

**GOVERNMENT SECTOR SPENDING AND PRIVATE
INVESTMENT IN KENYA**

BY

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DECLARATION

This paper is born out of my own efforts and it has never been presented for any award to the best of my knowledge

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DEDICATION

This study is devoted to my lovely mother Zipporah Ciiri Charles and my son Declan Sean Gitonga.

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This study wouldn't be possible without support from several people. I thank the Almighty God for bestowing upon me strength, knowledge, and wisdom which enabled me to finalize this paper. I acknowledge my family for moral and spiritual support during this journey. To my supervisor Dr. Elizabeth Owiti I will forever remain grateful for the invaluable guidance.

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ABBREVIATIONS AND ACRONYMS

ADF:	Augmented Dickey-Fuller
ARDL:	Autoregressive Distributed Lag
CBK:	Central Bank of Kenya
COVID-19:	Corona Virus Disease 2019
EAC:	East Africa Community
ECM:	Error Correction Model
EPZs:	Export Processing Zones
ERS:	Economic Recovery Strategy
GDP:	Gross Domestic Product
IRR:	Internal Rate of Return
IME:	Investment Marginal Efficiency
VECM:	Vector Error Correction Model
KNBS:	Kenya National Bureau of Statistics
KRA:	Kenya Revenue Authority
MTPs:	Medium Term Plans
OLS:	Ordinary Least Square
PPP:	Public-Private Partnerships
SAPs:	Structural Adjustment Policies
SMEs:	Small and Medium Enterprises
UNCTAD:	United Nations Conference on Trade and Development
USA:	United States of America
VAR:	Vector Autoregressive Model
WB :	World Bank

ABSTRACT

The private sector investment plays an integral part in guaranteeing economic soundness of an economy. In Kenya, the government outlay increased sharply in the last two decades although this has not been commensurate to the private capital growth rate. Existing literature analyzed the impact of government expenditure on private investment using aggregated government spending i.e. recurrent and development expenditures only. These researches have yielded mixed results with some in favor of the crowding-in hypothesis and other crowding-out effects. Due to this controversy, the link between private capital and specific public spending components remains unresolved. Limited studies have disaggregated the government outlay into sector expenditures in this thematic area. More so, Kenya has witnessed a tremendous increase in spending on infrastructural projects such as highways, ports, standard gauge railway, and massive investment in health and education sectors. All these efforts are meant to accelerate the realization of the Kenya Vision 2030 as well as the 'Big Four' Agenda of the Government. The objective of this study was to establish how various public sector outlay and debt charges impact private investment in the country. This study disaggregated government spending in education, health, agriculture, defense, infrastructure, and debt repayment and examined their separate effect on private investment. The study used secondary data for 1963 to 2018 from Kenya National Bureau of Statistics various Statistical Abstracts and Economic surveys. Both the Autoregressive Distributed Lag (ARDL) model and the Error Correction Model (ECM) were used to realize the outlined objectives. The study yielded mixed results with some components indicating promotion and demotion of private investment in the country. The recurrent outlay in infrastructure and capital outlays in health as well as debt charges were found to crowd-in private investment significantly. Education, agriculture, and infrastructure recurrent expenditures and infrastructure and agriculture capital spending have a positive influence on private investment though insignificantly. Other variables were found to crowd out private investment. This study recommends that the government should consider increasing and sustaining spending in education agriculture and infrastructure sectors to stimulate the economy while downsizing spending in sectors that crowd out private investment in the country.

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CHAPTER ONE: INTRODUCTION

1.1 Background

The correlation between investment and economic growth is strong and incontestable. Economists generally agree that capital accumulation positively influence economic growth and development (Barro, 1990). Investment, which is a key driver of economic growth, is broadly classified into private and public investment. The former which is the gross capital formation of the private sector is the spending by private entities to acquire fixed assets to enhance the production of capital goods whose demand and consumption increase income (Maingi, 2017). Both financial and empirical evidence backs private investment as a superior engine of economic growth. Government expenditure as a policy tool can be used to give impetus to private investment and has been emphasized in developing countries considering the significant achievements realized by newly industrialized economies such as Malaysia, Japan, China, etc. (Maingi, 2017).

Theoretically, economists believe that a positive correlation exists between government spending and private investment. According to Keynes (1936), an increase in government expenditure is expected to stimulating the aggregate demand, create employment, avert recessions, and complement private investment when the economy is not in full employment state. Since the emergence of Keynes in the 1930s various schools of thought have tried to elucidate this relationship.

The fiscal policy school opined that increased government expenditure in providing essential amenities such as roads, security, health and education enhances the private investment in developing countries hence spurring economic growth. In contrast, Neo-classical economists argues that when the economy is at full employment, government expenditure financed by debts as well as spending in some infrastructural projects will obstruct private investment (Blejer & Khan, 1981). This is because there will be competition for available loanable funds between the public and the private sector leading to high-interest rates, public debts as well as rising taxes (Ifeakachukwu et al., 2015). The result is reduced liquidity in the economy and a high cost of financing private investment.

Although private investment is an essential driver of economic growth, sustainable development, alleviation of unemployment, poverty, and wealth creation, the ratio of private investment to Gross Domestic Product (GDP) has remained comparatively low in sub-Saharan countries. During the 1990s, this ratio in sub-Saharan-Africa, Latin America, and Asia stood at 17, 22.5, and 28 percent respectively (Ifeakachukwu et al., 2013). Kenya recorded a ratio of 10.91 % which is lower than the sub-Saharan Africa ratio of 17% and the recommended level of 30% in the same period (Oyieke, 2011).

Notably, various scholars agree that various components outlay by the government may influence the private sector capital stock differently which further complicates the prior unresolved controversy of government expenditure (Maingi, 2017).

1.1.1 Overview and Trends of Private Investments in Kenya

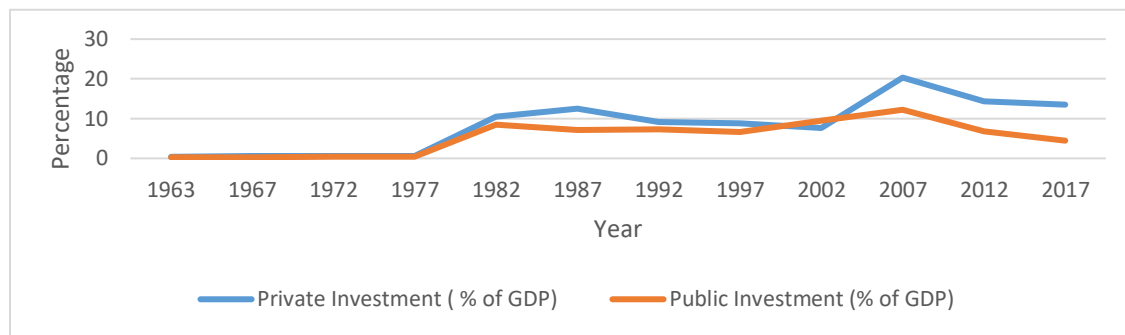
Over the years, developing countries Kenya included, have prioritized private capital formation to boost the production capacity and stimulate production techniques. The World Bank (WB) Ease of Doing Business Report, ranked Kenya position four in Africa, behind Mauritius, Rwanda, and Morocco and 56 globally out of 190 countries reviewed in 2020. The ranking majored in costs associated with the acquisition of construction permits, starting a business, electricity, credit access, property registration, tax payment, minority investors protection, contract enforcement, labor market, cross-border trading as well as resolving insolvency issues. However, although 74.6% of our total investment comes from the private sector, increased uncertainties such business recessions in every election cycle and the post-election violence witnessed in 2007/2008 decelerated the growth of private capital in the country (Oyieke, 2011).

According to Milbourne, Otto & Voss (2003), Kenya has experienced erratic fluctuations of private investment since the 1970s, resulting in the development and operationalization of various policies and plans to give impetus to private investors. Specifically, the growth of private investment as a percentage of GDP has been oscillating around 7.6 percent and 14 percent according to Kenya National Bureau of Statistics (KNBS) Various Economic Surveys.

Njuru (2012) notes that since independence, Kenya has laid down several policies and strategies including giving incentives to local investors to accelerate private stock accumulation. Nevertheless, the growth of this macroeconomic variable has posed mixed results over the decades hitting the all-time highest growth of 12.5% in 1987 (Kiptui, 2005). The impact of the oil crises experienced globally negatively affected investment in Kenya between 1971 and 1977. Also, the collapse of the East Africa Community (EAC) in 1977 barely 10 years after its establishment was a major impediment to economic integration and immensely affected private investments in Kenya (Oyieke, 2011)

The Kenya Vision 2030 economic pillar envisages to achieve a middle-income status with a GDP growth average of 10% during the implementation period and beyond (Kenya Vision 2030). To secure this dream, the country was expected to grow its private investment annually by at least 22% of the GDP up to 2013 and 24 percent in the remaining implementation period and beyond. However, this has not been achieved and the ratio standing at 17.4% in 2019 according to the KNBS Economic Survey report for 2020. The graph below illustrates the trends in domestic capital stock over the years.

Figure 1.1: Private and Public Investment Trends in Kenya



Source of Data: World Bank Indicators

Figure 1.1 illustrates the movement of both private and public capital between 1963 and 2017. The year 1973/74 recorded low investment by the private sector which Oyieke, (2011) associates to the detrimental effects of the oil crisis which occurred in the same period. He continues to notes that the improvement in private investment between 1978 to 1980 was mainly due to increased government spending resulting from the coffee. It is also important to note that the Economic Recovery Strategy (ERS) led to the rise in private

investment between 2003 -2007 due to economic stimulus programs launched in the review period.

1.1.2 Investment Policies in Kenya

Since independence, the government has reviewed, developed, and adopted several policies to motivate investors and spur investment growth in the country. These policies can be summarized into three major periods namely controlled regime, Structural Adjustments Programmes (SAPs) period, and liberal trade regimes (Moss *et al.*, 2004).

The controlled regime resulted from the implementation of the Sessional Paper No. 10 of 1965 (Kabubo & Kiriti, 2002). This paper sought to Africanize the economy and give impetus to industrialization. During this period, the Kenyan economy was government-based and many interventions to eliminate unfair competition between local and established foreign entrepreneurs were evident. Njuru (2012) avers that in this same period, the government played an active role as an investor by establishing agencies to provide essential services such as telecommunication among others.

SAPs which were packaged on a neoclassical basis comprised the second set of interventions. Kerich (2016) notes that the overriding goal of SAPs was to minimizing government fiscal interventions in the economy and introduce equivalent tariffs to boost private players. This resulted in the privatization of some parastatals in the country. Nonetheless, these measures were unsuccessful and characterized by failure to stimulate employments, workforce redundancies, high cost of living etc. (Oyieke, 2011).

Liberal trade regime which still exists was the third major paradigm shift by the government in terms of investment policies. More emphasis to boost investments in the country was laid on export promotion policies and interventions rather than import substitution which existed before. UNCTAD (2001) argues that some of the remarkable strategies during this period included the establishment of Export Processing Zones (EPZs) in the 1990s, liberalization of interest rates and removal of credit controls to enhance credit uptake by the private sector, streamlining the money market and public sector reforms including civil service. Additionally, the government offered capital allowance, tax holidays, import duty exemptions on raw materials, and machinery among others as

incentives to investors in EPZs as well as the creation of a department to enhance the effectiveness of private investment in Kenya.

1.1.3 Overview and Tendencies of Government Spending

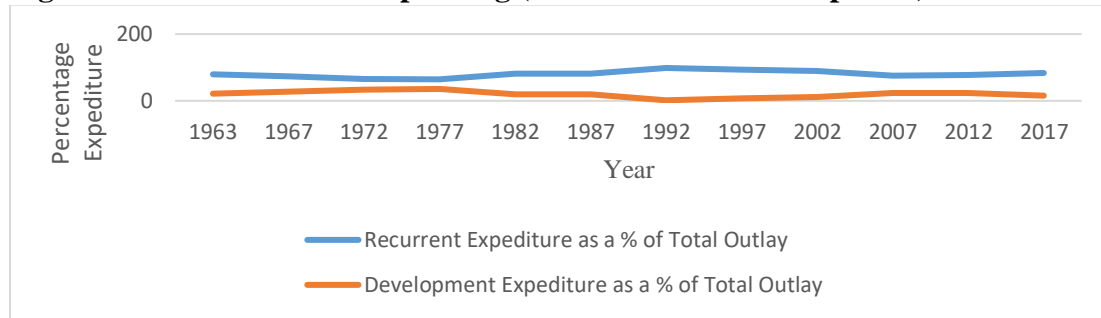
The two broad classifications of government expenditures are development and recurrent expenditures (Barro, 1990). The former is more discretionary and comprises spending on new projects and programs whose aim is to spur economic and social development. For instance, construction of hospitals, schools, infrastructures (railways and highways), water and irrigation projects, communication infrastructure, and many others that directly or indirectly affect the economic growth and stimulate private investment. Conversely, recurrent expenditure is less discretionary and includes the government expenditure on essential routine services like salaries and remunerations, depreciation etc. which don't necessarily result in the acquisition or creation of fixed assets (Agenor, 2007).

According to the Republic of Kenya (2003), recurrent expenditure has been higher than the capital expenditure in Kenya since independence. However, in the early years of independence, development expenditure was relatively more compared to the last two decades and it is during that period when the country recorded a notable performance of the private investment. An increase in development expenditure was mainly attributed to government spending on infrastructural projects such as ports expansion, roads, electricity supply, telecommunication, schools, etc. This spending was sustained at an average of 32% between 1972 -1979 before declining to 19% between 1982-1996. Further, between 1999-2001 there was a drastic drop in development expenditure to 9% attributed to conditions attached by WB and IMF on SAPs (Amanja *et al.*, 2005). The ERS infrastructural projects such as the rehabilitation of ports, telecommunications, education, and health revitalized the development expenditure between 2003 -2009 (Karumba, 2009).

1.1.4 Structure of Government Expenditure in Kenya since Independence

The graph below illustrates the composition of the broad classification of government expenditure as a proportion of the total outlay in Kenya between 1963 and 2017.

Figure 1.2: Government Spending (Recurrent and Development).



Data Source: Central Bank of Kenya (CBK) publications.

It is evident from Figure 1.2 that the recurrent expenditure has been greater than the development expenditure since independence. According to Oyieke (2011), this spending behavior of the government can be attributed to the adoption of African socialism which sought to eradicate poverty, illness, and illiteracy in the country immediately after independence. Further, the emergence of SAPs, corruption, government bloated wage bill, as well as wastefulness have exacerbated the development expenditure in Kenya (Oyieke, 2011).

1.1.5 Government Expenditure Reforms in Kenya

To increase and sustain economic growth through fiscal discipline, the government has formulated and implemented several policy reforms since independence. These transformations including the rationalization of government budgets have endeavored to channel resources to appropriate projects to stimulate economic growth and development and eventually crowd-in private capital formation (Maingi, 2017).

The government targeted to raise the development expenditure by 9 percent between the 1974-1978 planning cycles. This prompted a significant reduction of recurrent expenditure and prioritization of the faster-expanding sectors like education and social services. During this period, investment growth in electricity, agriculture, manufacturing, and forestry tripled that of the last three years. Further, between 1979 - 2001 fiscal years, the government undertook expenditure rationalization which yielded mixed results (the Republic of Kenya, 1997).

The SAPs period also presented an opportunity for the country to implement the conditions of the fiscal reform. The reforms envisioned a “laissez faire” economy with government role only limited to the provision of public goods and policy regulatory (Republic of Kenya, 1986). During the period, there was increased government spending on rural market centers and small towns, agricultural research, innovations and extension services, and Small and Medium Enterprises (SMEs) which boosted the output (Republic of Kenya, 1986). Elimination of trade barriers was expected to improve Kenya’s foreign investment climate as one of the means to economic recovery and growth but this was not the case (Kerich, 2016).

Republic of Kenya (1994) notes that the next set of fiscal interventions involved budget rationalization to ensure productivity and efficacy in government spending. The government identified and funded productive projects and minimized or /and stopped unproductive projects with low rates of return. Development projects in the areas of education, health, environment, and infrastructure were prioritized using both technical and economic criteria to rank and select. These measures shortened the implementation and completion times of projects. To increase resources for development, the government applied various civil service and fiscal reforms including freezing employment, increasing non-wage recurrent in 1990, and re-allocation of government outlays to main functions of the government to spur economic growth and attract private investments. The ERS of 2003 brought a paradigm shift by preferring a free-market approach to government-organized style, reducing recurrent expenditure to foster spending in capital projects as well as creating job opportunities and reducing the cost of doing business (Republic of Kenya, 2003).

The flagship projects prioritized in the Kenya Vision 2030 has shifted the government funding focus. Further, the government aims at scaling up the development expenditure including maintenance and operational cost of the expanded infrastructure as well as ensuring a small and efficient civil service by lowering the wage bill to 6 percent. The government development expenditure was to increase progressively to 38 percent by 2012 and beyond from 18 percent in 2007. The Kenya Vision 2030, the Big 4 Agenda, the Corona Virus Disease 2019 (COVID-19) Response strategy, and the post-COVID-19

Economic Recovery Strategy as well as other global, regional, and national development blueprints have shaped and will continue fashioning government expenditure enormously.

1.2 Statement of the Problem

Studies by Blejer & Khan (1981), Barro (1990), and Majeed & Khan (2013) claim that government outlays serves to promote the accumulation of investment by the private sector while Buiter (1977) and Argenor (2005) avows that it crowds-out private investment. These juxtaposed findings among others paint an inconclusive debate on the linkage between government expenditures and private capital formation (Blejer & Khan, 1981). According to the Republic of Kenya (2018), Kenya's public debt burden stood at 53.1% of the GDP in 2017 and it is expected to increase after the parliament voted to raise the ceiling to Ksh. 9 trillion in 2019. This has a direct bearing on debt charges.

This will be further compounded by the economic impact of locust invasion and now the COVID-19 pandemic whose public health control mechanisms includes partial lockdown, temporary suspension of non-essential social and economic activities globally. More than 95% of airports were closed and several countries closed their airspace and borders. Kenya's private sector relies heavily on commodity exports, remittances and tourism which has borne the largest burden of the pandemic resulting to loss of household income, business income and government tax revenue. The pandemic has led to global demand and supply shocks, leading to lower export, lower commodity prices and weak exchange rates. WB estimates that Kenya's GDP growth will decelerate to 1.5% in 2020 from an average of 5.7% between 2015 to 2019.

To attain the targets enshrined in the Kenya Vision 2030, the annual growth of investment should be at least 24% of the GDP up to 2030 (Kenya Vision 2030). Available data from KNBS and CBK reveals that generally, the private investment in the country has been unstable with seasonal fluctuations. According to the Third Medium Term Plan (MTP III), the government adopted the Public-Private Partnerships (PPP) model to implement the Kenya Vision 2030 and the 'Big Four' Agenda pillars.

To achieve the targets in the Kenya Vision 2030, the 'Big Four' Agenda, post COVID-19 Economic Recovery Strategy, and other local, regional, and international development

blueprints, there is an urgent need to understand how sector outlays impacts the private sector. This will inform the formulation of relevant vibrant fiscal policies to switch government spending in sectors that will spur private investment and hence economic growth. This renders Private investment an integral driver to spur economic growth to a double-digit.

In Kenya, many studies have concerted efforts to examine the connection between government expenditure and private capital outlay without decomposing the expenditures into sector components and examining their influence on private capital separately. Additionally, very few studies have included the debt charge variable in their analysis. It is on this milieu that this study seeks to establish how these specific sector outlays and debt charges impact private investment in Kenya.

1.3 Research Questions

- i. What is the relationship between government sector development expenditure and private investment in Kenya?
- ii. How does the government sector recurrent outlay impact the capital stock of the private sector in Kenya?

1.4 Objectives of the Study

1.4.1 The Main Objective

To explore how government-sector spending impact private capital formation in Kenya.

1.4.2 Specific Objectives

- i. To investigate the relationship between government sector development expenditure and private investment in Kenya.
- ii. To analyze how the government sector recurrent outlay impacts the capital stock of the private sector in Kenya.

1.5 Significance of the Study

The policy formulators will find this study useful in identifying the expenditure components that should be reduced in the ongoing austerity measures and them that have a greater multiplier effect in the economy which needs to be scaled up. The utilization of this study's recommendations is expected to enhance the formulation of relevant fiscal policies aimed at boosting private investment in the country. Additionally, since there is information scarcity on this topic, this study advances the literature on this topic.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This section analyses the literature, both theoretical as well as empirical studies around government expenditure and private investment. Relevant theories are reviewed and a theoretical foundation associated with this topic exposed. More so, Empirical studies conducted on this topic are also reviewed and the literature gaps established.

2.2 A Review of Theoretical Literature

2.2.1 Simple Accelerator Model

Simple accelerator model links capital investment to the output. It holds that private investment decisions are driven by the anticipated output increase occasioned by demand rise (Blejer & Khan, 1981). This implies that when demand for a certain commodity/service increases, firms will respond by making capital investments to match the anticipated output change. Otherwise, investment decisions will be shelved if there is no change in demand and output in the economy (Laopodis, 2001). This model has been used in studying business cycles and it is related to the Keynesian theory since it assumes a fixed price regime. The simple accelerator model is influential in firms' capital accumulation analysis but it has been criticized for ignoring costs related to investment.

Several empirical studies to determine the link between investments and their costs have been conducted. When the model is used to compare the firm's changes in the present and previous income, it explains investments better compared to the neoclassical model implying a weak link between the cost of capital and investment rate (Laopodis, 2001).

2.2.2 Keynesian Theory of Investment

According to Keynes (1936), firms and individuals make decisions to either save or invest independently. The Keynesian theory of investment propounded by John Maynard Keynes contends that investment and savings must be identical (Keynes, 1936). In his investment model, investment is a function of autonomous investment and interest rates on investments;

$$I = I_0 + I(r)$$

Where; I_0 =Autonomous investment, $I(r)$ =Investment interest rate

According to the above equation, there exists an indirect relationship between investment (I) and interest rates (r). This implies that in high-interest rates regimes investment by firms will be low and vice versa. To realize higher returns on investment Keynes (1936) argue that firms use the Internal Rate of Return (IRR) and Investment Marginal Efficiency (IME) to rank and select investment portfolios. An investment project whose IRR exceeds the prevailing market interest rates is preferred since its presumed to optimize the returns.

Blejer & Khan (1981), and others have supported this theory due to its ability to influence the adjustment speed of the current and the desired investment levels. When the economy is not operating under full employment which is the situation in many countries, interest rates on investments are relatively low (Blejer & Khan, 1981).

2.2.3 The Tobin's Q Theory

This concept is associated with Tobin (1969) and it holds that investment is majorly driven by the proportion of firm's current worth to the charge of replacing its physical possessions denoted by Q (Oyieke, 2011). Tobin construes that the ideal situation for the firm is when Q is unitary (equilibrium) and it would differ from unitary due to increasing marginal cost of investment and delivery lags. Firms should consider investing when Q is greater than one since it would attract profits which is more than the cost of the firm's assets. Conversely, when Q is less than a unit, firms should not invest but rather dispose-off some of their assets.

This theory has been hailed and criticized in equal measure. For instance, it's applicability in less developed and developing countries due to perfect information flow, low public investment, and the existence of perfect capital market assumptions is a major setback (Oyieke, 2011). Both the less developed and the developing countries Kenya included, have an inefficient market characterized by huge public debts, persistent unstable macroeconomic variables, negative trade imbalance, corruption, and bad governance all of which have a detrimental impact on private investment (Oyieke, 2011).

2.3 Empirical Review

Empirical studies around this theme, world over pose a dilemma about the influence of government expenditures on the private stock. While a sizeable number of researchers using various methodologies have found out that it crowds-out private investment, a good number of studies employing different methods have also found out that it enhances private investment.

Aschauer (1989) investigated the productivity of public expenditure in America between 1949 -1989 and noticed that government outlay components other than defense enhance the productivity of the economy. The study avers the existence of a very negligible correlation between military spending and productivity. Government spending on infrastructure such as highways, airports, sewers, etc. was found to be productive.

Barro (1990) investigated the connection between economic growth and state investment across several economies. A strong positive linkage was recognized between the two variables. The study concludes by warning that, though public spending encourages economic growth it should not be a long-run solution in a strong economy since it encourages distortion in the economy.

Monadjemi (1995) studied the private capital formation and public outlay association in Australia. The study covered the period 1960 to 1991 using the ordinary investment model and quarterly data. Generally, the findings revealed that state investment expenditures crowds-in private capital formation.

Chete & Akpokodje (1997) sought to empirically examine the causes of personal investment in Nigeria. The vital role of the private sector stock was evident and that the government will initiate the relevant market interventions to spur economic growth and consequently private investment. Further, the study noted that both government's fiscal and monetary policies are prudent instruments in the phase of declining private capital formation.

Laopodis (2001) used the Vector Error-Correction Model (VECM) to investigate how government budgets on military and non-military affect the gross accumulation of stock by the private entities in select European nations. The author realized that in some instances,

there was evidence of crowding-in and crowding-out of private investment by state expenditures. Further, the findings indicated a demotion of private capital formation by military expenditures contributing to the controversial debate on the defense budget on economic growth.

Beni & Mwakalobo (2009) studied nature and the correlation between private sector capital formation and government spending in South Africa using quarterly data from 1960 to 2005. Recurrent and development expenditure were the study independent variables without decomposing them further. The results of the study did not establish a clear direct link between the two variables. The study recommended that the government should increase the GDP to investment ratio through effective fiscal policies to rekindle growth rates.

Oyieke (2011) investigated the influence of capital expenditure on private investment in Kenya. He used expenditure on infrastructure and agriculture, real exchange rate, political risk, and debt financing as independent variables. The study adopted VECM and analyzed annual data for 1964 to 2006. According to the outcome, agriculture and infrastructure expenditures influences private sector capital significantly and insignificantly respectively. Other explanatory variables in the study (debt servicing, real exchange rate, and political risk) posed a crowding-out effect.

Bello *et al.* (2012) investigated the role of government outlay in encouraging or discouraging private investment. The study disaggregated government expenditure components and analyzed 34 years' series data for Nigeria using Multiple Regression Analysis. The study posed contradicting results with some components of expenditure complimenting and others hindering private investment growth. The study recommended priority to be accorded to components that spur private capital formation and effective macroeconomic control to cushion the private capital formation from escalating inflation.

Njuru (2012) used a modified accelerator model to investigate the nexus between private capital formation and fiscal policies in Kenya applying semiannual time-series data from 1964 to 2010. The study established that private capital formation and fiscal policy formulation and implementation are highly correlated in Kenya. Further, the study noted that fiscal policies and reforms, debt repayment, taxes, and government spending impact

private investment either positively or negatively both in the long term and short term. The study recommended tight measures by the government during fiscal policy formulation and implementation to spur the growth of macroeconomic variables.

Mohib *et al.* (2015) used disaggregated government spending categories in Pakistan to test how they impact the formation of capital by private entities. The expenditure categories included in the model are transport and communication, health, education, social welfare, defense, agriculture as well as debt charge, and inflation variables. Using the ECM model to test their hypothesis, they concluded that different categories of expenditure influence capital accumulation differently.

Joseph & Ekundayo (2016) conducted an empirical analysis in selected West African countries intending to explain the association that exists among fiscal policy and capital formation by the private sector. The study employed Ordinary Least Square (OLS) and time series data from these countries from 1993 to 2014. The results revealed that tax revenue and government development outlay complements private investment. On the other hand, recurrent expenditure and non-tax revenue and external debt recorded crowding out effect. Also, across the sampled countries, an insignificant accelerator effect of productivity growth was witnessed. To improve private investments and cushion economies from the negative effects, public debt and recurrent expenditures should be reduced significantly and development expenditure enhanced significantly.

Okisai (2018) investigated the association among public expenditure and private entities investment covering the year 1963 to 2012. The empirical analysis employed the VAR model to determine the nature and relationship of the two variables. The findings supported the hypothesis that both the recurrent and capital expenditures promote firms and individuals' investment behavior. Cognizant of the fact that government plays an integral role in propelling private investment in the country, the study recommends that the government should be keen to reallocate resources towards projects that add value to the private sector. Also, to build investors' confidence, the government should carry fiscal reforms in areas that promote private sector investment.

2.4 Literature Overview

Private investment and public spending topic has attracted researchers' attention world over evidenced by the analysed literature. Interestingly, these studies have posed different results with some supporting and others contradicting the economic theory which recognizes the role of government spending in rejuvenating the private investment. To this end, there is no clear and unanimous nexus between public and private investment. For instance, Aschauer (1989), Blejer & Khan (1981), and Njuru (2012) argued that government expenditure crowd-in private investment while Oyieke (2011), Beni & Mwakalobo (2009) and Laopodis (2001) found out that the former crowds-out the latter. A good number of studies around this thematic area have aggregated the government expenditure into broad recurrent and capital expenditures rendering the availability of literature on government sector spending limited. This could be the justification for the contradicting results from various researchers.

This study will be designed to contribute to this discussion and bridge the literature gap by disaggregating the government capital and recurrent expenditures into spending in agriculture, defense, education, health, and infrastructure sectors. The debt servicing component which is theoretically expected to impact domestic capital formation will also be used.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

We present the study methodologies in this chapter. Specifically, the section highlights the theoretical model, model specification, data sources and analysis, and the estimation method to be applied.

3.1 Theoretical Framework

Available literature indicates conflicting empirical results among researchers on the link between private investment and government expenditure. According to Njuru (2012), the outcome of any government fiscal intervention majorly rests on its design and implementation. This study will adopt this position and use the flexible accelerator framework which is based on the Keynesian investment theory. The model will be reconstructed to feature additional dynamics influencing private capital e.g. institutional as well as structural characteristics and the resource gap experienced in developing countries (Blejer & Khan, 1984). The model is stated in mathematical terms as:

$$K_t = \mu Y_t \tag{3.1}$$

In the above relationship, the appropriate inventory of capital by the private sector at a given duration is (K_t) and it is anticipated to be proportional to the projected productivity level (Y_t) with μ representing the unchanging capital-output ratio. To get the change in capital stock over a given period, we differentiate equation 3.1 with respect t to time and obtain:

$$\Delta K_t = \mu \Delta Y_t \tag{3.2}$$

We now introduce the equation of capital accumulation to link investment and the level of preferred capital inventory. The equation is specified as:

$$K_t = (1 - d) K_{t-1} + I_t \tag{3.3}$$

Where; K_t =current capita level, K_{t-1} =historical stock of capital, I_t =investment level at present and d represents the rate at which the installed capital depreciates. By Expanding

equation 3.3, assuming that there is no depreciation (i.e $d=0$) and expressing it in terms of investments (I) we get:

$$I_t = K_t - K_{t-1} \quad (3.4)$$

From equation 3.2, $K_t - K_{t-1} = \Delta K_t = \mu \Delta Y_t$, thus we can rewrite equation 3.4 as simple investment equation:

$$I_t = \mu \Delta Y_t \quad (3.5)$$

We can introduce lagged values of both investments (I) and productivity (Y) in the simple investment equation above due to the delays that are associated with the installation of new capital. This way, both the present and the preferred capital stock will be taken care of according to Nerlove's partial adjustment framework:

$$I_t = \alpha I_{t-1} + \beta_1 \Delta Y_t + \beta_2 \Delta Y_{t-1} + \varepsilon_t \quad (3.6)$$

Where I_{t-1} , ΔY_{t-1} , β , and ε_t indicate the level of investment of the previous period, the output of the previous period, coefficients of respective variables, and the error term respectively.

The flexible accelerator framework according to Blejer & Khan (1981) allows economic factors such as the interest levels, profit projections, government policies, trade openness, debt repayments, etc to affect private sector investment decisions and hence the adjustment speed. To account for this adjustment speed, we introduce another variable Z in equation 3.6 to obtain:

$$I_t = \alpha I_{t-1} + \beta_1 \Delta Y_t + \beta_2 \Delta Y_{t-1} + Z_t + \varepsilon_t \quad (3.7)$$

Thus, equation 3.7 takes into accounts all factors that affect the investment decisions of the private sector represented by Z_t .

3.3 Empirical Model

The following equation is specified from the above equation 3.7;

$$PI = f(ED, HE, AGR, DE, INF, DBT) \quad (3.8)$$

The relationship between private investment and development expenditure on education, health, agriculture, defense, infrastructure, and debt repayment is specified as;

$$PI_t = \beta_0 + \beta_1 DeED_t + \beta_2 DeHE_t + \beta_3 DeAGR_t + \beta_4 DeDF_t + \beta_5 DeINF_t + \beta_6 DBT_t + \varepsilon_t \quad (3.9)$$

Where;

PI_t - Private investment at time t (capital accumulated by both individuals and firms)

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ - Vector of parameters for different development spending components

$DeED_t$ - Development expenditure on education at time t

$DeHE_t$ - Development expenditure on health at time t

$DeAGR_t$ - Capital spending on agriculture at time t

$DeDF_t$ - Capital government spending on defense at time t

$DeINF_t$ - Development expenditure on infrastructure at time t

DBT_t - Government expenditure on debt servicing at time t

ε_t - Error term

Similarly, the same nexus now using recurrent expenditures on education, health, agriculture, infrastructure, defense, and debt repayment is specified as;

$$PI_t = \alpha_0 + \alpha_1 ReED_t + \alpha_2 ReHE_t + \alpha_3 ReAGR_t + \alpha_4 ReDF_t + \alpha_5 ReINF_t + \alpha_6 DBT_t + \mu_t \quad (3.10)$$

Where;

PI_t - Private investment at time t

$\alpha_0, \alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6$ - Vector of parameters for different recurrent spending components

$ReED_t$ - Recurrent expenditure on education at time t

$ReHE_t$ - Recurrent expenditure on health at time t

$ReAGR_t$ - Recurrent spending on agriculture at time t

$ReDF_t$ - Recurrent government spending on defense at time t

$ReINF_t$ - Recurrent spending on infrastructure at time t

DBT_t - Debt servicing at time t

μ_t - Error term

3.4 Estimation Method

This study applied the ARDL model. The model is deemed appropriate in time series when the independent variables are integrated of different orders i.e I(0) and I(1) (Pesaran & Shin, 2001).

This study decomposed government expenditure into sector spending and examined their influence on private investment distinctly. After conducting the Bound test analysis, the short run ARDL (p, q₁-q₆) model for the recurrent equation was specified as below;

Recurrent Expenditure Equation:

$$\begin{aligned} \Delta \ln PI_t = & \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta \ln PI_{t-1} + \sum_{i=1}^{q_1} \alpha_2 \Delta \ln ReED_{t-1} + \sum_{i=1}^{q_2} \alpha_3 \Delta \ln ReHE_{t-1} \\ & + \sum_{i=1}^{q_3} \alpha_4 \Delta \ln ReAGR_{t-1} + \sum_{i=1}^{q_4} \alpha_5 \Delta \ln ReDF_{t-1} + \sum_{i=1}^{q_5} \alpha_6 \Delta \ln ReINF_{t-1} + \sum_{i=1}^{q_6} \alpha_7 \Delta \ln DBT_{t-1} \\ & + \Upsilon_t \end{aligned} \quad (3.11)$$

Where;

Δ is the difference operator, α₀ is an intercept, α₁ - α₇ is the associated coefficients, P is the lags of the dependent variable, q₁ - q₆ represents lags for the independent variables, lnPI_{t-1} is the lagged values of PI while lnReED_{t-1}, lnReHE_{t-1}, lnReAGR_{t-1}, lnReDF_{t-1}, lnReINF_{t-1}, lnDBT_{t-1} are lagged values of repressors and Ξ_t is the error term.

After performing the Bound Test of cointegration, the long run ECM model for capital spending specified below was estimated.

Development Expenditure Equation:

$$\begin{aligned} \Delta \ln PI_t = & \beta_0 + \sum_{i=1}^p \beta_1 \Delta \ln PI_{t-1} + \sum_{i=1}^{q_1} \beta_2 \Delta \ln DeED_{t-1} + \sum_{i=1}^{q_2} \beta_3 \Delta \ln DeHE_{t-1} \\ & + \sum_{i=1}^{q_3} \beta_4 \Delta \ln DeAGR_{t-1} + \sum_{i=1}^{q_4} \beta_5 \Delta \ln DeDF_{t-1} + \sum_{i=1}^{q_5} \beta_6 \Delta \ln DeINF_{t-1} + \sum_{i=1}^{q_6} \beta_7 \Delta \ln DBT_{t-1} \\ & + \mu_1 ECT_{t-1} + \varepsilon_t \end{aligned} \quad (3.12)$$

Such that;

$\mu_1 ECT_{t-1}$ captures the long run representation.

3.5 Data Types, Sources, and Analysis

We used secondary data from official government reports i.e Statistical Abstracts and Economic Surveys of KNBS complimented by CKB Publications. Annual data for the year 1963 up to 2017 was used for all the variables. The data was analyzed using STATA version 14.1.

3.6 Definition and Measurement of Variables

Private Investment (PI) – Wealth accumulated by the private sector both firms and individuals in terms of fixed assets. It is measured in Kenya shillings in current market prices. It is proxied by the gross capital formation by the private sector. Jawad (2019) notes that it has a positive sign.

Development expenditure (DeED, DeHE, DeAGR, DeDE, DeINF) – This is total government outlays in education, health, agriculture, defense and infrastructure to acquire, upgrade and maintain physical assets such as buildings, roads, machinery, equipment, etc. it is expected to have a positive sign (Njuru, 2012).

Recurrent Expenditure (ReED, ReHE, ReAGR, ReDE, ReINF) - This is government spending in education, health, agriculture, defense, infrastructure which does not necessarily lead to the acquisition of fixed assets. Kiptui (2005) found out that it has a positive sign.

Debt charges (DBT) – This is the total amount of money used to service both local and foreign mature debts incurred by the government annually. It will be measured by the total amount paid as interest by the government. Maingi (2010) notes that it has a negative sign.

3.7 Pre-Estimation Test

3.7.1 Unit Root Test

Most often, in time series data, variables are non-stationary causing spurious results. To ensure stationarity of all the variables, the determination of unit root was undertaken by

applying the Augmented Dickey-Fuller (ADF) (Dickey, 2014). To address the unit root issues, non-stationary variables were differenced once.

3.7.2 Cointegration Test

Variables are said to be cointegrated if they exhibit both short-run and long-run relationships. Oyieke (2011) notes that cointegration has a cause-effect relationship and variables may move away from each other in the short-term and the same direction over some time. After performing the Bound cointegration test, short-run ARDL and long-run ECM models were constructed for recurrent and capital spending respectively.

3.8 Post Estimation Tests

3.8.1 Heteroscedasticity

The existence of constant errors across observations is a major convention of OLS. According to Maingi (2017), heteroscedasticity refers to a situation where error terms are not constant across observations and it is common in both primary and secondary data. Although it results in unbiased coefficient estimates, the estimated coefficients are inefficient leading to type I or type II error in decision making (Laopodis, 2001). The Breusch-Pagan test was used to detect heteroscedasticity.

3.8.2 Autocorrelation/Serial Correlation

OLS assumes that the disturbance terms in different periods are not correlated and autocorrelation is a violation of this conjecture. To detect serial correlation, Breusch Godfrey test was employed.

3.8.3 Model Stability

The two models used in this analysis were subjected to stability tests. The stability test was important to ensure the applicability and extension of the findings.

CHAPTER FOUR: PRESENTATION OF EMPIRICAL FINDINGS

4.1 Introduction

This chapter presents the findings of the econometric models of the study and endeavours to answer the study objectives. Findings interpretations are anchored on the reviewed literature and the economic theory.

4.2 Descriptive Statistics

We carried out the descriptive statistics to have a feel of the data set and understand the distribution of the data before conducting analysis. The statistics provided the study with information on measures of central tendency, dispersion, and normality.

4.2.1 Recurrent Spending Model

Table 4.1 shows that education has the lion share while health and agriculture sectors are the bottom two sectors respectively in terms recurrent expenditures. Increased spending in education can be attributed to the emphasis put to eradicate ignorance after independence and free primary and secondary education which is currently in place. Also, the result demonstrated a highly skewed distribution of all the variables and a leptokurtic kurtosis with long right-hand tails. The skewness and kurtosis values range was between 1.242 to 2.152 and 3.512 to 7.013 respectively, which according to Bryne (2010) mirrors a normal distribution.

Table 4.1: Descriptive Statistics of Recurrent Expenditures (KES Millions)

Variable	Private	Education	Health	Agriculture	Defense	Infrastructure	Debt
	Investment						
Mean	128491.20	60336.25	9721.48	5296.11	21022.22	8018.44	87064.56
Median	40560.00	12399.16	3842.74	2453.10	4874.02	242.80	29753.70
Std.Dev.	170371.40	93350.14	11890.49	6484.035	35908.59	13044.46	124011.30
Min	637.00	104.60	57.80	62.58	22.40	74.00	93.20
Max	734522.90	385265.00	49459.35	23968.00	140589.00	60446.00	470920.00
Variance	2.90e+10	8.71e+09	1.41e+08	4.20e+07	1.29e+09	1.70e+08	1.54e+10
Skewness	1.614	1.835	1.343	1.242	2.152	2.018	1.842
Kurtosis	5.188	5.546	4.098	3.512	6.689	7.013	5.659
Observations	55	55	55	55	55	55	55

Source: STATA Computation

Table 4.2: Descriptive Statistics of Development Expenditures (KES Millions)

Variable	Development Expenditure (KES Millions)						
	Private Investment	Education	Health	Agriculture	Defense	Infrastructure	Debt
Mean	128491.2	4950.338	4464.856	5598.109	487.34	25417.8	87064.56
Median	40560	625	790.34	1621	240	1854.1	29753.7
Std.Dev.	170371.4	7860.852	8062.073	9575.365	648.6385	60412.26	124011.3
Min	637	11.94	2.96	33.52	0.86	29.58	93.2
Max	734522.9	23048	35769	38058	3818.88	260421	470920
Variance	2.90e+10	6.18e+07	6.50e+07	9.17e+07	420731.9	3.65e+09	1.54e+10
Skewness	1.614	1.620	2.135	2.034	2.857	2.931	1.842
Kurtosis	5.188	4.354	6.867	5.923	14.145	10.786	5.659
Observations	55	55	55	55	55	55	55

Source: STATA Computation

4.1.2 Development Spending Equation

Table 4.2 presents the descriptive statistics for specific sector development expenditure in Kenya. Infrastructure has the highest share of capital investment while health and defense are the bottom two sectors respectively. High spending in infrastructure has been driven by the government's desire to connect the country with good road networks through construction of highways and rehabilitation of ports to enhance productivity. Moreover, the series also has a high range as shown in Table 4.2 above which is majorly attributed to increased government development expenditure over time. The results of skewness and Kurtosis confirmed normal distribution since they fall within the recommended limits (Bryne, 2010).

4.3 Pre-Estimation Test

The test for stationarity and cointegration analysis were conducted to check and correct the associated issues in the data set before the analysis was conducted.

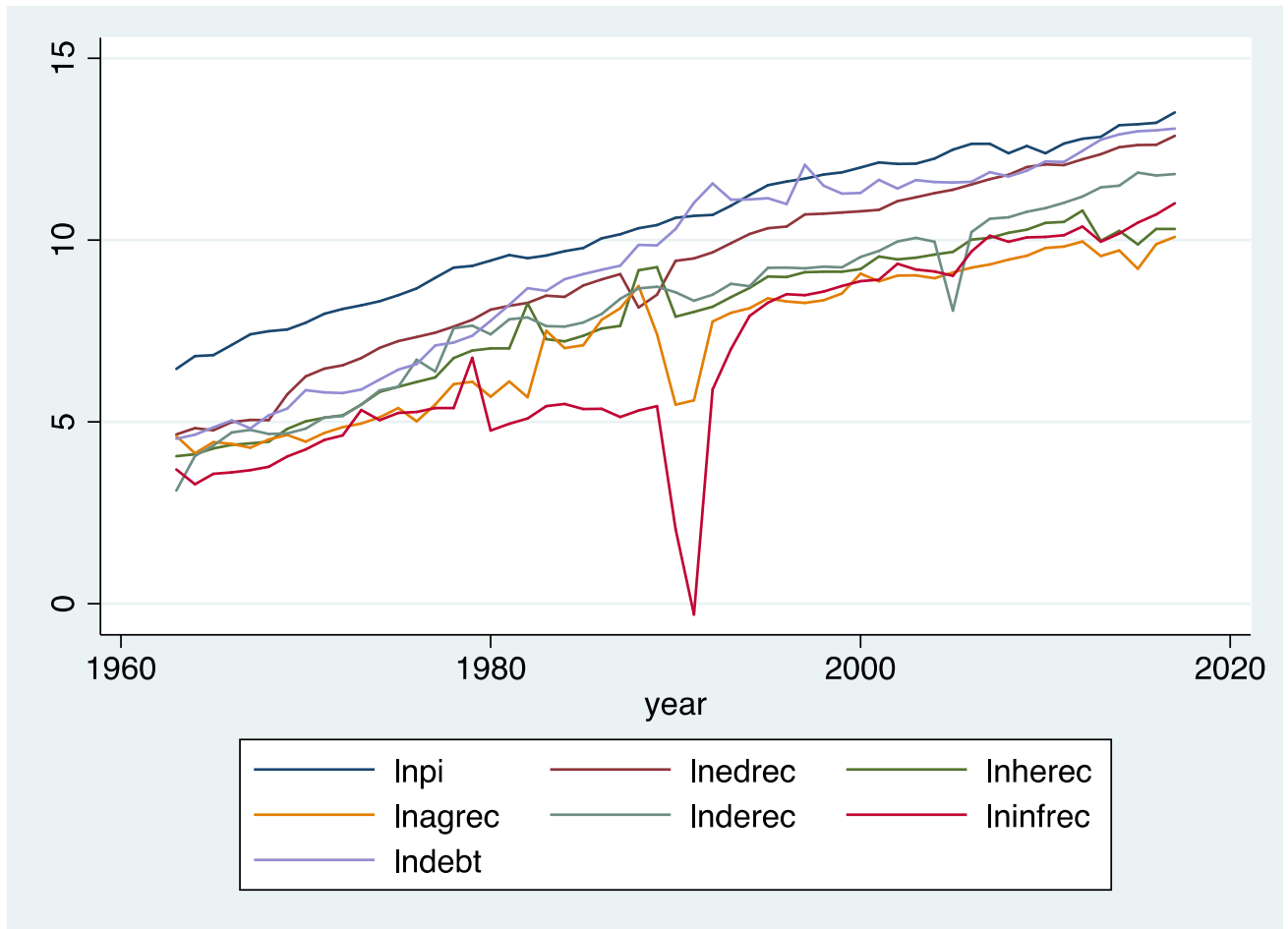
4.3.1 Unit Root Test

Stationarity test was paramount to avoid spurious regression results and guarantee meaningful inferences. The unit root tests addressing the two study objectives were conducted using the augmented Dickey Fuller (ADF) test as outlined below.

4.3.1.1 Recurrent Expenditure

Figure 4.1 below enables us to visualize the movements of variables selected for this study. The variables are all trending upward at a constant rate. Thus, the data generation process does not evolve around zero and that both a constant and trend should be included in ADF test.

Figure 4.1: Trend of Study Variables on Recurrent Spending



Source: STATA Output

Note:

- Inpi : Natural Logarithim of Private Investment
- Inedrec : Natural Logarithim of Recurrent Spending in Education
- Inherec : Natural Logarithim of Recurrent Spending in Health
- Inagrec : Natural Logarithim of Recurrent Spending in Agriculture
- Inderec : Natural Logarithim of Recurrent Spending in Defense
- Ininfrec : Natural Logarithim of Recurrent Spending in Infrustructure
- Indebt : Natural Logarithim of Debt Charge

Table 4.3: Augmented Dickey Fuller (ADF) Unit Root Test

Variable	Tests at levels	ADF Test		Comment
		t-Statistic	Critical value at 5% significance level	
Inpi	Constant & Trend	-1.701	-3.497	Non stationary
Inedrec	Constant & Trend	-2.641	-3.497	Non stationary
Inherec	Constant & Trend	-2.284	-3.497	Non stationary
Inagrec	Constant & Trend	-4.548	-3.497	Stationary
Inderec	Constant & Trend	-3.039	-3.497	Non stationary
Ininfrec	Constant & Trend	-3.367	-3.497	Non stationary
Indebt	Constant & Trend	-1.000	-3.497	Non stationary

Source: STATA Computation

Table 4.4: Augmented Dickey Fuller (ADF) Unit Root Test

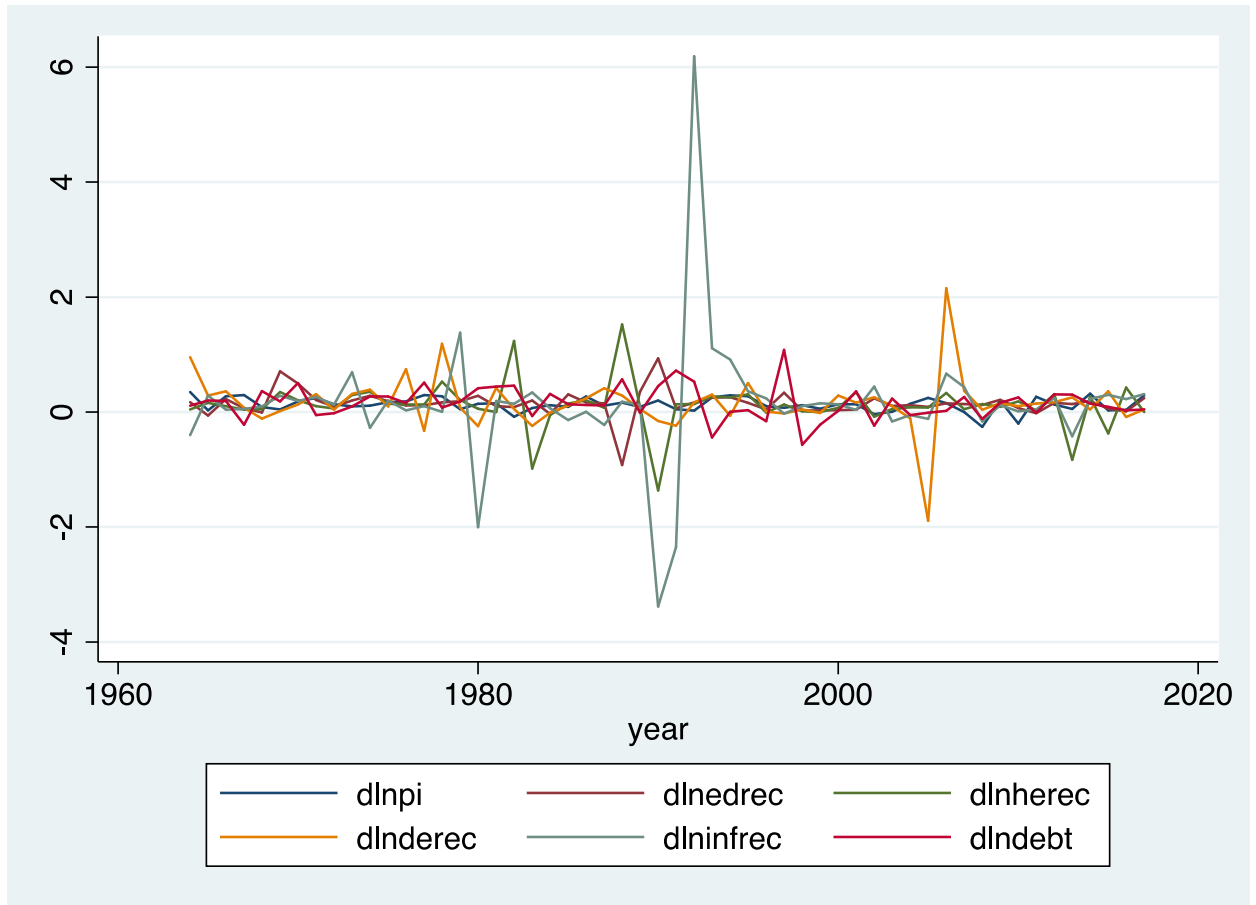
Variable	ADF Test	Comment
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	Tests at First Difference	t- Statistic	Critical value at 5% significance level	
Inpi	Constant & Trend	-5.208	-3.498	Stationary
Inedrec	Constant & Trend	-7.696	-3.498	Stationary
Inherec	Constant & Trend	-7.102	-3.498	Stationary
Inderec	Constant & Trend	-7.088	-3.498	Stationary
Ininfrec	Constant & Trend	-6.726	-3.498	Stationary
Indebt	Constant & Trend	-5.865	-3.498	Stationary

Source: STATA Computation

The above Table 4.3 shows the stationarity results of variables at levels while Table 4.4 displays the variables first difference results. The t-statistic absolute values for all variables except agriculture were less than their respective critical values at 5% significance level. Thus, the null hypothesis (H_0) of non-stationary series was rejected for agriculture (Inagrec) only and accepted for all other variables. However, running the ADF test using the first difference of the non-stationary variables, the series became stationary as show in Table 4.4 and Figure 4.2.

Figure 4.2: Trend of Study Variables on Recurrent Spending on 1st Difference

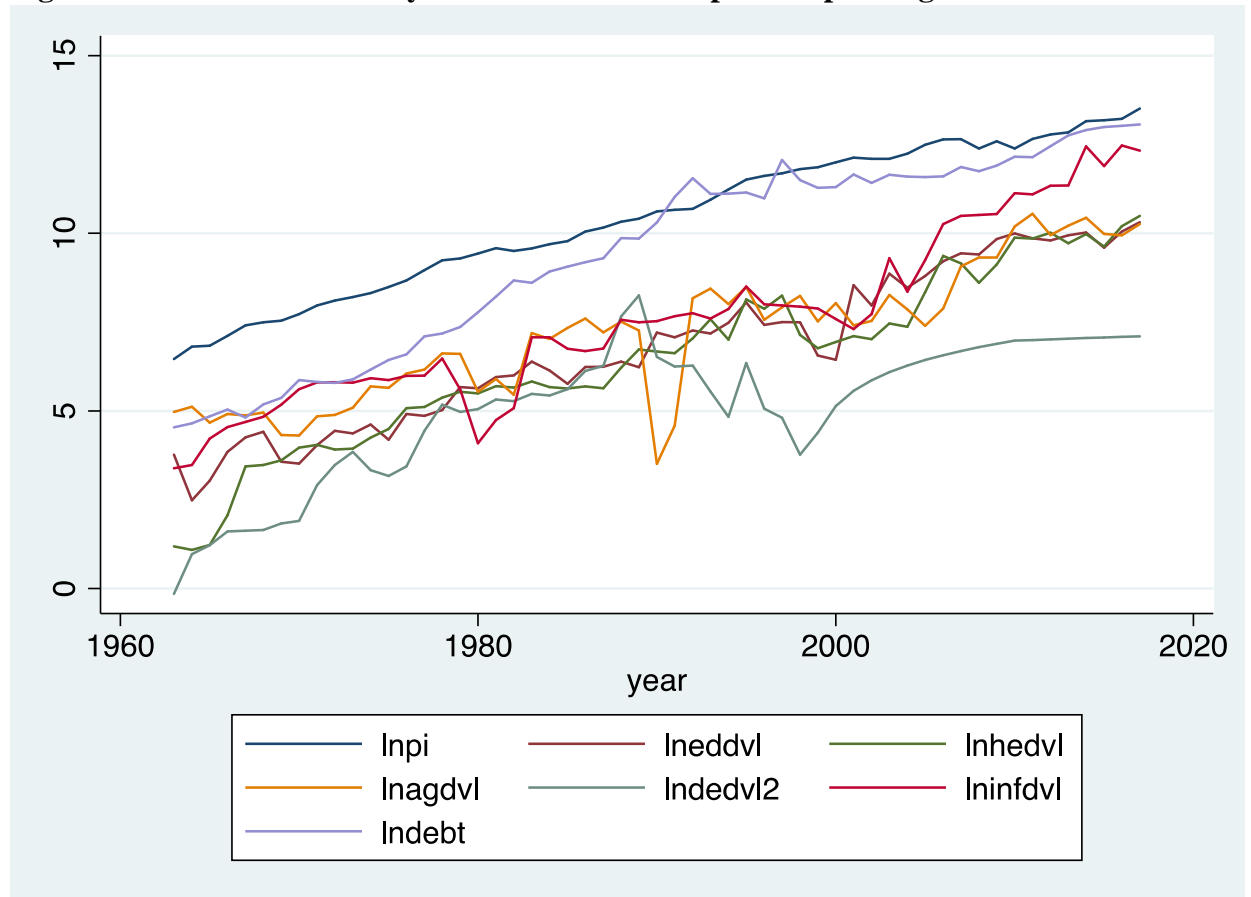


Source: STATA Output

4.3.1.2 Capital Expenditure

Figure 4.3 below displays overtime trend of variables used in capital model which covers the study objective two. Infrastructure and defense expenditure were the highest and the lowest respectively and all variables exhibited a constant upward trend. This means that the data generating process didn't revolve around zero and that both a constant and trend should be included in the ADF test.

Figure 4.3: Trends of Study Variables for Development Spending



Source: STATA Output

Note:

- Inpi : Natural Logarithim of Private Investment
- Ineddv1 : Natural Logarithim of Development Spending in Education
- Inhedv1 : Natural Logarithim of Development Spending in Health
- Inagdv1 : Natural Logarithim of Development Spending in Agriculture
- Indedv12 : Natural Logarithim of Development Spending in Defense
- Ininfdv1 : Natural Logarithim of Development Spending in Infrustructure
- Indebt : Natural Logarithim of Debt

Table 4.5: Augmented Dickey Fuller (ADF) Unit Root Test

Variable	Tests at levels	t- Statistic	Critical value at 5% significance level	Comment
lneddvl	Constant & Trend	-4.055	-3.497	Stationary
lnhedvl	Constant & Trend	-3.699	-3.497	Stationary
lnagdv1	Constant & Trend	-4.962	-3.497	Stationary
lndedvl	Constant & Trend	-2.213	-3.497	Non stationary
lninfdvl	Constant & Trend	-2.463	-3.497	Non stationary

Source: STATA Computation

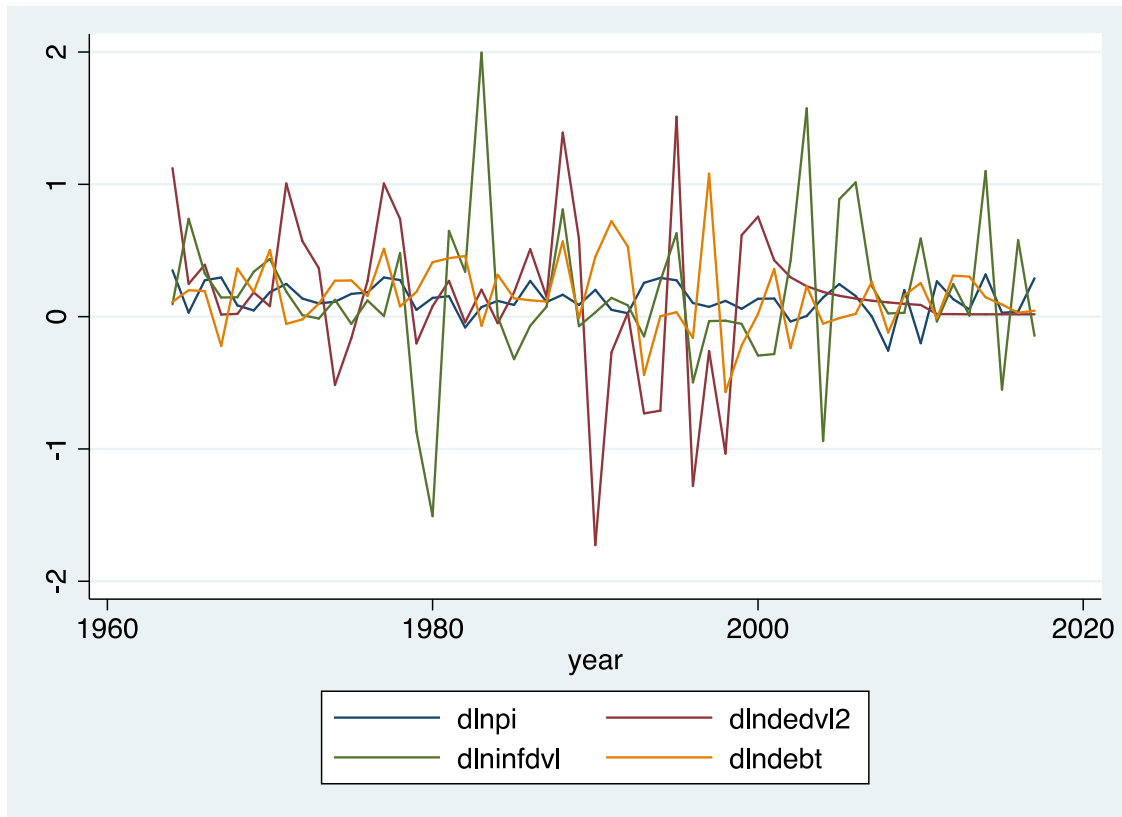
Table 4.6: Augmented Dickey Fuller (ADF) Unit Root Test

Variable	Tests at 1 st Difference	t- Stat	Critical value at 5% level	
lndedvl	Constant & Trend	-5.543	-3.498	Stationary
lninfdvl	Constant & Trend	-5.758	-3.498	Stationary

Source: STATA Computation

Tables 4.5 and 4.6 present the stationarity results at levels for education, health, infrastructure, agriculture and defense variables and upon 1st difference of infrastructure and defense which were non-stationary respectively. The H_0 of non-stationary series was accepted for development spending in education and infrastructure only since their absolute values for t-statistics were less than their respective critical values at 5% confidence level as indicated in Table 4.5. Upon differencing the non-stationary variables once, they all become stationary as confirmed in Table 4.6 and Figure 4.4.

Figure 4.4: Trend of Study Variables on Capital Spending After 1st Difference



Source: STATA Output

4.3.2 Cointegration Analysis

Cointegration analysis was imperative to establish the relationship among variables and to determine whether to estimate the long run or the short-run model. Most often, after conducting the unit root analysis, there are three major outcomes; integration at levels I (0), on first difference I (1) or the series has a combination of both. In our case, the stationarity results indicated a combination of both I (0) and I (1). Thus, a Bound test recommended by Pesaran, shin & Smith (2001) for such series was conducted.

4.3.2.1 Recurrent Expenditure Equation

Table 4.7: Cointegration Analysis

Significance level	10%		5%		2.5%		1%	
Bound	I ₍₀₎	I ₍₁₎	I ₍₀₎	I ₍₁₎	I ₍₀₎	I ₍₁₎	I ₍₀₎	I ₍₁₎
F stat = 2.325	2.12	3.23	2.45	3.61	2.75	3.99	3.15	4.43
t-Stat = -3.033	-2.57	-4.04	-2.86	-4.38	-3.13	-4.66	-3.43	-4.99

Source: STATA Computation

The (H₀) hypothesis is no cointegrating equation while the alternative (H₁) is there are cointegrating equations in the series. The H₀ was accepted since the value for F-statistic was 2.325 which was lower than the lower bound values at 5%, and 1% significant levels as shown in table 4.7. This means that the short-run Autoregressive Distributed Lag (ARDL) model should be estimated.

4.3.2.2 Development Expenditure Equation

Table 4.8: Cointegration Analysis

Significance level	10%		5%		2.5%		1%	
Bound	I ₍₀₎	I ₍₁₎	I ₍₀₎	I ₍₁₎	I ₍₀₎	I ₍₁₎	I ₍₀₎	I ₍₁₎
F Stat= 4.136	2.12	3.23	2.45	3.61	2.75	3.99	3.15	4.43
t stat=-3.444	-2.57	-4.04	-2.86	-4.38	-3.13	-4.66	-3.43	-4.99

Source: STATA Computation

The above table indicates the STATA output upon issuing the Bound cointegration test command. The F-Statistic value is 4.136 higher than the upper bound values at 10% and 5% level. Thus, the H₁ of the presence of cointegrating equations in the series was accepted. This means that both the long and short-run models should be estimated.

4.4 Models Estimation Results

4.4.1 Recurrent Expenditure ARDL Model Results

The cointegration results indicated absence of cointegrating equations in this series. To achieve objective one of this paper which was to determine the link between private investment and government recurrent spending, the short-run model (ARDL) was estimated and results presented below.

Table 4.9: Recurrent Expenditure Model Results

Variable	Coefficient	t-value	P-value
lnpi			
L1 lnpi	0.712	7.49	0.000
lnedrec	0.092	1.51	0.137
lnherec	-0.015	-0.32	0.748
lnagrec	0.028	0.76	0.451
Inderec	-0.012	-0.33	0.745
L1 lninfrec	0.036	1.95	0.058
Indebt	0.100	2.08	0.043
Constant	1.135	3.86	0.000
R-Squared	0.997	F	= 1968.050
Adj. R-squared	0.997	Prob>F	0.000
Log likelihood	45.497	Sample size	54

Source: STATA Computation

Table 4.9 presents the recurrent expenditure model regression outcomes. The F statistic is 1968.05 and its corresponding probability value is 0.000 which is highly significant at 1% level meaning the model is statistically significant. The R^2 is 0.997 implying that health, education, agriculture, infrastructure, defence and debt charges variables account for

99.71% variations in private investment in the country. The findings indicate that the 1st lag of private investment and recurrent spending in infrastructure and the debt are statistically significant at 1%, 10%, and 5% significant levels respectively.

This implies that in the short-run, a percentage point change in the first lag of private investment and recurrent spending in infrastructure are associated with 0.712 and 0.036 increase in private investment on average *ceteris paribus* at 1% and 10% statistical significance levels respectively. Also, a percentage point change in debt will increase the private investment by 0.1 on average *ceteris paribus* at 5% statistically significant level in the short run. Other variables in the model were statistically insignificant although defense and health coefficients indicated that they crowd out private investment. The constant for the model is 1.135 which is statically significant at 1% level.

Generally, this objective posed mixed results on how health, education, agriculture, infrastructure and defense outlays impact private investment. This agrees with the findings of Kiptui (2005) who using OLS methodoly established that recurrent expenditure is a critical component complimenting private investment as well as the findings of Mohib *et al.* (2015). Moreso, the empirical results of Aschauer (1989) recognized infrastructure spending as an activator of private investment which is largely supported by this paper. Also, this study underscores Laopodis (2001) position of military expenditures demoting private investment and contradicts Njuru (2012) and Oyieke (2011) position on the role of debt charges on private capital formation.

4.4.2 Capital Expenditure Error Correction Model (ECM) Results

Our second objective concern was determine how development spending outlay by the government impact the private sector. The ECM model was deemed the appropriate estimation technique due to the the long-run association of the variables involved.

Table 4.10: Capital Expenditure Error Correction Model (ECM) Results

Variable		Coefficient	t-value	p-value
Adjustment	lnpi			
	L1 lnpi	-0.212	-3.44	0.001
Long run	lneddv1	-0.425	-1.29	0.205
	lnhedv1	0.546	2.76	0.009
	lnagdvl	0.135	0.99	0.328
	lneddv12	-0.090	-1.07	0.292
	lninfdv1	0.031	0.29	0.771
	lndebt	0.509	4.91	0.000
	lnpi LD	-0.230	-1.79	0.082
Short run	lneddv1 D1	0.120	2.58	0.014
	lneddv1 LD	0.060	1.50	0.142
	lnagdvl D1	-0.053	-2.40	0.022
	lnagdvl LD	-0.027	-1.24	0.223
	lneddv12 D1	0.050	1.36	0.183
	lndebt D1	-0.169	-2.41	0.021
	lndebt LD	-0.083	-1.32	0.195
	Constant	1.043	4.01	0.000
	R ²	=0.502	Adjusted R ²	=0.3000
	Log likelihood	=55.925	Observations	=53

Source: STATA Computation

Table 4.10 shows the Capital Expenditure ECM outcome after running the regression. The long-run results are displayed in the upper panel and the short-run results on the lower panel. Our R^2 is 0.502 implying that 50.2% of Private investment variations were explained by the model regressors. The model adjustment term is -0.212 which is statistically significant at 1% level and it is within the theoretically accepted range of -1 and 0. Basically the sign of the adjustment term means that the errors of the previous period will be adjusted in the current period hence the series convergence in the long run.

The long run results revealed that the 1st lag of private investment, development spending in health, and the debt were significant at one percent level. This is supported by the absolute values of their respective t-values which are all greater than two (2). These coefficients indicate that increasing the health capital expenditure by one percent will result to a corresponding increase of private investment by 0.546 percent ceteris paribus in the long run while a unit increase in debt charge will result to 0.509 units investment increase in the long run ceteris paribus. The model's constant of 1.044 was significant at one percent level. Other variables in the model were statistically insignificant in the long run. Although statistically insignificant, both defense and education spending hurt private investment in the long run.

Similar to this study, Oyieke (2011) found out that infrastructure capital expenditure influences private capital significantly. Mohib *et al.* (2015) conducting a similar study in Pakistan concluded that health and defense spending compliments and demotes private investment respectively and Laopodis (2001) confirmed the same results for military expenditures. On the other hand, these results contradicts Njuru (2012) and Oyieke (2011) on the role of debt charge in private capital formation.

Essentially, these results demonstrates mixed effects of sector capital outlays on private investment just like the above findings on reccurent model. Capital spending in providing health care, agriculture and improving the infrastructure such as highways and ports has proved to stimulate the private sector in the long the run. This is in line with the Vision 2030 aspirations and the 'Big Four' Agenda of the government.

4.5 Diagnostic and Post-Estimation Tests

4.5.1 Autocorrelation

OLS assumes that the disturbance terms in different periods are not correlated and autocorrelation is a violation of this conjecture. To detect presence of serial correlation, Breusch Godfrey test was employed. Table 4.11 displays the STATA results for the same.

Table 4.11 Autocorrelation Results

Development Spending Equation			Development Spending Equation		
chi2	df	Prob > chi2	chi2	df	Prob > chi2
0.042	1	0.838	0.198	1	0.906

Source: STATA Computations

H₀: No Serial Autocorrelation

H₁: Autocorrelation Present

The results above indicates absence of autocorrelation in the two models. The H₀ is accepted since the chi2 P values are 0.838 and 0.906 are statistically insignificant at 0.05 for both models respectively.

4.5.2 Heteroscedasticity

The Breusch-Pagan test and White's test were used to test for heteroscedasticity in recurrent and development models respectively.

Table 4.12 Heteroscedasticity Results

Recurrent model	chi2(1)	=3.53
	Prob > chi2	=0.060
Development model	chi2(52)	=53
	Prob > chi2	=0.435

Source: STATA Computations

H₀: Presence of Heteroscedasticity

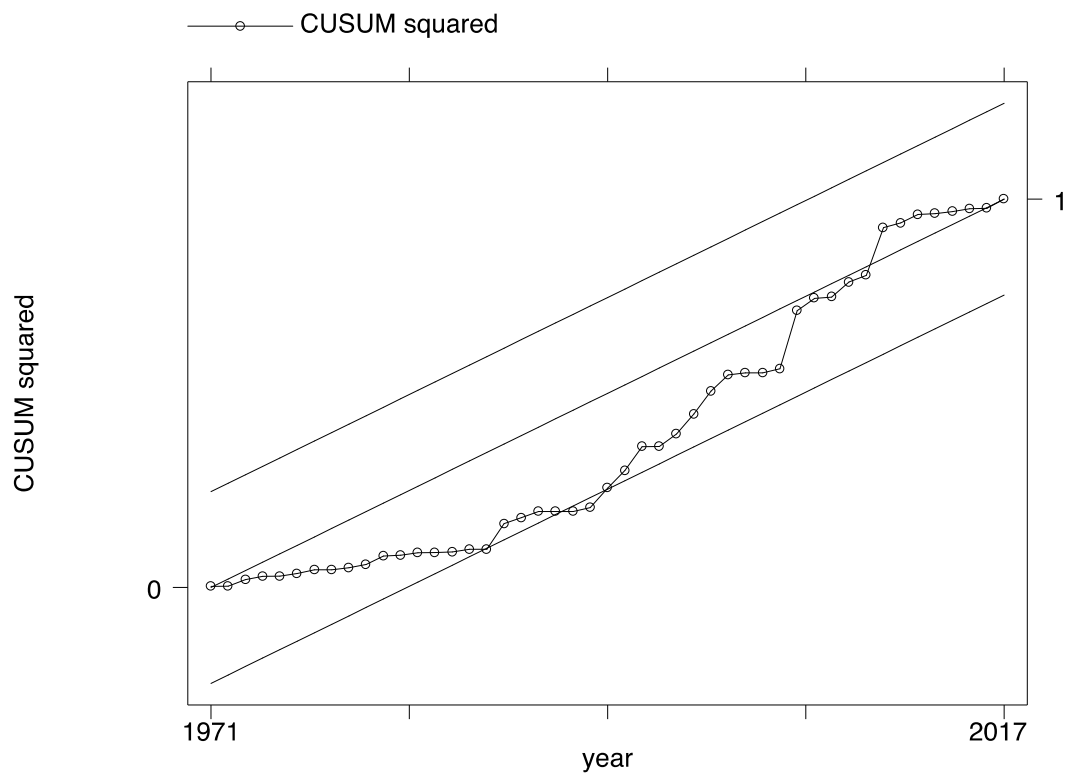
H₁: Homoscedasticity

From the results indicated above the H₀ was rejected and H₁ accepted in both models since the P values are within the 5% significant level. This means that the models do not suffer from heteroscedasticity problem.

4.5.3 Model Stability

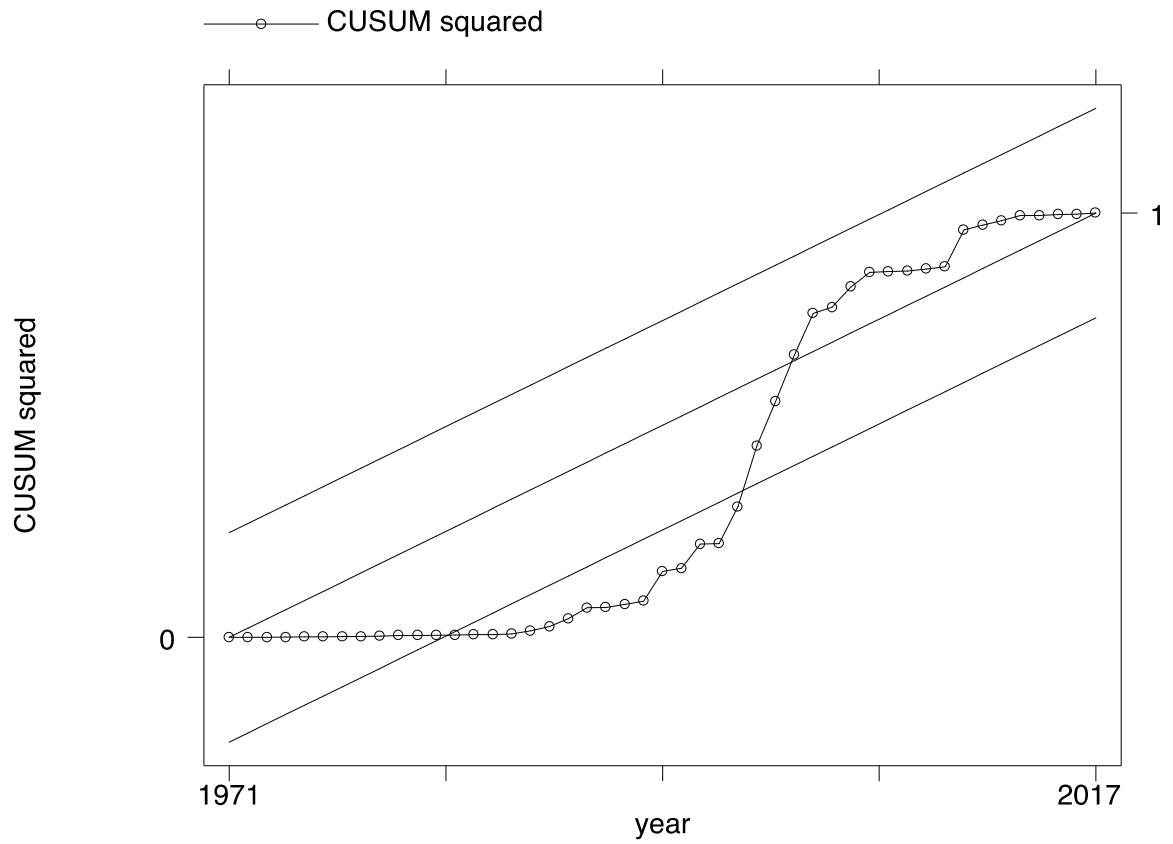
The stability of the model was tested to determine whether the model could be used to make meaningful inferences. The Cumulative Sum (CUSUM) graphs below were employed.

Figure 4.5a: Recurrent CUSUM Test



Source: STATA Computations

Figure 4.5b: Development CUSUM Test



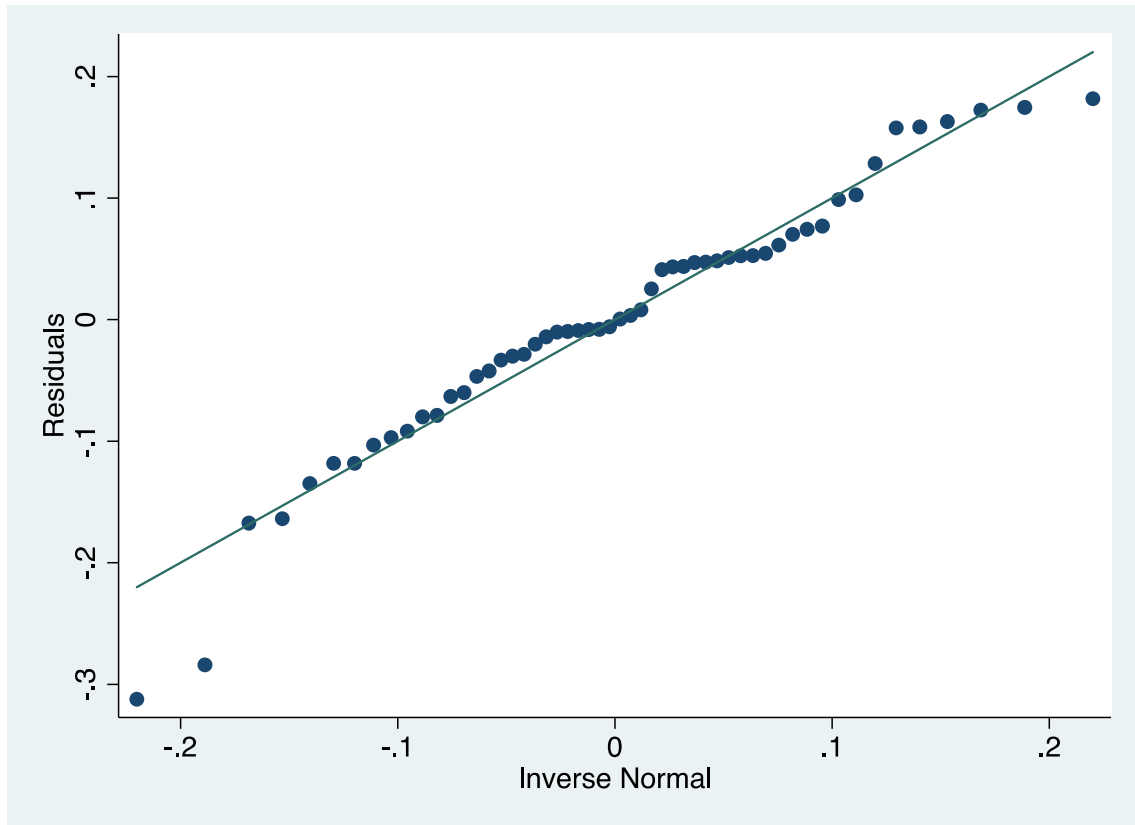
Source: STATA Computations

Based on STATA results, the CUSUM graphs were within the 5% boundary indicating that the models were stable as shown in Figures 4.5a and 4.5b above.

4.5.4 Normality Test of the Error Terms

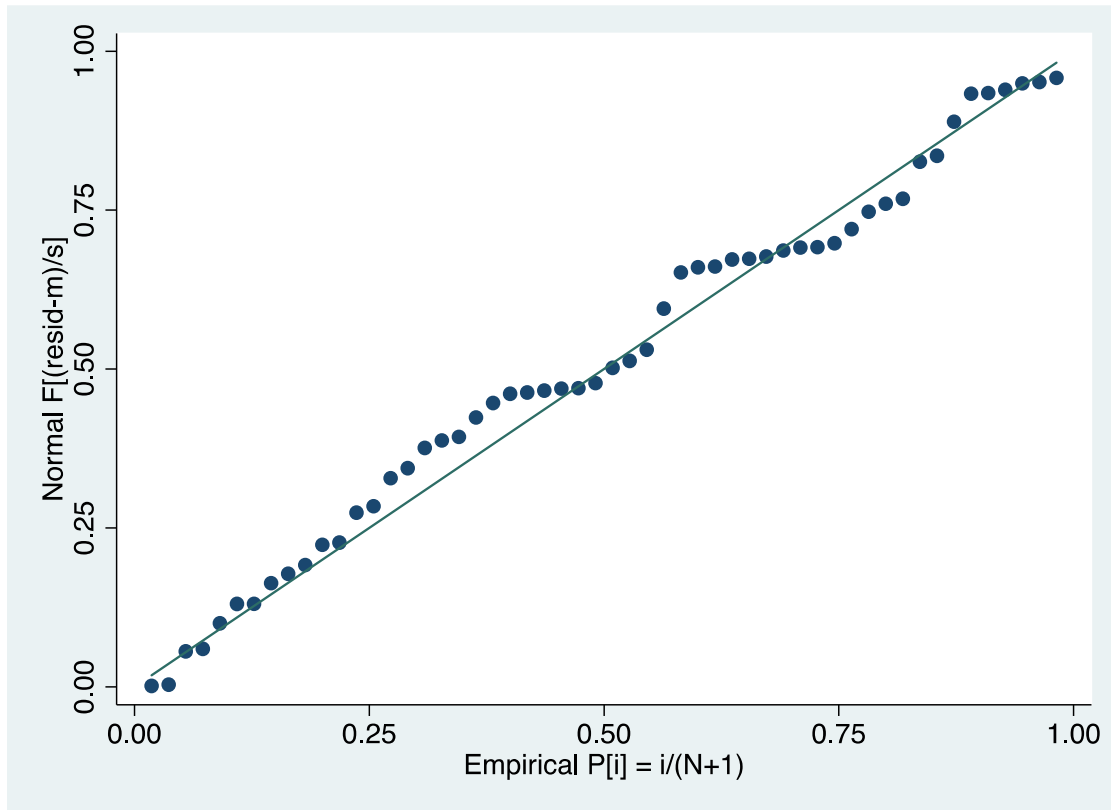
Recurrent Expenditure

Figure 4.6a: Tests of Normality of the Error terms: qnorm Recurrent Expenditure Model



Source: STATA Computations

Figure 4.6b: Test of Normality of the Error Term: pnorm Recurrent Expenditure Model

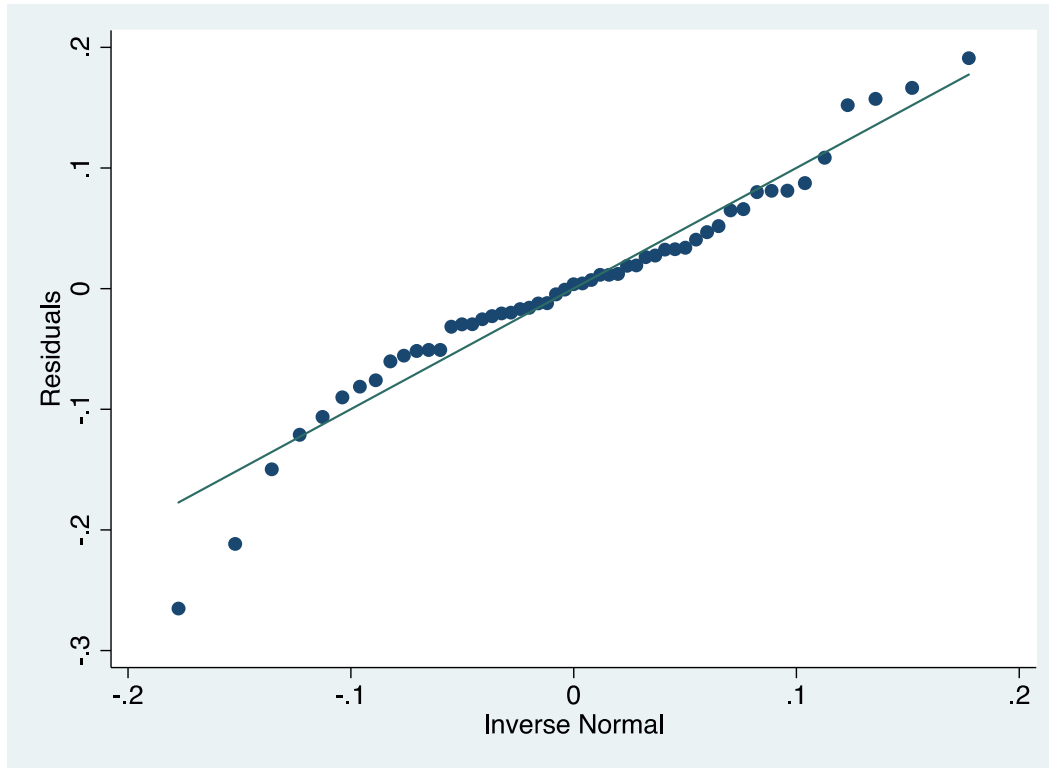


Source: STATA Computations

Residuals are assumed to be distributed normally with homoscedasticity variance in OLS. Normal probability (Figure 4.6a) and quantiles graphical analysis (Figure 4.6b) of checking errors distribution using `pnorm` and `qnorm` commands was used. Figure 4.6a and 4.6b above displays normality results for residuals of the recurrent model. The residuals are spread almost along the reference line ($y=x$). Although there are slight deviations from the reference line in both graphs, they are insignificant to invalidate a normal distribution of residuals.

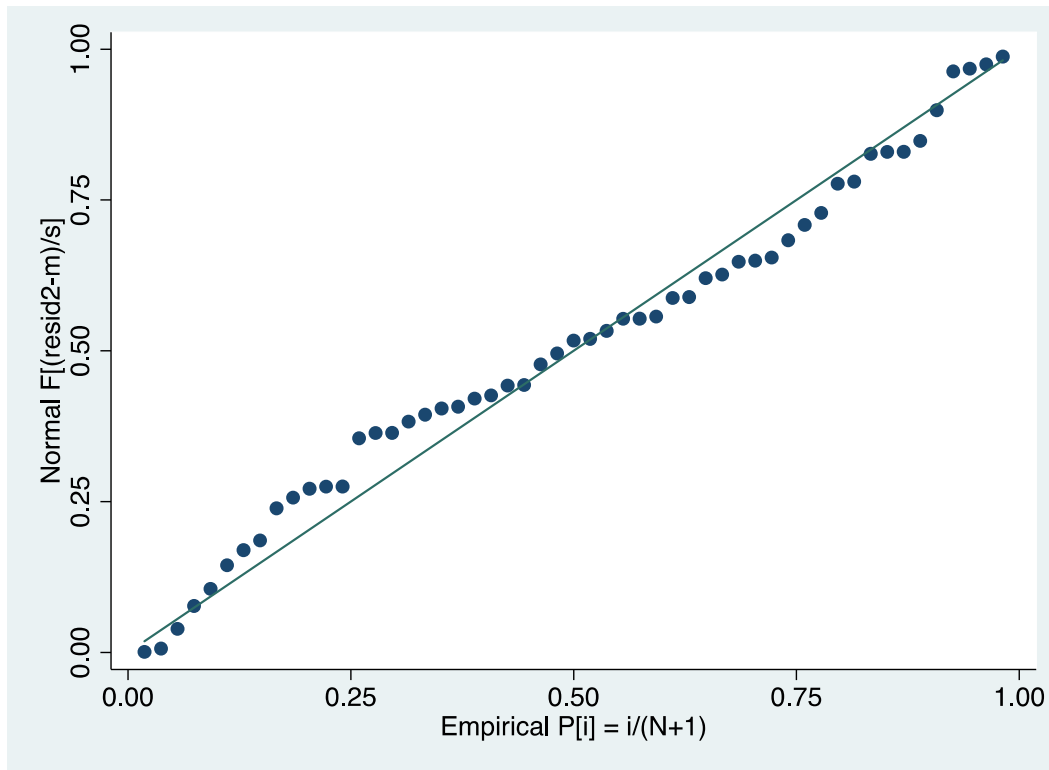
Development Expenditure

Figure 4.7a: Normality of the Error Terms: qnorm Development Expenditure



Source: STATA Computations

Figure 4.7b: Normality of the Error Terms: pnorm Development Expenditure



Source: STATA Computations

Sktest Resid2

Table 4.13: Skewness/Kurtosis Tests for Normality

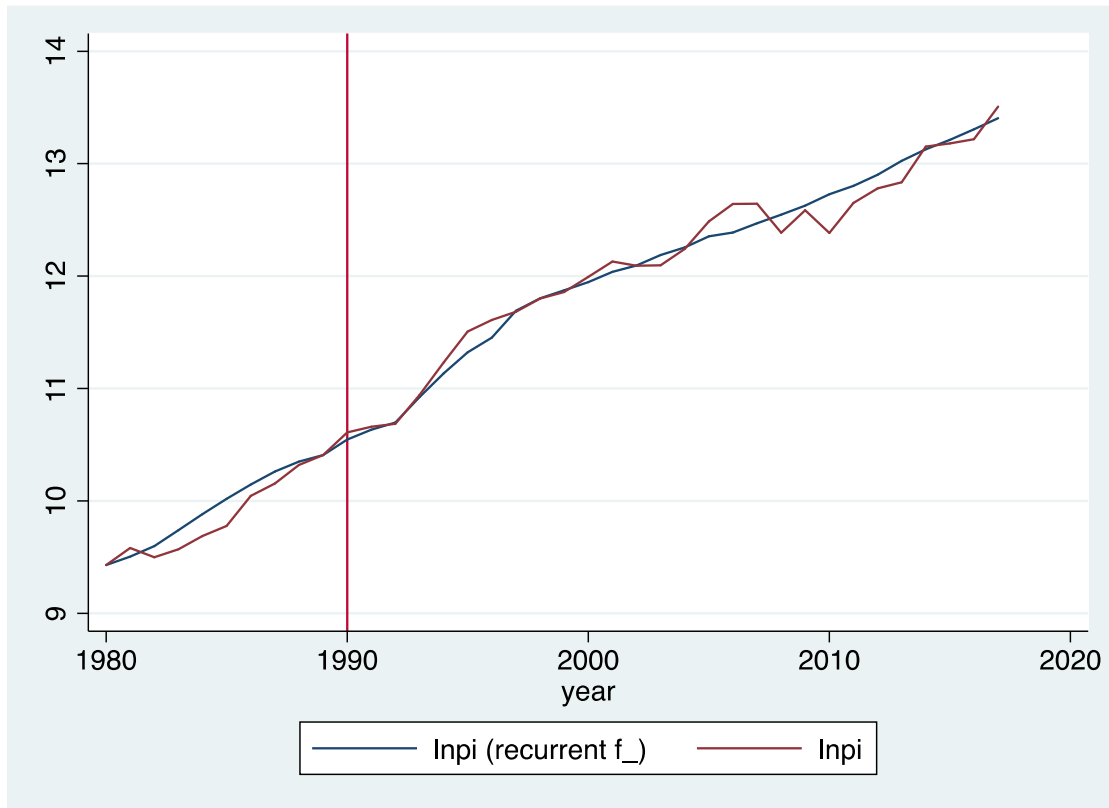
Variable	obs	Pr(Skewness)	Pr(Kurtosis)	-----Joint---	
				Adj chi2(2)	Prob>chi2
resid2	53	0.168	0.049	5.52	0.063

The pnorm and the qnorm stata commands were used to check the departure of residuals from normal. Both Figures 4.7a and 4.7b were used to show the distribution of residuals using the capital expenditure model. Errors were spread almost along the 45° diagonal line which mirrored normality. The graphical analysis was supported by the skewness/Kurtosis findings where normality H_0 hypothesis was accepted since the p value was insignificant at 5% level as indicated in Table 4.13.

4.5.5 Forecasting

4.5.5.1 Recurrent Expenditure Model

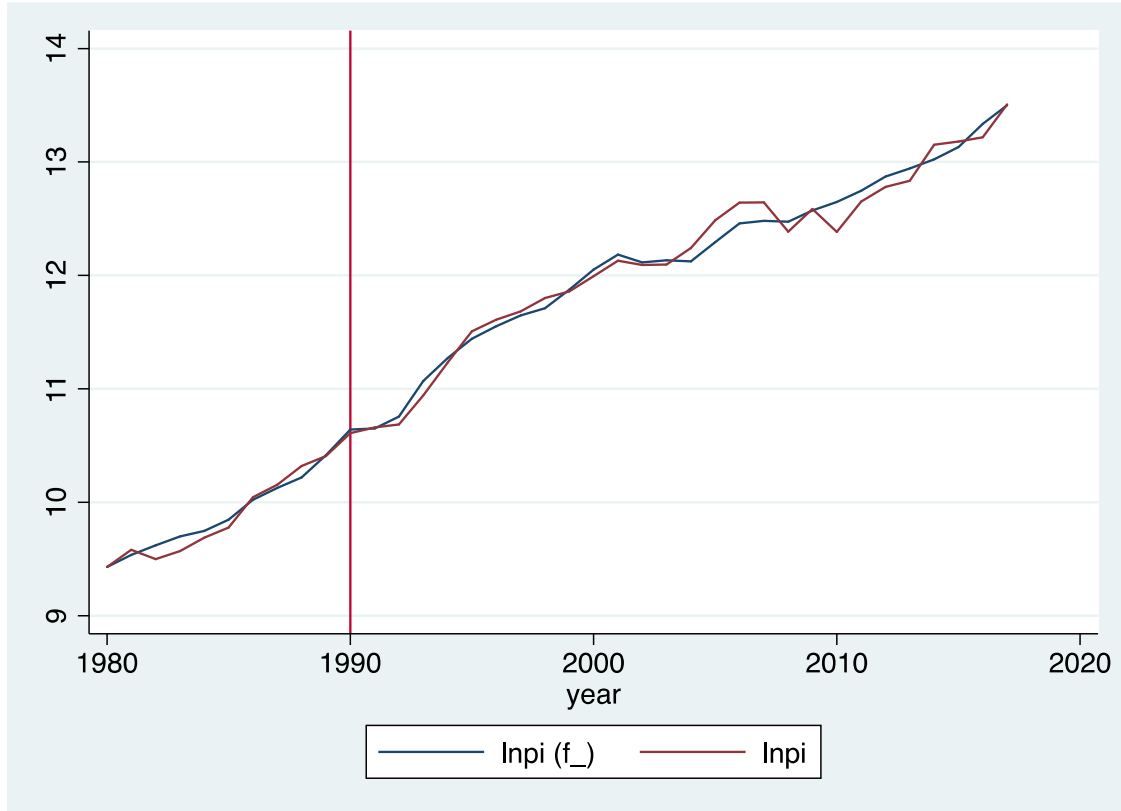
Figure 4.8a: Forecast using Recurrent Expenditure Model



Source: STATA Computations

4.5.5.2 Development Expenditure Model

Figure 4.8b: Forecast Using Capital Expenditure Model



Source: STATA Computations

Figure 4.8a and 4.8b shows private investment forecasted using the ARDL model. The blue graphs represents the forecasted private investment using the explanatory variables in the recurrent and capital models respectively alongside the graphs of actual values. The study concluded that the models fairly forecasts private investment since the forecasted and the actual graphs exhibited similar pattern and they are fairly close to each other.

CHAPTER FIVE: SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

This section captures the summary of the findings, evidence-based conclusions and offers policy recommendations as well as the direction for future studies.

5.2 Summary of Findings and Conclusions

This paper aimed at establishing the role of public expenditure in promoting or and demoting private investments in Kenya. The descriptive statistics of both models mirrored normal distributions with a high range of distribution occasioned by increasing government spending in sectors over time. The cointegration analysis revealed that there is long-run relationship between private investment and development outlay and a short-run relationship between private investment and recurrent expenditure.

ARDL results for the recurrent model indicated that 99.71% of private investment variations were accounted for by explanatory variables. The F statistic which was highly significant confirmed that the model variables were significant. Government recurrent spending in infrastructure and debt were found to promote private sector and also spending in Education and agriculture influence private investment in the short run though insignificantly. More so, though defense and health were insignificant, the econometric findings indicated that they negatively affect private investment. These findings compares with Keynes (1936) and the fiscal economists who opined that increasing government expenditure is expected to stimulating private investment when the economy is not in full employment state.

The ECM was used to establish the relationship between sector capital spending and private investments in Kenya. Econometric results indicated that 50.19% of private investment variation was explained by the dependent variables in the model. Capital outlay in health, agricultrure and infrastructure was found to positively impact private investment in the long run. On the contrary, defense and education development spending influence private investment negatively in the long run.

This paper concludes that public sector outlays are key in determining private investment and that different public spending components affect investment differently in both short run and long run. Debts are important to spur investment and economic growth and if well managed, repayments cannot hamper the economy. However, caution should be exercised in management of public debts. Government can influence investment growth targets in the country through fiscal policy in both short run and long run.

5.3 Policy Recommendations

The findings of this study disclose several important aspects that should be considered by the government during fiscal policy formulation processes. The study found out that the recurrent and development expenditures have both short-run and long-run influences on private investment respectively. Specific spending components impact investment differently. Thus, this study recommends that the government should consider increasing and sustaining spending in sectors that complement private investment to stimulate the economy while downsizing spending in sectors that crowd out private investment in the country.

The government recurrent spending in infrastructure, Education, and agriculture should be enhanced since they have a crowding-in effect. As the government intensifies the austerity measures, caution should be exercised when making sectors funding decisions. Investment in transport infrastructure expansion and modernizations will reduce costs of production hence attracting investors. Recurrent spending in education especially at a time when the government is implementing the free primary and secondary education should be amplified. This will go a long way in enhancing the quality of human resource capital which is a vital ingredient of investment. Also it will be prudent for government to enhance recurrent spending in this sector due to its significant contribution to GDP in Kenya. At the same time, government should scale down its recurrent outlays in health and defense since they deter private investment.

Capital spending in health, agriculture, and infrastructure should be enhanced since they all have a positive correlation with private investment. This endorsement is timely and in

line with the Vision 2030 aspirations, the government's "Big 4 Agenda" and the Post COVID-19 ERS whose aim is to rejuvenate the economy to achieve a double digit growth. Strategic capital investment in agriculture to stimulate the economy should be given priority since the contribution of this sector to GDP is significant. Capital investment in infrastructure should be given precedence to enhance transport and communication which eases the cost of doing business in the country.

This study finally raises pertinent issues on the rising debt levels and debt management in the country. We recommend that the government should exercise great care and caution when borrowing to ensure favorable terms as well as ensuring debts are invested in appropriate productive sectors with multiplier effects. The government should also emphasize good management of loans by sealing all the corruption and other wastages loopholes.

5.4 Areas of Further Study

This recognizes that there are qualitative variables that influence private investments but were not investigated. This in some ways renders the models unable to include all critical variables that influence private investment comprehensively. Thus, the study recommends that these variables should be factored in future studies.

There still exist limited literature on how specific sector spending by the government influence private investment in Kenya. Future studies should strive to fill this gap by considering a different methodology to establish this link.

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Appendices

Appendix 1: List of Documents Reviewed

Author	Study	Country & Data	Objectives	Methodology	Findings	Comments
Aschauer (1989)	Is public expenditure productive?	United States of America (USA) Data; Time series data from 1949 to 1989 Sources; Monthly Labor Review, published by the Department of Labor and the Department of Commerce.	To establish the relationship between aggregate productivity and stock and flow government-spending variables	Ordinary Least Square (OLS) method with the reduced form of cross-equation restrictions	government outlay components other than defense enhances the productivity of the economy. Also, Government spending on infrastructure such as highways, airports, sewers, etc. was found to be productive	Good in problem statement and background
Barro R.J (1990)	The relationship between government investment and economic growth across several countries	United States of America (USA) Data Time series data from the National Bureau of Economic Research's	To establish the link between government expenditure and economic growth	simple, constant-returns model of economic growth.	The results revealed that there is a strong correlation between government spending and economic growth	Applicable in problem statement
Monadjemi (1995)	Public and private spending: some Australian evidence	Australia Data; Quarterly data between 1960 to 1991	To examine the relationship between government expenditure and private investment in Australia	Ordinary investment model	public spending crowds-in private capital formation	Good for literature review

Chete and Akpokodje (1997)	Macroeconomic determinants of domestic private investment in Nigeria: an empirical exploration	Australia Data: Time series data from 1973-1994	To empirically investigate the determinants of private investments in Nigeria	OLS estimation method adopting a double log function	private investment plays a crucial role in the economy and that the government will initiate the relevant market interventions to spur economic growth and consequently private investment	Good for literature review
Laopodis (2001)	Effects of government spending on private investment	Select European countries i.e Greece, Ireland, Portugal, and Spain Data: Panel data	To investigate the effects of military and non-military public expenditures on gross private investment	Cointegration and Error-Correction Framework	In some instances, public investment crowds-in private investment and crowds it out in others. Also, there is no correlation between government expenditure on military and private investment	Good attempt to break down the expenditure into sector spending
Oyieke (2011)	Government Capital Spending and Financing and its Impact on Private Investment	Kenya Data: Time series data for the period 1964 to 2006	i)To determine the effect of government capital spending and related variables on private investment across time and regime. ii) To analyze the effect of different modes of financing public capital spending on	Error correction framework	agriculture expenditure had a positive impact on private capital formation while spending on infrastructure complements private investment insignificantly. Debt servicing, real exchange rate, and political risk posed a crowding-out effect.	Good for methodology

			private investment.			
Njuru (2012)	The nexus between private capital formation and fiscal policies in Kenya	Kenya Data: Semiannual time-series data from 1964 to 2010.	To investigate the nexus between private capital formation and fiscal policies in Kenya	Modified accelerator model	Private capital formation and fiscal policy formulation and implementation are highly correlated in Kenya	Good for background
Joseph and Ekundayo, (2016)	An empirical analysis in selected West African countries to determine the relationship between fiscal policy and private capital formation	West African countries Data: Time series data from these countries from 1993 to 2014	To establish the relationship between fiscal policy and private capital formation	Ordinary Least Square (OLS)	Tax revenue and government development outlay complement private investment. On the other hand, recurrent expenditure and non-tax revenue and external debt recorded crowding out effect.	Didn't decompose development and recurrent expenditure
Okisai (2018) investigated using	The impact of government expenditure on private investment in Kenya	Kenya Data: Time series data for the period 1963 to 2012	i) To determine the effects of government development expenditure on private investment ii) To determine the effects of government recurrent expenditure on private investment	VAR model	The findings supported the hypothesis that both the recurrent and capital expenditure crowd in private investment in the country.	He used broad categorization of government expenditure i.e. development and recurrent expenditure