DETERMINANTS OF GOVERNMENT CONSUMPTION EXPENDITURE IN KENYA

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DECLARATION

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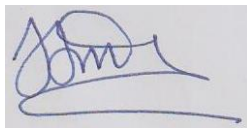This thesis work has been submitted for examination with our approval as University supervisors:

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To my mother, Magdalene Majoge, and siblings, Michael and Teresa, who gave me hope and encouragement to soldier on even at times of difficulties, you remain great assets to my life.

ABSTRACT

Government expenditure is a very instrumental demand tool in achieving economic stability and policy makers frequently use it to influence certain economic outcomes. Government expenditure majorly consists of two components: investment and consumption components. Many researchers concede that higher level of government consumption expenditure is growth retarding and therefore undesirable. The aim of the study was establish the economic, structural and political and institutional determinants of government consumption expenditure in Kenya. Government consumption expenditure in Kenya has grown relatively faster from Ksh 31.2732 billion in 1963 to Ksh 2107.2 billion in 2018. There is still scanty literature on this topic and yet consumption expenditure accounts for more than 55% of Kenya's total public spending every year. Because Shonchoy (2010) panel analysis suffers from cross-sectional heterogeneity and fails to be informative about Kenya's consumption spending, it became a motivation to examine the causes for the rise in Kenya's government consumption expenditure. Studies done by Kanano (2006) explained the reasons behind growth in gross expenditure, while Maingi (2010) and Abwoga (2013) focused on the effects of public consumption expenditure on economic growth in Kenya. However, their studies did not attempt to explain the causes of its growth. Oketch, T. O. and Linge, T. (2018) examined the determinants of recurrent public expenditure in Kenya but, however, reduced their scope and narrowed on salaries/wages, social contribution and non-wage related variables such as rent & utilities, travelling expenses, hospitality and other consumables and that focus makes this study deviate from their study. In light of this arguement, this study followed quantitative and correlational studies design to establish the reasons for rise in consumption expenditure in Kenya and drawing from the public choice approach, three models were used:(i) Economic model; consisted of gross domestic product, foreign aid, inflation rate, foreign direct investment, interest rate, trade openness and external debt stock (ii) Structural model; consisted of urbanization rate, young population (below 15 years) and old population (above 64 years) (iii) Politico-institutional model; comprised of market liberalization, political liberty, political cohesion, corruption and elections. Published data obtained from World Bank, Country Data Portal (2018) were used. Following cointegration test results on the time series data for the period 1963-2017, VECM, VAR and OLS estimations techniques were adopted. The results were that in the long-run, while 1USD increase in GDP causes USD1.3 increase in government consumption expenditure, a unit increase in inflation rate would cause USD1.8 increase in consumption expenditure. However, 1USD increase in foreign direct investment and external debt stock causes, respectively, USD 0.07 and USD 2.6 drop in government consumption expenditure. Corruption, democracy and political instability have positive effects on government consumption expenditure in Kenya. Urbanization and population dynamics jointly affect the variable in the short-run. This study recommends that the government should strengthen its institutions that are mandated to deal with graft cases, create peaceful political setting at all times and ensure a friendly environment to foreign investors.

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LIST OF ABBREVIATIONS AND ACRONYMS

ADFT   Augmented Dickey Fuller Test

AREAER   Annual Report on Exchange Arrangements and Exchange Restrictions

BLUE   Best Linear Unbiased Estimator

BOP   Balance of Payments

COPI   Corruption Perception Index

ECCB   Eastern Caribbean Central Bank

EAC   East African Community

FDI   Foreign Direct Investment

GDP   Gross Domestic Product

GC   Government Consumption Expenditure

IBRD   International Bank for Reconstruction and Development

IDA   International Development Association

IDE   Institute of Developing Economies

IFC   International Finance Corporation

IMF   International Monetary Fund

IS   Import Substitution

KNBS   Kenya National Bureau of Statistics

MTP	Medium-Term Plan
NACOSTI	National Council of Science and Technology Innovation
NARC	National Rainbow Coalition
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares
SAPs	Structural Adjustment Programs
UNCTAD	United Nations Conference on Trade and Development
VECM	Vector Error Correction Model
INT	Interest Rate
DCOG	Degree of Political Liberty
FRA	Ethnic Fractionalization
POP	Population
FA	Foreign Aid
DELE	Dummy Variable for Structural Programmes
TRO	Trade Openness
DSAP	Dummy for Structural Adjustment Programmes
PRI	Private Investment
URB	Urbanization

DPOC   Dummy for Multi-Partism

CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter presents the background information to the study, objectives, significance, scope, and the research questions of the study. Section 1.2 discusses background information to the research problem; section 1.3 contains policies which have continued to shape government expenditure in Kenya, section 1.4 presents the statement of the research problem, section 1.5 contains the objectives of the study, section 1.6 presents the hypothesis of the study, while sections 1.7 and 1.8 present the significance and the scope of the scope of the study respectively.

1.2 Background Information

Public expenditure is an ecclesiastical function of any government. Economy is always demand driven and in cases where there is a fall in household and private sector aggregate demand, then it becomes the responsibility of the government, as a principle, to take up the mantle to invigorate the economy through public expenditure as this helps to raise the fallen aggregate demand. It is believed that expenditure is a critical tool which governments, in cases of market distortions, usually use to bring about equitable distribution of income and wealth and hence, create stability in prices, manage inflation and spur growth. According to Musgrave (1989), it is because of the existence of market distortions that the state is required in the provision public goods and services. Governments would always struggle to cope up with such demands as the major goal of any government is to provide quality services to the citizens and also to increase development. For a nation to create a productive workforce and quality human capital, the government needs to extend quality services to the working population, and as the demand for

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such services scales up, government expenses are bound to grow along with it. It is also believed that government spending is an essential driver towards achieving efficiency in the allocation of scarce resources and spurring economic activities of a nation.

There are two components of public expenditure; development expenditure and recurrent expenditure which the government can use to create certain economic outcomes. But in doing this development-recurrent ratio must be observed. However, it has been observed that development-recurrent ratio favors recurrent components and that creates development expenditure problem (Were, 2018). Government consumption expenditure is prone to increase and is often favored to development expenditure in circumstances of fiscal stringency and this is even glaring in the global scenes. World government consumption expenditure grew from USD 2,583 trillion in 1960 to USD 55,360 trillion in 2017. Growth in world's consumption expenditure has been on the rise and reached its ever highest peak of USD 106,300 trillion in the year 2014 and this high peak was possibly attributed to fiscal expansion that many countries had to undergo after 2008 to counter the economic downturn from the negative global and domestic shocks. However, post fiscal consolidation periods following the global shock in oil prices have since been characterized by a fall in the level of government consumption expenditure in the whole world as shown in the figure below.
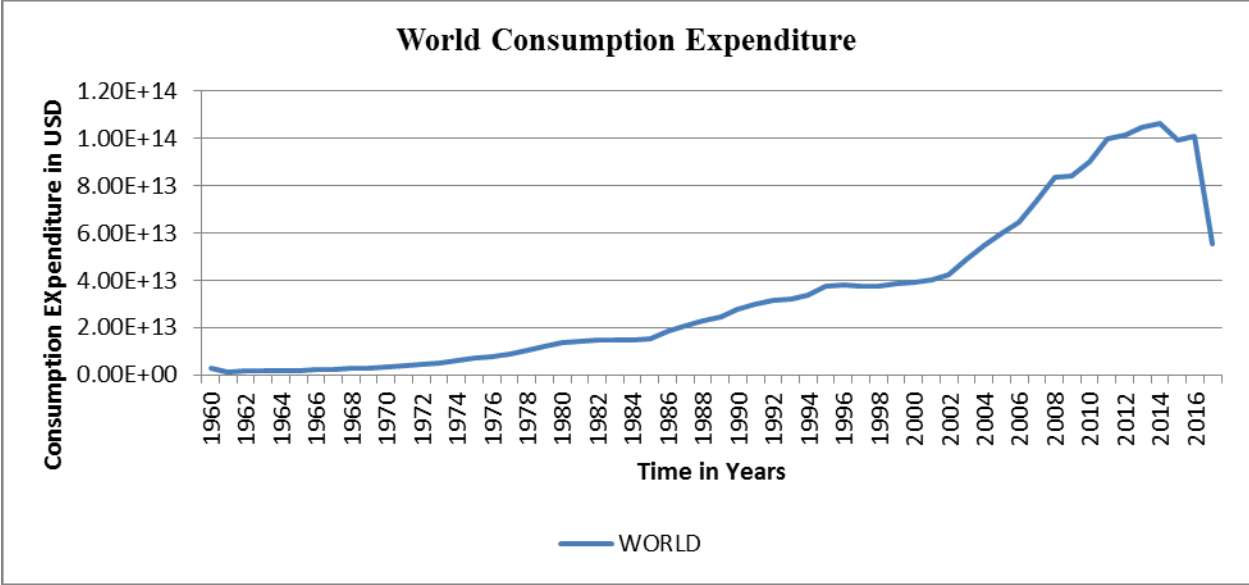
Figure 1: World Consumption Expenditure

Source: World Bank, 2018

Kenya's trend in government consumption does depart much from the world trends except for the last couple of years following post fiscal consolidation of the 2008 world shocks. It was expected that government expenditure would fall after recovery from the global shocks, however, consumption expenditure continued to trend upwards even long after economic recovery strategies adopted between 2008 and 2010.
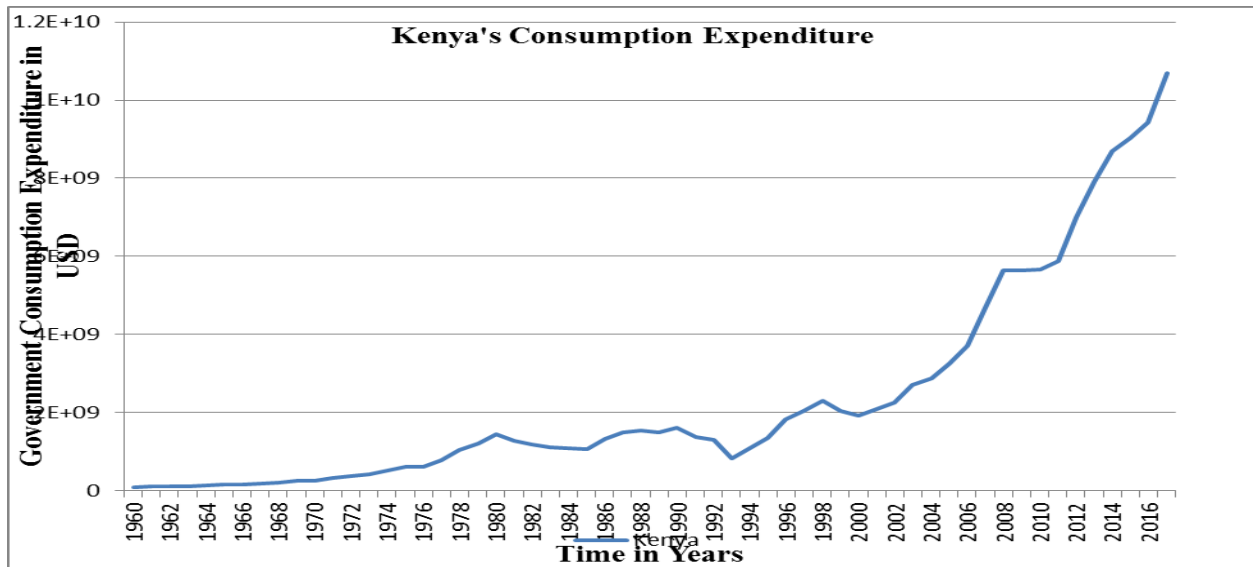
Figure 2: Kenya's Consumption Expenditure

Source: World Bank, 2018

Kenya has experienced increases in government expenditure in the last decade, where the public wage bill has increased tremendously and has accounted for a bigger share of the government budget outturns despite cautions that higher growth in recurrent expenditure relative development expenditure is a proscribed phenomenon by many governments since it is deemed growth retarding. In Kenya, there has been a steady growth in government's recurrent account where government consumption expenditure grew by 287.4 percent over the period 2002-2014. Between the years 2004-2014, government consumption expenditure rose by 202.6 percent. However, between the years 2009-2014, government consumption expenditure grew by 54.4 percent (The Republic of Kenya, 2015).

The lowest value of consumption expenditure that Kenya ever recorded was USD 86,715,965.24 in 1960 and the highest value of USD 10,687,876,290.12 in the year 2017 with an average of USD 2,330,652,945.90. It is notable that after the 2008/2010 fiscal consolidation period

government expenditure was meant come down and indeed growth in consumption expenditure dropped from 26. 2 % in 2007, further dropped to 20.3 % in 2008 and finally to 0.11 % in 2009. However, this drop did not stay as the country found itself in an expansion path of huge government consumption expenditure recording 19 % and 12 % growth in consumption expenditure in the year 2012 and 2013 respectively. This sudden expansion could be due to the roll out of devolution which had seen a speedy upsurge of administrative expenses, increased security spending, and the rising wage bill which has been associated with both national and county government employees. On average, based on the past five years, Kenya tops the East African countries in consumption expenditure with USD 8,757,880,222.04 followed by Tanzania with USD 6,693,052,622.84. Somalia, Burundi and Rwanda are the least spenders in government consumption with USD 317,859,302.75, USD 635,739,775.28 and 1,182,610,788.62 respectively, on average.
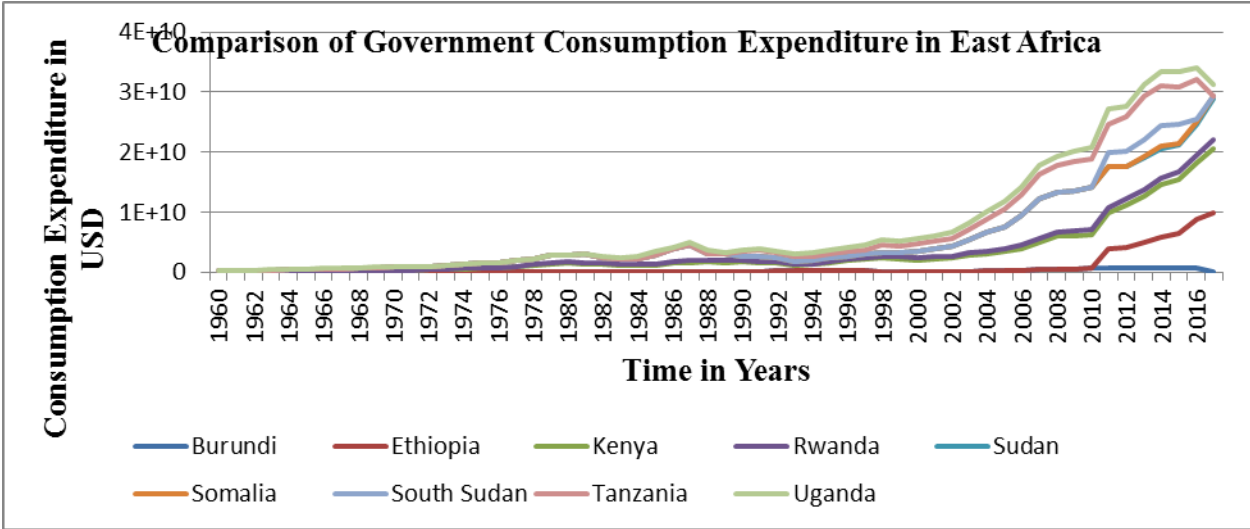
Figure 3: Eastern African Countries Consumption Expenditure

Source: World Bank, 2018

Kenya and Tanzania remain towering among all Eastern African countries probably because of their size in terms of population. Kenya's growth in consumption expenditure has been attributed to a number of fiscal pressures emanating from elections and their subsequent repeats, huge administrative expenses both at national and county governments and expenses towards drought mitigation measures which often occasion high tides in government expenditure. Kenya's plot of growth in government consumption expenditure exhibits high peaks and spikes and has even remained above world growth rate. The high spikes are indications of likelihood of disturbances on government spending that operate within the structure of the economy.
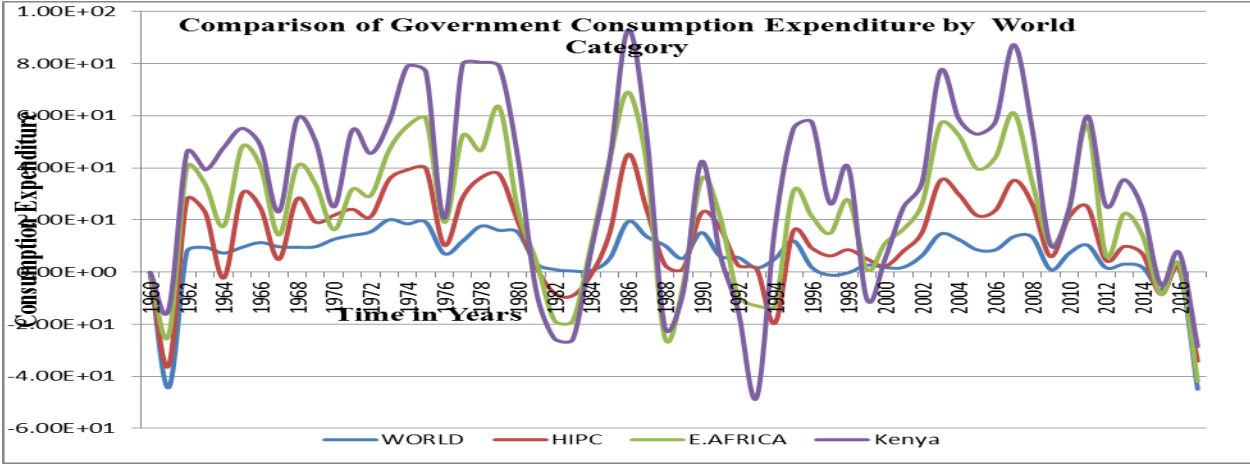
Key: HIPC, Heavily Indebted Pour Countries

Figure 4: Consumption Expenditure Growth by Category

Source: World Bank, 2018

Surprisingly, Kenya's growth in consumption expenditure is even higher than the World's growth rate and far much above the heavily indebted countries as seen in figure 4 above. Government consumption growth comparisons between Kenya and Eastern African countries also reveal a similar observation. Even though latest trend show that there is a decline in the rate

of government consumption expenditure across countries in Eastern Africa and the World over, Kenya still records higher rates in expenditure than any of the Eastern Africa counterparts.
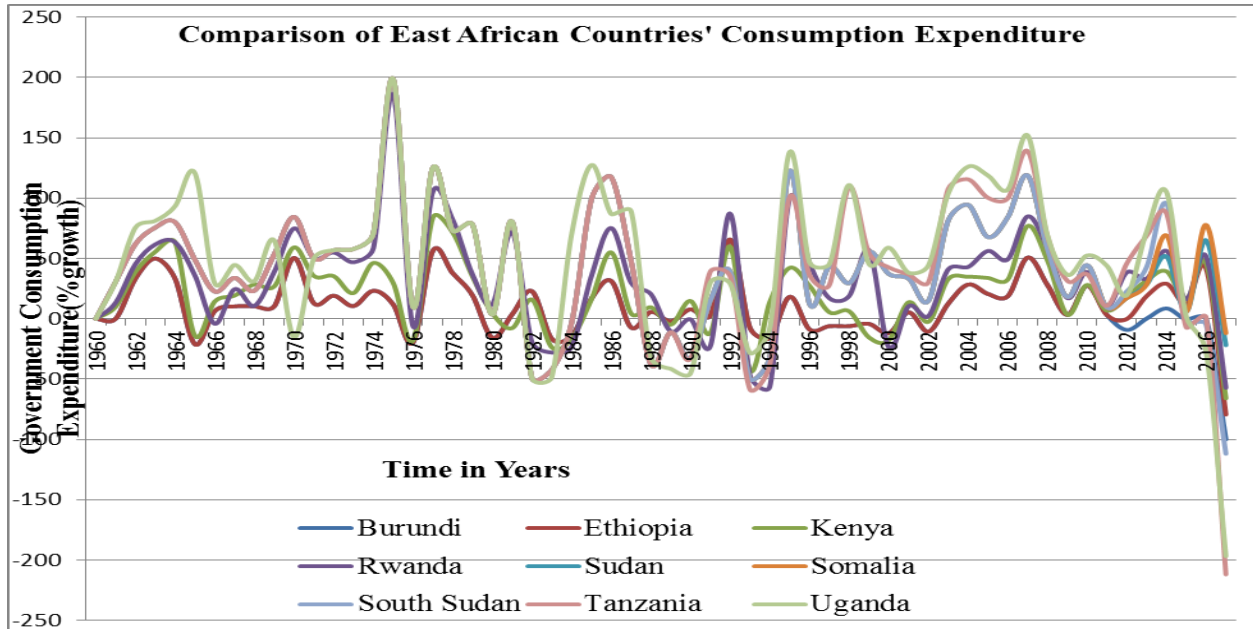
Figure 5: Eastern African Countries Consumption Expenditure Growth

Source: World Bank, 2018

Following the foregoing, we can see that government consumption expenditure in Kenya has an outstanding growth and this has often devastating implications on the government budget, sometimes resulting in reduction in development budget. In 2017/2018 financial year, the development budget expenditure was reduced by Ksh 30.6 billion juxtaposed with increase in consumption expenditure (Were, 2018). The high level of consumption expenditure should be checked because it has ripple effects to the economy. It has a direct impact on budget structure leading to huge fiscal deficits, causes wage-price spiral linked with macroeconomic instability such as inflation, unstable debt management and loss of competiveness in the economy. Kenya government is facing difficulties in managing its consumption spending, in particular with the

devolved units of governance. From time to time, workers represented by their unions have pushed for better pay and salaries, and this has always called for the restructuring of the government budget. This mounting pressure sometimes force the government into borrowing but this would only further aggravates the situation as it increases local debt. There have been grave concerns by policymakers that there is the tendency of blossoming government expenditure causing inflation to shoot to soaring levels and moreover interest sensitive investment in the economy tends to go down due to low savings and higher cost of borrowing (Oketch, T. O. and Linge, T., 2018). While Maingi (2010) illustrated the effects of consumption expenditure on economic growth, Kanano (2006) demonstrated the determinants of total public expenditure. Shonchoy(2010) used panel analysis to model determinants of government consumption expenditure among 111 developing nations, while Oketch, T. O. and Linge, T. (2018) focused on wages and allowances and consumables to elaborate the determinants of recurrent expenditure in Kenya. In light of this, this study sought to establish the determinants of government consumption expenditure in Kenya with special focus on three streams of variables; economic, structural and politico-institutional variables using series data for the period 1963-2017.

1.3 Expenditure Policies and Government Consumption Expenditure Trends in Kenya

Strategic investment plans have always backed the pursuit of sustainable economic growth in Kenya. According to Jerono (2009), the size and distribution of government spending have changed a great deal since Kenya got political independence in the early 1960s. Several Sessional Papers have guided the pattern of government spending in Kenya; Medium Term Plans, the Kenyan vision 2030 and the Constitution. The annual percentage growth of government consumption expenditure has been more than the increase in capital expenditure

since pre-independence. This alludes to the fact that in the 1960s the government was guided by African Socialism, a concept based on the eradication of poverty, ignorance, and disease. The government had to take over the responsibility of providing basic needs. Thus, in the subsequent years, inefficiency and mismanagement plagued the public sector; corruption, wastages in government ministries and excessive members of parliament salaries have accounted for soaring consumption expenditure in the late 1960s.

In 1986, the Kenyan government declared her intentions to downsize its public expenses and in pursuit of this, published Economic Management for Renewed Economic Growth sessional paper to provide controls to government spending. This strategic reform forced the government to cut back on expenditure due to pressure from the international community and development partners over the structure of its public spending. The decision to reduce government expenses encouraged more consumption and paying local and foreign debts as a trade-off for capital expenditure outlay.

In the 1990s, IMF persuaded Kenya to accent to Structural Adjustment Programs (SAPs), and there was a consensual agreement between IMF and the Kenyan government to reduce its allocation to capital expenditure especially on government parastatals. The SAPs were meant to reinvigorate and stir up African economies regarding enhanced saving, efficient use of scarce public resources and restructuring of parastatals for efficiency and competitiveness. The SAPs advocated for decontrol of prices, reforms in civil service, floating interest rates and liberation of trade (O'Brien and Ryan, 1999). According to *Kenyan Economic Survey* (1992), the first SAP to be implemented was privatization of key parastatals in Kenya which were mainly meant to create a culture of ethics and, sound management practices in the remaining non-privatized parastatals

and to reduce the bailout burden the parastatals had placed on the government. Thus, the implementation of both SAPs and Economic Management for Renewed Growth strategies seemed to work on the path of the government to downsize its consumption expenditure. Government consumption expenditure grew by 372 percent over the period 1974-1984. However, over the period 1984-1994, according to *(GoK, 1999)* government consumption expenditure growth dropped to 258 percent from 372 percent of the previous decade. Therefore, the lower percentage increase in government consumption over the period 1984-1994 reflected the government efforts to contain the then skyrocketing consumption expenditure.

In 1993, the Government of Kenya introduced a strategic reform meant to, further, downsize the then blossoming public sector workforce which seemed unnecessary financial burden on the exchequer (World Bank, 2003). Consequently, the government introduced the golden handshake program (voluntary early retirement) to manage and reduce the size of the public sector. According to (Gok, 2003), this strategy saw a reduction in civil service workforce from around 272,000 in 1991 to around 194,900 in 2002. However, government consumption expenditure still increased by 262.4 percent over the period 1991-2002 compared to 90.1 percent increase realized over the period 1986-199.

After 2002, the National Rainbow Coalition (NARC) government, as part of its flagship projects and political agenda, embarked on massive infrastructure development as enshrined in the Strategy for Poverty Eradication Sessional Paper of 2002. In 2003, NARC government laid more emphasis on development spending and Development budget was prepared to cater for free primary Education, rural electrification, and construction of roads and improvement of health

care. However, the percentage increase in government consumption expenditure still rose to 154.8 percent over the period 2002-2008 from 61.4 percent in 1997-2002.

Having conceived the idea to tolerate the minimum possible levels of public expenses, according to (GoK, 2012), the government of Kenya formulated a number of expenditure plans to ensure that it remains in the long run economic development trajectory; the government had to put in place short-term plans to keep her on the development path. In 2007, thus, the government of Kenya launched a Medium Term Plan (MTP) to run for the period 2008-2012 aimed at improving real GDP growth from an estimated 7 percent in 2007 to a double-digit percentage growth over the period 2009-2012. Between the period 2008-2012, savings and investment levels were expected to increase to support economic growth and employment creation envisaged under the plan. Consequently, under the plan, growth in government consumption expenditure which had risen to 154.8 percent over the period 2002-2008 dropped to 107.8 percent for the period 2008-2014. However, 107.8 percent increase in government consumption expenditure realized over the 2008-2015 period, is still higher than the percentage increases in government consumption expenditure achieved in the 1960s and the late 1970s. These figures show that, despite all the efforts which have been put in by the government, government consumption spending only continues to increase, sometimes at a slower rate like in the 1960s and sometimes at higher rates like in the 1980s as well as in the last decade.

The creation of new structures of governance (devolved units) and the devolution of services in the year 2013 under the new Constitution of Kenya is further believed to cause variations in the level of government consumption expenditure. Government consumption expenditure has

remained high, though, it decreased slightly in growth from 13.6 percent in the year 2013 to 11.8 percent in the year 2015 (see Figure 6).
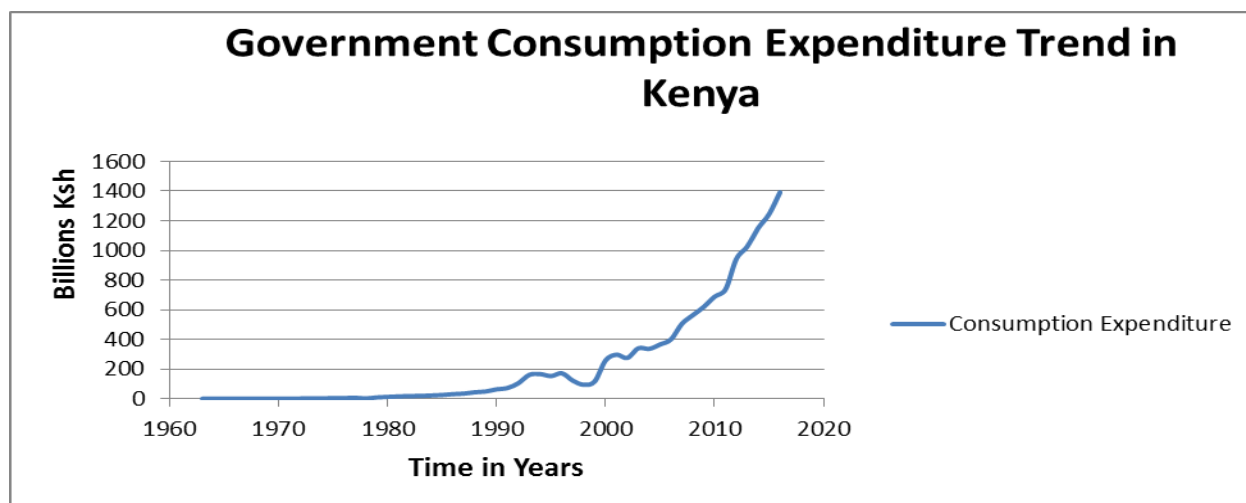
Figure 6: Government Consumption Expenditure Trend in Kenya

Source: World Bank, 2018

Government consumption expenditure in Kenya has expanded tremendously, having increased by 17410 percent over the period 1963-2018. On the other hand, the GDP grew by only 6742 percent over the same period. The growth in government consumption expenditure more than doubled the growth in the GDP over the period 1963-2018.
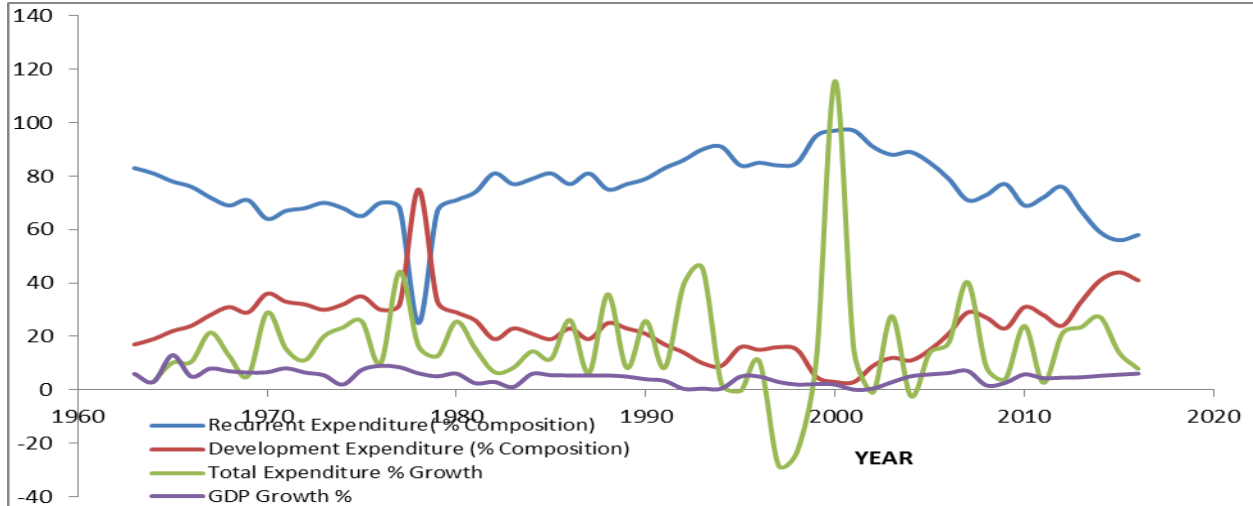
Figure 7: GDP, Recurrent and Development Expenditures Growth Rates

Source: World Bank, 2018

1.4 Statement of the Problem

Studying movements in government expenditure is central to state planning and of much concern is the composition of public expenditure. Government consumption expenditure is a very crucial part of government budget as it has always formed the major portion the budget almost in all countries across the world. In Kenya, government consumption has shown rapid growth from Ksh 31.2732 billion in 1963 to Ksh 2107.2 billion in the year 2018. Noting this relatively high level of consumption expenditure, the World Bank and IDA have issued caution to Kenya to downsize her consumption expenditure to create room for investment expenditure (Were, 2018; Kinuthia, 2018). The question that then lingers is how then should the government slash down consumption expenditure? The government has to identify the causes of growth to consumption spending and be able to effectively restrain the high tides exhibited in consumption expenditure

in Kenya. While Kanano (2006) modelled the determinants of total public expenditure growth in Kenya, Maingi (2010) sought to establish the effects of consumption expenditure on economic growth in Kenya. However, both of them did not model the causes of consumption expenditure. Shonchoy (2010) modelled the determinants of consumption among developing countries but it suffers the shortcomings of panel analysis to apply in the Kenyan case. Thus, in light of this exposition, this study endeavored to establish the determinants of government consumption expenditure in Kenya using time series data for the period 1963-2017.

1.5 Objectives of the Study

1.5.1 The Broad Objective

The broad purpose of this study was to establish the determinants of public consumption spending in Kenya.

1.5.2 Specific Objectives

The broad objective of this study is broken down into the following specific objectives:

i.   To establish the economic determinants of government consumption spending in Kenya.

ii.   To examine the structural determinants of government consumption spending in Kenya.

iii.   To establish the politico-institutional determinants of government consumption spending in Kenya.

1.6 Research Hypotheses

Upon fitting the data on the above three models, hypotheses were set in order to ascertain the significance of the aforementioned variables after conducting regression analysis. For the t-test

of significance to be carried out on the coefficient estimates, the following null and alternative hypotheses were considered:

i. H_o: Economic determinants do not affect government consumption spending in Kenya.

ii. H_o: Structural determinants do not affect consumption spending in Kenya.

iii. H_o: Politico-institutional determinants do not affect government consumption spending in Kenya.

1.7 Significance of the Study

The main reason for carrying out this study is to determine various driving factors to the growth of government consumption expenditure in Kenya. The results of this study are very crucial as it can be used to assist policy makers in containing and explaining the growth of government consumption expenditure in Kenya. The study comes at a time when Kenya government has to make very important decisions on the public wage bill and finds it very difficult to downsize its consumption expenditure due to the funding of devolution of services and constant strikes waged by unions representing teachers, nurses, and doctors. The study also contributes to the available literature by providing empirical evidence on determinants of government consumption expenditure in Kenya.

1.8 The Scope of the Study

This study has used time series data for the period 1963-2017 and it is worth noting that the period 1963 to 2017 remains of great concern as it adequately covers major world economic incidences which form part of the variables used in the study. Among the world economic shocks

falling within this time span include; the 1974 financial depression, the 1994 drought, and the periods of structural changes. Notable structural adjustment programs of the time were; the socialism policy of the 1960s, and the SAPs of the 1990s. Different political regimes such as the multi-party democracy of 1992/1997, the NARC government of 2002/2007, the coalition government of 2008/2012 and the devolved system of 2013 could have influenced the direction of growth in government consumption expenditure. Known political disturbances during this time include the famous 1990 Saba Saba riots call for democracy, 2008 post-election violence and 2017 post-poll tensions. The study focuses on Kenya, East Africa's leading economy and the results of this study can be of relevance to the rest of East Africa.

<center>**CHAPTER TWO**</center>

<center>**LITERATURE REVIEW**</center>

2.1 Introduction

This chapter is divided into three sections: section 2.2 illustrates the theoretical literature review, while sections 2.3 and 2.4 present the empirical literature review and summary of the literature review respectively. Theories which have been put forward about government consumption expenditure are considered under theoretical literature review while empirical literature review focuses on studies which have been done on government consumption spending. The summary of literature review highlights the extent to which research has been done in finding out the causes of growth in government consumption expenditure with a view to establishing possible literature links and gaps.

2.2 Theoretical Literature Review

For many years, varied theoretical models have been formulated to provide explanations to increases in state spending. They include constructs by Friedman (1979); Wiseman & Peacock (1961); Wagner (1893); Musgrave (1973) and Keynes (1936).

Adolph Wagner (1893), a German scholar and a famous economist in the late 19th century conducted an in-depth study on government expenditure. In his study, he postulated "the law of increasing state functions," which considers state spending as a behavioral variable that positively responds to the changes in a growing economy. There is the likelihood of a true link between state spending and income as well as economic growth. As an economy gradually increases in scale with time, the roles and responsibilities of the government increase. There are intrinsic dispositions for the roles of separate units of a state (such as county and sub-county

government structures) to increase with time, both intensively and extensively and consequently, these growths in government activities cause a corresponding growth in public spending. Simultaneous growth in government spending and gross domestic product can be attributed to three reasons: First, the responsibility of the state in providing basic security as well as its role in controlling economic activities are likely to become more enormous and expansive because of the growing complexity of economic life and urbanization, which occur especially during industrial transformation. Second, as a country undergoes industrial transformation, government sector activity tends to substitute for private sector activity because administrative functions and defensive roles of a state increase fundamentally during this process of industrial transformation. Finally, government spending on social protection and welfare programs (including education and transfer payments) also continues to grow as a country industrializes due to the raised elasticity of demand for these services; this is an assumption which is clearly implied in Wagner's work. Thus, as the national income increases, the income elasticity of demand for services offered by the state increases quickly, increasing the proportion of public sector expenditure in GDP. According to Abizadeh and Yousefi (1988), the size of government grows as an effect of industrialization. The richer a society becomes, the more the government spends in order to alleviate social and industrial stress. Therefore, in Wagner's approach, economic growth causes government expenditure through an increase in demand for public goods and services and also through redistribution as a course towards achieving equity in the society.

According to Keynes (1936), government spending is justified because it is considered as a platform for creating jobs and employing underutilized capital when an economy undergoes a recession with low levels of employment of labour and capital. The hypothesis is that during economic slumps, an expansionary budget policy is necessary to raise the aggregate demand in

an economy, thus boosting gross national income. This has the implication that growth in state spending lead to greater employment in public sector and firms in the business community through the government multiplier process. Keynes continues to observe that when employment of labour and capital continues to rise, output and income of companies also increase, and as a result, businesses hire more labour to produce the goods and services needed by the government. In the event that production process does not go to full employment as in the case of many developing economies, one noticeable situation is the unemployment uproar in the labour market. At this point the state is expected to exogenously change the production process through its expenditure. In Kenya, there has been outcry of massive unemployment of youths and, in fact, recent statistics show that the scenario is at its highest peak of 11.8 percent in 2016. To put the economy in a development trajectory that would ensure maximum employment, then government intervention looks quite necessary. Thus, this theory seems more applicable in the Kenyan case in which the wage bill is steadily increasing.

Keynes's theory which asserts that public spending is necessary to stimulate economic productivity and enhance creation of wealth, nonetheless, is challenged by Stratmann & Okolski (2010) who argue that there are several spending ways for governments, some of which are unproductive. Government spending activities could be overwhelmingly large to the extent that it becomes extremely difficult in knowing where goods and services can be most productively allocated and, thus, state spending may not be incurred on the desired priority areas and fails to identify appropriate projects where it would generate maximum benefit to the society. Further, the Keynesian theory disagrees with the classical and neoclassical economic views of public income and state expenditure. Although the two classes of economic thought are in concurrence

that budgetary constraint or deficit financing could encourage creation of goods and services, the neoclassical school of thought sees no reason to believe that the benefit of this stimulus would exceed the displacement effects that state spending would have on private investment. They argue that such economic stimulus programs would shift the demand for labour, increase the cost of hiring labour and becomes a barrier to profiteering private firms. Further, such increases in public spending would lead to accumulation of bonds and other state securities. In the meantime, their demand fall and consequently the price of the bonds would also fall causing the money market to tighten and interest rates begin to rise to levels which cannot be afforded by private individuals. Consequently, attempts to revamp the economy would be self-reversing since extremely high rate of interest would increase the cost of asset financing. Hayek (1989) also disagreed with Keynesian economic think points about what he basically called collectivist approach. He argues that the notion of a fiscal stimulus is accompanied with centralized planning and results to wrong expenditure of state revenue which may also result in business shocks.

The median voter hypothesis assumes that the median voter plays a significant role in determining the level of spending by the government (Alm and Embaye 2010). Consequently, the demand for public services is considered to be driven by factors such as the median voter's preferences, income, tax-price and relative price of private goods and services (Bowen 1943). One of the earliest studies offering a formal representation and empirical estimation of the median voter model is that of Borcherding and Deacon (2004), which analyses the demand for public services provided by the non-federal governments in the USA. Niskanen (1978) developed the median voter model to estimate government spending and demand for public goods and services by the voters. According to this model a voter's demand function is assumed to have the following form:

$$Q = A s^{\kappa} Y^{\lambda} Z^{\mu} \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 2.1$$

Where:

Q = quantity of the public good demanded by the median voter

s = the perceived per unit price of government services paid by the median voter

Y = the median voter's income

Z = other exogenous conditions affecting the demand for government services,

And where A is a scale parameter and (κ λ and μ) are parameters of the demand function with

$\kappa < 0$, $\lambda > 0$, and $\mu > 0$

Then, given the median voter's share of the unit cost of government services (α), the perceived per unit price of public services paid by the median voter (S), the median voter's demand function is as follows:

$$CQ = A \alpha^{\kappa} C^{1+\kappa} Y^{\lambda} Z^{\mu} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 2.2$$

Where:

C= Marginal cost

CQ= Government spending per capita

The variable (α), which represents the median voter's tax share, is assumed to be a function of the fraction of government expenditure financed by tax revenues and the total number of taxpayers, as follows:

$$\alpha = (R/E)(1/N) \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 2.3$$

Where R is the total tax revenues, E is the total government spending and N is the total number of voter-taxpayers. It is also assumed that the marginal cost (C) is a function of the private sector wage rate (W) and the total number of voter-taxpayers (N), as follows:

$$C = B W^{\sigma} N^{\varphi} \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 2.4$$

Where (B) is the scale parameter, and (σ) measures the rate of increase in the price of government services relative to that of services in other sectors while (φ) captures the degree of publicness of services offered by the government.

Substituting equations 2.3 and 2.4 into equation 2.2 leads to the following:

$$CQ = A\left(\frac{RE1N}{}\right)k(BW\sigma N\varphi)1 + kY\lambda Z\mu = AB1 + K(R/E)KW\sigma(1+k)N\varphi(1+k) - kY\lambda Z\mu\ldots\ldots\ldots\ldots\ldots\ldots2.5$$

This equation may be used to explain real aggregate government spending per capita G and its relationship to the variables in the median voter model. However, as the median voter model might not capture all the variations in government spending per capita, several other exogenous variables may be included during estimation.

Ernst Engel was also a German economist writing almost the same time as Adolph Wagner in the 19th century. Engel pointed out over a century ago that the composition of the consumer budget changes as family income increases, Zimmerman (1932). A smaller share comes to be spent on certain goods such as work clothing and a larger share on others, such as for coats, expensive jewelries etc. As average income increase, smaller charges in the consumption pattern for the economy may occur. At the earlier stages of national development, there is need for overhead capital such as roads, harbors, power installations, pipe-borne water etc. But as the economy developed, one would expect the public share in capital formation to decline over time. Individual expenditure pattern is thus compared to national expenditure and Engel finding is referred to as the declining portion of outlays on foods.

The Armey curve originates from the theories of market and government failure. The theory of market failures justifies government intervention to correct externalities and provide public

goods. The theory of government failures on the other hand focuses on the possible harmful effect of the State's activity and expansion (Grossman, 1988). According to Armey (1995) low government intervention increases economic growth until it reaches a certain level; nevertheless, excessive government expenditure reduces economic growth. The presence of a government and the provision of public goods create a growth-enhancing environment in the economy. Government contributions for regulation and up-keep of law and order further contribute to the growth of the economy by creating a safe economic atmosphere. Any expansion of government spending in the economy initially is associated with an expansion in output. Nevertheless, as spending rises, additional projects financed by the government become increasingly less productive. In addition, the taxes and borrowings levied to finance disproportionate ventures impose increasing burdens, thus creating disincentives to workers. At some point, the marginal benefits from increased government spending reach zero. Armey (1995) puts this phenomenon into a graphical perspective when he makes use of a graphical technique to explain the relationship between government spending and economic growth. Armey consequently indicates that the size of the government and the growth of the economy can be modeled as a quadratic function, that is, a concave curve, which assumes a role for both the linear term and the squared term of government expenditure in the economic growth process.
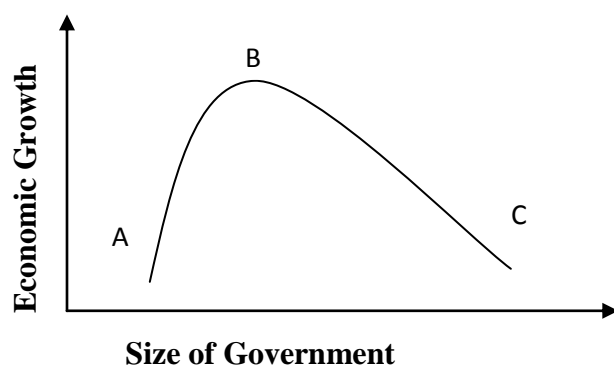
Figure 8: Armey Curve

At point A government intervention is low and as government size increases GDP continues to grow up to point B which is the optimum government size. Further increase in government size beyond this point yields a decline in GDP growth. The Armey curve therefore demonstrates the relation between government expenditure and economic growth and hypothesizes that an optimal size of government expenditure exists (Pevcin, 2004).   Maingi (2010) employed this technique to obtain government size for the case of Kenya and found that the optimal government size was at 23 % of the GDP.

Friedman (1979) conceptualized the "tax and spend hypothesis" which states that variations in state income are capable providing insights to changes that occur in public expenditure. According to Friedman (1979), public spending is characterized by unidirectional effect ranging from state income to public spending. By hypothesis, Friedman suggests that growth of state income would occasion a similar change in state spending.

Wiseman and Peacock (1961) observe that public expenditure increases when states struggle and strive to meet demands made by the citizens concerning various services that they need. According to them, there may be differing opinions about what is the acceptable level of public spending and the desirable taxation caps and limits. Divergences in pinions eventually boil to widespread shocks in the form of devastating political turmoil and aggressions. The disturbances, as Peacock and Wiseman (1961) substantiate, have a causal effect on the size of government expenditure, creating shifting effects, and consequently moving both public revenue and government spending to new levels. In the meantime, government begins to realize fiscal deficits, inadequate revenue collection and there would be growing need to raise taxes to meet fiscal targets. Before any consensus is reached concerning tax and revenue limits, citizens are

likely to show their displeasure by way of riots and demonstrations. The government would be forced to make changes to the contentious and intolerable tax rates and adopt new tax levels, which Wiseman and Peacock called 'tax tolerance level', which is generally acceptable to individuals. In addition, the citizens will anticipate the government to rejuvenate the production of goods and services and remain alive to emerging issues in the society which would otherwise provoke the already healed society and which in consequence would create an environment for the recurrence of the previous shocks. Further, critics of state expenditure hypothesize that the time interval for displacement is recognized as weakening determents to shielding the independence of sub government units and vesting more powers of the central government on public expenditure. During this process of reduction in local autonomy and centralization of state expenditure, the role of central government in expenditure projects seems to become larger and larger, a scenario referred to as the 'concentration process of increasing public sector activities'. Thus, there are tendencies of countries experiencing huge budget estimates during times of war and such cases would force the government to devise strategic ways of raising additional revenues to meet the increase in defense expenditure and reconstruction costs. Such growth in revenue, therefore, gives rise to increased government expenditure. That is to say; government spending is driven by great economic crises which can change public expenditure. Therefore, seemingly there is a possible positive correlation between government size and government tax revenues. Collection of tax revenues and accumulation of income is expected to increase as a country goes through years of economic development and public expenditure, undoubtedly, would increase as states develop and become more complex in functions.

Another approach to public expenditure is the concept of maximum social advantage. It is based on the concept of equal marginal benefit which states that a rational person would spend his/her earnings on alternative choice of commodities in such a manner that the extra benefit of the last shilling incurred on either commodity remains equal. According to Dalton (1920), state or public expenditure in whichever way must be conducted as long as any accruing benefit to the society from an additional small units in spending in whatever manner just balances any misfortune arising from small increment in levies and also in revenues which are collected from various means of consolidating national income. This balance between income and expenditure is what Dalton refers to as the optimal of both state spending and government revenue. In this regard, there would be a circular flow of wealth in which taxes generated from the citizens, directly or indirectly, would still find their way back to the citizens in the form of state investment programs. Dalton argues that when there is no ideal balance between public income and public expenditure, taxpayers are bound to lose to those gaining from the expenditure program which is extended to meet societal goals. Further, for the taxpayers to benefit from these streams of flow of income disbursements, the amount of tax paid by an individual must be strictly less than the gains. Pigou (1932) hypothesized that welfare economics is classified into two major categories, which include, the production and the distribution. Pigou suggests a standard measure of gauging an optimal tax level which can be used to analyze and synthesize possible loses and possible gains to offset negative externalities in state expenditures. This optimal level of tax has come to be called the pigou tax rate. Circumstances of maximum social advantage occur when public spending is to be incurred in a manner that demonstrates the fact that utility obtained from the last shilling spent is equal to the utility sacrificed with reference to the last shilling incurred in form of tax revenues to the state

Richard Abel Musgrave (1973), an American economist of German origin, advanced a hypothesis which asserts that in early stages of economic growth, public expenditure in the economy should be encouraged. During early stages of growth, there seem to exist market distortions which call for active government interventions to deal with such market imperfections. Development in nations is accompanied by industrialization of production processes and modernizing production techniques and this transitional process to new ways of production is normally initiated by governments. In developing nations, the proportions of the government activities in an economy continue to grow as there are suspected chronic deficiencies in requisite infrastructure such as roads. Countries which begin to industrial would exhibit comparatively higher budgetary estimates and that indicates that there is a true link that exists between economic growth of a country and increase in the activities of the state in economic affairs. At this stage, the growth in public expenditure might be higher than the associated growth in the economy; that is, the public sector growing faster than the economy. However, there has been wide criticism on increasing government size relative to private investment. Emphasis on public expenditure can possibly ignore the contribution to development by the private sector by assuming government expenditure is the only stimulus to economic growth and as such optimal economic targets might not be achieved, employment of labour and other productive resources are likely to fall below equilibrium levels.

The classical economists, encompassing such great economist of the time as Adam Smith, believe that government intervention in an economy is not necessary and that such interventions only create more negative externalities than positive externalities in an economy and prescribe an increasing role of individuals to propel and to control most of the activities in an economy. Adam Smith (1776) shows much support for the "laissez-faire", a situation in which the

economy is self-correcting and self-adjusting. The distribution of resources is not determined by the state but rather by natural forces prevailing in the commodity market and where economic development is not to be propelled by profit-oriented motives. As the classical school of thought's classification goes, the growth in total revenue or domestic income results to a symmetrical increase in prices of all commodities, without any change in the manner in which resources or even to the level of real national gross domestic product are distributed, a situation normally referred to as money neutrality. Presumably, this school of thought, classical, hypothesize that production is perfect, that employment of labour and other productive resources are always optimal and that there is maximum use. In this case, labour cost and the cost of acquiring capital are self-regulated, self-correcting and for a matter of practicality, the government wallet should always be at equilibrium as amount of savings is equated to investment. Classical economists equate societal progress to a situation in which the economy is at its full employment level and matters to do with profit maximization and cost minimization do not form part of the goals.

Monetarists believe that government expenditure, whether tax financed or deficit financed would always crowd out private which in turn leads to reduced output. Taxes are disincentives to investments because they reduce the disposable income of the general public and as such there would be less money left for savings and consequently less investment. On the other hand, they also believe deficit financing is equally detrimental to an economy as it causes interest rate to rise to unaffordable levels to individuals. Individuals would find it costly to carry out investment activities through asset financing and tightening the business environment more specifically in the financial market. They argue that the most honorable thing that policy formulators should do is to undertake a monetary policy framework as opposed to either fiscal expansion or deficit

financing. They continue to affirm that a monetary expansion would work better in stimulating growth by reducing inflationary pressure through sale of bonds.

The Leviathan Theory is also another view on public spending which tries to explain that the government's accrued involvement in the economy tends to diminish as public expenditure and taxes are reduced, holding other factors constants. Leviathan theory is based on the fact that the national government is generally understood as revenue maximizing leviathan that tries to harvest maximum revenue possible via fiscal decentralization of state control on taxation. The Leviathan Theory explains that public expenditure by the national government is generally lower in an extremely devolved system of governance because each of the lower units of governance (e.g. county governments) are charged with the task of collecting revenue and consequently incurring public expenditure at local levels. Further, according to Rodden (2003), devolution of national government's certain fiscal functions to sub government units, essentially, eases the fiscal burden pressure on national government. Kenya promulgated a new constitution about nine years down the line which outlines a new order of governance and introduced two levels of governance; the national government and county governments. The constitution, through the county revenue allocation act 2017, transfers expenditure allocations to: level 5 hospitals, construction of county headquarters, health facility-forgone user fees, leasing medical equipment, and road maintenance all to the county governments. This kind of institutional arrangement and in the spirit of the Leviathan Theory has the implication that the expenditure categories of the national government are bound to reduce significantly in comparison to pre-promulgation of the new system of governance.

Borcherding and Lee (2004) predict that continued increase in public expenditure is generally interpreted in a way as to fall in two major groups, and which include, a-institutional and institutional approaches. A-institutional view, on the one hand, has it that the ever increasing public expenditure is primarily based on social ramifications and bazaar environments. In this method, the median voter's, presumably, course of action is very instrumental in providing explanations and answers to the behavior of public expenditure, and thus the amount of goods and services that the government needs to provide to the citizens can be adequately and jointly explained by a number factors which include but not only limited to; the voter's interests, income, cost of tax, demography and the relative cost of individually owned commodities. The institutional perspective, on the other hand, puts more emphasis on the role of financial mismanagement and looting tendencies, structural adjustments and key economic or political disturbances which may act as obstacles or even inducements to persistent increases in state expenses.

However, there are opposing views on the size of government expenditure in an economy. One such concern held by Alm and Embaye (2010) is that when the government expands, there occur undesirable fiscal and economic problems which bring about macroeconomic instability. Governments usually finance their activities from taxes, borrowing and printing money. Thus, it can be anticipated that considerably larger public size is accompanied by higher tax rates and heavy borrowing and such scenarios are always viewed to have devastating impacts in the production of a country. The undesirable effects may include slow economic growth, massive financial shortages, enormous public debts, soaring price levels and rising costs in the money market, unfavorable balance of payments in addition to weakening local currency.

2.2 Empirical Literature Review

Many theories have been put forward to explain the behavior of government expenditure in general. In this study, the context of government of consumption expenditure was divided into three streams of literature conforming to three objectives of the study. Following this, three categories of literature, economic variables, structural variables and politico-institutional variables were discussed in this section.

2.2.1 Economic Variables

In this grouping, variables which exhibit cyclical behavior were considered and include gross domestic product, foreign aid, inflation rate, interest rate foreign direct investment, trade openness, and foreign debt.

In U.S.A, Uchenna et al. (2008) carried a study on government expenditure applying both cointegration technique and Granger causality testing procedures and using time series annual data for the period 1970 – 2002. The results indicate that state expenditure and inflation are co integrated and, thus, concluded that there seems to show a complete influence in connection with the two variables. Inflation and counter-cyclical policies are aimed at increasing taxes during booms to maximize revenues and vice-versa. In many cases, countercyclical policies are used to stimulate growth and prevent economic imbalances and are expected to increase public expenses in the economy. However, this position is in contrast to findings made by Abu (2004) that counter-cyclical variations such as inflation do not significantly affect government expenditure.

Inflation is an interesting variable in explaining government spending and, according to Aubin et al., (1988); it is normally considered in order to place seasonal factors into perspective. In the

case of financial stringency, it is a common expectation that public spending is reduced when the general price level rises and to be increased with increases in the level of unemployment.

Maingi (2010) notes that state expenses on such public functions as public order; salaries and allowances are all significantly and negatively to economic growth. Government spending on capital accumulation such as physical infrastructure development and development in education is a recipe for enhancing and spurring economic growth in Kenya. However, not all the different tiers of state expenditure are associated with economic growth; in other words, certain types of government expenditure are believed to spur economic growth while others are growth reducing. In this regard, government expenditure on investment, and total government expenditure have been found to be in a close positive association with economic growth in Kenya. However, when drawing summary of the study, he asserts that government consumption expenditure in Kenya tends to have mixed effects on economic growth.

In U.S, Peden and Bradley (1989) also carried out a study about public expenditure. They sought to find out the linkage between the levels of public spending on gross domestic product using secondary data for the period 1949 to 1985. The results of their study show that the degree of state functions in the economy has a true negative influence on both the gross domestic product (GDP) and the economic growth rate (growth in gross domestic product). They, thus, concluded that the degree of public functions in the economy, beyond what is accepted as the optimal levels, resulted in reduced levels of GDP, reduced levels of economic growth, and a significant reduction in productivity.

Njeru (2003) conducted a study on the effects of growth of foreign aid on public expenditure in Kenya over the period 1970-1999, used Heller's utility (1975) model to investigate the

relationship between foreign aid and public spending. He presumed the idea that a recipient country's aim is to maximize the social welfare in the face of budgetary constraints and would use aid inflows from overseas as an instrument in achieving their goals. The results of the study from ECM estimation model showed that there exists an important positive linkage between foreign aid and state spending. Njeru, further, notes the results of the study did agree with the findings of by other country-specific studies that on average, foreign aid leads to increased government spending.

Another study was also done in 2001 by Fölster and Henrekson to establish the growth effects of public expenditure and revenue collection strategies among developed and developing countries. They limited their study to developed countries due to disparities in the structure of government spending between developed and less developed countries. Observing the period of study from 1970 to 1995, they reveal that there was a strong negative link between public spending and gross domestic product and economic development. The growth effects of both public expenditure and taxation or revenue are very instrumental debates to most governments. It has also become central concern of many researchers. Kariuki (2003) studied the determinants of gross fixed capital formation in Kenya and found that increases in real interest rates do not deter private investment. Government expenditure was the most significant determinant of gross fixed capital formation. His study further reveals that monetary policy and output play a less significant role in explaining fixed capital formation, while FDI was very significant and strongly explain gross fixed capital formation in Kenya.

According to Remmer (2004) and Sanz & Velzquez (2002), population dynamics like dependency ratio must be put into consideration when executing state expenditure plans because

certain categories of expenditure, especially medical care and social protection, seem to be in close association with the population fabrics of any economy. Again borrowing a leaf from previous studies, the relative size of state activities in an economy serves to include the effects of more seasonal factors, such as changes in the tax base and state non-tax revenues. It is also viewed that the size of the state is associated with factors that may affect the structure and composition of aggregate spending in public sector, which may include the level of corruption, exposure to international shocks such as trade risks, and internal shocks; like political instability and social feuds.

Proponents of aid, according to Brautigam & Knack (2004), advance the view that aid assists developing nations to ease compelling revenue requirements, build and improve local institutions, better labour compensation to government workers, assists in establishing poverty reducing programs, and increase the productivity and operations of states. On the contrary, according to Clements et al. (2004), increased aid inflows may enhance financial mismanagement by locals who have absolute interests and who are after tax evasions, which results in significant reduction in revenue collection. Also, critics argue that aid may result to increases in government and private recurrent spending rather than capital accumulation, and therefore contributing proportionately less to the gross domestic product.

Foye (2014) carried out a study to examine the determinants of government capital expenditure in Nigeria, using Error Correction Model and showed that real gross domestic product, public debt, trade openness, private expenditure, and foreign direct investment are among the aggregate determinants of government capital expenditure. Foye also noted that state expenditure on research and health enhances the productivity of labor and leads to effective management of the

economy. Thus, increased private participation in the economy is a telling sign to policy formulating agencies of increasing public spending on public investment (capital) spending.

As Alesina and Tabellini (1990) explain, the growth of state borrowing is very in the structure of public fiscal policy. In their argument, debt overhang has a significant role to play in the allocation of the government budget and resource distribution in Nigeria. The researcher recognizes that this finding resonates well with the observations in the study done by Mahdavi (2004). Both studies affirm that foreign debt has a very fundamental role in the allocation of government budget and reveal that external borrowing affects the allocation of the government budget by raising some shares of the public budgetary plans while depriving other sectors. Further, this type of relation reflects a very important role for the state as an economy becomes more and more intricate and sophisticated. This complexity in economic activities causes the demand for public goods and social programs to increase significantly. On such basis, a thorough analysis of the different tiers of state expenditure should be done to track changes in the different structures of public spending as the role of the public sector in an economy increase in size and becomes more complex. Growth analysts have the view that, during the early stages of a country's economic progress, the state gets involved in almost in all aspects of the economy. However, government's role begins to gradually diminish as a country's size of productive resources gradually increases while the private sector begins to expand. This happens as a result of state activities providing a conducive environment for private sector participation in the economy. Further, the public usually surrender particular sectors to private investors and focuses on the provision of pure public goods.

Abu (2004) sought to establish possible determinants of Jordanian state expenditure using co-integration tests. He investigated the impact of a range of aggregate economic factors on government expenditure. The results of the study indicate that counter-cyclical policies, especially inflation, negatively influence growth in public expenditure. The results also show that population and unemployment are significantly associated with public expenditure in Jordan.

Akanbi (2014) in his study of determinants of government expenditure in Nigeria explained that increased per capita income was found to be in support of Wagner's law, given the response of total and capital expenditure, however, the law was refuted by the recurrent expenditure response. He continued to observe that prudent government spending results into a holistic and sustainable growth pattern, which serves as a management strategy for eradication of poverty and inequality within a society. Many states experience market imperfections during the process of production, and the only difference is the magnitude and the mode of manifestation. For such reasons, countries with high market distortions require a greater government involvement to put the economy in an equilibrium development path. Thus, government spending is a key tool for managing demand and an important instrument for targeting long-term equilibrium growth and development. Aigbokhan (1997) studied the relationship between the level of state activity and gross domestic product for the period 1960 – 1993. Aigbokhan based his study on the impacts of structural adjustment programs (SAPs) that were institutionalized then in 1986 and his empiric finding suggests a two-directional correlation between total public spending and gross domestic product. Granger causality tests results for the study reveal that state spending and gross domestic product are not co-integrated and could not be used to predict an equilibrium relationship for the two variables. Second, causality tests carried out confirm that state spending

is not related to continued increase in state revenues and that there exists no any possibility of response of state revenue to state spending.

Adam (2003) study on external debt, economic growth and poverty eradication in Sub-Saharan Africa assumed a neoclassical production function using cointegration Error-Correction technique in testing the short-run dynamics and long run equilibrium relationships. He used simultaneous model of analysis to capture the complex and the indirect relationships between the variables. The results revealed that GDP had unexpected significant reverse association with public spending on social goods and services which were not enough to trigger growth in Sub-Saharan Africa economies.

Gross national product is expected to have a positive relation with public expenditure and also as Shonchoy (2010) observes that lagged increase in per capita income (real GDP) increases government final consumption expenditure. He continues to explain that as GDP increases, future consumption expenditure is bound to increase. However, budget deficit poses restraints on the side of the government to increase expenses and it can, therefore, be negatively related to public spending.

Aregbeyen (2006) used Johansen co-integration and Granger causality testing procedure to establish causality between gross national income and aggregate state spending in Nigeria and the results reveal a unidirectional causality from gross domestic product to aggregate state expenditure in Nigeria, thereby verifying and holding Wagner's concepts of increasing state activities due to increases in public revenues. Further, Aregbeyen, from his study, reveals that there is no existence of a bi-directional causal relationship between productive public expenditure and gross domestic product in Nigeria. However, the causality from gross national

domestic to productive government spending was established to be more significant than the reverse direction after variance analysis test technique had been carried out. Babatunde (2011) examined the validity of Wagners Law and tested it using yearly time series for the period 1970 – 2006 in Nigeria. He adopted the Bounds Test technique together with Unrestricted Error Correction Model and Granger causality tests. Results of the Bounds Test reveal that there existed no equilibrium connection between state spending and output in Nigeria.

Aladejare (2013) sought to examine the effects of state spending on gross national income from 1961 to 2010 in Nigeria using Vector Error Correction Model and Granger Causality Approach. He concluded that there is truth in the Wagner's hypothesis that increases in GDP lead to increases in aggregate government expenditure in the Nigerian economy. Aladejare continues to observe that the causal effect of gross domestic product on state investment spending has a stronger significance in comparison to state consumption spending in Nigeria. Intuitively, increases in gross domestic product lead to more increases in capital expenditure than the increases in consumption expenditure in Nigeria. Olopade B. and Olopade D. (2010), examined how expenditure and monetary policies affect the growth rate of an economy and development in Nigeria, and their study reveals that there was no significant association of many of the categories of government spending under the study with gross domestic product and the GDP. The regression coefficient of their study, however, show mixed influences on economic growth and development with some being weekly significant. The variations in significance levels exhibited by the estimates were significant due to the exclusion effects of environmental impacts.

In Nigeria, Aruwa (2010) conducted a study on state spending in relation to economic progress and predicts that the growth in state spending and the manner in which it increases in growth is

largely due to increased demand in social security and social protection rather than investment, and the state is reduced to a less active role as tool for making crucial decisions during fiscal policy formulation. It is widely argued that, for a fiscal policy to yield a long-term economic performance, there is need to improve human capital and that a good proportion of public expenditure should be directed towards investing more on the stock of labour. Sound balance between state expenditure categories contribute to proper distribution of resources in an economy and have all the capabilities to enhance development. Notable growth improving public expenditure categories include expenditures on areas such as infrastructural development, quest and development of new knowledge, education, and health and, if possible, must at all times remain the priority of state's spending authority because provisions for more productive than for protective expenditures is essential for government budgetary and financial administration strategies.

Advocates of foreign aid assert that apart from providing urgent cover to disastrous situations, its main purpose is to help create enabling and fertile grounds for sustainable economic development. According to Sturm (2001), donations are usually limited to particular purposes that they have been requisitioned for, for example, putting up roads, and in this respect foreign aid is expected to be negatively related to government consumption expenditure. Some proponents of foreign aid hypothesize that the assistance helps developing nations to relieve compelling income requirements, improve local institutions, pay good salaries to government workers, help in establishing poverty reducing programs and improve the operations of the government. Conversely, critics argue that larger amounts of inflows might promote financial mismanagement behavior by people who safeguard their interests and who are after evading taxes, which leads to a decline in revenue. According to McGillivray and Morrissey (2001),

foreign aid affects government fiscal items on two accounts of disincentives: First, aid creates tax displacement effects which consequently lower the government incentives to increase taxes and revenues. Second, it might not be channeled into productive areas resulting in a phenomenon known as aid fungibility. Further, Please (1997) and Papanek (1973) agree that financial support can lead to increases in the level of public and private expenses rather than saving and capital accumulation, yielding less to the economy. Cameron (1978) observes that countries with higher degree of openness of the economy, usually, are more exposed to foreign competition and compete for business space by providing, among other things, adequate infrastructure. He continues to affirm that in order to attract foreign direct investment the government could increase public capital spending, and as such, nations with higher degree of trade openness experience higher increments in government spending.

Government budget deficit usually raises external government debt through foreign borrowing, which encourages budgetary over-estimation. There are costs associated with public debt; recipient countries have to incur debt repayment and debt administration costs, which are additional budgetary constraints. Most developing countries are heavily indebted and face serious fiscal challenges. In prescribing solutions to the problem, such countries should make efforts to cut on indebtedness which could have a corresponding cut on their expenditures, especially for the consumption of their population. According to Oxley and Martin (1991), monstrous proportion of budget deficits and government debt can result in restraining fiscal policy measures. They further assert that high debt payment costs wipe out other groups of public spending and that during periods of financial stringency; it is politically true that it is quite easier to suspend capital expenditures than it is to delay consumption spending. In most cases, it is notable that during times of fiscal stringency and financial consolidation, state capital

expenditure is an easy expenditure group to delay, suspend or even cut. This is a very usual behavior because investment expenditure is quite flexible and during times of restrictive economic policies and financial stringency, it is the first category of government expenditure to be reduced given that they are the most flexible component of costs.

Schuknecht (1999) examined fiscal policies regiment and seasonal exchange rates surrounding electoral periods in 25 developing nations and found that the macroeconomic factor of trade openness, proxied by the ration of the sum of imports and exports to gross domestic product, showed a positive impact on the aggregate budget balances as was previously envisaged by the study. However, the effect was not significant at conventional levels. Alesina et al. (1999) studied the influence of trade openness on financial performance and found that trade openness is not always a necessity to economic growth in Latin America.

Omar (1990) explains the relationship between growth of public expenditure and bureaucracy in Kuwait using panel data between the years 1975 to 1985. The study tries to examine the impact of certain macro and micro factors on public expenditure through statistical analysis and shows that there is a very concrete positive link between state expenditure and individual microeconomic variables such as expansion of education and provision of health services. Besides, Omar also found existence of a positive correlation between state expenditure and such aggregate economic variables as gross domestic product and demographic changes**.**

Ansari et al. (1997) also sought to establish the link between public spending and state revenue among some selected countries in African; Ghana, Kenya, and the Republic of South Africa for the period 1957-1990, using Granger test procedures and also by using the causality test approach developed by Holmes and Hutton in 1990. The study reveals that in Ghana, Kenya, and

South Africa there was no significant link which existed between public expenditure and gross national income over the study period. Ezirim and Muoghalu (2006) also explain the correlation between public expenditure and its causes in less developed countries and concluded that the coefficients of both debt overhang and debt burden constitute fundamental factors which explain changes in state expenditure in a practical situation of a developing country.

2.2.2 Structural Variables

In this category, the study considered demographic factors such urbanization, young population and old population. According to Lybeck (1988), most studies explaining government size usually include the structural variables to test for Wagner's hypothesis, particularly in the manner that emphasizes the gradual change of the local villages into industrialized societies with their change of services like mode of dressing, building designs, education, eating habits and health care from basic unit of life all the way to a giant public sector. The inclusion of the urbanization level in most models pre-empts a positive relationship with government consumption expenditure. Public capital spending, especially on infrastructure, is generally needed more in rural areas than in industrialized areas since a great deal of foundation work still need to be carried out. A larger degree of urbanization can lead to less demand for infrastructure and greater demand for services, and this could lead to higher tendencies of incurring greater proportions of recurrent expenditure. An inference to population distribution can be crucial in explaining and tracking changes in internal structure of government budget. As a way of example, a country whose population consists of people of minority ages implies that the public would be forced to channel more budget provisions to: education to put in place all the required educational resources; health to give provide remedy to basic health care, and food. Conversely, a high

proportion of the population falling within the conventional aging bracket would require a shift of the budgetary policies to the social services to provide a cover and security for old age in terms pension schemes and grants.

Similarly, a growing population might increase demand, and lead to increase in government consumption spending. A nation with a highly scattered population in terms ethnic of fragmentation may find it hard to reach a consensus on state expenditure and operational policies because ethnically polarized society weakens the centralized control of the government. Person et al. (1997) and Mau (1995) also argue that ethnic polarization undermines the checks and balances and encourages rent-seeking behavior. Easterly and Levine (1997) also discovered a significant negative association between ethnic diversity of nations and their state expenditure.

Heller and Diamond (1990) made an in depth study on the relationship between demographic factors and public expenditure and observed that, in addition to its size, the rapidity of its increase, age structure, and the geographical distribution of population all explain possible increases in public expenditure. They continued to show that as social needs of a society, e.g. expansion of education and health services, expand and increase in complexity there is a greater need for state interventions to provide for such services. According to them, demographic influences such as increase in population growth rate and increase in population density exert pressure on the available state resources, and it becomes the duty of the state to ensure that adequate services are availed to citizens. In a bid to do this, the state increases its resource employment to increase productivity of goods and services needed by the people.

Ekpo (1995) also attempted to examine determinants of government expenditure and demonstrates that ideology, bureaucratic controls, demographic changes, increased cost of state

production and foreign aid inflows are significant in providing explanations to continued increase in government spending.

Okafor and Eiya (2011) sought to establish the macroeconomic determinants of growth in public spending in Nigeria for the period 1999 - 2008 using OLS regression technique and concluded that: population, public debt and tax revenue had a strong significant positive association with total public expenditure. However, their study reveals that the link between inflation and state expenditure is quite robust and also that the two variables are negatively correlated. The finding agrees with Musgrave's tax and spend hypothesis. Taxes are the major sources of state revenue and they can either be expansionary, that is improving the GDP and increasing employment or contractionary. Expansionary fiscal policy targets increase capital injection into the different sectors of the economy, both productively and unproductively, with a view to creating equity in resource allocation, tackling poverty, creating employment to the people and bringing sustainable development.

Adetomobi J. and Ayanwale A. (2006) explored possible relationship between education expenditure trends, student enrolment in universities and other higher learning institutions, unemployment and gross domestic product in Nigeria. The results of their study indicate that state spending is unstable and cannot be predicted, with investment and consumption spending of the Nigerian government since 1970 because they form only tiny fractions of the nation's budget. Further, total student enrollment in institutions of higher learning contrasts sharply with level of employment in the case of Nigeria.

2.2.3 Politico-institutional Variables

Political regimes and political structures tend to influence expenditure components of a state. According to Cameron (1978), Socialist governments seem to realize larger state investment more rapidly than conservative states. Grilli et al. (1991) report that the type of state, (coalition, majority government or minority government), can affect both public debt overhang and the level of public expenditure. This happens because higher degree of political inclusivity and minority states can possibly have greater challenges in reaching consensual agreement and come up with a balanced budget. In cases of this kind, public capital expenditure category more often than not becomes an easier target to sacrifice. Nonetheless, multiparty democracy may enhance the possibility that a consensus between a party and another group with vested interest is made. Henrekson concludes from the results of his model for the Swedish government, which resonates well with the views of Roubini and Sachs, that states which are politically less strong are often forced to increase consumption expenditure than are for politically stronger states.

Nordhaus (1975), Dalen and Swank (1995) carried out a study in Netherlands and discovered that elections are significant in providing explanations to infrastructural expenditure. Schuknecht (2000) also observes that, in the study conducted among 24 developing countries, government capital expenditure is used as a tool to influence electoral decisions. Besides, Bates (1988) and Krueger (1993) reveal that government capital expenditure and political seasons are cointegrated, and it has been a common and widely practiced in countries like Zambia and Turkey. Economic and political liberalizations might provide an enabling environment to the private sector and cause the government to retract.

Kanano (2006) used OLS estimation techniques to study the determinants of public expenditure in Kenya using time series data for the period 1980 - 2004. He analyzed the impacts of government budgetary resource composition on public expenditure growth over the study period, and the results show that private debt significantly explains public expenditure growth in Kenya. Further, his study also finds validity in Wagner's hypothesis and reveals a strong positive relationship between government revenue and public expenditure in Kenya. His finding is consistent with the results published from studies done by Aladjare (2013) and Babatunde (2011) which indicate that increases in a state's rich resource base increase its spending capacity. According to Nyamongo & Schoeman (2007), size of the public can be proxied by the ratio of state expenditure to gross domestic product to measure how much the government activity is responsible for the changes in the economy.

Kirori and Ali (1965) studied the macroeconomic implication in Kenya and the results of their study show that demographic changes in real per capita income, relative price of public to private good, internal debt obligation and rate of urbanization influence growth of some government expenditure categories in Kenya.

Ndung'u (1995) used multivariate Granger causality test to examine the correlation between budget deficit, upsurge in the general price level and growth of money supply on the one side; and money printing and inflation rate on the contrary. The results of his study show that budget deficit affects monetary growth and, that there are both direct and indirect links between money printing and inflation in Kenya. The study identified factors such as high population growth rate, public sector over employment, interest rate on domestic on domestic and foreign debts and narrow tax base as the major causes of growth public expenditure. Ndung'u, however, does not

establish any link between the variables of interest and the components of government spending, that is, either investment spending or consumption spending. He concluded that debt management has always become a nightmare to many state planners in Kenya and affects allocation of resources in the government budget.

Mosoti (2014) explains the causes of the growth of public expenditure in Kenya over the period 1980 to 2012. He used Ordinary Least Squares to find a possible links between the explanatory and the dependent variables, and also employed co-integration tests to examine the degree of association between the independent variables themselves. He concluded that, in Kenya, Population, GDP, and coalition government show a strong significant relationship with public expenditure in the long run. The study also shows that population and GDP have a positive correlation with public expenditure growth while coalition government and free primary education have a negative effect on public expenditure growth in Kenya. The study further reveals that foreign aid and inflation remain insignificant in explaining the growth of public expenditure.

Muyambiri et al. (2010) investigated the link between state and private investment spending for Zimbabwe, using the Accelerator model and tested Pairwise Granger causality, and the results show that private expenditure granger causes government capital expenditure. They also noted that political factors rather than the economic factors alone significantly affect the government spending among many countries. For instance, Nadler and Hong (2011) carried out a study on how political and institutional factors have impacted on the U.S. budgetary items, using standard multiple regression techniques, the results of their study reveal that considering a range of economic factors, a greater public sector union membership, effective collective bargaining

rights and unyielding democratic orientation of the law making organ of the state are linked with increased yields, having the implication of higher risks of non-compliance. They also showed that all other things held constant, governments with weaker coalitions, weaker collective bargaining powers, and fewer left-leaning government lawmakers pay less in borrowing costs at the same levels of debt and similar levels of unplanned budget deficits than do governments with stronger coalitions and more left-leaning lawmakers.

In 2015, Hong and Nadler conducted a study to examine whether political and institutional factors are germane in explaining how the U.S. budgetary variables are impacted on. Among their findings is the fact that a strong democratic environment and focus in the government law making organs is significantly related to increases in the perceived risk of the government. The findings, in addition, reveal that, controlling for a range of economic factors, greater proportion of public sector coalition membership, lack of guaranteed rights to labour laws, and effective collective bargaining powers are strongly related to rise in the perceived risk of the government and that the right to strike does not have any significant influence on public bond yields. Also, Hong (2015) investigated the effect of budgetary rules on the U.S. budgetary outcome and whether the effects were related to political and economic factors. He also revealed that balanced budget rule is a critical environment for fiscal policy outcome. He further advanceed that the effect of budget rules depends significantly on political factors, particularly on the party identity of the head of the executive, that budgetary rules are much more binding when the governor is a Republican, but the identity of the party controlling the government lawmaking organs do not have a significant effect. He further elucidated that the effect of budget rules also depend on whether the state is divided. Budgetary rules are less binding in undivided state, in which one party controls the executive, and another controls the legislature, while the effect of the rules are

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greatly unaffected under divided lawmakers, in which different parties control each legislative chamber.

Edame (2014) studied the determinants of public infrastructure spending in Nigeria, using ECM. He also discovered that the rate of urbanization, public revenue, population density, external reserves, and type of government jointly or individually affect public spending on infrastructure in Nigeria. Aregbeyen and Akpan (2013) conducted a study on the long-term determinants of public expenditure in Nigeria, using a microeconomic analysis. In their study, Akpan argue: that foreign aid is significantly and positively influence consumption expenditure at the expense of capital expenditure; that revenue is also positively related to public expenditure, that trade openness negatively affect public expenditure; that debt service obligation negatively affect all the categories of public spending in the long run; that the greater the size of the urban population; the greater would be public consumption spending on economic environments; that Federal government expenditure is biased towards consumption expenditure, which increases significantly during an election period than would otherwise be the case. Similarly, Adebayo et al. (2014) examined the influence of state expenses on industrial growth of Nigeria via co-integration and causality and found that public expenditure on administration, production of services, and redistribution of resources showed a negative equilibrium correlation with growth in industrial sector in Nigeria while public expenditure on social amenities has a positive equilibrium correlation. Thus, they concluded that there was no crowding-out effect. From these studies reviewed, there is evidence that all the studies combined economic, social, and political determinants of government expenditure in Nigeria.

Shonchoy ((2010) used random effect model to investigating the causes of state consumption expenditure among 111l developing countries and found that political and institutional qualities and leadership regime, strongly influence state consumption spending. It found that authoritarian governments are more accommodative towards consumption expenditure. On the contrary, Shonchoy (2010) found corruption, size of the GDP and ethnicity to have a strong negative correlation with public spending. The paper focuses on the recent pattern of government consumption expenditure in developing countries with emphasis on political, institutional and governance variables. Using a panel data set for 97 developing countries from 1984 to 2004, he found evidence that political and institutional variables as well as governance variables significantly influence and shape the government expenditure. Political institutional variables such as political ruling, political power in the parliament as well as governance variables such as corruption and government effectiveness are found to have significant statistical association with government expenditure. In addition, the study finds evidence that public expenditure significantly shrinks under military dictator- ship compared with other forms of governance.

Kilinga (2015) studied the determinants of county government capital expenditure using cross-se tion data for the 2013/2014 budget period in Kenya. The findings of this study indicated that wage bill had a negative statistically significant relationship with capital expenditure. The findings also indicated that local revenue performance had a positive and significant relationship with capital expenditure. A unit increase in local revenue performance caused a variation of 3.550541 units in capital expenditure. Based on the findings of his study, he concluded that wage bill and local revenue performance, were key determinants of capital expenditure by county governments in Kenya and recommended that county should keep the wage bill at sustainable level to create more resources for capital programmes. He further suggested that counties should

invest in integrated revenue collection and management systems to seal revenue leakages. County government should also improve administrative procedures of tax collection and invest in untapped sources to improve local revenue collection.

Oketch T. O. and Linge T. (2018) investigated the determinants of recurrent public expenditures in Kenya with interest on salaries, social contribution and non-wage related variables such as rent & utilities, travelling expenses, hospitality and other consumables using error correction model and found that there was significant increase in recurrent expenditure during 2010/11 financial year. They also observed that all the variables; salaries, wages and social contribution, rent and utilities, pension, travelling, foreign trips, consumables (snacks, teas), trainings and hospitality except office and general supplies significantly affect recurrent spending in Kenya.

According to the report by Transparency International (2016), corruption in African states is on the rise and the respective leaders are to blame for not putting in place the necessary measures to strengthen their institutions. Mauro (1998) observe that politicians tend to allocate resources in areas where it would be quite easy for them to get large bribes and still keep them secret. He continues to explain that democracy improves efficiency in allocation of resources since politicians can only increase their chances of re-election when they become accountable to the electorates for the expenses that they incurred.

2.4 Summary of Literature Review

The main objective of government expenditure is to stimulate economic growth and development of a country. However, rapidly growing government consumption expenditure is said to have a retarding effect on economic growth (Aladjare, 2013). Little literature exists on government consumption expenditure in the world over and Kenya in particular. Mosoti (2014) and Kanano

(2006), on one hand, elaborated the reasons for growth of public expenditure in Kenya, while Maingi (2010) found evidence on the effects of government consumption expenditure on economic growth in Kenya and concluded that its growth retarding.. However, their studies did not examine the reasons for continued growth in consumption expenditure in Kenya. Shonchoy (2010) detailed the causes of growth in consumption expenditure among developing countries but this study finds that following the shortcomings panel analysis, the findings may not address the specific issues affecting Kenya (Levine and Renelt, 1992; Sala-i-Martin et al., 2003) and it is not always informative for a particular country (Harrison, 1996; Durlauf, 2002; Hoeffler, 2002). Oketch T. O. and Linge T. (2018) illustrated the determinants of recurrent public expenditures in Kenya with focus on microeconomic factors covering issues such as salaries/wages, social contribution and non-wage related variables such as rent & utilities, travelling expenses, hospitality and other consumables. It is noteworthy that this study differs from theirs in terms of focus. Their study focused on the microeconomic determinants as opposed to macroeconomic determinants which are at the centre of this study. It is evident from the literature review that public consumption expenditure seems to be influenced by national income, population, inflation and foreign aid, urbanization, governance and foreign direct investment.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents both conceptual and theoretical frameworks within which the study was formulated. It also discusses the models used in the study, data types, sources of data, and data analysis techniques employed in this study.

3.2 Research Design

The purpose of this study was to examine the determinants of government consumption expenditure in Kenya. The study applied quantitative approaches to in order to achieve the research objectives. The study was a non-experimental research in which a range of variables were measured and adopted correlational studies design, since correlation was used in the analysis. The study used data for the period 1963-2017 for the following set of variables: economic variables; gross domestic product, foreign aid, inflation, foreign direct investment, interest rate, trade openness and external debt stock; Structural variables; urbanization rate, young population and old population and finally Politico-institutional variables; market liberalization, political liberty, political instability, corruption and elections. The study used published data from World Bank Country Data Portal (2018) and UNCTAD, Country Development Index (2018). The collected data was analysed using Stata and Gretl econometric softwares. The systems of equations were estimated using VECM, VAR and OLS after carrying out time series property tests on the data.

3.2 Conceptual Framework

The study was guided by three objectives and each objective was modelled separately giving rise to three systems of equations in the study. Three categories of variables were adopted: economic variables; gross domestic product, foreign aid, inflation, foreign direct investment, interest rate, trade openness and external debt stock; Structural variables; urbanization rate, young population and old population and finally Politico-institutional variables; market liberalization, political liberty, political instability, corruption and elections.

The conceptual framework shows the linkage between independent variables and the dependent variable. The independent variables include economic, structural and political-institutional factors while government consumption expenditure is the dependent variable, as shown in Figure 9.

Independent Variables

Economic Variables
- Domestic Product
- Foreign Aid
- External debt stock
- Interest Rate
- Foreign Investment
- Trade Openness
- Inflation

Structural Variables
- Urbanizationon
- Young population
- Old population

Political and Institutional Variables
- Political instability
- Political Liberty
- Corruption
- Political Cycles

Government Consumption Expenditure

Figure 9: Conceptual Framework

Source: Author, 2018

3.3 Theoretical Framework

This study adopted public choice approach similar to that used by Hewitt (1991, 1992, 1993), Davoodi et.al (2001), Nyamongo (2007) and Akanbi and Schoeman (2010). The model analyses the relationship between government capital (infrastructure) spending, recurrent spending and overall government spending. Akanbi (2014) observes that previous studies mostly used the public choice model to examine the link between military spending and overall government spending, where military spending is considered as pure public good. Akanbi and Schoeman (2010) slightly deviated from this model where they explored the relationship between education spending and overall government. Akanbi (2014) further deviated from all the aforementioned studies by disaggregating capital and recurrent expenditure from overall government expenditure. Following the foregoing, this study disaggregated government consumption spending from total government expenditure and thus, the determination of consumption expenditure is modelled as a government optimization problem, meaning that the decision on the component of a budget for consumption expenditure is taken by the executive wings of the government.

Assuming the welfare function of the government to be as follows: $W = f\ (P, C, R, \text{and } Z)$... (3.1) Where P = private consumption; C = government capital spending; R = government recurrent spending; and Z = state variables (i.e. GDP per capita, government revenue, governance index, population and urbanisation index, etc.) The government's decision of the level of recurrent and overall government spending is affected by the state variables. Overall government spending is represented by the following equation: $G = C + R$. ………………………………………. (3.2)

Abstracting from private investment and the external account, the budget constraint is determined by the available resources in the economy: $G = Y - P$………………..…… (3.3)

Where, Y represents the value of gross domestic product. In order to obtain a simple analytical solution, a Cobb-Douglas specification for equation (3.1) is considered, while abstracting from the presence of state variables. Thus,

$$W = P^{\propto} C^{\beta} R^{\gamma}$$

………………………..…………………………………………………. (3.4)

Choices of G, C and R that maximise equation (3.4) subject to equations (3.2) and (3.3) will result in:

$$G = \frac{\beta}{\gamma} R + \frac{\gamma}{\beta} C$$

……………………………………………………………………….... (3.5)

$$C = \frac{\beta}{\beta+\gamma} G$$

……………..…………………………………………………………. (3.6)

$$R = \frac{\gamma}{\gamma+\beta} G$$

………………………………………………………………………. (3.7)

Equations (3.5), (3.6) and (3.7) show the simultaneous relationship between the two categories of spending and overall government spending. Higher capital and recurrent spending will lead to higher overall spending and vice versa. Allowing for the state variables to enter the equations, results in the following equations:

$G = f_1(C, R, Z)$………………………………………………………………………….. (3.8)

$C = f_2(G, Z)$………………………………………………………………………...…. (3.9)

$R = f_3(G, Z)$………………………………………………………………………. (3.10)

Equations (3.8), (3.9) and (3.10) form a structural model. In line with the specification of this study, equation (3.10) becomes the model of interest to this study showing that recurrent expenditure R is function of total government expenditure G plus other state variables Z such as

population, inflation, gross domestic product, trade openness, etc., which are assumed to influence different categories of government expenditure.

3.4 The Empirical Models

This study used three models that take the lead from Hewitt (1991, 1992, and 1993), Davoodi et.al (2001), Nyamongo (2007), Akanbi and Schoeman (2010), Mosoti (2014) and Akanbi (2014). The three models; Economic model, Structural model and Politico-institutional model, were specified as follows:

3.4.1 Economic Model

This system of equation consists of variables with cyclical behaviour and comprised of the following: gross domestic product, foreign aid, inflation rate, foreign direct investment, interest rate, trade openness and external debt stock. Thus, equation of the economic determinants was set as follows:

$$GC = \beta_0 + \beta_1 GDP + \beta_2 FA + \beta_3 INF + \beta_4 FDI + \beta_5 INT + \beta_6 TRO + \beta_6 DEBT + \mu \dots\dots\dots\dots (3.11)$$

where:

GC is real government consumption expenditure; GDP is real Gross Domestic Product; FA is Foreign Aid; INF is Inflation rate; FDI is foreign direct investment; INT is interest rate; TRO is trade openness; DEBT is external debt stock; β_0, β_1, β_2, β_3, β_4, β_5, β_6 are the coefficients or parameters are estimators, and μ is a random error term, assumed to be normally distributed with a zero expected value (or mean).

3.4.2 Structural Model

In this system, demographic factors were considered and they included urbanization rate, young population and old population. The model was therefore specified as follows:

$$GC = \beta_0 + \beta_1 URB + \beta_2 YOUNG + \beta_3 OLD + \mu \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (3.12)}$$

Where:

GC is real government consumption expenditure; URB is urbanization rate; YOUNG is young population below 15 years; OLD is old population above 64 years; β_0, β_1, β_2, β_3 are the coefficients or parameters are estimators, and μ is a random error term, assumed to be normally distributed with a zero expected value (or mean).

3.4.3 Politico-institutional Model

In this model, issues related to politics and governance were taken into account. It consists of six sets of dummy variables: market liberation, political liberty, political instability, election periods and corruption. The equation for this system was then set as follows:

$$GC = \beta_0 + \beta_1 SAP + \beta_2 DEMOC + \beta_3 WAR + \beta_4 ELECT + \beta_5 COR + \mu \dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (3.13)}$$

Where: GC is real government consumption expenditure; SAP is structural adjustment programs which takes a value of 1 for presence and 0 otherwise; DEMOC is political liberty which takes a value of 1 for presence and 0 otherwise; WAR is political instability which takes a value of 1 for presence and 0 otherwise; ELECT is elections which takes a value of 1 for presence and 0 otherwise; COR is corruption which takes a value of 1 for presence and 0 otherwise; β_0, β_1, β_2, β_3, β_4, β_5, are the coefficients or parameters are estimators, and μ is a random error term, assumed to be normally distributed with a zero expected value (or mean).

This study used OLS estimator to examine the determinants of government consumption spending in Kenya using time series data between the years 1963 to 2017. The classical linear regression model assumes that each error term is normally distributed, that is, it has zero mean and constant variance. As such, this study verified normality assumption using Darling Anderson and Quantile – Quantile plot and the test output conformed to the premise of Ordinary Least Squares (OLS) method of normal linear distribution, Best Linear Unbiased Estimators (BLUE).

3.4 Definition and Measurement of Variables

The variables of the study are defined, and their measurements, as well as their expected signs, are indicated (see Table A1).

Table A1: Definition and Measurement of Variables

Variable	Definition	Measurement	Effect
Trade Openness	The degree of capital and current account openness due to Chinn and Ito (2007).	The ratio of import prices to export prices	0
Inflation	The rate at which the market price level of goods and services rises.	It is measured as percentage change in CPI Index.	+ve
Gross Domestic Product	It is the total value of all goods and services produced over a specific time period in a country.	Measured using real GDP values reported in various statistical abstracts in USD thousands.	+ve
Young Population	The number of people below 15 years in a geographic area at a particular period in time.	Measured in millions of people.	+ve
Old Population	The number of people above 64 years in a geographic area at a	Measured in millions of people.	+ve

	particular period in time.		
Foreign Direct Investment	This refers to the investments undertaken in a country by non-citizen investors.	Annual FDI inflows in USD 'thousands' at current prices.	0
Market Liberalization	This is the extent of control of economic activities by the government in an economy.	It is represented by the dummy variable, SAPs.	0
Government Final Consumption Expenditure	It refers to the current expenditure by general government bodies on services such as defense, education, public order, road maintenance, wages, and salaries.	Government annual current expenditure outlays in USD 'thousands' at current prices.	0
External Debt Stock	Public guaranteed long-term debt owed to non-residents.	Country public debt outstanding and disbursed in USD 'thousands' at current prices.	+
Foreign Aid	An outright grant, not long-term lending for non-military purposes, by governments and international organizations, to generate some benefits to the recipient country.	Country foreign aid inflows in USD 'thousands' at current prices.	+
Political Cycles	It represents the changes in the leadership of a country.	It is proxied by election dummy variable.	0
Political Liberty	It captures periods of political freedom.	It is represented by dummy variables; multi-partism, coalition and devolved governments in Kenya which	0

		take a value of 1 or 0 otherwise.	
Political Instability	This is the degree of peace and harmony that exist in a country.	Periods of upheavals and wars in Kenya between 1963 and 2014, with 1982/1983 and 2007/2008 being the periods of interest. It will assume a value of 1 or 0 otherwise.	0
Corruption	Corruption is understood to be the abuse of public office for private gains, whether material or political.	World country's Corruption perception index.	+
Interest Rate Payment	It is the proportion of amount borrowed paid number of times per period for all periods during the total term of the loan usually one year.	Commercial banks' lending rates in percentages	0
Urbanization	Transformation of families to villages and villages to modern societies defines urbanization.	Proxied by the proportion of the population living in the urban centres at any time.	+

Source: Author, 2018

3.5 Data Sources and Time Series Properties

This study has used secondary data extracted from *Annual Statistical Abstracts* for the period 1963 to 2017, both from the Ministry of Finance and the Kenya National Bureau of Statistics. Statistical information on expenditure was obtained from the Ministry of Finance in Kenya, and information on GDP was obtained from the Kenya Nation Bureau of Statistics. Nominal values

from statistical Abstracts were obtained from World Bank, Country Data Portal (2018) and UNCTAD, Country Development Index (2018). Two deflators were used in this study; the CPI and GDP deflator. This study adopted 2010 indices as the base year for all the deflated values. Expenditure data at current prices were obtained by deflating the nominal expenditure data using the CPI. GDP deflator was used to convert GDP data to real GDP values. Real GDP is the percentage ratio of nominal GDP to the GDP deflator.

3.6 Time Series Properties

This section examines the properties exhibited by the time series data used in the study. Therefore, stationarity, causality, cointegration, normality and diagnostic tests were the issues to be established.

3.6.1 Augmented Dickey–Fuller Test

Macroeconomic variables specified in the model were assumed to have a unit root (that is the absence of stationarity). Generally, when testing for unit root in large samples, the ADF Test is preferred. The main reason for using ADFT is that it removes serial correlation. As a practice in econometrics, non-stationary data are not predictable and should not be used in the formulation of a model because results yielded using a nonstationary time series can be misleading. Therefore, for consistency purposes and the need for reliable results, the nonstationary time series needs to be changed into stationary data. While a nonstationary process has a variance and an expected value that does not converge or returns to an equilibrium expected value over time, a stationary process revolves around a constant equilibrium expected value and has a constant variance which does not depend on time.

A stochastic variable Y is said to exhibit a random walk without a drift if its value at a time, t, can be mathematically expressed as the sum of its value at a time, t-1, and a random shock, or white noise, (with zero mean and constant variance):

$$Y_t = \beta_0 + Y\rho_{t-1} + \varepsilon_t, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (3.14)}$$

where ρ is the constant term.

According to Gujarati (2004), If $\rho=1$, the random walk test gives rise to a unit root process. The Dicky and Fuller (1979) and the Augmented Dickey and Fuller methodologies are the commonly used techniques in testing for the presence of unit root. Considering the first order autoregressive process, the two tests are mathematically differentiated as follows:

$$Y_t = \beta_0 + \rho Y_{t-1} + \varepsilon_t, \ -1 \le \rho \le 1 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (3.15)}$$

Eliminating Y_{t-1} from the left hand side of equation 3.14 above gives the first difference form of the random walk model:

$$Y_t\text{-}Y_{t-1} = \beta_0 + \rho Y_{t-1} + \varepsilon t\text{-} Y_{t-1} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (3.16)}$$

$$\Delta Y_t = \beta_0 + (\rho\text{-}1) Y_{t-1} + \varepsilon_t = \beta_0 + \alpha Y_{t-1} + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (3.17)}$$

Where $\Delta Y_t = Y_t\text{-}Y_{t-1}$ is the value after first differencing of the random variable Y at time t; $\alpha = \rho$-1 and εt is white noise at time t. Equation (3.17) is restricted since it ignores possible presence of a constant term that may cause the series Yt to drift away from the origin. Thus, introducing a constant term gives random walk model with a drift:

$$\Delta Y_t = \beta_0 + \alpha Y_{t-1} + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (3.18)}$$

In each of the equations above, ADF procedure tests the null hypothesis that $\alpha = 0$, that is $\rho = 1$ against the alternate that $\alpha < 0$, that is $\rho < 1$. Rejection of the null hypothesis implies that the series is stationary. In the case where the null hypothesis is not rejected, the conclusion is that the series has a unit root and it means that it is not- stationary. Therefore, the null hypothesis that $\rho =$

1 is tested using the τ (tau) statistic, whose critical values were developed by Dicky Fuller (1979). If the test statistics results indicate a figure that is greater than the ADF critical values, the null hypothesis that the series does not exhibit a unit root is accepted, and the conclusion is that the series is non stationary. However, if the test statistics results show a figure that is less than the ADF critical values, the null hypothesis that a unit root does exist is rejected and the conclusion is that the series is stationary.

3.6.2 Granger Causality Test

A variable "Y" can be Granger-caused by "X" if the coefficients of the lagged "X"'s are statistically significant. That says, "X" causes "Y" and "Y" equally causes "X." In this study, it is presumed that government consumption expenditure predicts the level of the explanatory variables. Similarly, the explanatory variables can as well influence government consumption expenditure, and as such, the model used can suffer from simultaneous bias. The study tested for Granger causality of the explanatory variabes on government consumption expenditure variable, by running a linear equation with government consumption as the dependent variable, and then the F-test was carried out for the combined significance of the study model.

3.6.3 Cointegration Test

Cointegration is a technique applied to examine the presence of long-term linkages or co-movement between variables which are non-stationary, that is, a time series with a unit root. In practice, it is in order to establish the order of integration of each variable in the model before testing for cointegration. A variable Y_t is integrated of order d (d) if it exhibits stationary only after being differenced (d) times. The time series variable is assumed to be integrated of order d, I(d), if non-stationarity can be removed by differentiating a series d times and the stochastic

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trend remains after differencing only d-1 times. A variable Y_t without a stochastic trend or unit root is considered to be integrated of order zero, I(0). A set of time series of same integration order d is assumed to be cointegrated if a linear combination of the explanatory variables exists, that is, I (0). Also, according to (Lutkepohl, 2006), in econometrics, two or more variables are considered to be cointegrated if a long-run or equilibrium relation exists among them.

Accordingly, Johansen and Juselius test (1990) is used to test for co-integration based on the fact that the residuals from the regression exhibit stationarity i.e. the residuals are integrated of the order zero I(0). Therefore, the Johansen test has been used to establish whether the noise term ε_t is I(0). The regression coefficients were examined for significance using τ statistics for Y. The null hypothesis is that there is unit root, i.e. the residuals from the regression do not exhibit cointegration at levels. The null hypothesis that the residuals (ε_t) do not exhibit cointegration at levels is rejected when the τ statistic is less than the critical τ statistic by taking absolute values. Thus, the guideline here is:

Null hypothesis H_0= no cointegration between the variables

Alternative hypothesis H_1= there is cointegration among variables.

3.6.4 Diagnostic Tests

Regression diagnostics play a critical role in finding and validating a good predictive relationship among the dependent variables. The following diagnostic tests were carried out: heteroscedasticity, autocorrelation, and multicollinearity.

3.6.4.1 Heteroscedasticity Test

Economic analyses rely on heteroscedasticity test to examine whether a specified model has a constant variance. Implicitly, when the residuals of a model exhibit a constant variance then we

can conclude that there is absence of heteroscedasticity in the time series. The variance of a linear regression model should be constant for the linear regression model to hold, and if the error terms do not have constant variance, then they are said to be heteroscedastic. Breusch-Godfrey test is employed to test for the existence of heteroscedasticity. Unlike non-stationarity, there is no general method for correcting heteroscedasticity. However, if the error term is related to the variance, it is an econometric principle to make some changes to the regression. For example, in a case where the variance is inversely related to the error term then we can obtain the product of xt and each term in the equation by x_t or its square root. Also, if the variance is related to the time, then we can do the same using time, t.

3.6.4.2 Autocorrelation Test

Autocorrelation refers to an econometric problem whereby two or more consecutive errors are related. It is a common issue in the time series data. This study used Lagrange-Multiplier and Durbin-Watson tests for autocorrelation. A correlation test on the error terms is carried out to determine the magnitude of their correlation coefficients. Since most econometric problem revolving around time series show positive autocorrelation, as was observed by Montgomery et al. (2001), then the hypothesis which is presumably considered in the Durbin-Watson test is:

H_o: $\rho = 0$

H_1: $\rho > 1$

Autocorrelation is corrected by transforming the original autoregressive error terms into one with non-autocorrelated error term so as to conform to the use of OLS procedures; let:

$Y_t = \beta_1 + \beta_2 X_{2t} + \dots \beta_K X_{kt} + e_t, t=1$.………………...…………………………..…….… (3.19)

$e_t = \rho e_{t-1} + V_t \ (0 < |\rho| < 1)$.…………………………………………………………… (3.20)

Where: both e_t and V_t have zero means and the constant variances through time, e_t are autocorrelated, but V_t is not and ρ is the correlation coefficient between errors in the period t and errors in the period $t-1$.

3.6.4.3 Multicollinearity Test

Multicollinearity is an econometric problem in which two or more independent variables in multiple-variate regression model are highly interdependence and provide repeated information about the response, meaning that one can be a linear combination of the others with a non-trivial degree of accuracy. In cases of multicollinearity, parametrized estimates may change randomly as a response to small variations in the model.

Mathematically, a set of econometric variables is perfectly multicollinear if there exists a linear combination of one or more of the variables. In order to detect this problem of multicollinearity, the constructed models based on all the independent variables were passed through a series of statistical tests to examine their adjusted R-squared as well as the number of insignificant t-ratios.

CHAPTER FOUR

PRESENTATION, INTERPRETATION, AND DISCUSSION OF RESULTS

4.1 Introduction

This section reports the discussions on descriptive statistics of the study data, econometric analysis of the time series, interpretation and the discussion of the econometric results. In order to achieve the objectives of the study, three models were adopted to examine the research questions of the study. The summary statistics of the study are presented in section 4.2. The econometric tests are discussed in part 4.3, while section 4.4 contains the discussion on diagnostic tests and finally hypothesis testing and regression results are presented in section 4.5 and section 4.6 respectively.

4.2 Descriptive Analysis of Data

In time series analysis, descriptive analysis of data enables us to examine the variability of data so as to determine if the time series data can be subjected to further statistical analysis. Table A2 all through to Table A4 below show the STATA output summary for descriptive analysis for the three Models.

Table A2: Summary Statistics for Economic Model

```
-------------+--------------------------------------------------------
    Variable |        Obs         Mean     Std. Dev.         Min          Max
-------------+--------------------------------------------------------
          GC |         55      3.08e+09      2.18e+09      3.51e+08      8.92e+09

         GDP |         55      2.28e+10      1.39e+10      4.79e+09      5.81e+10

          FA |         55      1118.779      825.5417         280.3      3572.62

         INF |         55      10.60218      8.323728          .099       45.979

         FDI |         55      9.64e+10      1.52e+11      1.28e+08      5.19e+11
```

```
       INT |        55     .1804364    .0533659         .12         .36

       TRO |        55     1.750309    .4833703       1.087       3.008

      DEBT |        55     4.94e+09    4.79e+09    2.27e+08    2.57e+10
-----------+-----------------------------------------------------------
```

Source: Author, 2018

Table A3: Summary Statistics for Structural Model

```
-----------+-----------------------------------------------------------
  Variable |       Obs         Mean    Std. Dev.         Min         Max
-----------+-----------------------------------------------------------

      Year |        55         1990     16.02082        1963        2017

        GC |        55     3.08e+09     2.18e+09    3.51e+08    8.92e+09

       URB |        55     .2124364    .0757835        .087        .362

     YOUNG |        55     1.15e+07      4854349     4269399    2.01e+07

       OLD |        55     693468.6     277024.7      324836     1335152
-----------+-----------------------------------------------------------
```

Source: Author, 2018

Table A4: Summary Statistics for Political-institutional Model

```
-----------+-----------------------------------------------------------
  Variable |       Obs         Mean    Std. Dev.         Min         Max
-----------+-----------------------------------------------------------

        GC |        55     3.08e+09     2.18e+09    3.51e+08    8.92e+09

       SAP |        55     .1272727      .33635           0           1

     DEMOC |        55     .4727273    .5038572           0           1

       WAR |        55     .1090909    .3146266           0           1

     CHIGH |        55     .1454545     .355808           0           1

      CLOW |        55     .2181818    .4168182           0           1

 CMODERATE |        55     .2181818    .4168182           0           1

 CQUITEHIGH |       55     .0727273    .2620818           0           1

 CQUITELOW |        55     .1818182    .3892495           0           1
```

```
      ELECT |         55          .2     .4036867              0              1

------------+-------------------------------
            |     Freq.      Percent         Cum.
------------+-------------------------------

       FREE |          7       12.73        12.73

      DEMOC |         26       47.27        47.27

        WAR |          6       10.91       100.00

       HIGH |          8       14.55        14.55

        LOW |         12       21.82        36.36

   MODERATE |         12       21.82        58.18

 QUITE HIGH |          4        7.27        65.45

  QUITE LOW |         10       18.18        83.64

   VERY LOW |          9       16.36       100.00

      ELECT |         11       20.00        20.00
------------+-------------------------------------
```

Source: Author, 2018

A closer look at the mean and standard deviation for Economic Model and Structural Model show that there was no case where the standard deviation was greater than the mean, thus, an implication that the mean was a good indicator of the parameters in the two models. However, this was not the case with Political-institutional Model where the summary statistics for all the explanatory variables reported minimum values of zero and maximum values of 1. This situation was expected since Politico-institutional Model consisted of categorical variables which are discrete in nature and which assume either a value of 1 for presence or 0 otherwise. The frequency of occurrence for each of the attributes and their percentage distribution throughout the study period is displayed in the summary statistics for Politico-institutional Model above. This study adopted four dummy variables: dummies for market liberalization, political cohesion,

political cycles and political liberty all consisting of two levels of attribute representation as shown in Table A4 above. However, the variable COR consisted of six levels of attributes since the study used data on corruption perception index which was measured in a range of values (1= VERY LOW to 6 = VERY HIGH) depending on the degree of corruption. With this regard, all the categorical variables were coded to give numerical representation to the qualitative attributes and therefore whenever an event was observed, it was coded one (1), and zero (0) otherwise. There was 12.73 percent periods under structural adjustment programs, 20 percent of instances were under election periods and 47.27 percent represents periods under political freedom and liberty, while 10.19 percent represented periods of instability and political turmoil. Periods under which corruption cases were either quite high or high represented accounted for 21.82 percent of the total cases across the study period as can be seen in Table A4.

As for the Trade Openness Index, the mean value was 0.526 with a standard deviation of 0.2565. The highest and the lowest values for this variable were 0.083 and 1.1 respectively. The Rates of Interest over the period of the study averaged 18 percent with a standard deviation of 0.533, with the highest and the lowest values being 36.2 percent and 12 percent respectively. External debt stock, on the other hand, averaged USD 4,940 million with a standard deviation of 479 million. The highest and the lowest values for the variable were USD 227 million and USD 25,700 million. Gross Domestic Product for Kenya over the period of the study averaged USD 22,800 million with a standard deviation of 13,900 million. Its highest and lowest values ever recorded were USD 58,100 million and USD 4,790 million respectively. Foreign Direct Investment, on the other hand, averaged USD 96,400 million and with a standard deviation of 152,000 million. The respective highest value was USD 519,000 million, and it can also be seen that there was a tie when FDI receipts into Kenya hit below USD 1 thousand. As for foreign aid, the mean value

was USD 1,118.7 79 with a standard deviation of USD 825.5. The respective highest and lowest values for the variable were USD 3,572.63 thousand and 280.3 respectively.

From Table A3, it can be observed that, on average, from 1963 to 2017, the ratio of urban to rural populations was about 22 percent with a standard deviation of about 5. The highest and the lowest rates of Urbanization ever experienced were 36 percent and 8 percent respectively over the study period. The population of the old whose ages were 65 and above averaged 693,486.6 with a standard deviation of 277,024.7. The portion of the young population in Kenya over the period of the study averaged 11.6 million with a standard deviation of 4,854,349. The highest and the lowest population of the young ever recorded occurred in the years 2017 and 1963, respectively, with respective values of 20.1 million and 4.269399 million. The respective lowest and highest values for the variable old population were 1,335,152 and 324,438. Government consumption expenditure for the period of the study had a mean value of USD 3,080 million with a standard deviation of 2,180 million. The respective highest and lowest values for the variable were USD 8,970 million and USD 351 million respectively.

From the descriptive analysis of data above, it can be seen that the tie series exhibit variability as can be seen from the respective minima and maxima of the time series and can thus be subjected to further statistical analysis.

4.3 Econometric Analysis

As part of econometric tradition and practice, it is in order to ensure that the estimates are consistent and efficient and for such reasons, it was necessary to observe that pre-estimation assumptions underlying time series analysis were met. It was therefore imperative that, before estimating the response equations, the time series were tested for correlation analysis of the

explanatory variables, stationarity of each of the variables in the series, and as well as co-integration of the time series.

4.3.1 Correlation Analysis

The study conducted correlation analysis of the variables in each of the three models in order to establish any possibility of multicollinearity among them. In many cases correlation coefficients are used as criteria to specifying variables to be included in a predictor regression model. As much as correlation coefficients help in establishing the degree of association between two variables, very high correlation coefficients may imply a severe multicollinearity in the specified model. Table A5 all through to Table A7 present the findings on correlation analysis of the variables in the three models.

Table A5: Correlation coefficients for Economic Model

```
--------------------------------------------------------------------------
      |   GC      GDP     FA      INF     FDI     INT     TRO     DEBT
------------+-------------------------------------------------------------
   GC |1.0000

  GDP |0.6490* 1.0000

      |0.0324

   FA |0.5552* 0.4330* 1.0000

      |0.0561   0.0732

  INF |0.4480*  0.4663*  0.4513*  1.0000

      |0.07206  0.0713   0.0710

  FDI |0.4826*  0.4777*  0.6052*  0.2334   1.0000

      |0.07325  0.0755   0.0589   0.0863

  INT |-0.0593  -0.1146  -0.1549   0.3538* -0.1701   1.0000

      |0.6673   0.4048   0.2587   0.0381   0.2143
```

```
 TRO|0.5222*   0.6768*   0.3211*   0.2701*   0.6960*  -0.1383   1.0000

    |0.0847    0.0489    0.0412    0.0461    0.0473    0.3138

DEBT|0.6128*   0.6113*   0.4370*   0.5275*   0.6824*  -0.1300   0.6915*  1.0000

    |0.0455    0.0467    0.0711    0.0823    0.0423    0.3442   0.0381
------------+-----------------------------------------------------------
```

Source: Author, 2018

Table A6: Correlation coefficients for Structural Model

```
-------------------------------------------------------
            |    LGC     LURB    LYOUNG     LOLD
------------+------------------------------------
      LGC |   1.0000

     LURB |   0.8917*  1.0000

          |   0.0000

   LYOUNG |   0.8660*  0.8884*  1.0000

          |   0.0000    0.0000

     LOLD |   0.8770*  0.8757*  0.8881*  1.0000

          |   0.0000    0.0000    0.0000
-------------------------------------------------------
```

Source: Author, 2018

Table A7: Correlation coefficients for Politico-institutional Model

5% critical value (two-tailed) = 0.2656 for n = 55

GC	DDSAP_1	DDSAP_2	DDCOG_1	DDCOG_2	
1.0000	0.1548	-0.1548	-0.8408	0.8408	GC
	1.0000	-1.0000	-0.2523	0.2523	DDSAP_1
		1.0000	0.2523	-0.2523	DDSAP_2
			1.0000	-1.0000	DDCOG_1
				1.0000	DDCOG_2

DDPOC_1	DDPOC_2	DCOR_1	DCOR_2	DCOR_3	
-0.5082	0.5082	-0.5113	-0.3647	-0.2347	GC
-0.1336	0.1336	0.1689	0.1800	-0.7229	DDSAP_1
0.1336	-0.1336	-0.1689	-0.1800	0.7229	DDSAP_2
0.3696	-0.3696	0.4188	0.4464	0.3238	DDCOG_1
-0.3696	0.3696	-0.4188	-0.4464	-0.3238	DDCOG_2
1.0000	-1.0000	0.1548	0.1650	0.1849	DDPOC_1
	1.0000	-0.1548	-0.1650	-0.1849	DDPOC_2
		1.0000	-0.2085	-0.2337	DCOR_1
			1.0000	-0.2490	DCOR_2
				1.0000	DCOR_3

DCOR_4	DCOR_5	DCOR_6	DDELE_1	DDELE_2

0.2471	0.4623	0.6228	0.0668	-0.0668	GC
0.2017	0.1576	0.1069	-0.0818	0.0818	DDSAP_1
-0.2017	-0.1576	-0.1069	0.0818	-0.0818	DDSAP_2
-0.5579	-0.4357	-0.2958	-0.0728	0.0728	DDCOG_1
0.5579	0.4357	0.2958	0.0728	-0.0728	DDCOG_2
0.1849	-0.6827	-0.1266	0.0292	-0.0292	DDPOC_1
-0.1849	0.6827	0.1266	-0.0292	0.0292	DDPOC_2
-0.2337	-0.1825	-0.1239	0.0246	-0.0246	DCOR_1
-0.2490	-0.1945	-0.1320	-0.1179	0.1179	DCOR_2
-0.2791	-0.2179	-0.1479	0.0660	-0.0660	DCOR_3
1.0000	-0.2179	-0.1479	-0.0440	0.0440	DCOR_4
	1.0000	-0.1155	0.0516	-0.0516	DCOR_5
		1.0000	0.0350	-0.0350	DCOR_6
			1.0000	-1.0000	DDELE_1
				1.0000	DDELE_2

Source: Author, 2018

The Correlation matrices revealed that there was indeed some degree of association among the variables under study and, thus, implying that each of the variables could be used to specify the respective models for prediction and forecasting purposes in regression models. The variables did exhibit very high correlations to worry about multicollinearity problem in the models except for Structural Model in which all the variables showed high correlation coefficients. This scenario suggested a case of multicollinearity among the aforementioned variables. The respective p-values show that correlation coefficients were significant since their respective p-

values were less than 5% significance level. This condition was double checked by running variance inflation factors to affirm if indeed there existed a problem of multicollinearity among the variables.

4.3.2 Variance Inflation Factor Analysis

The time series in the Economic Model and Structural Model were subjected to collinearity test to examine the extent of multicollinearity among the variables in the system of equations. In practice, variance inflation factor test statistics are used to gauge the level of multicollinearity in a system of equation. The results of variance inflation factor analysis for the two system equations in Economic Model and Structural Model are presented in Table A8 and Table A9.

Table A 8: Variance Inflation Factor Analysis for Economic Model

```
---------------+-------------------------
    Variable |     VIF        1/VIF
------------+---------------------
        GDP |    25.51     0.039200
       DEBT |    22.29     0.044863
        FDI |     5.33     0.187617
         FA |     5.14     0.194553
        TRO |     5.03     0.198807
        INF |     2.09     0.478469
        INT |     1.52     0.656623
------------+---------------------
   Mean VIF |    11.19
```

Source: Author, 2018

Table A 9: Variance Inflation Factor Analysis Structural Model

```
----------------+---------------------------
    Variable |      VIF       1/VIF
-------------+----------------------
       YOUNG |     87.75    0.011396
         URB |     43.41    0.023035
         OLD |     42.16    0.023721
-------------+----------------------
    Mean VIF |     57.77
--------------+---------------------------
```

Source: Author, 2018

Overall correlation was very high in the Structural model as indicated by the mean VIF values of 11.19 and 57.77 for Economic Model and Structural Model respectively. The test results for multiple correlation coefficients for the Economic Model show that there was moderate multicollinearity exhibited by the variables except for external debt overhang and gross domestic product whose VIF statistics were above 5 which is the minimum threshold for tolerating multicollinearity problem. VIF statistics below 5 indicate less severity in multicollinearity to warrant any corrective measures. However, the variables DEBT and GDP in Economic Model exhibited higher levels of multicollinearity, a situation which is undesirable in time series analyses. Just as it was observed in the correlation analysis, all the explanatory variables in Structural Model were highly correlated and this was expected since urbanization rate was proxied by urban-rural population comparisons which encompassed both the population of the young and the old in the Structural model. Although, goodness of fit and the degree of precision of the predictors are preserved even when a model is fitted with highly correlated variables, higher levels of correlation can easily cause erratic changes in the coefficients and increase the

standard errors of the variables in question. Higher degrees of correlation make coefficients and standard errors to be too sensitive to slight changes in the model and thus making the interpretation of the coefficients invalid. Considering this argument, it follows that high degrees of correlation in a model is undesirable and therefore should be corrected. Multicollinearity can be corrected by either dropping the highly correlated variables in the model or by linearly combining the said variables. However, one major drawback for these methods is that the degree of freedom in the model is reduced since the number of variables must also reduce. In cases where multicollinearity is structurally induced, centring one of the highly correlated variables in the model can be done to solve the problem. In the face of all the above challenges, Principal Component Analysis or partial least square regression can be conducted. In this regard, the variables in the Structural Model were standardized since the high correlation in the model could have been structurally induced owing to the fact that all the data for the three variables were drawn from or was portion of the general population data and therefore acted as a multiple of the other.

4.3.2 Stationarity Analysis

The series plots in figure below give a pictorial description of the nature of variables in the Economic Model and Structural Model. The graphical representation in both Figure 10 and Figure 11 show a likelihood of the presence of unit root in the two models.
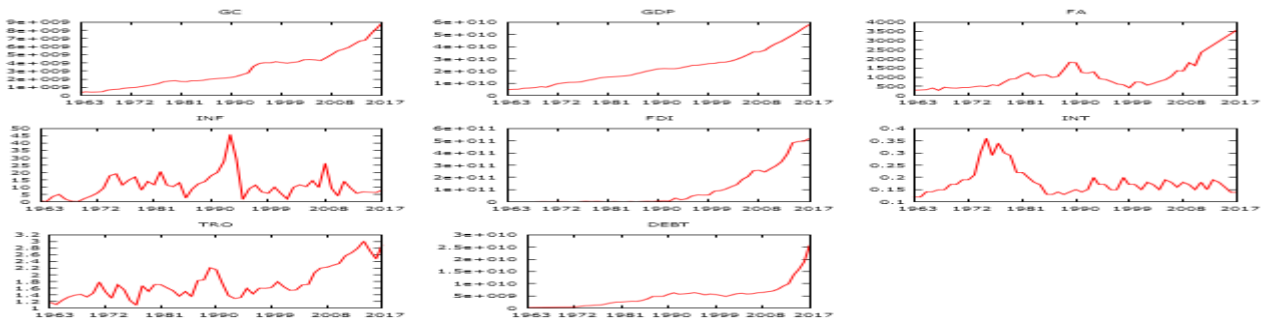
Figure 10: Time series plot for Economic Model

Source: Author, 2018
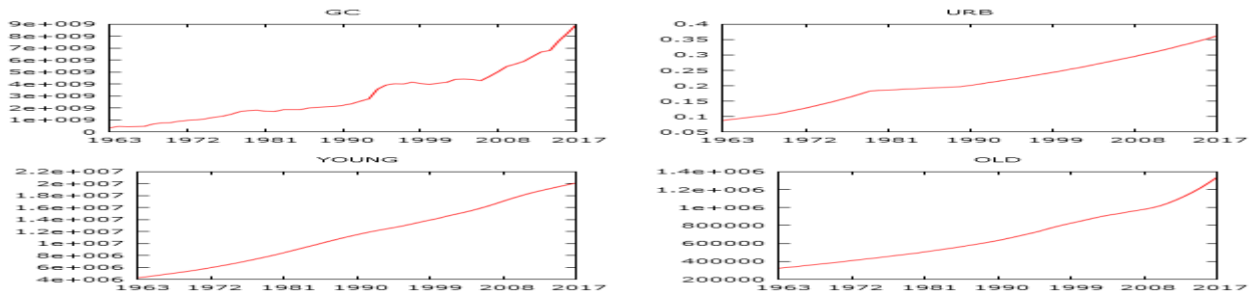
Figure 11: Time series plot for Structural Model

Source: Author, 2018

The results in both Figure 10 and Figure 11 indicate that the times series in the two models exhibited a strong trends and drifts and as such it was imperative to employ stationarity testing techniques to examine the presence of unit roots and the order of integration in the series for the two models. Strong trends in time series can be reduced by applying logarithmic transformation on the system equations and allow the coefficients to be interpreted as elasticities (Asteriou and Price, 2007). However, logarithmic transformation and data transformation in general are known erode original properties of the original series and introducing new issues which were not in the model. Using ADF test technique, the two series were subjected to stationarity checks to

80

examine the presence of unit root and the order of integration in the variables in the two system equations in the Economic Model and Structural Model. The results of stationarity tests are displayed in Table A10 all through to Table A13.

Table A10: ADF Test for Economic Model at Levels

	lags(0)	Number of obs	=	55
	Test	1% Critical	5% Critical	10%Critical
	Statistic	Value	Value	Value

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
GC	-2.417	-4.141	-3.496	-3.178
GDP	-2.528	-4.141	-3.496	-3.178
FA	-0.121	-4.141	-3.496	-3.178
INF	-3.764	-4.141	-3.496	-3.178
FDI	-1.232	-4.141	-3.496	-3.178
INT	-2.432	-4.141	-3.496	-3.178
TRO	-2.382	-4.141	-3.496	-3.178
DEBT	8.667	-4.141	-3.496	-3.178

Source: Author, 2018

Table A11: ADF Test for Structural Model at Levels

```
                    lags(0)      Number of obs    =        54

             Test       1% Critical       5% Critical      10% Critical

          Statistic         Value             Value            Value

---------------------------------------------------------------------

GC         -2.417          -4.141           -3.496           -3.178

URB        -1.074          -4.141           -3.496           -3.178

YOUNG      -3.148          -4.141           -3.496           -3.178

OLD        -0.117          -4.141           -3.496           -3.178

---------------------------------------------------------------------
```

Source: Author, 2018

Augmented Dickey-Fuller tests are used to examine the null hypothesis that a given times series is stationary, that is, it exhibits a deterministic trend against the alternative hypothesis that a system equation is non –stationary meaning that the time series has a unit root and exhibits stochastic trends. A time series with a unit root usually results in unreliable estimates and, thus, spurious and misleading. Each of the series in the two models turned out to be non-stationary as indicated by the test statistics at 5 % significance. From Table A10 and Table A11 above, none of the series in either model was stationary at levels, that is, all of them were not integrated of order I(0). This had the implication that there was unit root in the two models, meaning that they exhibited stochastic trends, a property which is undesirable. The test statistics for each of the variables was less than the absolute critical values of 3.496 at 5 % significance level and therefore the alternative hypothesis of no of unit were rejected at levels for all the variables or rather the null hypothesis that there was unit root in the series could not be rejected. This meant that the series in the two models were non-stationary at levels. It could therefore be concluded

that the said series were integrated of at least order I(1). In further quest for stationary among the variables, each of the non-stationary series was then differenced before they were again subjected to stationary test analysis because it was then that they could be used to provide meaningful statistical information. The results obtained are shown Table A12 and Table A13

Table A 12: ADF Test for Model 1 at First Difference

	lags(0)	Number of obs	=	54
	Test	1% Critical	5% Critical	10% Critical
	Statistic	Value	Value	Value
DGC	-9.775	-4.146	-3.498	-3.179
DGDP	-8.864	-4.146	-3.498	-3.179
DFA	-13.046	-4.146	-3.498	-3.179
DFDI	-9.420	-4.146	-3.498	-3.179
DINT	-8.497	-4.143	-3.497	-3.178
DTRO	-11.186	-4.146	-3.498	-3.179
DDEBT	-7.583	-4.146	-3.498	-3.179

Source: Author, 2018

Table A 13: ADF Test for Model 2 at First Difference

```
                          lags(0)      Number of obs    =        54

                Test     1% Critical      5% Critical     10% Critical
              Statistic      Value            Value          Value
   ---------------------------------------------------------------------
   GC         -2.417        -4.141           -3.496         -3.178

   DURB       -7.828        -4.146           -3.498         -3.179

   DYOUNG     -5.948        -4.141           -3.496         -3.178

   DOLD       -2.631        -4.146           -3.498         -3.179
   ---------------------------------------------------------------------
```

Source: Author, 2018

Following the concluded ADF tests, each of the non-stationary variables in the two models became stationary upon first differrencing. It was therefore concluded that the order of integration for the variables in the two models was I(1).

4.3.3 Lag Selection Criteria

System equations such as VAR, VECM and Johansen Cointegration Test may require lag selection criteria. Following the foregoing, an optimal lag must be chosen to fit the model and this is done through one of the available lag selection criteria; LL, LR, FPE, AIC, HQIC and SBIC lag selection criteria. Each of these criteria can be used on its own merit to arrive at optimal lag length to fit a model and in most cases majority decision is granted as the best decision for lag selection. As Enders (1995) observed, it is better to have a uniform lag lengths for the variables to be used in the system equations because working with different lag lengths for different variables causes asymmetry in the systems and sometimes lag selection for individual variables may turn out with very high lag lengths which might end up washing away

the degree of freedom in the model. In deciding on the correct lag length, a value corresponding to the least statistics in the criteria is chosen. However, AIC lag selection criterion is normally preferred (Pesaran and Shin, 1995; 1999).

Table A14: Selection-order criteria for Economic Model

```
 Sample:  1967 - 2017                              Number of obs      =         51

 +---------------------------------------------------------------------------+
 |lag |   LL       LR      df    p     FPE      AIC      HQIC      SBIC    |
 |----+----------------------------------------------------------------------|
 |  0 | -5250.05                          4.9e+79   206.198   206.314   206.501  |
 |  1 | -4807.27  885.57   64  0.000   1.8e+73   191.344   192.386   194.071* |
 |  2 | -4761.83  90.869   64  0.015   4.4e+73   192.072    194.04   197.223  |
 |  3 | -4660.96  201.74   64  0.000   1.8e+73   190.626   193.521   198.202  |
 |  4 |  -4514.2  293.52*  64  0.000   2.4e+72*  187.38*  191.202*   197.38   |
 +---------------------------------------------------------------------------+
```

  Source: Author, 2018

Table A15: Selection-order criteria for Structural Model

```
 Sample:  1967 - 2017                              Number of obs =      51

 ----------------------------------------------------------------------------+
 |lag |   LL       LR      df    p     FPE      AIC      HQIC      SBIC
 |----+----------------------------------------------------------------------|
 |  0 | -2363.38                          2.5e+35   92.8386   92.8965   92.9901
 |  1 | -1866.74  993.28   16  0.000   1.6e+27    73.99   74.2795   74.7476
 |  2 | -1768.96  195.57*  16  0.000   6.6e+25*  70.7828*  71.3039*  72.1464
 |  3 | -1756.41  25.101   16  0.068   7.8e+25   70.9181   71.6707   72.8878
 |  4 | -1746.91  19.001   16  0.269   1.1e+26   71.1729   72.1572   73.7487
 +---------------------------------------------------------------------------+
```

Source: Author, 2018

From the statistical outputs in Table A14 and Table A15 above, it is evident that lag selection criteria has advised lag length of 4 as the optimum lag to be used in any of the system equations such as VAR, VECM and Johansen cointegration tests for Economic Model. For the Structural Model, however, lag selection criteria showed that a lag length of 2 would be optimal for the model. Four out of five criteria, LR, FPE, AIC and HQIC, suggested lags 4 and 2 for Economic Model and Structural Model respectively as the optimal lag lengths for the respective models.

4.3.4 Cointegration Analysis

Since all the study variables were found to be I(1), it was very useful to establish whether the variables possessed inherent long run equilibrium relationships between them. The null supposition for this trial is that there were no cointegration equations against the alternative hypothesis would follow that at least there is a cointegration equation. To achieve this, first and foremost, the time series data were subjected to unrestricted cointegration rank test in order to determine whether there are no cointegrating equations. The decision to be followed here is that if the trace analysis reveals some cointegrating equations, then the null hypothesis is rejected and the alternative hypothesis is accepted instead.

Table A16: Johansen Cointegration Test for Economic Model

```
Trend: constant                           Number of obs =        51
Sample:  1967 - 2017                                Lags =         4
```

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	200	-4712.6327	.	276.9902	156.00

1	215	-4657.8794	0.88319	167.4835	124.24
2	228	-4623.3277	0.74204	98.3802	94.15
3	239	-4597.9604	0.63020	47.6456*	68.52
4	248	-4582.8666	0.44673	17.4580	47.21
5	255	-4576.6858	0.21525	5.0963	29.68
6	260	-4574.1376	0.09510	0.0000	15.41
7	263	-4574.1376	0.00000	0.0000	3.76
8	264	-4574.1376	-0.00000		

---

maximum rank	parms	LL	eigenvalue	max statistic	5% critical value
0	200	-4712.6327	.	109.5067	51.42
1	215	-4657.8794	0.88319	69.1033	45.28
2	228	-4623.3277	0.74204	50.7346	39.37
3	239	-4597.9604	0.63020	30.1876	33.46
4	248	-4582.8666	0.44673	12.3617	27.07
5	255	-4576.6858	0.21525	5.0963	20.97
6	260	-4574.1376	0.09510	0.0000	14.07
7	263	-4574.1376	0.00000	0.0000	3.76
8	264	-4574.1376	-0.00000		

Source: Author, 2018

Table A17: Johansen Cointegration Test for Structural Model

```
Trend: constant                           Number of obs =        53

Sample:  1965 - 2017                               Lags =         2

-----------------------------------------------------------------

                                                  5%

maximum                                    trace    critical

   rank     parms       LL      eigenvalue  statistic   value

     0        20    -1863.8318        .       47.5760*   47.21

     1        27    -1851.1009    0.38147     18.4143    29.68

     2        32    -1844.6205    0.21694      5.4534    15.41

     3        35    -1841.9775    0.09492      0.1673     3.76

     4        36    -1841.8938    0.00315

-----------------------------------------------------------------

                                                  5%

maximum                                     max    critical

   rank     parms       LL      eigenvalue  statistic   value

     0        20    -1863.8318        .       25.4617    27.07

     1        27    -1851.1009    0.38147     12.9609    20.97

     2        32    -1844.6205    0.21694      5.2860    14.07

     3        35    -1841.9775    0.09492      0.1673     3.76

     4        36    -1841.8938    0.00315

-----------------------------------------------------------------
```

Source: Author, 2018

From the Johansen Cointegration test for Economic Model, the alternative hypothesis that the model has at least one cointegrating equation could not be rejected or rather to say that the variables in the model had long-run relationship among them. This also meant that the null hypothesis of no cointegration could not be accepted. The trace statistics revealed 3 cointegrating equations with a probability value of 0.63020, which is greater than 5 percent significance level and, thus, it was quite convincing that there existed a long run relationship among the variables in the Economic Model. As such Economic Model would be best estimated using Vector-Error Correction since the variables in the model were integrated of the order I(1). From the Johansen Cointegration test for Structural Model, the null hypothesis that there was no cointegrating equation in the model could not be rejected or rather to say that variables in the model do not have long run association among them. The trace statistic for Structural Model revealed zero (0) cointegrating equations since the entire trace statistic throughout all the cointegration ranks were less than the respective critical values at 5 percent significance level. Also, the respective probability values for each of cointegration rank in Structural Model were all less 5 percent, meaning that the trace statistics were insignificant to reject the null hypothesis of no cointegration. Following this result, it therefore implied that Vector Autoregressive Model would be the most appropriate estimation method for Structural Model since the variables in the model were not cointegrated (Pesaran and Shin, 1995; 1999).

Before drawing any conclusions from the findings of this study, the study performed a series of analytic tests on the time series to ascertain their statistical correctness and effectiveness. Residual-based tests, together with stability tests, were conducted and the results are presented in the subsequent sections of this study.

4.4 Diagnostic Tests

In the study, three models were estimated in order to achieve the first, second, and third objectives of the study. In this effect, Government Consumption Expenditure was regressed on the centered values of urbanization rate, young population and old population for Structural Model following the prior decision made on the conducted multicollinearity tests. Before making any conclusions from the study findings, a number of diagnostic tests on the models were carried out to determine their statistical soundness (Gujarati, 2004). Diagnostic tests for serial correlation, autoregressive conditional heteroscedasticity and functional form were conducted on the two models.

4.4.1 Tests for Serial Correlation

Autocorrelation is said to be present in a situation where the magnitude of the regression residuals are related to that of the new residuals. In the event that this occurs, there would be an estimation efficiency loss in the estimates. Residuals which are highly correlated to the past values are likely to give unreliable results. To guard against invalid and unreliable regression results, residual test was conducted to ensure that the coefficients were consistent. The Lagrange-Multiplier test for no autocorrelation is normally used to examine the existence of serial correlation in a model, and it includes up to second lagged value of residuals per equation. Following this argument, Lagrange-Multiplier tests were conducted to establish the presence of autocorrelation in Economic Model and Structural Model. Lagrange-Multiplier tests the null hypothesis that there is no autocorrelation of the residuals in the system equation against the alternative hypothesis that there is serial correlation in the series in the model. In making conclusions on autocorrelation test, a comparison has to be made between the Lagrange-

Multiplier probability values yielded in the test against the usual critical value of 5 percent. If Lagrange-Multiplier test reports a probability value of less than 5 percent, then the null hypothesis of no serial correlation is rejected or rather the alternative hypothesis that there is serial correlation in the series is accepted. Table A18 and Table A19 present the results of Lagrange-Multiplier Test for serial correlation in Economic Model and Structural Model.

Table A 18: Autocorrelation Test for Economic Model

```
 Lagrange-multiplier test

 +--------------------------------------+
 | lag  |     chi2     df   Prob > chi2 |
 |------+-------------------------------|
 |   1  |   85.4305    64     0.06804   |
 |   2  |   59.5454    64     0.63455   |
 +--------------------------------------+
  H0: no autocorrelation at lag order
```

Source: Author, 2018

Table A 19Autocorrelation Test for Structural Model

```
 Lagrange-multiplier test
 +--------------------------------------+
 | lag  |     chi2     df   Prob > chi2 |
 |------+-------------------------------|
 |   1  |   19.0960    16     0.26371   |
 |   2  |    8.7606    16     0.92295   |
 +--------------------------------------+
  H0: no autocorrelation at lag order
```

Source: Author, 2018

From the conducted Lagrange-Multiplier test, it is clear that the null hypothesis of no autocorrelation could not be rejected or rather was accepted since the probability values of the respective test statistics were all greater than 5 percent significance level throughout all the lags in both system of equations. This means there was no serial correlation in the variables specified in the model and that was desirable.

4.4.2 Normality Tests

An essential constraint in regression analysis is that the disturbance term of the regression model must assume a normal distribution with zero expected value and constant variance. To guard against the effects of heteroscedasticity and to ascertain normality, residual based tests were carried out on the output of each of the estimated equations. The null hypothesis to be examined here is that the residuals are normally distributed against the alternative hypothesis that the residuals do not follow a normal distribution. To make a decision on this, the hypothesis that the residuals are normally distributed is rejected when the Jarque-Bera tests statistics turn out to be inferior to the usual 5 percent significance level and accepted otherwise. The results of these tests for Economic Model, Structural Model and Politico-institutional Model are presented in Tables A6, A7, and A8 and Figure A1 while the results for Model 2 are presented in Tables A9, A10, and A11.

Table A20: Normality Test for Economic Model

```
Jarque-Bera test

   +---------------------------------------------------------+
   |           Equation |        chi2   df  Prob > chi2 |
   |--------------------+------------------------------------|
   |                 GC |       0.789   2     0.67397    |
   |                GDP |       1.639   2     0.44072    |
   |                 FA |       3.281   2     0.19385    |
   |                INF |       0.502   2     0.77792    |
   |                FDI |       0.455   2     0.79639    |
   |                INT |       0.702   2     0.70415    |
   |                TRO |       1.227   2     0.54152    |
   |               DEBT |       1.322   2     0.51627    |
   |                ALL |       9.917  16     0.87091    |
   +---------------------------------------------------
```

Source: Author, 2018

For the Economic Model, the Jarque-Bera test statistics turned out to be greater than 5 percent for all the individual variables in the model as can be seen in Table A20 above. Thus, we could conclude that the residuals of each of the series in the Economic Model followed a normal distribution and the null hypothesis that the residuals were normally distributed could not be rejected. Similarly, the residuals of the overall model were also normally distributed since the p-value for the whole was 87.09 percent, which is much bigger than 5 percent critical value. Thus, the normality test for the model as a whole could also not be rejected and the conclusion was,

thus, drawn that the regression residuals from the estimated Economic Model equation followed a normal distribution.

Table A 21: Normality Test for Structural Model

```
Jarque-Bera test
+----------------------------------------------------------+
|          Equation |          chi2   df  Prob > chi2 |
|-------------------+--------------------------------------|
|                GC |          7.991   2     0.06643   |
|              ZURB |          6.928   2     0.09753   |
|            ZYOUNG |          1.189   2     0.55189   |
|              ZOLD |          1.139   2     0.56569   |
|               ALL |          7.247   8     0.05681   |
+----------------------------------------------------------+
```

Source: Author, 2018

For the Structural Model, the Jarque-Bera test statistics turned out to superior to the 5 percent critical value for each of the time series in the model as indicated in Table A21 above. That implies the null hypothesis that the residuals of the individual time series in the model are normally distributed could not be rejected. We can therefore state here that the residuals of the individual series followed a normal distribution. On average, the residuals of the overall system also followed a normal distribution as indicated by the p-value of 5.681 percent which is greater than 5 percent critical significance level. Therefore, the null hypothesis of normality of the regression residuals could not be rejected at the 5 percent significance level. The conclusion is, thus, drawn that the regression residuals from the estimated Structural Model equation are in

accordance with a standard distribution. A system of linear equation of normally distributed variables is regarded to have a normal distribution of the error terms and essentially have the implication that the coefficients of the estimates are also themselves normally distributed (Greene, 2008).

4.4.3 Specification Tests

To detect possibility of misspecification in the VECM model in Economic Model and Structural Model, the companion matrix of the corresponding VAR was generated and its eigenvalues and their corresponding moduli were then analyzed in comparison to unit band limits of a circle. A well specified and model stable will have all of its moduli of the companion matrix of the corresponding VAR falling within the unit band limits of a circle. If the eigenvalue stability condition reveals real root, then the model is not stable.   The results of the specification tests for Economic Model are displayed in Tables A22 and A23 below.

Table A22: Eigenvalue stability test condition for Economic Model

```
Eigenvalue stability condition
+--------------------------------------+
|        Eigenvalue         |  Modulus  |
|---------------------------+-----------|
|   1.154609 +  .1982024i   |   1.1715  |
|   1.154609 -  .1982024i   |   1.1715  |
|   1.020972                |   1.02097 |
|   .8233285 + .08126293i   |   .827329 |
|   .8233285 - .08126293i   |   .827329 |
```

```
|     .5588477  +   .2051742i  |    .595321    |

|     .5588477  -   .2051742i  |    .595321    |

|     .3241411  +   .4934674i  |    .590405    |

|     .3241411  -   .4934674i  |    .590405    |

|   -.5724551                  |    .572455    |

|   -.2455686  +   .3917534i   |    .462358    |

|   -.2455686  -   .3917534i   |    .462358    |

|     .3165786                 |    .316579    |

|   .04646984  +   .3063663i   |    .309871    |

|   .04646984  -   .3063663i   |    .309871    |

|   -.1582071                  |    .158207    |
+----------------------------------------+
 At least one eigenvalue is at least 1.0.
```

Source: Author, 2018

Table A23: Eigenvalue stability test condition for Structural Model

```
Eigenvalue stability condition
    +----------------------------------------+
    |          Eigenvalue          |  Modulus    |
    |------------------------------+-------------|
    |    .9035935  +   .1236521i   |  .907646    |
    |    .9035935  -   .1236521i   |  .905394    |
    |    .8224152  +   .1486242i   |  .836059    |
    |    .8224152  -   .1486242i   |  .826059    |
    |    .7364075  +   .1879924i   |  .760024    |
    |    .7364075  -   .1879924i   |  .760024    |
    |     .497213  +   .4234055i   |  .653064    |
    |     .497213  -   .4234055i   |  .653064    |
    +----------------------------------------+
     At least one eigenvalue is at least 1.0.
```

Source: Author, 2018

Eigenvalue stability test contains a table showing the eigenvalues of the companion matrix and their associated moduli. The table shows that one of the roots is 1. The table footer reminds us that the specified VECM imposes one unit modulus on the companion matrix. The output indicates that there is a real root at about 0.95.

Table A24: Wald-lag Specification Test For Structural Model

```
 Equation: GC

 +-----------------------------------+
 | lag |    chi2      df  Prob > chi2 |
 |-----+-----------------------------|
 |   1 |  187.4372     4     0.000    |
 |   2 |  33.32755     4     0.000    |
 +-----------------------------------+

 Equation: ZURB

 +-----------------------------------+
 | lag |    chi2      df  Prob > chi2 |
 |-----+-----------------------------|
 |   1 |  394.3766     3     0.000    |
 |   2 |  81.82692     3     0.000    |
 +-----------------------------------+

 Equation: ZYOUNG

 +-----------------------------------+
 | lag |    chi2      df  Prob > chi2 |
 |-----+-----------------------------|
 |   1 |  559.1972     3     0.000    |
 |   2 |  135.6865     3     0.000    |
 +-----------------------------------+

 Equation: ZOLD

 +-----------------------------------+
 | lag |    chi2      df  Prob > chi2 |
```

```
|-----+----------------------------|
|  1 |  864.6312      3      0.000   |
|  2 |  242.2069      3      0.000   |
+----------------------------------+
 Equation: All
+----------------------------------+
| lag |   chi2      df  Prob > chi2 |
|-----+----------------------------|
|  1 |  1950.245     13     0.000   |
|  2 |  471.7826     13     0.000   |
+----------------------------------+
```

Source: Author, 2018

4.5 Hypothesis Testing Results

Table A25 presents the results of the hypothesis tests for this study. The results show that all the null hypotheses in section 1.6 could be rejected except for foreign aid, urbanization rate and young population whose corresponding p-values of the coefficients were greater than 5 per cent critical value. For the rest of the variables, the p-values showed that the coefficients were statistically significant at 5 per cent and 1 per cent level of significance.

Table A25: Hypothesis Tests

Hypothesis	Coefficient	t-sticsatist	p-value
GDP positively affects GC	1.295213	10.11	0.000***
Foreign aid positively affects GC	-58746.8	0.08	0.940
Inflation rate positively affects GC	1.822308	8.57	0.000***
Foreign direct investment positively affects GC	-o.0702632	8.41	0.000***

Interest rate positively affects GC	-7274.939	.	.
Trade openness positively affects GC	-164.7232	.	.
Debt stock negatively affects GC	-2.602987	7.01	0.000***
Urbanization rate positively affects GC	.	2.315	0.315
Young population positively affects GC	.	0.7963	0.672
Old population positively affects GC	.	18.872	0.000***
Political liberty positively affects GC	6.40e+08	1.97	0.045*
Political instability positively affects GC	7.54e+08	2.93	0.000***
Corruption negatively affects GC	2.88e+09	7.7	0.000***
Elections positively affect GC			

Source: Author, 2018   GC* is Government Consumption Expenditure

4.6 Regression Results

The results of the long-run and short-run estimations of the economic variables and structural equations are presented in Table A26 and Table A27 while those of Politico-institutional equation from OLS estimation are presented in Table A30. According to Granger (1988), a significant coefficient of the error-correction term (ECM) indicates long-run Granger causality running from the explanatory to the dependent variables.

4.6.1 Long-Run Coefficients of Economic model

This study estimated the system equation in Economic Model which comprised of economic variables: gross domestic product, foreign aid, inflation rate, foreign direct investment, interest rate, trade openness and external debt stock using VECM model as was earlier envisaged. The estimation was conducted on the variables for the period 1963 to 2017 covering a total of 55

observations. Peseran *et al.* (2001) proposed Schartz-Bayesian criterion to be used to determine the number of optimal lags to be considered in the conditional Error-Correction Model. However, this study settled on the optimal lag lengths suggested by more of the lag selection criteria. When the coefficient of the error term is negative and its corresponding probability value is inferior to 5 percent critical value, then the null hypothesis of long run causality running from the endogenous variables to the target model is not reject or rather the null hypothesis is accepted. The short run dynamics of the system equation in Economic Model was also obtained by examining their significance by comparing their respective p-values with 5 percent critical value in which case the latter is superior then short cause running from the lagged value to the dependent variable is confirmed. The results of the vector error-correction are presented in Table A26 below.

Table A26: Vector-Error-Correction Model for Economic Model

```
Sample:  1967 - 2017                          No. of obs     =         51

                                              AIC            =    191.0933

Log likelihood = -4657.879                    HQIC           =    194.2054

Det(Sigma_ml)  =  2.95e+69                    SBIC           =    199.2373

Equation          Parms    RMSE     R-sq     chi2     P>chi2

Identification:  beta is exactly identified

                 Johansen normalization restriction imposed

-------------------------------------------------------------------------------

      beta |    Coef.   Std. Err.      z     P>|z|      [95% Conf. Interval]

-------------+-----------------------------------------------------------------

_ce1       |

       GC |          1        .         .       .          .          .

      GDP | -1.295213    .128144   -10.11   0.000    -1.546371   -1.044056

       FA |  58746.85    776991.6     0.08   0.940    -1464129    1581622

      INF | -1.822308    .2125307    -8.57   0.000     1.882358    6.326808
```

100

```
    FDI |    .0702632    .0083541     8.41    0.000     .0538895     .0866368

    INT |    7274.939           .        .        .            .            .

    TRO |    164.7232           .        .        .            .            .

   DEBT |    2.602987    .3713241     7.01    0.000     1.875205     3.330769

   _cons |    8.95e+09           .        .        .            .            .
------------------------------------------------------------------------
```

Source: Author, 2018

The estimated VECM system reveals one error correction term (ce1), whose coefficient indicates the speed of adjustment of towards the long-run equilibrium. As indicated in the table above, the coefficient of the error term is negative and therefore the presupposition that the system converges towards a long-run equilibrium could not be ruled out. The coefficient of the error term was -0.0338675 indicating that the speed of adjustment towards long-run equilibrium was 3.4 per cent towards the long-run equiibrium.

From the Johansen normalization equation in the table above, government consumption expenditure is positioned as the dependent variable and as it has been observed that there is a long-run relationship running from the endogenous variables: gross domestic product, foreign aid, inflation rate, foreign direct investment, interest rate, trade openness and external debt overhang. A long-run system of a cointegrating equation can therefore be derived from the Johansen normalization equation in the table above as:

$Ce1_{t-1} = GC_{t-1} - 1.295213GDP_{t-1} + 58746.85FA_{t-1} - 1.822308INF_{t-1} + 0.0702632FDI_{t-1} + 7274.939INT_{t-1} + 164.7232TRO_{t-1} + 2.602987DEBT_{t-1} + 8.95e+09$ 4.1

Where: $ce1_{t-1}$ is the previous error correction term. Since the p-values of foreign aid, interest rate, trade openness and the constant turned out to be more than 5 percent critical value and a

conclusion therefore that the effects were insignificant, meaning that their coefficients were statistically not different from zero, they can be excluded in the above equation 4.1 and the long-run equation was then specified as:

$$Cel_{t-1} = GC_{t-1} - 1.295213GDP_{t-1} - 1.822308INF_{t-1} + 0.0702632FDI_{t-1} + 2.602987DEBT_{t-1} \ldots \text{ 4.2}$$

Since the coefficients of the Johansen normalization equation are reversed in the long-run, the final long-run equation for this system equation was therefore specified by reversing the signs to obtain:

$$Cel_{t-1} = GC_{t-1} + 1.295213GDP_{t-1} + 1.822308INF_{t-1} - 0.0702632FDI_{t-1} - 2.602987DEBT_{t-1} \ldots \text{ 4.3}$$

The general interpretation we can have here is that, in the long- run, interest rate, foreign direct investment and external debt stock have a negative impact while gross domestic product has a positive impact on government consumption expenditure in Kenya, ceteris paribus. Unlike the other variables which have been dropped from the system equation, the coefficients of the variables in equation are statistically significant since there p- values lie below 5 percent critical value.

The short-run dynamics of the economic model are obtained by examining the short-run coefficients in the VECM output results in Table A26 above. By extracting significant short-run coefficients only based on p-values less than 5 percent critical value, only the first lag of external debt stock and the constant turned out to be significant. Joint lag effects of each variable were also examined to check the possibility of all the lags of a variable jointly explaining previous realization of government consumption expenditure in the short-run.

Table A27: short-Run Dynamics of the Economic Model

Variable	chi2(3)	p-value
GDP	2.76	0.4294
FA	3.00	0.3919
INF	2.94	0.4005
FDI	0.20	0.9776
INT	3.77	0.2877
TRO	2.32	0.5084
DEBT	12.50	**0.0059*****

Source: Author, 2018

Following the analysis of the short-run results, it was found that only external debt stock and its first lag seem to explain the previous realization of government consumption expenditure in the long-run. Thus, the short-run equation for the economic model was specified as:

$GC_t = Constant+DEBT_{t-1}+ce1_{t-1}$……....……………………………………………....……….. 4.4

Fixing the coefficients of equation 4.4 using values obtained in VECM estimation outputs in Table A26 and dropping the constant since its coefficient is not different from zero, we get our short-run equation for the economic model as follows:

$GC_t = -0.1244211DEBT_{t-1}-0.0338675ce1$………………...……………………….....……….. 4.5

The adjustment term is statistically significant at the 5 percent level, suggesting previous deviations from long-run equilibrium are corrected for within the current at a convergence speed of 3.39 percent as indicated in the coefficient of the error term in equation 4.5 above. In the equation, it is also revealed that a percentage change in external debt stock is associated with 12.4 percent decrease in government consumption expenditure, on average, ceteris paribus. Thus,

for the structural variables; gross domestic product, inflation rate, foreign direct investment and external debt stock explain the previous realization in government consumption expenditure in Kenya.

The coefficient of gross domestic product in Table A26 was been found to be 1.295213 with a p-value of 0.000, an indication that the coefficient was significant since the probability is less than 5 percent critical value as shown in Johansen normalization equation in Table A26. As indicated earlier, the signs of the coefficients in Johansen normalization equation are reversed during interpretation, thus, yielding positive coefficient for the variable gross domestic product. The magnitude and sign of the coefficient show that a percentage increase in the level of gross domestic product would lead to about 1.3 percent increase in Government Consumption Expenditure in Kenya. This result was in line with the prior assumption made in the study that gross domestic product has a significant positive influence to government consumption expenditure. The findings also agree with the observations made by Omar (1990) who argues that as GDP of a country increase, the government spending activities also increase along with it. The government's roles and responsibilities in areas such as the provision of security and maintaining balance in various economic variables are bound to increase. As national income increases, the government's responsibilities in meeting the needs of the people increase. The government has to undertake investments in the national institutions and expand many of its services so as to enhance its capacity to meet the increasing needs of the people. Shonchoy (2010), in his study to examine the determinants of government consumption expenditure among developing countries, also observed that increases in real gross domestic product increase government future consumption expenditure. Aregbeyen and Akpan (2013) in their study of the long-term determinants of government expenditure in Nigeria also found a similar result and

observed that as more revenues were generated, the government's propensity to spend increases proportionately across the different cadres of expenditure. Thus, consumption spending being the lion's share in most government expenditure categories is bound to increase by significant magnitudes. Other notable studies which found a significant positive association between gross domestic product and government spending include Okafor and Eiya (2011) who found that gross domestic product determines total government expenditure in Nigeria, while Edame (2014) observed that gross domestic product played a role in determining government investment expenditure in Nigeria. We can, thus, draw the conclusion that, in Kenya, as the yield in gross domestic increases, government consumption expenditure also increases along with it.

Also, from table A26, the coefficient of foreign direct investment is -0.07263, and the p-value is 0.000 which is significant at the 5 percent confidence level. The magnitude and the sign of the coefficient mean that in the long-run, percentage increase in foreign direct investment would cause government consumption spending to drop by 0.07263 percent, on average, ceteris paribus. This case, by intuition, could be because foreign investments complement government activities in providing employment and social welfare needs of the host country. Foreign investment agents subsidize the functions of the host country in a number of ways: apart introducing cutting age technologies in the production sector, they offer market completion to the host country, provide complementary role which has the advantage of bringing costs down and help improve the absorptive capacity of the host nation as far as funding and budgeting are concerned in order to minimize inefficiencies and wastages which characterize most host countries particularly in the Sub-Saharan Africa. As host governments strive to improve their absorptive capacity to attract more foreign investment agents, stringency measures have to be imposed on the budgetary composition of the government and may result in reduction of the unproductive components of

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the budget. Girma (2003) also observed that the size, the type and the degree of impacts of foreign investment inflows largely depend on the absorptive capacity of the host nation. The results obtained by this study correspond to the findings got by Foye (2014) who while examining the determinants of public investment expenditure in Nigeria observed that foreign direct investment are among the macroeconomic determinants of government investment expenditure in Nigeria. Following the foregoing argument we can conclude that foreign direct investment has impacted negatively on government consumption expenditure in Kenya and has asymmetrical effect with gross domestic product to government consumption spending.

The coefficient of inflation rate is 1.822308 with a p-value of less than 5 percent critical value which shows that it is significant at the 5 percent confidence level. The sign and the magnitude indicate that in the long run, a per cent increase in inflation rate would cause 1.822 percent increase in government consumption expenditure, on average, ceteris paribus. This finding contradicts what Okafor and Eiya (2011) found when examining effects of inflation on government expenditure that there was no significant relationship between the two variables. Inflationary conditions are cyclical phenomena which are reflected in the general increase in price levels. Price volatility may be a serious problem to the treasury and the degree of impact depends on the optimal response by the treasury. Mostly when price shocks are observed then the government has got to revise its budgets usually with the easy tradeoff of slashing the development component of the budget. Reduction of recurrent component expenditure in the face of financial crises is not an easy option especially in developing countries. It is a common phenomenon that when budgetary revision is made on the recurrent components such us wages and salaries as an optimal response to observed shocks in price increases, it is more likely than not that the budget would be revised upwards. This happens because reducing salaries and wage

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rates when prices are rising can easily meet a strong opposition waged by bandwagon of trade unionists that traditionally end up strikes and civil unrests.

Finally, the coefficient of external debt stock is -2.60299 with a p-value of less than 5 percent critical value meaning that the coefficient was statistically significant. The statistical information we can derive from this result is that, in the long-run, a percentage increase in external debt level would result in a 2.6 percent decrease in government consumption expenditure in Kenya, on average, ceteris paribus. Aregbeyen and Akpan (2013) observed that government debt obligation reduced recurrent expenditure and all other components in the government budget for the case of Nigeria. This finding is also consistent with Mahdavi (2004) findings that external debt has a pivotal role to play in the allocation of the government budget. He found that external debt affects the structure of the government budget by increasing some shares of the public budget while starving other sectors. Kenya's debt level continually has increased over the years since 1963 to what many policy makers described as economically unsustainable and the external debt stock hit a record high 4.5 trillion in the year 2018. This has posed a serious problem in the allocation of the government budget considering the debt obligation that Kenya already had. Debt obligation is seen to starve certain components of the government budget especially the development category and sometimes where the government revenues are severely constrained it is accompanied with stringent fiscal policies measures. In 2018, the government of Kenya faced with the moral obligation to repay borrowed money and huge budget deficit to drive the envisaged flagship projects that were dabbed the big four agenda, the treasury had to issue austerity measures to bridge the budget deficit. The stringency measures included among others slashing of foreign and domestic travel costs to ensure leanness in government expenditure;

increase taxes by 8 percent to generate more revenue and reduced sectoral budgets in order to reduce the budget deficit by Ksh 23 billion, contends Mwangi (2018).

 4.6.2 Short-Run coefficients of the structural Model

This study estimated the system equation in the structural model which comprised of structural variables: centred value of urbanization rate (ZURB), centred value of young population (ZYOUNG), centred value of old population (ZOLD) and government consumption expenditure. Since the variables were integrated of the order I(1) and failed the Johansen test of cointegration, this study settled on VAR model to estimate the system of equation in the structural model.

The estimation was conducted on the variables for the period 1963 to 2017 covering a total of 55 observations to examine if there existed any short-run effects running from the variables urbanization rate, young population and old population to government consumption expenditure. In making decision about the significance of the estimates, the corresponding p-values of the coefficients were compared with the traditional 5 percent critical value. Whenever the probability value of test of the corresponding coefficients exceeded 5 percent critical then the null the hypothesis that there was short-run causality running to government consumption spending was rejected. The results obtained from the VAR estimation of the structural model are displayed in Table A28 below.

Table A28: Vector autoregression for Structural Model

```
Sample:  1965 - 2017                          No. of obs      =        53

Log likelihood = -493.7229                    AIC      = 19.98954

FPE          =   5717.709                     HQIC     = 20.50419

Det(Sigma_ml) =   1450.327                     SBIC     = 21.32785
```

Equation	Parms	RMSE	R-sq	chi2	P>chi2
GC	9	1.5e+08	0.9961	13377.06	0.0000
ZURB	9	.015748	0.9998	10270.21	0.0000
ZYOUNG	9	.003376	1.0000	262117.8	0.0000
ZOLD	9	.00779	0.9999	13539.17	0.0000

	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
GC						
GC						
L1.	.9995086	.1189346	8.40	0.000	.8396481	1.350524
L2.	-.4879464	.1344519	-3.63	0.000	-.7514673	-.2244256
ZURB						
L1.	1.28e+09	8.76e+08	1.47	0.143	-4.33e+08	3.00e+09
L2.	-1.23e+09	9.34e+08	-1.32	0.188	-3.06e+09	6.02e+08
ZYOUNG						
L1.	2.09e+09	4.05e+09	0.52	0.606	-5.85e+09	1.00e+10
L2.	-2.24e+09	4.01e+09	-0.56	0.576	-1.01e+10	5.61e+09
ZOLD						
L1.	6.501309	1.601307	4.06	0.000	3.361309	9.634709
L2.	-5.713209	1.544111	-3.70	0.000	-8.74e+09	-2.691809
_cons	7.00e+08	4.48e+08	1.56	0.118	-1.78e+08	1.58e+09

Source: Author, 2018

Joint significance was conducted to check whether the lags of the respective variables jointly have significant effect to government consumption which is the target variable in the system equation. Granger Causality Wald test was used to check joint significance of the variables lagged values. The results are displayed in Table A29.

Table A29: Granger Causality Wald tests

```
Granger causality Wald tests
+-------------------------------------------------------------
|    Equation            Excluded |   chi2     df Prob > chi2 |
|---------------------------------+-----------------------
|        GC                 ZURB |  2.3108     2    0.315    |
|                                                             
|        GC               ZYOUNG |  .7963      2    0.672    |
|                                                             
|        GC                 ZOLD |  18.872     2    0.000    |
|                                                             
|        GC                  ALL |  24.289     6    0.000    |
|                                                             
|------------------------------+--------------------------|
```

 Source: Author, 2018

From Table A28 above, the results show that government consumption expenditure is strongly endogenous; that is, it exhibits weak exogeneity since the relation between its past values or lagged values is very strong as indicated by the test statistics and the corresponding p-values which are less than 1 percent significance level. The first lag of government shows a strong positive endogeneity with a coefficient of 1.095086 and p-value of less than 1 percent significance level. This indicates that there is a short causality running from the first lag of government consumption expenditure to the dependent variable government consumption expenditure. This also means that the previous realizations of government consumption expenditure were associated with the first lag of government consumption expenditure. The magnitude and the coefficient indicate that the previous realization of government consumption

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expenditure is associated with 99.51 percent increase in government consumption expenditure, on average, ceteris paribus. The coefficient of the second lag of government consumption expenditure is also significant since the p-value is less than 1 percent critical value. The magnitude and sign indicate that the past values of government of government consumption expenditure in Kenya are associated with its own second lag. This time round the negative implies that the government consumption expenditure in current year causes 48.8 percent fall in government consumption expenditure two years later. However, the overall endogeneity was insignificant as indicated in the Granger Casuality test for joint significance in Table A28 above.

From Table A28 above, the coefficient of the first lag and the second lag of the old population whose ages were 65 and above was significant as indicated by the test statistics and the corresponding p-values which were less than 1 percent critical level. This implied that there was short-run cuausality running from the first lag and the second lag of old population to government consumption expenditure. As can be seen from the table, Coefficient of the first lag is 6.50130, which shows that a percentage increase in the first lag of the old population aged 65 years and above is associated with 65 percent increase in government consumption expenditure in Kenya, on average, ceteris paribus. However, the second lag has a negative coefficient of -5.713209 which indicates that a percentage increase in the second lag of the old population aged 65 years and above is associated with 57.1 percent decline in government consumption expenditure in Kenya. The overall exogeneity effect for the old population aged 65 and above was also significant as indicated in Granger Causality Wald test in Table A29 above. The outcome of this finding was expected following the argument that the population of elderly is associated with government expenditure in social protection programs. This finding is also consistent with the view that a high proportion of the population above 65 years will always

result in a shift of the budget to the social services to provide for old age pension and grants and governments need to take care of the of the disparities of dependency ratio of the population (Remmer, 2004; Sanz & Velzquez, 2002). This result also agrees with Edame (2014) who found that population density influence public expenditure on infrastructure in Nigeria. In Kenya there are massive government expenditure programs targeting the old age to cater for their vulnerability. The government offers a host of services ranging from payment of pensions to health services. By January 2018, the government of Kenya had already identified 556, 000 people aged 70 years and above who applied for social cover by the government. This number excluded some 310, 000 persons who were already under social protection cover by the government, contends "Senior Citizens get government money"(2018).These programs are basically meant for social protection and restrain over dependency at old age.

Ove rally, the variables urbanization rate, young population aged below years and the old aged 65 years and above jointly affect government consumption expenditure in the short-run as indicated in the Granger Causality Wald test for joint significance. Just like the old population, government of Kenya pumps a lot of money towards health care and education of children below 15 years. This finding resonates very well with the results of Ansari et al. (1997) who discovered a positive correlation between the variables. The need to improve pathetic life among urban dwellers has attracted a lot of government interest to improve sanitation and housing in major towns in Kenya. The government ensures that there is adequate and clean water for the urban dwellers and of more importance is the issue of garbage and waste disposal which ails most towns in Kenya. As stated by "Uhuru unveils water storage plan" (2018), Kenya has hatched a plan to provide a solution to water crisis in major towns. The latest statistics show that Kenya's urban population was about 12.3 million in 2017 which formed 26.5 % of the total population

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with a growing demand for better housing and sanitation services. Also, Shonchoy (2010) in a similar taste observed that there is significant positive association between the degree of urbanization and government expenditure because of ever emerging demands for public utilities and services in urban areas as the fraction of population living in urban areas increases. This finding is in agreement with the findings of Abu and Mustafa (2011) who argues that as the rate of urbanization increases, government has to incur additional expenses associated with new developments in urban centres. These expenditures include investments in security to provide peace and protection for the massive influx of people into the urban areas. As small towns graduate into cities, the autonomy of the central government over public goods and resources falls and for the government to continue asserting its authority even to the very smallest units of the urban dwellings, it forces the government to increase expenditure on delegated functions. Growth in urbanization is strongly associated with improvement in technology which has continued to attract especially the youth into cities. It has been the dream of many African countries and Kenya, in particular, to empower young people and ease unemployment in urban areas. The Kenyan government has always addressed this issue in various forms; one way is by funding Internet and communication technologies across counties. Other sources of expected investment growth as a result of growing urbanization include investments in the provision of social and physical facilities such as sewerage systems, roads upgrade, and street lighting. Good housing, good education, better sanitation and sewerage, better wages and remuneration have always defined the nature and characteristics of urban dwellers because it is the desire of any government to provide better living conditions of its people. Urban centres have increased appetite for good education, housing and health care services and the quest to provide such services have always attracted the city counter-part rural folks. Every year thousands of school

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leavers throng into cities in pursuit of better living conditions and employment opportunities but in doing so they only add to the bad statistics of unemployment, overcrowding and poor housing. Population influx in cities has presented great financial burden to African governments and in this regard, additional resources have to be set aside to beef up security, improve sanitation and upgrade service delivery in the highly populated urban dwellings as a result of rural-urban migration. Following the foregoing, a conclusion was made that urbanization rate, young population and old population jointly affect government consumption expenditure in Kenya.

4.6.3 Institutional effects of government consumption expenditure

In estimating the institutional model, OLS was used. Government consumption expenditure was regressed against five sets of dummy variables: market liberation (SAP), political liberty (DEMOC), political cohesion (WAR), election periods (ELECT) and corruption (COR). Each of these dummy variables consisted of two levels except corruption which had six levels. Each attribute was coded 1 for presence and 0 otherwise. The estimation was conducted on the models for the period 1963 to 2017 covering a total of 55 observations. The significance of the coefficients were adjudged by comparing the probability values of the estimates with the 5 percent critical values in which case the latter would turn out to be inferior then the null presumption of significance of the said coefficient is rejected at 5 percent level. The results of the estimation are shown in Table A30 below.

Table A30: OLS Regression Results

```
    Source |       SS       df       MS              Number of obs =   55
-------------+------------------------------     F( 9, 45) =  161.38
       Model |  2.4930e+20      9  2.7700e+19     Prob > F  =  0.0000
    Residual |  7.7241e+18     45  1.7165e+17     R-square  =  0.9699
-------------+------------------------------     Adj R-squared =0.9639
       Total |  2.5702e+20     54  4.7597e+18     Root MSE   =  4.1e+08

-----------------------------------------------------------------------------
          GC |     Coef.   Std. Err.      t    P>|t|    [95% Conf. Interval]
-------------+---------------------------------------------------------------
         SAP |   2.28e+08   2.44e+08    0.94   0.354   -2.62e+08    7.19e+08
       DEMOC |   6.40e+08   3.25e+08    1.97   0.045   -1.40e+07    1.29e+09
         WAR |   7.54e+08   2.57e+08    2.93   0.005    2.36e+08    1.27e+09
       CHIGH |   3.81e+09   4.13e+08    9.23   0.000    2.98e+09    4.64e+09
        CLOW |   1.30e+09   2.40e+08    5.39   0.000    8.12e+08    1.78e+09
   CMODERATE |   2.88e+09   3.74e+08    7.70   0.000    2.12e+09    3.63e+09
  CQUITEHIGH |   6.47e+09   4.13e+08   15.67   0.000    5.64e+09    7.31e+09
   CQUITELOW |   8.41e+08   1.91e+08    4.40   0.000    4.56e+08    1.23e+09
       ELECT |   1.22e+08   1.43e+08    0.85   0.398   -1.67e+08    4.11e+08
       _cons |   5.49e+08   1.42e+08    3.88   0.000    2.64e+08    8.35e+08
-----------------------------------------------------------------------------
```

Source: Author, 2018

The results of the OLS regression show that the explanatory variables jointly explain the variations in the dependent variable government consumption expenditure. 96.3 per cent of the variations that occur in government consumption expenditure are jointly explained by changes in the explanatory variables: market liberation, political liberty, political cohesion, elections and corruption. The probability of the f-statistics is less than which means that the coefficient of R-squared is significant and therefore it meant that the model was well fitted.

The coefficient of political liberty was significant with a value of 6.40e+08 which represents a difference in government consumption expenditure between years when there was political liberty and years when there was no political freedom. Thus, showing that periods of political liberty are associated with more government consumption expenditure compared to periods of where there was no political liberty, on average, ceteris paribus. The findings, however, are consistent with the finding of Ansari et al. (1997) who discovered a positive link between the two variables. Many research studies point to the fact that investment spending is the most likely expenditure category that is prone to cuts in cases of financial shortages or in situations where there are political disagreements. Also, another consistency in this observation is seen in the findings of Kaufman and Stallings (1991) who argue that in a transition to democracy there is a lot of political payoff to meeting electorate demands for redistribution, because institutional uncertainty and short time horizons give politicians an incentive to heavily discount the potential political risks of future inflation and balance of payments adjustments. Conversely, authoritarian regimes face no such calculus and are more likely to reduce social expenditure. There are expansionary financial pressures that are associated with multi party governments. Most multi-party governments are pro expenditure on social protection programs such as pension schemes and transfer funds. In Kenya, there has been a strong push from the minority parties together with the workers' unions for the government to provide better livelihoods to the citizens. Apart from keeping the government of the day on its toss to provide basic services, multi-partysm represents an additional cost to the government of Kenya. The constitution of Kenya requires that the government funds a significant proportion of the electoral processes of registered parties. Precisely, about 0.3 percent of total revenues are disbursed to political parties to cover administrative costs. Thus, the government should provide proper and sound legislation on the

amount of funds that are allocated to political parties, corroborates Langa't (2018). Thus, this study alongside other studies which have been mentioned, conclude that that democratic regimes tend allocate more resources to social programs than authoritarian regimes which have been witnessed in Kenya since its independent.

Corruption Perception Index had six levels representing the degree of corruption: very low (CVERYLOW), quite low (CQUITELOW), low (CLOW), moderate (CMODERATE), quite high (CQUITEHIGH) and high (CHIGH). Normally when n levels of dummy variables are used to represent attributes, only n-1 levels are included in the regression. In practice, the lowest level is usually excluded, and thus this study eliminated the observations for very low (CLOW) in the regression and the coefficient of the included variables are interpreted in relation to the excluded attribute very low (CLOW). To see this clearly, the coefficients of corruption have been extracted from the OLS regression table to demonstrate this fact.

Table A 31: Regression Coefficients of Corruption Attributes

```
-----------------------------------------------------------------------------
      CHIGH |   3.81e+09   4.13e+08    9.23   0.000    2.98e+09   4.64e+09

       CLOW |   1.30e+09   2.40e+08    5.39   0.000    8.12e+08   1.78e+09

 CMODERATE |   2.88e+09   3.74e+08    7.70   0.000    2.12e+09   3.63e+09

CQUITEHIGH |   6.47e+09   4.13e+08   15.67   0.000    5.64e+09   7.31e+09

 CQUITELOW |   8.41e+08   1.91e+08    4.40   0.000    4.56e+08   1.23e+09

-----------------------------------------------------------------------------
```

Source: Author, 2018

The respective coefficients represent significant differences in government consumption expenditure between very low level of corruption and the respective levels included. Since this differences which are reflected in the coefficients of the attributes representing corruption are

greater than one, then it means that all the attributes of corruption included in the model contribute more to increases in government consumption expenditure than when the level of corruption is just very low (CVERYLOW). Thus, it can be stated here that, as degree of corruption increases, government consumption expenditure is also bound to increase along with it. This is demonstrated in the results when all other attributes representing higher levels report positive difference in the coefficient relative to the lowest level of corruption very low (CVERYLOW) as shown in Table A30 above. This result is in agreement with the prior expectation of this study that corruption positively affects government spending. Corruption has a negative effect on the global reputation of a country, and these often scare away private investors. According to Leftie (2017), the latest statistics by Transparency International show that Kenya dropped by about six places in the 2016 global ranking of fight against corruption and the blame squarely lies in the weakness of government institutions which have failed to provide water tight measures to whip away graft malpractices. Many politicians lobby for classes of expenditure which they can easily get bribes on and go scot free and once they have identified these tiers of government expenditure, politicians tend to increase them to greater proportions in order to amass maximum bribe. In many cases, expenditure vote heads like allowances and other forms remunerations are the ones which often prone to increase by those bearing the responsibility to incur expenditure. We can conclude that as the corruption rating of the country increases, government consumption expenditure will increase. This finding agrees with the findings of Omar (1990), who argues that fraud cases in countries can be perpetrated through inflation of the prices of goods and services that the government purchases. As the government tries to fend off the index ratings, it will invest in public institutions by increasing capitations to it to enforce its anti-corruption policies. We thus conclude that corruption is a positive

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determinant of government consumption expenditure. Corruption and fraud activities tend be associated with government expenses especially in areas which do not easily invoke audit queries from the general public. Expenditures on security and defense, according to Mauro (1998), are more likely to provide great opportunities for politicians to levy huge bribes. Political corruption begins when politicians start lobbying for more allocation of funds in such areas as state security and defense where they can easily receive bribes. On another account, corruption cases have a damaging effect on the image of a country in the global scenes. Rampant cases of frauds tend to scare away foreign investors, and this eliminates the complementary function of foreign investment to the host nation. Therefore, governments which operate in the absence of the complementary role of the private investors have to incur a lot more expenses in their pursuit to provide basic goods and services to the people. In Kenya, the Corruption Perception Index has considerably worsened, dropping to about six places in the 2016 global ranking report given by the Transparency International. Thus, the government is more likely to realize an increase in its consumption expenditure as the fraud cases increase. There have been calls by stakeholders and the international community for the Kenyan government to strengthen its institutions that oversight expenditures. In particular, after noticing a worry corruption trends across many African countries, Transparency International (2016) report notes that African leaders must strengthen institutions that hold their governments accountable, comments Leftie (2017).

Another variable in the model whose effect was statistically significant was political instability. The attribute was captured by observing periods characterized by politically instigated wars. The regression results in Table A29 above show a positive coefficient of 7.54e+08 with p-value of 0.005. Similarly, the coefficient of 7.54e+08 represents a positive departure in government

consumption expenditure from the level of government consumption expenditure when the event was not observed, that is, when there was no war. Starting from a point of reference where there are no politically instigated violence and wars and moving to a period of political instability, government consumption expenditure would increase by USD 7.54e+08, on average, ceteris paribus. This finding corresponds to the observations made by Wiseman and Peacock (1961) who noted that public expenditure is poised to increase when states struggle and strive to meet demand which have placed before them by the citizens concerning a range of services that they wish to be rendered to them. According to Wiseman and Peacock (1961), there may be some sought of disagreement on what is the acceptable level of public spending and the desirable amount of burden in form of taxation caps and limits that the citizens can bear. More often than not political disagreements lead to widespread shocks in the form of devastating political turmoil and aggressions which have significant effects on the size of state expenditure, creating shifting effects, and consequently moving both public revenue and government spending to new levels. In the meantime, government begins to realize fiscal deficits, inadequate revenue collection and there would be growing need to raise taxes to meet fiscal targets. Before any consensus is reached concerning tax and revenue limits, citizens are likely to show their displeasure by way of riots and demonstrations. The government would be forced to make changes to the contentious and intolerable tax rates and adopt new tax levels, which Wiseman and Peacock called 'tax tolerance level', which is the maximum level of tax burden that every citizen can bear. In addition, the citizens will anticipate the government to rejuvenate the production of goods and services and remain alive to emerging issues in the society which would otherwise provoke the already healed society and which in consequence would create an environment for the recurrence of the previous shocks.

There have been several political disturbances in Kenya with far reaching economic costs. Destruction of property and general vandalism shape wars that have taken place in Kenya. In a bid bring back peace and tranquility, most individuals and parties who suffer what we call collateral damage have always sought assistance or sometimes complete recompense to damages from the state. In Kenya there are thousands of people who have lost their property to acts of war and violence and many of them have been compensated in one way or the other. In 2018, a section of those who suffered collateral damages during the 2017 post-election skirmishes sought for legal assistance towards state recompense and were awarded Ksh 6.3 billion after a Kenyan court had ruled in their favour, observed Ogina (2018). Thus, there are tendencies of countries experiencing huge budget estimates during times of war and such cases would force the government to devise strategic ways of raising additional revenues to meet the increase in defense expenditure and reconstruction costs. Such growth in revenue, therefore, gives rise to increased government expenditure. That is to say; government spending is driven by great economic crises which can change public expenditure. According to Salen (2017), countries across the world lose billions of money to war to more than what states invest in peace building. On average, the world spends about $13.6 trillion a year on war related issues. It is not surprising to say that the economy of the "war world" is even much larger than the Kenyan economy and in fact what the whole world spends in wars is enough to run multiple economies in Sub-Saharan Africa.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Introduction

This chapter presents the summary, conclusions and policy consequences of the study's findings. This chapter is split into four parts. Section 5.2 presents the summary of the study, section 5.3 presents the main conclusions, and section 5.4 presents the policy implications arising from the study and finally section 5.5 cover areas for further research.

5.2 Summary

This study has been undertaken to find out the determinants of government consumption expenditure in Kenya. The specific aims of the study are to establish the economic factors which cause the growth in government consumption expenditure in Kenya, to find out the structural causes of government consumption expenditure in Kenya, and to establish the politico-institutional determinants of government consumption expenditure in Kenya. The study estimates two models where various variables entered into each of the models.

For the economic model, the findings of the study show that, gross domestic product and its first lag, inflation rate foreign direct investment, and external debt stock are all statistically important in providing explanations to the changes in government consumption expenditure in Kenya at the 5 percent significance level. The inflation rate, gross domestic product and first lag of gross domestic product, on the one hand, have positive effects on government consumption expenditure. In the long-run, 1USD increase in domestic resources causes USD 1.3 increase in government consumption expenditure in Kenya. Similarly, a unit increase in inflation rate causes USD 1.8 increase in government expenditure. 1USD increase in foreign direct investment leads

to USD 0.07 decrease in expenditure while 1USD increase in external debt stock results in USD 2.6 decrease in government consumption expenditure in Kenya.

For the structural model, the results indicate that the three variables urbanization rate, young population and old population jointly cause increase in government consumption expenditure in Kenya in the short-run. Also, the first lag and the second lag of old population was found to have a positive influence on government consumption expenditure in Kenya while the second had negative impact.

For the political-institutional model, the results indicate that political instability, political liberty and Corruption are statistically strong in providing explanations to the variations in public consumption expenditure in Kenya. As for political instability, the significance of the beta coefficient shows that there is a significant positive difference in the government consumption expenditure between the periods when there was no political violence and the periods when there was political disturbances. Likewise, the introduction of multi-party politics in Kenya and instances of corruption are associated with increase in government consumption expenditure in Kenya.

5.3 Conclusions

Based on the objectives and the findings of the study, we can draw a number of conclusions. The conclusions are based on only the variables that were found to be statistically significant. Three objectives were identified to guide the study.

The findings of the economic model give answers to the first objective of the study that economic determinants of government consumption expenditure are gross domestic product,

inflation rate, foreign direct investment and external debt stock. While gross domestic product and inflation rate are positive determinants, foreign direct investment and external debt stock turned out to be negative determinants of government consumption spending in Kenya in the long-run.

To the second objective of the study, the findings of the structural model yielded answers to the problem that structural determinants of government consumption expenditure in Kenya include the joint effect of urbanization, young population and old population. These three variables jointly cause government consumption expenditure in the short-run. Individually, the first lag of old population cause increase in government consumption expenditure while the second lag of old has significant negative effect on government consumption expenditure in Kenya in the short-run.

Finally, for the third objective the political and institutional determinants were identified by the institutional model whose estimations reveal that political liberty, political instability and corruption are the political and institutional determinants of government consumption expenditure in Kenya, ceteris paribus. All the three variables have a significant positive impact on government consumption expenditure.

5.4 Policy Implications

The results obtained from this study are quite informative and is very useful to policy formulation and implementation. Prudent fiscal policy measures should be put in place to cushion inflationary measure. Inflationary fiscal policies have the tendency of bloating the government budget.

The government should create conducive environment for foreign investment as this will complement a good portion of activities and reduce its financial burden. Foreign investors will absorb labor and reduce the government burden on remuneration of employs.

The government should be very much cautious of the debt level and avoid over-borrowing since debt obligation has a severe impact on the government budget, creating huge deficits which when are tax financed lead to increases in prices which again inflate the government budget.

The government should be up to date with urban dynamics and have accurate forecast about urbanization in readiness to meet consumption expenditure associated with development in towns and cities. Upsurge in population in urban dwellings can be restrained by checking on rural-urban migration. Appropriate methods to absorb people in jobs at local levels should be devised.

The government should take keen interest in empowering its citizens at younger ages to avoid vulnerability at later years which is associated huge government expenditure. This will reduce instances of, for example, free transfers to the old as way of social protection.

Adequate resources, in terms of capitation and personnel, should be given to institutions such Ethics and Anti-Corruption Commission that are mandated to deal with graft and rent seeking behaviors in order to effectively control and ensure efficiency and leanness in government spending.

Peace building should remain as one of the mega projects of the government. The government should ensure that the political class do not propagate divisive politics that usually end up in

serious political tensions. Legislations on incitements and instigation of political violence should be strengthened and strictly adhered to.

5.5 Areas for Further Research

This study has extensively examined the determinants of government consumption spending in Kenya. Government consumption spending is the dependent variable which comprises of two categories of expenditure: productive government consumption expenditure and non-productive government consumption expenditure. Thus, a study of these two tiers of government expenditure can be conducted in relation to their determinants or with reference to GDP in Kenya.

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APPENDICES

Appendix 1: Study Data

Study Data

Year	GC	GDP	FA	INF	FDI	INT(%)	TRO	DEBT	URB(%)	YOUNG	OLD	DSAP	DCOG	DPOC	COR	DELE
1963	351,286,212	4,792,311,613	288	0.70	657,000,000	0.12	1.171	2.27E+08	0.087	4269399	324836	0	0	0	0	1
1964	451,700,456	5,030,224,355	301	0.10	678,000,000	0.12	1.107	2.57E+08	0.091	4435675	333192	0	0	0	0	0
1965	415,119,577	5,131,286,299	320	3.58	767,000,000	0.14	1.237	2.75E+08	0.094	4600668	341325	0	0	0	0	0
1966	434,352,007	5,887,051,209	401	5.01	775,000,000	0.14	1.332	3.05E+08	0.098	4783280	351203	0	0	0	0	0
1967	463,658,566	6,084,928,660	280	1.76	594,000,000	0.15	1.388	3.18E+08	0.101	4961967	360821	0	0	0	0	0
1968	661,242,348	6,570,669,650	452	0.37	789,000,000	0.15	1.414	3.37E+08	0.105	5140807	370194	0	0	0	0	0
1969	748,180,784	7,093,643,996	411	0.17	1,255,945,730	0.17	1.335	3.87E+08	0.109	5325670	379288	0	0	0	0	1
1970	773,784,773	6,763,403,165	396	2.19	1,617,130,054	0.17	1.45	4.08E+08	0.115	5520297	388095	0	0	0	0	0
1971	890,042,851	8,263,112,874	429	3.78	1,200,394,633	0.19	1.782	4.26E+08	0.121	5738332	399107	0	0	0	0	0
1972	965,258,661	9,674,653,292	429	5.83	1,331,200,293	0.19	1.489	4.97E+08	0.127	5965472	409687	0	0	0	2	0
1973	1,000,020,951	10,245,126,984	471	9.28	1,546,401,232	0.21	1.298	7.23E+08	0.134	6201611	419877	0	0	0	2	0
1974	1,085,363,225	10,661,654,644	512	17.81	961,996,534	0.3	1.702	9.47E+08	0.141	6445137	429719	0	0	0	2	0
1975	1,215,005,505	10,755,712,100	473	19.12	533,653,890	0.36	1.559	1.02E+09	0.148	6695280	439259	0	0	0	2	1
1976	1,304,900,761	10,987,386,320	578	11.45	1,445,572,016	0.29	1.227	1.18E+09	0.156	6970559	450481	0	0	0	2	0
1977	1,464,242,099	12,026,111,612	539	14.82	3,609,711,696	0.34	1.087	1.29E+09	0.164	7248156	461458	0	0	0	2	0
1978	1,681,254,562	12,857,415,801	725	16.93	1,953,679,406	0.3	1.673	1.68E+09	0.173	7531265	472255	0	0	0	2	0
1979	1,777,495,211	13,836,537,077	891	7.98	3,275,107,510	0.29	1.501	2.1E+09	0.182	7824326	482880	0	0	0	2	0
1980	1,817,791,732	14,610,272,938	922	13.86	1,829,666,739	0.22	1.707	2.49E+09	0.185	8129488	493405	0	0	0	2	0
1981	1,719,928,754	15,161,598,045	1,111	11.60	128,098,167	0.22	1.704	2.5E+09	0.186	8458608	506441	0	0	0	2	0

1982	1,694,023,850	15,390,004,223	1,240	20.67	2,167,197,121	0.2	1.61	2.63E+09	0.187	8796501	519250	0	0	0	3	1
1983	1,838,934,323	15,591,467,110	1,016	11.40	1,027,382,238	0.18	1.523	2.76E+09	0.189	9139661	531949	0	0	0	3	0
1984	1,839,143,654	15,865,131,188	1,109	10.28	373,663,920	0.17	1.359	2.72E+09	0.19	9482028	544688	0	0	0	3	0
1985	1,857,800,420	16,547,420,962	1,131	13.01	2,042,302,905	0.13	1.499	3.19E+09	0.192	9819027	557624	0	0	0	3	0
1986	1,990,648,105	17,735,121,268	987	2.53	489,440,306	0.13	1.344	3.77E+09	0.193	10173988	572091	1	0	0	3	0
1987	2,055,174,871	18,788,074,473	1,039	8.64	2,211,432,179	0.14	1.826	4.79E+09	0.194	10518208	586486	1	0	0	3	1
1988	2,093,299,567	19,953,533,269	1,412	12.27	3,673,685,214	0.13	1.844	4.82E+09	0.196	10850379	601133	1	0	0	3	0
1989	2,123,181,791	20,889,423,571	1,819	13.79	2,431,744,430	0.14	2.214	4.86E+09	0.197	11167757	616497	1	0	0	3	0
1990	2,220,783,103	21,765,118,855	1,792	17.78	5,491,424,685	0.15	2.156	5.64E+09	0.201	11467190	632983	1	0	0	3	0
1991	2,349,941,301	22,078,176,744	1,253	20.08	8,034,274,947	0.14	1.746	6.25E+09	0.205	11767216	651909	1	0	0	3	0
1992	2,564,350,190	21,901,663,054	1,222	27.33	6,056,198,696	0.15	1.375	5.73E+09	0.21	12038394	671582	1	1	0	3	1
1993	2,756,674,491	21,979,019,127	1,290	45.98	30,063,270,037	0.2	1.291	5.85E+09	0.214	12287452	691918	0	1	0	3	0
1994	3,566,974,714	22,557,679,340	914	28.81	15,878,450,814	0.17	1.318	6.04E+09	0.219	12527082	712645	0	1	0	4	0
1995	3,917,606,775	23,551,619,535	871	1.55	23,525,287,893	0.17	1.593	6.3E+09	0.223	12766107	733566	0	1	0	4	0
1996	4,023,764,556	24,528,267,342	755	8.86	47,420,497,597	0.15	1.427	5.95E+09	0.228	13035463	759486	0	1	0	4	0
1997	4,005,514,209	24,644,752,554	621	11.36	55,663,525,557	0.15	1.597	5.42E+09	0.233	13326573	783389	0	1	0	4	1
1998	4,148,021,705	25,455,617,585	580	6.72	53,785,051,860	0.2	1.592	5.79E+09	0.238	13627127	805494	0	1	0	4	0
1999	4,049,404,920	26,042,468,490	418	5.74	55,118,546,562	0.17	1.621	5.56E+09	0.243	13917680	826139	0	1	0	4	0
2000	3,958,877,207	26,198,643,973	731	9.98	86,833,155,311	0.17	1.791	5.22E+09	0.248	14191415	845441	0	1	0	4	0
2001	4,068,479,154	27,188,928,219	724	5.74	90,307,526,563	0.15	1.642	4.82E+09	0.254	14532174	865668	0	1	0	4	0
2002	4,135,263,938	27,337,613,464	557	1.96	103,316,222,868	0.18	1.533	5.3E+09	0.259	14836533	885844	0	1	0	4	1

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2003	4,383,778,237	28,139,282,294	655	9.82	123,019,069,251	0.17	1.545	5.86E+09	0.265	15128672	904906	0	1	0	4	0
2004	4,409,293,769	29,575,595,617	767	11.62	140,580,397,295	0.15	1.696	6.09E+09	0.271	15444881	921093	0	1	0	4	0
2005	4,374,765,411	31,322,527,291	856	10.31	182,836,488,979	0.19	1.709	5.78E+09	0.277	15802363	933874	0	1	0	4	0
2006	4,286,517,446	33,349,876,084	1,041	14.45	206,968,349,240	0.18	2.066	5.88E+09	0.283	16179955	951108	0	1	0	5	0
2007	4,635,712,914	35,634,585,974	1,355	9.76	255,264,484,554	0.16	2.203	6.24E+09	0.289	16600762	965574	0	1	0	5	1
2008	5,032,071,859	35,717,358,968	1,333	26.24	258,391,085,676	0.18	2.225	6.4E+09	0.295	17045624	979657	0	1	1	5	0
2009	5,468,039,088	36,898,510,533	1,790	9.23	243,449,561,675	0.17	2.286	6.73E+09	0.302	17478912	996821	0	1	1	5	0
2010	5,667,624,178	40,000,088,347	1,629	3.96	269,412,100,743	0.15	2.339	6.99E+09	0.308	17880094	1019133	0	1	1	5	0
2011	5,900,931,530	42,443,399,231	2,342	14.02	294,294,878,546	0.18	2.568	7.77E+09	0.315	18267407	1049421	0	1	1	5	0
2012	6,305,701,039	44,380,180,300	2,547	9.38	328,307,096,805	0.15	2.659	9.02E+09	0.322	18610545	1084909	0	1	1	5	0
2013	6,687,847,522	46,989,153,289	2,752	5.72	390,135,478,045	0.19	2.794	9.95E+09	0.33	18921486	1125355	0	1	0	5	1
2014	6,801,220,706	49,506,417,104	2,957	6.88	483,261,822,519	0.18	3.008	1.36E+10	0.337	19223909	1170077	0	1	0	5	0
2015	7,584,735,804	52,337,445,097	3,162	6.58	492,962,773,993	0.16	2.725	1.59E+10	0.345	19529772	1218878	0	1	0	5	0
2016	8,227,853,512	55,409,230,682	3,368	6.30	496,240,651,479	0.14	2.477	1.9E+10	0.353	19813651	1275510	0	1	0	5	0
2017	8,916,980,081	58,116,217,884	3,573	8.01	518,557,138,823	0.14	2.903	2.57E+10	0.362	20111743	1335152	0	1	1	5	1

Appendix2: Research Permit

Figure 12: Research Permit