, C., and Florio, M. (2012). Public enterprises, planning and policy adoption: three welfare propositions. *Journal of economic policy reform*, 15 (4), 263–279.

Desta, T., Reta, M., and Girma, B. (2022). Factors Affecting Tax Revenue in Ethiopia: Autoregressive Distributed Lag Approach.

Devarajan, S., Swaroop, V., and Zou, H.F (1996). The composition of public expenditure and economic growth. *Journal of Monetary Economics*, 37(2), 313-344.

Diamond, P. A. (1965). National debt in a neoclassical growth model. *The American Economic Review*, *55*(5), 1126-1150.

Dickey, D. A., and Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association*, *74*(366a), 427-431.

Dilrukshini, W. A. (2009). Public expenditure and economic growth in Sri Lanka: Cointegration analysis and causality testing. *Staff Studies*, *34*(1).

Dornbush, R. (1999). *Macroeconomics.* 7th edition. Princeton: Princeton University Press.

Dudzevičiūtė, G., Šimelytė, A., and Liučvaitienė, A. (2018).Government expenditure and economic growth in the European Union countries. *International Journal of Social Economics*, *45*(2), 372-386.

Durlauf, S. N., and Blume, L. (Eds.). (2008). *The new Palgrave dictionary of economics* (Vol. 6). Basingstoke: Palgrave Macmillan.

Dzhumashev, R. (2014). The two way relationship between government spending and Corruption and its Effects on Economic Growth. *Contemporary economic policy*, 32(2), 403-4 19.

Easterly, W., and Irwin, T. (2007). Public investment and fiscal stability: *policy research working paper,* 4158, Washington DC: World Bank.

Easterly, W., and Levine, R. (1997). Africa's growth tragedy: policies and ethnic divisions. *The quarterly journal of economics*, 1203-1250.

Ehrhart, H., Minea, A., and Villieu, P. (2014). Debt, seigniorage, and the growth laffer curve in developing countries. *Journal of Macroeconomics, 42*, 199-210.

Elliott, G. (1999). Efficient tests for a unit root when the initial observation is drawn from its unconditional distribution. *International Economic Review*, *40*(3), 767-784.

Elmendorf, D. W., and Mankiw, N. G. (1999). Government debt. *Handbook of macroeconomics*, *1*, 1615-1669.

Eltejaei, E. (2015). Oil, government's budget and economic growth in Iran. *International Journal of Economic Policy in Emerging Economies, 8*(3), 213-228.

Erden L., and Holcombe, R. G. (2005). The effects of public investment on pricvate investment in developing economies. *Public finance review,* 33(5), 575-602.

Erden, L., and Holcombe, R. (2006). The linkage between public and private investment: a co-integration analysis of panel of developing countries. *Eastern economic journal,* 32(3), 479-492.

Erenburg, S.J., and Wohar, M. (1995). Public and private investment: are there causal linkages. *Journal of macroeconomics*, 17(1),1-30.

Fatima, A., and Waheed, A. (2011). Effects of macroeconomic uncertainty on investment and economic growth: evidence from Pakistan. *Transition studies review,* 18(1), 112-123.

Feldstein, M. (1980). Fiscal policies, inflation and capital formation, *American Economic Review*, 70, 636-650.

Feldstein, M. (1985). Debt and taxes in the theory of public finance. *National Bureau of Economic Research Working paper*, 1433.

Fölster, S., and Henrekson, M. (2001). Growth effects of government expenditure and taxation in rich countries. *European economic review*, *45*(8), 1501-1520.

Forni, L., Monteforte, L., and Sessa, L. (2009). The general equilibrium effects of fiscal policy: Estimates for the euro area. *Journal of Public economics*, *93*(3-4), 559-585.

Forte, F., and Magazzino, C. (2011). Optimal size government and economic growth in EU countries. *Economia politica*, *28*(3), 295-322.

Fujita, M., and Thisse, J.F. (2002). Economics of agglomeration: cities, industrial location and regional growth. Cambridge: Cambridge University Press.

Galbis, V. (1979). Money, investment, and growth in Latin America, 1961-1973. *Economic Development and Cultural Change*, *27*(3), 423-443.

Garidzirai, R., and Muzindutsi, P. F. (2020). a Panel ARDL analysis of the productivity of key economic sectors contributing to local economic growth in an emerging country. *Studia Universitatis Babes-Bolyai, Oeconomica*, *65*(1).

Gashti, P. H., Mohammadi, T. and Maleki, B. (2012). The effect of government expenditure composition on economic growth: Evidence on ECO countries. *Economics and Finance Review*, *2*(5), 14-21.

Gerrard, B. (1996). Competing schools of thought in macroeconomics an ever emerging consensus? *Journal of Economic Studies*.

Ghali, K. (2003). Government spending, budget financing and economic growth: the Tunisian experience. *Journal of developing area*, 36(2), 19-37.

Ghani, E. and Ud-din, M. (2006). The impact of public investment on economic growth in Pakistan. *Pakistan development review*, 45(1), 89-98.

Ghani, E., and Husnain, M.I (2010). Expenditure-growth nexus: does the source of finance matter? empirical evidence form selected South Asian Countries. *Pakistan development review*, 49(4), 631-640.

Ghura, D. (1995). Effects of macroeconomic policies on income growth, inflation, and output growth in Sub-Saharan Africa. *Journal of policy Modeling*, *17*(4), 367-395.

Greiner, A., and Fincke, B. (2015). Productive government spending, public debt and growth. In *Public Debt, Sustainability and Economic Growth* (pp. 147-203). Springer, Cham.

Greiner, A., and Semmler, W. (2000). Endogenous growth, government debt and budgetary regime. *Journal of macroeconomics,* 30(1), 415-427.

Greiner, A., Semmler, W., and Gong, G. (2005). *The forces of economic growth: A time series perspective*. Princeton University Press.

Gu, Y., Guo, J., Liang, X., and Zhao, Y. (2022). Does the debt-growth link differ across private and public debt? Evidence from China. *Economic Modelling*, *114*, 105930.

Gu, Y., Guo, J., Liang, X., and Zhao, Y. (2022). Does the debt-growth link differ across private and public debt? Evidence from China. *Economic Modelling*, *114*, 105930.

Gupta, N. (2005). Partial privatization and firm performance. *The Journal of Finance*, *60*(2), 987-1015.

Haini, H., and Wei Loon, P. (2021). Examining the impact of government spending on the finance-growth nexus: evidence from post-communist economies. *Post-Communist Economies*, 1-23.

Hall, R. E., Sims, C. A., Modigliani, F., and Brainard, W. (1977). Investment, interest rates, and the effects of stabilization policies. *Brookings papers on economic activity*, *1977*(1), 61-121.

Hamida Begum, M., and Aziz, S. I. (2019). Impact of domestic credit to private sector on gross domestic product in Bangladesh. *IOSR Journal of Economics and Finance (IOSR-JEF)*, *10*(1), 45-54.

Handa, J. (2008). *Monetary economics*. Routledge.

Haque, M. E., and Kneller, R. (2015). Why does public investment fail to raise economic growth? The role of corruption. *The Manchester School*, 83(6), 623-651.

Hasnul, A. G. (2015). The effects of government expenditure on economic growth: the case of Malaysia.

Hassan, A and Salim, R. (2011). Determinants of private investment: time series evidence from Bangladesh. *Journal of developing Areas*, 229-249.

Hassan, A. K., and Salim, R. A. (2011). Determinants of private investment: time series evidence from Bangladesh. *The journal of developing areas*, 45(1), 22 9-249.

Hassan, M., and Kandil, M. (2014). Government spending decomposition: priorities toward anchoring higher growth. *Middle East development journal*, *6*(2), 232-254.

Hatemi-J, A. (2014). Asymmetric generalized impulse responses with an application in finance. *Economic Modelling*, *36*, 18-22.

Hatemi-J, A. (2014). On the interaction between government spending and economic performance in Sweden: an asymmetric approach. *Applied economic letters*, 21(15), 1099-1103.

Hermes, N., and Lensink, R. (2001). *Fiscal policy and private investment in less developed countries* (No. 2001/32). WIDER Discussion Paper.

Hokmeng, H., and Moolio, P. (2015). The Impact of Foreign Aid on Economic Growth in Cambodia: A Co-integration Approach. *Kasbit Business Journal*, *8*(1), 4-25.

Holman, J. A., and Neanidis, K. C. (2006). Financing government expenditures in an open economy. *Journal of Economic Dynamics and Control*, *30*(8), 1315-1337.

Hong, H., and Ahmed, S. (2009). Government spending on public goods: Evidence on growth and poverty. *Economic and Political Weekly*, 102-108.

Husni Madi, H., and Jaffar Hussain, S. (2007). The role of health promotion in poverty reduction. *EMHJ-Eastern Mediterranean Health Journal, 13 (6), 1249-1255, 2007*.

Hyder, K., and Qayyum, A. (2002). Crowding-out hypothesis in a vector error correction framework: a case study of Pakistan. *Pakistan development review papers* 40(4), 633-650.

Imoisi, A. (2021). Fiscal Policy and Sustainability of Public Debt: The Nigerian Experience.

Jerono, C. R. (2009). Government Expenditure Components on Economic Growth in Kenya. *International Journal of Business and Social Science, 4*(4), 256-279.

Johansen, S. (1995). *Likelihood-based inference in cointegrated vector autoregressive models*. New York: Oxford University Press.

Johansen, S., and Juselius, K (1990). Maximum-likelihood estimation and inference on cointegration with application to the demand for money. *Oxford bulletin of economics and statistics, 52(2),* 169-210.

Jorgenson, D. W. (1963). Capital theory and investment behavior.

Joshua, J. (2015). *The contribution of human capital towards economic growth in China*. Springer.

Kalyvitis, S. (2003). Public investment rules and endogenous growth with empirical evidence from Canada. *Scottish journal of political economy*, 50(1), 90-110.

Kandil, M. (2006). The growth of government spending and the money supply: Evidence and implications within and across industrial countries. *Journal of Economic Studies*.

Kandil, M. (2006). Variation in the effects of government spending shocks with methods of financing: Evidence from the US. *International review of economics and finance,* 15(4), 463-4 86.

Kandil, M. (2013). Exchange rate variability and the macro-economy: Evidence from developing and developed countries. *Global Economic Review*, *42*(2), 182-214.

Kandil, M. (2013). Variation in the fiscal multiplier with the method of financing: evidence across industrial countries. *Applied Economics*, *45*(35), 4894-4927.

Kandil, M. (2016). On the relationship between public and private spending in developing and developed countries. *The Journal of International Trade and Economic Development*, *25*(2), 165-191.

Karagol, E. (2004). A Disaggregate Analysis of Government Expenditure and Private Investment in Turkey. *Journal of Economic Cooperation, 25*(2), 131-144.

Karagol, E., and Ozdemir, K. (2006). Government Expenditures and Private Investment: Evidence from Turkey. *The Middle East Business and Economic Review*, *18*(2), 33.

Karras, G. (1994). Macroeconomic effects of budget deficits: further international evidence. *Journal of International Money and Finance*, *13*(2), 190-210.

Katrakilidis, C., and Tsaliki, P. (2009). Further evidence on the causal relationship between government spending and economic growth: The case of Greece, 1958–2004. *Acta Oeconomica*, *59*(1), 57-78.

Keynes, J. M. (1936). The General Theory of Employment, Interest, and Money, New York: H arcourt, Brace and World.

Khan, I. (2022). South Asia's sustained financial development and the role of remittance: An empirical analysis.

Kiguel, M. A., Neumeyer, P. A., and Mundial, B. (1989). Inflation and seigniorage in Argentina.

King, R. G., and Rebelo, S. (1990). Public policy and economic growth: developing neoclassical implications. *Journal of Political Economy*, *98*(5), 126-S150.

King, R. G., Plosser, C. I., and Rebelo, S. T. (1988). Production, growth and business cycles: II. New directions. *Journal of Monetary Economics*, *21*(2-3), 309-341.

Kneller, R., Bleaney, M.F., and Gemmell, N. (1999). Fiscal policy and growth: evidence from OECD Countries.*Journal of Public Economics*, 74(2), 171-190.

Kochin, L. (1974). Are future taxes anticipated by consumers. *Journal of money, credit and banking*, 6(3), 385-94.

Kuipers, S., Brakman, S., and Van Ees, H. (Eds.). (1998). *Market behaviour and macroeconomic modelling*. Springer.

Kuipers, S., Brakman, S., and Van Ees, H. (Eds.). (1998). *Market behaviour and macroeconomic modelling*. Springer.

Kunofiwa, T., and Odhiambo, N. M. (2018). Government expenditure and economic growth in Zimbabwe: an ARDL-bounds testing approach. *International journal of economic policy in emerging economies*, *6*(1), 78-90.

Landau, D. L. (1985). Government expenditure and economic growth in the developed countries: 1952-76. *Public Choice*, 459-477.

Laopodis, N.(2001). Effects of government spending on private investment. *Journal of applied economics*, 33(12), 1563-1577.

Leff, N. H., and Sato, K. (1980). Macroeconomic adjustment in developing countries: instability, short-run growth, and external dependency. *The Review of Economics and Statistics*, 170-179.

Leshoro, T. L. A. (2017). Investigating the non-linear Wagner's hypothesis in South Africa. *African Journal of Economic and Management Studies*.

Levine, R., and Renelt, D. (1992). A sensitivity analysis of cross-country growth regressions. *The American economic review*, 942-963.

Linnemann, L. (2005). Distortionary taxation, debt, and the transmission of fiscal policy shocks. *Public Finance Analysis*, 368-392.

Lopes da Veiga, J. A., Ferreira-Lopes, A., and Sequeira, T. N. (2016). Public Debt, Economic Growth and Inflation in A frican Economies. *South African Journal of Economics*, *84*(2), 294-322.

Lucas Jr, R. E. (1988). On the mechanics of economic development. *Journal of monetary economics*, *22*(1), 3-42.

Magableh, S., and Ajlouni, S. (2016). Determinants of private investment in Jordan: An ARDL bounds testing approach. *Dirasat, Administrative Sciences*, *43*(1), 263-274.

Maingi, J. (2010). The impact of Government expenditure on economic growth in Kenya. unpublished PhD dissertation, Kenyatta University.

Maitra, B., and Mukhopadhyay, C. K. (2012). Public spending on education, health care and economic growth in selected countries of Asia and the Pacific.

Makuyana, G., and M Odhiambo, N. (2019). Public and private investment and economic growth in Malawi: an ARDL-bounds testing approach. *Economic research-Ekonomska istraživanja*, *32*(1), 673-689.

Makuyana, G., and Odhiambo, N. M. (2018). Public and private investment and economic growth: An Empirical investigation. *Studia Universitatis Babes-Bolyai, Oeconomica*, *63*(2).

Mallick, H., Mahalik, M. K., and Sahoo, M. (2018). Is crude oil price detrimental to domestic private investment for an emerging economy? The role of public sector investment and financial sector development in an era of globalization. *Energy Economics*, *69*, 307-324.

Mallick, J. (2019). The effects of government investment shocks on private investment: Empirical evidence from the developing economy. *Indian Economic Review*, *54*(2), 291-316.

Mallick, S. K. (2006). Policy instruments to avoid output collapse: an optimal control model for India. *Applied Financial Economics*, *16*(10), 761-776.

Mankiw, N. G., Romer, D., and Weil, D. N. (1992). A contribution to the empirics of economic growth. *The quarterly journal of economics*, *107*(2), 407-437.

Marica, S. (2015). Essays on the composition of government spending and economic growth.

Marquis, M. H., and Reffett, K. L. (1995). The inflation tax in a convex model of equilibrium growth. *Economica*, 109-121.

Martinez-Lopez, D. (2006). Linking public investment to private investment. The case of Spanish regions. *International Review of Applied Economics*, *20*(4), 411-423.

Mbaye, E. Z. (2014). *Determinants of domestic private investments in Kenya*. Doctoral dissertation, University of Nairobi.

McPherson, M. F. (2000). *Seignorage in High Indebted Developing Countries* (No. 58). Eager Publication/BHM.

Miller, S. M., and Russek, F. S. (1997). Fiscal structures and economic growth: international evidence. *Economic Inquiry*, *35*(3), 603-613.

Mincer, J. (1974). Schooling, experience, and earnings. National Bureau of Economic Research: New York.

Minea, A., and Villieu, P. (2009). Borrowing to finance investment? The golden rule of public finance reconsidered in an endogenous growth setting. *Journal for fiscal studies,*30(1), 103-133.

Mitchell, D. J. (2005). The impact of government spending on economic growth. *The Heritage Foundation*, *1813*, 1-18.

Mohanty, R. K. (2019). Does fiscal deficit crowd out private corporate sector investment in India?. *The Singapore Economic Review*, *64*(05), 1201-1224.

Mohanty, R. K. (2020). Fiscal Deficit and Economic Growth Nexus in India: A Simultaneous Error Correction Approach. *Journal of Quantitative Economics*, 1-25.

Molonko, B., and Ampah, S. N. (2018). Moderating effect of political risk on the relationship between capital expenditure and sectoral economic growth in Kenya. *International journal of economics and finance*, *10*(1), 129-139.

Monteiro, G., and Turnovsky, S.J. (2008). The composition of productive government expenditure: consequences for economic growth and welfare. *Indian growth and development review*, 1(1), 57-83.

Muguro, J. W. (2017). E*ffect of public expenditure on economic growth in Kenya: 1963 2015* (Doctoral dissertation, Kca University).

Mundell, R. (1963). Inflation and real interest. *Journal of political economy*, *71*(3), 280-283.

Munthali, T.C. (2012). Interaction of public and private investment in Southern Africa: a dynamic panel analysis. International review of applied economics, 26 (5), 597-622.

Musgrave, R. A. (1964). On measuring fiscal performance. *The review of economics and statistics*, 213-220.

Musgrave, R.A. (1969). *Fiscal systems*. New York: Yale University Press.

Mushkin, S. J. (1962). Health as an Investment. *Journal of political economy*, *70*(5), 129-157.

Muthu, S. (2017). Does public investment crowd-out private investment in India. *Journal of Financial Economic Policy*.

Narayan, P. K., and Singh, B. (2007). Modelling the relationship between defense spending and economic growth for the Fiji Islands. *Defence and peace economics*, *18*(4), 391-401.

Ndjokou, M. M. (2013). Fiscal Policy and Growth: An Empirical Evaluation in CFA Franc Zone. *International business research*, *6*(7), 131.

Nekarda, C. J., and Ramey, V. A. (2011). Industry evidence on the effects of government spending. *American Economic Journal: Macroeconomics*, *3*(1), 36-59.

Nelson, R. R., and Phelps, E. S. (1966). Investment in humans, technological diffusion, and economic growth. *The American economic review*, *56*(1/2), 69-75.

Nguyen, C. T., and Trinh, L. T. (2018). The impacts of public investment on private investment and economic growth: Evidence from Vietnam. *Journal of Asian Business and Economic Studies*.

Niskanen, W. A. (1971). *Bureaucracy and representative government*. Routledge.

Nketiah-Amponsah, E. (2009). Public spending and economic growth: evidence from Ghana (1970–2004). *Development Southern Africa*, *26*(3), 477-497.

North, D. C., and Thomas, R. P. (1973). *The rise of the western world: A new economic history*. Cambridge University Press.

Ntembe, A., Amin, A. A., and Tawah, R. (2017). Analysis of public investments and economic growth in Cameroon. *Journal of economics and finance*, 1-24.

Nurudeen, A., and Usman, A. (2010). Government expenditure and economic growth in Nigeria, 1970-2008: A disaggregated analysis. *Business and economics journal*, *4*(1), 1-11.

Nyamongo, E. M., Misati, R. N., Kipyegon, L., and Ndirangu, L. (2012). Remittances, financial development and economic growth in Africa. *Journal of economics and business*, *64*(3), 240-260.

Nyang'aya, T. G. (2019). *Effect of Public Investment on Private Investment in Kenya* (Doctoral dissertation, University of Nairobi).

Nyasha, S., and Odhiambo, N. M. (2019). The impact of public expenditure on economic growth: A review of international literature. *Folia Oeconomica Stetinensia*, *19*(2), 81-101.

Obeng, S. K., Akoto, L., and Acquah, F. (2018). Democracy, globalization and private investment in Ghana. *Global Business Review*, *19*(1), 1-20.

Odhiambo, N. M. (2015). Government expenditure and economic growth in South Africa: An empirical investigation. *Atlantic Economic Journal*, *43*(3), 393-406.

Ofori, I. K., Gbolonyo, E. Y., and Ojong, N. (2022). Foreign direct investment and inclusive green growth in Africa: Energy efficiency contingencies and thresholds. *Energy Economics*.

Okah, J., Chukwu, K. O., and Ananwude, A. (2019). Deficit financing and economic growth in Nigeria: 1987-2017. *Asian Journal of Economics, Business and Accounting*, *12*(1), 1-13.

Omojolaibi, J. A., Okenesi, T. N. P., and Mesagan, E. P. (2016). Fiscal policy and private investment in selected West African countries. *CBN Journal of Applied Statistics*, *7*(1), 277-309.

Oshikoya, T. W. (1994). Macroeconomic determinants of domestic private investment in Africa: An empirical analysis. *Economic development and cultural change*, *42*(3), 573-596.

Oyinlola, M. A., and Akinnibosun, O. (2013). Public expenditure and economic growth nexus: Further evidence from Nigeria. *Journal of economics and international finance*, *5*(4), 146-154.

Palivos, T., and Yip, C. K. (1995). Government expenditure financing in an endogenous growth model: a comparison. *Journal of money, credit and banking*, *27*(4), 1159-1178.

Paparas, D., Richter, C., and Paparas, A. (2015). Fiscal policy and economic growth, empirical evidence in European Union. *Turkish economic review*, *2*(4), 239-268.

Paternostro, S., Rajaram, A., and Tiongson, E. R. (2007). How does the composition of public spending matter?. *Oxford Development Studies*, *35*(1), 47-82.

Pattillo, C. A., Poirson, H., and Ricci, L. A. (2004). What are the channels through which external debt affects growth?.

Peacock, A. T., and Wiseman, J. (1961). The growth of government expenditures in the United Kingdom.

Pecorino, P. (1997). The optimal rate of inflation when capital is taxed. *Journal of Macroeconomics*, *19*(4), 657-673.

Pereira, A. M. (2001). On the effects of public investment on private investment: what crowds in what? *Public Finance Review*, *29*(1), 3-25.

Pesaran, M. H., Shin, Y., and Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), 289-326.

Pescatori, A., Sandri, D., and Simon, J. (2014). Debt and growth: is there a magic threshold?14 (34). International Monetary Fund.

Phillips, P.C.B and Perron, P. (1988), Testing for a unit root in time series regression. *Journal of biometrika*, 75, 335-346.

Pradhan, R. P., and Bagchi, T. P. (2013). Effect of transportation infrastructure on economic growth in India: the VECM approach. *Research in transportation economics,* 38(1), 139-148.

Rahman, M., Islam, A. M., and Banerjee, P. K. (2016). Public versus private investment in economic growth of Bangladesh: an econometric analysis. *International Journal of Trade and Global Markets, 9*(3), 228-248.

Ramirez, M. D. (2010). *Economic and institutional determinants of FDI flows to Latin America: A panel study* (No. 1003).

Ranjan, K., and Sharma, C. (2008).Government expenditure and economic growth: evidence from India.*Journal of public finance, 6(3),* 60-69.

Rebelo, S. (1991). Long-run policy analysis and long-run growth. *Journal of political Economy, 99*(3), 500-521.

Reinert, K. A., Rajan, R. S., Glass, A. J., and Davis, L. S. (Eds.). (2009). *The Princeton encyclopedia of the world economy.(Two volume set)* (Vol. 1). Princeton University Press.

Republic of Kenya (1976). Economic survey. Kenya National Bureau of Statistics. Nairobi

Republic of Kenya (1985). Economic survey. Kenya National Bureau of Statistics. Nairobi

Republic of Kenya (1990). Economic survey. Kenya National Bureau of Statistics. Nairobi.

Republic of Kenya (1993). Economic survey. Kenya National Bureau of Statistics. Nairobi.

Republic of Kenya (1994). Economic survey. Kenya national Bureau of Statistics. Nairobi

Republic of Kenya (2003). Economic survey. Kenya National Bureau of Statistics. Nairobi.

Republic of Kenya (2010). Economic survey. Kenya National Bureau of Statistics.Nairobi

Republic of Kenya (2012). Economic survey. Kenya national Bureau of Statistics. Nairobi

Republic of Kenya (2015). Economic survey. Kenya National Bureau of Statistics. Nairobi

Republic of Kenya (2016). Economic survey. Kenya National Bureau of Statistics. Nairobi

Republic of Kenya (2018). Economic survey. Kenya National Bureau of Statistics. Nairobi.

Rioja, F. K and Christie, T. A., (2017). Fiscal position and the financing of productive government expenditures: an application to Latin America. *Journal of economic policy reform,* 20(2), 113-135.

Rioja, K.F and Christie, T.A.L (2011). Financing productive government expenditures: the importance of initial fiscal conditions. *Journal of economic and development studies*, 2(4),1-19.

Rodrik, D., Subramanian, A., and Trebbi, F. (2004). Institutions rule: the primacy of institutions over geography and integration in economic development. *Journal of economic growth*, *9*(2), 131-165.

Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of political economy*, *94*(5), 1002-1037.

Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of political economy*, *94*(5), 1002-1037.

Romp, W., and De Haan, J. (2007). Public capital and economic growth: A critical survey. *Perspektiven der wirtschaftspolitik*, *8*(Supplement), 6-52.

Rother, P., and Checherita, C. (2010). The impact of high and growing government debt on economic growth: an empirical investigation for the EURO area. *working paper series No.1237/August 2010.*

Sabir, S., and Shamshir, M. (2020). Impact of economic and social infrastructure on the long-run economic growth of Pakistan. *Sustainable water resources management*, *6*(1), 10.

Saboori, B., Sulaiman, J., and Mohd, S. (2012). Economic growth and CO2 emissions in Malaysia: a cointegration analysis of the environmental Kuznets curve. *Energy policy*, *51*, 184-191.

Sachs, J. D., Mellinger, A. D., and Gallup, J. L. (2001). The geography of poverty and wealth. *Scientific American*, *284*(3), 70-75.

Sáez, M. P., Álvarez-García, S., and Rodríguez, D. C. (2017). Government expenditure and economic growth in the European Union countries: New evidence. *Bulletin of Geography. Socio-Economic Series*, (36), 127-133.

Saleh, A. S., and Harvie, C. (2005). The budget deficit and economic performance: A survey. *The Singapore economic review*, *50*(02), 211-243.

Samuelson, P. (1939) 'Interaction between the multiplier analysis and the principle of acceleration', *Review of economics and statistics*, 21(2).

Schaltegger, C. A., and Torgler, B. (2006). Growth effects of public expenditure on the state and local level: evidence from a sample of rich governments. *Applied Economics*, *38*(10), 1181-1192.

Schultz, T. W. (1961). Investment in human capital. *The American economic review*, *51*(1), 1-17.

Seetanah, B., Fauzel, S., and Sannasee, R. (2015). Productivity spillovers of FDI in the manufacturing sector of Mauritius. evidence from a dynamic framework. *The journal of developing areas*, 49(2), 295-316.

Seitz, H., and Licht, G. (1995). The impact of public infrastructure capital on regional manufacturing production cost. *Regional Studies*, *29*(3), 231-240.

Selvanathan, E. A., Selvanathan, S., and Jayasinghe, M. S. (2021). Revisiting Wagner's and Keynesian's propositions and the relationship between sectoral government expenditure and economic growth. *Economic Analysis and Policy*, *71*, 355-370.

Şen, H., and Kaya, A. (2014). Crowding-out or crowding-in? Analyzing the effects of government spending on private investment in Turkey. *Panoeconomicus*, *61*(6), 631-651.

Serven, L., Easterly, W., and Irwin, T. (2007). Walking up the down escalator: public investment and fiscal stability.

Shiller, R. J., Tirole, J., and Williamson, O. (2008). The new Palgrave dictionary of economics.

Shin, Y., and Schmidt, P. (1992). The KPSS stationarity test as a unit root test. *Economics Letters*, *38*(4), 387-392.

Shioji, E. (2001). Public capital and economic growth: a convergence approach. *Journal of economic growth*, *6*(3), 205-227.

Shvets, S. (2020). The golden rule of public finance under active monetary stance: endogenous setting for a developing economy.

Sidrauski, M. (1967). Inflation and economic growth. *Journal of political economy*, *75*(6), 796-810.

Sims, C. (1972). Money, income, and causality. *American economic review*, 62(4), 540-552.

Sims, C.(1980). Macroeconomics and reality. *Econometrica: Journal of the econometric society*, 1-48.

Sineviciene, L., and Vasiliauskaite, A. (2012). Fiscal policy interaction with private investment: The case of the baltic states. *Engineering economics*, *23*(3), 233-241.

Singh, R. D. (1992). Government-introduced price distortions and growth: Evidence from twenty-nine developing countries. *Public Choice*, 83-99.

Smith, D. (2006). Does Britain Have Regional Justice or Injustice in its Government Spending and Taxation?. *Economic Research Council Digest*, *37*(1), 9-26.

Solow and Swan, T. W. (1956). Economic growth and capital accumulation. *Economic record*, *32*(2), 334-361.

Sørensen, P., and Whitta-Jacobsen, H. (2010). *Introducing Advanced Macroeconomics: Growth and Business Cycles 2e*. McGraw Hill.

Stillson, R. T. (1976). Some policy implications of foreign capital flows in certain developing countries. *Money and Finance in Economic Growth and Development, New York: Marcel Dekker*.

Stock, J.H., and Watson, M.W. (2001). Vector auto regressions. *Journal of economic perspectives*, 15, 101-115.

Straub, S. (2008). *Infrastructure and growth in developing countries: Recent advances and research challenges*. The World Bank.

Taloba, A., and Bhattarai, K. (2018). Fiscal Policy and Economic Growth in Oil-based economies: The case of Libya.

Temple, J., and Rodrik, D. (2003). In Search of Prosperity: Analytic Narratives on Economic Growth.

Thanh, S. D., Hart, N., and Canh, N. P. (2020). Public spending, public governance and economic growth at the Vietnamese provincial level: A disaggregate analysis. *Economic systems*, *44*(4), 100780.

Thirlwall, A. P. (2015). Keynes, economic development and the developing countries. In e*ssays on Keynesian and Kaldorian economics*, 149-177. Palgrave Macmillan, London.

Thobeka N. and Marius M. M. (2018) Can public debt stimulate public investment and economic growth in South Africa? *Cogent Economics and Finance*.

Tobin J. (1965) Money and economic growth. Econometrica 33:671–684

Tobin, J. (1969). A general equilibrium approach to monetary theory. *Journal of money, credit and banking*, 1(1).

Tsen, W. H. (2006). Granger causality tests among openness to international trade, human capital accumulation and economic growth in China: 1952–1999. *International Economic Journal*, *20*(3), 285-302.

Turnovsky, S. J. (1995). Optimal tax policy in a stochastically growing economy. *The Japanese economic review*, *46*(2), 125-147.

Turnovsky, S.J., and Chatterjee, S. (2005). Financing public investment through foreign aid: consequences for economic growth and welfare. *Review of international economics*, 13(1), 20-44.

Tyce, M. (2020). A 'private-sector success story'? Uncovering the role of politics and the state in Kenya's horticultural export sector. *The Journal of development studies*, *56*(10), 1877-1893.

ul Husnain, M. I., and Ghani, E. (2010). Expenditure-Growth Nexus: Does the Source of Finance Matter? Empirical evidence from selected South Asian Countries [with Comments]. *The Pakistan Development Review*, 631-640

Van, V. B., and Sudhipongpracha, T. (2015). Exploring government budget deficit and economic growth: Evidence from Vietnam's economic miracle. *Asian Affairs: An American Review*, *42*(3), 127-148.

Verbeck, M. (2000) *A guide to modern econometrics. 2nd edition*. Erasmus University: John Wiley and Sons Ltd.

Voss, G. M. (2002). Public and private investment in the United States and Canada. *Economic modelling*, *19*(4), 641-664.

Wagner, A. (1883). *Classics in the theory of public finance*. London: Macmillan.

Wahab, M. (2004). Economic growth and government expenditure: evidence from a new test specification. *Applied economics*, *36*(19), 2125-2135.

Wahab, M. (2011). Asymmetric output growth effects of government spending: Cross- sectional and panel data evidence. *International review of economics and finance*, 20(4),5 74-590.

Wang, B. (2005). Effects of government expenditure on private investment: Canadian empirical evidence. *Empirical Economics*, *30*(2), 493-504.

Wang, B. (2009). The effect of foreign borrowing policies on economic growth: success or failure?. *Journal of economic policy reform*, 12, 273-284.

Wawire, N., Njuru, S. G., Ombuki, C. (2014). Impact of government expenditure on private investment in Kenya. *journal of economics*, 2(8).

Weil, D.N. (2007). Accounting for the effects of health on economic growth. *The quarterly journal of economic*, 122(3), 1265-1306.

Weisskopf, T. E. (1972). The impact of foreign capital inflow on domestic savings in underdeveloped countries. *Journal of international Economics*, *2*(1), 25-38.

Welch, F. (1970). Education in production. *Journal of political economics*, 78(1), 35-59.

Were, M. (2001). *The impact of external debt on economic growth in Kenya: An empirical assessment* (No. 2001/116). WIDER discussion paper.

Wesselhoft, J.E. (2013). The effects of public capital on aggregate output: empirical evidence for 22 OECD countries. *Review of economics*, 64(1), 51-72.

Yasin, M. (2011). Public spending and economic growth: empirical investigation of Sub-Saharan Africa. *Southwestern Economic Review, 30*, 59-68.

Younsi, M., Bechtini, M., and Khemili, H. (2021). The effects of foreign aid, foreign direct investment and domestic investment on economic growth in African countries: Nonlinearities and complementarities. *African Development Review, 33*(1), 55-66.

Zou, Y. (2006). Empirical studies on the relationship between public and private investment and GDP growth. *Applied Economics*, *38*(11), 1259-1270.