

**FISCAL CONSOLIDATION CONSTRAINTS AND BUDGET IMBALANCE  
DYNAMICS IN KENYA**

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**Thesis submitted to the School of Economics in partial fulfilment for the Degree of  
Doctor of Philosophy in Economics of the University of Nairobi**

**August, 2019**

**DECLARATION**

This thesis is my original work and, to the best of my knowledge, has not been presented for award of a degree in any other University.

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This thesis has been submitted for examination with our approval as the University supervisors.

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Signature..... Date.....

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**DEDICATION**

*To my Mum Millicent Beldina Anyango Oguso*

*and*

*my Granny, the late Rebecca Salome Oloo Oguso*

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## ABSTRACT

Kenya needs substantial and sustained fiscal consolidation to create fiscal space for financing the government's election pledges (the Big Four Agenda), the Vision 2030 development projects, and sustainable development goals. This calls for optimal allocation of the limited resources to create a platform for the realization of the set goals. However, the government has found it hard to sustain its fiscal consolidation attempts. This study investigates the fiscal consolidation constraints and the budget imbalance dynamics in Kenya. The study consists of three papers. The first paper examines the fiscal consolidation constraints that act through the persistent rise in public recurrent expenditure using four Auto-regressive Distributed Lag (ARDL) error correction models. The second paper acknowledges that economic growth creates an environment conducive for sustainable fiscal consolidation and assesses the economic growth effect of public recurrent and development expenditure using Pooled Mean Group (PMG) estimator. The third paper investigates the fiscal consolidation constraints in Kenya that act through the budget imbalance dynamics. The paper employs the Olivera-Tanzi effect approach. The study covers the period 2000 – 2015 using panel data in the second paper, and time series data in the first and third paper. The main data sources for the study were the United Nations Conference on Trade and Development, the World Bank, Kenya Revenue Authority, Kenya National Bureau of Statistics and Central Bank of Kenya as well as the reports of Annual Estimates for Development Expenditures and Recurrent Expenditure from the Kenya National Treasury. The first paper shows that in Kenya, the fiscal consolidation efforts constraints are persistent public sector wage adjustments and committing much of the tax revenue collections to fund recurrent expenditure with the intent of borrowing to finance development expenditure. The paper points out that the fiscal adjustment efforts are not effective in limiting the rise in recurrent public expenditure. In the second paper, the study concludes that the persistent increase in the sectoral recurrent public expenditure retards economic growth whereas the sectoral public development expenditure improves economic growth in Kenya. However, this is only evident in the long term. The third paper also indicates that inflation, minimum wages adjustment, rise in perceived level of corruption in the public sector and political budget cycle worsen the budget imbalances (deficits) thus constrain fiscal consolidation efforts in Kenya. The paper also shows that the Olivera-Tanzi propositions partly explain the budget imbalance dynamics in Kenya. Finally, the study provides policy implications that include how to carry out credible fiscal consolidation and control the persistent rise in public recurrent expenditure. Other recommendations are on enhancing chances of successful fiscal consolidation, and reducing the fiscal imbalance gap. The recommendations affirm that the government should focus on significant expenditure reforms to signal its commitment to fiscal management and sustainability, and strictly enforce the principles of financial responsibility as provided in the Public Finance Management (PFM) Act of 2012. Measures to reduce the fiscal imbalance gap in Kenya are proposed in this study. The measures include controlling both supply and demand side inflationary pressure and dealing with rent-seeking behavior in the public sector.

*JEL Classification: E60, E61, E62, H62, J38*

*Keywords: Non-Wage Recurrent Expenditure, Budget Imbalance Dynamics, Fiscal Consolidation, Compensation of Government Employees, Public Recurrent Expenditure*

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## ABBREVIATIONS AND ACRONYMS

ADF	Augmented Dickey Fuller test
AfDB	Africa Development Bank
AIC	Akaike's information criterion
ARD	Agriculture and Rural Development Sector
ARDL	Autoregressive Distributed Lag
BPS	Budget Policy Statement
CBA	Collective Bargaining Agreement
CBK	Central Bank of Kenya
CES	Constant Elasticity of Substitution
CPI	Consumer Price Index
CUSUM	Cumulative Sum
DFE	Dynamic Fixed Effects
DSA	Debt Sustainability Analysis
EAC	East Africa Community
ECM	Error Correction Model
ECT	Error Correction Term
EIICT	Energy, Infrastructure Development, Information & Communications Technology Sector
EPW	Environmental Protection & Water Sector
EU	European Union
FY	Fiscal Year
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GECA	General Economic and Commercial Affairs Sector
GMM	Generalized Method of Moments
HQIC	Hannan and Quinn information criterion
HRD	Human Resource Development Sector

IMF	International Monetary Fund
IPS	Im, Pesaran and Shin
KANU	Kenya African National Union
KIPPRA	Kenya Institute for Public Policy Research and Analysis
KNBS	Kenya National Bureau of Statistics
KNUT	Kenya National Union of Teachers
KPSS	Kwiatkowski-Phillips-Schmidt-Shin
KRA	Kenya Revenue Authority
KSh	Kenya Shillings
KUPPET	Kenya Union of Post Primary Education Teachers
LLC	Levin, Lin and Chu
LR	Likelihood ratio
MDA	Ministries, Departments and Agencies
MG	Mean Group
MTDS	Medium Term Debt Management Strategies
MTEF	Medium-Term Expenditure Framework
NARC	National Rainbow Coalition
NSPI	National Security, Public Administration and International Relations (NSPI) Sector
OCOB	Office of the Controller of Budget
ODA	Official Development Aid
ODM	Orange Democratic Movement
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
PFM	Public Finance Management
PMG	Pooled Mean Group
PNU	Party of National Unity
PP	Philips-Perron test
SAPs	Structural Adjustment Programmes

SBIC	Schwarz's Bayesian Information Criterion
SPGJLO	Social Protection, Culture, Recreation, Other Services, Governance, Justice, Law and Order Sector
SRC	Salaries and Remuneration Commission
UASU	University Academic Staff Union
UK	United Kingdom
UKCS	Union of Kenya Civil Servants
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
USA	United States of America
VAR	Vector Auto Regression
VAT	Value Added Tax
VECM	Vector Error Correction Model



## OPERATIONAL DEFINITIONS OF TERMS

*Budget imbalance dynamics:* refers to the intrinsic changes that lead to the widening gap between public expenditure and government revenue (excluding grants).

*Compensation of employees:* includes public recurrent spending on personnel emoluments, gratuity and pensions contributions, house allowances, transfer allowances, medical allowances, passage and leave allowances, and other personal allowances to public sector employees

*Fiscal adjustment:* refers to reduction of primary public budget deficit, resulting from increased revenue, reduction in public expenditure, or both simultaneously.

*Fiscal consolidation:* refers to measures that a government takes to reduce public debt accumulation and fiscal deficits.

*Fiscal profligacy:* refers to extravagance or wastefulness in the use of government budgetary resources.

*Non-wage recurrent expenditure:* includes government recurrent spending on non-wage items such as purchase of stationery, operations and maintenance, transport and accommodation, water, electricity, telephone among others.

*Political budget cycle:* refers to a cycle in some components of government budget induced by the manipulations of the incumbent government during the general election periods with the aim of winning votes.

*Public expenditure:* refers to spending made by government on its citizens' collective needs and wants. In this study, public expenditure is measured by the aggregate expenditure by the national government.

*Recurrent expenditure:* refers to the expenditure incurred by the government that re-occurs monthly or annually such as compensation of employees, administrative expenditures, and operational expenditures.

*Recurrent expenditure problem:* refers to a situation where public expenditure on operations and maintenance is not sufficient to sustain flow of public investment's productive services to private factors of production in an economy. This may render the public investments ineffective (wasteful) ventures.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background**

Expansionary fiscal policies that developing countries are pursuing are increasingly becoming unsustainable (Wiese, Jong-A-Pin and Haan, 2015). The countries continue to pursue expansionary fiscal policies mainly due to pressure for increased pro-poor spending and the need to meet electoral pledges and international development obligations. The persistent budget deficits have forced the countries to continue accumulating more debts. Failure to curtail increase in public debt accumulation is evidence that most African countries face challenges of fiscal consolidation. The countries need sustained fiscal consolidation to create additional fiscal space, which would enable them to meet their development goals. There have been attempts to curtail growth in government recurrent expenditure and channel more resources to public investments. However, this seems not to have achieved much. Failure of most International Monetary Fund (IMF) fiscal programme suggest that a number of factors constrain fiscal adjustment efforts in the countries where they are implemented (Baker, 2010). The literature identifies number of factors that influence fiscal consolidation success.

A study by Molnár (2012) suggested that fiscal rules, composition of fiscal consolidation measures, strong economic growth, declining interest rates and political factors tend to increase the odds of success of fiscal consolidation. Political considerations have considerable implications on the success of fical adjustment efforts. Rocha and Picchetti (2003) noted that governments might

signal their commitment to a serious fiscal adjustment by cutting the politically sensitive budget items such as welfare programmes, social security and government employment. If a government cannot effectively curtail the growth in politically sensitive budget items, then most public officers are likely not to take the austerity measures seriously. Consequently, the efforts might not realize the desired fiscal consolidation results.

Plekhanov, Kumar and Leigh (2007) indicated that factors that facilitate fiscal consolidation success include macro-economic and political situation; institutional framework changes and adoption of structural reforms; participation of local government such as cuts in their wage bill; and mobilizing government support for fiscal adjustments. Plekhanov *et al.* (2007) also pointed out that sustaining fiscal adjustment efforts requires strong political leadership, with strong institutions playing a supportive role. Therefore, implementation of the fiscal adjustment measures requires proper governance and strong political good. In a review of the International Monetary Fund (IMF) fiscal programmes, Lavigne (2006) pointed out that political economy factors significantly influence fiscal adjustment, thus programmes that do not adequately account for political and institutional realities misrepresent the constraints facing policy-makers hence are more likely to fail. Wiese *et al.* (2015) argued that political fragmentation of the government also affects the chances of carrying out a successful adjustment. Fiscal rules play an essential part in guiding fiscal consolidation efforts, especially if the government strictly implements them. Studies have shown that countries with fiscal rules, especially expenditure-based rules, tend to have significantly larger and successful fiscal consolidations (Amo-Yartey, Turner, Peter, Okwuokei,

Nicholls and Narita, 2012). According to Amo-Yartey *et al.* (2012), push for fiscal consolidation should be complemented by tax policy reforms, controlled contingent liabilities, improved government spending efficiency, active debt management, growth enhancing structural reforms, and public sector rationalization.

Largely, instruments of fiscal consolidation are government revenue increases and expenditure cuts. Alesina and Perotti (1997) classified fiscal adjustments into two. First, is that which relies on public expenditure cuts that may include reduction in public wages and employment, cuts in transfers and social security with constant or reduced taxes on households. The second primarily relies on government tax increases with the expenditure cuts on public investment, while public wages, government employment, and transfers remain almost unaffected. Rocha and Picchetti (2003), Plekhanov *et al.*(2007), Molar (2012), Amo-Yartey *et al.* (2012), and Alesina and Ardagna (2010; 2013) argued for the effectiveness of expenditure-based consolidation in fiscal consolidation as compared to tax-based consolidation measures. The study pointed out that public expenditure based consolidation efforts often complement the changes that increase the efficiency of fiscal procedures. Public expenditure-based fiscal consolidation tends to be more effective since expenditure measures reflect greater commitment; lead to efficiency gains and makes substantial consolidation more feasible. However, Molnár (2012) noted that if there is room to adjust government taxes that are considerably less harmful to growth then tax-based consolidations could be effective. Taxes that are considered to be less distortionary thus less harmful to growth are property taxes and value-added taxes (Molnár, 2012). On the other hand, expenditure-based

consolidation may result into losses in output if targeted at growth-enhancing public services insufficiently produced by market forces (Cournède, Goujard, Pina and de Serres, 2013).

According to Alesina and Perotti (1995; 1997), consolidations concentrated on the public expenditure side especially on public wages and transfers tend to be successful and long lasting. In contrast, Alesina and Perotti (1995; 1997) argued that consolidations focused on increases in tax or cuts of public investment incline to be unsuccessful. Rocha and Picchetti (2003) pointed out that the size of the consolidation matters in fiscal consolidation. The study argued that fiscal consolidation appears to be more credible when its magnitude is greater. The greater magnitude of the consolidation signals the government's commitment to the success of the fiscal consolidation effort. Thus, public officers are more likely to take the efforts seriously and ensure the effective implementation of the austerity measures. Ardagna (2004) noted that the greater the initial change in main fiscal balance, the higher the chances of fiscal adjustment success. Amo-Yartey *et al.* (2012) opined that decisive and lasting reduction in public spending drive major public debt reductions.

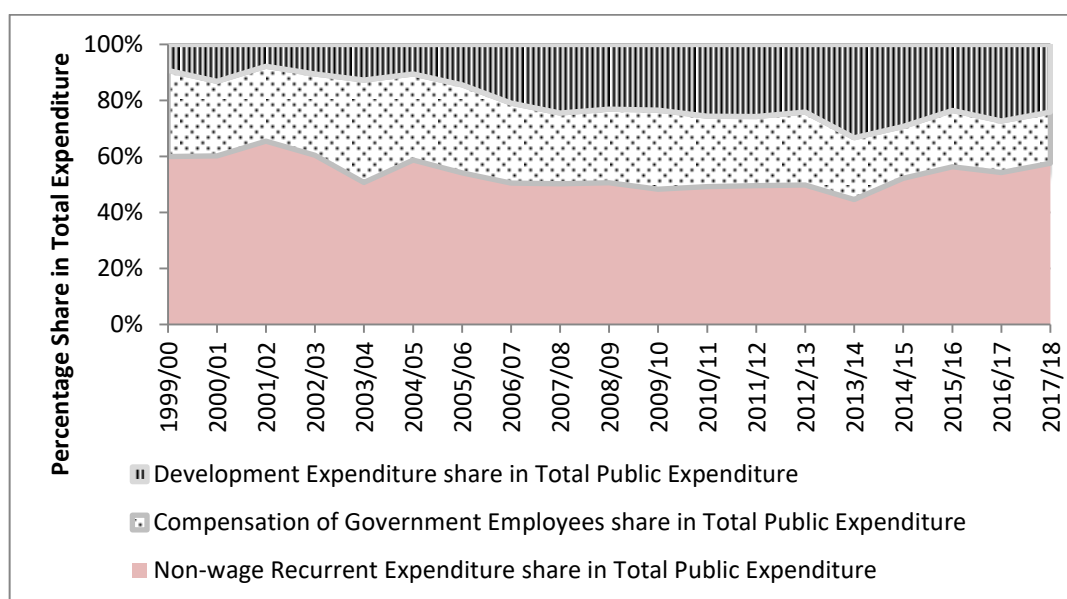
Amo-Yartey *et al.* (2012) advocated for enhanced public sector efficiency, and improved management of public wages and government transfers as some of the appropriate measures for public expenditure-based consolidation. The study noted that most of the Caribbean countries have adopted a holistic approach to fiscal consolidation efforts by considering all possible improvement in government revenue and expenditure cuts. The countries were found to undertake short-term temporal increase in tax rates and temporal public wage freeze. Amo-Yartey *et al.*

(2012) also noted that in countries where spending was restrained, public investment spending was reduced at the expense of recurrent spending. Some of the Caribbean countries outlined expenditure reduction measures in their medium-term fiscal strategy, but they could not implement them as desired due to political economy considerations. This suggests that public support and broad political consensus enhances success in fiscal adjustments. Wiese *et al.* (2015) sampled 20 Organisation for Economic Co-operation and Development (OECD) nations with the purpose to re-examine whether public expenditure cuts characterize successful fiscal adjustments. Their results showed an equal effect of change in public expenditure and government revenues changes in effective fiscal adjustments. The studies reviewed in this section suggest various success factors and constraints to fiscal consolidation. These informed the need to carry out an analysis of the fiscal consolidation constraints in Kenya.

## **1.2 Budget Imbalance Dynamics in Kenya**

Since Kenya attained its independence, its fiscal policy stance has been largely expansionary. Kenya's Economic survey data (Republic of Kenya, 2002a; 2004a; 2006a; 2008a; 2010a; 2012a; 2014a; 2016a; 2018a) showed that public expenditure, measured using the aggregate national government expenditure as a portion of the GDP, has averaged 33.7 percent annually from fiscal year (FY) 1999/00 to FY 2017/18. This registered a low of 27.6 percent in 2012/13 and an estimated high of 35.9 percent in 2017/18. The Economic survey data and Kenya's Budget Statement for 2018/19 indicated that total nominal national government expenditure rose more than tenfold from KSh 225.7 billion (about \$2.2 billion) in

FY 1999/00 to Ksh 2,556.6 billion (approximately \$25.3 billion) in FY 2018/19. In pursuit of the development goals in Kenya’s Vision 2030 blueprint and the international development obligations, the expansionary fiscal policy stance is not a cause of concern in itself. However, the fiscal aspects of particular concern to policy makers are the large proportions of arguably unproductive public expenditure over the years and the failure to ensure sustainable fiscal consolidation. Figure 1.1 indicates the main components of Kenya’s public expenditure between FY 1999/00 and FY 2017/18.



**Figure 1.1: Main Public Expenditure Components**

Data Source: Republic of Kenya (2002a; 2004a; 2006a; 2008a; 2010a; 2012a; 2014a; 2016a; 2018a)

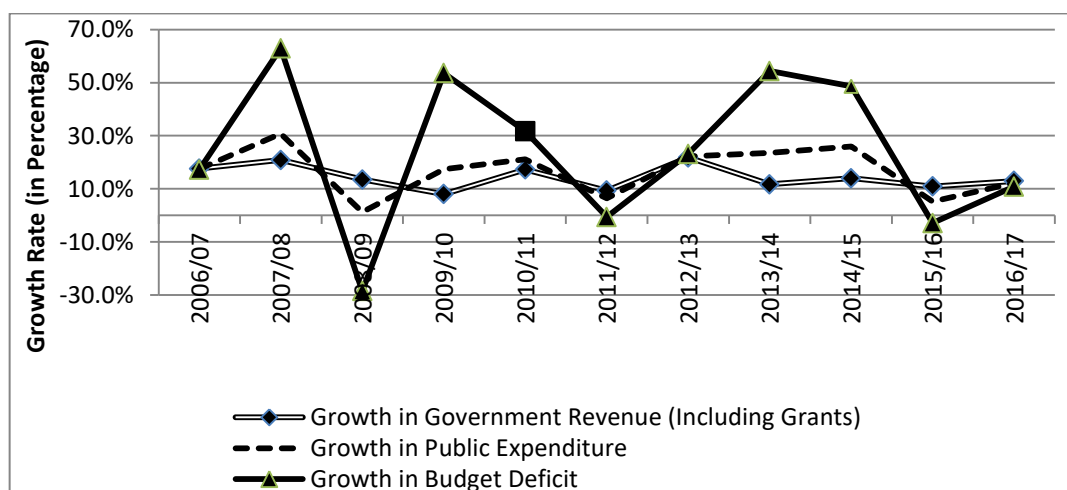
On aggregate, recurrent public expenditure has averaged approximately 79.7 percent of the overall public expenditure leaving only 20.3 percent for development expenditure annually. The figure shows that Kenya’s public expenditure has largely been composed of non-wage recurrent expenditure with an annual average of 53.7 percentage share in total expenditure since FY 1999/00. Compensation of government employees follows with a yearly average of 25.8

percent share in total public expenditure. This shows why there has been a lot of debate on Kenya's public wage bill in the last decade. In its wage bill quarterly bulletin, the Salaries and Remuneration Commission (SRC) (2017) showed that public wage bill in Kenya rose from KSh 464.9 billion (approximately US\$ 4.60 billion) in FY 2012/13 to KSh 698.5 billion (approximately US\$ 6.92 billion) in FY 2017/18. The Kenya Institute for Public Policy Research and Analysis (KIPPRA) (2013) through a study commissioned by the SRC showed that large vertical inequality exists in public wages caused by the huge salaries obtained by top ten percent of the public wage earners. The study also found out that some job groups are entitled to more allowances, which disproportionately benefit the middle and higher job cadres. These public sector wage inequalities, in addition to other factors, have led to frequent industrial action by workers' unions. These have resulted in frequent demands for minimum wage adjustments thus exerting pressure on the government to expand its budget to cater for the increased wage bill.

Expansionary budgets lead to increased pressure for government borrowing, thus leading to the fiscal consolidation challenges in a country. According to the OECD, United Nations Development Programme (UNDP) and the African Development Bank (AfDB) (2016), the overall budget deficit for Africa (including grants) worsened from -4.8 percent GDP in 2014 to -6.6 percent GDP in 2015. The African Development Bank (2018) showed that the budget deficit for Africa further worsened to 7.0 percent in 2016. It was estimated that the budget deficit for Africa declined to 5.7 percent in 2017. AfDB *et al* (2016) and AfDB (2018) showed that the general budget deficit with inclusion of grants as a



percentage of East Africa GDP deteriorated from -4 percent in 2013 to -4.6 percent in 2015, then registered a slight improvement in 2016 to -4.2 percent and was approximated to be at -3.9 percent in 2107. A closer look at the averages of the budget deficit to GDP ratios reported by AfDB *et al.* (2016) and AfDB (2018) over the last five years (since 2013) indicated that, apart from South Sudan that faces internal instability, Kenya is the next worst performing nation in the region. Kenya’s budget deficit as a percentage of the GDP averaged at 7.2 percent for the period 2013-2017 which is above the East Africa region’s average of 4.1 percent and Africa’s average of 5.5 percent. Kenya’s Budget Statement for financial year 2018/19 projected the fiscal deficit to narrow to 5.7 percent of Gross Domestic Product in FY 2018/19 from the projected 7.2 percent of GDP in the FY 2017/18. The expectation is that this will further reduce to about 3.0 percent of Gross Domestic Products by FY 2021/22. Figure 1.2 shows Kenya’s budget imbalance dynamics during the period FY 2006/07 to 2016/17.



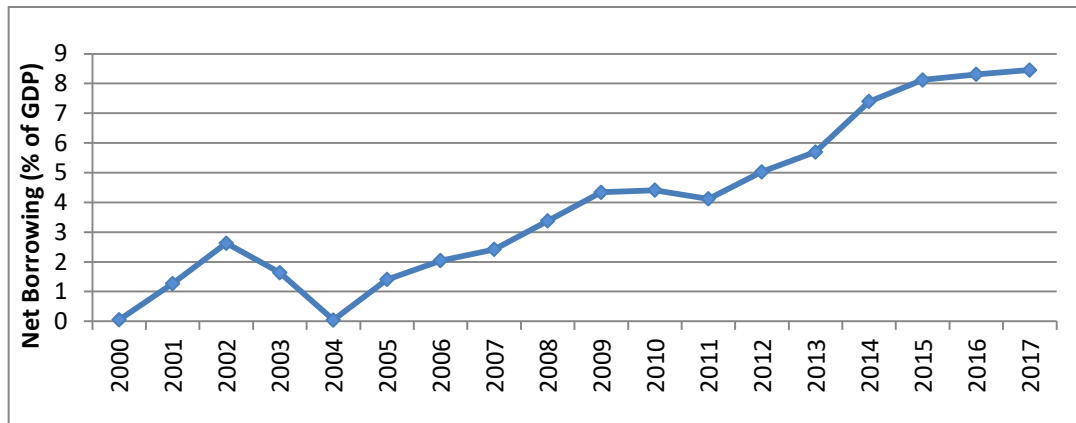
**Figure 1.2: Kenya’s Budget Imbalance Dynamics**

Data Source: Republic of Kenya (2008a; 2010a; 2014a; 2016a; 2018a)

The figure shows that the growth in budget deficit was quite erratic in the period under study, recording a high increase of 63.0 percent in 2007/08 and a major decline of 28.5 percent in 2008/09. This coincided with the period when Kenya had an internal shock, that is, the skirmishes that followed the controversial 2007 presidential elections. Important to note is that public expenditure growth seems to pull budget deficits' growth with it but the growth in the latter is larger and more erratic than the former. This supports the targeting of public expenditure, particularly expenditure items that are non-productive, in the efforts of fiscal consolidation in the country. Moreover, the larger and more erratic growth in budget deficits is a pointer that there are additional factors with compounding effects on the budget imbalances. Part of these could be factors of political economy such as the political budget cycle, corruption, and change in the system of governance - implementation of the two-tier system of governance since 2013, among others.

Growth in government tax revenue was stagnant over the period under study, oscillating between a low of 9.3 percent in 2011/12 and a high of 21.8 percent in 2012/13. The narrow tax base in Kenya, which largely relies on income taxes (about 8 percent of GDP and 40 percent of overall revenue), and Value - Added Tax (VAT) which constitutes about 25 percent of entire revenue (World Bank, 2015) makes it problematic for the government to pursue tax-based fiscal consolidations. Additionally, there has been limited revenue-raising efforts within the counties, with the counties collecting only 43 percent of the targeted own-source revenue (World Bank, 2015). This has led to the increasing pressure from

the Council of Governors for the national government to increase the transfers to the counties. Consequently, the persistent budget deficits have led to a sustained pressure on the government to increase public borrowing, which has remained on an expansionary path since 2004 as shown in Figure 1.3.



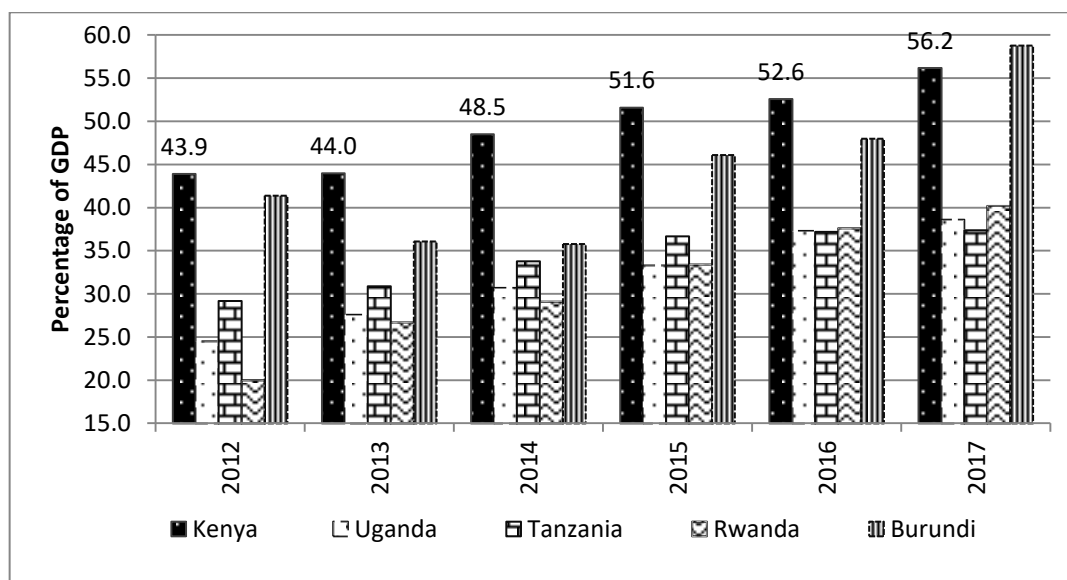
**Figure 1.3: Kenya’s Government Net Borrowing as a Proportion of GDP**

Data Source: International Monetary Fund, World Economic Outlook Database (April, 2018)

The figure shows a persistent rise in government’s net borrowing as a fraction of GDP from below 1 percent in 2004 to a high of 8.5 percent in 2017. On average, the government’s net borrowing has been rising by 4.7 percent annually from 2004 to 2017. During the pre-devolution period (2004 – 2010), the government net borrowing averaged 2.6 percent annually. This seems to have accelerated to an annual average of 6.7 percent after 2010, when Kenya adopted the new devolved governance system. Evidently, accumulation of public debt in Kenya has been on an increase since 2011.

### 1.3 Public Debt Management and Sustainability in Kenya

As mentioned earlier, public debt accumulation in Kenya has been on the rise since 2011. Figure 1.4 compares Kenya's public debt with that of other East African nations since 2012.



**Figure 1.4: Public Debt as a Percentage of Gross Domestic Product**  
Data Source: Republic of Kenya (2018b)

Generally, the figure shows that the public debt of Kenya has been higher than that of its East Africa Community (EAC) counterparts apart from 2017 when Burundi registered public debt at a percentage of 58.8 of the GDP. Kenya's public debt, proportional to the GDP, rose to 56.2 percent in 2017, up from 44.0 percent in 2013. Prior to this period, the World Economic Outlook data (International Monetary Fund, 2017) reported a general decline in gross public debt/GDP ratio from 61.84 percent of the GDP in 2002 to 38.37 percent in 2007. This represented a decline of 23.47 percentage points in GDP ratio or gross public debt over the period. This showed that during the 2002 - 2007 periods, when the National

Rainbow Coalition (NARC) was in power, fiscal consolidation in Kenya was successful<sup>1</sup> since public debt/GDP ratio reduced by over 23 percentage points in five years. Over the same period, the nominal GDP grew from 1,035.4 billion in 2002 to 1,833.5 billion Kenyan Shillings in 2007 (Republic of Kenya, 2002a; 2008a). This represents a nominal growth of about 77.1 percent from 2002 GDP figure to the 2007 GDP figure. However, Kenya was not able to sustain the fiscal consolidation achievements beyond 2007. By 2010, the gross public debt had risen to 44.40 percent of GDP. The following year saw a slight decline to 43.05 percent. However, after 2012, the gross public debt in terms of the percent of GDP has persistently been on the rise.

To manage the rising public debt in Kenya, the National Treasury prepares Medium Term Debt Management Strategies (MTDS) as provided under Section 33 of the Public Finance Management (PFM) Act, 2012. The projections span three years, with the existing debt portfolio as the starting point. The scope of the Medium Term Debt Management Strategies analysis is usually national government debt and called up guaranteed debt. Kenya's progression to a lower middle-income country status meant that it moved to a mixture of commercial and concessional financing terms, with financial terms that are hard compared to the soft terms in the concessional window from multilateral agencies (Republic of Kenya, 2016b). The Republic of Kenya (2018b) indicated that Kenya's public and publicly guaranteed debt as at end of December 2017 was Ksh 4,571.6 billion that

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<sup>1</sup>There is no standard definition of successful fiscal consolidation across the world. However, Amo-Yartey *et al.* (2012) suggested that in most countries, fiscal consolidation is considered successful if debt to GDP ratio reduces by five percent below the level prior to start of consolidation in a period of four years.

is equivalent to 53.1 percent of the GDP. From the 2018 MTDS analysis, this amounted to Ksh 4,375.5 billion (US\$42.4 billion) as at end of December 2017, equivalent to 50.8 percent of GDP (Republic of Kenya, 2018b). External debt amounted to 25.6 percent of GDP (US\$21.4 billion) while domestic debt amounted to 25.2 percent of GDP (US\$ 21.0 billion). According to Republic of Kenya (2018b), the estimated debt portfolio as at June 2018 was characterized by low but marginal increase in payments of interest as a proportion of GDP, roll-over risk, and stable relative exposure to exchange rate risk. The estimated overall interest payment as at June 2018 was 3.9 percent of GDP, with interest payment on external debt and domestic debt accounting for 1.0 percent and 2.9 percent of GDP respectively.

In view of the lower middle-income status with hardened terms and less concessional borrowing, the Republic of Kenya (2016b) showed that Kenya made a deliberate effort to diversify sources of external borrowing targeting Eurobond, Samurai bond, syndicated loans, and commercial loans. Domestically, the government introduced a retail based product, *M-Akiba*, as an avenue for investing in Treasury Bonds conveniently through mobile phone-based financial platforms. Additionally, the Republic of Kenya (2016b) indicated that the implementation of the Medium Term Debt Management Strategies is closely coordinated with cash management to enable management of liquidity around a targeted balance on a regular basis.

The 2018 MTDS evaluated the alternative fiscal deficit funding strategy under four alternative debt management strategies and proposed an optimal strategy that comprised the following actions. About 57 percent external borrowing

and 43 percent domestic borrowing; external debt with concessional loans proposed at 23 percent, semi-concessional loans at 12 percent and commercial loans at 22 percent; and issuance of long term instruments (more borrowing through medium term to long term treasury bonds and less through treasury bills). Republic of Kenya (2018b) pointed out that this strategy was realistic in managing the large repayments falling due for both domestic and external debt in the medium term and provided an opportunity to extend the debt maturities for the overall debt that would improve the average time to maturity of the overall debt.

According to the International Monetary Fund, Kenya performs well in terms of policy and being a lower middle-income nation, it is subjected to public debt sustainability threshold of: 74 percent present value of debt-to-GDP ratio; present value of public sector debt-to-revenue ratio of 300; and debt service-to-revenue ratio of 30. Given these thresholds, the February 2017 Debt Sustainability Analysis (DSA) by the IMF showed that Kenya faced a small risk of debt distress. As presented in Republic of Kenya (2018b), the present value of public debt-to-GDP increased from 48.7 percent in 2016 to 49.0 percent in 2017 and was projected to decline to 47.1 percent of GDP by 2019. The present value of public debt-to-revenue ratio was anticipated to gradually deteriorate from 235.7 percent in 2017 to about 217.4 percent in 2019. The debt service-to-revenue ratio was projected to drop from 35.8 percent in 2017 to about 24.3 percent in 2026. Using fiscal year data for the period 1983 to 2013, Ryan and Maana (2014) examined the sustainability of Kenya's public debt using cointegration and stochastic debt sustainability approaches. The study found out that the public debt in Kenya is sustainable. However, Ryan and Maana (2014) pointed out that one of the

measures to ensure debt sustainability in Kenya was rationalisation of government recurrent expenditure in the medium-term. Additionally, Republic of Kenya (2016b) pointed out that the public debt of Kenya would maintain sustainability throughout the medium term only if fiscal consolidation efforts remained on course. Republic of Kenya (2018b) noted that Kenya remained exposed to high exchange risks and refinancing risk associated with high domestic debt repayments at 37.7 percent that were expected to fall due within the FY 2018/19. These were largely comprised of Treasury bills. This section affirms that fiscal consolidation is essential for public debt sustainability in Kenya.

#### **1.4 Fiscal Consolidation Efforts and Constraints in Kenya**

Kenya has made efforts to rationalize public expenditure over the years with little success. In 1970s and early 1980s, fiscal consolidation measures mainly focused on identification of projects with potentially high productivity and putting more resources into their faster completion (Maingi, 2010). The measures also focused on postponing or cancelling the execution of projects with low potential benefits to avail funds for projects with higher return on investment. The measures also included shifting of funds from new investment projects towards operation and maintenance of existing public facilities (Republic of Kenya, 1986; Maingi, 2010).

In the 1990s, Sessional Paper Number One of 1994 on Recovery and Sustainable Development put focus on maximizing public expenditure productivity through objective technical and economic criteria in project selection. During this period, the government gave priority to infrastructural development, environment



projects and development of human capital through improved health care and education (Republic of Kenya, 1994; Maingi, 2010). Additionally, the government froze new recruitments of public sector employees while recurrent non-wage operational and development spending were increased (Republic of Kenya, 1994; Maingi, 2010). This was to ensure adequate provision for the operational costs of the public investments. In the 2000s, Republic of Kenya (2003c) showed that fiscal consolidation efforts in Kenya focused on strengthening the budgeting process and rationalizing allocations to recurrent expenditure. This saw increased allocation for infrastructural development, especially the period after 2002 when the National Rainbow Coalition came to power. Despite all these efforts, public recurrent spending continues to take a large share of public expenditure. The fiscal adjustment efforts aimed at controlling the existing public recurrent expenditure in order to switch more resources towards public investment spending seem not to be realizing the desired results. The persistent rise in public recurrent expenditure is likely to crowd out the available budgetary allocation for expenditure on development. This implies that the government has to rely more and more on borrowings to finance the public investment spending. Consequently, it becomes difficult for the government to sustain its fiscal consolidation efforts.

During the period after FY 2007/08, there was an external shock (global economic crisis) and an internal shock in the Kenyan economy (resulting from the post-election violence that followed the disputed December 2007 general elections). Consequently, in March 2008, a coalition government between Party of National Unity (PNU) and Orange Democratic Movement (ODM) was formed. The grand coalition government ruled Kenya until March 2013. The expanded

government resulted in an increase in size of government and consequently increase in recurrent spending, especially the public wage bill. The PNU – ODM coalition government delivered a new constitution to Kenyans in August 2010. The new constitution led to the creation of various commissions under the reforms agenda. One of the independent commissions established was the Salaries and Remuneration Commission (SRC). This commission was formed to establish and frequently evaluate the benefits and remuneration of all public officers. The commission was also mandated to advise both the county and national governments on the benefits and compensation of the entire public officers. However, the constitutional provision defining the mandate of SRC mandate excludes the state corporations, where self-generated funds are used to pay the workers. Since it was established, the SRC has adopted several strategies to address the unsustainable wage bill. These strategies include temporary freeze on wage review, adoption of a four-year salary review cycle, public servants’ job evaluation, development of remuneration and benefits policy, and review and harmonization of allowances (SRC, 2017). The strategies have majorly focused on wage values. However, the number of public sector employees, who are not under SRC’s mandate such as State corporation employees, has continued to increase. Therefore, the desired impact on reducing the public wage bill is yet to be realized (SRC, 2017).

In 2013, Kenya began the implementation of the devolved system of governance consisting of 47 county governments and the national government. Fiscal decentralization that followed has created new financial pressures regarding setting up of administrative structures, additional public wage bill and operational

expenditures of running the county governments. As pointed out by the World Bank (2015), the pressure for expansionary public spending in Kenya continues to emanate from the county governments' administrative expenditures, the rise in public wage bill, and the need to enhance security expenditure due to terrorism threats and internal security concerns. Fiscal pressure also emanates from the financing of infrastructural development in the country's Vision 2030 blueprint and other flagship projects aimed at fulfilling the government's pre-election promises (World Bank, 2015). Moreover, despite the release of several functions to the county governments, most of the national government expenditure items have remained at the pre-devolution level and are still on an increasing trend.

These trends are evidence that sustaining fiscal consolidation efforts in the country remains a challenge. For instance, both the county and national governments have found it difficult to adhere to the Public Finance Management (PFM) Act 2012 requirements. The requirements indicate that public investment spending ought to be at least 30 percent of the total county or national government budget. The PFM Act 2012 also requires that national government's borrowings should be for development spending only, and that wages and benefits to public officers be within the set limitations. Indeed, Kenya has mainly relied on foreign sources to finance its public investment projects, but this again raises the need for more allocation for operations and maintenance of the new public investments. However, World Bank (2015) indicated that the allocations for operations and maintenance spending for the public investment projects have also declined thus raising the prospects of a possible public recurrent expenditure problem in future.

Moreover, the rising public recurrent expenditure – largely considered unproductive (Barro, 1990) -limits the growth in the country’s tax base. However, the argument that public recurrent expenditure is less growth enhancing than the public investment expenditures remains debatable in view of limited empirical evidence in the case of Kenya. Literature also indicates that other factors such as rent seeking behaviour of public officers may motivate an agitation to allocate more resources to public investments but not the fact that they are considerably productive in nature. This is because public recurrent expenditures, on the other hand, are less discretionary hence does not offer opportunities for corruption like mega infrastructural projects.

In summary, the preceding sections show that attaining sustainable fiscal consolidation in Kenya remains a challenge. This called for an in-depth analysis on the fiscal consolidation constraints working through the persistent rise in public recurrent expenditures and the budget imbalances. Sustained fiscal consolidation can induce substantial long-run economic growth effects, improve the optimal allocation of public finance, improve government savings and consequently national savings, and limit distortive tax rates (Rother, Schuknecht and Stark, 2010). Additionally, an improvement in fiscal sustainability outlook supports low inflation expectations, lowers the risk of abrupt public policy changes and reduces risk premium on government bond yields (Laubach, 2009). These further reduce real rates of interest and support interest-sensitive assets market demand. Fiscal consolidation also benefits financial intermediation, consumption and investment.

## **1.5 Statement of the Research Problem**

Fiscal consolidation is important for fiscal sustainability and macroeconomic stability of an economy. Substantial fiscal consolidation would create fiscal space to finance Kenya's Vision 2030 development projects, the government's Big Four Agenda (related to the electoral pledges) and the international development obligations. In an attempt to create the needed fiscal space, the Kenyan government has attempted to control the persistent rise of public recurrent expenditure and to maintain its budget deficits (including grants) to a mean of 3 percent of GDP as envisioned in the Vision 2030 economic blue print targets. However, these fiscal consolidation attempts have been unsustainable and/or unsuccessful. A review of Kenya's Economic Survey data (Republic of Kenya, 2002a; 2004a; 2006a; 2008a; 2010a; 2012a; 2014a; 2016a; 2018a) showed that, on average, 79.7 percent of the annual government spending between 1999/00 and 2017/18 went to recurrent public expenditure and that public recurrent expenditure has been at an average of 20.98 percent of GDP annually. On the other hand, development spending has been at an annual average of 5.35 percent of GDP only. Government expenditure on compensation of government employees during the period was at an annual average of 7.39 percent of GDP, which is above the development expenditure's average. Additionally, the execution of the new devolved system of governance since 2013 continues to exert new fiscal pressures, which are mostly recurrent in nature. Moreover, the World Bank (2015) showed that even after devolving some functions to the county governments, most of the national government expenditure items have remained at the pre-devolution level and on an increasing trend. Both national and county governments have also failed

to adhere to the principles of fiscal responsibility of the Public Finance Management Act 2012.

Thus, pursuing sustainable fiscal consolidation remains a challenge to the Kenyan government due to a number of factors, making the financial position of the country more fragile. A fragile fiscal position has severe consequences. For instance, fiscal vulnerability adversely affects the financial sector stability via its exposure to sovereign risk and undermines economic confidence in the country. A fragile fiscal position also reduces the effectiveness of fiscal policies in dealing with negative economic shocks, increases political risks and exerts undue pressure on the monetary policies of a country (Rother *et al.*, 2010). The prospects of higher recurrent expenditure, with minimal allocation for operations and maintenance of new public investments also expose the country to a possible recurrent expenditure problem. This is a situation where public expenditure on operations and maintenance is not sufficient to sustain flow of public investment's productive services to private factors of production in an economy. This may render the public investments ineffective (wasteful) ventures. Since public debt developments in most cases follow the broad trend of deteriorating budget deficits, the persistent budget imbalance and its dynamics exacerbate the fiscal consolidation problems in the country.

It is against these backdrops that this study sought to investigate fiscal consolidation constraints and budget imbalance dynamics in Kenya. The study examined the fiscal consolidation constraints that act through the persistent growth in public recurrent expenditure and the growing budget imbalance. Public expenditure items that retard economic growth further limit fiscal consolidation

efforts. Therefore, using sector level data, the study further examined whether the public recurrent expenditure enhances or retards sectoral economic growth in Kenya. Further, the study examined the budget imbalances dynamics in the country with a view of also testing whether the Olivera-Tanzi effect propositions are applicable in explaining the dynamics.

### **1.6 Research Questions**

- (i) What are the determinants of Kenya's public recurrent expenditure growth?
- (ii) What is the economic growth effect of sectoral public recurrent spending in Kenya?
- (iii) What explains the budget imbalance dynamics in Kenya?

### **1.7 Objectives of the Study**

The primary objective of the study was to examine the fiscal consolidation constraints and examine the budget imbalance dynamics in Kenya. More precisely, the study sought to:

- (i) Determine the factors that contribute to the persistent growth in public recurrent expenditure in Kenya.
- (ii) Assess the economic growth effect of the sectoral public recurrent expenditure in Kenya
- (iii) Analyse the budget imbalance dynamics in Kenya using Olivera-Tanzi effect theory.

## **1.8 Significance of the Study**

The recommendations derived from this research is anticipated to inform proper targeting of the fiscal adjustment measures and affirms the need to adhere to the fiscal responsibility principles of the Public Finance Management Act 2012 at both levels of governance. Generally, the study findings have influence on public policy decisions geared towards fiscal consolidation in the country. This is useful to the public policy makers at the National Treasury and the office of the Budget Controller. The study also generates insights on the drivers of the expansionary government spending on recurrent budget items and persistent budget imbalances in Kenya. Further, the findings contribute to the prevailing information on challenges of attaining sustained fiscal consolidation in developing countries and the applicability of the Olivera- Tanzi effect theory in explaining budget imbalance dynamics in low or moderate inflation economies.

## **1.9 Scope of the Study**

This study analyses fiscal consolidation constraints that act through the expenditure side in general and the persistent rise in public recurrent expenditure in particular. The study employed data for the period 2000 – 2015 due to the limited quarterly data points on key variables prior to the year 2000 and the need to use data that are more recent in the analysis. However, the study excluded data for 2016/17 and 2017/18 since data on key variables, especially public finance variables, for the two years are estimates or revised estimates. In the first paper, the study used quarterly data for the period 2000 – 2015 to analyse the determinants of the persistent rise in public recurrent expenditure, which consequently constrain



fiscal adjustment efforts in Kenya. Further, the study examined the economic growth effect of the increased budgetary allocation for sectoral public recurrent expenditure using annual macro-panel data for the fiscal period 2000 – 2015. The other key focus of this study was on the fiscal consolidation constraints that act through the budget imbalance dynamics and the application of the Olivera-Tanzi effect theory in explaining the budget imbalance dynamics in the country. This analysis also used quarterly data covering a 15-year period of 2000 - 2015

### **1.10 Organization of the Study**

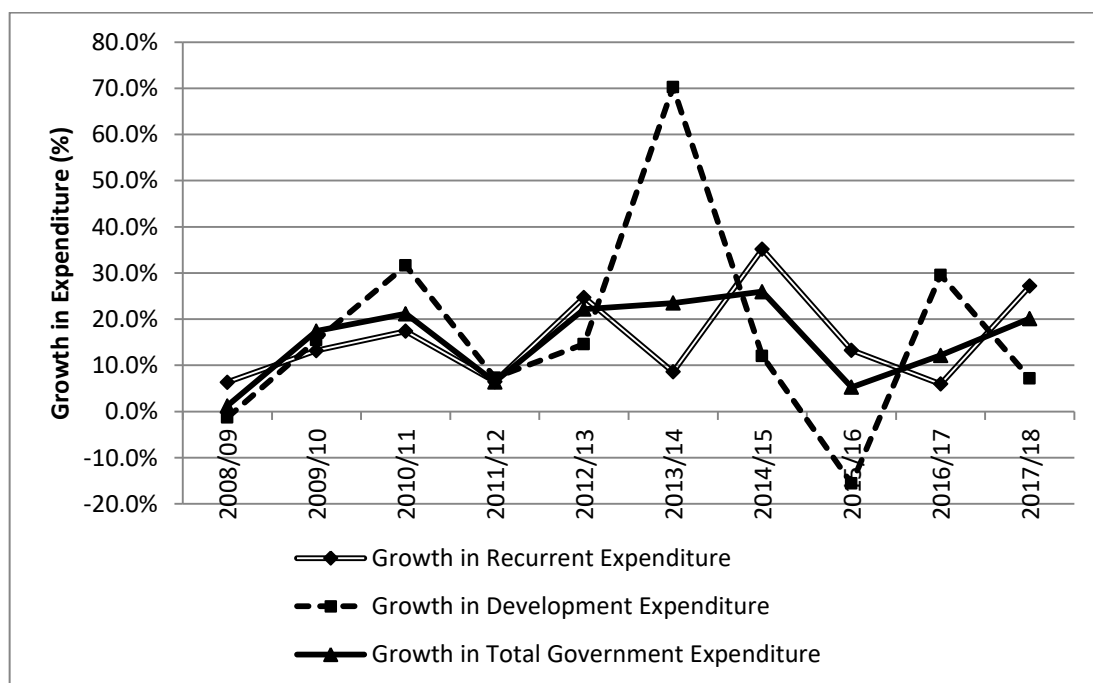
The structure of the remaining sections of the thesis is as follows: chapter two covers the analyses of the determinants of the persistent growth in public recurrent expenditure; chapter three examines the economic growth effect of the sectoral public recurrent expenditure; and chapter four analyses the budget imbalance dynamics in the country. Each of the three chapters constitute a research paper consisting of background and problem statement, specific research objectives, literature review, methodology, empirical analysis and discussions of the results from the respective papers. Finally, chapter five suggests policy changes based on the conclusions made from the study, it further presents the summary, study contributions, study limitations and further research recommendations.

**CHAPTER TWO**  
**DETERMINANTS OF GROWTH IN PUBLIC RECURRENT**  
**EXPENDITURE**

**2.1 Background**

Since independence, Kenya's fiscal stance has been expansionary with most of the budgetary resources devoted to the public recurrent expenditure, which has continued to rise. Currently, the high and growing proportion of public recurrent expenditure in the total public expenditure is a key policy concern in Kenya. This is especially due to the inability of the country to control the rising recurrent expenditures, which constitute over 70 percent of the public expenditure at both county and national levels of government. Previous studies have shown that successful fiscal consolidation is attainable if targeted at the reduction of public expenditure, particularly recurrent spending (Alesina and Perotti, 1995,1997; Plekhanov *et al.*, 2007; Rocha and Picchetti, 2003;Alesina and Ardagna, 2010, 2013; Molnár, 2012; Amo-Yartey *et al.*, 2012; Cournède *et al.*, 2013). However, the drivers of persistent increase in public recurrent spending, that further constrain fiscal consolidation efforts, have not received the required focus in most studies and for Kenya specifically. The growing consensus that fiscal consolidation should target reduction in public recurrent expenditure to be effective and long lasting implies that the failure to control persistent growth in these types of expenditures constrain fiscal adjustment efforts in developing countries. This necessitated this research paper, which was geared towards identifying the factors driving persistent growth in recurrent public spending in Kenya.

For the period 1964-2002, M’Amanja and Morrissey (2005) showed that without considering public debt repayment, the public recurrent expenditure was at an annual average of between 15 percent and 20 percent of the GDP. In contrast, they noted that public development spending during the period was below 10 percent of GDP on average. On average, Kenya’s Economic Survey data (Republic of Kenya, 2002a; 2004a; 2006a; 2008a; 2010a; 2012a; 2014a; 2016a; 2018a) showed that 79.7 percent of the annual government spending between 1999/00 and 2017/18 went to public recurrent expenditure, leaving only 20.3 percent of the budgetary resources for development expenditure. The trend of the main compositions of the public expenditure over the period 2008 - 2018 was shown in Figure 2.1.

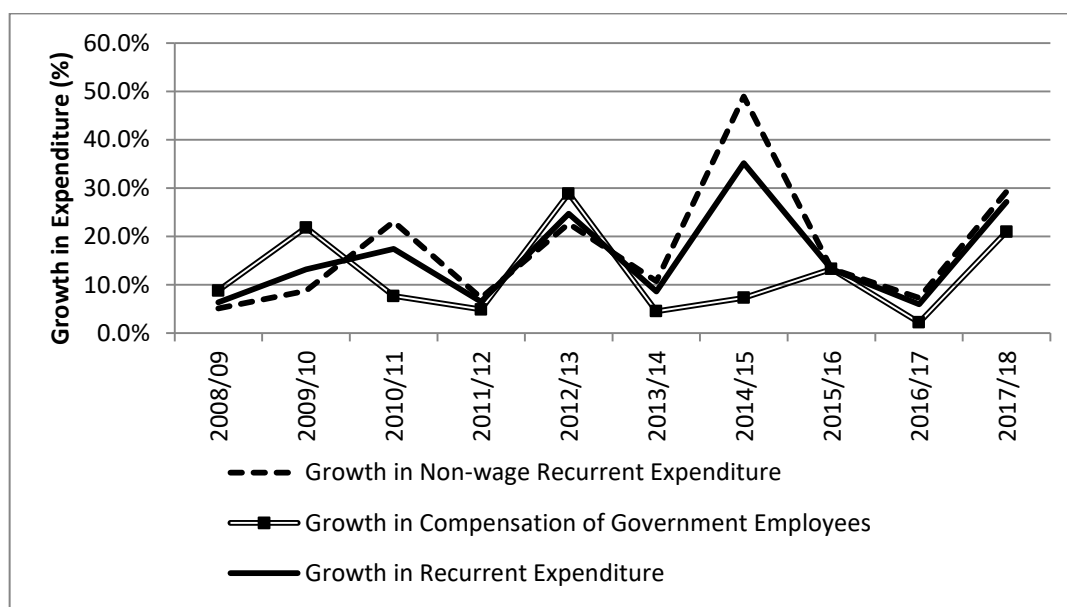


**Figure 2.1: Growth in Public Expenditure Components**

Data Source: Republic of Kenya (2010a; 2012a; 2014a; 2016a; 2018a)

The figure shows that in the last decade (2008/09 – 2017/18), growth in recurrent expenditure has generally pulled the overall public expenditure with it.

This justifies the focus on controlling growth in public recurrent expenditure in fiscal consolidation attempts in the country. However, the growth in development expenditure has been relatively erratic, slightly pulling overall public expenditure growth with it in a few instances, that is, in 2009/10 - 2010/11 period and 2015/16 – 2016/17 period. Allocating more budgetary resources towards development expenditure items is expected to enhance an economy’s productive capacity. Further, the resulting growth in productivity and economic activities would lead to tax base expansion, which presents an opportunity for enhancing domestic resource mobilization. Improved revenue performance improves a countries fiscal space and reduces the need for public borrowing. This justifies the priority provided to public investment spending as compared to the arguably unproductive public recurrent expenditure items (Semmler, Greiner, Diallo, Rezai and Rajaram, 2007).Figure 2.2 shows growth of the major components of public recurrent expenditure for the period 2008 - 2018.



**Figure 2.2: Growth in Public Recurrent Expenditure Components**  
 Data Source: Republic of Kenya (2010a; 2012a; 2014a; 2016a; 2018a)

The figure shows that the growth in non-wage recurrent expenditure mirrors that of the overall recurrent spending in Kenya. However, there is a slight difference with the trend in growth of compensation of government employees. The figure shows that growth in non-wage recurrent expenditure has been higher in most of the years. This shows that more focus should be on controlling the growth in non-wage recurrent expenditure and public wage bill. Kenya's 2013 Budget Policy Statement (BPS) attributed high public sector wage bill to political economy factors such as recruitment of more public sector employees following the formation of the PNU-ODM coalition government in 2008. The 2013 BPS noted that between 2008 and 2012, the government employed approximately 58,700 new public sector workers. In the financial year 2012/13, the realignment of salary structures for civil servants by SRC seems to have led to a rise in the public sector wage bill (Republic of Kenya, 2013c). The trends in the figure show that despite the efforts to limit the growth in public recurrent expenditure by focusing on public wage bill, the aggregate public recurrent expenditure continues to rise. Thus, this paper sought to identify the features responsible for the persistent growth and development in public recurrent expenditure, which also act as constraints to the fiscal consolidation efforts in Kenya.

The fact that public recurrent expenditure has remained higher than fiscal expansion has been largely achieved through increased public borrowing. The limited effort in revenue collection at the county government level which led to a shortfall of about 57 percent in revenue collection in 2014 (World Bank, 2015) means that the county governments will continue over-relying on the national government transfers. Evidently, the Council of Governors has been pushing the

national government to increase the fiscal transfers to the county governments to finance their expenditures, which are largely recurrent in nature.

### **2.1.1 Statement of the Problem**

There is a growing consensus that fiscal consolidation targeted on the expenditure and specifically on cutting public recurrent expenditure is more effective and long lasting (Alesina and Perotti, 1995, 1997; Alesina and Ardagna, 2010; Amo-Yartey *et al.*, 2012). This seems to inform the targeting of fiscal adjustment efforts in Kenya. Evidently, the government has, on several occasions, initiated austerity measures targeted at unproductive recurrent expenditure items and the public wage bill. Despite these fiscal adjustment efforts, Kenya's fiscal stance remains expansionary with the public recurrent expenditure constituting an annual average of over 79 percent of the aggregate public outlays since FY 1999/00. During the study period (2000 – 2015), Kenya's Economic Survey data (Republic of Kenya, 2002a; 2004a; 2006a; 2008a; 2010a; 2012a; 2014a; 2016a; 2018a) showed that the public recurrent expenditure was at an annual average of 20.98 percent of GDP while development expenditure was at an annual average of just 5.35 percent of GDP. Average government spending on compensation of employees during the period was 7.39 percent of GDP, which is above the development expenditure average. A review of public expenditure in Kenya by the World Bank (2015) showed that in 2014, administrative recurrent expenditure and compensation of employees consumed about 30 percent and 46 percent of the county government budgets respectively, with only ten out of the 47 county governments allocating 30 percent of their devolved budget, minimally, to development spending.

On the other hand, Kenya's narrow tax base which largely relies on income taxes and value-added tax (which constitutes 25 percent of total revenue) (World Bank, 2015) makes it hard for the government to pursue tax-based fiscal consolidation. Moreover, development aid has also increasingly become unpredictable, weakening economic growth (tax base) in Kenya (Ojiambo, Oduor, Mburu and Wawire, 2015) and forcing the government to rely more and more on domestic revenue resources and borrowings (Wawire, 2017). Additionally, there has been limited revenue raising efforts in the counties as evidenced by collection of only 43 percent of the targeted own-source revenue in 2014 (World Bank, 2015). This has led to increase in pressure for more national government transfers to the counties.

The persistent increase in public recurrent expenditure and the new fiscal pressures that are largely recurrent in nature, emerging from the transition of the system of governance into a devolved mode and the increasing non-priority spending. The prospects of non-priority expenditures, that limit allocations for operations and maintenance of new public investments, are likely to result in a recurrent expenditure problem in Kenya. This may render the public investment projects ineffective in enhancing the productive capacity of the economy. Consequently, these further constrain the fiscal consolidation efforts in the country. In view of this, this paper sought to examine the causes of persistent growth of Kenya's public recurrent expenditure. The factors limit the success and sustainability of fiscal consolidation efforts in the country. The paper disaggregates the public recurrent expenditure hence gives a special focus on non-wage and government employees recurrent expenditure in Kenya.

### **2.1.2 Research Questions**

- (i) What are the factors responsible for the persistent growth in public recurrent expenditure relative to public investment spending in Kenya?
- (ii) How do these factors impact the growth in compensation of non-wage and government employees' recurrent expenditure in Kenya?
- (iii) To what extent do the fiscal adjustment efforts by the government control the growth in public recurrent expenditure in Kenya?

### **2.1.3 Objectives**

The general objective of this paper was to examine the fiscal consolidation constraints that act through the persistent rise in public recurrent expenditure in Kenya. Specifically, the papers ought to:

- (i) Determine the factors that contribute to persistent growth in public recurrent expenditure relative to public investment spending in Kenya.
- (ii) Examine how the factors influence the growth in compensation of non-wage and government employees' recurrent expenditure in Kenya.
- (iii) Determine the extent to which the fiscal adjustment efforts by the government control growth in public recurrent expenditure in Kenya.

### **2.1.4 Policy Relevance**

The persistent growth in public recurrent expenditure in the country has put the national and county governments under critical focus on their spending priorities. Additionally, the persistent growth in public recurrent expenditure seems to frustrate fiscal consolidation efforts in the country. In view of these, containing the growth in public recurrent expenditure and shifting more resources towards



public investment spending is a major concern to policymakers in Kenya. The results from this paper provide useful fiscal policy insights that are expected to help re-orient the fiscal consolidation efforts in the country. The paper also contributes to existing knowledge on the constraints to fiscal consolidation efforts in developing countries.

## **2.2 Literature Review**

This section presents theories applicable in analysis of growth in public spending, and its primary attributes. The section further explores the empirical literature on studies in this area.

### **2.2.1 Theoretical Literature**

#### ***(a) Theories of Growth of Public Expenditure***

Theories put forward to explain growth in government expenditure include Wagner's Law, Keynesian theory, Monetarist theory, crowding-out theory, Peacock and Wiseman's displacement effect theory, ratchet effects models, political business cycle theory, strategic debt accumulation theory, Leviathan theory of government, median voter theorem, fiscal illusion theory and Baumol's law. Adolph Wagner's law of increasing state activity postulated that to maximize social welfare, growth in an economy and the accompanying extensive and intensive increase in government activities lead to growth in public spending (Bağdigen and Çetintaş, 2003; Bird, 1971). According to Wagner's law, the growing social needs of the country, welfare functions, and the administrative and protective actions, result in an increase in public spending corresponding to the growing economy. According to Musgrave and Musgrave (1989), as nations

industrialize, there will be growth in size of public sector in the national economy with the public sector growing faster than the economy. Musgrave and Rostow's development model pointed out that high public expenditure on infrastructure in the initial early development stage, law and order, health and education is required to create social overhead capital. During the middle development stage, public spending complements private investment due to market failures thus falls considerably. In the third development phase (maturity stage) the high demand for private goods put pressure on the government to enhance public expenditure on education, health and welfare. This consequently leads to increased government expenditure and particularly in the social sector.

The Keynesian theory argued that fiscal policies (particularly government expenditure) influence aggregate demand, unemployment and deflation in an economy (Branson, 1989). During periods of economic downturn, governments increase public expenditure to enhance total demand, reduce levels of unemployment and deflation in the economy. Increased government spending would increase the amount of money in circulation, encourage individual consumption and boost private investment thus help to pull the country out of a depression. The main limitation of the Keynesian proposition is that the government enhanced aggregate demand reduces the high unemployment levels but at the same time creates inflationary pressure, which the government again has to deal with. The need to control the inflationary pressure in an economy is the basis of the propositions by the monetarists who disliked government interventions (such as increased public spending) and tended to trust free markets (Maingi, 2010). The monetarist, led by Friedman (1956), argued that rapid increase in

money supply results in high inflation rates and that money changes only affect real national output indirectly. They also argued that without government interference, the economy tends towards its natural rate of unemployment thus they were against the government interventions to boost aggregate demand in an economy.

The crowding out theory also explains how government interventions in the economy could affect the private sector investments hence economic performance and future levels of public expenditure. Trotman (1997) noted that crowding out occurs when government production uses resources meant for private sector. Alternatively, crowding out effect happens when public expenditure, taxation and borrowings cause disincentives to private sector productive efforts. Government borrowings in the domestic market could result into high prevailing interest rates, leading to disincentives for private sector investments. Therefore, if the government can borrow domestically with negligible crowding out effect, then it is likely to prefer domestic debt to foreign debt. Since it is easier for the government to borrow locally, it would increase its domestic borrowing if the borrowings have negligible effect on private investments. This means more resources would be available to the government for increased public expenditure.

Wiseman and Peacock (1961) postulated the theory of displacement effect. It proposed that citizens have a perception of bearable tax burden. This acts as a political constraint to the extent of public expenditure growth. When a disturbance such as social unrest or war occurs, the government is justified to increase its expenditure. Consequently, to cater for the disturbance, individuals adjust the perception of the bearable tax responsibility vertically. After dealing with the

disruption, the level of public spending fails to fall back to the initial level (Peacock and Wiseman, 1961). Indeed, a disturbance such as the post-election skirmishes experienced in Kenya in 2007/2008 fiscal year imposed new and continuing obligations on the government. This included an expanded grand coalition government, re-settlement of displaced individuals, reparation expenditures, implementation of the reform agenda that led to the devolved system of governance and creation of a number of commissions, interest payment on public debts incurred during the period among other obligations. The intermittent occurrences of shocks in an economy result into a stepwise rise in government spending as the shocks occur from one period to another. The displacement effect theory is closely linked to the ratchet effects model that argued that disturbances permit the government to increase and sustain a higher level of public spending. Ratchet effects model consists of inspection effect where the taxpayers and government discover new expenditure priorities, which provide justification for higher public sector spending.

Asymmetric spending by government over the business cycle also results into upward cyclical ratchet effect in public expenditure (Hercowitz and Strawczynski, 2002). During recessions, governments are more likely to increase spending (that is, implement Keynesian economic policies to boost aggregate demand and related economic activities) but during economic boom, implementing a symmetric reduction of government spending is difficult. This may be due to pressure from powerful interest groups who are unlikely to agree to putting aside of the additional government revenue during economic boom for future use during recessions (Hercowitz and Strawczynski, 2002). The mechanism underlying this

hypothesis is that countercyclical policy is politically attractive during recessions. However, during economic booms, symmetrically reducing public expenditure is difficult as increased tax revenues put the government in a limiting position to resist pressure for increased spending from various interest groups in the country. Consequently, this leads to upward cyclical ratchet effect in public expenditure.

The political business cycles theory that was first presented by Nordhaus (1975) stipulated that periods between general elections in a given country influence public expenditure composition and growth. The two variants of this theory are theory of political parties and opportunistic political budget cycles. The theory of political parties argued that the ideologies of the party in power influences government spending. For instance, if the party in power seeks to enhance national security, then there will be increased allocation of budget to security, in relation to other sectors. Since the other budgetary items are equally important, the government cannot reduce their allocations but will also improve due to the need to provide public goods and services to the increasing population. On aggregate, this will lead to an increase in public expenditure as the incumbent government seeks to fulfil its electoral pledges. This variant is mainly applicable to states with solid political party philosophies like the United States of America (USA). However, this is not only limited to the developed countries. Parties forming governments in developing countries also have agenda (for example, the Big Four Agenda by the Jubilee government in Kenya) that they seek to fulfil during their tenure. The implication of this is increased expenditure in the incumbent government's priority areas. The theory of opportunistic political cycles argued that the incumbent manipulates spending compositions during an election

year to increase its chances of the election once more (Alesina and Tabellini, 2005; Shi and Svensson, 2006; Yuan-Hong and Chung-Ju, 2013). This variant of the political budget cycle theory is applicable to countries with weak political party ideologies, mostly developing countries like Kenya. During election period, the government allocates more budgetary resources towards budget items that are more visible to the voters and pays keen attention to the demands of several interest groups in the country. In an attempt to maximize on the votes, the government increases public expenditure to serve these interests.

Alesina and Tabellini (1990a) put forward the strategic debt accumulation theory that explained how policy makers strategically accumulate public debt during election periods leading to an increase in public expenditure. The theory argued that if current policy makers believe that individuals whose views they disagree with may determine future policy, they will accumulate more public debt through expansionary fiscal policy to restrain future policy makers' spending. The basis of their argument is that high accumulation of public debt constrains the fiscal space for spending by future governments (Alesina and Tabellini, 1990a). This theory is applicable in explaining the tendency of governments to overspend during election years to constrain the spending of the next government. For instance, if the incumbent prefers enhanced national security whereas the main challenger in the opposition prefers enhanced human capital development (increased expenditure on education and health sectors), then the incumbent will increase borrowing to fund national security in the current period. Suppose the main challenger forms the next government, they will have a limited fiscal space to finance their fiscal preferences. Since public services such as provision of national

security are sensitive, the new government may not be able to reduce their budgetary allocations thus will have to continue with the previous government's fiscal policies while concurrently servicing the accumulated public debt.

The state-as- a Leviathan<sup>2</sup> theory, put forward by Brennan and Buchanan, assumed extremely egoistic behaviour on the part of government representatives. The theory suggested that their main objective is to maximize government revenue thus putting unnecessarily high expenditures on those governed (Moždzen, 2014). The theory observed that there is no bound for the rapacity of state actors hence they only try to assess the lowest indifference curve to move the citizens to, with minimal political repercussions. Therefore, the state will use any opportunity available to maximize revenue given the tax base and the structure of tax rate within this constraint. On the other hand, the representative taxpayer assumes an optimal amount of public goods from the perspective of the entire society thus will try to constrain the government so that it captures only tax resources that are necessary to finance that particular amount of public goods (Moždzen, 2014). This consequently constrains the growth in public expenditure financed by the tax resources. If the society does not restrict the ability of the state to levy taxes, the state is likely to accumulate as much revenue as they can. Consequently, this leads to increase in government spending.

Another aspect of the Leviathan theory, presented by Rodden (2003), argued that tax decentralization results into tax competition between national and local governments that destroys Leviathan's monopoly on taxation. This limits

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<sup>2</sup>The theory views the government as “a revenue-hungry monster” that uses any tool at its disposal to maximize on revenue (Moždzen, 2014).

growth of government spending, bringing it closer to the levels desired by the citizens. However, Rodden (2003) pointed out that if a common pool resource is used to fund decentralized government spending, then the competing local governments are likely to “overfish” from the common pool resource. This leads to a faster development in public expenditure as increases in grants to local governments automatically lead to growth in their expenditure. In view of the decentralized system of governance in Kenya, this theory explains the push by the Council of Governors to have the fiscal transfers from the national government increased. This will eventually result into increased public expenditure by the 47 county governments. Unfortunately, the county governments’ expenditures largely remain recurrent in nature.

The median voter theorem follows the work of Bergstrom and Goodman (1973), Gemmell, Morrissey and Pinar (1999), and Bocherding and Deacon (1972), and. This theory assumed that citizens vote in a majority rule voting system with two candidates and only one issue to be decided on (for instance, the structure of public expenditure). The theorem also assumed that the voters place all the alternatives (tax rates, size of public expenditure, how much to spend on public recurrent expenditure versus development items) along a one – dimensional political spectrum and that their preferences are single-peaked<sup>3</sup>. Additionally, the theorem assumed that there is perfect information about the issues and the voter preferences. Thus if an odd number of voters have single-peaked preferences as compared to a one-dimensional space, then the most preferred result by the median voter will be selected. However, there

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<sup>3</sup>Single-peaked preferences leads to voters choosing the alternatives closest to their most preferred outcome (Gemmell *et al.*, 1999).



can be cases of inefficient outcome resulting from logrolling. In a logrolling system, majority of voters can trade votes to form a coalition to vote for preferences that serve their special interests at the expense of other voters.

Amilcare Puviani (an Italian economist) put forward the fiscal illusion theory in the 1903 book “*Teoria della illusione finanziaria*” (Theory of Financial Illusion). Fiscal illusion is the process in which governments mask the real tax costs of incurred public expenditures by using fiscal instruments such as indirect taxes or inflation phenomena (Guziejewska, 2016). Therefore, public expenditure increases due to the illusion that the costs of providing public goods and services by the government are substantially lower than they really are (Guziejewska, 2016). In reality, providing public services such as education and healthcare is as costly to the government as it is to the private sector. Additionally, fiscal illusion due to multifaceted fiscal relations between the national/central government budget and the country/local government budgets has a profound effect on rise in public expenditure in countries with devolved system of governance such as Kenya.

Baumol’s law stated that a two-sector economy with a permanent difference in productivity growth has no steady state (Paldam, 2009). The theory argued that public sector’s technology is more labour-intensive than private sector’s. The private sector production allows for easy replacement of capital for labour thus technological advances in the economy would lead to increases in productivity resulting into rising returns to labour in the private sector (Baumol, 1986). Since labour costs in both private, public sectors are closely related, and the public sector cannot substitute capital for labour, the increase in private sector

wages will feed through into increases in public sector costs. If the proportion of output in public to private sector remains the same, then the proportion of public expenditure will rise. This will consequently lead to an expanded size of the public sector.

***(b) Theories of Wage Adjustment and Determination***

How wages and salaries for government employees are determined influences the overall level of remuneration of public servants. This consequently affects growth in the public sector wage bill. Theories that describe determination and adjustment of wages in the public sector are surplus value theory, bargaining theory, flexible theory of wages, investment theory of wage determination and the marginal productivity theory. Kamboj (2011) presented flexible theory of wages put forward by Hicks in 1966, which argued that forces of supply and demand in the labour market are the determinants of wages. This implies that when the demand for specific skills in the labour market is high, those with that particular skill are likely to be paid more lucrative wages. However, this again depends on the labour supply, that is, the number of participants in the labour market with that particular skill. If the demand for that skill is higher than its labour supply, then those with the skill are likely to demand higher wages. The mechanism of wage setting assumes wages are established freely in response to the evolving labour market dynamism and corresponding changes in the economy. Nevertheless, practically, wages are sticky and rigid downwards. Kamboj (2011) also presented the surplus-value theory, postulated by Karl Marx (1818-1883), which argued that the value of wealth created by labour determines the level of salaries allocated to workers. In contrast, this theory fails to consider influence of other factors of

production that include land, entrepreneurship and capital. Marginal productivity theory holds that workers should be paid according to their marginal productivity thus the marginal productivity is likely to be equal to the price of each factor of production (Omolo, 2007; Kamboj, 2011). However, it is not easy to measure labour productivity especially in the public sector. Therefore, the application of this theory in the Kenyan public sector is limited since measurement of labour productivity for government employees is still a challenge.

Theories somewhat appropriate to Kenya's situation are theory of investment and bargaining theory. The investment theory postulated that work forces should be paid based on their experience, training as well as investment in education (Kamboj, 2011). According to this theory, workers with high level of education attainment should be paid better salaries than their counterparts with relatively low education attainment.

Contrary, the bargaining theory suggests that working conditions and wages are identified via Collective Bargaining Agreements (CBAs) between workers as well as employers through their labour unions. Thus, wages are determined and adjusted by the comparative strength of the trade unions' bargaining power (Kamboj, 2011; Omolo, 2007). In Kenya, adjustments in public sector employees' compensations over the years have involved government constituted ad-hoc commissions and collective bargaining agreements with trade unions representing workers in various domains. In the last two decades (in the 1990s and 2000s), there has been increased activities of labour unions in Kenya. This has seen the formation of new workers unions and increased industrial actions by workers unions such as Kenya Medical Practitioners, Pharmacists and Dentists

Union. Evidently, there has been a rise in number of mutual bargaining agreements registered by the labour relations and employment court. For instance, Republic of Kenya (2018a) showed that the total number of Collective Bargaining Agreements (CBA) registered in 2017 were 232 compared to 128 in 2016. In 2018, this increased to 313 registered Collective Bargaining Agreements (Republic of Kenya, 2019). Therefore, the bargaining theory of wages largely explains the adjustment of wages in the public sector in Kenya.

### **2.2.2 Empirical Literature**

Key drivers of growth in public spending can be categorised into economic factors, political economy factors and demographic factors. This section discusses how the specific factors in each category influence growth in government spending. Studies such as Painter and Bae (2001) have found positive effects of increase in income per capita on public expenditure. Numerous studies, however, have been inclined on the direction of causality between national income growth and public expenditure, in an effort to provide empirical proof for the debate on Keynesian hypothesis and Wagner's law. For example, Çetintaş and Bağdigen (2003) examined the legitimacy of law of Wagner for Turkey over 1965-2000 period and noted that neither does national income growth lead to public spending growth nor growth of public spending results into national income growth. Sevitenyi (2012) utilized co-integration and Toda-Yamamoto Granger causality test to arrive at the conclusion that unidirectional causality existed, stemming from overall public spending to Nigerian national income. The research provided support for the Keynesian hypothesis. However, Chinwe *et al.* (2012) pointed out a long-run stable association in recurrent expenditure as well as national income

growth that offered support for Wagner's law. Moreover, Zaghini and Lamartina (2008) concluded that the long-run public expenses' elasticity in relation to Gross Domestic Products was importantly larger than one. The result showed that there is increase of government's activities with growth in national income.

Another key economic factor is inflation. Beck (1976) argued that prices in private sector increases slower as compared to the public sector. He further gave credence to the UK price index of the consumer that increased to 179.00 from 59.00 (base year 1970 = 100) and recurrent government authorities spending that rised from 44.00 (base year 1970 = 100) to 2012.00 between 1955- 1975. Fielding (1997) also observed that the rate of inflation has an essential effect on the development of public expenditure in an economy. Increase in costs of living resulting from rising inflation rates comprises the foundation for trade-union demands for an ascending modification of wages paid to the workers they represent (Omolo, 2007). In Kenya, lack of productivity in measurement mechanisms of labour on which remuneration and public service wages could be based suggests that public pays are revised and determined on the basis of adjustments of the cost of living (Republic of Kenya, 2012b). The level of inflation in the economy influences this.

Omolo (2007) recognized adjustment of the cost of living resulting from inflation and adjustments of salary due to labour unions activities as one of the key factors of the rise in public segment wages in Kenya. Galdon-Sanchez, Martinez-de-Morentin and Bayo-Moriones (2011) also determined living cost adjustment because of inflation as one of the factors that shape wage adjustments in organisations. The Salaries and Remuneration Commission, employs per capita

Gross Domestic Products, and revenue to GDP ratio in defining state officer's remuneration. The commission endorses a public sector wage review cycle of four years, and adjustments of annual wages to buffer the erosion of the officers' real wages owing to increasing cost of living, and inflation (Republic of Kenya, 2013b). This supports the argument that a rise in general price levels in the economy is a critical factor of consideration in the revision of public salaries in the nation.

Remmer (2004) made an analysis on data from various countries between 1970 and 1999. The research indicated that for lower and middle income countries, foreign aids systematically generate incentives for expansionary fiscal stance. This is because foreign aid provides additional budget support to the government to increase its expenditure. Njeru (2003), and Neil and Njeru (2009) supported the result from the study carried out by Remmer (2004). The two studies pointed out donors offer growth and development support to countries. On the other hand, somehow, public officers switch fiscal resources from one vote to another to fund some of the public recurrent expenditure items. For instance, Aregbeyen and Akpan (2013) discovered that inflows of foreign assistance contributed to a rise in public administration recurrent expenditure and not public development expenditure or socio-economic services expenditures. According to Mar'c (2014), governments respond to foreign assistance by changing how their resources are utilized instead of increase of public expenditure (quantity effect of assistance). Therefore, Mar'c (2014) suggested that aid substitutes for domestic revenue in some countries. The studies suggested that foreign aid inflows influence both composition of public expenditure and revenue generation by the government.

Thus, aid dependence seems to foster more aid dependence. This means that a country that over relies on foreign aid for budgetary support is likely not to put in much effort on domestic resource mobilization. The result is low tax effort that condemns the country to continued reliance on foreign aid in order to support its budget.

Government tax revenue has a long-lasting positive relationship with increase in public expenditure (Fielding, 1997; Zaghini and Lamartina, 2008; Wolde-Rufael, 2008; Aregbeyen and Akpan, 2013). Fielding (1997) observed that most public expenditure variations across Sub-Saharan Africa countries over time are attributable to tax revenue variations. Fielding (1997) noted that countries with higher debts face severe difficulties when accessing credit used for public expenditure smoothing hence their recurrent spending is highly linked to recent government revenue collections. A study by Masenyetse and Motelle (2012) found a causality running from revenue of the government to recurrent expenditure but there lacks causality between capital expenditure and government revenue. This means that government revenue is largely used to finance recurrent whereas capital expenditure is financed through other sources such as grants and public borrowing. Aregbeyen and Akpan (2013) found out that growth in government revenue in the previous year increased development expenditure by over 70 percent and expenditure on recurrent expenditure by 38 percent in Nigeria.

Rodrick (1998) pointed out that openness to trade and size of a country's public expenditure are positively related. The study argued that public expenditure can be employed as a risk-reducing tool thus as the economy become exposed to more external risks with increased openness, the public expenditure tends to rise.

However, Aregbeyen and Akpan (2013) found contrary results in their study on Nigeria. The study argued that this could be due to less trade tax revenue accruing to the government with increase in openness. Additionally, Aregbeyen and Akpan (2013) argued that the result could be due to export volume from Nigeria not responding to trade openness as much as the imports bills thus shrinking public resources. The study also found out that debt servicing reduces all components of public expenditure. Aregbeyen and Akpan (2013) argued that an increase in debt service leaves the government with inadequate budgetary resources hence is linked to insignificant reduction in public expenditures, apart from the development expenditure component.

One of the political economy factors that influences growth and composition of public expenditure is political business cycle. An incumbent party seeking re-election is likely to increase expenditure on budget items visible to voters to signal its level of “competence” to voters during the election period (Rogoff, 1990; Drazen and Eslava, 2010). Recurrent expenditure items are arguably more immediately visible than the development expenditure items. Thus, increased recurrent expenditure has more direct political value than development expenditure during a period of election (Rogoff, 1990). The voters may observe type of public expenditure (Rogoff, 1990) or the overall government spending (Shi and Svensson, 2002). Studies by Rogoff (1990), Vergne (2009), and Aregbeyen and Akpan (2013) pointed out that an incumbent government’s fiscal manipulation results into an increase in recurrent spending during election periods at the expense of public investment. Vergne (2009) argued that the impacts of financial manipulations endure even after the election period and governments prefer to



manipulate the fiscal allocations without increasing budget deficits as countries engage more in electoral politics. Aregbeyen and Akpan (2013) found out that, in the long run, public recurrent spending is likely to increase by 38 percent during an election period in Nigeria.

Drazen and Eslava (2010), on the other hand, suggested that election period's fiscal manipulations tend to result in increase in development expenditure in a country. In Drazen and Eslava (2010) model, they allowed the overall level of public expenditure (and the deficit) to remain fixed while the political manipulation affected only the composition of government spending. They assumed that voters value some goods, which can induce an opportunistic politician to change composition of pre-election public spending towards the goods. Drazen and Eslava (2010) found out that in election years, infrastructure spending expands significantly whereas payments to temporary workers, retirees' transfers and interest payments reduce. The study showed that votes garnered by the incumbent's party decreases as budget deficit in the year preceding the election increases. This signals that well informed voters dislike high public expenditure and budget deficits.

Certain interest groups tend to influence the composition of public expenditures. The government may be forced to shift expenditure towards public goods demanded by these interest groups (Drazen and Eslava, 2010). This depends on their electoral importance. Mueller and Murrell (1986) opined that competition for special interest groups in a country's population occurs prior to an election thus favours sought by certain interest groups, such as youths or labour unions, always influence government policies during and after the elections, leading to

expansionary fiscal policy. The size and number of such special interest groups in a country and the electoral competition for their votes always influences the government's spending priorities. For instance, if the incumbent government wants to win the youth's votes, they may shift more budgetary resources to youth funds and to sectors with activities dominated by the youths such as sports and entertainment. This positively influences the growth in public expenditure as the party forming the government embarks on fulfilling of the pledges made to the interest groups during the election period.

A number of studies have also shown that rent-seeking behaviours of public officers influence the composition and growth of public expenditure (Mauro, 1998; Ghosh and Gregoriou, 2008; Mogues 2012; Aregbeyen and Akpan, 2013). Corrupt public officers are more likely to increase spending on budget items where it is easier to obtain large kickbacks and keep them secret (Mauro, 1998). They are also likely to increase allocations for sectors such as defense and energy, where budget-making process is confidential. Thus, there is a tendency for corrupt public officers to channel more budgetary resources towards public goods such as large infrastructure projects and highly sophisticated military equipment whose exact value is difficult to determine. The study by Ghosh and Gregoriou (2008), Mogues (2012), and Aregbeyen and Akpan (2013) supported this argument by Mauro (1998). In these studies, the consensus is that an increase in corruption levels in an economy would lead to high public expenditure on large capital investments than on public recurrent expenditure. However, in the long term, these large capital investments tend to be of low quality and over-valued, as public officials seek rent through the tendering process and execution of the awarded contracts (Mogues,

2012). In some instances, the government may not be able to adequately provide for the operational costs of the new capital investments. Thus, the new mega capital expenditures may be rendered wasteful investments as recurrent expenditure problem sets in. The general argument is that public investment spending is highly discretionary, allowing for opportunities to misappropriate government funds, as opposed to recurrent spending (such as salaries and wages) which are spending on previous commitments with limited discretion to corrupt government officers. The finding of Aregbeyen and Akpan (2013) that corruption has a substantial adverse impact on spending on recurrent budget items but a positive effect on development items in Nigeria supports this argument.

The demographic factors also put pressure on most governments to adjust public expenditure to cater for increased demand for public goods and services as the population grows. Population density has an adverse influence on public expenditure implying that the higher the population density, the less expensive it is to serve it (Painter and Bae, 2001). Moreover, Sanz and Velázquez (2001) using a sample of OECD nations estimated a system of median voter demand equations and found out that population's age structure and density determine the rise and composition of public expenditure. Painter and Bae (2001) pointed out that the elderly population proportion has a negative relationship with state public expenditure. This indicated that the elderly tend to have lower demand for public goods as compared to a youthful population like the case of Kenya. However, Lamartina and Zaghini (2008) noted that due to an ageing population, an increase in demand for social security could also substantially contribute to an increase in public spending.

### 2.2.3 Overview of Literature

The literature reviewed identified factors that influence growth in public expenditure. These can be categorised into economic, political economy and demographic factors. The economic factors include income per capita (Painter and Bae, 2001; Aregbeyen and Akpan, 2013), inflation (Beck, 1976; Fielding, 1997; Omolo, 2007; Bayo-Moriones *et al.*, 2011; Republic of Kenya, 2012b), inflow of foreign aid (Remmer, 2004; Njeru, 2003; Neil and Njeru, 2009; Aregbeyen and Akpan, 2013; Mar'c, 2014), government revenue (Fielding, 1997; Wolde-Rufael, 2008; Masenyetse and Motelle, 2012; Aregbeyen and Akpan, 2013;), openness to the international market (Rodrick, 1998) and debt servicing (Aregbeyen and Akpan, 2013). However, the political economy factors that the literature showed to influence public expenditure include political budget cycles (Rogoff, 1990; Drazen and Eslava, 2010; Shi and Svensson, 2002; Vergne, 2009; Potrafke, 2010; Aregbeyen and Akpan, 2013; Sanz and Velázquez, 2001), type of government (Potrafke, 2010) and levels of corruption in the public sector (Mauro, 1998; Mogue, 2012; Aregbeyen and Akpan, 2013). Additionally, the demographic factors that influence growth of public expenditure are population density and age structure (Painter and Bae, 2001; Sanz and Velázquez, 2001), urbanization (Aregbeyen and Akpan, 2013) and special interest groups (Mueller and Murrell, 1986). The reviewed literature can be summarized as follows:

<b>Dependent Variable</b>	<b>Key Explanatory Variables</b>	<b>Key Findings</b>
Public Expenditure	National income (Gross Domestic Product)	-Increase in national income positively influences growth in public expenditure ((Painter and Bae, 2001; Aregbeyen and Akpan, 2013; Chinwe <i>et al.</i> , 2012).
	Wage adjustments (minimum wages adjustments)	-An increase in minimum wages positively influences the growth in public recurrent expenditure.  -Wage adjustments based on cost of living adjustments lead to growth in public wage bill (Omolo, 2007; Republic of Kenya, 2012b).  - Bayo-Moriones, Galdon-Sanchez and Martinez-de-Morentin (2011) also identified cost of living recalibration as one of the factors that shape wage adjustments in organisations.
	Government tax revenue	-Government tax revenue has a long run positive relationship with an increase in public spending (Fielding, 1997; Lamartina and Zaghini, 2008; Wolde-Rufael, 2008; Aregbeyen and Akpan, 2013)
	Inflation (change in consumer price indices)	Inflation impacts negatively on real wages and consequently the aggregate compensation of government employees hence results in increased agitation for cost of living adjustment of wages in the public sector (Omolo, 2007; Bayo-Moriones <i>et al.</i> , 2011).
	Exchange rates	-a rise in real effective rate of exchange (a devaluation of the Kenyan shilling) has positive influence on government spending as this makes the imports consumed by the government expensive in domestic currency ((Easterly and Schmidt – Hebbel, 1991)
	Corruption in the Public Sector (corruption perception index)	-an increase in corruption in the public domain is positively related with a growth in state development spending but negatively related with public recurrent spending (Mauro, 1998; Ghosh and Gregoriou, 2008; Mogues , 2012; Aregbeyen and Akpan 2013). -- Corrupt public officers are more likely to increase spending on budget items where it is easier to obtain large kickbacks and keep them secret (Mauro, 1998). They are also likely to increase allocations for sectors such as defence and energy, where budget-making process is confidential.
	Political budget cycle (election cycle)	-An incumbent party seeking re-election is likely to increase expenditure on budget items visible to voters to signal its level of “competence” to voters during the election period (Rogoff, 1990; Drazen and Eslava, 2010). Recurrent expenditure items are arguably more immediately visible than the development expenditure items

Foreign Aid

-Drazen and Eslava (2010) suggested that election period's fiscal manipulations tend to result in increase in development expenditure in a country.

-Remmer (2004) found out that for lower- income and middle-income countries, foreign aid systematically generates incentives for expansionary fiscal stance. Aregbeyen and Akpan (2013) discovered that inflows of foreign aid in Nigeria led to a rise in public administration recurrent spending

Source: Authors (2019) Compilation

The literature shows that there has been a little focus on political economy and demographic factors yet they are among the major considerations by policy makers that seem to constrain the fiscal consolidation efforts in developing countries. Therefore, this study sought to bridge this gap by building its analysis around the political economy factors in an attempt to analyse their influence on growth in public recurrent expenditure, which further constrains the fiscal consolidation efforts in Kenya.

Moreover, much of the reviewed literature generally focuses on how these factors influence growth in aggregate public expenditure with quite a number using a panel of countries (Fielding, 1997; Sanz and Velázquez, 2001; Remmer, 2004; Wolde-Rufael, 2008; Potrafke, 2010). This paper, on the other hand, carried out a single-country study with special focus on the persistent growth of public recurrent spending and its components, compared with the increase in public investment spending. More specifically, among the studies reviewed concerning Kenya (Njeru, 2003; M'Amanja and Morrissey, 2005; Omolo, 2007; and Neil and Njeru, 2009), none has attempted to analyse the factors influencing the persistent growth in public recurrent expenditure in Kenya. Moreover, the studies do not look at the

constraints to fiscal consolidation efforts in the country. This paper therefore aimed at filling these research gaps by carrying out a country-specific analysis using disaggregated quarterly data for the period 2000 quarter 1 to 2015 quarter 4.

### **2.3 Methodology**

This section presents the research design, theoretical framework, empirical model, variables included in the model and their data sources.

#### **2.3.1 Research Design**

This research paper utilized quantitative research design. The time-series data from 2000 Quarter 1 to 2015 Quarter 4 was used, thus on average the number of observations for the analysis was 64. This period was used due to the unavailability of quarterly data for the dependent variables for the period before the year 2000 and the need to use more recent data (though 2016/17 and 2017/18 data are excluded since the government finance statistics for the period were still reported as estimates). The quantitative analysis of the data first involved carrying out diagnostic tests to analyse characteristics of the variables included in the empirical models and to identify the most appropriate estimation method. Further, the paper carried out post estimation tests to establish the efficiency of the estimators before discussing the results.

#### **2.3.2 Theoretical Framework**

The central theory of this paper was based on the argument that fundamental public expenditure decisions are always discretionary in nature thus influenced more by the political economy factors. The policy makers and

politicians who make fiscal decisions are motivated by the desire to attain and retain power. Thus, citizens through voting or any other opportunity available to them can influence their public expenditure decisions. The public officers are expected to take fiscal decisions that appeal to a dominant coalition of voters. The voters, on the other hand, desire the levels and compositions of expenditures and taxes that would maximize their interests. The central theory for this paper, therefore, is the median voter demand theorem.

The median voter theorem suggested that, with two large parties of roughly equal size, political rivalry would pull both parties to median policy stances. The two parties could be assured of the votes of their radical supporters. Therefore, the median voters (wavering swing voters) determine the contest. However, a critique of the theorem shows that in real life, this is a bit more complex. First, the median voter theorem assumed a democratic electoral process that is not usually the case in most developing countries without well-established democracies. Other overriding factors influence the electoral outcome rather than the voters turning out to vote for their favourable candidates. This limits the application of public choice theories such as the median voter theorem in explaining the fiscal policy decisions made by the governments. Moreover, the theorem does not work well in countries where eligible voters habitually do not turn out to vote but cast their votes periodically due to populist promises of radical change.

Second, an increase in public expenditure tends to transcend the political divide. This means it has proponents and opponents across the political divide. Third, there is more than one dimension to consider in making a decision on public expenditure components to increase. The theorem assumed that the utility of the



voters is simple and has linear characteristics, which may not be the case due to heterogeneity of preferences. The median voter may have mixed preferences to the fiscal policies of the leading political parties participating in an election. For instance, Party A could be proposing enhanced security expenditure but no free education. On the other hand, Party B could be proposing not to enhance security expenditure but provide free education up to undergraduate level. If the median voter prefers enhanced security and free undergraduate education, then it becomes difficult to identify which candidate he is likely to vote for in an election.

In view of the limitations of the median voter theorem and recognizing the fact that growth in public expenditure in Kenya is largely but not solely a political phenomenon, this study incorporates other demographic and economic variables in the analysis. The theoretical framework for this study collapses the predictions of various competing public expenditure growth theories into a single model to evaluate their different dynamic relationships and relative explanatory power.

An approach to median voter theorem where the decision made is based on magnitude of the components of public expenditure is employed in this analysis. The framework is similar to that employed by Gemmell *et al.* (1999) and Sanz and Velázquez (2001; 2003). However, Sanz and Velázquez (2001) disaggregated public expenditure in terms of their functions. In this case, government spending was disaggregated based on whether the expenditure is towards a public investment item, compensation of government employees or non-wage recurrent expenditure.

Median voter model operates on the assumption that peoples vote in a popular system with the magnitude of the different components of government

spending being the decision items. Gemmell *et al.* (1999) and Sanz and Velázquez (2001; 2003) expressed the voter of median demand for public expenditure as follows:

$$G_i = \varphi Y_i^\alpha P_{gi}^\beta; \quad i = 1, 2, \dots, N \dots \dots \dots (2.1)$$

where:  $G_i$  is quantity of public goods and services demanded by the voter-taxpayer  $i$ .

$P_{gi}$  is tax-price paid by voter-taxpayer  $i$  for  $G_i$

$Y_i$  is income of voter-taxpayer  $i$ .

$\alpha$  And  $\beta$  are income and price elasticity's for goods and services provided by the government, respectively while  $\varphi$  is an adjustment factor.

The budget constrain to the government is assumed to be the domestic resources (tax revenue) available for spending. Gemmell *et al.* (1999) and Sanz and Velázquez (2001; 2003) specified the price to be paid by voter-taxpayer  $i$  for the government to provide public goods and services as:

$$P_{gi} = T_i C N^\sigma \dots \dots \dots (2.2)$$

Where:  $P_{gi}$  is tax-price paid by voter-taxpayer  $i$  for  $G_i$

$T_i$  is the tax share of voter-taxpayer  $i$  in total tax revenue.

$C$  is per unit expenditure of public goods and services ( $G$ )

$N$  is the total population while  $\sigma$  is the degree of publicness of the goods and services provided by the government.

Equation 2.2 shows that the price paid by voter-taxpayer  $i$  for public goods and services depends on the individual pays, per unit cost of good or service, the population, and the extent to which the good or service is non-rivalrous and non-

excludable. Assuming that there is no discrimination in taxation (Bocherding and Deacon, 1972),  $T_i$  is assumed to be equal to  $1/N$  thus the price payable for the public goods and services is given by  $P_{gi} = CN^{\sigma-1}$ . With this information, the variable  $P_{gi}$  is replaced in Equation 2.1 and the equation is manipulated to express the median voter –taxpayer demand for public expenditure as:

$$G_i = \varphi Y_i^\alpha C^\beta N^{\beta(\sigma-1)}; \quad i = 1, 2, \dots, N \dots \dots \dots (2.3)$$

Since the government is assumed to be sensitive to the median voter-taxpayer’s demand, it is expected to match its expenditure with the median voter’s demand. Therefore, on average, the nominal public expenditure on individual i is equal to the median voter-taxpayer demand for public expenditure given by Equation 2.3. It therefore follows that the total nominal public expenditure ( $G_{nominal}$ ) is given by:

$$G_{nominal} = G_i P_{gi} N^\sigma \dots \dots \dots (2.4)$$

Where all the variables are as defined before and quantity of public goods and services in demand by the voter-taxpayer i can be expressed as  $G_i = G/N^\sigma$  with G being the aggregate demand for public goods and services.

Since this is a time-series analysis, Gemmell *et al.* (1999) suggested modification of Equation 2.3 to allow for change in relative government/private sector prices (Pr) which is given as:

$$P_r = C/P_x \dots \dots \dots (2.5)$$

Where  $P_x$  is the price of private sector goods and C is per unit cost of government goods and services (G)

Gemmell *et al.* (1999) noted that to compute real public expenditure (G), nominal public expenditure should be divided by the tax-price ( $P_{gi}$ ). Nevertheless, because the degree of publicness ( $\sigma$ ) is unknown, it is divided by the unit cost of the goods (C) provided by the government then the population coefficient is improved accordingly to accommodate this in the model. Using relative prices and aggregating to express the demand for goods and services provided by the government in terms of total expenditure; Gemmell *et al.* (1999) specified the standard median voter demand model as follows:

$$G = \varphi Y^\alpha P_r^\beta N^\emptyset \dots\dots\dots (2.6)$$

Where  $\emptyset = (\beta + 1)(\sigma - 1) + \sigma - \alpha$ , G is total real public expenditure, Y is total real national income (real GDP), Pr is the relative government/private sector prices, and N is the total population.

This specification is the standard median voter demand model where the citizens are completely conscious of costs of public goods and services (Gemmell *et al.*, 1999). In contrast to Sanz, and Velázquez (2001), and Gemmell *et al.* (1999), this analysis assumes that there is no fiscal illusion (the voter-taxpayer is aware of the true tax-price of government provided goods) thus adopts Equation 2.6 as the theoretical model. In specifying the empirical model, G, the total real public expenditure was disaggregated into development spending and recurrent spending (which is further disaggregated into expenses on government employees and non-wage recurrent expenditure). In the model, the median voter income was proxied by the GDP per capita and minimum wages. Instead of the total population, N, the empirical model for this paper used population density to approximate the concentration of the median

voter per square kilometre. Other economic and political economy factors identified in the literature were also included in the model. Together, the exogenous variables have expenditure quantity effects leading to rise in expenditure levels as well as expenditure quality effects.

### 2.3.3 Model Specification

In specifying the empirical models for this analysis, the standard median voter demand model presented in Equation (2.6) was log transformed and modified by inclusion of additional variables identified in the literature. Since the interest of this paper was to examine factors influencing change in public recurrent expenditure, the variables entered the models at their first difference levels. The dynamic empirical models were specified as follows:

#### *Model 1: Public Recurrent Expenditure*

$$\begin{aligned}
 \Delta \ln G_{re,t} = & \alpha_0 + \sum \alpha_f \Delta \ln G_{re,t-f} + \sum \omega_i \Delta \ln GDPC_{t-i} \\
 & + \sum \vartheta_m \Delta \ln MW_{t-m} + \sum \varkappa_s \Delta \ln PopD_{t-s} \\
 & + \sum \beta_j \Delta \ln TR_{t-j} + \sum \gamma_k \Delta \ln PD_{t-k} + \sum \delta_l \Delta \ln CPI_{t-l} \\
 & + \sum \varphi_r \Delta \ln REER_{t-r} \\
 & + \sum \pi_n \Delta \ln CorPI_{t-n} + \tau_0 F_{adj,t} + \tau_1 ELC_t + \tau_2 @trend \\
 & + \mu_t \dots \dots \dots (2.7)
 \end{aligned}$$

#### *Model 2: Public Development Expenditure*

$$\begin{aligned}
 \Delta \ln G_{de,t} = & \alpha_0 + \sum \alpha_f \Delta \ln G_{de,t-f} + \sum \omega_i \Delta \ln GDPC_{t-i} + \sum \varkappa_s \Delta \ln PopD_{t-s} \\
 & + \sum \beta_j \Delta \ln TR_{t-j} + \sum \gamma_k \Delta \ln PD_{t-k} + \sum \delta_l \Delta \ln CPI_{t-l} \\
 & + \sum \varphi_r \Delta \ln REER_{t-r} \\
 & + \sum \pi_n \Delta \ln CorPI_{t-n} + \tau_0 F_{adj,t} + \tau_1 ELC_t + \tau_2 @trend \\
 & + \mu_t \dots \dots \dots (2.8)
 \end{aligned}$$

**Model 3: Compensation of Government Employees**

$$\begin{aligned} \Delta \ln G_{ce,t} = & \alpha_0 + \sum \alpha_f \Delta \ln G_{ce,t-f} + \sum \omega_i \Delta \ln GDPC_{t-i} \\ & + \sum \vartheta_m \Delta \ln MW_{t-m} + \sum \varkappa_s \Delta \ln PopD_{t-s} \\ & + \sum \beta_j \Delta \ln TR_{t-j} + \sum \gamma_k \Delta \ln PD_{t-k} + \sum \delta_l \Delta \ln CPI_{t-l} \\ & + \sum \varphi_r \Delta \ln REER_{t-r} \\ & + \sum \pi_n \Delta \ln CorPI_{t-n} + \tau_0 F_{adj,t} + \tau_1 ELC_t + \tau_2 @trend \\ & + \mu_t \dots \dots \dots (2.9) \end{aligned}$$

**Model 4: Non-wage Recurrent Expenditure**

$$\begin{aligned} \Delta \ln G_{nwre,t} = & \alpha_0 + \sum \alpha_f \Delta \ln G_{nwre,t-f} + \sum \omega_i \Delta \ln GDPC_{t-i} + \sum \varkappa_s \Delta \ln PopD_{t-s} \\ & + \sum \beta_j \Delta \ln TR_{t-j} + \sum \gamma_k \Delta \ln PD_{t-k} + \sum \delta_l \Delta \ln CPI_{t-l} \\ & + \sum \varphi_r \Delta \ln REER_{t-r} \\ & + \sum \pi_n \Delta \ln CorPI_{t-n} + \tau_0 F_{adj,t} + \tau_1 ELC_t + \tau_2 @trend \\ & + \mu_t \dots \dots \dots (2.10) \end{aligned}$$

Where;

$\ln$  is the natural log

$\Delta$  denotes change/difference

$t$  denotes time index (from 2000Q1 to 2015Q4)

$\alpha_0$  are the autonomous adjustments of the dependent variables

$\alpha_f, \omega_i, \vartheta_m, \varkappa_s, \beta_j, \gamma_k, \delta_l, \varphi_r, \pi_n, \tau_0, \tau_1, \tau_2$  are coefficients

$f, i, m, s, j, k, l, r, n$  are the lag lengths of the respective explanatory variables

$G_{re}$  is real public recurrent expenditure

$G_{de}$  is real public development expenditure

$G_{ce}$  is real compensation of government employees

$G_{nwre}$  is real non-wage recurrent expenditure

$GDPC$  is real national income (real GDP) per capita

*MW* is real minimum wages

*PopD* is population density

*TR* is real government tax revenue

*PD* is real public debt

*CPI* is Consumer Price Index

*REER* is real effective exchange rates

*CorPI* is Corruption Perception Index

*F<sub>adj</sub>* is Fiscal adjustment dummy

*ELC* is election dummy

*@trend* is used to control for time trend in the models.

$\mu_t$  is stochastic disturbance term

After carrying out the diagnostic tests and the cointegration tests, the following model was estimated to generate the empirical findings discussed in Section 2.4.5. In view of the Autoregressive Distributed Lag (ARDL) Bounds cointegration test results, the analysis employed an Error Correction Model (ECM). In modelling the ECM, the error correction term (ECT) was given by residuals of the long-run level relationship of the models. The Error Correction Model (ECM) for each of the models was estimated using the following equation:

$$\begin{aligned} \Delta \ln DepVar_t = & \alpha_0 + \sum \alpha_i \Delta \ln (DepVar)_{t-i} \\ & + \sum \vartheta_m \Delta \ln MW_{t-m} + \sum \beta_j \Delta \ln TR_{t-j} + \sum \gamma_k \Delta \ln PD_{t-k} \\ & + \sum \delta_l \Delta \ln CPI_{t-l} + \sum \varphi_r \Delta \ln REER_{t-r} \\ & + \sum \pi_n \Delta \ln CorPI_{t-n} + \tau_0 F_{adj_t} + \tau_1 ELC_t + \tau_2 @trend + \sigma ECT_{t-1} \\ & + \mu_t \dots (2.11) \end{aligned}$$

Where *DepVar* represents respective dependent variable for each estimated equation, that is: log of public recurrent expenditure, log of public development expenditure, log of government employees compensation, and log of non-wage recurrent expenditure, *ECT* is the error correction term gotten from the Ordinary Least Squares (OLS) residual series from the long-run cointegrating relationship. All the other variables are as defined before. Note that the estimation of the public development expenditure model does not include the minimum wage variable.

### **2.3.4 Definition and Measurement of Variables**

The nominal variables except indices and dummy variables were expressed in real values to remove the inflation effects over time. The variables included in the models were as explained in this section.

*Real Public Recurrent Expenditure* captures the aggregate recurring expenses of the national government in every quarter, measured in Kenya shillings. This consists of the compensation of employees, non-wage recurrent expenditure and interests payment on debt by the national government.

*Real Public Development Expenditure* is the budgetary expenses of national government on development items/projects in every quarter, measured in Kenya Shillings.

*Real Compensation of Government Employees* is the quarterly spending on government employees' allowances, wages, pensions and other social contributions. Real compensation of government employees is in Kenya Shillings.

*Real Non-wage Recurrent Expenditure* captures the expenses incurred by the national government on inputs used in providing public goods and services,



measured in Kenya Shillings. This includes quarterly public expenditure on operations and maintenance, stationery, trainings, travels, electricity, conferences and catering services.

*GDP per capita* measures the national income per person. This is reported in local currency unit (Kenya Shillings). It is used to proxy the median voter income as well as to capture Wagner's hypothesis. A positive significant influence on public recurrent expenditure growth and its components is expected (Painter and Bae, 2001; Aregbeyen and Akpan, 2013). The World Bank reports the GDP per capita annually. The annual data was transformed into quarterly data using *Eviews* Statistical software to conform to the data structure of the other variables.

*Real minimum wages* was measured using real values of gazetted basic minimum wages on monthly basis in urban areas such as Kisumu, Nairobi, Mombasa, excluding house allowances. These cities have a relatively high concentration of public servants hence the decision to use their minimum wages instead of that for agricultural industry. Real minimum wages is in Kenya Shillings. It is also used to proxy the median voter income. An increase in real minimum wage was expected to positively influence the growth in public recurrent expenditure.

*Population Density* is the number of people per square kilometre. It was used to proxy the influence of concentration of median voter-taxpayers per square kilometre on growth in the various components of public expenditure. Population density is reported annually as at 1<sup>st</sup> July of every year thus to conform with the data structure of the other variables, the annual data was transformed into quarterly data using *Eviews* and adjusted accordingly to run concurrently with the respective

quarters. The expected result was that an improvement in population density would lead to a corresponding increase in public recurrent spending.

*Real Tax Revenue* is the total government revenue in every quarter, excluding grants and non-tax revenue. Government tax revenue is in Kenya Shillings. It was expected that an increase in government tax revenue would have a positive effect on public expenditure and its components (Aregbeyen and Akpan, 2013; Lamartina and Zaghini, 2008; Fielding, 1997; Wolde-Rufael, 2008).

*Real Public Debt* is the end of quarter public debt amounts, in Kenya Shillings. Increase in public debt increases the government budgetary resources hence has a positive influence on all public expenditure categories.

*Consumer Price Index* measures the general price levels in the economy. It is in indices. The expected result was that a rise in the general price levels (inflation) would impact negatively on real wages and consequently the aggregate compensation of government employees hence results in increased agitation for cost of living adjustment of wages in the public sector (Omolo, 2007; Bayo-Moriones *et al.*, 2011). Increase in inflation was expected to positively impact on the growth of non-wage recurrent expenditure, aggregate public recurrent expenditure and development expenditure.

*Real Effective Exchange Rates* measures the relative prices between Kenya and its trading partners. This analysis employs Consumer Price Index (CPI)-based real effective exchange rates reported by United Nations Conference on Trade and Development (UNCTAD), which is a weighted average of the Kenya Shillings in relation to a basket of currencies of the trading partners, adjusted for inflation.

Therefore, a rise in real effective rate of exchange was anticipated to have a positive impact on government spending (Easterly and Schmidt – Hebbel, 1991) as this makes the imports consumed by the government expensive in domestic currency. The real effective exchange rates are annually reported hence, the data was converted into quarterly time series data using *Eviews*.

*Corruption Perception Index* captures the perceived level of public sector corruption, reported by Transparency International. For every country, it is measured on an index scale of zero (highly corrupt) to 100 (very clean). A decline in corruption perception index score is interpreted as an increase in corruption levels in the country's public sector. According to Mauro (1998), Ghosh and Gregoriou (2008), Mogues (2012), and Aregbeyen and Akpan (2013), an increase in corruption in the public sector is positively related with an increase in government development spending but negatively related with public recurrent spending.

*Fiscal Adjustment Dummy* captures the improvement or decline in the primary budget deficit, measured in Kenya Shillings. The fiscal balances are computed by the difference between total revenue (including non-tax revenue but excluding grants) and total public expenditure as reported by the Central Bank of Kenya (CBK) in every quarter. It is captured by 1 for the periods when there were improvements in fiscal balances and 0 for period with decline in fiscal balances.

*Election dummy* captures the political business cycle. It assumed the value 1 for the periods when there were general elections (three quarters before the election and the quarter when the election was held) and 0 for the period where there were no general elections. The study defines the dummy for the period before

the elections since the interest here is to capture the pre-election fiscal manipulations. The expected result was apposite influence on the growth of various components of government spending during election periods (Rogoff, 1990; Shi and Svensson, 2002; Drazen and Eslava, 2010; Vergne, 2009; Potrafke, 2010; Aregbeyen and Akpan, 2013).

### **2.3.5 Data Sources and Type**

The quarterly data on components of public expenditure and public debt were derived from CBK whereas data on Consumer Price Indices and minimum wages were obtained from KNBS. Quarterly data on tax revenue was collected from Kenya Revenue Authority whereas data on GDP per capita was acquired from the World Bank online database. Data on Kenya's population density was obtained from the World Population Prospects by United Nations, Department of Economic and Social Affairs, Population Division whereas data on Corruption Perception Indices for Kenya was acquired from various Transparency International's annual reports. Data for real effective exchange rates was obtained from UNCTAD (2017) online statistics.

## **2.4 Empirical Analysis and Discussions**

### **2.4.1 Diagnostic Tests Results**

This section provides the results obtained from the diagnostic tests. The trend analysis of the variables (see Figure A1 to Figure A11 in Appendix I) was carried out before testing for unit roots.

**Table 2.1: Unit Roots Test Results**

Variable (Specification)	Test in...	ADF (Test Statistic)	PP (Test Statistic)	KPSS (Test Statistic)	Conclusion
<i>LnGce</i> (Trend & Intercept; Lag length =1)	Levels	-10.9853***	-13.6881***	0.1416*	<i>LnGce</i> is <i>I</i> (0)
	1 <sup>st</sup> Difference	-10.1385***	-43.3060***	0.3685***	
<i>LnGnwre</i> (Trend & Intercept; Lag length =1)	Levels	-10.6940***	-18.4187***	0.0917	<i>LnGnwrc</i> is <i>I</i> (0)
	1 <sup>st</sup> Difference	-9.8614***	-48.4776***	0.3465***	
<i>LnGre</i> (Trend & Intercept; Lag length =1)	Levels	-11.1202***	-18.1568***	0.0958	<i>LnGrc</i> is <i>I</i> (0)
	1 <sup>st</sup> Difference	-10.0373***	-49.2307***	0.3790***	
<i>LnGde</i> (Trend & Intercept; Lag length =1)	Levels	-9.5670***	-9.9084***	0.1219*	<i>LnGde</i> is <i>I</i> (0)
	1 <sup>st</sup> Difference	-9.8269***	-45.7939***	0.2983***	
<i>LnGDPC</i> (Trend & Intercept; Lag length =1)	Levels	-2.4938	-2.1157	0.9894***	<i>LnGDPC</i> is <i>I</i> (1)
	1 <sup>st</sup> Difference	-4.4267***	-4.4267***	0.3896***	
<i>LnMW</i> (Intercept, no trend; Lag length =1)	Levels	-3.9962***	-4.0576***	0.1198*	<i>LnMW</i> is <i>I</i> (0)
	1 <sup>st</sup> Difference	-7.8027***	-18.6028***	0.1270*	
<i>LnPopD</i> (Trend & Intercept; Lag length =9)	Levels	-3.1850*	-3.7997**	0.2444***	Indeterminate (Not stationary at first difference)
	1 <sup>st</sup> Difference	-0.3162	1.4556	0.1987**	
	2 <sup>nd</sup> Difference	-3.1462	-7.3564***	0.1789**	
<i>LnTR</i> (Trend & Intercept; Lag length =1)	Levels	-3.7387**	-10.1694***	0.0879	<i>LnTR</i> is <i>I</i> (0)
	1 <sup>st</sup> Difference	-22.9876***	-90.0148***	0.2407***	
<i>LnPD</i> (Trend & Intercept; Lag length =1)	Levels	-0.2633	-0.1866	0.2568***	<i>LnPD</i> is <i>I</i> (1)
	1 <sup>st</sup> Difference	-7.9093***	-7.9193***	0.0539	
<i>LnCPI</i> (Trend & Intercept; Lag length =1)	Levels	-3.3311*	-2.6425	0.0828	<i>LnCPI</i> is <i>I</i> (1)
	1 <sup>st</sup> Difference	-6.2019***	-6.2051***	0.0460	
<i>LnREER</i> (Trend & Intercept; Lag length =1)	Levels	-3.0006	-2.3237	0.1320*	<i>LnREER</i> is <i>I</i> (1)
	1 <sup>st</sup> Difference	-4.2705***	-4.2628***	0.0502	
<i>LnCorPI</i> ( Intercept; Lag length =1)	Levels	-1.3732	-1.0284	0.7485***	<i>LnCorPI</i> is <i>I</i> (1)
	1 <sup>st</sup> Difference	-3.8529***	-3.9117***	0.1046	
<i>FAdj</i> (None; Lag length =0)	Levels	-3.6265***	-4.6512***	0.2592	<i>FAdj</i> is <i>I</i> (0)
	1 <sup>st</sup> Difference	-10.8991***	-18.5654***	0.2063	
<i>ELC</i> (None; Lag length =0)	Levels	-3.7118***	-3.4180***	0.0547	<i>ELC</i> is <i>I</i> (0)
	1 <sup>st</sup> Difference	-7.8103***	-19.2201***	0.0218	

*Ln* =Natural Log ;*G<sub>ce</sub>* is real public expenditure on compensation of employees; *G<sub>nwre</sub>* is real public expenditure on non-wage recurrent expenditure; *G<sub>re</sub>* is real public expenditure on recurrent expenditure; *G<sub>de</sub>* is real public expenditure on development items; *GDPC* is GDP per capita; *MW* is minimum wage; *TR* is real tax revenue; *PD* is real government debt; *CPI* is consumer price index; *CorPI* is government sector Corruption Perception Index; *REER* is Real Effective Exchange Rates; *F<sub>adj</sub>* is Fiscal Adjustment; *ELC* is elections dummy; *ADF* = Augmented Dickey-Fuller; *PP* = Phillips-Perron; *KPSS* = Kwiatkowski-Phillips-Schmidt-Shin test.

Source: Authors (2019)

The results showed that log of public recurrent spending, log of public development expenditure, log of compensation of government employees, log of non-wage recurrent expenditure, log of minimum wages, log of tax revenue, fiscal adjustment, and election dummy were stationary at their levels. This implies that the variables were integrated of order zero ( $I(0)$ ). The other variables were found to be stationary on their first differencing thus, they were integrated of first order. This included log of per capita income, log of public debt, log of Consumer Price Index, and log of real effective exchange rate and log of corruption perception index. For log of population density, the order of integration could not be determined as the three test statistics gave conflicting results at both levels and differences. On first differencing all of the  $I(0)$  variables, it was confirmed that they were still stationary at their first difference, thus appropriate for dynamic analysis of the models. This is because the intention was to have the variables enter the models at their first difference in order to analyse the change in the various components of public expenditure as the explanatory variables changes. However, the variable log of population density was found to be non-stationary even after first differencing, thus it was dropped from the models.

**Table 2.2: Heteroskedasticity and Serial Correlation Tests**

Test	<i>Public Recurrent Expenditure Model (1)</i> Obs. R-Squared	<i>Public Development Expenditure Model (2)</i> Obs. R-Squared	<i>Compensation of Government Employees Model (3)</i> Obs. R-Squared	<i>Non-wage Recurrent Expenditure Model(4)</i> Obs. R-Squared	Conclusion
Heteroskedasticity Test	11.9185 Prob. Chi-Square (8) = 0.1591	14.6462* Prob. Chi-Square (8) = 0.0664	12.2673 Prob. Chi-Square (8) = 0.1410	11.4680 Prob. Chi-Square (8) = 0.1770	All models are homoskedastic except Model 2
Breusch-Godfrey Serial Correlation LM Test	12.7686*** Prob. Chi-Square (2) = 0.0017	9.2424*** Prob. Chi-Square (2) = 0.0092	13.8584*** Prob. Chi-Square (2) = 0.0010	11.3300*** Prob. Chi-Square (2) = 0.0035	All the models have serial correlation
*, **, *** denote the rejection of the null hypothesis at 10 percent, 5 percent, 1 percent level of significance, respectively.					

Source: Authors (2019)

The results showed that there was no heteroskedasticity in all the models at five percent level of significance. However, the model for development expenditure was found to be heteroskedastic at 10 percent level of significance. Since the tests are based on the five percent significance level, the study assumed weak homoscedasticity for the development expenditure model. Serial correlation was performed using Breusch-Godfrey LM Test. The null hypothesis was rejected at five percent significance level, for all the models hence no serial correlation.

Multicollinearity among independent variables increases the standard errors of the correlated variables that consequently reduce the absolute value of the t-statistics thus making a variable that could be significant to be insignificant. The results from the correlation analysis (see Table A1 in Appendix I) showed high correlation between log of per capita income and the following variables: log of tax revenue, log of consumer price index, log of real effective exchange rate, and log

of corruption perception index. Consequently, to control for the problems associated with multicollinearity, the variable for per capita income was dropped from the models.

In time series data, there could be a structural break if there is an unpredicted shift in the time series. Chow breakpoint test is applied in testing for structural breaks in situations where the structural break is already known and single. However, when it is not known whether structural break exists or not, then multiple breakpoint test is applied to identify possible multiple structural breaks. In this analysis, multiple breakpoint tests was applied to identify periods of possible structural breaks. After that, the Chow breakpoint test was applied on the periods identified to confirm whether they are significant or not.

**Table 2.3: Results of Test for Structural Break**

	<i>Multiple Breakpoint Test</i>			<i>Chow Breakpoint Test</i>	<b>Conclusion</b>
	<i>Break Test</i>	<i>F-statistic</i>	<i>Break Dates</i>	<i>F-statistic</i>	
<i>Public Recurrent Expenditure Model (1)</i>	0 vs.1	67.7667	2013Q1	1.4684	Break point not significant
	1 vs. 2	3.4005		Prob. (7,40) = 0.2063	
<i>Public Development Expenditure Model (2)</i>	0 vs. 1	66.1426	2013Q1	3.5106***	Break point significant
	1 vs. 2	3.2814		Prob. (7,40) = 0.0050	
<i>Compensation of Government Employees Model (3)</i>	0 vs. 1	98.1122	2013Q1	1.5076	Break point not significant
	1 vs. 2	3.2174		Prob. (7,40) = 0.1926	
<i>Non-Wage Recurrent Expenditure Model (4)</i>	0 vs. 1	1.8081	None	-	No Break point
*, **, *** denote the rejection of the null hypothesis at 10 percent, 5 percent, 1 percent level of significance, respectively					

Source: Authors (2019)



The results in Table 2.3 showed significant breakpoint in the public development expenditure series in 2013 quarter one. This breakpoint can be associated with the March 2013 general election when the Jubilee coalition came into power and when devolved system of governance was rolled out. The election dummy, included in the model to capture political budget cycle, was therefore used to capture this structural breakpoint since it was found to be related to the political budget cycle.

#### 2.4.2 Cointegration Test and Model Selection

Prior to testing for co-integration, the models' appropriate lag structure were evaluated by use of Schwarz's Bayesian information criterion (SBIC), Akaike's information criterion (AIC), and the Hannan and Quinn information criterion (HQIC) lag-order selection statistics. The lower the lag value found from a criterion the better the model.

**Table 2.4: Results of Optimal Lag Selection**

	AIC	SIC	HQIC	Optimal Lag Length
<i>Public Recurrent Expenditure Model (1)</i>	2.5267* (Lag =9)	-1.8384* (Lag =9)	-2.2646* (Lag =9)	9
<i>Public Development Expenditure Model (2)</i>	-0.3443* (Lag =8)	0.3058* (Lag =8)	-0.0968* (Lag =8)	8
<i>Compensation of Government Employees Model (3)</i>	-3.1274* (Lag =8)	-2.4773* (Lag =8)	-2.8799* (Lag =8)	8
<i>Non-Wage Recurrent Expenditure Model (4)</i>	-1.0974* (Lag =9)	-0.4133* (Lag =5)	-0.8353* (Lag =9)	9
<b>Note:</b> * indicates the lag order selected by the criterion				

Source: Authors (2019)

The results showed that the optimal lag length for the public recurrent expenditure model and non-wage recurrent expenditure model was nine lags. The optimal lag length for public development expenditure model and compensation of government employees was found to be eight lags. This was noted to be within the expected optimal lag length of 12, applied by most studies using quarterly time series data.

Hargreaves (1994) showed that there are several methods of examining cointegration in time series models. The earlier methods developed in the 1970s and 1980s included: Augmented Least Squares (Bewley, 1979; Hendry and Richard, 1982), Ordinary Least Squares (Engle-Granger, 1987), Fully Modified Estimator (Park and Phillips, 1988), Canonical Cointegration (Bossaerts, 1988), Maximum Likelihood (Johansen, 1988), Non-Parametric Canonical Cointegration (Park, 1989), and Principal Components (Stock and Watson, 1989). In the 1990s, the following methods were developed: Instrumental Variables (Phillips and Hansen, 1990), Three Step Estimator (Engle and Yoo, 1991), Spectral Regression (Phillips, 1991), and Modified Box-Tiao (Bewley, Orden and Fisher, 1991). Among these methods, Engle-Granger and Johansen procedures are the most commonly used cointegration tests. These cointegration tests are applied on time series data with variables that are integrated of the same order (that is, those are integrated of order one). Later on, Pesaran and Shin (1999) and Pesaran, Shin and Smith (2001) developed an Autoregressive Distributed Lag (ARDL) Bounds testing methodology that could be used to test for cointegration in data series with variables that are integrated of different orders (that is, those that are integrated of order zero and order one).

Engle-Granger procedure is a single equation procedure that follows two-step estimations (Engle and Granger, 1987; Bilgili, 1998). The first step produces the residuals and the second step uses the residuals generated to estimate a regression of first differenced residuals on lagged residuals. According to Engle and Granger (1987), the components of a  $(k \times 1)$  vector,  $y_t$ , are said to be cointegrated of order  $d, b$ , denoted as  $y_t \sim CI(d, b)$ , if all the components of the vector  $y_t$  are integrated of order  $d$  (meaning they are  $I(d)$ ), and there exists a cointegrating vector  $\gamma (\neq 0)$  so that  $z_t = \gamma' y_t \sim I(d - b)$ . For the Engle and Granger procedure, usually  $d = b = 1$ . That is, the procedure is applicable when all the variables in the data series are integrated of order one. The major drawback of the Engle-Granger procedure is the single equation model. In reality, there is likely to be more than one cointegrating relations if the variables exceed two in a model. Johansen (1988) provided a solution to this drawback through the Johansen procedure that made it possible to estimate all cointegrating vectors when there are more than two variables.

The Johansen procedure is a likelihood-ratio tests that provides estimates of all cointegrating vectors. Bilgili (1998) postulated that if there are  $n$  variables in a series, all with unit roots, then there are at most  $n - 1$  cointegrating vectors. Just like Engle-Granger procedure, the procedure is applicable when all the variables in the data series are integrated of order one. Johansen (1988) showed that the procedure is based on Eigen values of data transformation and represents linear combinations of the data with canonical (maximum) correlations. In the Johansen procedure, there are two tests: the maximum Eigen value ( $\Omega$  max) and trace ( $\Omega$  trace) tests. Suppose  $r$  is the rank of a matrix  $\Pi$ . This gives the number of

cointegrating vectors. The maximum Eigen value test investigates whether the principal Eigen value is zero comparative to the other with the next largest Eigen value is zero. The first test is a test whether the rank of the matrix  $\Pi$ , is zero. The null hypothesis is that  $\text{rank}(\Pi) = 0$  against the alternative hypothesis that  $\text{rank}(\Pi) = 1$ . This is a test using the largest Eigen value. Therefore, if the rank of the matrix is zero, then the largest Eigen value is zero. This implies that there is no cointegration. However, if the largest Eigen value ( $\Omega_{\max}$ ) is nonzero, then the rank of the matrix is at least one and there is at least one cointegrating vector. This implies that there is cointegration. For further tests, the null hypothesis is that  $\text{rank}(\Pi) = 1; 2 \dots$  against the alternative hypothesis that  $\text{rank}(\Pi) = 2; 3 \dots$ . The trace test is a test whether the rank of the matrix  $\Pi$ , is  $r_0$ . The null hypothesis is that  $\text{rank}(\Pi) = r_0$ . The alternative hypothesis is that  $r_0 < \text{rank}(\Pi) \leq n$ , where  $n$  is the maximum number of possible cointegrating vectors. Bilgili (1998) showed that in a three-variable case, where  $n = 3$ , the hypothesis for  $\Omega$  trace tests is that there is no cointegration against alternative that there are 1, 2, or 3 cointegration vectors. If  $H_0: r = 0$  is rejected against  $H_1: r > 0$ , then  $H_0: r < 1$  is tested against hypothesis  $r = 2$  or  $3$ .

In this analysis, the ARDL bounds test was used to test for cointegration. This is because the variables were found not to be integrated of the same order. The ARDL Bounds Testing methodology of Pesaran and Shin (1999) and Pesaran, Shin and Smith (2001) can be used with a mixture of variables that are integrated of order zero and one (that is,  $I(0)$  and  $I(1)$  data series). In the test, different variables can be assigned different lag-lengths as they enter the model. However, none of the variables should be integrated of order two ( $I(2)$ ). This explains the

dropping of the variable for population density which was neither integrated of order zero nor order one. The following ARDL model was employed in testing for cointegration:

$$\begin{aligned}
\Delta \ln DepVar_t = & \alpha_0 + \sum \alpha_i \Delta \ln (DepVar)_{t-i} \\
& + \sum \vartheta_m \Delta \ln MW_{t-m} + \sum \beta_j \Delta \ln TR_{t-j} + \sum \gamma_k \Delta \ln PD_{t-k} \\
& + \sum \delta_l \Delta \ln CPI_{t-l} + \sum \varphi_r \Delta \ln REER_{t-r} \\
& + \sum \pi_n \Delta \ln CorPI_{t-n} + \theta_0 \ln (DepVar)_{t-1} + \theta_1 \ln MW_{t-1} \\
& + \theta_2 \ln TR_{t-1} + \theta_3 \ln PD_{t-1} + \theta_4 \ln CPI_{t-1} + \theta_5 \ln REER_{t-1} \\
& + \theta_6 \ln CorPI_{t-1} + \tau_0 Fadj_t + \tau_1 ELC_t + \tau_2 @trend \\
& + \mu_t \dots (2.12)
\end{aligned}$$

Where *DepVar* is the dependent variable, that is, log of public recurrent expenditure, log of public development expenditure, log of compensation of employees, and log of non-wage recurrent expenditure, for the respective models.  $\Delta$  is the difference operator. The variable *@trend* was used to control for time trend in the models. Other variables are as defined before in the models specification section. Note that in the public development expenditure model the variable for minimum wages was omitted since the variable was found to be irrelevant in the analysis of growth in development expenditure. This applied to the entire analysis in the paper.

Pesaran *et al.* (2001) referred to Equation 2.12 as a “conditional Error Correction Model (ECM)” since it includes same lagged level variables like in a regular error correction model, but their coefficients are not restricted (unrestricted error correction model). The equation was estimated for the respective models. General to specific procedure was employed (highest insignificant variables were

dropped as the models are re-estimated until the appropriate ARDL model was established) while checking whether the errors are serially independent and the respective models are dynamically stable.

Bound testing was then carried out where coefficient diagnostics for the level lagged variables was done using F-Test. The F-test has a non-standard distribution which relies on whether the variables in the model are I(0) or I(1), the number of regressors (k+1), and whether the model contains an intercept and/or a trend (Pesaran *et al.*, 2001). Null hypothesis of the test states that there is no long-run equilibrium association (cointegration) between the variables, that is,  $H_0: \theta_0 = \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = 0$ ; against the alternative that  $H_0$  is not true.

Since the models employed in this analysis have unrestricted intercept and unrestricted trend, F-statistic attained from Wald Test was compared with the tabulated Pesaran Critical values at five percent significance level for a model with unrestricted trend and unrestricted intercept (see Pesaran Critical values in Table A2 and Table A3 in Appendix D). If the calculated-statistic lies below the lower bound, then the conclusion is that the variables are I (0), hence no cointegration is possible. If the F-statistic exceeds the upper bound, then there is cointegration in the model while the test is inconclusive if the F-statistic falls between the bounds.

As a cross-check, Bounds t-test of  $H_0: \theta_0 = 0$ , against  $H_1: \theta_0 < 0$  was performed. In the Bounds t-test, the conclusion that there is a long-run relationship between the variables is supported if t-statistic for level lagged independent variable is greater than the upper bound tabulated by Pesaran *et al.* (2001). Contrary, if the t-statistic is less than the lower bound, then the conclusion is that the data are all stationary.

**Table 2.5: Results of ARDL Bounds Cointegration Test**

		<i>Public Recurrent Expenditure Model (1)</i>	<i>Public Development Expenditure Model (2)</i>	<i>Compensation of Government Employees Model (3)</i>	<i>Non-Wage Recurrent Expenditure Model (4)</i>
Specification		Unrestricted intercept and unrestricted trend; number of regressors ( $k$ ) = 7	Unrestricted intercept and unrestricted trend; number of regressors ( $k$ ) = 6	Unrestricted intercept and unrestricted trend; number of regressors ( $k$ ) = 7	Unrestricted intercept and unrestricted trend; number of regressors ( $k$ ) = 7
<i>F – statistic</i>		4.5621	63.0724	450.4870	89.5382
Pesaran Critical Values at 5percent Level of Significance	Lower Bound	2.69	2.87	2.69	2.69
	Upper Bound	3.83	4.00	3.83	3.83
<i>t – statistic</i>		-4.4364	-17.4469	-53.6470	-23.2677
Pesaran Critical Values at 5percentLevel of Significance	Lower Bound	-3.41	-3.41	-3.41	-3.41
	Upper Bound	-4.85	-4.69	-4.85	-4.85
Conclusion		Cointegrated	Cointegrated	Cointegrated	Cointegrated

Source: Authors (2019)

The results showed that F-statistics for all the models are greater than the Upper Bound Pesaran’s critical values. Therefore, the null hypothesis of no cointegration was rejected. On the other hand, the results for Bounds t-test showed that the t-statistics for all models except the public recurrent expenditure model were greater than the Upper Bound Pesaran’s critical values (in absolute terms) at five percent level of significance. The results for the public recurrent expenditure model showed that the Bounds t-test statistic fall between the lower bound and the upper bound but closer to the upper bound. This gave an indeterminate result. Despite the mixed result for one of the models, the general conclusion from the

cointegration tests was that the variables are cointegrated, based on the strength of the F – statistics results, which were significantly above the upper bound.

### 2.4.3 Efficiency and Dynamic Stability of the Estimator

Before presentation of the empirical results, the efficiency and dynamic stability of the estimated coefficients were ascertained through test for serial correlation, residual normality, CUSUM (cumulative sum) test of parameters stability, and AR roots graphs test of stability. Granger causality test was also carried out to examine the causality direction between the public expenditure components and the respective explanatory variables included in the model.

Serial correlation test was done to confirm if the errors are serially independent. This is a key requirement for ARDL model’s estimator efficiency. Additionally, Jarque-Bera test was used to determine the normality of the residuals, with the null hypothesis that residuals are normally distributed.

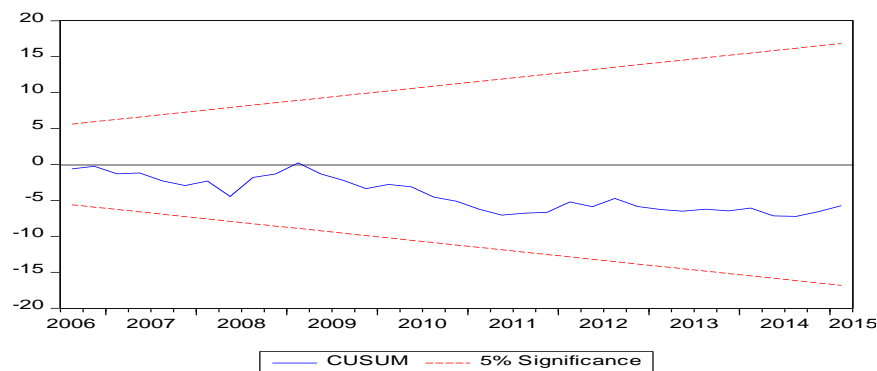
**Table 2.6: Results of Tests for the Efficiency of the Estimators**

Test	<i>Public Recurrent Expenditure Model (1)</i>	<i>Public Development Expenditure Model (2)</i>	<i>Compensation of Government Employees Model (3)</i>	<i>Non-Wage Recurrent Expenditure Model (4)</i>	Conclusion
Breusch-Godfrey Serial Correlation LM Test (F-statistic)	1.5759 <i>Prob. F(2,33) = 0.2220</i>	1.2414 <i>Prob. F(2,37) = 0.3007</i>	2.4489 <i>Prob. F(2,36) = 0.1007</i>	0.7513 <i>Prob. F(2,38) = 0.4786</i>	No serial correlation
Jarque-Bera Normality Test (test –statistic)	0.2881 <i>(P-value = 0.8658)</i>	4.2321 <i>(P-value = 0.1205)</i>	0.2191 <i>(P-value = 0.8963)</i>	0.1870 <i>(P-value = 0.9107)</i>	Residuals are normally distributed
*, **, *** denote the rejection of the null hypothesis at 10 percent, 5 percent, 1 percent level of significance, respectively.					

Source: Authors (2019)



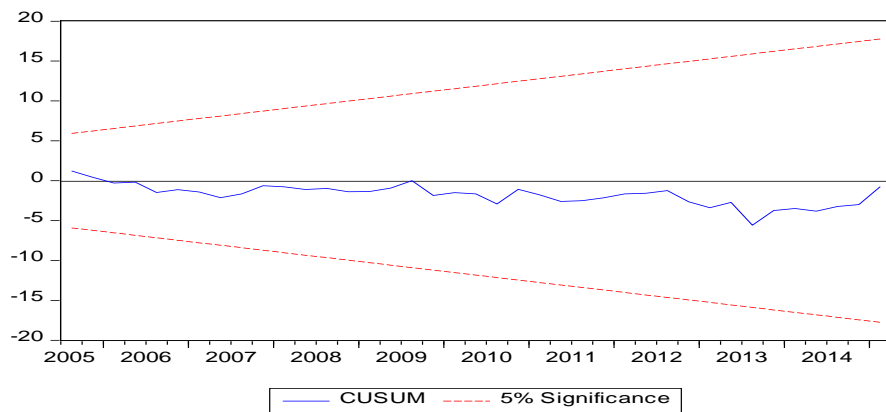
The results from the tests on efficiency of the estimators showed that residuals in the models are serially independent and normally distributed, which was desirable for their specification. Further, the test for dynamic stability of the estimators was carried out using the CUSUM test and the AR roots graphs. The null hypothesis for CUSUM test is that the parameters are stable (which is desirable). Under the null hypothesis, the CUSUM statistic is drawn from a CUSUM distribution, which is a symmetric distribution centered at zero. The null hypothesis is rejected at five percent significance level if CUSUM statistics is below the 2.5-percentile or above the 97.5-percentile of the CUSUM distribution. The output is a graph of the CUSUM statistics (blue) line and bands representing the upper and lower bounds of the critical region for a test at the five percent significance level. The decision criteria is that, if the CUSUM statistics (blue) line lies within the bands then the null hypothesis cannot be rejected hence the conclusion that the parameters are stable. The closer the CUSUM statistics (blue) line to zero line, the more stable the parameters in the model. Results for CUSUM tests are presented in the following figures.



**Figures 2.3: CUSUM Test Results for Stability of Public Recurrent Expenditure Model**

Source: Authors (2019)

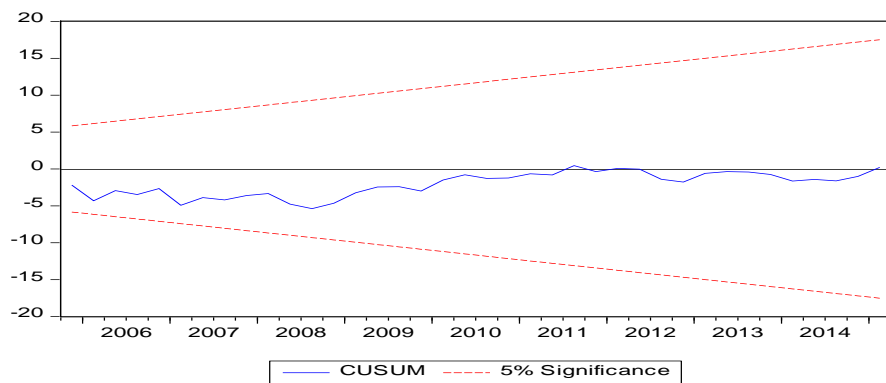
The figure shows that the public recurrent expenditure estimator was found to be dynamically stable since the CUSUM statistics (blue) line lies within the bands representing the lower and upper bounds and is not far away from zero. This affirmed the reliability of the estimator in explaining the relationship between growth in public recurrent expenditure and the explanatory variables.



**Figures 2.4: CUSUM Test Results for Stability of Public Development Expenditure Model**

Source: Authors (2019)

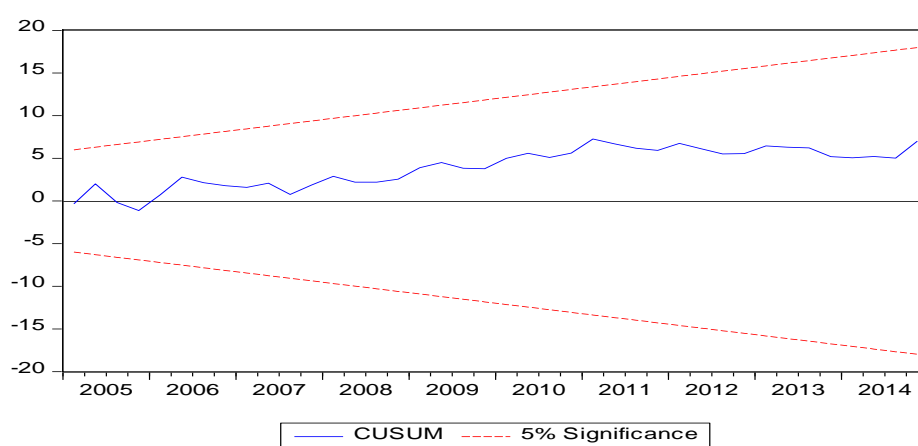
The figure shows that the public development expenditure estimator was found to be dynamically stable since the CUSUM statistics (blue) line lies within the bands representing the lower and upper bounds and lies next to the zero line. This affirmed the reliability of the estimator in explaining the relationship between growth in public development expenditure and the explanatory variables.



**Figures 2.5: CUSUM Test Results for Stability of Compensation of Government Employees Model**

Source: Authors (2019)

The figure shows that the compensation of government employees' estimator was found to be dynamically stable. This is because the CUSUM statistics (blue) line lies within the bands representing the lower and upper bounds and oscillates next to the zero line, and even touches the zero line at some points. This affirmed the reliability of the estimator in explaining the relationship between growth in compensation of government employees and the explanatory variables.

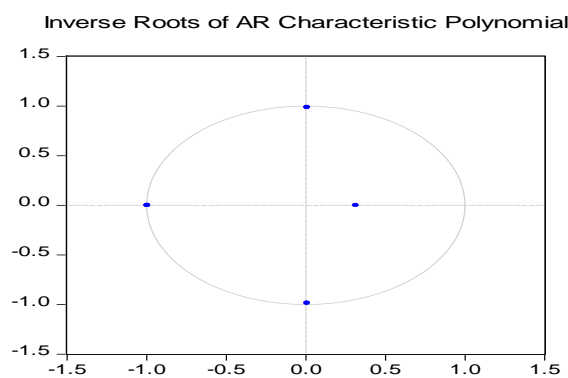


**Figures 2.6: CUSUM Test Results for Stability of the Non-Wage Recurrent Expenditure Model**  
Source: Authors (2019)

The figure shows that the non-wage recurrent expenditure model was found to be dynamically stable since the CUSUM statistics (blue) line lies within the bands representing the lower and upper bounds and next to the zero line. This affirmed the reliability of the estimator in explaining the relationship between growth in non-wage recurrent expenditure and the explanatory variables.

The AR roots graphs that report the inverse roots of characteristic autoregressive polynomial are presented in the following figures. For the AR roots graphs, an estimated model is stationary if the modulus of all roots is less than one and lies inside the unit circle. For instance, an autoregressive model of order one (AR (1)) process given by  $y_t = \alpha y_{t-1} + \varepsilon_t$  (where  $y$  is the variable of

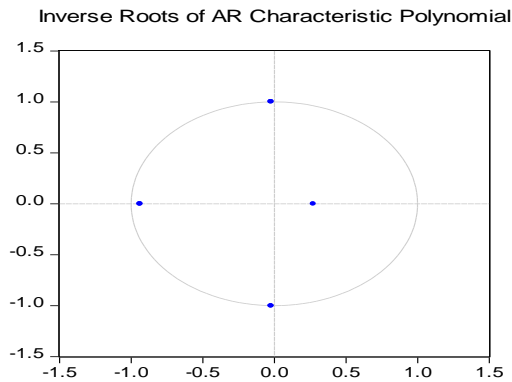
interest,  $y_0 = 0$   $\alpha$  is a root,  $t$  is time period and  $\varepsilon_t$  is white noise with variance  $\sigma^2$ ) can be thought of as taking the previous value of  $y$  and amplify it with the root  $\alpha$  and adding a small noise. Therefore, if the absolute value of the root is greater than one, then every new value of  $y$  is likely to be larger than its previous value, meaning that the process explodes for large period ( $t$ ). The AR roots graphs are shown in the following figures.



**Figure 2.7: AR Roots Graph of Public Recurrent Expenditure Model**

Source: Authors (2019)

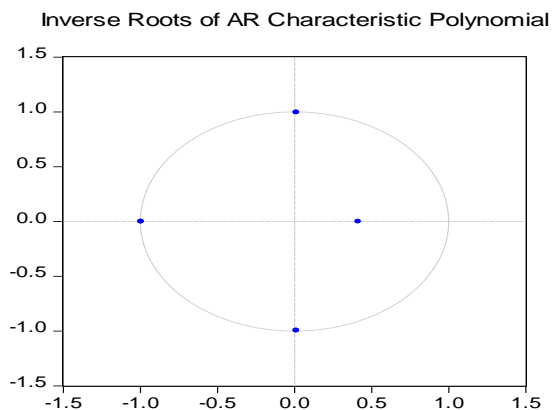
The AR roots graph in Figure 2.6 showed that for the public recurrent expenditure model, some of the roots have modulus equal to one and lie on the unit circle. This implied that even though the system was stable, it was likely to have a random walk/process with time since there was no force that kept the process stable. This could weaken the validity of the standard errors.



**Figure 2.8: AR Roots Graph of Public Development Expenditure Model**

Source: Authors (2019)

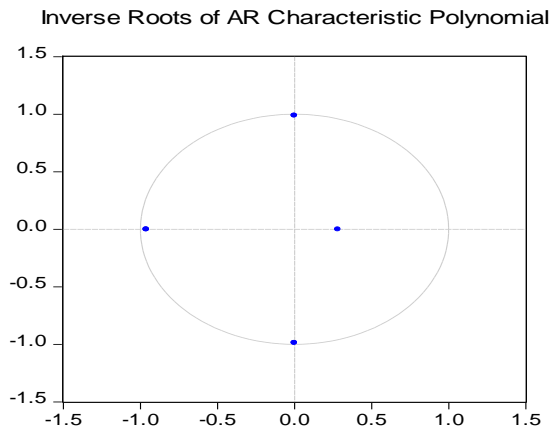
The AR roots graph in Figure 2.7 showed that for the public development expenditure model, some of the roots have modulus equal to one and lie on the unit circle. This implied that even though the system was stable, it was likely to have a random walk/process as the time (t) becomes larger. This could weaken the validity of the standard errors.



**Figure 2.9: AR Roots Graph of Compensation of Government Employees Model**

Source: Authors (2019)

The AR roots graph in Figure 2.8 showed in the compensation of government employees' model, some of the roots have modulus equal to one and lie on the unit circle. This implied that even though the system was stable, it was likely to have a random walk/process as the time (t) becomes larger. This could weaken the validity of the standard errors.



**Figure 2.10: AR Roots Graph of Non-Wage Recurrent Expenditure Model**  
 Source: Authors (2019)

The AR roots graph in Figure 2.9 showed that in the non-wage recurrent expenditure model, some of the roots have modulus equal to one and lie on the unit circle. This implied that even though the system was stable, it was likely to have a random walk/process as the time becomes larger. This could weaken the validity of the standard errors since there was no force that kept the process stable.

#### 2.4.4 Granger Causality Test

In an empirical analysis, the regressions result only show a relationship between the response and the predictor variables. Therefore, there is need to investigate for causality direction between two related variables and whether there is a feedback mechanism between the two variables. The causality test by Granger measures and estimate if one thing or event occurs earlier than another and helps predict it (Granger, 1969). There are three distinct results in Granger-causality test produces: discover a single directional causal relation (ignore or reject the null in one of the tests); reject or ignore the null hypothesis of the two tests; or do not reject the null hypothesis.

Maziarz (2015) pointed out that Granger causality test do not necessarily justify implications of real causality between the related variables. In the first instance where the null hypothesis is rejected in one of the test, the result suggests presence of one-directional causal relationship between the two-time series. Maziarz (2015) pointed out that this result has four implications. First, it could mean that the causality test by Granger is true; namely, variable X Granger causes variable Y. Second, it could suggest that the directional course of the causal relation is opposite because of rational expectations. This is according to the argument by Noble (1982) that behaviour of economic actors could make the analysis consider reversed dependency. Third, suppose sampling is not regular enough (Harvey and Stock, 1989), the rejection of the null hypothesis could mean that there is immediate causality (McRorie and Chamber, 2006). Fourth, rejecting the null hypothesis may occur because of time series non-linearity (Roberts and Nord, 1985) or time series cointegration (Lee *et al.*, 2002).

In the second instance where bi-directional Granger causality is observed, Maziarz (2015) showed that the suggestion could be an immediate Granger causality between the time series or that variable X and Y are determined by a third variable as argued by Sims (1972). In the third instance, where there is no rejection of the null hypothesis in both tests, the interpretation is that there is no Granger causality between the data series. Maziarz (2015) highlighted three possible implications. First, there could be nonlinear Granger causality between time series or indirect causality (Dufour and Taamouti, 2010). Second, there could be instant causality if the time series are not stationary (Glasure and Lee, 1998). Third, there

could be no causal relation between variable X and Y as predicted by the Granger causality test result.

Therefore, one needs sufficient knowledge about the theoretical mechanisms connecting the two time series and the investigated phenomenon to judge whether the relation discovered by Granger causality test is true or erroneous (Maziarz, 2015). Granger (1988) affirmed that possible action is not measured or considered for any arbitrarily selected group of variables rather, it is considered for variables for which the researcher has some past belief that causation is, in some sense, likely. Additionally, some of the causes of Granger causality misinterpretation such as time series cointegration and data nonlinearity can be detected and corrected.

In this paper, pairwise causality test by Granger was used to establish the direction of causality between the dependent variable and the respective explanatory variables used in the models. The Granger causality test results (see Table A4 in Appendix I) showed that real minimum wages Granger causes growth in public recurrent expenditure and compensation of government employees. The results showed bidirectional causality between real tax revenue and public recurrent expenditure. The results also showed bidirectional causality between real tax revenue and compensation of government employees, and between real tax revenue and non-wage recurrent expenditure. However, the results found unidirectional causality running from public development spending to real tax revenue. The feedback effect found between real tax revenue and public recurrent expenditure implied that whereas government tax revenue is used to finance public expenditure, the expenditures also act as a base for income tax and VAT revenue.



Inflation was found to Granger cause real public recurrent expenditure and its two components. The results also showed unidirectional causality between fiscal adjustment and real non-wage recurrent expenditure running from the former to the latter. The implication of this was that the fiscal adjustment efforts create more fiscal space that goes to financing of growth in non-wage recurrent expenditure.

#### **2.4.5 Discussion of Regression Results**

The ARDL Error Correction Model regression results from the models based on Equation 2.11 were as presented in Table 2.7.

**Table 2.7: ARDL ECM Regression results for Growth in Public Recurrent and Development Expenditure**

	<i>Public Recurrent Expenditure Model (1)</i>	<i>Public Development Expenditure Model (2)</i>
<b>Explanatory Variables</b>	<b>Dependent Variable:</b> Change in Log of Real Public Recurrent Expenditure ( $\Delta \ln G_{re,t}$ )	<b>Dependent Variable:</b> Change in Log of Real Public Development Expenditure ( $\Delta \ln G_{de,t}$ )
Change in log of real public recurrent expenditure, lagged once ( $\Delta \ln G_{rc,t-1}$ )	-0.0081 (0.1507)	-
Change in log of real public development expenditure, lagged four times ( $\Delta \ln G_{de,t-4}$ )	-	0.9445*** (0.0574)
Change in log of real minimum wages, lagged once ( $\Delta \ln MW_{t-1}$ )	6.0941*** (1.9065)	-
Change in log of real minimum wages, lagged twice ( $\Delta \ln MW_{t-2}$ )	8.5692*** (1.7122)	-
Change in log of real tax revenue, lagged twice ( $\Delta \ln TR_{t-2}$ )	4.6864*** (1.1335)	-
Change in log of real tax revenue, lagged thrice ( $\Delta \ln TR_{t-3}$ )	5.1718*** (1.1904)	-
Change in log of real tax revenue, lagged four times ( $\Delta \ln TR_{t-4}$ )	5.2155*** (1.1072)	0.4807 (0.3759)
Change in log of real public debt, lagged twice ( $\Delta \ln PD_{t-2}$ )	-	0.5906 (1.5096)
Change in log of real public debt, lagged four times ( $\Delta \ln PD_{t-4}$ )	-1.7323 (2.1055)	-
Change in log of consumer price index ( $\Delta \ln CPI_t$ )	-5.8345 (3.7489)	-
Change in log of consumer price index , lagged twice ( $\Delta \ln CPI_{t-2}$ )	-	-1.8135 (2.6267)
Change in log of real effective exchange rate , lagged once ( $\Delta \ln REER_{t-1}$ )	1.9971 (2.1288)	-
Change in log of real effective exchange rate , lagged twice ( $\Delta \ln REER_{t-2}$ )	-	2.6329** (1.2454)
Change in log of corruption perception index, lagged once ( $\Delta \ln CorPI_{t-1}$ )	2.0538 (3.3426)	
Change in the log of corruption perception index, lagged thrice ( $\Delta \ln CorPI_{t-3}$ )	-	-2.7477 (1.8110)
Fiscal Adjustment ( $Fadj_t$ )	0.2810 (0.1797)	0.0596 (0.1163)
Election dummy ( $ELC_t$ )	-0.3598** (0.1678)	-0.0046 (0.1188)
Time trend ( $@trend$ )	-0.0032 (0.0045)	0.0004 (0.0030)
Constant Term	-0.1121 (0.2185)	-0.0474 (0.1494)
Error Correction Term ( $ECT_{t-1}$ )	-0.4466** (0.1931)	-0.1952* (0.0997)
F-statistics	19.5254*** (P-value = 0.0000)	91.1655*** (P-value = 0.0000)
Adjusted R-squared	0.8411	0.9485
<i>Note: Level of significance are denoted by * <math>p &lt; 0.1</math>, ** <math>p &lt; 0.05</math>, and *** <math>p &lt; 0.01</math>. The figures inside the parentheses are robust standard errors</i>		

Source: Authors (2019)

This analysis made use of 50 observations after adjustments, the F-statistics were shown to be significant at one percent level of significance implying that the included variables in both models were jointly important in explaining variations of the sample in the public recurrent expenditure and development expenditure. The adjusted R-squared indicated that variables included in the public recurrent expenditure model explained about 84.11 percent of the variations in public recurrent expenditure whereas variables included in development expenditure model explained about 94.85 percent of the variations in public development expenditure. The R-squared for time series models are usually high since there are no variations across units of analysis like in panel or cross-sectional models. The results for error correction terms showed that in the public development expenditure model, the systems adjusted towards the long run equilibrium at a speed of 19.52 percent whereas in the public recurrent expenditure model, the system changed towards the equilibrium (long run) at a higher speed of 44.66 percent. This supported the argument that public recurrent expenditure rise faster than the development expenditure component.

The empirical results showed that a percentage increase in development expenditure at one percent level of significance, lagged four quarters, would lead to a 0.94 percent rise in public development spending in the current period. This showed that the current period's development expenditure depends on its previous values. This is because, there is need to adequately provide for the maintenance and operational costs of the new public investments to ensure value for money invested in the projects. However, the coefficient of lagged public recurrent expenditure was found to be insignificant meaning that the current period's

recurrent expenditures do not depend on the previous periods recurrent expenditure levels.

The results also showed that at one percent significance level, a percentage increase in real minimum wages (lagged once) would lead to a 6.09 percent rise in public recurrent expenditure whereas a percentage increase in real minimum wages (lagged twice) would lead to 8.57 percent rise in public recurrent expenditure. This meant that the frequent minimum wage adjustments lead to growth in recurrent expenditure by the government. The effect is compounded by the high number of lower cadre public servants whose wages are usually adjusted upwards whenever the minimum wages are adjusted. Note that real minimum wages variable was excluded in estimation of the development expenditure model.

The results also showed that the coefficient of real tax revenue in the public recurrent expenditure model was significant and positive whereas in public development expenditure model, it was positive but insignificant. The result on real tax revenue and development spending showed that Kenya does not rely much on tax revenue to finance its development spending. Alternatively, the result showed that the governments commits most of its tax revenue to financing recurrent expenditure thus increase in revenue collections translate to increased fiscal space for recurrent spending by the government. Almost the entire government's development spending is finance by borrowed funds and foreign grants. These results contrast those of Aregbeyen and Akpan (2013) for Nigeria, which showed that a growth in previous year's government tax revenue led to a rise in development expenditure by over 70 percent.

The results for the public recurrent expenditure model showed that at one percent level of significance, an increase of percentage in real tax revenue at second, third and fourth lag level would lead to a 4.69 percent, 5.17 percent and 5.22 percent rise in public recurrent expenditure respectively. This is a combined effect of about 15.08 percent within a year, which implied that government revenue was mainly committed to financing of the public recurrent expenditure at the expense of the public development spending. The results on public recurrent expenditure, is supported by the findings of Fielding (1997), Masenyetse and Motelle (2012), Wolde-Rufael (2008) and Aregbeyen and Akpan (2013).

The real effective exchange rates' coefficient was found to be statistically insignificant in public recurrent expenditure model but significant in public development expenditure model. This implied that real effective exchange rates do not significantly explain the changes in real public recurrent expenditure, but explains the changes in real development expenditure. The results showed that at five percent level of significance, a percentage rise in real effective exchange rates (lagged twice), a depreciation of the Kenya Shilling, would produce a 2.63 percent increase in real development spending. This showed that most of the inputs used in public development projects are imported. Hence, their costs and consequently the aggregate expenditure on public investment projects are greatly influenced by the depreciation of the shilling. This supports the arguments by Easterly and Hebbel (1991) that an increase in real effective exchange rates has a positive influence on government spending as this makes the imports consumed by the government expensive in domestic currency.

The election dummy had a significant negative coefficient in the public recurrent expenditure model but an insignificant negative coefficient in the public development expenditure model. The results showed that at five percent level of significance, holding of a general election in Kenya would bring about a 0.36 percent decline in real public recurrent expenditure. Though the decline was found to be marginal, the result implied that the government tends to focus on fiscal discipline during the election periods to avoid heavy borrowing, which could be less appealing to the informed voters. This was contrary to the findings of Rogoff (1990), Vergne (2009) and Aregbeyen and Akpan (2013) who pointed out that government's fiscal manipulation during election period result into an increase in public recurrent spending during the period at the expense of public investment expenditure. These results showed that the Kenyan government tend to focus more on fiscal discipline during the election periods to limit the fiscal deficit and appeal to the voters. This is in line with the argument by Drazen and Eslava (2010) that showed that well-informed voters dislike high public spending and budget deficits.

Real public debt, consumer price index, corruption perception index, and fiscal adjustment dummy were found not to influence the changes in both real public recurrent expenditure and real development expenditure. However, real public debt had a negative coefficient in the public recurrent expenditure model and a positive coefficient in the development expenditure model. Corruption perception index was found to have public recurrent expenditure model with a positive coefficient in and a negative coefficient in development expenditure model. Since in the models, an increase in the corruption perception index implied a decrease in perceived corruption level in the public sector, the results meant that

an increase in corruption in the public sector would likely lead to less budgetary allocation for public recurrent expenditure but more allocation for public investment spending.

Fiscal adjustment was found to have a positive coefficient in all models meaning that an improvement in fiscal balances tend to come from the revenue rather than expenditure side. These results showed that the fiscal adjustment measures were not effective on the expenditure side and the improvement on the fiscal balances could be because of improvement on revenue collection, which in turn led to increased fiscal space for government spending. Further, compensation of government employees and government non-wage recurrent expenditure models were estimated based on Equation 2.11 and the regression results were as presented in Table 2.8.

**Table 2.8: ARDL ECM Regression results for Growth in Compensation of Government Employees and Non-Wage Recurrent expenditure**

<b>Explanatory Variables</b>	<i>Compensation of Government Employees Model (3).</i> <b>Dependent Variable:</b> Change in log of real compensation of government employees ( $\Delta \ln G_{ce,t}$ )	<i>Non-Wage Recurrent Expenditure Model (4).</i> <b>Dependent Variable:</b> Change in log of real non-wage recurrent expenditure ( $\Delta \ln G_{nwre,t}$ )
Change in log of real compensation of government employees, lagged once ( $\Delta \ln G_{ce,t-1}$ )	0.3940**(0.1916)	-
Change in log of real non-wage recurrent expenditure, lagged once ( $\Delta \ln G_{nwre,t-1}$ )	-	0.0905 (0.1320)
Change in log of real minimum wages, lagged once ( $\Delta \ln MW_{t-1}$ )	6.0253** (2.5621)	-
Change in log of real tax revenue, lagged twice ( $\Delta \ln TR_{t-2}$ )	6.5124*** (1.5260)	3.9299*** (1.0373)
Change in log of real tax revenue, lagged thrice ( $\Delta \ln TR_{t-3}$ )	3.2095** (1.2028)	-
Change in log of real public debt, lagged twice ( $\Delta \ln PD_{t-2}$ )	-	0.9450 (3.1686)
Change in log of real public debt, lagged four times ( $\Delta \ln PD_{t-4}$ )	1.6185 (2.7791)	-
Change in log of consumer price index ( $\Delta \ln CPI_t$ )	-4.0173 (5.4270)	-
Change in log of consumer price index, lagged once ( $\Delta \ln CPI_{t-1}$ )	-	-9.2714* (5.4732)
Change in log of real effective exchange rates ( $\Delta \ln REER_t$ )	-	3.2150 (2.6505)
Change in log of real effective exchange rates ( $\Delta \ln REER_{t-2}$ )	2.5888 (2.5991)	-
Change in log of corruption perception index ( $\Delta \ln CorPI_t$ )	2.3987 (3.8112)	-
Change in log of corruption perception index, lagged four times ( $\Delta \ln CorPI_{t-4}$ )	-	5.9097 (4.0648)
Fiscal adjustment ( $Fadj_t$ )	0.7793*** (0.2073)	1.0134*** (0.2194)
Election dummy ( $ELC_t$ )	-0.3715* (0.2183)	-0.3583 (0.246T2)
Time trend ( $@trend$ )	-0.0051 (0.0059)	-0.0087 (0.0068)
Constant	-0.3746 (0.2801)	-0.2441 (0.3357)
Error correction term ( $ECT_{t-1}$ )	-0.7311** (0.2703)	-0.8608*** (0.2625)
F – statistic	10.5422*** (P-value = 0.0000)	12.5737*** (P-value = 0.0000)
Adjusted R-squared	0.6961	0.6983
<i>Note: Level of significance are denoted by * <math>p &lt; 0.1</math>, ** <math>p &lt; 0.05</math>, and *** <math>p &lt; 0.01</math>. The figures inside the parentheses are robust standard errors</i>		

Source: Authors (2019)



The analysis made use of 51 observations after adjustments. The F-tests results showed that included variables in the models were important in explaining sample variations in the remuneration of government employees and recurrent non-wage government spending. Results for the adjusted R-squared indicated that the variables included in the compensation of government employees model explained about 69.61 percent of the sample variations in compensation of government employees whereas the variables included in the non-wage recurrent expenditure model explained about 69.83 percent of the sample variations in non-wage recurrent expenditure. The estimate of the coefficients to the error correction term showed that the system in compensation of government employees' model adjusts towards its equilibrium (long-run) at a lower speed of 73.11 percent as compared to that of government non-wage recurrent expenditure that changes at a speed of 86.08 percent towards its long-run equilibrium.

The empirical results showed that the coefficient of lagged compensation of government employees and lagged non-wage recurrent expenditure are both positive though the latter is insignificant. At 5 percent level, a percentage rise in real compensation of government employees, lagged once, would result in a 0.39 percent increase in compensation of government employees in the current period. This result's implication is that the current period's compensation of government employees is influenced by its previous period's value. This is clarified by the rise in number of government employees over time and the increasing commitments such as payment of pensions as the public servants retire from service.

The analysis also showed that at five percent level, a percentage increase in real minimum wages (lagged once) would lead to a 6.03 percent rise in

compensation of government employees. This showed that the persistent trade union demands for adjustments of public servant wages, which is often accompanied by the annual adjustments in the minimum wages across the board, tend to significantly result in an increase in compensation of government employees. This implies that the quest for upward adjustment of wages by the perceived 'median voters' influences the rise in public recurrent expenditure in Kenya. The variable was, however, not included in the non-wage recurrent expenditure model.

The results showed that at one percent significance level, a percentage growth in real tax revenue (lagged twice) would result into a 6.51 percent rise in compensation of government employees and a 3.93 percent rise in government non-wage recurrent expenditure. Additionally, the results showed that at five percent level of significance, a percentage increase of real tax revenue (lagged with three quarters) would lead to a 3.21 percent rise in real compensation of government employees. It is worth noting that for a percentage increase in real government revenue, real compensation of government employees would grow by about 5.79 percent more than non-wage recurrent expenditure. The results affirmed that most of government revenue is committed to recurrent spending at the expense of other budget items such as public investments. These results supported the findings by Aregbeyen and Akpan (2013), Lamartina and Zaghini (2008), Fielding (1997) and Wolde-Rufael (2008) who found out that government revenue has a long run positive relationship with growth in public recurrent spending.

The analysis found out that the consumer price index had a negative insignificant coefficient in the compensation of government employees' model but

a significant negative coefficient in the government non-wage recurrent expenditure model. The results showed that at 10 percent level of significance, a percentage increase in consumer price index would lead to a 9.27 percent decline in real value of government non-wage recurrent expenditure. This implies that an increase in inflation erodes the real value of non-wage public expenditure thus tend to lead to their nominal values being adjusted upwards leading to an overall rise in nominal public spending on the recurrent non-wage items.

The results for fiscal adjustment variable showed that at one percent level of significance, an improvement in fiscal balances would lead to a 0.78 percent increase in real compensation of government employees and a 1.01 percent rise in real government non-wage recurrent expenditure. The results supported the argument that the fiscal adjustment measures are not effective in limiting the rise in public wage bills as well as the non-wage recurrent expenditure. Instead, improvements in fiscal balances result in the revenue being channelled towards financing increased recurrent expenditure in which more revenue is spent on non-wage recurrent expenditure than on public wages. The results on election dummy showed that at 10 percent level of significance, the compensation of government employees is likely to decline by 0.37 percent whenever a general election occurs in Kenya. This affirmed that during election periods in Kenya, the government tends to focus on fiscal discipline to avoid heavy borrowing, which could be less appealing to the informed voters. Thus, the government tends to focus more on austerity measures during election periods to show its commitment to reduce recurrent expenditures such as the public wage bill. However, in most instances, this is not sustained into the post-election period. The election dummy coefficient

in government non-wage recurrent expenditure model was found to be negative but insignificant. This implies that the austerity measures usually carried out during the election periods are not effective on reducing non-wage recurrent expenditure.

The coefficients of real public debt, real effective exchange rates and corruption perception index were positive but insignificant statistically implying that the variables do not influence compensation of government employees and on-wage recurrent expenditure. Though insignificant, the coefficients showed that real public debt and real effective exchange rates have a positive but insignificant relationship with the two components of public recurrent spending. In addition, the results showed an inverse but insignificant relationship between public sector perceived corruption and growth in the two components of public recurrent expenditure. Since an increase in the corruption perception index implied a decrease in the public sector perceived corruption level, the results meant that increase in corruption in the public sector would likely result in less budgetary allocation for payment of non-wage recurrent expenditure and government employees.

In summary, this paper showed that the persistent public recurrent expenditure growth and the growth in public investment spending are not influenced significantly by the same factors. Growth in public recurrent expenditure was found to be mainly influenced by real minimum wage adjustments and increase in real tax revenue. Alternatively, growth in real public development spending was found to be mainly influenced by its lagged values and exchange rates that are real effective. Additionally, the results showed that within four quarters, the factors with significant coefficients had a combined effect of about

16.16 percent on the rise in compensation of government employees and a combined effect of 14.21 percent on government non-wage recurrent expenditure. This supported the argument that compensation of government employees adjusts faster to the factors as compared to non-wage recurrent expenditure. These results also showed that the fiscal adjustment measures are not effective in controlling the rise in public wage bills, non-wage recurrent expenditure and public recurrent expenditure in general.

## CHAPTER THREE

### EFFECTS OF SECTORAL PUBLIC RECURRENT EXPENDITURE ON ECONOMIC GROWTH

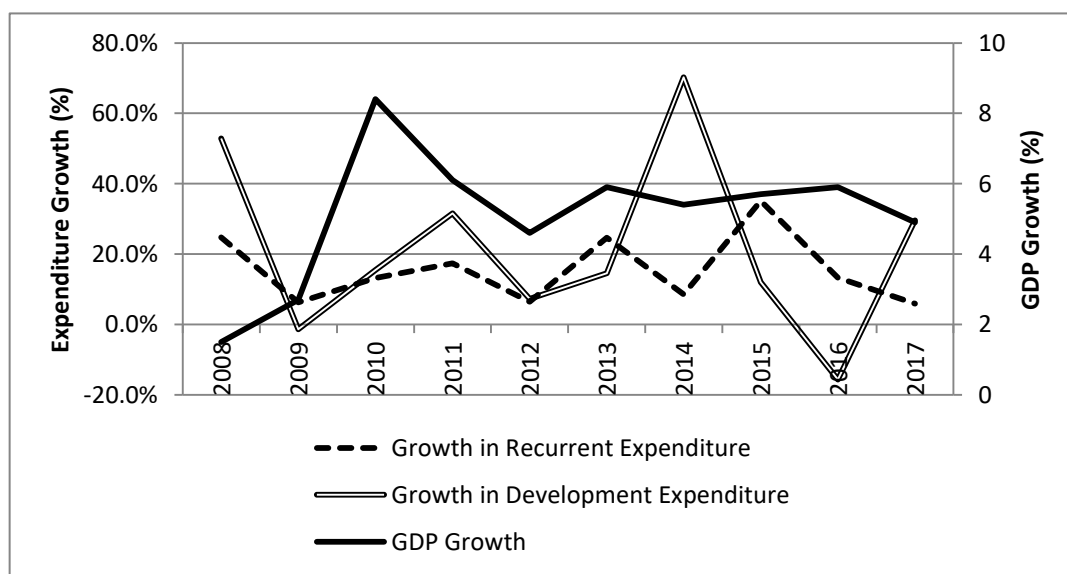
#### 3.1 Background

Policy makers in developing countries are facing immense challenges in sustaining fiscal consolidation. On top of the debate on the best strategy to employ in carrying out fiscal consolidation, the policymakers are also grappling with issues to do with how to make the fiscal adjustment efforts more effective and sustainable. Molnár (2012) argued that economic growth is one of the enablers of successful and sustainable fiscal consolidation. Heylen and Everaert (2000) observed that in order for fiscal consolidation to be successful, GDP growth needs to be high. This is because the burden of debt reduces with growth in real output, while at the same time raising tax receipts in an economy. Moreover, the study observed that fiscal consolidation tends to bring about reduction in gross public debt ratios when output gap is increasing and economic growth is strong. However, Gupta *et al.* (2005) found a moderate logical solution in favor of an independent effect of economic growth on fiscal adjustment's duration. These studies have shown that economic growth enhancing adjustment strategies are likely to be more effective and long lasting than those that do not positively influence economic performance.

Gupta *et al.*, (2005) suggests that the composition of public expenditure has an impact on fiscal success and the economic growth of a country. Therefore, public expenditure should shift from economic growth retarding items towards economic growth enhancing expenditure items. This will enhance sustainability in

fiscal consolidation for a resource constrained country like Kenya. The composition of public expenditure has been considered as an important factor in determining economic growth. This notion was pioneered by Barro (1990) after developing the endogenous growth model.

The debate on what components of public expenditure is considerably productive and those viewed as non-productive continues to date. However, categorization of expenditure items *a priori* as productive or unproductive remains debatable as a result of inconclusive findings from several research work based on different countries. There is still lack of enough studies with regard to the effects of public recurrent expenditure on Kenya’s economic growth. It is not clear whether public recurrent expenditure is growth enhancing, growth retarding or ineffective. Figure 3.1 relates the trend in growth of recurrent and development expenditure (on the primary y-axis) and GDP growth (on the secondary y-axis) in Kenya for the period 2008 – 2017.



**Figure 3.1: Growth in Recurrent Expenditure and GDP Growth**

Source: Republic of Kenya (2010a; 2012a; 2014a; 2016a; 2018a)

The graph above fails to provide a definitive relationship between public recurrent expenditure and growth in GDP for the last 20 years. Additionally, there lacks a clear link between the growth in development expenditure and GDP. However, there are periods such as 2009 – 2014 when growth in GDP has mirrored that of development expenditure though with some lag. As indicated earlier, public recurrent expenditure in Kenya can generally be categorised into employee remuneration expenditures and non-wage recurrent expenditures. Consequently, non-wage recurrent expenditure consists of expenditures of goods and services utilized by government. These include utilities' supplies and services, communication services, travel, subsistence and other transportation expenditures, printing, advertising and information services, rentals of produced assets, training expenses, hospitality services and supplies, general supplies, electricity expenditures, routine maintenance, purchase of office furniture and general equipment. The debate on productive components of public expenditure, together with the realization that economic growth enhances chances of sustainable fiscal consolidation, informed the need to carry out this study on implications of the persistent growth in sectoral recurrent public expenditure on Kenya's economic growth. The study employs sector level analysis. The sectors used as units of analysis for this paper are described in Section 3.3.1. The classification is borrowed from the sectors of Kenya's Office of the Controller of Budget (OCOB) classification with a little manipulation for analytical convenience.



### **3.1.1 Statement of the Problem**

Adequately financing the public investments as well as public recurrent expenditure in Kenya remains a challenge due to limited state resources with competing needs. In this regard, the Government of Kenya has unsuccessfully attempted to control the persistent rise of the public recurrent expenditure, which is deemed to be less or none productive. The aim has been to release more resources towards public investment spending. This has significantly contributed in enhancing the productive capacity of the economy.

In contrast, the argument that public recurrent expenditure is less growth enhancing than the public investment expenditures remains debatable. This is in regard to limited empirical evidence and inconclusive findings from various scholarly works. There are arguments that factors such as rent-seeking behaviour of public officers could be behind the agitations to allocate more resources to mega public investment projects contrary to the argument that the allocations are because they are more productive. In most instances, the public investments turn out to be of undesirable quality, but over-valued, as public officials seek rent through tendering and execution of contracts.

Appropriate allocation of government budgetary resources towards growth enhancing items is important since economic growth improves the environment for successful and sustainable fiscal consolidation in a country. Ryan and Maana (2014) showed that one percent rise in economic growth in Kenya reduced public debt/GDP ratio by up to 2.5 percent within three years. Faster economic growth implies larger tax revenue, reduced demand for social security expenditures and reduced government debt and deficit to GDP ratios (Zaghini, 2001). This

eventually creates an environment for sustainable fiscal consolidation within an economy. Therefore, the central question that this paper sought to address was “what component of public expenditure increases economic growth in Kenya?” This paper sought to establish the effects of the persistent rise in public recurrent expenditure on sectoral economic growth in Kenya.

### **3.1.2 Research Questions**

- (i) What is the economic growth effect of persistent rise in sectoral public recurrent spending in Kenya?
- (ii) What is the impact of economic growth on sectoral public recurrent expenditure in comparison with sectoral public investment spending in Kenya?

### **3.1.3 Research Aims**

The main goal of this research paper was to examine the effects of sectoral public recurrent expenditure on economic growth in Kenya. Specifically, the paper sought to:

- (i) Determine the economic growth effects of the persistent rise in sectoral public recurrent spending in Kenya.
- (ii) Compare the sectoral growth impacts of public investment expenditure and public recurrent expenditure in Kenya.

### **3.1.4 Policy Relevance**

Implications of public expenditure composition are important for public policies on sustainable fiscal consolidation and economic growth. In an attempt to optimally allocate budgetary resources, the government faces a challenge of

evaluating the efficiency and quality of the expenditure items on which the resources are located. This paper generates empirical information that is critical for a country with constrained fiscal space like Kenya. The paper provides empirical evidence on the effects of a constant increase in sectoral public recurrent spending on economic development. The focus on economic performance was justified since the literature showed that a country could achieve sustainable fiscal consolidation through enhanced economic growth. Therefore, findings of this research are expected to inform policies on fiscal adjustments and budgetary resource allocations in Kenya. Moreover, the results will contribute in filling the knowledge gap stated. Finally, they will also contribute in the debate on the impact that components of public expenditure have on economic growth.

### **3.2 Literature Review**

The section presents a detailed discussion of theories that are relevant to the study at hand. Additionally, it also provides an overview of some scholarly works that have been conducted on the impacts of public expenditure composition on economic growth.

#### **3.2.1 Theoretical Literature**

The theories herein are used to further expound on the effects of government spending on economic growth, the Keynesian theory, monetary theory, neoclassical theory and the theory of endogenous growth that was developed in 1980s. Using the quantity theory of money, the monetarists led by Milton Friedman argued that to reduce inflationary pressure in an economy, then growth in the money supply should be controlled. This called for the need to limit

expansionary public expenditure (Brunner and Meltzer, 1992). Expansionary fiscal policy leads to increased money supply in the economy, which eventually result in demand – push inflationary pressure. Furthermore, they suggested that crowding out of private investments is influenced by an increase in public spending (Ahmed and Miller, 2000). This is because higher tax burden results in reduced disposable income for individuals and decreased profit margins for businesses. Thus, this affects private savings hence limits private investment and economic growth.

Consequently, according to Maingi (2010), the traditional Keynesian macroeconomics of growth was pro-government expenditure. The Keynesians argued that increased public expenditure helps to boost aggregate demand in an economy. This presents an opportunity for increased economic activities that lead to increased national output to meet the increased aggregate demand. The result is higher final domestic consumption and enhanced economic growth. However, Branson (1989) pointed out that this depends on the effectiveness and size of government expenditure multiplier.

According to the endogenous growth models, steady state growth is endogenous (is determined in the model). The neoclassical models postulate that the steady state growth results from exogenous factors such as exogenous technological change. In neoclassical economic growth models, none of the fundamentals of the economy matter for long-term growth thus economic growth is determined outside the model. The endogenous growth theories as discussed by Lucas (1988), Rebelo (1991) and Romer (1986) are summarized by equation  $Y = AK$  where  $Y$  is output,  $A$  represents technological factors and  $K$  symbolizes human and physical capitals.

Research and Development (R & D) models by Uzawa (1965), Lucas (1988) and Romer (1990) argued that research sector invokes current stock knowledge and human capital to produce new knowledge. This knowledge is responsible for improving productivity and is accessible to the rest of the economic sector at almost no marginal cost. The models further suggest that the most important aspect in economic growth is the production of human capital.

According to the Romer (1986) model, knowledge is displayed as an increasing marginal productivity; it is also an input in the production function. Romer (1990) explained that, the average stock of human capital results into an endogenous growth. This is attributed to the fact that human capital has an external effect on the rate of technical adjustment. In 1990, Robert Barro developed an endogenous growth model, based on a consumer-producer representative agent set-up. The model was aimed at describing the relationship between economic growth and fiscal policy. The model uses government tax revenue in financing public spending that enters into the function of production as a productive input. The production function consists of productive government spending which enhances the private capital marginal productivity and a non-decreasing (constant) allowing for perpetual growth (Minea, 2008). Therefore, as productive government spending increases, this enters the production function of private sectors inputs that enhance the marginal production of the outputs of private sector labor and capital inputs. Consequently, this improves the overall national output, including that of the private sector. Thus, increase in productive government spending enhances economic performance. To achieve this, it is essential to examine the productive public expenditure components so that more resources are allocated to these

components. This affirms that public expenditure composition matters in enhancing economic growth. Therefore, the other theory that attempts to describe the relationship between government expenditure and economic growth is the theory of public expenditure.

The pioneers of the public expenditure theory categorized public spending into productive and unproductive spending. According to Sala-I-Martin and Barro, (1992) productive expenditures are incorporated in the private production function, whereas, unproductive expenditures are not included. Generally, this means that productive expenditures directly affect economic growth; on the other hand, unproductive expenditures do not have a direct impact on economic growth. Public expenditure composition theory modelled the relationship between particular public expenditure categories and economic growth. In support of the theory, Adam and Bevan (2005) suggested that the impact of fiscal deficit growth in an economy could be negative, positive or ambiguous depending on the budget items financed. This implies that if the budget items financed are productive expenditures, then this is likely to result in improved economic performance.

### **3.2.2 Empirical Literature**

Several scholarly works have argued that the compositional factors of government expenditure have a significant impact on economic growth. A common argument has been for a large increase in expenditure on public investments, believed to have a strong growth effect through their influence on the rate of return on capital, accumulation of private capital and their marginal productivity. Endogenous growth literature has focused more on stock of government infrastructure as a productive input. However, Tanzi and Zee (1997)

argued that this effect should not be limited to infrastructure spending only. Moreover, Ghosh and Gregoriou (2008) pointed out that the growth effect of public recurrent expenditure and public development spending depended on how countries perceived the productivity of the public goods. They added that this varies from one country to another. Thus, the public recurrent expenditure could be growth enhancing in one country but not the other.

There exists a positive relationship between economic development and public recurrent spending (Kweka and Morrissey (2000); Devarajan *et al.* (1996); Busatto (2011); Ghosh and Gregoriou (2008); Chinwe *et al.* (2012)). A study conducted by Devarajan *et al.* (1996) revealed that for the 43 developing nations investigated, there existed a significant positive impact of public spending that is recurrent on the total GDP growth. Surprisingly, the study also found that public investment expenditure negatively impacted on per capita real GDP. The study also recorded that the share of public recurrent expenditure had a positive impact on growth. Moreover, the study explains if productive expenditure were already excessive, a share increment in aggregate expenditure will negatively influence economic development.

Ghosh and Gregoriou (2008) also supported the findings of this research. They carried out a separate research by developing a model of 15 countries, the measurement of the time series being 28 years. The findings of their analysis revealed that there was economic growth was impacted positively by public recurrent expenditure. On the other hand expenditure on public investments impacted negatively on economic development. The model used by Ghosh and Gregoriou (2008) solved for three endogenous variables; maximum shares of both

expenditure items in aggregate expenditure, optimum tax rate and the maximum rate of growth. The study considered bias of omitted variables that might have resulted from only including tax revenue on the revenue side of the government budget constrain. From the perspective of maximum financial policy, countries that perceived recurrent spending correctly experienced an increase in public expenditure share. This triggered an increase in economic growth. Additionally, it was also noted that those countries that focused allocation of funds towards development spending other than recurrent spending, based their decisions on rent seeking and not productivity considerations. This is because it is easier for corrupt public officers to seek rent from execution of mega infrastructural projects as opposed to recurrent expenditure such as salaries and wages that are less discretionary in nature.

Kweka and Morrissey (2000) used Tanzanian data for the period 1965 – 1996. The study proxied private investment with private capital formation and public investment spending with development expenditure. The study also used public recurrent expenditure less expenditure on health and education to proxy government consumption. The study found a negative effect of increased development expenditure on the growth of the economy. Also it was clear that increased government consumption expenditure, highly associated with increased private consumption, positively affected economic growth. However, investments in human resources were found to be insignificant. Kweka and Morrissey (2000) argued that economic development could be improved by investing in human capital. However, they noted that disincentive effects associated with higher taxation and deficit financing could be growth retarding. In addition to the



inefficiencies of public investment expenditure (because of rent seeking behavior of public officers), the net growth effect is likely to be negative. Kweka and Morrissey (2000), therefore, concluded that what matters is whether public investment influences productivity and not their level.

Busatto (2011) carried out an analysis on public expenditure composition and the effects it had on economic development. The research was focused on Rio Grande do Sul in Brazil. Correlation analysis and linear regression were applied. The results revealed that public recurrent expenditure in the State had a positive effect on economic growth. Specifically, public recurrent expenditure subgroups, that is, wages and salaries and other recurrent expenditure, were found to enhance economic growth. However, the research failed to test for the casualty direction between economic growth and recurrent spending. Thus, the possibility of an opposite effect could not be ruled out. That is, recurrent spending could not be causing GDP growth but rather GDP growth could be enhancing generation of more tax revenue, thus creating room for higher recurrent spending by the state. Further, the study found an insignificant effect in economic growth with regard to public expenditure. Busatto (2011) attributed this to low capital spending levels which is insufficient in altering GDP growth rate. There exists a stable long-run connection between economic development and recurrent expenditure. This indicates that recurrent public expenditure positively influences economic growth (Chinwe *et al.* 2012).

There are authors such as Afonso and Furceri (2008), Barro (1990), Manh and Terukazu (2005), Ghura (1995), Haque (2003), Gupta *et al.* (2005), Grier and Tullock (1989), and Arewa and Nwakahma (2013) who pointed out that increase in

public recurrent expenditure (government consumption) is actually economic growth retarding. Most of these researches followed Barro (1990) argument that public investment expenditure is productive whereas expenditure on government consumption is unproductive. Grier and Tullock (1989) using 1950 – 1981 panel data for 113 countries recorded that an increase in recurrent public expenditure is correlated negatively with the growth of an economy.

Barro (1990) argues that productivity in the private sector is enhanced by an increase in public investment spending whereas public recurrent spending is economic growth retarding. Barro (1990) noted that public recurrent expenditure is less growth enhancing since it introduces distortions in the economy but provide no stimulus to private investments. Ghura (1995), who used 1970-1990 panel data of 33 Sub Saharan Africa countries, realized similar results. Jones *et al.* (2001) also observed that analysis based on endogenous growth model suggested that high level of recurrent public expenditure adversely impacted on the performance of the economy.

Haque (2003) pointed out that increased public recurrent expenditure is most likely to negatively affect the growth of an economy. The study added that this could be as a resulting from the negative impact of the increase in recurrent public expenditure on productivity of private sector and reduced returns on investment due to rise in taxes to finance them. Manh and Terukazu (2005) analysed data collected from 1970 to 2001 from a sample of 105 countries. The research used the fixed-effect model based on Devarajan *et al.* (1996). The results of the analysis indicated that private investments, foreign direct investments and public capital positively affected economic performance. On the other hand, public

recurrent spending had negative effect on economic development. Additionally, the results suggest that excess public investments could limit benefits incurred from foreign direct investments.

Gupta *et al.* (2005) carried out a study to analyze the effects of the composition of public expenditure and fiscal consolidation on economic growth. The results showed that countries with government spending on wages had lower growth, whereas those with high allocations for capital and non-wage items experienced faster economic growth. The results also supported the argument that there is a strong link between reforms on public expenditure and economic growth, as fiscal adjustments realized by curtailing recurrent expenditure were found to be more conducive to growth. More specifically, public wage bill reduction was found not to be harmful to economic growth for the whole sample of 39 countries characterized as low-income (Gupta *et al.*, 2005). Additionally, the study found out that fiscal consolidations tend to impact most on economic growth when they result in reduced domestic borrowing. The empirical findings averagely recorded that a one percent decrease in fiscal deficit to the ratio of GDP increased the per capita growth by 0.5 percent the short and long run. Manh and Terukazu (2005) also noted that an increasing public expenditure requires higher taxes, which are distortionary thus lowers the economic growth rate.

Afonso and Furceri (2008) analysed these impacts in relation to volatility, size, revenue from the government and government spending on growth based on countries in the European Union and OECD. The study found out that both set of countries' government consumption and subsidies negatively impacted on the growth of the economy. Subsequently, the results indicated that public investment

had no significant economic growth effect, and that transfers had positive influence for European Union countries. The study used pooled country and time fixed effects model. For European Union countries, government consumption and volatility in investments were found to have a significantly negative effect on economic growth.

.Afonso and Furceri (2008) argued that government capital investment might indeed turn out to be less productive if it crowds out private investment or if it is devoted to inefficient projects. The study explained that the negative impact of government consumption and subsidies on economic growth could be because of subsidies providing some disincentives and being distortionary. In Nigeria, Arewa and Nwakahma (2013) showed that public recurrent spending retards growth in the economy whereas economic growth is enhanced by public investment spending.

Maingi (2010) used an estimated Vector Auto Regression (VAR) model and variance decomposition analysis to inspect the impact of the components of economic growth of public spending in Kenya. The study disaggregated public expenditure into the following components: physical infrastructure, public debt servicing, general administration and services, government consumption expenditure, public investment, education and training, general order and national security, defence, healthcare, and economic affairs. The impact of a shock in public components of expenditure was realized for a period of between 10 and 15 years. This implied that the components of public expenditure had long-run economic growth effects. One standard deviation shock on government consumption was found to have a mixed impact on GDP growth rate that lasted for 15 years. The government consumption expenditure had a positive impact on the

growth of the economy in the short run, while the effect was negative in the long run. Maingi (2010) theorized that the proliferation in total demand via the multiplier effect conceivably would have contributed to the positive effect. On the other hand, the research explained that the crowding out effect owing to a decrease in household disposable income could have resulted in the negative impacts. Maingi (2010) also recorded a positive impact in economic growth in Kenya and development of physical infrastructure.

A research carried out by Mudaki and Masaviru (2012) made use of Kenya's data for the period 1972 to 2008 to analyze the impact of public expenditure on economic growth in all sectors. However, the research did not look at recurrent versus public investment components of the sectoral expenditures. Using vector error correction model, Muthui *et al.* (2013) employed time series data ranging between 1964 – 2011 to investigate economic growth effects of public spending on education, health, security infrastructure, defence and public order in Kenya. The study found a positive, immediate and sustained growth effect of a shock on public infrastructure expenditure on Kenya's GDP. Just like Mudaki and Masaviru (2012), the study by Muthui *et al.* (2013) did not disaggregate public expenditure into recurrent and development items.

### **3.2.3 Overview of Literature**

The literature reviewed showed that the effect of public recurrent expenditure on economic performance is inconclusive. The summary of the literature reviewed was as follows:

<b>Dependent Variable</b>	<b>Key Explanatory Variables</b>	<b>Key Findings</b>
Economic Growth (Gross Domestic Product)	Public recurrent expenditure	<p>-Devarajan <i>et al.</i> (1996), Kweka and Morrissey (2000), Ghosh and Gregoriou (2008), Busatto (2011) and Chinwe <i>et al.</i> (2012) showed that public recurrent expenditure have a positive effect on economic growth.</p> <p>- Maingi (2010) showed that in the short-run, state-sanctioned consumption expenditure in Kenya had a positive impact on economic growth. However, an adverse effect was instead recorded in the long-run.</p> <p>-On the other hand, Grier and Tullock (1989), Barro (1990), Ghura (1995), Haque (2003), Manh and Terukazu (2005), Gupta <i>et al.</i> (2005), Afonso and Furceri (2008), and Arewa and Nwakahma (2013) found a negative effect of public recurrent spending on economic growth. Most of these studies followed Barro (1990) argument that public investment spending is productive whereas expenditure on government consumption is unproductive.</p>
	Public Development Expenditure	<p>-Public development expenditure has a positive effect on economic growth (Aschauer, 1989; Barro, 1990; Easterly and Rebelo, 1993; Haque, 2003; Gupta <i>et al.</i>, 2005).</p> <p>- Busatto (2011) found an insignificant economic growth effect on the part of public investment spending. This was attributed to low level of capital spending, which is insufficient to alter GDP growth rate</p> <p>-Ghosh and Gregoriou (2008) showed that public investments had a negative effect on economic growth.</p> <p>-Kweka and Morrissey (2000) used Tanzanian data for the period 1965 – 1996. The study proxied private investment with private capital formation and public investment spending with development expenditure. The study showed an adverse effect of increased development expenditure on economic growth. The study also showed that increased government consumption expenditure, highly associated with increased private consumption, had a positive effect on the growth of the economy.</p>

Source: Authors (2019) Compilation

The summary above shows that some studies found a positive impact of public recurrent expenditure on economic growth. These studies include Devarajan *et al.* (1996), Kweka and Morrissey (2000), Ghosh and Gregoriou (2008), Busatto (2011) and Chinwe *et al.* (2012). On the other hand, studies by Grier and Tullock

(1989), Barro (1990), Ghura (1995), Haque (2003), Manh and Terukazu (2005), Gupta *et al.* (2005), Afonso and Furceri (2008), and Arewa and Nwakahma(2013) found a negative effect of public recurrent expenditure on economic growth. The inconclusive results could be due to differing methodologies and/or data problems. Most of the empirical studies are based on cross-country panel data. However, this paper focused on one country (Kenya) using disaggregated sector specific panel data. A single country study avoids the difficulties faced by cross-country panel studies. The main challenge in cross-country studies derives from the omitted or poorly measured country specific factors.

The studies specific to Kenya, that is, the study by Maingi (2010), Mudaki and Masaviru (2012), and Muthui *et al.* (2013) did not disaggregate public expenditure in terms of public recurrent and investment spending. Instead, they focused on the functional allocation of public expenditure per sector and analyzed the economic growth effects of total sector allocations without disaggregating them. Empirical evidence on economic growth effect of increased public recurrent spending in Kenya is therefore scarce. This study therefore sought to fill this gap by focusing on the public recurrent expenditure at the sector level. The study also sought to contribute to knowledge on whether increased government spending on recurrent budget items is economic growth enhancing or retarding

### **3.3 Methodology**

#### **3.3.1 Research Design**

This paper employed quantitative research design using macro panel data from seven sectors in Kenya over a period of 16 years running from fiscal year 1999/2000 to 2014/15. Study period was chosen in view of the limited disaggregated data for the budgetary votes in the various sectors. More importantly, the intention was to focus on most recent period in view of the changes that Kenya has experienced in its governance and public finance management since 2002. Therefore, the paper made use of sector level data. The sectors used as units of analysis were:

- (i) Agriculture and Rural Development Sector (ARD);
- (ii) Human Resource Development Sector (HRD);
- (iii) Energy, Infrastructure Development, Information & Communications Technology Sector (EIICT);
- (iv) Environmental Protection & Water Sector (EPW);
- (v) General Economic and Commercial Affairs Sector (GECA);
- (vi) Social Protection, Culture, Recreation, Other Services, Governance, Justice, Law and Order Sector (SPGJLO); and
- (vii) National Security, Government Administration, and International Relations (NSPI) sector.

The analysis borrowed from the categorization of sectors used by Kenya's Office of the Controller of Budgets, with a few adjustments for purposes of analytical convenience. The quantitative analysis of the data first involved carrying out



diagnostic tests to analyse features of the variables included in the empirical model and to identify the most appropriate estimation method. Further, the paper carried out post estimation tests to establish the efficiency of the estimator before interpreting and discussing the findings.

### 3.3.2 Theoretical Framework

This paper was anchored on the endogenous growth model by Barro (1990). The model consisted of a representative, infinite-lived household in a closed economy seeking to maximize the overall utility given by:

$$U = \int_0^{\infty} \frac{c^{1-\sigma} - 1}{1-\sigma} e^{-\rho t} dt \dots\dots\dots (3.1)$$

Where  $c$  is consumption per person,  $\rho > 0$  is constant rate of time preference,  $\sigma > 0$  is elasticity which indicate that the marginal utility has constant elasticity  $-\sigma$  and  $t$  captures the time period.

Following Rebelo (1991), the model assumed constant returns to a broad concept of capital thus the household-producer's production function was given by:

$$y = Ak \dots\dots\dots (3.2)$$

Where  $y$  is output per worker,  $k$  is capital per worker and  $A > 0$  is the constant net marginal product of capital. The model assumed that each person worked a given amount of time so that there was no labour-leisure choice. The production function showed roughly constant returns to scale in human and non-human (physical)

capital taken together but diminishing returns in either input separately (Barro, 1990). The economy was argued to transition from an arbitrary starting ratio of physical to human capital to a steady-state ratio. In maximization of the representative household's overall utility in Equation 3.1, Barro (1990) indicated that growth rate of consumption at each point in time was given by:

$$\frac{\dot{c}}{c} = \frac{1}{\sigma}(f' - \rho) \dots \dots \dots (3.3)$$

Where  $f'$  is the marginal product of capital in  $y = f(k)$  production function, which is similar to  $A$  in Equation 3.2. Substituting  $f' = A$  in Equation 3.3 yield a per capita growth rate ( $\gamma$ ) given by:

$$\gamma = \frac{\dot{c}}{c} = \frac{1}{\sigma}(A - \rho) \dots \dots \dots (3.4)$$

The corresponding inequality conditions presented by Barro (1990) was

$$A > \rho > A(1 - \sigma) \dots \dots \dots (3.5)$$

Where the first part of the inequality implied a positive per capita growth rate ( $\gamma$ ) in Equation 3.4 whereas the second part of the inequality implied that the attainable utility was bounded. Barro (1990) argued that the economy is always at a position of steady – state growth in which consumption per person, capital per worker and output per worker grow at the rate  $\gamma$  given by Equation 3.4.

Barro (1990) modified the growth model in Equation 3.2 by incorporating the public sector in which government services are provided without user charges, are non-rival and are used as inputs in the household – producer production function. This presented a potentially positive linkage between government spending and economic growth. Since the public services were assumed to be non-

rival for the users, it was the total of government purchases, rather than the amount per capita, that mattered for each individual. The quantity of government services provided to each household-producer ( $g$ ) was included in the model as a separate argument since it was assumed not to be close substitutes for private inputs ( $K$ ). Therefore, production function was given by:

$$y = \varphi(k, g) = k \cdot \varphi\left(\frac{g}{k}\right) \dots \dots \dots (3.6)$$

Where  $\varphi$  satisfied the conditions for positive and diminishing marginal products,  $k$  was the representative producer's quantity of capital and  $g$  was the quantity of government services provided to each household-producer that can be measured by the per capita quantity of government purchases of goods and services. The production function exhibited constant returns to scale in  $k$  and  $g$  together but diminishing returns in  $k$  separately. Barro (1990) normalized the number of households to unity so that  $g$  corresponded to aggregate expenditures and  $T$  to aggregate revenues and further assumed that the public expenditure was financed contemporaneously by a flat-rate income tax presented as:

$$g = T = \tau y = \tau \cdot k \cdot \varphi\left(\frac{g}{k}\right) \dots \dots \dots (3.7)$$

Where  $T$  is the government tax revenue and  $\tau$  is the tax rate. This equation constrained the government to run a balanced budget.

In the setting where public expenditure also finances some services that enter into households' utility functions, the total spending per household is assumed to be  $g + h$ , where the quantity  $h$  represents the government's consumption services. Thus, the government budget constraint becomes:

$$T = (\tau_g + \tau_h) \cdot y \dots \dots \dots (3.8)$$

Where  $\tau_g = g/y$  the public expenditure ratio for is productive services and  $\tau_h = h/y$  is the ratio for consumption services.

The infinite-lived household's overall utility in Equation 3.1 was then given by:

$$U = \int_0^{\infty} \frac{(c^{1-\beta} \cdot h^{\beta})^{1-\sigma} - 1}{1-\sigma} e^{-\rho t} dt \dots \dots \dots (3.9)$$

Where  $0 < \beta < 1$ . With the households' choices for consumption and saving (with  $g$  and  $h$  taken as given), Barro (1990) presented the steady-state growth rate as:

$$\gamma_h = \frac{1}{\sigma} \left[ (1 - \tau_g - \tau_h) \cdot \varphi \left( \frac{g}{k} \right) \cdot (1 - \aleph) - \rho \right] \dots \dots \dots (3.10)$$

Where  $\gamma_h$  is the new steady state growth rate with public expenditure included in the model,  $\aleph$  is the elasticity of  $y$  with respect to  $g$  (for a given value of  $k$ ), so that  $0 < \aleph < 1$  and the other variables are as defined before. Barro (1990) noted that in the model the growth-maximizing share of productive government spending was smaller if the government was also using the income tax to finance other types of spending.

### 3.3.3 Model Specification

The specification of the empirical model for this paper borrowed from the models used by Ram (1986), Devarajan *et al.* (1996), and Ghosh and Gregoriou (2008). Ram (1986) assumed that the economy consists of two sectors, public sector (G) and private sector (Pr), whereas output in the two sectors depended on

Labour ( $L$ ) and capital ( $K$ ). Output in the private sector also depended on the externality effect of government output so that the production functions of the sectors were given by:

$$Y_G = f(L_G, K_G) \dots \dots \dots (3.11a)$$

$$Y_{Pr} = f(L_{Pr}, K_{Pr}, Y_G) \dots \dots \dots (3.11b)$$

Where  $Y_G$  is government output, which is also an input in the private sector production function,  $Y_{Pr}$  is the private sector output,  $L_G$  and  $K_G$  are government's labour and capital inputs,  $L_{Pr}$  and  $K_{Pr}$  are private sector's labour and capital inputs. The total output ( $Y$ ) in the economy was given by the sum of the output of the government and private sector:

$$Y = Y_G + Y_{Pr} \dots \dots \dots (3.11c)$$

Ram (1986) also assumed that the factor productivity in the two sectors differed such that

$$\frac{\partial Y_G / \partial L}{\partial Y_{Pr} / \partial L} = \frac{\partial Y_G / \partial K}{\partial Y_{Pr} / \partial K} = (1 + \delta) \dots \dots \dots (3.12)$$

Where  $\delta$  indicates which sector has higher marginal productivity such that  $\delta > 0$  imply that the public sector has a higher input productivity. Upon manipulation of the production functions and using Equation 3.12, Ram (1986) derived the following growth equation:

$$\dot{Y} = \alpha (I/Y) + \beta \dot{L} + [(\delta / (1 + \delta)) - \theta] \dot{Y}_G \left( \frac{Y_G}{Y} \right) + \theta \dot{Y}_G \dots (3.13)$$

Where:  $\dot{Y}$  is the rate of total output growth;  $I$  is investment which is assumed to be equal to  $\delta K$ ;  $\dot{L}$  is the rate of growth in labour force;  $\dot{Y}_G$  is the rate of growth of public sector output;  $\alpha$  is the marginal product of capital in the private sector;  $\beta$  is the elasticity of private sector output with respect to labour; and  $\theta$  is the elasticity of private sector output with respect to  $Y_G$ .

In order to produce public sector output  $Y_G$ , Ghosh and Gregoriou (2008) who extended the work of Devarajan *et al.* (1996) specified two types of government spending  $g_1$  and  $g_2$  which was argued to be public investment spending and public recurrent spending respectively. The model by Barro (1990) and Devarajan *et al.* (1996) assumed a balanced budget. However, Ghosh and Gregoriou (2008) extended their model by incorporating the government borrowing and interest payment on debt to fully consider the government budget constraint. Hence, the government budget constraint was given by:

$$g_1 + g_2 = \tau(y + rb) + \dot{b} - rb \dots \dots \dots (3.14)$$

Where  $\tau$  is tax rate (constant over time),  $b$  is government borrowing,  $r$  is the interest rate on government debt. The right-hand side of Equation (3.14) presents Net Revenue (NR), that is, total revenue less interest payment on debt. The shares of Net Revenue (NR), used to finance public expenditure on the two public goods ( $g_1$  and  $g_2$ ), was given by:

$$g_1 = \phi (NR) \text{ and } g_2 = (1 - \phi)NR \dots \dots \dots (3.15)$$

Where  $0 \leq \phi \leq 1$

The representative agent's utility, which is derived from private consumption ( $c$ ), is isoelastic and was given by Equation 3.1 whereas the representative agent's budget constrain in the Ghosh and Gregoriou (2008) model was given by:

$$\dot{k} + \dot{b} = (1 - \tau)(y + rb) - c \dots \dots \dots (3.16)$$

The representative agent's problem is to choose  $c$ ,  $\dot{k}$  and  $\dot{b}$  to maximize utility ( $U$ ) subject to the budget constrain given by Equation (3.16), taking  $\tau$ ,  $g_1$  and  $g_2$ , and also the initial values of capital and government borrowing ( $k_0$  and  $b_0$ ) as given. Taking the private sector's choices as given, Ghosh and Gregoriou (2008) argued that the objective of the government in a decentralized economy is to run the public sector in the nation's interest. The problem of the government therefore is to choose  $\tau$ ,  $g_1$  and  $g_2$  to maximize utility of the representative agent subject to the government budget constrain, the representative agent's budget constrain and the Euler Equation from the first order condition of representative agent's utility maximization problem. The government takes  $k_0$  and  $b_0$  as given.

Specifying the model used in this paper, public expenditure entered the private sector's production function as input and as complement to the private sector investments in the country. Government is assumed to raise taxes optimally without distortion and then chooses how much to spend on public investment and recurrent items. To avoid perfect collinearity among explanatory variables, the model does not include government revenue and budget balance or government borrowing variables that capture the government budget constrain. Additionally, the public expenditure compositions were not categorized into those that are considered productive or unproductive. This was left to come out in the analysis, as

Devarajan *et al.* (1996) did. This paper employed the following distributed lag model:

$$\begin{aligned}
 SGDPg_{it} = & \sum \beta_j \left( \frac{G_{re,it-j}}{SGDP_{it-j}} \right) + \sum \vartheta_n \left( \frac{G_{de,it-n}}{SGDP_{it-n}} \right) + \sum \varphi_z \left( \frac{SK_{it-z}}{SGDP_{it-z}} \right) \\
 & + \sum \omega_r SLg_{it-r} + \sum \tau_p \left( \frac{PC_{t-p}}{SGDP_{it-p}} \right) + \rho_i + \sigma_t \\
 & + \varepsilon_{it} \dots \dots \dots (3.17)
 \end{aligned}$$

Where:

$i$  denote the cross-sectional dimensions

$t$  denotes time series dimensions (from 2000 to 2015)

$\beta_j, \vartheta_n, \tau_p, \omega_r, \varphi_z$ . are coefficients

$j, n, p, r, z$  are the lag lengths of the respective independent variables

$SGDP$  is real sectoral GDP

$SGDPg$  is real sectoral GDP growth

$G_{re}$  is real sectoral public recurrent expenditure

$G_{de}$  is real sectoral public development spending

$SLg$  is growth in government labour force in the sector (growth in number of government employees in the sector)

$SK$  is real sectoral gross fixed capital formation (which includes private investment)

$PC$  is real private final consumption expenditure

$\rho_i$ , is time-invariant unobserved sector-specific fixed effect, for instance, differences in the initial level of sectoral GDP growth.

$\sigma_t$  is the unobservable individual-invariant time effects



$\varepsilon_{it}$  is the error terms for sector  $i$  at time period  $t$ .

### **3.3.4 Definition and Measurement of Variables**

The general price level used to convert the nominal variables into real values is captured by the average of the quarterly Consumer Price Indices (CPIs) in the respective fiscal years.

*Real Growth in Sectoral GDP* is real growth in Gross Domestic Product for each sector. It was measured by change in sectoral GDP expressed as a ratio of the previous (base) year's GDP. It was the dependent variable in the analysis. Since the GDP by activities, used to obtain sectoral GDP, are reported in calendar years by Kenya National Bureau of Statistics (KNBS) while other variables are reported for the fiscal years (July to June), the GDP data was transformed by getting a moving average of the subsequent years. For example, the sectoral GDP for FY 2001/2002 was obtained by averaging GDP for calendar years 2001 and 2002. The same applied to the other years.

*Real Public recurrent expenditure* captures the aggregate public recurrent expenditure incurred by the government at sector level in each fiscal year. It includes the expenditures of compensating government employees and all other non-wage recurrent expenditure incurred by the sectors, measured in Kenya Shillings. The expected economic growth effect of the variable was ambiguous in view of the mixed results from the various studies. Devarajan *et al.* (1996), Kweka and Morrissey (2000), Ghosh and Gregoriou (2008), Busatto (2011) and Chinwe *et al.* (2012) found that public recurrent expenditure have a positive effect on economic performance. On the other hand, Grier and Tullock (1989), Barro

(1990), Ghura (1995), Haque (2003), Manh and Terukazu (2005), Gupta *et al.* (2005), Afonso and Furceri (2008), and Arewa and Nwakahma (2013) found a retarding effect of public recurrent spending on economic growth.

*Real Public Development Expenditure* captures the annual public development spending at sector level, in Kenya Shillings. The expected result was that public development expenditure has a positive effect on economic growth (Aschauer, 1989; Barro, 1990; Easterly and Rebelo, 1993; Haque, 2003; Gupta *et al.*, 2005).

*Sectoral Gross Fixed Capital Formation* is the expenditure on fixed assets by category of item in each financial year, reported in the Kenyan currency. This was linked to the sectors. It measured the net increase in fixed assets (capital) in the economy. This captured the private sector investments in the sectors as well. The expected result was that the variable would have a positive effect on economic growth (Ghosh and Gregoriou, 2008; Devarajan *et al.*, 1996).

*Growth in government labour input* captures the change in number of government employees per sector in each fiscal year divided by the previous year's (base) number of government employees in the sector. The figures captured employment stock as at 30<sup>th</sup> June as reported by the Kenya National Treasury. The data on private sector employees for every sector was not available. Therefore, the only available data on government employees was employed in the analysis. An increase in government labour input was expected to lead to an increase in real sectoral GDP growth (Ram, 1986; Barro, 1990).

*Real private final consumption expenditure* was computed by finding the difference between total final consumption expenditure and general government

final consumption expenditure in Kenya, measured in Kenya Shillings by the World Bank. Final consumption expenditures are reported in calendar year thus the data was transformed by getting a moving average of the subsequent years to obtain fiscal year figures like in the case of the GDP data.

### **3.3.5 Data Sources and Type**

The paper made use of seven sector panels (see Table A5 in Appendix II) as units of analysis. Data on sectoral GDP and sectoral gross fixed capital formation (expenditures on fixed assets by category of item and their expenditure shares at current prices) was extracted from Kenya Economic Survey publications (see Table A6 in Appendix II). The values of the types of assets were categorised into the respective sectors.

Sector level data on the distilled recurrent public expenditure, number of employees, and the development expenditure was extracted from Kenya National Treasury's reports on Annual Estimates for Recurrent Expenditure and Development Expenditures (approved gross estimates for the various budgetary votes; Ministries, State Departments, State Corporations and Commissions) and Supplementary Budget Estimates. These were categorized into the respective sectors and aggregated to come up with sector level data used in the analysis.

Data on total final consumption expenditure and general government final consumption expenditure used to compute general private final consumption in Kenya were sourced from the World Economic Indicators repository of the World Bank.

### 3.4 Empirical Analysis and Discussions

The paper made use of short macro panels of 16 years, for the period 1999/2000 to 2014/2015. The period (T) was too brief to infer any dependable time series results for any lone group but sufficiently lengthy to encapsulate the dynamics of the variables comprising the model. The cross-sectional unit (n) consist of seven sectors. Therefore, this is unbalanced panel, with time dimension higher than the cross-sectional dimension (T > n dimension).

#### 3.4.1 Descriptive Statistics

The macro panel was unbalanced and consisted of seven sectors (n), observed at 16 different periods (T) thus there are 112 total observations (N) for every variable on average.

**Table 3.1: Descriptive Statistics**

Variable	Mean	Standard Deviation	Minimum Value	Maximum Value
Cross-sectional units, ID ( <i>i</i> )	4	2.0090	1	7
Time dimension, Year ( <i>t</i> )	2007.5	4.6305	2000	2015
Sectoral GDP Growth ( <i>SGDP<sub>git</sub></i> )	0.0446	0.1104	-0.5470	0.4373
Sector Public Recurrent Expenditure as a proportion of Sectoral GDP ( $\frac{G_{re,it}}{SGDP_{it}}$ )	0.33462	0.3630	0.0067	1.2014
Sector Public Development Expenditure as a proportion of Sectoral GDP ( $\frac{G_{de,it}}{SGDP_{it}}$ )	0.1144	0.1018	0.0103	0.58102
Sector Gross Fixed Capital Formation as a proportion of Sectoral GDP ( $\frac{SK_{it}}{SGDP_{it}}$ )	0.1196	0.2193	0	0.7436
Sector Growth of Government Labour Force ( <i>SLg<sub>it</sub></i> )	0.0587	0.6078	-0.9133	5.5382
Private Final Consumption as a proportion of Sectoral GDP ( $\frac{PC_{it}}{SGDP_{it}}$ )	14.0231	12.6136	2.7951	47.1582

Source: Authors (2019)

The explanatory variables were expressed as a share of sectoral GDP except *SLg*, which captured the growth in government employees in the sectors.

### **3.4.2 Diagnostic Tests Results**

In checking for panel unit roots, this analysis made use of Levin, Lin and Chu (2002) (LLC) test, Im, Pesaran and Shin (2003) (IPS) test and Augmented Dickey Fuller (ADF) Fisher unit root test proposed by Maddala and Wu (1999). The results for the panel unit root tests were as presented in Table 3.2. The null hypothesis for Levin-Lin-Chu unit-root test is that panels contain unit roots. For Im-Pesaran-Shin unit-root test, the null hypothesis is that all panels contain unit roots with the alternative that some panels are stationary. The null hypothesis for Augmented Dickey-Fuller Fisher-type unit-root test suggests that unit roots exist in all panels, with the alternative hypothesis suggesting the contrary – that albeit one panel would be stationary.

**Table 3.2: Panel Unit Root Test Results**

Variable (Specification)	Test in...	LLC Test	IPS Test	Fisher - ADF Test	Conclusion
		<i>Adjusted t-statistic</i>	<i>W-t-bar Statistic</i>	<i>Inverse chi-squared(14) Statistic</i>	
Sectoral GDP Growth ( $SGDPg_{it}$ ) (Trend & Lag length =1)	Levels	-7.2061***	-4.3358***	60.5372***	$SGDPg_{it}$ is $I(0)$
	1 <sup>st</sup> Difference	-8.6226***	-6.0578***	88.7802***	
Sector Public Recurrent Expenditure as a proportion of Sectoral GDP ( $\frac{Gre_{it}}{SGDP_{it}}$ ) (Lag length =1)	Levels	0.4446	1.1465	5.9791	$\frac{Gre_{it}}{SGDP_{it}}$ is $I(1)$
	1 <sup>st</sup> Difference	-2.7447***	-2.1571**	28.0916**	
Sector Public Development Expenditure as a proportion of Sectoral GDP ( $\frac{Gde_{it}}{SGDP_{it}}$ ) (Trend & Lag length =1)	Levels	-10.2004***	-2.3383 **	50.2594***	$\frac{Gde_{it}}{SGDP_{it}}$ is $I(0)$
	1 <sup>st</sup> Difference	-3.4505***	-2.7242**	37.8955***	
Sector Gross Fixed Capital Formation as a proportion of Sectoral GDP ( $\frac{SK_{it}}{SGDP_{it}}$ ) (Lag length =3)	Levels	-1.6415*	<i>Insufficient number of time periods</i>	19.7602	$\frac{SK_{it}}{SGDP_{it}}$ is $I(1)$
	1 <sup>st</sup> Difference	-4.3268***		44.8262***	
Sector Growth of Government Labour Force ( $SLg_{it}$ ) (Trend & Lag length =1)	Levels	-0.4622	-0.9663	34.4095***	$SLg_{it}$ is $I(1)$
	1 <sup>st</sup> Difference	-4.3580***	-3.5469***	73.3203***	
Private Final Consumption as a proportion of Sectoral GDP ( $\frac{PC_{it}}{SGDP_{it}}$ ) (Lag length =1)	Levels	-3.6890***	-1.7017**	26.0982**	$\frac{PC_{it}}{SGDP_{it}}$ is $I(0)$
	1 <sup>st</sup> Difference	-2.8603***	-3.3968***	42.3708***	
<p><i>Note: LLC = Levin, Lin and Chu test; IPS =Im, Pesaran and Shin test; ADF = Augmented Dickey Fuller - Fisher unit root; The values in the table are the Test Statistics; (*), (**) and (***) = the series is stationary at 10 percent, 5 percent and 1 percent respectively</i></p>					

Source: Authors (2019)

The unit root tests results showed that the growth of sectoral GDP, share of sectoral development spending in sectoral GDP, and ratio of final private consumption to sectoral GDP were stationary at their levels, meaning that they were integrated of order zero. The results also showed that the share of sectoral recurrent spending in sectoral GDP, share of sectoral gross fixed capital formation

in sectoral GDP and the increase in sectoral number of government employees were stationary on their first difference, meaning that they were integrated of order one. All the variables that were stationary at their levels were also found to be stationary at their first difference.

The Likelihood-ratio (LR) test, in conjunction with the modified Wald test was implemented to test Panel level heteroskedasticity. The null hypothesis formulated was that there existed a constant variance in the panels, or homoskedasticity. Additionally, panel level autocorrelation was checked using the Wooldridge test, with Pesaran's (2004) test of cross sectional independence being executed to test for contemporaneous correlation. The null hypothesis for autocorrelation test is that there is no serial correlation in the panels. On the other hand, the null hypothesis for contemporaneous correlation test is that the residuals are not correlated across entities (no cross-sectional dependence in the data series).

**Table 3.3: Diagnostic Tests Results**

<b>Panel Level Heteroskedasticity Test</b>		
<b>Likelihood-Ratio (LR) Test</b>	<b>Modified Wald Test</b>	<b>Conclusion</b>
LR $\chi^2(6) = 22.39^{***}$ Prob > $\chi^2 = 0.0010$	$\chi^2(7) = 109.34^{***}$ Prob > $\chi^2 = 0.0000$	Heteroskedasticity present
<b>Test for Autocorrelation</b>		
<i>Wooldridge Test</i>	F (1, 6) = 3.413 Prob > F = 0.1142	No first order autocorrelation
<b>Test for Contemporaneous Correlation</b>		
<i>Pesaran's CD Test</i>	Pesaran's Test statistic = 6.129 <sup>***</sup> P-value = 0.0000	Cross-sectional dependence present
<i>Note: (*), (**) and (***) imply statistical significance at 10 percent, 5 percent and 1 percent respectively</i>		

Source: Authors (2019)

The results for the diagnostic tests showed that there was panel level heteroskedasticity in the panel data. To control for this, robust standard errors were employed during the analysis. Additionally, the results showed that there was no first order autocorrelation. However, the results showed cross-sectional dependence in the panels. This was expected in view of the sector level macro panel country specific data used in the analysis. Thus, there was likely to be a lot of commonality across the sectors that form the respective panels, possibly due to unobserved factors common to all sectors.

The selection of the maximum lag to be applied in the estimation of the model was carried out for each cross sectional unit (sector). Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC) and Hannan-Quin Information Criterion (HQIC) were used to determine the optimal lags for each of the panels.



**Table 3.4: Optimal Lag Selection Results**

Panel/Sector	AIC	SIC	HQIC	Optimal Lag Length
Agriculture and Rural Development Sector (ARD)	-3.5974* (Lag =1)	-3.3856* (Lag =1)	-3.8298* (Lag =1)	1
Human Resource Development Sector (HRD)	-3.2479* (Lag =1)	-3.0360* (Lag =1)	-3.4802* (Lag =1)	1
Energy, Infrastructure Development, Information & Communications Technology Sector (EIICT)	-4.0205* (Lag =2)	-3.7784* (Lag =2)	-4.2860* (Lag =2)	2
Environmental Protection & Water Sector (EPW)	-65.6426* (Lag =4)	-65.4454* (Lag =4)	-66.0683* (Lag =4)	4
General Economic and Commercial Affairs Sector (GECA)	-1.7530* (Lag =1)	-1.5412* (Lag =1)	-1.9948* (Lag =2)	1
Social Protection, Culture, Recreation, Other Services, Governance, Justice, Law and Order Sector (SCGJLO)	-62.6647* (Lag =4)	-62.4675* (Lag =4)	-63.0903* (Lag =4)	4
National Security, Government Administration and International Relations sector(NSPI)	-67.5433* (Lag =4)	-67.3461* (Lag =4)	-67.9689* (Lag =4)	4
<i>Note: * indicates the lag order selected by the criterion</i>				

Source: Authors (2019)

The results showed that the three criteria suggested a maximum lag of one for the following panels: Agriculture and Rural Development (ARD) sector, Human Resource Development (HRD) sector, and General Economic and Commercial Affairs (GECA) sector. Additionally, the criteria suggested a maximum lag of four for the following panels: Environmental Protection & Water (EPW) sector, Social Protection, Culture, Recreation, Other Services, Governance, Justice, Law and Order (SCGJLO) sector, and National Security, Government Administration and International Relations (NSPI) sector. However, in the Energy,

Infrastructure Development, Information & Communications Technology (EIICT) panel, the criteria suggested a maximum lag of two. In view of these results, the analysis adopted a maximum lag of four for all the panels.

### **3.4.3 Panel Cointegration Test**

The main tests for panel cointegration are the Pedroni's panel cointegration test (Pedroni, 1999) and Westerlund (2007) four-panel cointegration test. Pedroni test allows for multiple regressors based on the residuals obtained from a static relationship that are less powerful compared to those based on a dynamic model (Westerlund, 2007). Additionally, Pedroni's seven panel cointegration tests assume cross-sectional independence, which is not the case for the model in this paper. Therefore, this paper made use of Westerlund (2007) cointegration test, which imposes no common-factor restriction (Persyn and Westerlund, 2008). Null hypothesis of Westerlund (2007) cointegration test is that there is no cointegration in the data series. The test has four test statistics;  $G_a$  and  $G_t$  test statistics that are based on 'group mean' and  $P_a$  and  $P_t$  test statistics, which are based on pooled information over all cross-sectional units (Persyn and Westerlund, 2008). If  $G_a$  and  $G_t$  test statistics are found to be statistically significant, then there is cointegration in at least one of the cross-sectional units. On the other hand, if  $P_a$  and  $P_t$  test statistics are found to be statistically significant, then there is cointegration in the panel as a whole. Persyn and Westerlund (2008) indicated that the four tests accommodate unit-specific trend, short-run dynamics, cross-sectional dependence, and slope parameters. They are also normally distributed.

In the Westerlund (2007) cointegration tests, stationary variables do not play a role since they do not include the same stochastic trend as the  $I(1)$  variables. However, the dependent variable at its first difference level and independent variables that were found to be integrated of order one,  $I(1)$  are included. In view of the short time series dimension and few cross-sectional units, the results for panel cointegration test are sensitive to choice parameters like lags, lead length, and kernel width (Persyn and Westerlund, 2008). Westerlund (2007) cointegration test results are presented in Table 3.5, beginning with the one where all the variables were included. This is followed by test between dependent variable and each of the explanatory variables integrated of order one.

**Table 3.5: Westerlund ECM Panel Cointegration Test Results**

<b>Variables Included in the Test (Lag Length = 1)</b>	<b>Group Mean Statistics (Gt)</b>	<b>Group Mean Statistics (Ga)</b>	<b>Panel Statistics (Pt)</b>	<b>Panel Statistics (Pa)</b>	<b>Conclusion</b>
<i>Real Sectoral GDP growth, Sector Public Recurrent Expenditure as a proportion of Sectoral GDP, and Sector Gross Fixed Capital Formation as a proportion of Sectoral GDP</i>	-5.369*** (0.0000)	-0.167 (0.434)	-3.700 *** (0.0000)	- 2.524*** (0.006)	Inconclusive
<i>Real Sectoral GDP growth, Sector Public Recurrent Expenditure as a proportion of Sectoral GDP, and Sector Growth of Government Labour Force</i>	-13.960*** (0.0000)	2.284 (0.989)	-4.054*** (0.000)	-0.245 (0.403)	Inconclusive
<i>Real Sectoral GDP growth, Sector Gross Fixed Capital Formation as a proportion of Sectoral GDP, and Sector Growth of Government Labour Force</i>	-7.582*** (0.000)	1.846 (0.968)	-2.759*** (0.003)	-0.861 (0.195)	Inconclusive
<i>Real Sectoral GDP growth and Sector Public Recurrent Expenditure as a proportion of Sectoral GDP</i>	-7.544 *** (0.0000)	- 5.548*** (0.0000)	-6.983*** (0.0000)	- 6.192*** (0.0000)	Panel cointegration confirmed
<i>Real Sectoral GDP growth and Sector Gross Fixed Capital Formation as a proportion of Sectoral GDP</i>	-6.824*** (0.0000)	- 4.170*** (0.0000)	-5.829*** (0.0000)	- 6.028*** (0.0000)	Panel cointegration confirmed
<i>Real Sectoral GDP growth and Sector Growth of Government Labour Force</i>	-6.958*** (0.0000)	- 3.294*** (0.001)	-4.984*** (0.0000)	- 4.133*** (0.0000)	Panel cointegration confirmed
<i>Ho: No panelcointegration; Levels of significance for the test = (*), (**) and (***) imply statistical significance at 10 percent, 5 percent and 1 percent respectively; Test Statistics is the Z-value; the figures in parentheses are P-values</i>					

Source: Authors (2019)

Westerlund ECM panel cointegration test give both group mean and panel statistics. At a level of significance of five percent, test statistics for group and panel statistics showed inconclusive results for the first three combinations of variables. However, in the last three combinations where the dependent variable was included in the test with each of the variables, panel cointegration was

confirmed. This implied a long run relationship in the data series, which called for use of panel Error Correction Model (ECM) to estimate the model.

#### **3.4.4 Selection of the Regression Model**

As indicated earlier, this paper used short unbalanced panels with time series dimension (T) greater than cross-sectional units (n). Therefore, difference or system Generalized Method of Moments (GMM) methods could not be applied in the estimation of the model. This is because difference or system Generalized Method of Moments method require '*small T, large n*' panels that are heteroskedastic. The method is also best applicable in panels where there is autocorrelation within individual units but not across them. The difference or system Generalized Method of Moments (GMM) estimators assume that the only available instruments are 'internal' based on the lags of the instrumented variables but also allow for inclusion of external instruments (Roodman, 2009; Baum, 2013). Thus, to identify an appropriate regression model to implement, the paper relied on panel cointegration test, random effects tests and Hausman test. Null hypothesis for the random effects test is that there is no significant panel effect – no difference across the cross-sectional units (Greene, 2012). For Hausman test, the null hypothesis is that random effects model is preferred (more consistent and efficient) than fixed effects model. In view of heteroskedasticity and contemporaneous correlation, Hausman test that is heteroskedasticity consistent and robust to general forms of spatial and temporal dependence was performed using *xtscc* program.

**Table 3.6: Random Effects and Hausman Tests Results**

Test	Test Statistics	Conclusion
<b>Spatial Correlation-Robust Hausman Test</b>	F (5,12) = 2.20 Prob > F = 0.1222	Random Effects model is preferred over Fixed Effects model
<b>Random Effects Test</b>	Chibar2(01) = 0.00 Prob > chibar2 = 1.0000	No significant panel (random) effect
<i>Note: (*), (**) and (***) imply statistical significance at 10 percent, 5 percent and 1 percent respectively</i>		

Source: Authors (2019)

From the Hausman test results, the conclusion was that the random effects model was more preferred than the fixed effects regression model. However, there did not exist a significant panel effect in the data series as evidenced in the results for the random effects test implying that the random effects model was not appropriate in analyzing the data as compared to Pooled Ordinary Least Squares regression method. These results, the presence of panel cointegration in addition to the different orders of integration of the variables implied that the most appropriate regression model for this analysis was a panel ARDL model. In Panel ARDL, the variables integrated of order two are excluded from the estimation (Pesaran *et al.*, 2001). In this approach, there are Mean Group estimator, Pooled Mean Group estimator, and Dynamic Fixed Effects estimator. The Dynamic Fixed Effects estimator imposes restrictions on the slope coefficients and error variances to be equal across all cross sectional units (Baltagi, Griçn and Xiong, 2000). On the other hand, the Mean Group estimator, introduced by Pesaran and Smith (1995), does not impose any restrictions but is inconsistent if the data does not have sufficiently large time series dimensions and as large as 20 cross sectional units.

The Pooled Mean Group estimator restrains the equivalence of the long run coefficient while allowing the short run parameters, intercept terms, and error variance to vary across groups (Pesaran *et al.*, 1999). The Pooled Mean Group model estimates non-stationary dynamic panels and is suitable when there is reason to expect the similarity between the variables' long-run equilibrium relationship across all or some of the cross sectional units (Pesaran *et al.*, 1999). Therefore, the Pooled Mean Group estimator was suitable in the model estimation of this study. The estimation was done using general to specific method using a maximum lag of four. Several iterations were carried out while dropping the variables at their most insignificant lag levels until an appropriate model explaining the relationship between sectoral GDP growth and the explanatory variables was established.

#### **3.4.5 Test for Consistency and Efficiency of the Estimator**

The consistency and efficiency of the Pooled Mean Group estimator requires the error correction term's coefficient in the long-run relationship to be significant negative and not lower than negative two, and the residuals of the Error Correction model to be serially independent (Pesaran *et al.*, 1999). The post estimation tests carried out were Jarque-Bera normality test, autocorrelation test, and Hausman test for long-run elasticity and homogeneity of the Pooled Mean Group model. Null hypothesis for the Jarque-Bera test states that the 'residuals are normally distributed'. The null hypothesis for autocorrelation test is that there is 'no first order autocorrelation'. The Hausman-type test sought to test the null hypothesis that the Pooled Mean Group estimator was more efficient than the Mean Group estimator (that is, there exists homogeneity of the long-run parameters)..

**Table 3.7: Post-Estimation Tests Results**

<b>Test</b>	<b>Test Statistic</b>	<b>Conclusion</b>
<b>Jarque-Bera test</b>	Adj chi2(2) = 5.22 (P-value = 0.0737)	Residuals normally distributed
<b>Wooldridge Test for Autocorrelation</b>	F(1,6) = 3.285 (P-value = 0.1199)	The residuals are serially independent
<b>Hausman-type test</b>	chi2(5) = 0.14 (P-value = 0.9996)	PMG estimator is more efficient (there is homogeneity of the long-run parameters)

Source: Authors (2019)

The results showed that the residuals are serially independent and normally distributed. The Hausman-type test also showed that Pooled Mean Group estimator was more efficient than Mean Group estimator. The results for the Hausman-type test confirmed homogeneity of the long-run parameters meaning that the long-run elasticity was equal across all the panels as stipulated by the Pooled Mean Group model. These results affirmed that the estimated model was stable, consistent, and efficient in explaining the relationship between sectoral GDP growth and the explanatory variables included in the model.

### **3.4.6 Granger Causality Test**

In an empirical analysis, the results only show the relationship of interest between a dependent variable and its conceived explanatory variables. Therefore, there is need to test for direction of causality between two related variables and whether there is a feedback mechanism between the two variables. Granger causality test is used to test for direction of causality between related variables. It ascertains the order in which an occurrence of interest happens, and attempts to further predict it (Granger, 1969). Granger causality test produces three variants: reject the null in one of the tests (find a one-directional causal relation); reject the



null hypothesis of the two tests (get a bi-directional Granger-causality); or do not reject the null hypothesis. As discussed in Section 2.4.4, Maziarz (2015) pointed out that Granger causality test results have various implications. Therefore, Maziarz (2015) noted that one needs sufficient knowledge about the theoretical mechanisms connecting the two data series and the investigated phenomenon to determine if the discovered relation from the test is erroneous, or indeed true.

Since for panel models a variable may Granger cause another in one panel and not the other, the Granger causality test was done on each of the panels separately. The results were as presented in Table A7 in Appendix II. Results showed that the public recurrent expenditure as a proportion of sectoral GDP Granger caused sectoral GDP growth in the National Security, Government Administration and International relations sector whereas public development expenditure as a proportion of sectoral GDP Granger caused sectoral GDP growth in Agriculture and Rural Development and Environmental Protection and Water sectors. This shows the direction of causality between the components of public expenditure and economic growth at sector level. It also highlights the sectors where public recurrent expenditure and development expenditure significantly influences sectoral economic growth. Additionally, the results showed that growth in government employees in the sectors Granger caused sectoral GDP growth in Human Resource Development and Environmental Protection and Water sectors. This highlights the sectors where growth in government employment effectively enhances sectoral economic performance. The econometric implication of the Grange Causality test results is on whether there exists an endogeneity problem in the estimated model or not. Since the result found unidirectional causalities

running from the explanatory variables to sectoral economic growth, then this signals that endogeneity problem is not a concern in the estimated model.

### **3.4.7 Discussion of the Regression Results**

Based on Equation 3.17, short run and long run models were estimated using the PMG estimator. The regression results were as presented in Table 3.8.

**Table 3.8: Pooled Mean Group (PMG) Estimation Results**

<b>Short Run Results</b>	
<b>Dependent Variable: Change in Sectoral GDP Growth (<math>\Delta SGDP_{g,it}</math>)</b>	
<b>Explanatory Variables</b>	
<i>Change in Sectoral Public Recurrent Expenditure as a proportion of Sectoral GDP</i> $\left(\Delta \frac{G_{re,it-1}}{SGDP_{it-1}}\right)$	-2.7771 (3.9225)
<i>Change in Sectoral Public Development Expenditure as a proportion of Sectoral GDP</i> $\left(\Delta \frac{G_{de,it}}{SGDP_{it}}\right)$	9.1389 (8.9447)
<i>Change in Sectoral Gross Fixed Capital Formation as a proportion of Sectoral GDP</i> $\left(\Delta \frac{SK_{it-1}}{SGDP_{it-1}}\right)$	0.2194 (1.0023)
<i>Change in Sectoral Growth of Government Labour Force (<math>\Delta SLg_{it}</math>)</i>	-0.5454** (0.2174)
<i>Change in Private Final Consumption as a proportion of Sectoral GDP</i> $\left(\Delta \frac{PC_{it-2}}{SGDP_{it-2}}\right)$	-0.0138 (0.0527)
<i>Constant Term</i>	0.0462 (0.1635)
<i>Error Correction Term (ECT)</i>	-0.8082*** (0.3133)
<b>Long Run Results</b>	
<i>Sectoral Public Recurrent Expenditure as a proportion of Sectoral GDP</i> $\left(\frac{G_{re,it-1}}{SGDP_{it-1}}\right)$	-1.1295*** (0.1599)
<i>Sectoral Public Development Expenditure as a proportion of Sectoral GDP</i> $\left(\frac{G_{de,it}}{SGDP_{it}}\right)$	0.4529** (0.2121)
<i>Sectoral Gross Fixed Capital Formation as a proportion of sectoral GDP</i> $\left(\frac{SK_{it-1}}{SGDP_{it-1}}\right)$	0.3243*** (0.0737)
<i>Sectoral Growth of Government Labour Force (<math>SLg_{it}</math>)</i>	1.4157*** (0.3741)
<i>Private Final Consumption as a proportion of sectoral GDP</i> $\left(\frac{PC_{it-2}}{SGDP_{it-2}}\right)$	-0.0089** (0.0045)
Number of observations	77
F – Statistic	14.77*** (Prob > F =0.0002)
Within R-squared	0.2631
<i>Note: Level of significance are denoted by * <math>p&lt;0.1</math>, ** <math>p&lt;0.05</math>, and *** <math>p&lt;0.01</math>. The numbers in parentheses are the standard errors</i>	

Source: Authors (2019)

Since the Pooled Mean Group estimator does not give the F-statistic and the R-squared figures, the statistics were obtained from a modification of the Driscoll and Kraay's (1998) original covariance matrix estimator, which controls

for heteroskedasticity, autocorrelation and the general cross-sectional dependence forms (Hoechle, 2007). The F-statistic was significant. Meaning, the variables included in the model were jointly significant in predicting the sample variations in sectoral GDP growth.

The R-squared indicated that the variables included in the model explained 26.31 percent of the total variability in sectoral GDP growth. The relatively low reported R-squared was expected for the panel model. This is clear from the fact that when calculating the R-squared in panel models, no explanatory power is usually assigned to the individual intercepts. Thus, the reported R-squared is always low and is only comparable to that from cross sectional models. For time series models, there is no variations across units of analysis hence the reported R-squared is always high. The regression results showed that the error correction term coefficient was negative and significant at one percent significance level. This implied that the system adjusts quickly towards long run equilibrium at a speed of 80.82 percent.

For the variables expressed as ratios, one unit change is interpreted as a 100 percent change in their proportional share in sectoral Gross Domestic Product. The empirical results demonstrated that, in the short run, the sector public recurrent expenditure as a proportion of sectoral GDP had an insignificant negative coefficient but in the long run, it had a significant negative coefficient. Specifically, the long run results showed that at one percent level of significance, a 100 percent increase in sector public recurrent expenditure as a proportion of sectoral GDP would lead to a decline in sectoral GDP growth by 112.95 percent with a lag of one year. Evidently, these results showed that the persistent increase

in the various components of public recurrent expenditure is detrimental to growth in sectoral GDP. The result supported the findings by Grier and Tullock (1989), Barro (1990), Ghura (1995), Haque (2003), Manh and Terukazu (2005), Gupta *et al.* (2005), Afonso and Furceri (2008), and Arewa and Nwakahma(2013) who found out that there exists a negative relationship between rise in public recurrent spending and economic growth. However, the result does not support the findings of Devarajan *et al.* (1996), Kweka and Morrissey (2000), Ghosh and Gregoriou (2008), Busatto (2011) and Chinwe *et al.* (2012) who found a positive effect of public recurrent spending on economic growth. The result therefore provides an empirical support to the argument that public recurrent expenditure retards economic growth as opposed to the argument that it enhances economic performance.

Sectoral development expenditure as a share of sectoral GDP was found to have a positive but insignificant coefficient in the short run but a significant positive coefficient in the long run. These results show that the sectoral public investments have no immediate impact on Kenya's economic performance. This calls for further investigations so that the government can come up with measures to ensure that the public investments are effective in enhancing the productivity capacity of the economy both in the short term and in the long term. Specifically, the long run results showed that at five percent level of significance, a 100 percent increase in sectoral development expenditure as a proportion of sectoral GDP would lead to 45.29 percent increase in sectoral GDP growth with no lag. The results on public development spending supported the findings and arguments by

Aschauer (1989), Easterly and Rebelo (1993), Barro (1990), Haque (2003), and Gupta *et al.* (2005). The authors argued that it is the public investment spending rather than public recurrent spending that has a positive effect on economic growth. However, the results did not support the findings by Devarajan *et al.* (1996), Ghosh and Gregoriou (2008), and Busatto (2011) that public development spending negatively affects economic growth. This finding therefore provides empirical support to the argument that increased development expenditure enhances the productive capacity of an economy thus positively influences economic growth.

The long-run results showed that at one percent significance level, a 100 percent increase in sectoral gross fixed capital formation as a fraction of sectoral GDP would lead to a 32.43 percent rise in sectoral growth of GDP with a one-year lag. This implies that capital accumulation in the sectors positively influences sectoral economic performance. This is in line with the results from several studies such as Aschauer (1989), Barro (1990), Devarajan *et al.* (1996), and Ghosh and Gregoriou (2008). An increase in sector growth in government labor force was expected to result in an increase in real sectoral GDP growth in both short and long run (Ram, 1986; Barro, 1990). However, the results showed that sector growth in government labour force had a significant negative coefficient in the short run but a positive significant coefficient in the long run. The short run results showed that at five percent level of significance, a percentage increase in growth of government employees in the sectors would lead to a 0.54 percent decline in sectoral GDP growth. However, the long run results showed that at one percent level of significance, a percentage increase in growth in government employees would lead

to a 1.42 percent increase in sectoral GDP growth. The short run results pointed out the fact that growth in government employees may be distortionary in the short term as it results in increased non-productive expenditure on public wage bill financed through distortionary taxes, which suppresses the growth of economy. However, the effect of increase in government employment would be a positive impact on economic performance as the increased aggregate employment in the economy result in improved private savings and private investments in the economy in the long run. These consequently boost economic performance in the long term.

The significant negative coefficient of private final consumption as a proportion of sectoral GDP in the long run was unexpected. According to the Keynesian theory, increased private final consumption is expected to lead to increased aggregate demand in an economy hence increased economic performance. Furthermore, the results showed an insignificant negative coefficient in the short run. However, the long run results showed that at five percent significance level, a 100 percent increase in private final consumption as a proportion of sectoral GDP would lead to a 0.89 percent decline in sectoral GDP growth with a lag of two years. Though this decline in sectoral economic performance is marginal, it brings to question the composition of private consumption in the country. It is a pointer to the fact that a greater proportion of private final consumption could be from imports which is a leakage from the domestic economy. This implies that a great proportion of the aggregate demand in the economy is met through increased imports, contrary to the predictions of the

Keynesian theory that this would lead to increased national output in the domestic economy.

In summary, the paper showed that persistent rise in public recurrent expenditure in the sectors in Kenya retards economic growth whereas expenditure on public development boosts economic growth. The findings showed that, in the long run, the two variables only influence sectoral economic growth unlike in the short run. Additionally, the sectoral gross fixed capital formation and sector growth in government labour force were found to enhance sectoral economic growth in the long run. However, sector growth in government labour force was found to retard the growth of the economy in the short run while private final consumption was found to retard the growth of the economy in the long run..

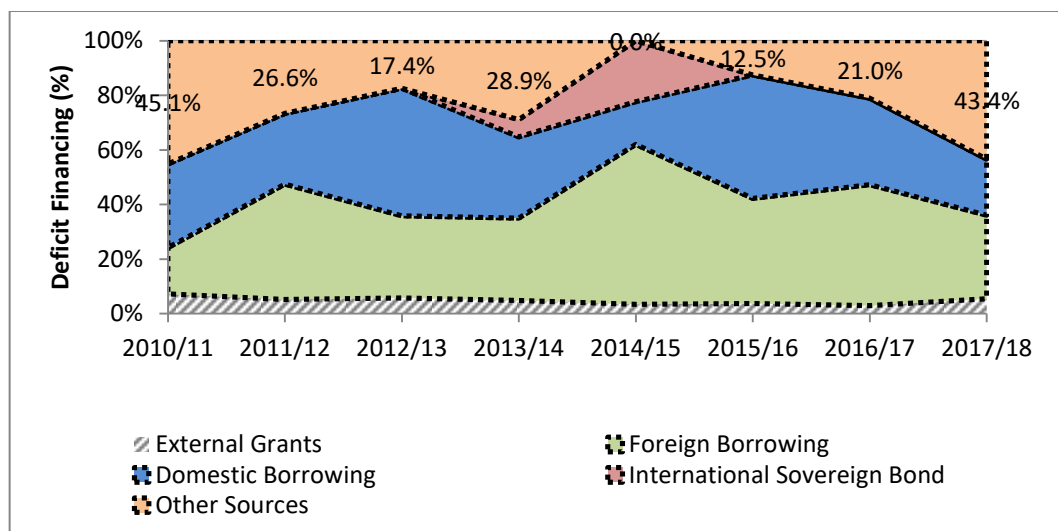


## CHAPTER FOUR

### ANALYSIS OF BUDGET IMBALANCE DYNAMICS

#### 4.1 Background

The macroeconomic health of a country greatly depends on its budget imbalance dynamics. Budget deficits are viewed as the focus of macroeconomic and fiscal adjustments in view of the economic ills associated with them. The economic ills mainly derive from the ways of financing budget deficits, especially when excessively employed. For instance, financing the budget deficits through domestic borrowing may crowd out private investment and consumption (Mashakada, 2013; Easterly and Schmidt-Hebbel, 1991) whereas financing through foreign borrowing may lead to current account deficits (Easterly and Schmidt-Hebbel, 1991). These macroeconomic imbalances may further limit the fiscal consolidation efforts in a country. Figure 4.1 illustrates the alternative sources of finance for budget deficits in Kenya for the financial years 2010/11 to 2017/18.



**Figure 4.1: Budget Deficit Financing in Kenya**

Data Source: Republic of Kenya (2014a; 2016a; 2017; 2018a)

The figure shows that budget deficit in Kenya is financed through domestic borrowing (financed an average of 30.8 percent of the budget deficit between 2010/11 and 2017/18) and external/foreign loans (financed an average of 36.5 percent of the budget deficit over the period 2010/11 - 2017/18). In the financial year 2013/14 and 2014/15, Kenya financed 6.4 percent and 22.4 percent of its deficit respectively using international sovereign bond. In the reviewed period, the external grants have financed an average of 4.8 percent annually of the budget deficit. Key to note is that the government-financed a substantial proportion of the deficit through other sources not clearly explained in the data sources used. These other sources could include monetization of the budget deficit and/or drawing down on foreign exchange reserves. Monetization (money creation) of the budget deficit may increase the base money in an economy, which further generates inflationary pressure (Easterly and Schmidt-Hebbel, 1991; Mashakada, 2013).

Possible monetization of the budget deficit means that the government could be financing part of the deficit through seigniorage that is the difference between the face value of the money and the cost of producing coins or paper money. Seigniorage can be viewed as inflation tax on the public that accrues to the government if the money created is worth more than the cost incurred to produce it. Possible monetization of part of the budget deficit informed the use of the Olivera-Tanzi effect theory in analysis of the budget imbalance dynamics in Kenya. Olivera (1967) modeled an increase in size of budget deficits that occur resulting from inflation when expenditure of the public was associated with the current level of prices, but because of lags in tax collections, government tax revenues are related to previous price levels. Tanzi (1978) noted that it is always

not possible for taxes to be paid to tax authorities at the same time that the taxable activity occurs. Therefore, there are always time lags before the tax is paid. The argument is that during this tax collection time lag, the rise in general price levels in the economy erodes the real value of the tax collections. However, the nominal expenditures by the government increase due to the inflation effects. Consequently, the gap between government revenue collections and expenditure widens thus worsening the budget deficits over time.

In view of the macroeconomic imbalances that may be generated by the budget deficits, it is important to control their expansionary pressure in an economy. To this end, comprehending the factors behind the expansionary budget imbalance dynamics is of importance to policymakers. The available literature has shown that budget imbalances respond to various factors. These include economic factors such as inflation (Olivera, 1967; Tanzi, 1977; Heller, 1980; Aghevli and Khan, 1978), and political economy factors such as type of government (Alesina and Drazen, 1991) and strategic debt accumulation (Alesina and Tabellini, 1990a). The other factors include institutional and structural factors such as the tax reforms (Moyi and Muriithi, 2003); tax revenue performance (Wawire, 1991; 2006; 2017); and demographic factors (Painter and Bae, 2001; Sanz and Velázquez, 2001; Wawire, 2006; 2017). The literature showed that budget imbalances respond to various factors, which might vary from one country to another. It is against this backdrop that this paper sought to provide a broad analysis of budget imbalance dynamics in Kenya. The paper examined the factors that simultaneously influence growth in public expenditure while limiting growth in government revenue at the

same time. Further, it looked at how these factors directly influence the budget imbalance dynamics in the country.

#### **4.1.1 Statement of the Problem**

In the Vision 2030 economic blue print, Kenya aims at maintaining its budget deficit (including grants) down to about 3 percent of Gross Domestic Product over the period (Republic of Kenya, 2007b). However, Kenya remains a perpetual casualty of expansionary budget deficits. Over the period under study (2000 – 2015), Kenya’s persistent budget deficits (including grants) has increased from 3.86 percentage share of GDP in the year 2000 to 13.11 percentage share of the GDP in 2015. This is far from the target of three percent envisioned in Vision 2030 blueprint. Since 2012, the budget deficits (including grants) have worsened from 6.48 percent share of Gross Domestic Product to 9.73 percent share of Gross Domestic Product in 2014 and finally to 13.11 percent in 2015. This is despite the government attempts to carry out austerity measures and efforts to improve on domestic revenue mobilization.

The persistent growth in the budget deficits is worrying due to the pressure it continues to generate for additional government borrowing and the associated economic ills. For instance, fiscal deficits are responsible for an assortment of ills such as high inflation rates, over indebtedness and excluding investments of the private sector (Mindila, Gongera, Nyakwara and Ouma, 2013). These further constrain fiscal consolidation efforts in the country. These consequences of persistent budget deficits called for an analysis of the factors behind the fiscal imbalance dynamics in the country. Identifying and establishing control measures to lower the impacts of these factors, some which may be discretionary, would help

to limit the associated economic ills and provide a supportive macroeconomic environment for successful and sustainable fiscal consolidation in the country.

#### **4.1.2 Research Questions**

- (i) What explains the budget imbalance dynamics in Kenya?
- (ii) Do Olivera-Tanzi effect propositions explain the budget imbalance dynamics in Kenya?

#### **4.1.3 Research Objectives**

The major aim of this study was to examine the budget imbalance dynamics in Kenya. Precisely, the paper aimed to:

- (i) Analyse the budget imbalance dynamics in Kenya
- (ii) Examine whether the Olivera-Tanzi effect propositions explain the budget imbalance dynamics in Kenya

#### **4.1.4 Policy Relevance**

One of the perennial macroeconomic policy challenges facing Kenya is persistent budget deficits and how to control it. In pursuit of Kenya's development agenda, budget deficits may be unavoidable. However, there are factors that may have expansionary pressure on public expenditure while simultaneously limiting growth in government tax revenue hence increasing the size of the budget deficits. These might yield undesirable consequences in the economy. This paper broadly examined the underlying factors behind Kenya's budget imbalance dynamics. This was important in diagnosing the underlying drivers of persistent budget deficits in the country so that appropriate measures are put in place to control the deficits as well as check the increase in public debt accumulation. The findings from this

paper provide more insight into the drivers of the persistent budget deficits in Kenya. They also inform policy measures aimed at controlling the occurrence of unsustainably large government debts that could result in monetization of budget deficits. These consequently provide an environment for successful implementation of the fiscal consolidation policies in the country. This study also adds to knowledge on the application of Olivera – Tanzi effect propositions in explaining the budget imbalance dynamics in the low or moderate inflation countries.

## **4.2 Literature Review**

### **4.2.1 Theoretical Literature**

The dynamics of budget imbalances can be explained using various theories. Theories commonly used to explain the budget imbalances are briefly discussed in this section.

First, the Keynesian theory postulated that increase in budget deficits increases aggregate demand in an economy, which may stimulate investment and growth under conditions of less than full employment (Mashakada, 2013). In doing so, Mashakada (2013) explained that the Keynesian model assumed the economy has not attained full employment production level, consumption was related to current income and there existed a substantial number of liquidity-constrained economic agents. To the extent that government and private debt do not compete for households' savings, budget deficits stimulate aggregate demand and provide policymakers with a means to offset cyclical fluctuations and to accelerate economic growth (Galli and Padovano, 2002). The Keynesian rationale then

implies a deficit reaction function driven by variables including unemployment and output growth rate.

Second, the optimal finance theory is in accordance with the Ricardian equivalence proposition. It argued that taxes and budget deficits are equivalent in their effect in terms of consumption. This meant that government could use debt to smooth taxes over time. Barro (1979) suggested that, in a Ricardian world with distortionary taxes, fiscal deficits could be used for smoothing tax rates over time despite government spending and income fluctuations over time. Galli and Padovano (2002) argued that fluctuations of tax base induced by business cycle need surpluses in upswing periods and deficits in downturn periods to keep public expenditures and tax rate constant.

Third, the public choice theories presented by Galli and Padovano (2002) claimed that political choices made under sets of institutional constraints have implications on the budget. Galli and Padovano (2002) argued that voters and pressure groups choose public debt over taxes to redistribute resources in their favour. Hence, changes in the political influence of these groups and in the institutional framework where fiscal choices occur set the equilibrium deficit level. The government choice theories presented by Galli and Padovano (2002) are the special interest group theory, wars of attrition, and political budget cycle. Special interest group theory suggested the identification of interest groups that prefer public debt financing of public expenditure and the political influence of such a group in shifting government policy to their favour. The special interest groups could be youths, women, or the elderly and their political influence could increase as their population increases.

In the wars of attrition explanation for fiscal deficits, the argument by Drazen and Alesina (1991), and Perotti and Kontopoulos (1999) was that coalition or divided governments lead to creation and persistence of budget deficits. For instance, the argument is that decision making in a coalition government is always a challenge thus result in delays in fiscal stabilization and accumulation of more public debt. The theory of political budget cycles argued that expansionary fiscal policy just before general elections are held lead to a boom in the economy, which voters perceived as a sign of competence of the incumbent government as it seeks re-election (Rogoff, 1990; Alesina, Roubini and Cohen, 1997). This means that budget deficits are likely to increase during the election periods.

Lastly, in the Olivera-Tanzi effects theory from the work of Olivera (1967) and Tanzi (1977; 1978), Olivera (1967) suggested that seigniorage induced by high inflation might decrease real income tax. Thereafter, Tanzi (1978) analysed work of Olivera and braced it. The Tanzi-Olivera effects theory postulated that as inflation rises, public expenditures increase while revenue of real tax, after inflation adjustment, decreases hence fuelling the problem of the budget deficit. The delay in adjustment of tax revenue to inflation is influenced by elasticity of tax on the basis of nominal income and length of time between an occurrence of taxable event and tax payment (Tanzi, 1978). Given the lag in collection of taxes, the greater the rate of inflation, the lesser the real value of tax revenue collected, holding other factors constant (Tanzi, 1978). Khan and Aghevli (1978) showed that public expenditures adjust more quickly to inflation than taxes, with the result that the budget deficit is enlarged over time.



#### **4.2.2 Empirical Literature**

This section address the underlying factors that influence budget imbalances. The magnitude of the budget imbalances widely depends on tax performance of the country in question. Therefore, it follows that factors that influence tax performance of a country also influences the budget imbalances. A study by Wawire (1991) focusing on revenue performance in Kenya for the period 1958 - 1989 showed that as per capita income and volume of international trade increased, tax ratio also increased. The study also illustrated that the economy's structure influenced the ratio tax in Kenya as well. The GDP shares of manufacturing, mining, quarrying, building and construction sectors were found to increase the tax ratio while GDP shares of agriculture, forestry and fishing sectors were found to be inversely related to tax ratio. Muriithi and Moyi (2003) showed that structural changes influence tax revenue performance. For example, following the implementation of Sessional Paper Number One of 1986, Kenya introduced Tax Reform Programme to improve administration of taxes, enhance collection of revenue, improve compliance, and reduce collection expenditures (Muriithi and Moyi, 2003). This has seen growth of revenue collection in the country, particularly since the establishment of a semi-autonomous tax administration, that is, the inception of Kenya Revenue Authority (KRA) in 1995. Muriithi and Moyi (2003) noted that the reforms resulted in reduction of direct taxes by lowering of income tax rates gradually, widening of tax brackets, increasing indirect taxes, and shifting from international trade to domestic products' taxes. They computed the elasticity for Kenya's overall tax system for the period 1973-1999, which they found to be at 0.645. This meant that for this period the tax system was inelastic

thus yielded a 0.645 percent change in tax revenue on average for every one percent GDP growth. The results also indicated that tax buoyancy exceeded tax-to-income elasticity in all tax categories, revealing revenue impact of discretionary policy in Kenya.

Another study by Wawire (2006) focusing on Kenya's tax revenue performance found that tax revenue responded to changes in their respective tax bases, though with lags. Additionally, Wawire (2006) showed that demographic factors also influenced tax revenue performance. For instance, the study showed that increased population led to a decline in tax revenue from various tax heads except income taxes, sales taxes, trade taxes and excise duties. The study pointed out that apart from the fact that increases in population put pressure on taxes that fund the resulting high demand for public goods and public services; big population is linked with illiteracy that leads to poor income reporting and inadequate record keeping which limits domestic tax mobilisation. Diokno (2007) opined that inflation might positively influence fiscal balances by increasing revenue generation through income tax 'bracket creep'.

Using a panel of 12 countries, Weeks (2008) investigated the factors influencing tax performances. The panel included Uganda, Kenya, Rwanda, Tanzania, Burundi, Botswana, Lesotho, South Africa, Malawi, Mozambique, Swaziland and Zambia, with data from 1992 to 2007. The findings showed that inflation does not influence tax revenue performance across the countries since none of them had high inflation rate that could produce the Tanzi-Olivera effect. The revenue tax performances in these countries were found to be determined by export growth, economic growth, and per capita income. According to Cho (2009),

the implication of a large agricultural sector in an economy was a less efficient tax system, which further resulted into larger budget deficits.

Use of the panel data derived from 56 developing countries between 1980 and 2006, Ehrhart (2013) analysed the impact of budget cycle that is political on tax revenue composition. The study showed that incumbent governments tend to apply lower indirect taxes (about 0.3 percent of GDP lower) during the periods prior to general elections while not manipulating the direct taxes. The argument was that the share of capital for median voters in developing countries was lesser than the capital endowment mean for the entire population, thus governments seemed to desire lower indirect taxes more instead of lower direct taxes (Ehrhart, 2013).

Mwakalobo (2015) showed that inflation and official development aid negatively influenced generation of the tax revenue in Kenya. The study also showed that increased urbanisation and openness contributed positively to sales and excise tax revenue generation. The study found a positive relationship between rises in general price levels in an economy and trade taxes. Additionally, the study found an inverse relationship between growth of agriculture sector and sales and excise tax revenue. Wawire (2017) showed that gross domestic product, demographic factors, structural and institutional factors influenced revenue performance of the Value Added Tax (VAT) in Kenya. The study found out that sales tax introduction in 1973, tea and booms, the 1984/85 introduction of sales tax on imports, the 1995 establishment of Kenya Revenue Authority, budget rationalization programme, favourable weather and volume of international trade positively influenced the performance of VAT in Kenya.

The most common explanation of effects of inflation on budget imbalances was presented by the Olivera-Tanzi effect propositions and related empirical studies. Olivera (1967) modeled an increase in size of budget deficits that resulted from a rise in inflation when increases in public expenditure are closely linked to existing price levels but government tax revenues are related to preceding level of price, due to tax collections lags. Studies thereafter (Khan and Aghevli, 1978; Diokno, 2007; Heller, 1980; Hossain, 1987;) have found similar results showing that with increased inflation, public expenditure adjusted rapidly while the real value of tax revenue was simultaneously eroded due to tax collection lags thus resulting in an increase in size of budget deficits.

Aghevli and Khan (1978) explained that financing of inflation-induced budget deficit increased supply of money into the economy, which further generated inflationary pressure. In this case, the increased money supply caused more inflation and was a result of the prevailing inflation, a phenomenon that Aghevli and Khan (1978) confirmed. The study noted that even though governments would wish to restrain increase in public expenditures during periods of inflation, reducing their commitments in real terms remained difficult. Therefore, the value of the government commitments have to be adjusted upwards as inflation rises.

Tanzi (1978) noted that it was not possible to make tax payments to tax authorities at the same time that the taxable activity occurred. Hence, there are always time lags before the tax is paid. Tanzi (1978) also noted that developing countries were more likely to have low elasticity tax systems, with longer collection lags. The erosions of real values of tax revenue are high in cases of low

elasticity of tax system and long lag between occurrence of the tax event and tax payment. This shows that the value of revenue's tax, which is finally paid to the tax authority, is eroded. With the upward adjustments of the nominal values of government spending due to inflation over the same period, the result is an expansionary fiscal deficit.

Heller (1980) found that public spending adjusted more quickly than tax revenue to anticipated inflation. However, the study found an opposite result with respect to unanticipated inflation. The study realized that public spending on goods and services adjusted shortly, especially compared to that on salaries and wages or public investment while corporate income taxes adjusted faster than personal income taxes. The study also noted that at high inflation rates, revenue from domestic sales tax adjusted faster than that from income tax. Using quarterly data over the 1974- 1983 period, Hossain (1987) also found out that Bangladesh's public expenditures adjusted more rapidly to inflation than government tax revenue resulting into an increase in size of budget deficit.

Tujula and Wolswijk (2004) used a sample of OECD countries and found out that a rise in inflation did not have an effect on budget balances. However, Tujula and Wolswijk (2004) noted that various countries explicitly linked public spending to inflation hence government spending in these countries was directly proportional to the inflation rates. Diokno (2007) found a positive influence of inflation on fiscal balances through income tax 'bracket creep'. The study by Diokno (2007) noted that inflation worsened budget deficits through increased nominal interest rates that consequently led to increased servicing cost of the public debt. On the other hand, Ezeabasili, Mojekwu and Herbert (2012), using

data for the period 1970-2006, showed that budget deficit was related to inflation in Nigeria in a positive manner, though the coefficient of inflation in the model was found to be statistically insignificant.

Nikolaos and Constantinos (2013) employed dynamic panel econometrics among 52 countries (including Kenya) between 1970 and 2009. The results could not verify the empirical link between inflation and budget deficits in developed world. However, in developing nations including Kenya, the study realized a negative influence of inflation on budget deficits. The reasons Nikolaos and Constantinos (2013) provided for this result was that commitments to fiscal profligacy in conjunction with stability of developed countries' currencies could have significantly sustained their price levels. Fiscal profligacy is the state of being wasteful and extravagant with the public finances. It is the exact opposite of fiscal prudence. The study also pointed out that increased financial deepening and independent monetary authorities prevented budget deficits from raising general prices. Gongera *et al.* (2013) used a descriptive research design in which they analyzed data from 33 tax seniors in five leading audit firms in Kenya. They found out that inflation was among the main factors influencing budget deficits in Kenya.

Economic growth also influences budget imbalances through its impact on public spending and tax revenue growth. Roubini and Sachs (1989) showed that acceleration of growth in GDP lowers fiscal deficit implying that economic growth boosts chances of success in fiscal consolidation efforts. Roubini and Sachs (1989) also found that a rise in unemployment and debt-servicing expenditures raised the budget deficit. Tujula and Wolswijk (2004) used pooled least squares to estimate the factors behind the budget imbalance dynamics for the period 1970-2002 in a

panel of OECD countries. They found out that real GDP growth reduced budget deficits in the countries. Using changes in output gap and unemployment rate in place of GDP in the empirical model gave Tujula and Wolswijk (2004) similar results. Cho (2009) pointed out that GDP growth influences the budget deficits through its impact on tax revenue growth, grows with increases in national income. Lwanga and Mawejje (2014) found a unidirectional causal relationship between budget deficits and gross domestic product in Uganda with 79.94 percent variance in fiscal deficit in a period of one year explained by 4.03 percent GDP.

Exchange rate regimes and fluctuations in exchange rates influence the budget imbalance dynamics. According to Easterly and Schmidt-Hebbel (1991), the net implications of real fluctuations in exchange rate on budget balances relied on relative weight of traded/non-traded items in public expenditure and tax revenue. Real depreciation of domestic currency raises public expenditures (in domestic currency units) by increasing foreign interest payments and expenditure on traded-goods, capital, and intermediate goods acquired by the government (Easterly and Schmidt-Hebbel, 1991). However, real depreciation boosted government tax revenue from increases in surplus of traded-goods producing firms and from taxation of traded goods (Easterly and Schmidt-Hebbel, 1991).

Njoroge, Kosimbei and Korir (2014) researched on the twin deficit hypothesis in Kenya using a multivariate approach and found out that there was no direct causality between budget deficit and current account balance. The two were found not to be directly cointegrated. However, when the researchers included exchange and interest rates in the model, the study established a significant long-run co-movement between current account balance and budget deficit in Kenya. A

study by Osoro, Gor and Mbithi (2014) employed an error correction model in analysing the association between current account deficit and the budget deficit in Kenya. The researcher found a positive influence of budget deficit on current account shortage and confirmed unidirectional causality between budget deficit and current account, running from the former to the latter.

The political economy factors that were found to influence the budget imbalances are political budget cycle, type of government, and corruption in the public sector. During election years, the incumbent government tend to pursue expansionary fiscal policies to boost economic performance in time for the electoral campaigns (Tujula and Wolswijk, 2004; Cho, 2009). According to Tujula and Wolswijk (2004) budget balances worsened by approximately 0.3 percent of GDP in general election periods. Using a larger sample of countries, Svensson and Shi (2006) revealed that political business cycle was greater in developing countries rather than developed countries in view of low number of informed voters and greater rents politicians extract from retaining power in developing countries. Using a set of Sub-Saharan African countries, Block (2002) showed that political business cycle had effects on budget balances and public expenditure. However, the research found no effect of political business cycle on overall tax revenue.

Alesina and Tabellini (1990a) showed that strategic interaction between two governments in office at different times could lead to increase in budget deficits through accumulation of public debt over what it could be under a benevolent social planner. Alesina and Tabellini (1990a) considered a system of governance with two political parties whose ideological preferences on two public



goods were different. For instance, the incumbent party may prefer enhanced national security (defense) while the party seeking to take over power prefers social welfare. The ruling party would accumulate public debt to spend more on defense so much that when the other party takes over power they will be paying the debt and will have little fiscal space to spend on social welfare (Alesina and Perotti, 1994). Through this strategic interaction, the incumbent government commits future tax revenues to servicing of debt hence reducing the fiscal space of the future government to increase expenditure. This interaction worsens the budget deficits. Public debt accumulation by incumbent government is higher the less it seems for the current government to be re-elected and the greater the disagreement on public expenditure composition between the two parties (Alesina and Perotti, 1994).

Alesina and Tabellini (1990b) developed a model explaining the relationship between budget deficits and individual (median voter) preferences as opposed to party preferences. They argued that since fiscal preferences were determined by majority rule, policies preferred by the current median voters would carry the day. In view of uncertainty about the preferences of the future median voters, current median voters would influence government spending to their favor leading to increase in budget deficits and public debt accumulation to satisfy their preferences.

The type of government and corruption level in the public sector also affects the size and dynamism of budget deficits in a country. Sachs and Roubini (1989) examined the evolution of size of government and budget deficits in the OECD economies during the period 1960 - 1985. They found out that countries

mostly characterized by multi-party coalitions and proportional representation voting like Italy and Belgium failed to limit public debt accumulation. They affirmed that budget deficit reduction required political consensus, which was not easy to achieve in multi-party coalitions. Cho (2009) pointed out that one-party majority governments were more likely to maintain tighter fiscal discipline than coalition governments since reaching a consensus on fiscal policy in a coalition government was more difficult.

Alesina and Drazen (1991) pointed out in their “war-of-attrition” model that delayed stabilizations occurred due to too many parties forming the government that made it difficult to arrive at a consensus on fiscal policy adjustments. Potrafke (2010) carried out a study using health expenditure data of a sample of 18 OECD countries for the period 1971-2004. The study realized that government expenditure was always higher the more the parties that formed government. The study concluded that coalition governments with many parties were likely to have higher spending than single-party governments.

Before the 2002 general elections, a single-majority party government (Kenya African National Union) governed Kenya. However, in the December 2002 general elections, the National Rainbow Coalition (NARC) won the elections and formed a coalition government. This was a coalition of several parties that came together before the elections. The coalition government ruled Kenya until March 2008 after the disputed December 2007 general elections. However, the coalition government faced many challenges following claims of a memorandum of understanding on power-sharing being dishonored. This culminated in disagreements on the constitutional making process and a hotly contested

constitutional referendum in 2005 that resulted in some of the coalition partners bolting out of the government. In March 2008, a grand coalition government consisting of Orange Democratic Movement (ODM) and Party of National Unity (PNU) was formed. The coalition governed Kenya until March 2013. Following the 2013 general elections, the Jubilee Coalition came into power. However, the parties that formed the coalition before the election later on dissolved to form the Jubilee Party in 2016. These show that the composition of Kenya's government has changed during the period of the study thus it is significant to examine how the coalition governments, particularly the grand coalition government of 2008-2013 influenced fiscal balances in the country. Potrafke (2010) argued that expenditure in coalition governments was likely to be higher since it becomes more difficult to make decisions in a coalition government than in a single party majority rule. Evidently, this was a major issue in the PNU – ODM coalition government. It was hard to reach a consensus between the faction headed by the President and the one headed by the Prime Minister. In several occasions, decision-making stalled with one party accusing the other of lack of consultation.

The other political economy factor found to influence budget imbalances is level of corruption in the public sector. According to Mwakalobo (2015), Kenya, Tanzania and Uganda had institutional weaknesses that led to revenue leakages through embezzlement of revenue collected as well as tax evasion. These affected negatively the sum of revenue collected and subsequently the size of the budget deficit. Gongera *et al.* (2013) listed corruption, non-priority public expenditures, failure by Kenya Revenue Authority to meet its revenue targets, and the low tax compliance rates as some of the factors responsible for the persistent budget

deficits in Kenya. Indeed, misappropriations of public funds and tax evasion have resulted in increased government spending and limited growth in tax revenue collections in many developing countries. Consequently, the budget deficits in these countries have continued to grow.

Demographic factors also influence the budget imbalances through the pressure they put on governments to adjust public expenditure so as to cater for increasing demand for public services and goods. By using a sample of OECD countries, Sanz and Velázquez (2001) estimated a system of median voter demand equations. The study found out that population's age structure and density determine the rise and composition of public expenditure. Painter and Bae (2001) pointed out that the elderly population proportion had a negative relationship with state public expenditure, which indicated that the elderly had a lower demand for public goods. Youthful populations, like the case for Kenya, tend to have a higher demand for public goods than an aging population. This leads to increased pressure for the government to increase spending which worsens the budget deficits. Aregbeyen and Akpan (2013) also showed that increased urbanization positively influenced public spending thus worsened the budget deficits.

Thus, the reviewed literature identified economic factors (inflation, GDP growth, unemployment rate, real exchange rate, openness to international trade and external balance), political economy factors (corruption, political budget cycles, tax reforms, type of government), and demographic factors (such as urbanization) as the underlying factors behind the budget imbalances dynamics witnessed in various countries.

### 4.2.3 Overview of Literature

As observed by Tujula and Wolswijk (2004), the literature showed that much emphasis has been on economic and fiscal variables as the underlying factors of fiscal imbalance dynamics. However, as countries with similar macroeconomic and fiscal fundamentals continued to have significant variations in budget imbalances, focus shifted to behavioral effects such as political aspects, budgetary processes, and role of budgetary institutions. Evidently, most studies reviewed focused on economic factors without broadly incorporating other factors such as political and demographic factors. Thus, the study aimed to fill this gap by taking a broad view of factors behind budget imbalance dynamics in Kenya. The literature reviewed can be summarized as follows:

<b>Dependent Variable</b>	<b>Key Explanatory Variables</b>	<b>Key Findings</b>
Budget imbalances (deficits)	National income (Gross Domestic Product)	<p>-National income (GDP) has a desirable impact on state tax revenue performance (Muriithi and Moyi, 2003; Wawire, 2006; 2017; Weeks, 2008;).</p> <p>-Wawire (1991), focusing on Kenyan revenue performance for the period 1958 - 1989 showed that as per capita income and volume of international trade increased, tax ratio also increased</p> <p>-Wawire (2017) showed that gross domestic product, structural and demographic factors, and institutional factors influenced Value Added Tax (VAT) revenue performance in Kenya</p> <p>-Roubini and Sachs (1989) showed that acceleration of growth in GDP lowers fiscal deficit implying that economic growth.</p> <p>-Tujula and Wolswijk (2004) found out that real GDP growth reduced budget deficits in a panel of OECD countries.</p>
	Inflation (change in consumer price indices)	<p>-With increased inflation, public expenditure adjusted rapidly while the real value of tax revenue is simultaneously eroded due to tax collection lags thus resulting in an increase in size of budget deficits (Olivera, 1967; Tanzi, 1977, 1978; Heller, 1980; Aghevli and Khan, 1978; Hossain, 1987).</p>

	<p>-Tujula and Wolswijk (2004) used a sample of OECD countries and found out that a rise in inflation did not have an effect on budget balances. The explanation was that there was no immediate and comprehensive identification of tax brackets, owing to inflation driving tax revenues in some nations,</p> <p>- Diokno (2007) noted that inflation worsened budget deficits through increased nominal interest rates that consequently led to increased cost of servicing the public debt.</p> <p>-Nikolaos and Constantinos (2013) employed dynamic panel econometrics on a panel of 52 countries (including Kenya) over the period 1970 - 2009. The results could not verify the empirical link between inflation and budget deficits in developed world. However, in developing countries such as Kenya, the study realized a negative effect of inflation on budget deficits.</p> <p>-Gongera <i>et al.</i> (2013) used a descriptive research design in which they analysed data from 33 tax seniors in five leading audit firms in Kenya and found out that inflation was one of the main determinants of budget deficits in Kenya.</p>
Exchange Rates	-Real depreciation of domestic currency raises public expenditures (in domestic currency units) by increasing foreign interest payments and expenditure on traded-goods, capital, and intermediate goods acquired by the government (Easterly and Schmidt-Hebbel, 1991). However, real depreciation boosted government tax revenue from increases in surplus of traded-goods producing firms and from taxation of traded goods (Easterly and Schmidt-Hebbel, 1991). The effect on budget imbalances is therefore ambiguous and defined by the corresponding relative weights of traded and non-traded items in public revenue and spending (Easterly and Schmidt – Hebbel, 1991).
Level of Corruption in the Public Sector (Corruption perception index)	-a rise in corruption in the public domain limits performance of tax revenue in the country (Gongera <i>et al.</i> , 2013). According to Mwakalobo (2015), Kenya, Tanzania and Uganda had institutional weaknesses that led to revenue loss through embezzlement of tax collected and tax-evasion.
Political business cycle (election cycle)	<p>-Using panel data from 56 developing countries for the period 1980-2006, Ehrhart (2013) showed that incumbent governments tend to apply lower indirect taxes (about 0.3 percent of GDP lower) during the periods prior to general elections while not manipulating the direct taxes (Cho, 2009).</p> <p>-During election years, the incumbent government tend to pursue expansionary fiscal policies to boost economic performance in time for the electoral campaigns (Tujula and Wolswijk, 2004; Cho, 2009).</p> <p>-Tujula and Wolswijk (2004) noted that budget balances worsened by approximately 0.3 percent of GDP in general election periods.</p> <p>-Alesina and Tabellini (1990a) showed that strategic interaction between two</p>

	governments in office at different times could lead to increase in budget deficits through accumulation of public debt over what it could be under a benevolent social planner.
Type of government	<p>-Roubini and Sachs (1989) examined the evolution of size of government and budget deficits in the OECD economies during the period 1960 - 1985. They found out that countries mostly characterized by multi-party coalitions and proportional representation voting like failed to limit public debt accumulation. They affirmed that budget deficit reduction required political consensus, which was not easy to achieve in multi-party coalitions.</p> <p>-In their “war-of-attrition” model, Alesina and Drazen (1991) pointed out that delayed stabilizations occurred due to too many parties forming the government that made it difficult to arrive at a consensus on fiscal policy adjustments</p> <p>-Tujula and Wolswijk (2004) argued that a majority rule government is more decisive than multiparty coalition government. Therefore, one-party majority government was expected to maintain tighter fiscal discipline than coalition governments.</p> <p>-Cho (2009) pointed out that one-party majority governments were more likely to maintain tighter fiscal discipline than coalition governments since reaching a consensus on fiscal policy in a coalition government was more difficult</p>
Demographic factors	<p>-Using a sample of OECD countries, Sanz and Velázquez (2001) estimated a system of median voter demand equations. The study found out that population’s age structure and density determine the increase and composition of public expenditure.</p> <p>-Painter and Bae (2001) pointed out that the elderly population proportion had a negative relationship with state public expenditure, which indicated that the elderly had a lower demand for public goods.</p> <p>-Aregbeyen and Akpan (2013) also showed that increased urbanization positively influenced public spending.</p>

Source: Authors (2019) Compilation

Most of the empirical studies such as the studies by Easterly and Schmidt-Hebbel (1991), Roubini and Sachs (1989), Block (2002) Tujula and Wolswijk (2004), Weeks (2008), Ehrhart (2013), Nikolaos and Constantinos (2013), and Mwakalobo (2015) used cross-country panel econometric techniques. Most of the reviewed studies made use of samples of OECD countries. The reviewed literature presents limited focus on Sub-Sahara African countries with only Block (2002) and

Weeks (2008) focusing their analysis on a sample of Sub-Sahara African countries. Sample chosen by Easterly and Schmidt-Hebbel (1991) also included a limited number of Sub-Sahara African countries. To fill this gap, this paper made use of country – specific data. The analysis was carried out using a set of simultaneous equations.

Moreover, none of the studies reviewed focused on empirical analysis of budget imbalance dynamics in Kenya. The empirical studies on Kenya mainly focused on tax revenue performance (Moyi and Muriithi, 2003; Wawire, 2006; 2017; Gongera *et al.*, 2013), analysis of the twin –deficits hypothesis (Njoroge *et al.*, 2014;Osoro *et al.*, 2014) and macroeconomic effects of budget deficits in the Kenyan economy. Before looking at the possible effects of the growing budget deficits, it is appropriate to first diagnose the root causes of its persistent growth. This paper sought to fill this gap as well.

### **4.3 Methodology**

#### **4.3.1 Research Design**

This research paper made use of quantitative research design using time series. The data used was collected at different time periods hence time series data for the period 2000 Quarter one to 2015 Quarter four. The need to use more recent time series data and the unavailability of quarterly data on most of the variables for the period before the year 2000 informed the choice of the study period. However, the time period covered is sufficient in view of availability of quarterly data. The quantitative analysis of the data first involved carrying out diagnostic tests to analyse characteristics of the variables and to identify the most appropriate



estimation method. Further, the paper carried out post estimation tests to ascertain the efficiency of the estimators before interpreting and discussing the results.

### 4.3.2 Theoretical Framework

This paper took a broad view of the budget imbalance dynamics in Kenya. The analysis was based on an interaction of theories explaining the relationship between various factors and budget imbalances dynamics. However, the analysis borrowed heavily from empirical studies that had looked at the impact of economic factors, specifically inflation, on budget imbalances through two-step effects on tax revenue generation and government spending adjustments. The theoretical underpinning for this paper, therefore, was the Olivera-Tanzi effect theory with the assumption that the effect can also take place in a low or moderate inflation country like Kenya. Olivera-Tanzi effect theory postulated that an increase in the level of inflation can lead to a rapid increase in government spending while the real tax revenue is eroded due to tax collection time lags (Olivera, 1967; Tanzi, 1977; 1978). This arguably fuels the budget imbalance problem. More specifically, the paper borrowed from the theoretical framework used by Aghevli and Khan (1978) and Heller (1980).

Aghevli and Khan (1978) analysed the relationship between inflationary process and budget deficits in developing countries. They modelled the public sector by assuming that government's "desired" real expenditures was related to real income levels (assuming that real income is exogenous). This was presented as follows:

$$\log(G/P)_t^d = g_0 + g_1 \log Y_t; 0 < g_1 \dots \dots \dots (4.1)$$

Where  $\log$  is logarithm,  $G$  is nominal public expenditure,  $P$  is price level,  $d$  indicates that it's the desired level of real public expenditure,  $t$  is time variable,  $Y$  is real national income,  $g_1$  is real income elasticity of public expenditure which is one if the government increases its expenditure proportionately with growth of real income.

Aghevli and Khan (1978) argued that government attempts to keep its real public expenditure constant in the face of inflation thus they specified actual real expenditures to adjust to the difference between desired real public expenditures and actual real public expenditures in the previous period as presented in Equation 4.2:

$$\log(G/P)_t = \varphi \left[ \log(G/P)_t^d - \log(G/P)_{t-1} \right] \dots \dots \dots (4.2)$$

where  $\varphi$  is the coefficient of adjustment,  $0 < \varphi < 1$

Substituting Equation (4.1) into (4.2), a solution for level of real public expenditures was obtained as follows:

$$\log(G/P)_t = \varphi g_0 + \varphi g_1 \log Y_t + (1 - \varphi) \log(G/P)_{t-1} \dots \dots \dots (4.3)$$

This is a partial adjustment model. However, for this analysis, the dynamism of the model was determined by the data used. In nominal terms, Equation (4.3) was expressed as follows:

$$\log G_t = \varphi g_0 + \varphi g_1 \log Y_t + (1 - \varphi) \{ \log G_{t-1} - \log P_{t-1} \} + \log P_t \dots \dots (4.4)$$

Aghevli and Ghan (1978) also assumed that the desired nominal government tax revenue was functionally related to the level of nominal income, thus:

$$\log TR_t^d = t_0 + t_1(\log Y_t + \log P_t); 0 < t_1 \dots\dots\dots (4.5)$$

Where TR is the nominal total revenue and  $t_1$  denotes the elasticity of total revenue that is expected to be positive. The other variables are as described before. Actual total revenues adjust to difference between desired total revenue and actual total revenue obtained in the previous period;

$$\log TR_t = \tau[\log TR_t^d - \log TR_{t-1}] \dots\dots\dots (4.6)$$

Where  $\tau$  is the coefficient of adjustment,  $0 < \tau < 1$

Substituting Equation (4.5) into (4.6), an equation for nominal total tax revenues was obtained as follows:

$$\log TR_t = \tau t_0 + \tau t_1(\log Y_t + \log P_t) + (1 - \tau) \log TR_{t-1} \dots\dots\dots (4.7)$$

In this framework, even if at the beginning there is a balanced budget, there will be an increasing divergence between expenditure and revenue due to inflation and other factors. Fundamentally, the hypothesis is that there is a more rapid adjustment of expenditure to its desired level as compared to tax revenue (Heller, 1980). Additionally, there could be other economic, institutional and/or political economy factors influencing government spending positively while at the same time acting as a limiting factor to revenue generation. Consequently, these factors result into an increase in size of budget deficit.

### 4.3.3 Specification of the Empirical Models

The empirical model used to analyze the budget imbalance dynamics in Kenya was derived from the theoretical framework presented by Aghevli and Khan (1978). Authors such as Heller (1980), Hossain (1987) and Neyapti (2003) have

also applied a similar model. Neyapti (2003) presented the relationship behind the budget imbalance dynamics as follows:

$$G_t + rB_{t-1} - TR_t = B_{bal} \dots\dots\dots (4.8)$$

Where:  $G$  is nominal public expenditure;  $r$  is nominal interest on outstanding debt paid by the government;  $B$  is stock of government debt that bear interest;  $TR$  is total revenue;  $B_{bal}$  is budget balance which is the current public expenditure plus the interest payment on outstanding debts minus the total revenue. In this analysis, the focus is on the adjustments of the budget balance components, which consequently determine the budget imbalance dynamics. The empirical model for the analysis of the nominal adjustments in public expenditure followed Equation 4.4 with some modification and was specified as follows:

**Model 1: Public Expenditure Model**

$$\begin{aligned} \Delta \ln G_t = & \alpha_0 + \sum \alpha_i \Delta \ln G_{t-i} + \sum \beta_f \Delta \ln Y_{t-f} + \\ & + \sum \gamma_k \Delta \ln CPI_{t-k} + \sum \delta_l \Delta \ln NEER_{t-l} + \sum \vartheta_w \Delta \ln MW_{t-w} \\ & + \sum \pi_n \Delta \ln CorPI_{t-n} + \tau_1 ELC + \tau_2 GovT + \tau_3 @trend \\ & + \mu_t \dots\dots\dots (4.9) \end{aligned}$$

Where;

$\Delta$  is the difference operator

$\ln$  is the natural log

$t$  denotes time index in quarters (2000Q1, ..., 2015Q4)

$\alpha_0$  is the autonomous adjustments of the dependent variable

$\alpha_i, \beta_f, \gamma_k, \delta_l, \vartheta_w, \pi_n, \tau_1, \tau_2$  and  $\tau_3$  are coefficients

$i, f, k, l, w, n$  are the lag lengths of the respective variables

$G$  is nominal public expenditure (including interest payment on government debt).

$Y$  is nominal national income (nominal GDP)

$CPI$  is Consumer Price Indices

$NEER$  is Nominal Effective Exchange rates

$MW$  is nominal minimum wages

$CorPI$  is Corruption Perception Index

$ELC$  is election dummy

$GovT$  is type of government (takes the value 1 for grand coalition government (2008 Q2 to 2013Q1) and 0 otherwise).

$@trend$  used to capture time trend

$\mu_t$  is stochastic disturbance term

This specification mirrored that of Aghevli and Khan (1978) with the addition of other economic variables, institutional variables and political economy variables. Moreover, the specification differed with that of Hossain (1987) in that Hossain disaggregated public expenditure into public domestic revenue expenditure and public domestic development expenditure. Hossain (1987) also used domestic revenue as a determinant of public domestic revenue expenditure (that is, expenditure on recurrent items) and government's available development resources (from domestic revenue surplus and from foreign aid and loans) as the determinant for public domestic development expenditure. For this analysis, public expenditure was not disaggregated hence was not linked to a particular financing source. Instead, national income was incorporated in the model to capture the economy's tax base. Nominal adjustment in government tax revenue followed Equation 4.7 with some modification and was specified as:

**Model 2: Government Tax Revenue Model**

$$\begin{aligned}\Delta \ln TR_t = & \alpha_0 + \sum \alpha_i \Delta \ln TR_{t-i} + \sum \beta_f \Delta \ln Y_{t-f} + \\ & + \sum \gamma_k \Delta \ln CPI_{t-k} + \sum \delta_l \Delta \ln NEER_{t-l} + \sum \vartheta_w \Delta \ln MW_{t-w} \\ & + \sum \pi_n \Delta \ln CorPI_{t-n} + \tau_1 ELC + \tau_2 GovT + \tau_3 @trend \\ & + \mu_t \dots (4.10)\end{aligned}$$

Where: *TR* is the nominal government tax revenue (excluding grants and non-tax revenue). Other variables and symbols are as defined before in Equation 4.9. This model borrowed from Hossain (1987) model. However, Hossain disaggregated the total government revenue into tax and non-tax revenue. Hossain (1987) also used level of national expenditure but not national income as the proxy for tax base in the tax equation. In this analysis, level of GDP is used since government's tax revenues are fundamentally related to level of national income. Additionally, other economic variables, institutional and political economy variables are also included. Using specifications in Equation 4.9 and 4.10, decision on how a variable influences the budget imbalance dynamics is determined from the sign and magnitude of the coefficients. To this end, a model for direct analysis of budget imbalance dynamics was also specified in order to corroborate the results from the first two models. Therefore, the model for nominal adjustments in budget imbalances was given by:

**Model 3: Budget Imbalance Model**

$$\begin{aligned}\Delta \ln B_{bal,t} = & \alpha_0 + \sum \alpha_i \Delta \ln B_{bal,t-i} + \sum \beta_f \Delta \ln Y_{t-f} + \\ & + \sum \gamma_k \Delta \ln CPI_{t-k} + \sum \delta_l \Delta \ln NEER_{t-l} + \sum \vartheta_w \Delta \ln MW_{t-w} \\ & + \sum \pi_n \Delta \ln CorPI_{t-n} + \tau_1 ELC + \tau_2 GovT + \tau_3 @trend \\ & + \mu_t \dots (4.11)\end{aligned}$$

Where:  $B_{bal}$  is the nominal budget imbalance (which can be a deficit or a surplus in a quarter). The other variables and symbols are as defined before in Equation 4.9.

Following the diagnostic and cointegration results, the study estimated a model of long-run levels together with an Error Correction Model (ECM) to measure the long-run equilibrating relationship and the dynamic effects between the variables. The long-run level relationship for the three models was estimated using the following equation:

$$\begin{aligned} \ln DepVar_t = & \beta_0 + \beta_1 \ln CPI_t + \beta_2 \ln NEER_t + \beta_3 \ln MW_t + \beta_4 \ln CorPI_t \\ & + \tau_1 ELC_t + \tau_2 GovT_t + \tau_3 @trend + \varepsilon_t \dots (4.12) \end{aligned}$$

Where:  $DepVar$  is the response variable in the respective models. The other variables and notations are as defined before. The Ordinary Least Squares (OLS) residual series from the long-run cointegrating relationship given by Equation 4.12 was used as Error Correction Term (ECT) in the Error Correction Model. The Error Correction Model for each of the three models was estimated using the following Equation:

$$\begin{aligned} \Delta \ln DepVar_t = & \alpha_0 + \sum \alpha_i \Delta \ln (DepVar)_{t-i} \\ & + \sum \gamma_k \Delta \ln CPI_{t-k} + \sum \delta_l \Delta \ln NEER_{t-l} + \sum \vartheta_w \Delta \ln MW_{t-w} \\ & + \sum \pi_n \Delta \ln CorPI_{t-n} + \tau_1 ELC_t + \tau_2 GovT_t + \tau_3 @trend \\ & + \varphi ECT_{t-1} + \mu_t \dots (4.13) \end{aligned}$$

Where: ECT is the Error Correction Term. Other notations and variables are as defined before. The results discussed in Section 4.4.5 are based on the estimations of Equation 4.13.

#### 4.3.4 Definitions of Variables and Expected Results

The dependent variables in this analysis are nominal adjustments in aggregate public expenditure, total government revenue and budget balance. Change variables were used since the focus was to see how the various variables influenced budget imbalance dynamics.

*Nominal public expenditure* is the total national government expenditure including interest payment on government debt in a quarter. Total public expenditure is in Kenya Shillings.

*Nominal government tax revenue* is the total quarterly nominal government tax revenue (excluding grants and non-tax revenue). Government tax revenue is in Kenya Shillings.

*Nominal budget balance* is the difference between quarterly total tax revenue (excluding non-tax revenue and grants) and total current government spending (including interest payment on outstanding debts). Since most of the quarterly budget balances take negative (deficit) figures, their log transformation followed the formulae employed by Busse and Hefeker (2007) in log transforming negative numbers, which is:

$$y = \ln\{x + \sqrt{(x^2 + 1)}\} \dots\dots\dots (4.14)$$

Where:  $x$  captures the budget balance (deficit) figures. Since the budget balances are in billions and trillions, one trillion (1,000,000,000,000) figure is used in the formulae instead of one.

*Nominal national income* is the quarterly nominal Gross Domestic Product (GDP). The GDP figures are in Kenya Shillings. The variable was expected to



have a positive influence on both public expenditure and total tax revenue adjustments (Muriithi and Moyi, 2003; Weeks, 2008; Wawire, 2006; 2017). Therefore, the overall effect on the budget imbalances was ambiguous. This depends on the magnitude of its implication on total tax revenue and government spending respectively.

*Consumer price index* captures the general price levels in the economy. It was included in the model to estimate the effects of inflation on public spending, government tax revenue and consequently budget imbalances in Kenya. The expected result was that an increase in general levels of prices in the economy would lead to a rapid adjustment in public expenditure more than the adjustment in nominal government revenues thus worsening the budget imbalances (Olivera, 1967; Tanzi, 1977, 1978; Heller, 1980; Aghevli and Khan, 1978; Hossain, 1987; Diokno, 2007).

*Nominal effective exchange rates* are weighted averages of Kenya Shilling (KSh) relative to a basket of the trading partners' currencies. The currencies of trading partners are each weighted according to their importance in trade with Kenya. Nominal effective rate of exchange is not adjusted for the effects of inflation and is reported annually by the United Nations Conference on Trade and Development (UNCTAD) hence the data is converted to quarterly time series data using *Eviews*. The index base for the nominal effective rates of exchange data used in the analysis is the year 2000. A rise in nominal effective rate of exchange (a devaluation of the Kenya Shilling) increases the price of imports consumed by the government in domestic currency thus leads to an increase in government spending (Easterly and Schmidt – Hebbel, 1991). A depreciation of nominal effective

exchange rate was expected to have a positive effect on both government spending and tax revenue generation (Easterly and Schmidt – Hebbel, 1991). The effect on budget imbalances was therefore ambiguous and depended on the relative weights of traded and non-traded items in public expenditure and revenue (Easterly and Schmidt – Hebbel, 1991).

*Nominal minimum wages* are the nominal values of gazetted monthly basic lowest pays in urban areas (Nairobi, Kisumu, Mombasa), excluding house allowances. These cities have a relatively high concentration of public servants hence the decision to use their minimum wages instead of that for agricultural industry. Nominal minimum wages were expected to positively influence the adjustments in government spending and tax revenue. However, the influence on budget imbalances remained ambiguous (the studies reviewed had not included it in their empirical models).

*Corruption perception index* measures the effects of perceived level of corruption in the public sector on the public expenditure, government tax revenue and budget balances. A score of a country represents the perceived corruption level in the public sector on a scale of 0 (highly corrupt) to 100 (no corruption/very clean). Increase in corruption levels, indicated by a decline in corruption perception index score, was expected to have a positive effect on certain public expenditure items, especially public expenditure and public investment in general. On the other hand, it was expected that an increase in corruption in the public sector would limit growth in tax revenue generation in the country (Gongera *et al.*, 2013). Consequently, increase in corruption in the public sector was expected to worsen budget imbalances in the country.

*Election dummy* captures the influence of political business cycle (that is, the changes in public budget influenced by the fiscal manipulations of the incumbent government during election periods). It took the value 1 for period where there were general elections (that is, three quarters before and including the quarter when the election is held) and 0 for period when there were no general elections. The dummy was defined for the period before the elections since the interest was to capture the effects of pre-election fiscal manipulations. The variable was anticipated to have a positive effect on government spending but a negative influence on tax revenue generation as incumbent governments tend to spend more and tax less during the election years to increase their chances of re-election (Alesina and Tabellini, 1990b; Alesina and Perotti, 1994; Block, 2009; Tujula and Wolswijk, 2004; Cho, 2009).

*Type of government* was used in the models to capture the influence of the composition of the government of the day on budget imbalances. It took the value one (1) for the grand coalition government period (formed in March 2008 after the 2007 post-election violence, which ruled until March 2013) and zero (0) otherwise. Tujula and Wolswijk (2004) argued that majority rule government is more decisive than multiparty coalition government. Therefore, one-party majority government was expected to maintain tighter fiscal discipline than coalition governments. Hence, the years when the grand coalition government ruled Kenya were expected to have a positive effect on public expenditure and consequently worsen budget imbalances (Cho, 2009; Alesina and Drazen, 1991; Roubini and Sachs, 1989).

#### **4.3.5 Data Sources and Type**

The quarterly data on public expenditure, GDP, Consumer Price Index, interest payment on government debt were gotten from CBK and KNBS. Quarterly tax revenue data was obtained from Kenya Revenue Authority whereas minimum wages data was obtained from the Kenya Economic Surveys publications. Data for nominal effective exchange rates was obtained from the United Nations Conference on Trade and Development (UNCTAD) online statistics. Corruption perception indices data were obtained from the annual reports on corruption perception indices in the public sectors of various countries published by the Transparency International. The annual data for nominal effective exchange rate and corruption perception indices were transformed into quarterly data using *Eviews* statistical software to conform to the data structure of the other variables.

#### **4.4 Empirical Analysis and Discussions**

##### **4.4.1 Diagnostic Tests Results**

Before performing the diagnostic tests, the trend of the variables were examined. The trend analysis for the various variables were as shown in Figure A12 to Figure A19 in Appendix III.

**Table 4.1: Unit Root Test Results**

Variable (Specification)	Test in...	Augmented Dickey-Fuller Test	Philips-Perron Test	Kwiatkowski-Phillips-Schmidt-Shin Test	Conclusion
<i>LnG</i> (Trend & Intercept; Lag length =6)	Levels	-2.0825	-17.3931***	0.0956	<i>LnG is I(1)</i>
	1 <sup>st</sup> Difference	-5.0990***	-50.0575***	0.3842***	
<i>LnTR</i> (Trend & Intercept; Lag length =10)	Levels	-3.1325	-13.0695***	0.1368*	<i>LnTR is I(1)</i>
	1 <sup>st</sup> Difference	-4.9041***	-69.1988***	0.2766***	
<i>LnB<sub>bal</sub></i> (Trend & Intercept; Lag length =6)	Levels	-2.0804	-21.1534***	0.2317***	<i>LnB<sub>bal</sub> is I(1)</i>
	1 <sup>st</sup> Difference	-5.4310***	-47.8805***	0.2960***	
<i>LnY</i> (Trend & Intercept; Lag length =4)	Levels	-2.3759	-2.2818	0.1946**	<i>LnY is I(1)</i>
	1 <sup>st</sup> Difference	-8.9088***	-9.1752***	0.1033	
<i>LnCPI</i> (Trend & Intercept; Lag length =1)	Levels	-3.3311*	-2.6425	0.0828	<i>LnCPI is I(1)</i>
	1 <sup>st</sup> Difference	-6.2019***	-6.2052***	0.0460	
<i>LnNEER</i> (Trend & Intercept; Lag length =4)	Levels	-1.6709	-1.3572	0.6903**	<i>LnNEER is I(1)</i>
	1 <sup>st</sup> Difference	-3.0564**	-4.3052***	0.0506	
<i>LnMW</i> (Trend; Lag length =3)	Levels	-0.6459	-0.5322	1.0091***	<i>LnMW is I(1)</i>
	1 <sup>st</sup> Difference	-3.1487**	-18.7506***	0.1310	
<i>LnCorPI</i> (Trend & Intercept; Lag length =0)	Levels	-3.2509*	-2.6446	0.1070	<i>LnCorPI is I(1)</i>
	1 <sup>st</sup> Difference	-3.8599**	-3.9302**	0.0573	
<i>ELC</i> (No Trend & Intercept; Lag length =0)	Levels	-3.7118***	-3.4180***	0.0547	<i>ELC is I(0)</i>
	1 <sup>st</sup> Difference	-7.0538***	-19.2201***	0.0218	
<i>GovT</i> (No Trend & Intercept; Lag length =0)	Levels	-1.2609	-1.2756	0.3508	<i>GovT is I(1)</i>
	1 <sup>st</sup> Difference	-7.8103***	-7.8103***	0.1587	

*Ln* =Natural Log ; *G* is nominal public expenditure ; *TR*is nominal government tax revenue; *B<sub>bal</sub>*is nominal budget balance; *Y*is nominal national income (Gross Domestic Product); *CPI*is Consumer Price Index; *NEER* is Nominal Effective Exchange Rate; *MW* is nominal Minimum Wages; *CorPI*is public sector corruption perception index;*ELC*is elections dummy; *GovT* is government type dummy;*ADF* = Augmented Dickey-Fuller; *PP* = Phillips-Perron; *KPSS* = Kwiatkowski-Phillips-Schmidt-Shin test.

Source: Authors (2019)

Table 4.1 showed that election dummy stationary at levels thus was integrated of order zero. Nominal public expenditure, nominal tax revenue, budget balances, national income, consumer price index, nominal effective exchange rate, nominal minimum wages, corruption perception index, and government type were found to be stationary after first differencing and hence integrated of order one.

Heteroskedasticity test was carried out using Breusch-Pagan-Godfrey Test with null hypothesis of no heteroskedasticity.

**Table 4.2: Heteroskedasticity and Serial Correlation Tests Results**

<b>Test</b>	<b><i>Public Expenditure Model(1)Obs. R-Squared</i></b>	<b><i>Government Tax Revenue Model (2) Obs. R-Squared</i></b>	<b><i>Budget Imbalance Model (3) Obs. R-Squared</i></b>	<b>Conclusion</b>
Heteroskedasticity Test	5.4460	8.4275	5.0011	All models are homoscedastic
Breusch-Godfrey Serial Correlation LM Test	8.0716**	11.3813***	6.3433**	All the models have serial correlation
<i>Note: *, **, *** denote the rejection of the null hypothesis at 10 percent, 5 percent, 1 percent level of significance, respectively.</i>				

Source: Authors (2019)

The Table 4.2 results revealed that there was no heteroskedasticity in the models. The table also showed the results for serial correlation test, which was performed using the LM test. The results confirmed the existence of serial correlation in all the data series.

Multicollinearity among the independent variables increases standard errors of the correlated variables, which consequently reduces the absolute value of t-statistics since t-statistic is computed by dividing the estimated coefficients by the standard errors. Consequently, multicollinearity problem makes a variable that

could be significant to be insignificant. Results for correlation analysis (see Table A8 in Appendix III) showed that the log of national income had a high correlation with most of the variables. Therefore, the variable was dropped from the models in an attempt to correct for multicollinearity.

A test for structural break was carried out to examine if there was an unexpected shift in the time series. Multiple breakpoint tests was applied to identify periods of possible structural breaks in the data series and then Chow breakpoint test was applied on the periods identified by the former test to confirm their significance.

**Table 4.3: Results of Structural Break Tests**

	<i>Multiple Breakpoint Test</i>			<i>Chow Beakpoint Test</i>	<b>Conclusion</b>
	<i>Break Test</i>	<i>F-statistic</i>	<i>Break Dates</i>	<i>F-statistic</i>	
<i>Public expenditure Model (1)</i>	0 vs.1	2.8192	None	-	No Break point
<i>Government Tax Revenue Model (2)</i>	0 vs. 1	4.7700	2012Q1	1.9134	Break point not significant
	1 vs. 2	1.7450			
<i>Budget Imbalance Model (3)</i>	0 vs. 1	16.0678	2004Q4	3.1188**	Break point significant
	1 vs. 2	1.4166			
<i>Note: *, **, *** Denote the rejection of the null hypothesis at 10 percent, 5 percent, 1 percent level of significance, respectively.</i>					

Source: Authors (2019)

The results showed that for the public expenditure model, there were no break dates whereas for government tax revenue and budget imbalances models there were break dates in 2012 quarter one and 2004 quarter four respectively. The

Chow Breakpoint test showed that the 2012 quarter one break point was insignificant whereas the 2004 quarter four breakpoint was significant. The breakpoint was captured in the model by a dummy variable for political budget cycle (capturing the period preceding the 2005 national referendum on proposed constitutional change). There were spirited campaigns for and against the new constitution during this period that could have had fiscal implications. The voters eventually rejected the proposed constitutional changes and this resulted into the disintegration of the National Rainbow Coalition government as the President sacked the ministers who campaigned against the constitutional changes.

#### **4.4.2 Cointegration Test and Model Selection**

Section 2.4.2 discusses the various methods of testing for cointegration in data series with variables that are integrated of identical order (order one). Since the variables included in this analysis were not integrated of the same order, the most appropriate method for testing cointegration in the data series was Autoregressive Distributed Lag (ARDL) Bounds testing methodology of Pesaran and Shin (1999) and Pesaran *et al.* (2001). This method is applicable in a case with a mixture of data series that are integrated of order zero or one. The variables can enter the model at different lag-lengths. However, there should be no variable integrated of second order

An appropriate lag structure was determined before carrying out the cointegration test. This analysis made use of Akaike's information criterion (AIC), Hannan and Quinn information criterion (HQIC), and Schwarz's Bayesian



information criterion (SBIC), lag-order selection statistics. The decision here is that the lower the value obtained by the criterion, the better the model.

**Table 4.4: Optimal Lag Selection Results**

	AIC	SBIC	HQIC	Optimal Lag Length
<i>Public expenditure Model (1)</i>	-2.3660* (Lag =8)	-1.8786* (Lag =4)	-2.1520* (Lag =4)	4
<i>Government Tax Revenue Model (2)</i>	-2.9806* (Lag =8)	-2.3473* (Lag =8)	-2.7516* (Lag =8)	8
<i>Budget Imbalances Model (3)</i>	-1.1181* (Lag =8)	-0.6414* (Lag =4)	-0.9379* (Lag =4)	4
<i>Note: * indicates the lag order selected by the criterion</i>				

Source: Authors (2019)

From Table 4.4, the model of public expenditure adopted an optimum lag length of four whereas the government tax revenue model adopted an optimal lag length of eight. The budget imbalance model adopted an optimal lag of four. To test for cointegration, the following equation was employed:

$$\begin{aligned}
 \Delta \ln DepVar_t = & \alpha_0 + \sum \alpha_i \Delta \ln (DepVar)_{t-i} \\
 & + \sum \gamma_k \Delta \ln CPI_{t-k} + \sum \delta_l \Delta \ln NEER_{t-l} + \sum \vartheta_w \Delta \ln MW_{t-w} \\
 & + \sum \pi_n \Delta \ln CorPI_{t-n} + \theta_1 \ln (DepVar)_{t-1} + \theta_2 \ln CPI_{t-1} \\
 & + \theta_3 \ln NEER_{t-1} + \theta_4 \ln MW_{t-1} + \theta_5 \ln CorPI_{t-1} + \tau_1 ELC_t \\
 & + \tau_2 GovT_t + \tau_3 @trend + \mu_t \dots (4.15)
 \end{aligned}$$

Where: DepVar is the dependent variable for the respective models, that is, log of nominal public expenditure, log of nominal government tax revenue and log of nominal budget balances. The other variables are as defined before in the model specification section. Equation 4.15 is referred to as a “conditional error correction

model” by Pesaran *et al.* (2001) since it includes some lagged level variables like in a regular error correction model, but their coefficients are not restricted (it can also be termed as an ‘unrestricted error correction model’). General to specific procedure was employed while checking whether the errors are serially independent and the model is dynamically stable. This was done until a dynamically stable ARDL model, with serially independent residuals was established.

Bound testing was then carried out where coefficient diagnostics for the level lagged variables was done using F-Test. The null hypothesis was that there is cointegration (no long-run equilibrium relationship) between the variables. That is,  $H_0: \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = 0$ . The computed F-statistic was compared with the tabulated Pesaran values at five percent significance level (see Table A2 and Table A3 in Appendix I) for a model with unrestricted trend and unrestricted intercept. Pesaran *et al.* (2001) presented a lower bound which was based on the assumption that all of the variables are integrated of order 0, I(0), and an upper bound based on the assumption that all of the variables are integrated of first order, I(1).

As a crosscheck, Bounds t-test of  $H_0: \theta_1 = 0$ , against  $H_1: \theta_1 < 0$  was performed. The decision here is that cointegration is confirmed if the t-statistic for level lagged independent variable is greater than the upper bound tabulated by Pesaran *et al.* (2001).

**Table 4.5: ARDL Bounds Cointegration Test Results**

	<i>Public expenditure Model (1)</i>	<i>Government Tax Revenue Model (2)</i>	<i>Budget Imbalance Model (3)</i>
Specification	Unrestricted intercept and unrestricted trend; k = 5	Unrestricted intercept and unrestricted trend; k = 5	Unrestricted intercept and unrestricted trend; k = 5
<i>F – statistic</i>	15.9726	11.9560	738.5547
Pesaran Critical Values at 5% Level of Significance	Lower Bound	3.12	3.12
	Upper Bound	4.25	4.25
<i>t – statistic</i>	-8.8623	-7.6156	-58.8581
Pesaran Critical Values at 5% Level of Significance	Lower Bound	-3.41	-3.41
	Upper Bound	-4.52	-4.52
Conclusion	Cointegrated	Cointegrated	Cointegrated

Source: Authors (2019)

The results showed that the F-statistics were more than the Upper Bound Pesaran’s tabulated values. Therefore, the null hypothesis was rejected at five percent significance level and concludes no cointegration. Results for Bounds t-test also showed that in absolute terms, t-statistics of the three models were more than Upper Bound Pesaran’s tabulated values at five percent significance level. In conclusion, the results revealed that there was a long run cointegrating association in the models.

#### 4.4.3 Efficiency and Dynamic Stability of the Estimators

Before presentation of the empirical results, the efficiency and dynamic stability of the estimators were ascertained through test for serial correlation,

residual normality, Cumulative Sum (CUSUM) test of parameters stability, and AR roots graphs test of stability. Granger causality test was also performed to ascertain the direction of causality between the dependent variables and the explanatory variables included in the respective models. The test for serial correlation was performed to confirm if the residuals are serially independent. This is a vital requirement for ARDL model efficiency. Additionally, Jarque-Bera test was used to determine the residuals were normality distributed, with the null hypothesis that residuals are normally distributed.

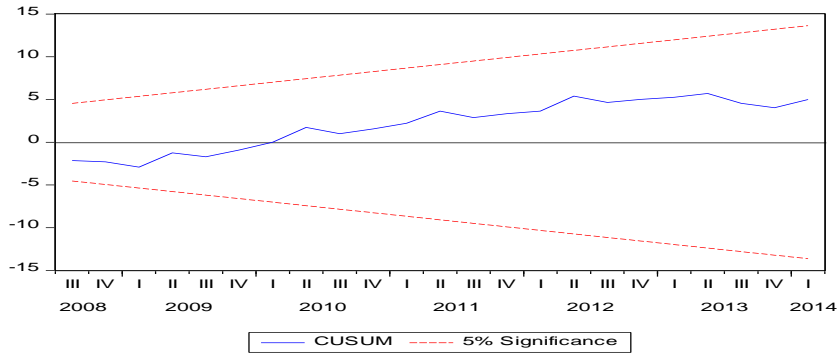
**Table 4.6: Results of Tests for Efficiency of the Estimators**

Test	<i>Public expenditure Model (1)</i>	<i>Government Tax Revenue Model (2)</i>	<i>Budget Imbalance Model (3)</i>	<i>Conclusion</i>
Breusch-Godfrey Serial Correlation LM Test (F-statistic)	0.4317	2.4415	0.4408	No serial correlation
Jarque-Bera Normality Test (test – statistic)	1.7328	1.9192	0.1240	Residuals are normally distributed
*, **, *** Denote the rejection of the null hypothesis at 10 percent, 5 percent, 1 percent level of significance, respectively.				

Source: Authors (2019)

The results showed that the errors are normally distributed and serially independent, which was desirable for the specification of the estimated models. Further, the dynamic stability of the estimated models was performed by use of the Cumulative Sum (CUSUM) test and the AR roots graphs. The null hypothesis for CUSUM test is that the parameters are stable (which is desirable). The decision criteria is that, if the CUSUM statistics (blue) line lies within the bands then we fail to reject the null hypothesis hence the conclusion that the parameters are

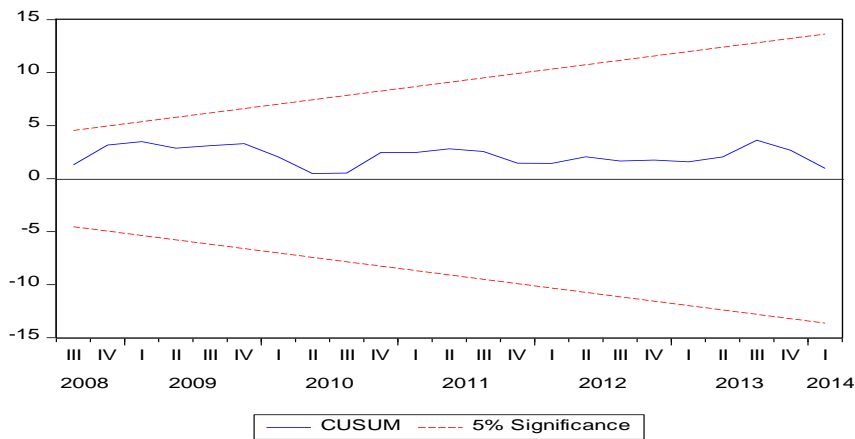
stable. It is worth noting that the closer the CUSUM statistics (blue) line to zero, the more stable the parameters in the model. Results for the CUSUM tests were as presented in the following figures.



**Figure 4.2: Result of CUSUM Test for Public Expenditure Model Stability**

Source: Authors (2019)

The figure showed that the estimated public expenditure model was dynamically stable since the CUSUM statistics (blue line) lies within the bands, crosses the zero line and oscillates next to it. This implied that the estimated model was steady and reliable.

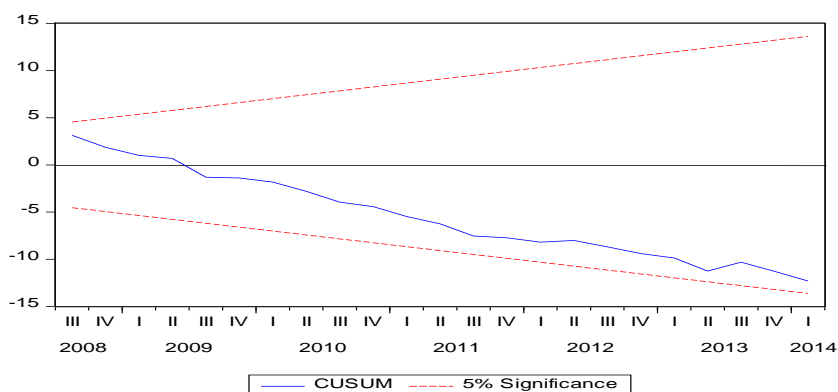


**Figure 4.3: Result of CUSUM Test for Government Tax Revenue Model Stability**

Source: Authors (2019)

The figure showed that the estimated tax revenue model was dynamically stable since the CUSUM statistics (blue line) lies within the bands and next to the zero

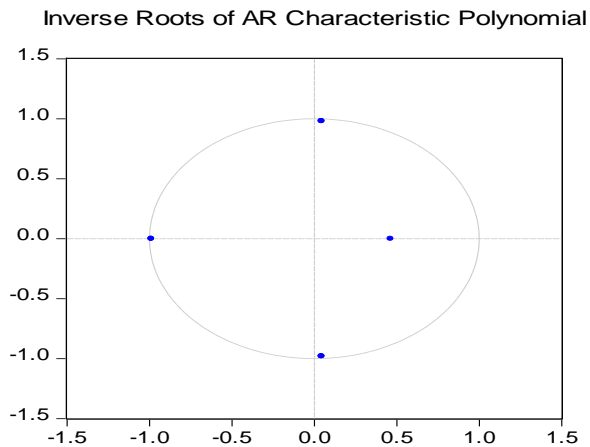
line. This implied that the model was steady and reliable in explaining the relationship between government tax revenue and the explanatory variables.



**Figure 4.4: Result of CUSUM Test for Budget Imbalance Model stability**  
Source: Authors (2019)

The figure showed that the estimated budget imbalance model was dynamically stable since the CUSUM statistics (blue line) lies within the bands. However, the CUSUM statistics seem to move closer and closer to the lower bound and away from the zero line towards the year 2015 implying that the system becomes less stable with time.

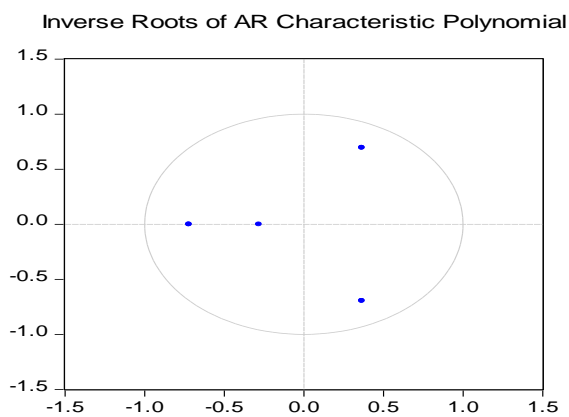
For the AR roots graphs, an estimated model is stable if the absolute value of all the roots are less than one and lies inside the unit circle. For instance, an AR model of first order (AR (1)) process given by  $y_t = \alpha y_{t-1} + \varepsilon_t$  (where  $y$  is the interested variable,  $y_0 = 0$ ,  $\alpha$  is a root,  $t$  is time period and  $\varepsilon_t$  is white noise with variance  $\sigma^2$ ) can be thought of as taking the previous value of  $y$  and amplify it with the root  $\alpha$  and adding a small noise. Therefore, if the modulus of the root is greater than one, then every new value of  $y$  is likely to be larger than its previous value, meaning that the process explodes for large time period ( $t$ ). The AR roots graphs are presented in the following figures.



**Figure 4.5: AR Roots Graph for Public Expenditure Model**

Source: Authors (2019)

The AR roots graph in Figure 4.5 showed that in the public expenditure model, some roots were on the unit circle, which implied that even though the system was stable, it was likely to have a random walk/process with time. This could weaken the validity of the standard errors with time.

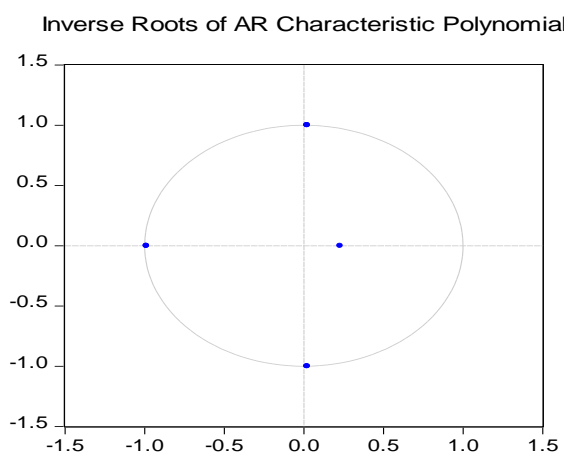


**Figure 4.6: AR Roots Graph for Government Tax Revenue Model**

Source: Authors (2019)

The AR roots graph in Figure 4.6 showed that in the tax revenue model, the absolute value (modulus) of all the roots were less than one and were within the unit circle. This implied that the process was bound or forced around a trend thus

was stable and was not likely to have a random walk with time. This showed that the standard errors remained valid even with a larger period.



**Figure 4.7: AR Roots Graph for Budget Imbalance Model**

Source: Authors (2019)

The AR roots graph in Figure 4.7 showed that in the budget imbalance model, some roots were on the unit circle, which implied that even though the system was stable, it was likely to have a random walk/process with time. This could weaken the validity of the standard errors with time.

#### **4.4.4 Granger Causality Test**

Regressions results obtained from an empirical analysis only show an association between the response and the explanatory variables but cannot tell the causality direction between the two variables. Therefore, there is need to test for direction of causality between two related variables and whether there is a response mechanism between the two variables. Granger causality test seeks to determine whether one thing happens prior to the other and helps predict it (Granger, 1969). Granger-causality test produces three different results: reject the null in one of the tests (find a unidirectional causal relation); reject the null hypothesis of the two



tests (find a bi-directional Granger-causality); or do not reject the null hypothesis at all. As discussed in Section 2.4.4, Maziarz (2015) pointed out that Granger causality test results have various implications. Therefore, Maziarz (2015) noted that one needs sufficient knowledge about the theoretical mechanisms connecting the two data series and the investigated phenomenon to determine whether the discovered relation by Granger causality test is either true or invalid.

The pairwise Granger causality test results for this paper were as presented in Table A9 in Appendix III. The findings showed that variation in log of consumer price index Granger caused variation in log of government tax revenue at five percent levels of significance. This affirmed that rise in inflation affects tax revenues collections by the government. The results also showed that change in log of consumer price index did not Granger cause change in log of budget balance at the second lag level where it entered the budget imbalance model. However, a further test of Granger causality between the two variables at fourth lag level, where the variable entered the public expenditure and tax revenue model, revealed that change in log of budget balance instead Granger caused variation in log of consumer price index (see Table A10 in Appendix III). This was an indication that methods of financing Kenya's budget deficits could be partly inflationary.

The results also showed a unidirectional causality running from change in log on nominal effective exchange rates to change in log of budget balance at five percent significance level. Meaning, the changes in nominal effective exchange rates Granger causes budget deficits through its effects on the amount of foreign debt repayments made by the government. Additionally, change in log of minimum wage was found to Granger cause variation in log of budget balance and variation

in log of government tax revenue. However, the direction of causality was found to be bidirectional in the tax revenue model implying that whereas tax revenue financed the expenditure on wage adjustments, the adjusted wages (a base for income taxes especially pay as you earn) also improved on income tax revenue collection in the country.

#### **4.4.5 Discussion of the Regression Results**

Using Equation 4.13 for the respective dependent variables, the ARDL Error Correction Model regression results obtained for the three models were as presented in Table 4.7

**Table 4.7: ARDL ECM Regression Results from the Analysis of Budget Imbalance Dynamics**

	<u>Public Expenditure Model (1)</u>	<u>Government Tax Revenue Model (2)</u>	<u>Budget Imbalance Model (3)</u>
<b>Explanatory Variables</b>	<b>Dependent Variable:</b> Change in log of public expenditure ( $\Delta \ln G_t$ )	<b>Dependent Variable:</b> Change in log of government tax revenue ( $\Delta \ln TR_t$ )	<b>Dependent Variable:</b> Change in log of budget balance ( $\Delta \ln B_{bal,t}$ )
Change in log of public expenditure , lagged twice ( $\Delta \ln G_{t-2}$ )	0.2870 (0.1917)	-	-
Change in log of government tax revenue, lagged twice ( $\Delta \ln TR_{t-2}$ )	-	0.3678*** (0.0658)	-
Change in log of budget balance, lagged once ( $\Delta \ln B_{bal,t-1}$ )	-	-	-0.1277 (0.0833)
Change in log consumer price index ( $\Delta \ln CPI_t$ )	-	-	9.7729** (4.5629)
Change in log of consumer price index, lagged twice ( $\Delta \ln CPI_{t-2}$ )	-	-	8.4025* (4.6807)
Change in log of consumer price index, lagged four times ( $\Delta \ln CPI_{t-4}$ )	9.2574 (6.0788)	-0.9700** (0.4164)	-
Change in log of nominal effective exchange rate, lagged three times ( $\Delta \ln NEER_{t-3}$ )	-	0.2620 (0.3806)	4.3719 (4.2718)
Change in log of nominal effective exchange rate, lagged four times ( $\Delta \ln NEER_{t-4}$ )	1.3653 (5.6298)	-	-
Change in log of minimum wages ( $\Delta \ln MW_t$ )	-	-	13.5752*** (2.4678)
Change in log of minimum wages, lagged once ( $\Delta \ln MW_{t-1}$ )	6.1093* (3.1982)	-	-
Change in log of minimum wages, lagged twice ( $\Delta \ln MW_{t-2}$ )	14.0827*** (4.6792)	-	-
Change in log of minimum wages, lagged three quarters ( $\Delta \ln MW_{t-3}$ )	-	0.9430*** (0.2197)	-
Change in log of minimum wages, lagged four quarters ( $\Delta \ln MW_{t-4}$ )	-	-	13.6265*** (2.7829)
Change in log of corruption perception index, lagged once ( $\Delta \ln CorPI_{t-1}$ )	-4.2191 (5.9250)	-	-
Change in log of corruption perception index, lagged twice ( $\Delta \ln CorPI_{t-2}$ )	-	-	-6.7946* (3.6277)
Change in log of corruption perception index, lagged three quarters ( $\Delta \ln CorPI_{t-3}$ )	-	-0.0376 (0.3280)	-
Election dummy ( $ELC_t$ )	-0.2727 (0.2537)	0.0157 (0.0184)	0.3090* (0.1806)
Government Type ( $GovT_t$ )	-0.6949** (0.3428)	0.0150 (0.0196)	-0.3317 (0.2169)
Constant Term	-0.4926 (0.3430)	0.0272 (0.0224)	-1.1482*** (0.2841)
Error correction term ( $ECT_{t-1}$ )	-1.1399*** (0.2361)	-1.0307*** (0.1667)	-0.4876*** (0.1698)
Time trend ( $@trend$ )	0.0104 (0.0101)	-0.0006 (0.0007)	0.0067 (0.0073)
Number of Observations	52	48	49
F - statistic	5.7616***	36.5099***	27.6321***
Adjusted R-squared	0.4828	0.8718	0.8592

Note: Level of significance are denoted by \*  $p < 0.1$ , \*\*  $p < 0.05$ , and \*\*\*  $p < 0.01$ . The figures inside the parentheses are robust standard errors

Source: Authors (2019)

The analysis of public expenditure, tax revenue and budget imbalance dynamics included 52, 48 and 49 observations respectively after adjustments. The variables entered the respective models at different lag levels. The F-tests showed that the coefficients were jointly significant in explaining the sample variations in public expenditure, tax revenue and budget deficits. The adjusted R-squared figures showed that variables included in the respective models explained 48.28 percent, 87.18 percent, and 85.92 percent of the sample variations in the respective dependent variables.

The coefficients of all the error correction terms were negative. Moreover, they were significant at one percent significance level. This implied that at one percent significance level, the systems in the public expenditure, government tax revenue and budget imbalance models adjust towards long-term equilibrium at a speed of 114.0 percent, 103.07 percent and 48.76 percent respectively. It is important to note that the findings showed that the system in the public expenditure estimated model adjusted quickly to its long run equilibrium than the tax revenue model. This partly explained the persistent widening gap between government tax revenue and public spending observed during the study period.

Since the variables included in the models were in logarithms, except the dummy variables (election dummy and government type dummy), their coefficients were interpreted as elasticity. The empirical findings showed that of all the lagged dependent variables, only government tax revenue influenced the changes in the current response variables. This implies that current tax revenue collections are influenced by the previous revenue collections. The results showed that at one percent significance level, a percentage rise in nominal government tax

revenue (lagged twice) would lead to a 0.37 percent rise in current nominal government tax revenue.

Inflation, captured in the models by the changes in log of consumer price indices, was found to have a positive but insignificant coefficient in the public expenditure model. However, the coefficient of change in log of consumer price index was found to be significant in the government tax revenue and budget imbalance models. The results showed that at five percent level of significance, a percentage rise in consumer price index (lagged four quarters) would lead to a 0.97 percent decline in nominal government tax revenue. On the other hand, at five percent level of significance, a percentage rise in current period's consumer price index would lead to a 9.77 percent increase in nominal budget balances (deficits). A percentage rise in consumer price index (lagged four quarters) would lead to 8.40 percent increase in the nominal budget balances (deficits) at 10 percent significance level. This is a combined effect of approximately 18.17 percent increase in nominal budget deficit in a year. These results supported the findings of Aghevli and Khan (1978), Heller (1980), Hossain (1987) and Diokno (2007) who found out that public expenditure adjusted more quickly to inflation than tax revenue, with the result that the budget deficit was eventually enlarged. These results also provided an empirical back up to the results of Gongera *et al.*, (2013) who noted that inflation contributed to Kenya's budget deficits. However, Gongera *et al.* (2013) did not carry out an empirical analysis based on an econometric model. The study employed a descriptive research design, collected, and analyzed data from 33 tax seniors in the five leading audit firms in the country.

The Granger causality test in the preceding unit showed that financing of the annual nominal budget deficits in the country could be partly inflationary in nature. The results revealed that change in log of budget balance Granger caused change in log of consumer price index at the fourth lag level. The empirical results and the Granger causality test results are suggestive of a possible Olivera-Tanzi effect. The Olivera-Tanzi effect postulated that as inflation rose, public expenditure increased while real tax revenue, after adjusting for inflation, depreciated hence fuelling the budget deficit problem (Olivera, 1967; Tanzi, 1977; 1978).

The nominal minimum wages were seen to have an optimistic influence on public spending, government tax revenue and budget imbalances. Nominal minimum wages were used in the models to capture the effect of the frequent wage adjustments on the budget imbalance dynamics in Kenya. The results showed that at one percent level of significance, a percentage rise in nominal minimum wages (lagged once) would lead to a 14.08 percent increase in nominal public expenditure. Additionally, at 10 percent level of significance, a percentage increase in nominal minimum wages would lead to a 6.11 increase in public expenditure. For the government tax revenue and budget imbalance models, the results showed that at one percent level of significance, a percentage increase in nominal minimum wages (lagged three quarters) would lead to an increase in nominal government tax revenue by 0.94 percent. Additionally, a percentage increase in nominal minimum wages (lagged four quarters) would result to a 13.62 percent increase in nominal budget deficits (that is, worsen the budget imbalances). These results show that the upward adjustment of nominal wages is among the factors

that constrain the fiscal consolidation efforts in the country through its expansionary effects on the budget deficits.

Corruption perception index was found to have a negative coefficient in all the models but the coefficient was only significant in the budget imbalance model. A decrease in the corruption index reflects an increase in the perceived corruption level in the government level. Therefore, the negative coefficient showed that a percentage rise in corruption levels in the public sector would lead to a 6.97 percent increase in nominal budget deficits (worsen the budget imbalances) within three quarters of a year. The result supported the arguments by Mwakalobo (2015) that institutional weaknesses in Kenya, Tanzania and Uganda led to tax revenue leakages through tax evasion, non-tax compliance and revenue embezzlement. These have an adverse influence on the amount of tax revenue collected, consequently worsening the budget deficits. The results also provided empirical support to the findings by Gongera *et al.* (2013) which argued that increased corruption levels tend to limit growth in tax revenue generation in Kenya. These results showed that corruption was one of the major factors responsible for the persistent nominal budget deficits observed in Kenya.

The election dummy variable (political budget cycle) had an insignificant coefficient in the public expenditure model and government tax revenue model but a positive significant coefficient in the budget imbalance model. The findings showed that at 10 percent significance level, occurrence of a general election in Kenya would lead to a 0.31 percent increase in nominal budget deficits. The result supported the findings of Tujula and Wolswijk (2004) that budget imbalances on average worsen by about 0.3 percent of GDP in general elections years. On the

other hand, change in government type into a grand coalition government from March 2008 to March 2013 had an adverse effect on the nominal government spending, but no effect on government tax revenue and nominal budget balances. The results showed that change of government from that led by Party of National Unity into a grand coalition government with Orange Democratic Movement (2008 to 2013) led to a 0.69 percent decline in nominal government spending. This result pointed at improved fiscal discipline during the period Kenya was ruled by a grand coalition government. However, the results were contrary to the argument by Cho (2009) that one-party majority governments were more likely to maintain tighter fiscal discipline than coalition governments. Though not significant, the negative coefficient of the type of government dummy in the budget imbalance model was in line with the wars of attrition model explanation for fiscal deficit presented by Galli and Padovano (2002), Alesina and Drazen (1991), and Kontopoulos and Perotti (1999). The wars of attrition model postulated that coalition governments tended to delay stabilization since it became more difficult to reach a consensus on fiscal policy in a coalition government than in a one-party majority government. The other variable included in the model, that is, nominal effective exchange rate (NEER) was found to have a positive but insignificant coefficient in all the three models.

In summary, the paper showed that the Olivera-Tanzi effect propositions partially explained budget imbalance dynamics in Kenya. The nominal minimum wage adjustments, corruption level in government, the election dummy and type of government dummy were the political economy variables included in the model. The findings disclosed that each of the variables had a significant coefficient in at



least one of the models. Consequently, the paper concluded that the political economy variables influenced budget imbalance dynamics in Kenya.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND IMPLICATIONS OF POLICY**

#### **5.1 Introduction**

This chapter provides a recap of the research problem, summary, and conclusions made from the study, implications of the policy, and study contributions to knowledge, limitations, and possible areas for future research.

#### **5.2 Summary**

Kenya needs substantial and sustainable fiscal consolidation to create fiscal space for financing its Vision 2030 development projects, the current government's election pledges (Big Four Agenda) and international development goals. To achieve these objectives, the government should allocate resources optimally among the competing needs and create a platform for the realization of the set goals. Consequently, the government has attempted to control the persistent rise in public recurrent expenditure in order to switch more resources towards public investments. However, the government has found it a challenge to control the persistent growth in non-priority recurrent expenditures as evidenced by the country's failure to attain sustainable fiscal consolidation. The government has continued to accumulate more public debt because of the persistent budget deficits.

Additionally, there has been limited revenue raising efforts within the counties, with the counties collecting only 43 percent of the targeted own-source revenue. This has led to increased pressure from the counties for the national to increase the allocations for country government transfers. It is against these backdrops that this study sought to investigate the fiscal consolidation constraints,

which act through the persistent growth in public recurrent expenditure. The study also sought to establish whether the sectoral public recurrent expenditure enhances economic growth or not. The factors leading to the expansionary budget imbalances force the government to accumulate more debt, further constraining the fiscal consolidation efforts in the country. Therefore, the study also sought to examine these factors by analyzing the budget imbalance dynamics in the country using the Olivera-Tanzi effect theory.

The first paper of this study sought to examine the fiscal consolidation constraints that act through the persistent growth in public recurrent expenditure in Kenya using time series data from the year 2000 Quarter one to 2015 Quarter four. Specifically, the paper sought to: identify the factors responsible for the persistent public recurrent expenditure growth relative to public investment spending in Kenya; examine how the factors influence the growth in non-wage recurrent expenditure and payments to government employees in Kenya; and determine the extent to which the fiscal adjustment efforts by the government limit growth in public recurrent expenditure in Kenya. To address these objectives, the paper specified and estimated four Autoregressive Distributed Lag error correction models.

The findings showed that, in the long run, the system in the public recurrent expenditure model adjusted faster to its equilibrium than the system in public development expenditure model. Additionally, the system in the government non-wage recurrent expenditure model was found to adjust faster towards its long run equilibrium relative to that of the government compensation of employees' model.

This partly explained why growth in public recurrent expenditure always adjusts faster than growth in development spending.

The factors found to influence the changes in public recurrent expenditure and its components were real minimum wages, real tax revenue, consumer price index, and the political budget cycle. The results showed that the persistent trade union demands for adjustments of public sector wages, often accompanied by the annual adjustments in the minimum wages across the board, resulted into an increase in compensation of government employees and consequently, public recurrent expenditure. The paper found out that government tax revenue was largely committed to financing of the public recurrent spending, thus forgoing the public development expenditure. The results showed that real tax revenue had an impact on compensation of government employees and non-wage recurrent expenditure. However, real tax revenue had no influence on growth in public development expenditure.

The first paper found out that the consumer price index had a negative insignificant coefficient in the public recurrent expenditure model, public development expenditures model and compensation of government employees' model but a significant negative coefficient in the government non-wage recurrent expenditure model. This implied that inflation increase erodes the real value of non-wage government spending thus tend to lead to an upward adjustment of their nominal values resulting in an overall rise in nominal public expenditure. The paper also showed that real effective exchange rates did not explain the changes in real public recurrent expenditure and its components but explained the changes in real development expenditure. This is because most of the inputs used in public

development projects are imported. Thus, the devaluation of the Kenya shilling affects the costs of the imported inputs and consequently the aggregate expenditure on public investment projects.

The election dummy had a significant negative coefficient in the real public recurrent expenditure model and real compensation of government employees' model. However, it had an insignificant negative coefficient in the real development expenditure model and real government non-wage recurrent expenditure model. These results showed that the Kenyan government tend to focus more on fiscal discipline during the election periods to avoid increasing the fiscal deficit. Fiscal adjustment, on the other hand, was found to have a positive coefficient in all models. These findings showed that the fiscal adjustment measures were not effective in limiting the growth of public wage bill and non-wage recurrent expenditure. The results showed that the fiscal adjustment measures were not effective on the expenditure side and the improvement on the fiscal balances were due to improvements on revenue collection, which in turn led to increased space for government recurrent spending.

In recognition of the fact that the growth of economy is a major enabler for sustainable fiscal consolidation, the second paper of this study examined the economic growth effect of the increased budgetary allocation for public recurrent expenditure in Kenya using sector level data. The paper made use of unbalanced short macro panels of seven sectors observed for 16 years each (from 1999/2000 to 2014/2015). Pooled Mean Group estimator was used to analyze the data. The empirical drew conclusions that a rise in the share of public recurrent spending in sectoral GDP had no effect on sectoral growth of the economy in the short run but

a negative impact in the long term. The results also disclosed that arise in sectoral development expenditure share had no effect on sectoral GDP growth in the short run but a positive impact on economic growth in the long term. The empirical results showed that persistent rise in sectoral public recurrent expenditure are actually growth retarding whereas sectoral development spending is growth enhancing in the long term.

The results for other variables included in the second paper showed a positive impact on sectoral economic growth for share of sectoral gross fixed capital formation in sectoral GDP. However, growth in government labour force in the sectors presented mixed results. The short run results showed a negative effect whereas the long run results showed a positive impact on sectoral growth of the economy. These results pointed out that, in the short run, growth in government employees may lead to more resources being committed to compensation of employees thus suppressing economic growth. Nevertheless, the increase in employment created by the government would result in improved economic growth in the long term. This is because the government employees among other citizens continue to consume and invest in the domestic economy. The empirical results also found a negative impact of the share of private consumption in sectoral GDP on growth of economy in the long term. Though this decline in sectoral growth is marginal, it is a pointer to a greater proportion of private consumption being from imports, which is a leakage from the domestic economy.

In the third paper, the study concentrated on the persistent budget imbalances in Kenya and the application of Olivera-Tanzi effect theory in explaining the budget imbalance dynamics. The paper made use of time series data

from the year 2000 Quarter one to 2015 Quarter four. The paper specified and estimated three ARDL error correction models. The first and second models analyzed indirect effects of various factors on budget imbalances. This was done by looking at their simultaneous effect on change in government tax revenue and nominal public expenditure. The dynamism in the two models were then compared with that of the budget imbalance model.

In the third paper, the regression results showed that the systems in the public expenditure, tax revenue and budget imbalance models adjusted towards their long run equilibrium at a speed of 113.99 percent, 103.07 percent and 48.76 percent respectively. This showed that the system in the public expenditure model adjusted quickly to its long run equilibrium than the tax revenue model, partly explaining the persistent growth in budget imbalances (deficits) in Kenya. Whereas the consumer price index had a positive insignificant coefficient in the public expenditure model, the empirical results showed that an increase in consumer price index led to an erosion of the nominal value of government tax revenue. Consequently, this led to an increase in the budget deficits as indicated by the budget imbalance model. Together with the Granger causality results which showed that change in log of nominal budget balances Granger caused adjustment in log of consumer price index at the fourth lag level (in a year), the results indicated that the Olivera-Tanzi effect proposition could be used to explain the budget imbalance dynamics in the economy of Kenya.

To investigate the impacts of political economy variables on the budget imbalance dynamics, the empirical models in the third paper included nominal minimum wage adjustments, public sector perceived corruption level, the election

dummy and type of government dummy. Nominal minimum wages had a positive effect on public spending, budget imbalances and government tax revenue in Kenya. The paper also found out that rise in perceived corruption levels in the public sector led to an increase in nominal budget deficits within three quarters of a year. Additionally, the paper showed that an occurrence of a general election (political budget cycles) led to a rise in nominal budget deficit in Kenya. On the other hand, change in type of government into a grand coalition government (that was in power from March 2008 to March 2013) had a negative effect on the nominal government spending adjustment by 0.69 percent, but no effect on tax revenue and nominal budget deficits. These results are suggestive of a tighter fiscal discipline during the grand coalition years (2008 – 2013).

In summary, the study showed that that increase in consumer price indices (inflation), upward adjustment of nominal minimum wages, and rise in corruption levels in the government and an occurrence of a general election in the country worsens the budget imbalances (deficits) in Kenya. These variables act as constraints to the fiscal consolidation efforts in the country as they worsen the fiscal deficits thus forcing the government to increase borrowing to finance the fiscal gap.

### **5.3 Conclusion**

From the first paper, the study concluded that the frequent adjustments of minimum wages and the commitment of tax revenue to funding recurrent spending (at the expense of public investment expenditure, which are largely financed by borrowed funds), are the main factors that lead to the persistent growth in public



recurrent expenditure in Kenya. It is the previous public development expenditure and the real effective exchange rates that were found to influence growth in real public development expenditure in Kenya. The study affirmed that compensation of government employees adjusts faster to the significant factors as compared to government non-wage recurrent expenditure. The study also showed that the fiscal adjustment measures were not effective in limiting the rise in public wage bills, non-wage recurrent expenditure and public recurrent expenditure in general.

From the second paper, the conclusion was that the persistent increase in sectoral public recurrent spending retards economic growth in the sectors. However, increased sectoral public development expenditure enhances growth of the economy in various sectors. The current study showed that sectoral public recurrent and development expenditures only influenced sectoral growth of the economy not in the long run rather than in the short run. Additionally, the study showed that the sector growth in government labour force and the sectoral gross fixed capital formation had a positive impact on sectoral in the long run growth of the economy. However, sector growth in government labour force was established to retard the growth of the economy in the short run whereas private final consumption was found to retard the long run economic growth.

From the third paper, the conclusion was that the Olivera-Tanzi effect propositions partly explained the budget imbalance dynamics in Kenya. Additionally, the study concluded that political economy factors influence the nominal budget imbalance dynamics observed in Kenya. The study showed the factors that worsen the budget imbalances (deficits) in Kenya are increase in the consumer price indices (inflation), upward adjustment of nominal minimum wages,

rise in government's corruption levels and an occurrence of a general election in the country. This study therefore concludes that the above factors act as constraints to the fiscal consolidation efforts in the country as they worsen the fiscal deficits thus forcing the government to borrow more to finance the fiscal gap.

#### **5.4 Policy Implications**

Based on the study findings, the implications to policy presented in this section were derived. The study recommends measures to control the persistent rise in public recurrent expenditure in Kenya. The government needs to embark on a credible fiscal consolidation effort by focusing on serious and significant expenditure reforms to signal government commitment to fiscal management and sustainability. For instance, the government needs to begin the fiscal adjustment efforts with a large upfront adjustment to signal its seriousness on fiscal consolidation and deliver credible change in public debt dynamics. This is informed by the consensus in the literature reviewed in this study that showed that expenditure based consolidation measures are more effective than tax based consolidation measures.

First, the government, through Salaries and Remuneration Commission, needs to restrict frequent public sector wage adjustments. For instance, after the harmonization of the remunerations of government employees across all the sectors, the government should consider restricting wage adjustments to the amounts usually paid as years of service increments only. This is because the study results, in the first and the third paper, showed that the minimum wage adjustments led to the persistent rise in public recurrent expenditure and worsening of the

budget imbalances (deficits) in Kenya. Generally, the minimum wage adjustments always follow the wage adjustments offered to various public servants, achieved through industrial unrests by public servants in various sectors as they push for cost of living adjustment to their wages. These further push the government spending on public wage bill upwards.

Second, the government should also put more focus on controlling the increase of goods and services spending used by the various national ministries, departments and supports teams. This is because, in the long-run, the government non-wage recurrent expenditures were found to change faster to their equilibrium than the compensation of government employees. Controlling the rise in government non-wage recurrent expenditures can be realized by cutting down on non-priority expenditures and increasing the efficiency of public procurement through better sourcing and reducing wastages.

Third, the Public Finance Management (PFM) Act of 2012 financial obligation principles should be strictly enforced at both county and national government levels. This is because fiscal adjustments were found to lead to increased expenditure on the public recurrent expenditure components instead of restraining their growth. This implied that the fiscal adjustments observed resulted from improved revenue collections, which were further channelled towards increased recurrent spending. Evidently, both levels of government are yet to adhere to the PFM Act of 2012 which requires allocation of at least 30 percent of the overall county or national government budget to public investment spending.

The study also recommends measures to enhance chances of successful fiscal consolidation through sustainable growth of the economy. First, the

government should aim at both components of public recurrent expenditure when carrying out austerity measures. This is because the persistent rise in public recurrent expenditure was found to retard growth of the economy. Meaning, the persistent growth in public recurrent spending further constrains fiscal consolidation efforts in the county through its negative effects on economic growth. More specifically, more focus need to be placed on the non-wage recurrent expenditures in view of their relatively high discretionary nature as compared to compensation of government employees. Additionally, the second paper showed that, in the short run, increase in government labour force in the sectors had an adverse effect on economic growth but a positive economic growth outcome in the long run. This showed that while committing more government resources towards employment of more public servants may suppress growth of the economy in the short run, in the long run, the effect on growth of the economy is positive. This could be because of increased employment in the economy and increased consumption and investment in the domestic economy by government employees among other citizens.

The second measure to enhance chances of successful fiscal consolidation through sustainable economic growth is to encourage local production of the consumer items that form significant proportions of the private final consumption expenditure. This is because the second paper showed that, in the long run, private consumption share increase in sectoral GDP has an adverse effect on the growth of the economy. This implies that a greater proportion of private final consumption could be from imports that is a leakage from the domestic economy. This trend should be checked since it is likely to have other macroeconomic effects on the

reduction in the foreign currency reserves and the stability of the Kenyan Shilling in the international market.

From the findings of the third paper, the study recommends measures to reduce the fiscal imbalance gap in Kenya. First, there is need for more concerted efforts both on demand and supply sides of the economy to check the inflationary pressure in the country. This is because the changes in general level of prices were found to substantially worsen the nominal budget imbalances (deficits) in Kenya. More effort should be on improving the business environment to enhance domestic production of consumer products and address the supply side constraints to inadequate supply of consumer products in Kenya. Additionally, the expansionary fiscal stance that creates inflationary pressure on the economic demand needs to be checked. More of the government resources should be devoted to the supply side's productive public expenditure aimed at reducing the cost of doing business and enhancing production in the key sectors of the economy.

Second, decisive and punitive actions need to be taken to lower the corruption level in government. This is because the study showed that increase in corruption worsens the budget imbalances (deficits). Additionally, there is need for more focus on ensuring value for money spent on infrastructural development projects in the country. The fight on corruption should focus on the over-pricing of mega infrastructural projects in the country. For instance, the costs of constructing a kilometre of road should be standardized across the country. The same should apply to other infrastructural projects. This is because the results from the first paper showed that corruption tend to increase the government spending on development projects. In the third paper, corruption was found to worsen the

budget imbalances (deficits) in the public sector which means that corruption tend to compromise the quality and value for money spent on the development projects. Generally, rent seeking behaviour of the public officers and tax evasion are challenges that need to be dealt with decisively in controlling unproductive public expenditure and enhancing domestic revenue mobilisation in the country.

### **5.5 Contributions to Knowledge**

The first contribution of this study to knowledge is the focus it has given to empirical analysis of growth in public recurrent expenditure in general and compensation of government employees and specifically the non-wage recurrent spending. The study brings out the factors that act as constraints to expenditure based fiscal consolidation in the country through the analysis of persistent rise in the public recurrent expenditure and its components. In addition to rise in minimum wages, committing government tax revenue towards public recurrent spending and inflation, there are political economy variables that were found to worsen the budget imbalances (deficits) in Kenya. These factors constrain the fiscal consolidation efforts in the country. These are increase in level of corruption in government and an occurrence of a general election in the country. The findings of this study generally contribute towards filling the knowledge gaps in relation to fiscal consolidation challenges in especially in developing countries particularly Kenya. Further, this study presents policy recommendations that Kenya can explore to control the persistent rise in public recurrent expenditure and the widening fiscal imbalance gap to ensure sustainable fiscal consolidation in the country.

Secondly, this study is among the first to use sector level disaggregated data to provide empirical proof of the impact of public recurrent and development spending on the growth of the economy in Kenya. This study contributes to empirical evidence that composition of public expenditure matters in pursuit of a country's economic growth and sustainable fiscal consolidation. More importantly, the study contributes to the existing empirical evidence that expenditure based fiscal consolidation should be targeted more at public recurrent expenditure and its components in view of the result that they are not only non-productive but also retard economic growth.

Thirdly, the study findings showed that the Olivera-Tanzi effect propositions could be used to explain the fiscal imbalance dynamics in Kenya. The fact that Kenya is not a high inflation economy like the economies where the Olivera-Tanzi effect has been experienced before puts to question the assertion of the proposition that it only applies to high inflation economies. The study therefore suggests that the theory could be applicable in explaining the budget imbalance dynamics witnessed in moderate inflation economies, which calls for further investigation.

## **5.6 Limitations of the Study**

The study relied on published data from various sources, which meant that accuracy of the findings depended on the accuracy of data captured from the respective sources. There were also limitations on the frequency of data obtained from different source. The largest amount of data was quarterly data sourced from various government sources. However, data which were largely annual was

obtained from external sources which include the World Bank. To ensure that the annual data conformed to the quarterly frequency data from the domestic sources, the data were transformed into quarterly data using *Eviews* statistical software. Before data transformation, the annual data generation process for the respective data series were examined to determine the data generation process to apply in generating the quarterly data.

In the second paper, the study faced limitation in the unavailability of audited sector level expenditure data for the whole study period. Therefore, the approved public expenditure data for the various government ministries, state departments and agencies budget votes were utilized in the study. These were extracted from the Kenya National Treasury's Approved Budget Estimates Reports and Supplementary Budget Reports. There were also challenges in obtaining consistent and complete disaggregated data on the approved gross estimates for a long period to enable a time series analysis for each sector. In view of this, the study employed a macro-panel data analysis for the period 1999/2000 to 2014/2015, using disaggregated data of public recurrent and development expenditures.

### **5.7 Areas for Further Research**

During the study period, the developments in the Kenyan labour market showed that there has been an increase in unionization of labour in the country. This has seen the establishment of Union of Kenya Civil Servants as well as increased activities of organized labour unions such as Kenya National Union of Teachers. Members of these unions form a large proportion of government



employees and the unions have been able to negotiate substantial wage increments on behalf of their members over the study period hence their activities could be having a significant effect on public recurrent spending adjustments. However, this study faced limitations of data in an effort to evaluate the impact of the trade unions' activities on growth in public recurrent expenditure with a particular focus on compensation of public sector employees. A further study in this area is therefore recommended.

For the second paper, a similar analysis using government audited disaggregated data for the various public expenditure components at sector level, when available, is recommended to help corroborate the results. Analysis using a further decomposition of the public recurrent expenditure into detailed components is encouraged to determine the magnitude and effects of these components on economic growth. This will enable the government to be more specific on its fiscal adjustment measures.

In view of the new devolved system of governance in Kenya, there will be need to examine possible vertical fiscal imbalances in the two-tier system of governance and how this influences the overall fiscal imbalances for the country. Such analysis will help to construct indicators of vertical fiscal imbalances for the national and county governments.

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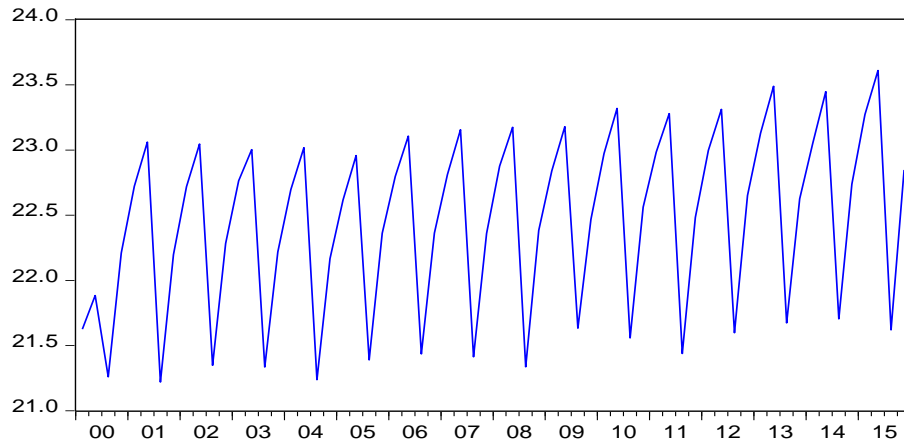
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## APPENDICES

### Appendix I: Appendices to Analysis of Determinants of Growth in Public Recurrent Expenditure

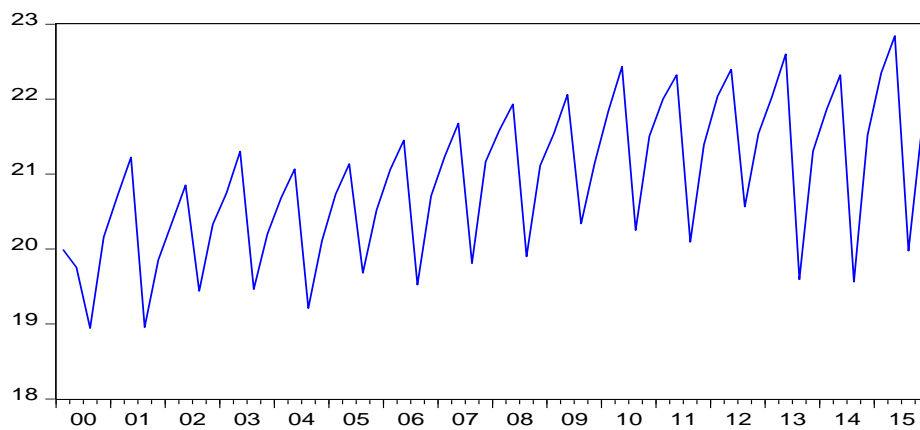
LNGRC



**Figure A1: Trend Analysis of Log of Real Public Recurrent Expenditure**

Source: Authors (2019)

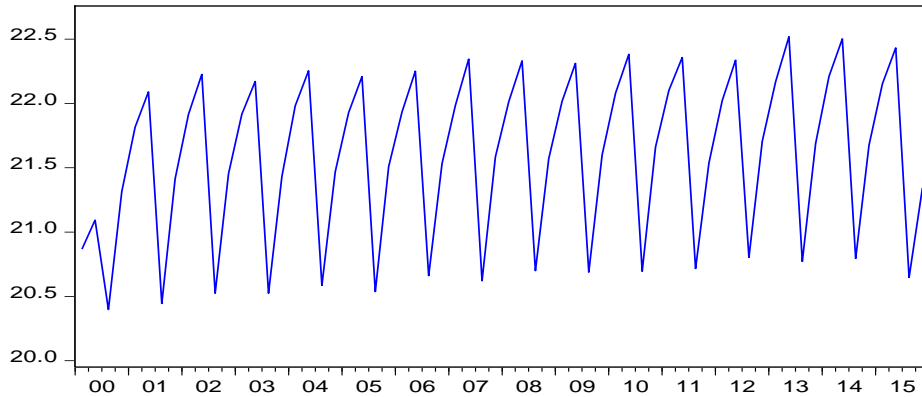
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**Figure A2: Trend Analysis of Log of Real Public Development Expenditure**

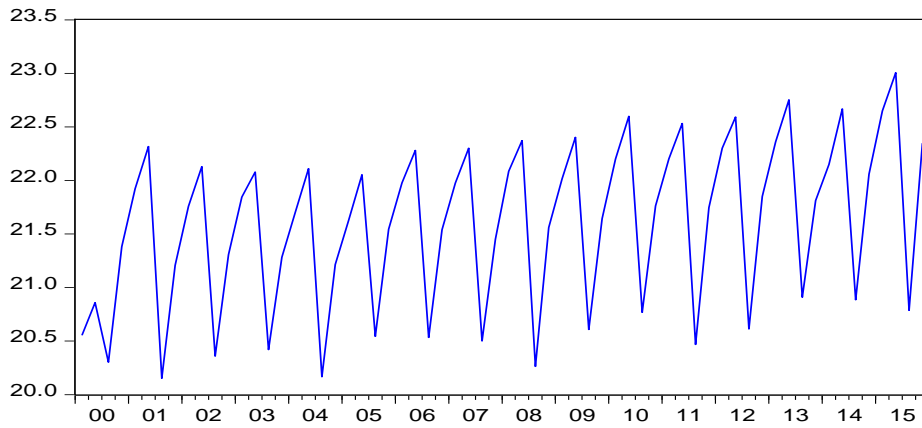
Source: Authors (2019)

LNGCE



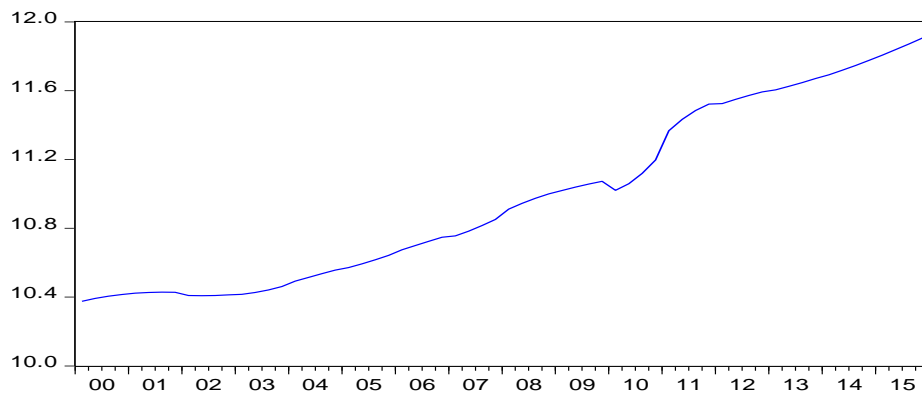
**Figure A3: Trend Analysis of Log of Real Compensation of Government Employees**  
Source: Authors (2019)

LNGNWRC

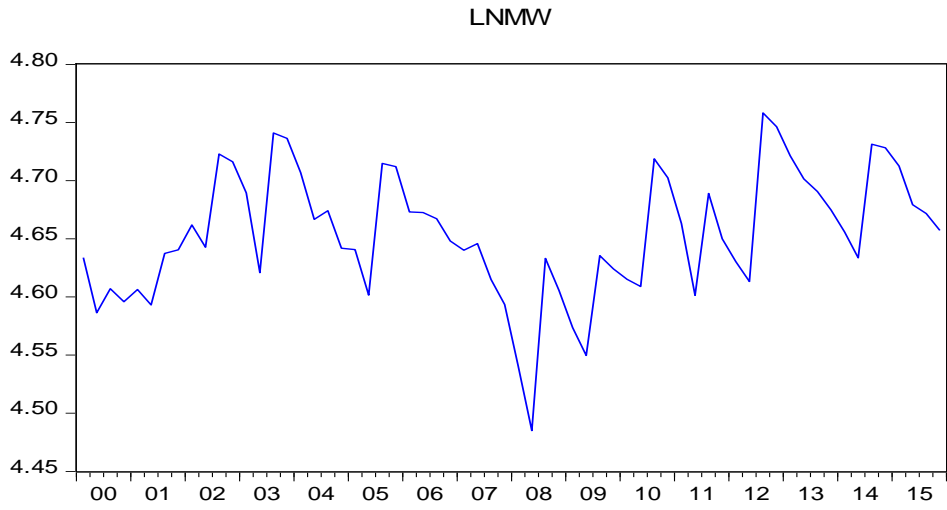


**Figure A4: Trend Analysis of Log of Real Non-Wage Recurrent Expenditure**  
Source: Authors (2019)

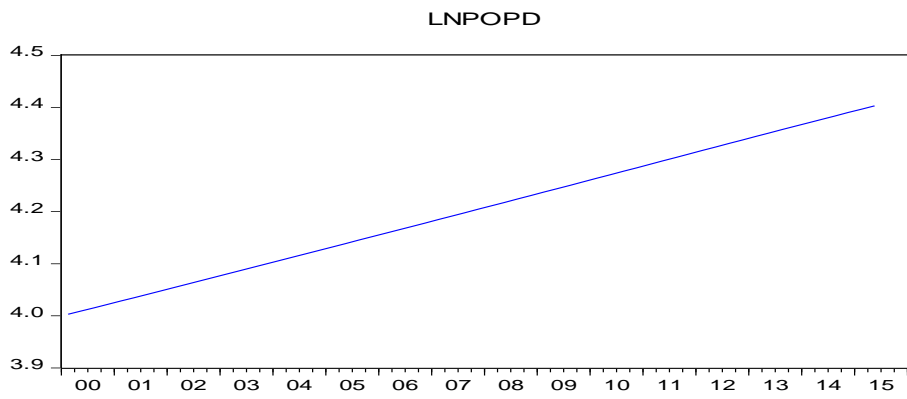
LNGDPC



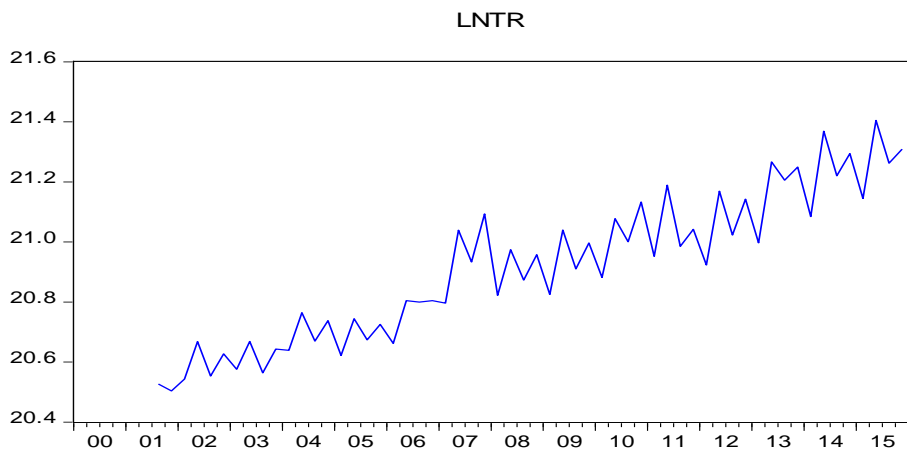
**Figure A5: Trend Analysis of Log of GDP per Capita**  
Source: Authors (2019)



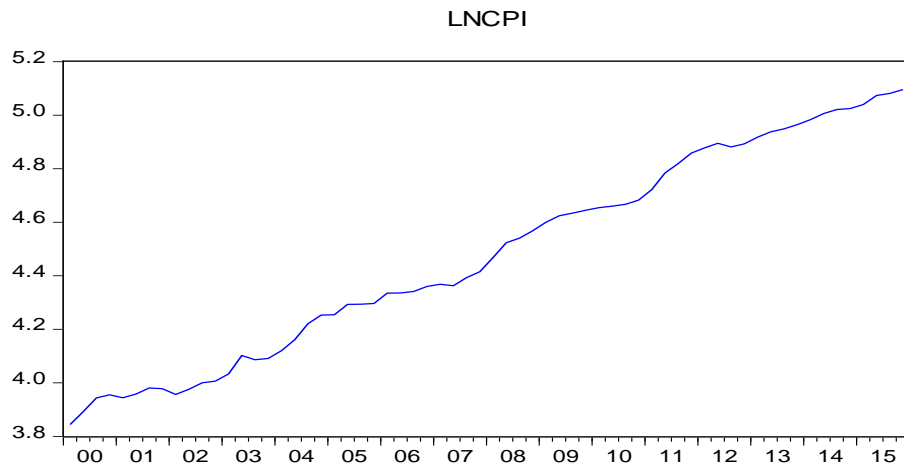
**Figure A6: Trend Analysis of Log of Real Minimum Wages**  
Source: Authors (2019)



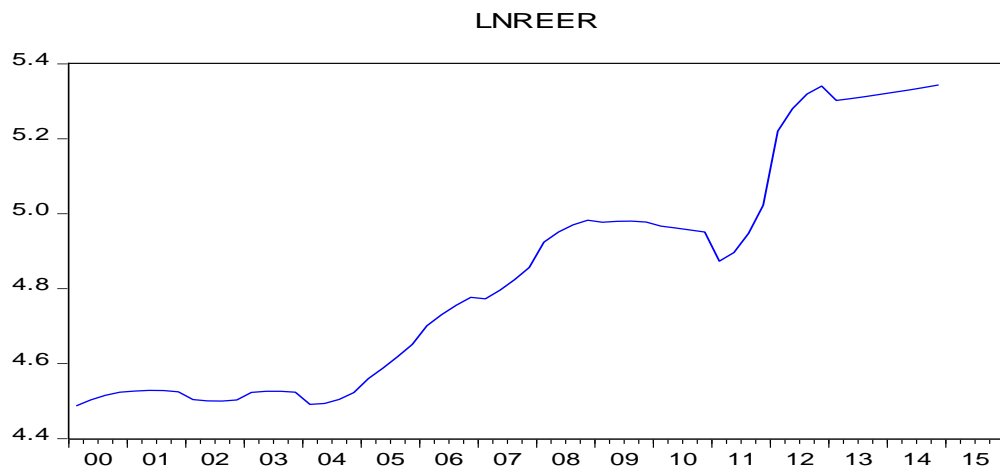
**Figure A7: Trend Analysis of Log of Population Density**  
Source: Authors (2019)



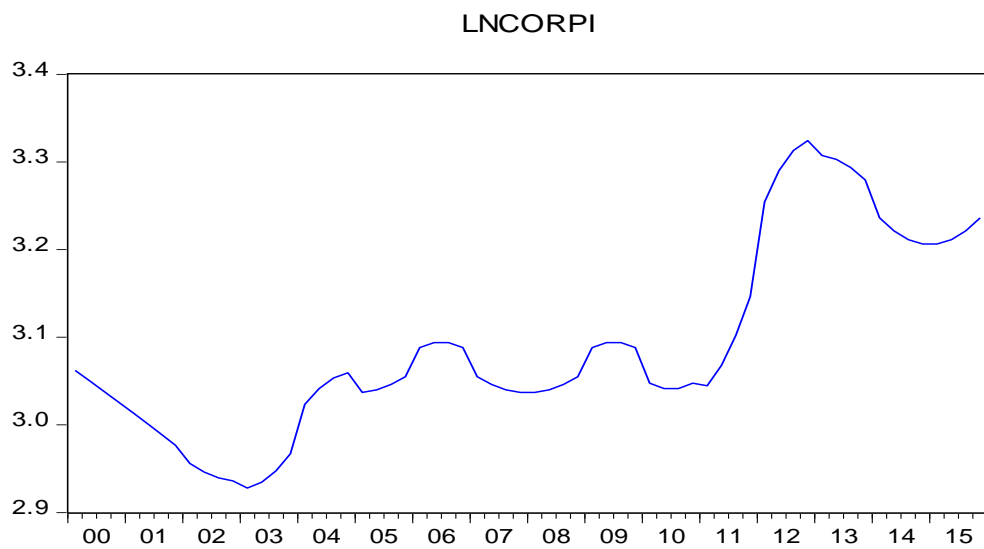
**Figure A8: Trend Analysis of Log of Real Tax Revenue**  
Source: Authors (2019)



**Figure A9: Trend Analysis of Log of Consumer Price Index**  
Source: Authors (2019)



**Figure A10: Trend Analysis of Log of Real Effective Exchange Rates**  
Source: Authors (2019)



**Figure A11: Trend Analysis of Log of Corruption Perception Index**  
Source: Authors (2019)

**Table A1: Multicollinearity Test Results for Analysis of Determinants of Growth in Public Recurrent Expenditure**

	<i>LnGDPC</i>	<i>LnMW</i>	<i>LnTR</i>	<i>LnPD</i>	<i>LnCPI</i>	<i>LnREER</i>	<i>LnCORPI</i>	<i>FADJ</i>	<i>ELC</i>
<i>Log of GDP per Capita (LnGDPC)</i>	1	0.0844	0.9040	0.6740	0.9841	0.9609	0.8679	0.0475	-0.0220
<i>Log of Minimum Wages (LnMW)</i>	0.0844	1	-0.0593	0.4963	0.0141	0.0208	0.1907	-0.2110	0.1283
<i>Log of Tax Revenue (LnTR)</i>	0.9040	-0.05930	1	0.5679	0.9155	0.8915	0.7478	0.0554	0.0528
<i>Log of Public Debt (LnPD)</i>	0.6740	0.4963	0.5679	1	0.5797	0.5878	0.5821	-0.0082	0.0034
<i>Log of Consumer Price Index (LNCPI)</i>	0.9841	0.0141	0.9155	0.5797	1	0.9605	0.8556	0.0378	-0.04175
<i>Log of Real Effective Exchange Rates (LnREER)</i>	0.9609	0.0208	0.8915	0.5878	0.9605	1	0.8864	0.0559	0.0512
<i>Log of Corruption Perception Index (LnCORPI)</i>	0.8679	0.1907	0.7478	0.5821	0.8556	0.8864	1	0.0102	0.0054
<i>Fiscal Adjustment Dummy (FADJ)</i>	0.0475	-0.2110	0.0554	-0.0082	0.0378	0.0560	0.0102	1	-0.0125
<i>Election Dummy (ELC)</i>	-0.0220	0.1283	0.0528	0.0034	-0.0418	0.05128	0.005481	-0.0125	1

Source: Authors (2019)



**Table A2: Asymptotic Critical Value Bounds for the F-statistic.**

Table CI(iv) Case IV: Unrestricted intercept and restricted trend

<i>k</i>	0.100		0.050		0.025		0.010		Mean		Variance	
	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)
0	5.37	5.37	6.29	6.29	7.14	7.14	8.26	8.26	3.17	3.17	2.68	2.68
1	4.05	4.49	4.68	5.15	5.30	5.83	6.10	6.73	2.45	2.77	1.41	1.65
2	3.38	4.02	3.88	4.61	4.37	5.16	4.99	5.85	2.09	2.57	0.92	1.20
3	2.97	3.74	3.38	4.23	3.80	4.68	4.30	5.23	1.87	2.45	0.67	0.93
4	2.68	3.53	3.05	3.97	3.40	4.36	3.81	4.92	1.72	2.37	0.51	0.76
5	2.49	3.38	2.81	3.76	3.11	4.13	3.50	4.63	1.62	2.31	0.42	0.64
6	2.33	3.25	2.63	3.62	2.90	3.94	3.27	4.39	1.54	2.27	0.35	0.55
7	2.22	3.17	2.50	3.50	2.76	3.81	3.07	4.23	1.48	2.24	0.31	0.49
8	2.13	3.09	2.38	3.41	2.62	3.70	2.93	4.06	1.44	2.22	0.27	0.44
9	2.05	3.02	2.30	3.33	2.52	3.60	2.79	3.93	1.40	2.20	0.24	0.40
10	1.98	2.97	2.21	3.25	2.42	3.52	2.68	3.84	1.36	2.18	0.22	0.36

Table CI(v) Case V: Unrestricted intercept and unrestricted trend

<i>k</i>	0.100		0.050		0.025		0.010		Mean		Variance	
	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)
0	9.81	9.81	11.64	11.64	13.36	13.36	15.73	15.73	5.33	5.33	11.35	11.35
1	5.59	6.26	6.56	7.30	7.46	8.27	8.74	9.63	3.17	3.64	3.33	3.91
2	4.19	5.06	4.87	5.85	5.49	6.59	6.34	7.52	2.44	3.09	1.70	2.23
3	3.47	4.45	4.01	5.07	4.52	5.62	5.17	6.36	2.08	2.81	1.08	1.51
4	3.03	4.06	3.47	4.57	3.89	5.07	4.40	5.72	1.86	2.64	0.77	1.14
5	2.75	3.79	3.12	4.25	3.47	4.67	3.93	5.23	1.72	2.53	0.59	0.91
6	2.53	3.59	2.87	4.00	3.19	4.38	3.60	4.90	1.62	2.45	0.48	0.75
7	2.38	3.45	2.69	3.83	2.98	4.16	3.34	4.63	1.54	2.39	0.40	0.64
8	2.26	3.34	2.55	3.68	2.82	4.02	3.15	4.43	1.48	2.35	0.34	0.56
9	2.16	3.24	2.43	3.56	2.67	3.87	2.97	4.24	1.43	2.31	0.30	0.49
10	2.07	3.16	2.33	3.46	2.56	3.76	2.84	4.10	1.40	2.28	0.26	0.44

Source: Pesaran *et al.* (2001; Page 301)

**Table A3: Asymptotic Critical Value Bounds of the t-statistic**

Table CII(v) Case V: Unrestricted intercept and unrestricted trend

<i>k</i>	0.100		0.050		0.025		0.010		Mean		Variance	
	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)	<i>I</i> (0)	<i>I</i> (1)
0	-3.13	-3.13	-3.41	-3.41	-3.65	-3.66	-3.96	-3.97	-2.18	-2.18	0.57	0.57
1	-3.13	-3.40	-3.41	-3.69	-3.65	-3.96	-3.96	-4.26	-2.18	-2.37	0.57	0.67
2	-3.13	-3.63	-3.41	-3.95	-3.65	-4.20	-3.96	-4.53	-2.18	-2.55	0.57	0.74
3	-3.13	-3.84	-3.41	-4.16	-3.65	-4.42	-3.96	-4.73	-2.18	-2.72	0.57	0.79
4	-3.13	-4.04	-3.41	-4.36	-3.65	-4.62	-3.96	-4.96	-2.18	-2.89	0.57	0.82
5	-3.13	-4.21	-3.41	-4.52	-3.65	-4.79	-3.96	-5.13	-2.18	-3.04	0.57	0.85
6	-3.13	-4.37	-3.41	-4.69	-3.65	-4.96	-3.96	-5.31	-2.18	-3.20	0.57	0.87
7	-3.13	-4.53	-3.41	-4.85	-3.65	-5.14	-3.96	-5.49	-2.18	-3.34	0.57	0.88
8	-3.13	-4.68	-3.41	-5.01	-3.65	-5.30	-3.96	-5.65	-2.18	-3.49	0.57	0.90
9	-3.13	-4.82	-3.41	-5.15	-3.65	-5.44	-3.96	-5.79	-2.18	-3.62	0.57	0.91
10	-3.13	-4.96	-3.41	-5.29	-3.65	-5.59	-3.96	-5.94	-2.18	-3.75	0.57	0.92

Source: Pesaran *et al.* (2001; Page 304)

**Table A4: Pairwise Granger Causality Test Results for the Determinants of Growth in Public Recurrent Expenditure**

	Public Recurrent Expenditure Model		Public Development Expenditure Model		Compensation of Government Employees Model		Non-Wage Recurrent Expenditure Model	
	Dependent variable = $\Delta \ln G_{rc}$		Dependent variable = $\Delta \ln G_{de}$		Dependent variable = $\Delta \ln G_{ce}$		Dependent variable = $\Delta \ln G_{nwre}$	
<i>Variables and Direction of Causality</i>	<i>Lag length</i>	<i>F-Statistics</i>	<i>Lag length</i>	<i>F-Statistics</i>	<i>Lag length</i>	<i>F-Statistics</i>	<i>Lag length</i>	<i>F-Statistics</i>
$\Delta \ln MW \rightarrow$ <i>Dependent Variable</i>	2	2.6552*	-	-	1	7.2717***	-	-
<i>Dependent Variable</i> $\rightarrow \Delta \ln MW$	2	0.0105	-	-	1	0.8838	-	-
$\Delta \ln TR \rightarrow$ <i>Dependent Variable</i>	2	94.5428***	4	0.2881	2	84.1159***	2	96.3269***
<i>Dependent Variable</i> $\rightarrow \Delta \ln TR$	2	30.4386***	4	7.6465***	2	29.2124***	2	30.7827***
$\Delta \ln PD \rightarrow$ <i>Dependent Variable</i>	4	0.5593	2	0.9821	4	1.0784	2	0.8578
<i>Dependent Variable</i> $\rightarrow \Delta \ln PD$	4	0.5299	2	0.8992	4	0.6879	2	1.2042
$\Delta \ln CPI \rightarrow$ <i>Dependent Variable</i>	1	4.2554**	2	1.0593	1	4.1403**	1	4.0485**
<i>Dependent Variable</i> $\rightarrow \Delta \ln CPI$	1	0.9088	2	0.2206	1	1.0196	1	0.7918
$\Delta \ln REER \rightarrow$ <i>Dependent Variable</i>	1	0.0032	2	0.1562	2	0.0733	1	0.0013
<i>Dependent Variable</i> $\rightarrow \Delta \ln REER$	1	0.0134	2	0.0048	2	0.0160	1	0.0035
$\Delta \ln CorPI \rightarrow$ <i>Dependent Variable</i>	1	0.0079	3	0.7775	1	0.0057	4	0.0517
<i>Dependent Variable</i> $\rightarrow \Delta \ln CorPI$	1	0.0269	3	0.0438	1	0.0637	4	0.1825
$FAdj \rightarrow$ <i>Dependent Variable</i>	1	2.3834	1	2.3727	1	2.0257	1	2.8975*
<i>Dependent Variable</i> $\rightarrow FAdj$	1	0.0124	1	0.0403	1	0.0152	1	0.0103
$ELC \rightarrow$ <i>Dependent Variable</i>	1	0.0135	1	0.0049	1	0.0235	1	0.0031
<i>Dependent Variable</i> $\rightarrow ELC$	1	0.0673	1	0.0570	1	0.0517	1	0.0478

*Note: The null hypothesis is that variable X does not Granger cause variable Y (X  $\rightarrow$  Y). \*, \*\*, \*\*\* Denote the rejection of the null hypothesis at 10 percent, 5 percent, 1 percent level of significance, respectively.*

Source: Authors (2019)

## Appendix II: Appendices to Analysis of the Effects of Sectoral Public Expenditure on Economic Growth

**Table A5: Categorization of the Government's Ministries, Departments, and Agency Budget Votes for Sectoral Expenditures**

<b><i>1. Agriculture and Rural Development (ARD) Sector</i></b>
Ministry of Agriculture; and Ministry of Livestock & Fisheries Development
<b><i>2. Human Resource Development (HRD) Sector</i></b>
Ministry of Education, Science & Technology; Ministry of Health; Ministry of Labour; Teachers Service Commission; and Ministry of Government Health and Sanitation
<b><i>3. Energy, Infrastructure Development, Information &amp; Communications Technology (EIICT) Sector</i></b>
Ministry of Roads & Government Works; Ministry of Transport; Ministry of Energy; Ministry of Local Government & Nairobi Metropolitan Development; Ministry of Lands & Housing; Ministry of Information & Communication; and National Land Commission
<b><i>4. Environmental Protection &amp; Water (EPW) Sector</i></b>
Ministry of Water & Irrigation ; Ministry of Environment, Mineral Resources & Forestry & Wildlife; Ministry of Mining; and Ministry of Forestry and Wildlife
<b><i>5. General Economic and Commercial Affairs (GECA) Sector</i></b>
Ministry of Trade & Industrialization; Ministry of Regional Development Authorities; Ministry of Tourism; Ministry of Co-Operative Development & Marketing; Ministry of Planning, National Development \$ Vision 2030; Ministry of Finance; Commission of Revenue Allocation; Auditor General / Kenya National Audit Office; and Office of the Controller of Budget
<b><i>6. Social Protection, Culture, Recreation, Other Services, Governance, Justice, Law and Order (SPGJLO ) Sector</i></b>
Ministry of Justice, National Cohesion and Constitutional Affairs; State Law Office; Judicial Department; Ministry of Home Affairs; Ministry of State for Immigration & Registration of Persons; Ministry of Gender, Children & Social Development; Ministry of State for National Heritage & Culture; Ministry of Youth Affairs & Sports; Ministry of State for Special Programmes and Development of Northern Kenya & Other Arid Lands; Parliamentary Service Commission; Kenya Anti-Corruption Commission/Ethics And Anti-Corruption Commission; National Gender & Equality Commission; Electoral Commission of Kenya / Independent Elections and Boundaries Commission; Directorate of Government Prosecutions; Commission for the Implementation of the Constitution; Registrar of Political Parties; Commission on Administrative Justice; Witness Protection Agency ; Kenya National Human Rights and Equality Commission; and Commission on Administrative Justice
<b><i>7. National Security, Government Administration and International Relations (NSPI) sector</i></b>
State House, Cabinet Office; Ministry of State for Government Service; Government Service Commission; Ministry of Foreign Affairs; Ministry of East Africa Community (EAC); Ministry of State for Provincial Administration & Internal Security; Ministry of State for Defense and National Intelligence Service; Ministry of State for Immigration and Registration of persons; Salaries and Remuneration Commission; Office of the Prime Minister; National Police Service Commission; and Independent Police Oversight Authority (IPOA)

Source: Authors (2019)

**Table A6: Categorization of the Economic Activities for Sectoral Gross Domestic Product**

<b>1. <i>Agriculture and Rural Development Sector</i></b>
Agriculture and Fishing
<b>2. <i>Human Resource Development Sector</i></b>
Education
Human Health and Social Work Activities
<b>3. <i>Energy, Infrastructure Development, Information &amp; Communications Technology (EIICT) Sector</i></b>
Electricity Supply
Construction
Transport and Storage
Real Estate
Information and Communication
Post and telecommunications
<b>4. <i>Environmental Protection &amp; Water (EPW) Sector</i></b>
Water Supply; Sewerage, Waste Management
Forestry & logging
Mining and Quarrying
<b>5. <i>General Economic and Commercial Affairs (GECA) Sector</i></b>
Manufacturing
Wholesale and Retail trade; repairs
Accommodation and Food service activities
Financial and Insurance activities
<b>6. <i>Social Protection, Culture, Recreation, Other Services, Governance, Justice, Law and Order (SPGJLO) Sector</i></b>
Arts, Entertainment and Recreation
Other community, social and personal services
Activities of Households as Employers
Other Service Activities
Professional, Scientific and Technical activities
<b>7. <i>National Security, Government Administration and International Relations (NSPI) sector</i></b>
Government Administration and Defense
Administrative and Support Service Activities

Source: Authors (2019)

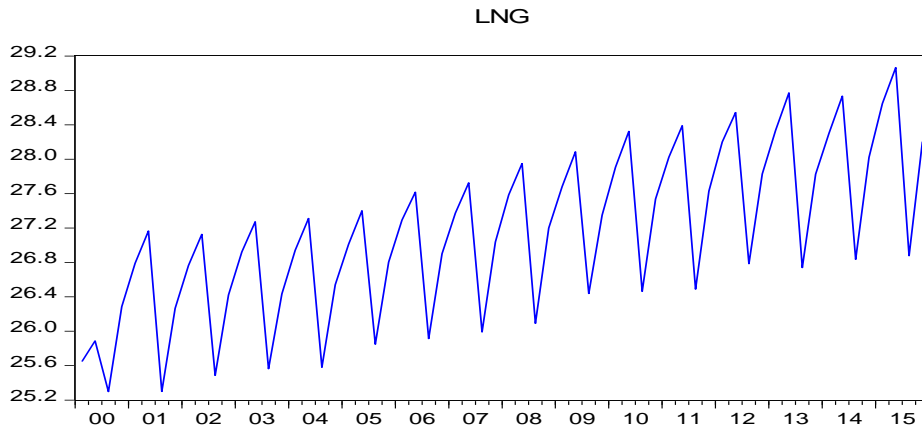
**Table A7: Pairwise Granger Causality Test for Variables included in the Analysis of the Effects of Sectoral Public Recurrent Expenditure on Economic Growth**

Direction of Causality	PANEL/SECTOR							
	Lag Length	ARD	HRD	EICT	EPW	GECA	SCGJLO	NSPI
		F-statistics	F-statistics	F-statistics	F-statistics	F-statistics	F-statistics	F-statistics
$\Delta\left(\frac{G_{rc,it-1}}{SGDP_{it-1}}\right) \rightarrow \Delta SGDP_{g,it}$	1	0.0048	0.8457	0.0136	0.5746	1.7015	0.8703	5.0954**
$\Delta SGDP_{g,it} \rightarrow \Delta\left(\frac{G_{rc,it-1}}{SGDP_{it-1}}\right)$	1	0.2974	0.3682	0.6970	0.0328	0.5014	0.0085	0.9375
$\Delta\left(\frac{G_{de,it}}{SGDP_{it}}\right) \rightarrow \Delta SGDP_{g,it}$	1	5.4464**	0.0063	1.4038	7.5315	1.4151	0.3422	0.4473
$\Delta SGDP_{g,it} \rightarrow \Delta\left(\frac{G_{de,it}}{SGDP_{it}}\right)$	1	0.4763	2.4178	1.7811	0.5710	2.3118	0.0040	1.0167
$\Delta\left(\frac{SK_{it-1}}{SGDP_{it-1}}\right) \rightarrow \Delta SGDP_{g,it}$	1	1.1683	0.1770	0.1353	-	0.0762	-	-
$\Delta SGDP_{g,it} \rightarrow \Delta\left(\frac{SK_{it-1}}{SGDP_{it-1}}\right)$	1	2.6378	2.6941	0.3474	-	0.4596	-	-
$\Delta SLg_{it} \rightarrow \Delta SGDP_{g,it}$	1	1.9358	3.6001*	1.2106	8.2374**	1.5429	0.0115	3.3766
$\Delta SGDP_{g,it} \rightarrow \Delta SLg_{it}$	1	0.8345	0.6600	0.0275	0.2561	3.3264	0.5151	2.0910
$\Delta\left(\frac{PC_{it-2}}{SGDP_{it-2}}\right) \rightarrow \Delta SGDP_{g,it}$	2	1.5280	0.9710	0.0022	0.6077	0.5296	2.5683	1.2926
$\Delta SGDP_{g,it} \rightarrow \Delta\left(\frac{PC_{it-2}}{SGDP_{it-2}}\right)$	2	0.4206	0.0349	0.0923	0.0177	0.0828	2.3120	1.0675

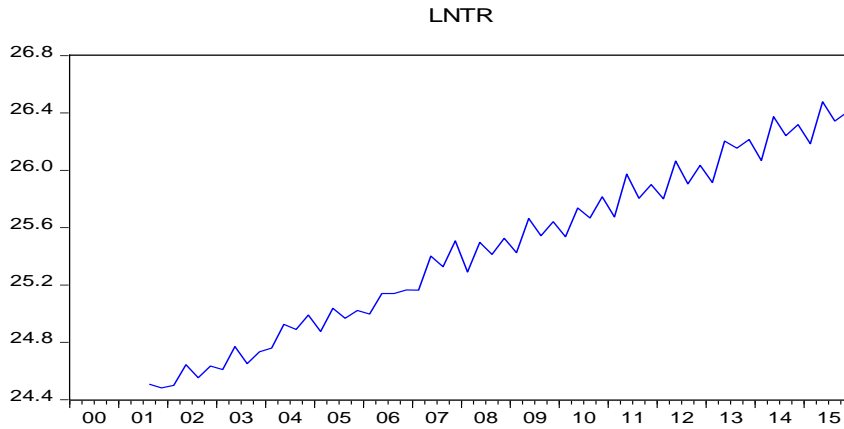
*Note: The null hypothesis is that variable X does not Granger cause variable Y (X → Y). \*, \*\*, \*\*\* Denote the rejection of the null hypothesis at 10 percent, 5 percent, 1 percent level of significance, respectively;ARD - Agriculture and Rural Development Sector; HRD - Human Resource Development Sector; EICT - Energy, Infrastructure Development, Information & Communications Technology Sector; EPW - Environmental Protection & Water Sector; GECA - General Economic and Commercial Affairs Sector; SPGJLO - Social Protection, Culture, Recreation, Other Services, Governance, Justice, Law and Order Sector ; NSPI - National Security, Government Administration and International Relations sector;SGDPg is real Sectoral GDP growth, SGDP is real Sectoral GDP, G<sub>re</sub> is real Sectoral Public Recurrent Expenditure, G<sub>dev</sub> is real Sectoral Development Expenditure, SK is real Gross Fixed Capital Formation at sector level, SLg is growth in number of government employees in each sector, PC is real final private consumption*

Source: Authors (2019)

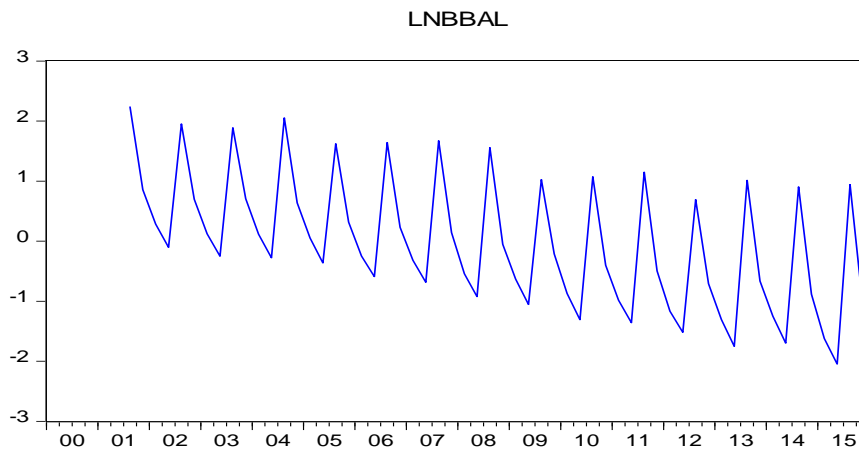
### Appendix III: Appendices to the Analysis of Budget Imbalance Dynamics



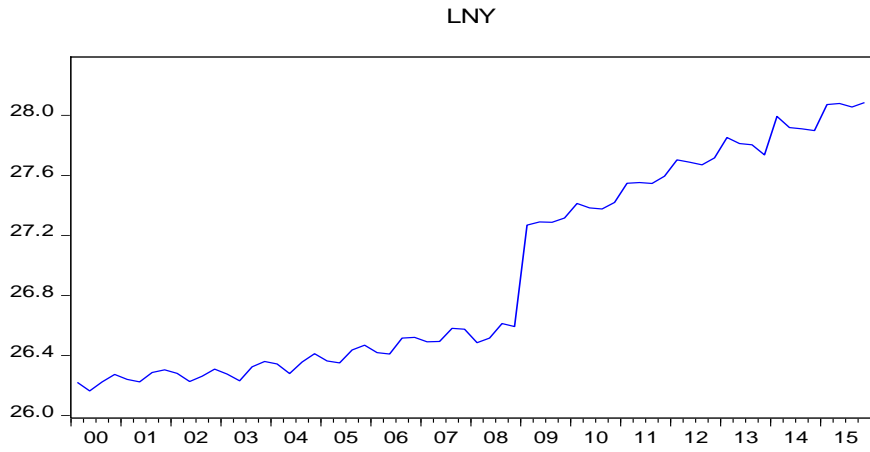
**Figure A12: Trend Analysis of Log of Nominal Public expenditure**  
Source: Authors (2019)



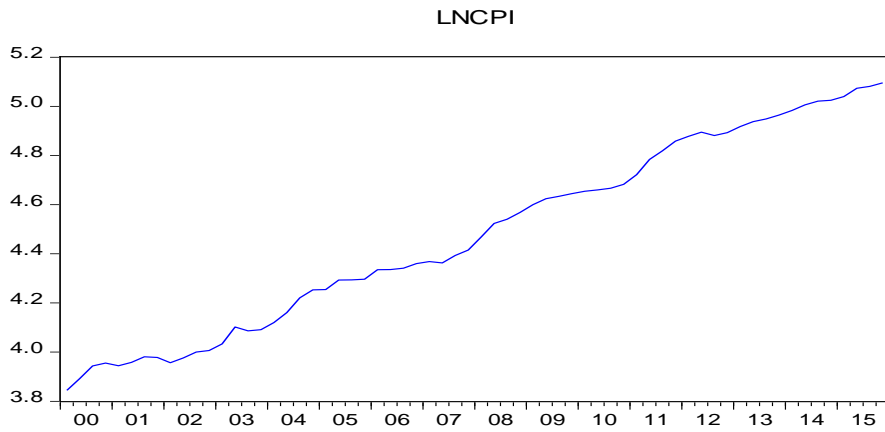
**Figure A13: Trend Analysis of Log of Nominal Tax Revenue**  
Source: Authors (2019)



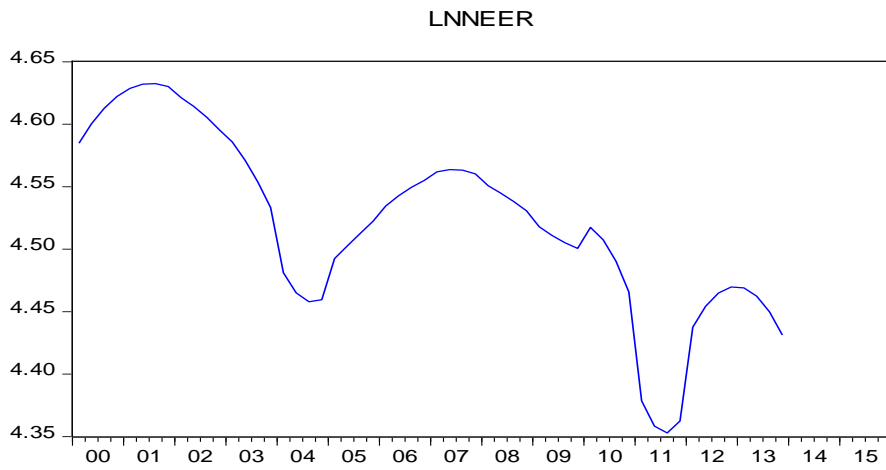
**Figure A14: Trend Analysis of Log of Nominal Budget Balance**  
Source: Authors (2019)



**Figure A15: Trend Analysis of Log of Nominal National Income**  
Source: Authors (2019)

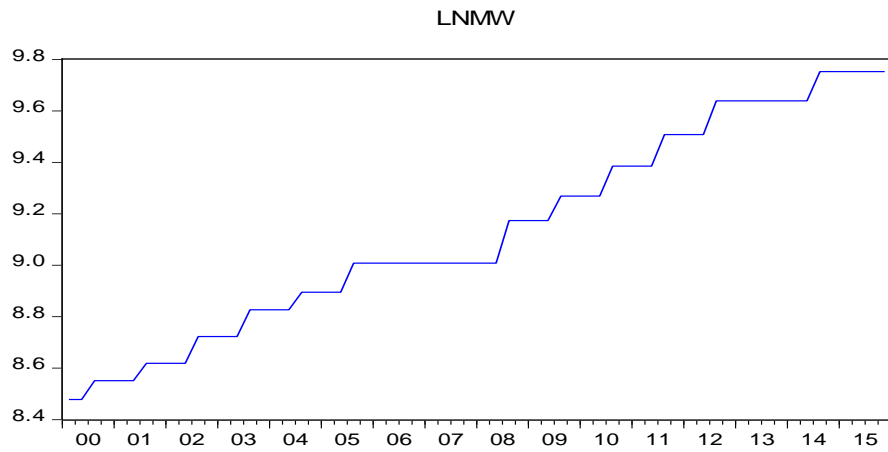


**Figure A16: Trend Analysis of Log of Consumer Price Index**  
Source: Authors (2019)

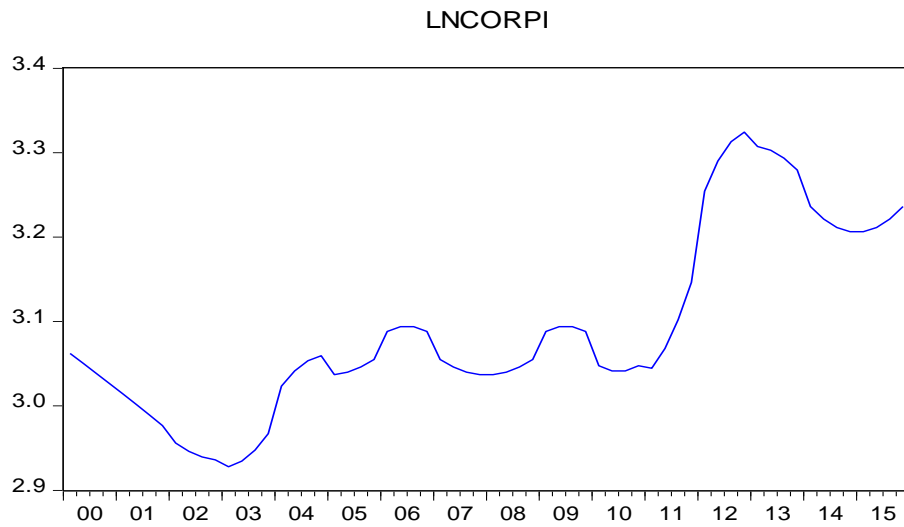


**Figure A17: Trend Analysis of Log of Nominal Effective Exchange Rates**  
Source: Authors (2019)





**Figure A18: Trend Analysis of Log of Nominal Minimum Wages**  
Source: Authors (2019)



**Figure A19: Trend Analysis of Log of Corruption Perception Index**  
Source: Authors (2019)

**Table A8: Multicollinearity Test Results for the Variables included in the Analysis of Budget Imbalance Dynamics**

	<i>LnY</i>	<i>LnCPI</i>	<i>LnNEER</i>	<i>LnMW</i>	<i>LnCORPI</i>	<i>ELC</i>	<i>GovT</i>
<i>Log of National Income (LnY)</i>	1	0.9368	-0.7497	0.9384	0.7788	0.1357	0.7342
<i>Log of Consumer Price Index (LnCPI)</i>	0.9368	1	-0.7902	0.9876	0.7857	0.1030	0.7130
<i>Log of Nominal Effective Exchange Rate (LnNEER)</i>	-0.7497	-0.7902	1	-0.8045	-0.5740	0.1209	-0.5548
<i>Log of Minimum Wages (LnMW)</i>	0.9384	0.9876	-0.8045	1	0.7956	0.1314	0.6765
<i>Log of Corruption Perception Index (LnCORPI)</i>	0.7788	0.7859	-0.57409	0.7956	1	0.07941	0.3937
<i>Election Dummy (ELC)</i>	0.1357	0.1030	0.1209	0.1314	0.0794	1	0.1005
<i>Government Type Dummy (GovT)</i>	0.7342	0.7131	-0.5548	0.6765	0.3937	0.1005	1

Source: Authors (2019)

**Table A9: Pairwise Granger Causality Test Results for the Variables included in the Analysis of Budget Imbalance Dynamics**

	Public expenditure Model		Government Tax Revenue Model		Budget Imbalance Model	
	Dependent variable = $\Delta \ln G$		Dependent variable = $\Delta \ln TR$		Dependent variable = $\Delta \ln B_{bal}$	
<i>Variables and Direction of Causality</i>	<i>Lag length</i>	<i>F-Statistics</i>	<i>Lag length</i>	<i>F-Statistics</i>	<i>Lag length</i>	<i>F-Statistics</i>
$\Delta \ln CPI \rightarrow$ <i>Dependent Variable</i>	4	0.7033	4	2.9728**	2	1.0326
<i>Dependent Variable</i> $\rightarrow \Delta \ln CPI$	4	2.0813	4	1.7091	2	0.3581
$\Delta \ln NEER \rightarrow$ <i>Dependent Variable</i>	4	0.4041	3	0.7466	3	3.8136**
<i>Dependent Variable</i> $\rightarrow \Delta \ln NEER$	4	0.1250	3	0.4919	3	0.0331
$\Delta \ln MW \rightarrow$ <i>Dependent Variable</i>	2	2.1404	3	5.2829***	4	9.1553***
<i>Dependent Variable</i> $\rightarrow \Delta \ln MW$	2	0.2302	3	12.3760***	4	0.2186
$\Delta \ln CorPI \rightarrow$ <i>Dependent Variable</i>	1	0.0054	3	0.3703	2	0.0504
<i>Dependent Variable</i> $\rightarrow \Delta \ln CorPI$	1	0.0047	3	0.5647	2	0.0025
$ELC \rightarrow$ <i>Dependent Variable</i>	1	0.1052	1	1.4701	1	0.0998
<i>Dependent Variable</i> $\rightarrow ELC$	1	3.2970*	1	0.2959	1	3.4502*
$GovT \rightarrow$ <i>Dependent Variable</i>	1	0.0083	1	0.0102	1	0.0112
<i>Dependent Variable</i> $\rightarrow GovT$	1	0.0002	1	0.2409	1	0.0003

*Note: The null hypothesis is that variable X does not Granger cause variable Y (X  $\rightarrow$  Y). \*, \*\*, \*\*\* Denote the rejection of the null hypothesis at 10 percent, 5 percent, 1 percent level of significance, respectively.*

Source: Authors (2019)

**Table A10: Pairwise Granger Causality Tests for Change in Log of Consumer Price Index and Change in Log of Budget Balance**

Date: 05/21/17 Time: 13:12			
Sample: 2000Q1 2015Q2			
Lags: 4			
Null Hypothesis:	Obs	F-Statistic	Prob.
$\Delta \ln CPI$ does not Granger Cause $\Delta \ln B_{bat}$	51	1.31363	0.2806
$\Delta \ln B_{bat}$ does not Granger Cause $\Delta \ln CPI$		2.89217	0.0334

Source: Authors (2019)