ANALYSIS OF COUNTY GOVERNMENT EXPENDITURE AND COUNTY ECONOMIC GROWTH IN KENYA

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A Thesis Submitted to the Graduate School in Fulfilment of the Requirements for the Doctor of Philosophy Degree in Economics of Egerton University

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DECLARATION AND RECOMMENDATION

Declaration

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

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DEDICATION

This thesis is dedicated to my loving parents for their support, guidance and encouragement.

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This notwithstanding, the content and conclusion (s) are entirely those of the author, who is solely responsible for any omission (s) and or error (s).

ABSTRACT

The modern devolution development across the globe has been in part driven by assertions of a supposed 'economic dividend' linked with the devolved expenditure. There is however, little empirical evidence to validate these assertions in Kenya. Most empirical studies across different countries have used different methods of analysis, different time periods and diverse techniques of measuring variable which have generated mixed conclusions and others are inconclusive. More so, in Kenya these studies do not differentiate between long-run and short-run channels through which county expenditure influences economic activities. The implication in differentiating these two effects arises for the two motives. First, there is interval between a fiscal policy action and its impact in the county economy. Second, they can have opposite effects on growth. Failure to differentiate can give erroneous results and recommendations. It is against this background that this study was carried out to analyse the long-run and short-run effect of components of county expenditure on county economic growth in Kenya using panel data set over the period 2013 to 2017. This study used the published annual data from Economic Surveys, Gross County Product (GCP) report, Statistical Abstracts and county Budget Implementation Review reports. Further, this study was informed by neoclassical augmented Ram growth accounting model as the theoretical framework. The analysis techniques that were used in this study were descriptive and inferential statistics. Employing Harris–Tzavalis (HT) test, this study tested for the panel unit root and found that all variables were non-stationary at their level except GCP per capita, human capital and non-devolved expenditure. To check if the variables have long-run relationship, this study used Kao panel test. The result for this test revealed that there exists a long-run relationship among the real GCP per capita and regressors in the model. Once cointegration was confirmed using Kao test, the long-run and error correction estimates of the panel ARDL model were obtained. The ARDL results revealed that spending on recurrent and rise in absorption rate of expenditure exerts a positive and significant effect on economic growth both in short-run and long-run hence confirming Keynesian theory in Kenya. However, capital expenditure was insignificant during the study period. Arising from the study findings, this study submits that the county authorities need to put in place policies that will improve budget allocation and execution so as to improve expenditure to capital infrastructure in counties. This is because counties typically lack infrastructures such as roads, power, water and communications that boost private productivity and consequently GCP growth.

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LIST OF ABBREVIATIONS AND ACRONYMS

AIC:	Akaike information criteria
ARDL:	Autoregressive Distributed Lag model
CGA:	County Government Allocation
CRA:	Commission on Revenue Allocation
CRTS:	Constant Returns to Scale
ECM:	Error Correction Model
FY:	Financial Year
GCP:	Gross County Product
GDP:	Gross Domestic Product
GoK:	Government of Kenya
HD	Harrod-Domar model
HT:	Harris–Tzavalis
IEA:	Institute of Economic Affairs
IFMIS:	Integrated Financial Management Information System
KES:	Kenyan Shilling
LM:	Lagrange Multiplier
MRW:	Mankiw-Romer-Weil model
OCOB:	Office of the Controller of Budget
VAR:	Vector Auto Regression model

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The recent global initiative towards federalized spending has been gradually justified on the basis that decentralization of resources to sub-national governments level are likely to deliver greater efficiency in the delivery of public goods and services and consequently stimulate economic activities at devolved units (Martinez-Vasquez & McNab, 2006; Mutie, 2014; World Bank, 2016). The Devolution trend in unindustrialized nations is reinforced by the International Monetary Fund (IMF) and World Bank (WB), which considers expenditure decentralization as a key pillar of its economic growth and poverty eradication strategy (IMF, 2016; World Bank, 2016). But, attention to expenditure transfer has been mainly inspired by local political reasons (Yemek, 2005; Mwiathi, 2017). Like the case of Kenya in 2007/2008. The 2007/2008 post-election violence saw the introduction of new governance system, which entrenched devolved system (GoK, 2010). In a number of nations including Kenya, devolved system of governance refers to devolution. Essentially devolution is one form of fiscal decentralization. However, devolution is more extensive and include transfer of both economic and political powers from central government to devolved units (Ezcurra & Rodríguez-Pose, 2010; World Bank, 2016).

Global devolution is a heterogeneous and complex process. From the most decentralized federal nations, such as Spain, Canada and Germany to the least decentralized countries like Mexico and France. Devolution processes across the sphere have adopted a wide variety of federalism systems (Cole *et al.*, 1999). Consequently, conceptualizing devolution is far from simple (Barkan & Chege, 1989; Cole *et al.*, 1999; IMF, 2016).

The world drift towards federalization is centered on sub-national legitimacy and entails increased transfers of economic resources and political power from the state to the sub-national or local government (Cole *et al.*, 1999; Maku & Olukayode, 2009). In most cases, and as in preceding waves of devolution, sub-national legitimacy has cultural, political, social, tribal, religion, historical and economic justification (Lessmann, 2009). The Northern Italian Leagues and regionalist separatist parties in Spain were the first to base the devolution legitimacy on regional and economic inequalities (Keating, 1999; Ezcurra & Rodríguez-Pose, 2010).

In the United States of America (USA), the main character of the devolved system of governance is the key function played by local governments in influencing the political system of the nation. The federal level of jurisdiction enjoys some authority, as a lender of resources to national and sub-national level of governments (Musgrave, 1969; Keating, 1999; Akai & Sakata, 2002). In Canada the fiscal federalism system is highly decentralized. The objective of fiscal transfer program in Canada is to minimize financial resource concentration at the center (Musgrave, 1969; Ezcurra & Rodríguez-Pose, 2010). Canadian provinces enjoy some degree of autonomy because public sector is highly decentralized. Even with a high degree of expenditure regionalization as evidenced in Canada, there is conflicts on equity and resource distribution, given the size and large regional and economic inequalities between the devolved units (Bastagli *et al.*, 2012). The central government provides transfer grants to correct fiscal imbalances and pay public services at provincial level (Musgrave &Musgrave, 1989; Brosio, 2000; Mwiathi, 2017). India enjoys federation system of governance with the constitutional separation of powers and source of finance between local, state and union level of government. India is defined as quasi-federal system of governance with the strong unitary character (Zhang & Zou, 2001). In contrast, the German federal system of government is highly centralized (Hindriks & Gareth, 2004; Mwiathi, 2017).

Africa displays a remarkable decentralisation institutional creativity and a variety of fiscal decentralization system of governance. For instance, Nigeria, which was the first and only federal state in Africa, recently ratified a new constitution that boosts the power of sub-national governments. Two more countries, South Africa and Ethiopia, have adopted quasi-federal framework system (Yemek, 2005). With decentralization trends in Africa, rural areas are currently receiving more attention over the urban ones (Brosio, 2000; Lessmann, 2009; Agbonkhese & Asekome, 2014; IMF, 2016; KIPPRA, 2016). Most of African countries, such as Ethiopia, Ghana, Kenya, Mali and Rwanda fiscal decentralization is as a result of increasing demand for more autonomy from some areas of the state, as well as fair and equitable distribution of national wealth (Cole *et al.*, 1999; Brosio, 2000; Yemek, 2005; IMF, 2010).

In 1996, South Africa unanimously adopted post-apartheid constitution which established three levels of governance structure, 284 local governments, 9 provincial governments and a national government (Yemek, 2005; Hammed, 2016). All three level of governments are evolving, and the mandate of both local and provincial governments has improved considerably (Yemek, 2005; Hammed, 2016). Each level of governance structure has its own

responsibilities and powers. The central government is mandated to manage nation's affairs but share the mandate for the provision of public goods and services with the lower tier governments. The state government can intervene in the decision of local or provincial government only and limited as demarcated in the 1996 constitution (Smoke, 2001; Yemek, 2005).

Since 1988, Ghana's devolved system of governance displays unique features (World Bank, 2016). Devolved units in Ghana finance their budget primarily through intergovernmental transfer and generation of own revenues. The structure of decentralized government revenue in Ghana is as follows in proportion of aggregate revenue: national government transfer (69 per cent) and own taxes and fees (31 per cent). This implies like Kenyan case, Ghana's sub-national government greatly depends on national government transfer to fund their budget. Rwanda's style for fiscal devolution is another unique type in the continent (Mwiathi, 2017). According to the Rwanda's approach, the general obligation of the public expenditure devolution is to ensure local community is empowered politically, economically and socially to defeat poverty and grow equality by getting involved in identifying, planning, executing and management of their local economic development strategy and programs (Barkan & Chege, 1989; Brosio, 2000; Smoke, 2001; World Bank, 2003; Morgan, 2006; Lessmann, 2009).

In 2010, Kenya promulgated a new constitution which reconfigured balance of political and economic power by transferring authority or power and economic resources from the state to the 47 county governments led by 47 elected governors (GoK, 2010; IEA, 2010). County authorities and national governments are mandated by the constitution to negotiate a working formula in terms of power and responsibilities. However, some have encountered economic, political and administrative problems in the provision of basic public goods and services to the county citizens (Morgan, 2006; Chebet, 2013; GoK, 2014; World Bank, 2016).

The proportion of fiscal decentralization conventionally is higher in federal states, for instance USA, Ethiopia, Canada, Ghana and South Africa (Yemek, 2005; IEA, 2010; World Bank, 2014; SID, 2017). The 2014 share of devolved budget in Kenya (20 per cent of aggregate budget), resembled the same level of spending in the region; for instance, in Tanzania and Uganda devolved expenditure by aggregate budget accounted for 22 and 20 per cent, respectively; While in Ethiopia it was about 46 per cent of aggregate budget (GoK, 2015; SID, 2017).

Determination of devolved spending and its configurations is elaborate and comprise a number of aspects, such as foreign and domestic aid, demographic factors, political process, openness, existing fiscal conditions, social factors and economic factors (Thissen, 2001; Hindriks & Gareth, 2004). The amount a devolved unit can spend depends on its ability to generate own revenue, borrow from domestic market, intergovernmental transfer and ability to attract private investors from within and outside (Krugman, 1994). The median voter hypothesis states that local government officials choose the level of budget selected by the median voter (Alm & Embaye, 2010). It is therefore, anticipated that the consequence of devolved expenditure will also vary from one nation to another depending on the decentralization system in place, available devolved budget, level of economic progress, political progress, social structure and governance structure in place (Brosio, 2000; Alm & Embaye, 2010). The fundamental objective of expenditure decentralization is to jumpstart economic advancement, eradicate poverty and reduce economic discrepancy. However, in the face of increasing devolved budget, local economic growth has stagnated, number of poor people increased, combined with widening economic imbalances in devolved units.

1.1.1 Fiscal Decentralization

Fiscal decentralization involves mainly delegating expenditure functions, revenue sources and administrative functions to devolved units. The notion behind the fiscal delegation is inspiring efficiency and effectiveness in the supply and provision of local public goods and services, thus improving and encouraging the mechanisms of economic expansion in the nation (Mitchell, 2005; Ganaie *et al.,* 2018). Since lower tier of government are primary public goods and service suppliers, altering their organization may have an extensive impact on several aspects of its governance such as service delivery, policy decision making, revenue generation and general spending (Morgan, 2006; Ganaie *et al.*, 2018). According to economic theory, expenditure decentralization ought to stimulate economic development since it is expected to make the opinion of the majority or underprivileged heard and considered; increase their access to public goods and service; grow quality of service and ease their vulnerability (Putnam, 1993; Akai & Sakata, 2002; Rodden, 2004; Ezcurra & Rodríguez-Pose, 2010; Chebet, 2013).

According to advocates of devolution, centralized system of government is not able to deliver local public services efficiently and effectively in comparison to delegating functions to lower tier of government (Krugman, 1994). From political viewpoint, Putnam (1993),

attribute the support of decentralized systems originates from the fact that they are more transparent and accountable, and encourages political development process. Musgrave (1969) developed hypothesis on 'efficiency through devolution' to argument economics on devolution. According to the hypothesis, devolved units have a greater capacity to shape policies and delivery of public goods and services to the liking of local community, thus optimizing welfare and making provision of basic services more efficient and effective (Thissen, 2001; Rodden, 2004; Agbonkhese & Asekome, 2014).

In contrast, other scholarly literature differs with the idea that fiscal devolution lead to higher economic efficiency (Nijenhuis, 2003). Such conditions involve where there are high chances for corruption at lower tier level of government, where it's problematic to assign powers in non- overlapping way, economies of scale and scope exist, conditional grants are used, insubordination by national government is rampant and where devolved government unit operate in environments of 'soft budget constraints' (Nijenhuis, 2003; Rodden, 2004; Chebet, 2013; Kimaro *et al.*, 2017).

In a nutshell, devolution is anticipated to make devolved spending more effective and efficient (Nijenhuis, 2003; ICPAK, 2014), create opportunities for county regimes to mobilize around sustainable development goals (SDGs) (Putnam, 1993; Mutie, 2014) and contribute to a better coordination between various local stakeholders. In addition, importantly, devolution is expected to provide each devolved unit the autonomy to pursue a development strategy tailored to its own economic potential and competitive advantage (Morgan, 2006; IMF, 2016), thus contributing to greater county and national economic growth (Omolo, 2010; Muriu, 2013; Agbonkhese & Asekome, 2014; KIPPRA, 2016).

While federalization has the ability to solve the difficult of income variations and stimulate economic growth, where decentralization has been applied, the challenge of income disparities has not essentially declined (Mwiathi, 2017). Devolution undermine potential economic growth through capture of benefits by the local elites (Omolo, 2010; Bastagli *et al.*, 2012). For example, Canada still faces large income inequalities among the regions despite being one of the most decentralized economy. Thus, federalization system can impede the ability of the nation to reduce income inequality gaps and grow the local economy. Decentralization will only introduce new factions at devolved units (Nijenhuis, 2003; Mutie, 2014).

From previous empirical literature, a number of studies that examined the different channels through which devolution influences growth produced various outcomes (World Bank, 1997; Bagaka, 2008; World Bank, 2016). In economic theory, expenditure decentralization can stimulate economic activities and initiate further growth in governance and political process. Further, from previous studies fiscal delegation is expected to positively grow county economic growth (Yemek, 2005; Murui, 2013). Alternatively, devolution can slow economic growth if it is not complemented with improved governance and transparency at lower tier government (Martinez-Vasquez & McNab, 2006; Lessmann, 2009).

Federalization strategies have been unable to solve African instabilities such as political, economic, social and institutional challenges of the continent development objectives (Nijenhuis, 2003; Muriu, 2013). Further, opponents of federalization argue that fiscal delegation can slow economic expansion through: parochialism; local elites controlling the system; understaffed devolved units; arise in bureaucracy; corruption; poor governance; separation of source of revenue and expenditure roles (Omolo, 2010). This will undermine performance of counties and lead to inefficiency; and newly created devolved units are likely to face capacity constraints (Amagoh & Amin, 2012; OCOB, 2018). In states where the national government lacks the ability to accomplish its main roles and in situations with rising income inequalities rate, there is a likelihood that devolution will accelerate poverty, instead of shrinking it (Mapesa & Kibua, 2006; World Bank, 2016). This uncertainty submits that the link between fiscal federalization and economic growth is not clear-cut and that the performance is basically swayed by devolved unit particulars, social, political, and economic structure and design of fiscal federalization in place (World Bank, 2003; Ganaie *et al.*, 2018).

Expenditure decentralization may also have detrimental and beneficial economic growth impact. However, the impact of devolved spending on growth involves both indirect and direct mechanisms (Gisore, 2017). Direct impacts may be through alterations in the structure of the devolved spending or taxation and raise of revenue (Kalio, 2000; Kakar, 2011; Amagoh & Amin, 2012). Indirect impacts manifest through socio-economic aspects such as economic growth and stability, and governance reforms are usually influenced by fiscal spending (Agenor, 2007). With these conflicting theoretical thoughts, the influence of expenditure federalization on devolved unit economic growth is theoretically unclear, and empirical investigation is essential.

Fiscal policy is one of the public policy instruments that influence economic stabilities by sourcing revenue through taxation and swaying devolved unit spending (Muriu, 2013; ICPAK, 2014). Devolved government expenditures are categorized into recurrent and capital expenditures (M'Amanja & Morrissey, 2005; McCreadie, 2009; Amagoh & Amin, 2012). The former, according to Abu and Abdullahi (2010), is linked to purchase of public consumption goods, while the latter usually contain public investments and human capital allocation.

The mechanisms through which components of devolved government spending may impact county GDP growth are as follows. The First mechanism is spending on essential public goods that raises the total purchase of the population in the devolved unit (Keynes, 1936; Maingi, 2017). Second, government investment in physical capital is believed to have a direct effect on economic activities through improving the country's capital stock (M'Amanja & Morrissey, 2005; Gisore, 2017). The third channel is the externality effect of public expenditure that alters economic growth indirectly by improving the marginal productivity of privately supplied factors of production through expenditure on health, education and other main public services, which contribute to the accumulation of human capital in long-run (Kalio, 2000; Mitchell, 2005; McCreadie, 2009). The final mechanism is through intersectoral productivity differentials which makes particular areas of the local and national economy to be more effective and efficient than others (Age'nor, 2007; Abu & Abdullahi, 2010; Kakar, 2011).

1.1.2 Historical and Current Perspectives on Fiscal Decentralization Initiative in Kenya

In Kenya, fiscal decentralization started as early as 1963, particularly the *Majimbo* system and the sessional paper No 10 (African Socialism and its Application to Planning in Kenya) of 1965 (Barkan & Chege, 1989; IEA, 2010; Omolo, 2010). Further, Mutie (2014) observes that there are four main principles that guide fiscal decentralization process in Kenya. These are fiscal transfers from central government, local spending functions, revenue assignment and lower tier government borrowing. Kenya came up with a new constitution which was promulgated in the year 2010 and fiscal decentralization is integrated in this constitution. Before the country prepared a new constitution, fiscal decentralization used to operate at the local authority level. It is this Act Cap 265 of 1999 that established the Local Authority Transfer Fund (LATF) (Mapesa & Kibua, 2006; GoK, 2010; IEA, 2010). The Municipal council and County council authorities were mandated, to maintain health facilities and local

schools, repair and maintain minor roads at devolved unit and levy domestic taxes and collect fees at local authority level (Smoke, 2001; Mwiathi, 2017). However, despite their insubordination by national government, LATF was the best case of devolved public service provision in Kenya (IEA, 2010). LATF involved both economic and political features of devolution until 2013 as they were administered by mainly local elected leaders and maintained local revenue collection responsibilities, specifically land rates and fees (Mapesa & Kibua, 2006; Mutie, 2014).

As has been observed by Institute of Economic Affairs (IEA, 2010), a number of the fiscal decentralization programs that have been established by the government of Kenya over the years such as the District Development Program (1966), District Development Planning (1971), and District Focus for Rural Development of (1983). Though all these initiatives had the same noble idea of developing Kenya and specifically the devolved units, most remained underfunded by exchequer (Barkan & Chege, 1989; Nijenhuis, 2003; Mapesa & Kibua, 2006; Bagaka, 2008).

Further efforts by the Kenyan Government to realize equitable regional growth, economic growth and poverty eradication led to development of various economic concepts. However, it is from Mid-90s, that the government introduced various decentralized initiatives, namely the Road Maintenance Levy Fund (RMLF) and Secondary Schools Education Bursary Fund (SSEBF) both of 1993. Other devolved funds established over the years include: Rural Electrification Program (REP) (1998), Poverty Eradication Funds (PEF) (1999), Constituency Development Fund (CDF) (2003), the Constituency Education Bursary Fund (CEBF) (2003), Free Primary Education Fund (FPEF) (2003), Youth Enterprise Development Fund (YEDF) (2006), Women Enterprise Development Fund (WEDF) (2007), Subsidized Secondary Education (SSE) (2008), Economic Stimulus Program (ESP) (2009), and Free Day Secondary Education (FDSE) (2018).

Parliamentary act of 2003 established Constituency Development Fund with an aim of helping Kenya to eradicate poverty at grassroots level and stimulate economic growth through engaging the local population. The CDF act stipulate that the national government shall transfer at least 2.5 per cent of recent audited revenue to 210 constituencies in Kenya (Bagaka, 2008; Mutie, 2014).

All these devolved funds have been increasing and have been functioning from the period they were established to the present time. Although, a number of them including LATF were

stopped in the spirit of devolution (Mapesa & Kibua, 2006; GoK, 2010; KIPPRA, 2016). Further, most were replaced by County Government Allocation (CGA) from 2013. The following Table 1.1 presents the various devolved funds allocation to sub-national government and devolved units over the years in Kenya.

Table 1.1: Devolved Funds Measured in KES millions per year

Year	CGA	LATF	CDF	RMLF	REP	FPEF	YEDF	WEDF
2011/12	-	17300	16989	20943	3600	7383	400	246
2012/13	9800	20600	19055	20680	3850	8787	298	134
2013/14	195665	-	23100	21500	4150	8907	900	133
2014/15	231059	-	31565	25079	7960	9000	550	169
2015/16	276223	-	33452	31456	7950	10000	500	229
2016/17	305016	-	37672	46700	7497	13500	600	900
2017/18	326897	-	38068	51914	9700	14000	700	800

Notes: *CGA- County Government Allocation, LATF-Local Authority Transfer Fund, RMLF-Road Maintenance Levy Fund, REP-Rural Electrification Program, FPEF- Free Primary Education Fund, YEDF-Youth Enterprise Development Fund, CDF-Constituency Development Fund and WEDF- Women Enterprise Development Fund.*

Source: IEA (2010); GoK (2011-2018); OCOB (2013-2018).

From Table 1.1, the amount of funds decentralized to local authorities, districts, counties and constituencies in Kenyan Shillings (KES) has in the past two decades significantly increased (ICPAK, 2014; GoK, 2017; OCOB, 2019). The fund transfers to decentralized units improved significantly from 2011. For instance, CDF and LATF improved from KES.16.99 billion in 2011/2012 to KES.19 billion in 2012/2013 and KES.17 billion in 2011/2012 to KES.20.6 billion in 2012/2013, respectively. Despite of this improvement in devolved allocation, levels of economic growth remained volatile, and economic inequalities and poverty level remained unwavering in Kenya (Bagaka, 2008; GoK, 2014; KIPPRA, 2016). This dictated the enactment of new constitution (2010) that rooted for devolution and established 47 county governments. The constitution also established conditional grants and equitable share to finance spending functions by new devolved units (Bagaka, 2008; GoK, 2010; KIPPRA, 2016; OCOB, 2019).

In 2010, Kenyans voted overwhelmingly for the new Constitution that ushered in a devolved system of government, with fiscal decentralization as main inspiration. The promulgated constitution of 2010 and County government act of 2012 entrenched the newly created 47 counties as the center of economic planning and development in local and national government (GoK, 2012; World Bank, 2016). Each county is expected to prepare County sector plan, County spatial plan and County Integrated Development Plan (CIDP) enumerating the development agenda for five-year period (IEA, 2010; ICPAK, 2014). The main objective of devolution was: jumpstart long-term economic growth; reduce inequalities among counties; improve equity in access to social and economic services at the county level; improve access to public goods and services in Kenya (Gregorious & Ghosh, 2007; KIPPRA, 2016; World Bank, 2016). The change that marks a major departure from the previous devolution trend is the relocation of the administration of the housing, pre-primary education services, water, local roads maintenance, agriculture and livestock, and health services from central government to the county government (Yemek, 2005; ICPAK, 2014; GoK, 2018).

The new constitution of Kenya, Article 203, sets the minimum annual transfer from the central government to the new 47 counties at 15 per cent of the recent audited account of national revenue (GoK, 2010). Commission on Revenue Allocation (CRA) allocates an initial year Equalization Fund of 0.5 per cent as stipulated in Article 204 for revamping physical infrastructure in marginalized counties (IEA, 2010; ICPAK, 2014; OCOB, 2014).

1.1.3 Fiscal Devolution and Economic Growth in Kenya

In 2017, global economy experienced accelerated estimated economic growth of 3.6 per cent, up from 3.1 per cent of 2016 largely influenced by growing purchase by advanced economies and China (World Bank, 2016; SID, 2017). The advanced economies are believed to have shrunk from 2.5 per cent in 2016 to 2.4 per cent in 2017. While the United States of America improved from 1.5 per cent in 2016 to a growth of 2.2 in 2017 mainly influenced by growth in household income that expanded private consumption and investment. In China, with recovery in export and fiscal policy action, expanded by 6.8 per cent from 6.7 per cent experienced in 2016 (KIPPRA, 2016; SID, 2017; GoK, 2018).

Sub-Saharan Africa growth improved from 1.4 per cent in 2016 to 2.7 per cent in 2017, relatively stimulated with increased export of commodity by Nigeria and South Africa. In East African Community (EAC) region, economic growth stabilized at 5.4 per cent by 2016 and 2017, a meltdown from a 6.1 per cent expansion of 2015. Meltdown in growth was

attributed to effect of drought experienced in Rwanda, Tanzania and Uganda for the period 2016 to 2017, which reduced agricultural and livestock output and overall economic activities (SID, 2017; GoK, 2019).

In Kenya the performance of the national economy averaged at 6.6 per cent per annum over the period 1964 –1973, and mimic closely with the performance of emerging industrialized nations (World Bank, 2014). Further, the economy expanded by 5.5 per cent for 5-year period (2013-2017) compared to the previous growth of 4.7 per cent in 2008 to 2012 (KIPPRA, 2016; GoK, 2017; KNBS, 2019). Specifically, Kenya's economy is estimated to have expanded by 4.9 per cent in 2017 underperforming the growth of 5.9 per cent in 2016. Meltdown in economic growth was associated with drought and uncertainty in general election of 2017/2018 (KIPPRA, 2016; GoK, 2018).

On sub-national level economic growth, the Kenyan government compiled the first set of estimates on Gross County Product (GCP) by county for the period 2013-2017 (KNBS, 2019). GCP growth is a measure of how much each county unit contributes to Kenya's overall growth (GDP) and may therefore be inferred as the "County GDP" (Vidyattama, 2010; Bundervoet *et al*., 2015; Basihos, 2016; GoK, 2019). Largely, counties associated with thriving economic activities such as agriculture, livestock, communication, transportation, manufacturing, financial, real estate, and wholesale and retail trade, took lead in the ranking by GCP growth. Nonetheless, many of the counties with a small share to GCP are growing at a faster rate, signifying potential for catch-up but also due to the base effect (KIPPRA, 2016; GoK, 2019). Table 1.2 and Table A3 (appendix 2) presents data on annual GCP growth by county as derived from Gross County Product at constant price (GoK, 2019; KNBS, 2019).

Table 1.2: Sub - National real GCP growth rates (in %)

Year	Kenya	Nairobi	Mombasa	Kiambu	Elgeyo Marakwet	Garissa	Embu
2014	5.4	3.9	5.3	6.6	5.0	2.3	-3.4
2015	5.7	5.8	3.8	8.3	12.2	4.2	11.6
2016	5.9	6.6	7.8	7.0	13.9	3.4	-3.5
2017	4.9	6.0	9.3	5.2	9.0	3.0	5.7
Average	5.5	5.6	6.6	6.8	10.0	3.2	2.6

Source: GoK (2019); KNBS (2019).

As shown in Table 1.2 and Table A3 (appendix 2), on average Elgeyo Marakwet County grew fastest (GCP growth of 10 per cent annually between 2014 and 2017), followed by Nyandarua (9.3 per cent per annum), Laikipia (8.6 per cent per annum) and Siaya (8.4 per cent per annum). At the other end, on average Embu grew slowest of all counties (2.6 per cent per annum), followed by Garissa (3.2 per cent annually), and both Kitui and Kisumu (3.5 per cent annually). In addition, Kiambu grew by 6.8 per cent on average, Mombasa at 6.6 per cent and Nairobi City at 5.6 per cent annually. County economic Growth was volatile across 47 counties during 2014 to 2017 period. On average only, Elgeyo Marakwet County documented a double-digit growth during 2014 to 2017 period (KNBS, 2019). Further, over the period 2014 to 2017, at least 17 counties, documented a faster growth in their real GCP relative to the average growth in 47 counties (Table 1.2 and Table A3). More than a half of the counties' real GCP growth remained below average (in 28 counties), while in two counties (Nairobi and Kwale), real GCP growth remained stable relative to the average county growth based on a four-year period (KNBS, 2019). The source of county GDP growth volatility has been attributed to exogenous (fluctuating export commodity prices) shocks and domestic (general election cycle) factors (GoK, 2019). However, positive but volatile real GCP growth during 2014 to 2017 period could translate to rapid poverty reduction and minimal income disparities in counties (KIPPRA, 2016).

The study controlled for population to provide more insights from sub-national data. Table 1.3 presents the devolved unit GCP per capita that is a derivation of the GCP divided by the population of the county (Bundervoet *et al.,* 2015; KNBS, 2019). Full list of GCP per capita for each county, in Kenyan Shillings (KES), is presented in Table A4 in the appendix 2.

Table 1.3: County Per capita GCP (in KES)

Year	Kenya	Nairobi	Mombasa	Kiambu	Mandera	West Pokot	Turkana
2013	87261	212543	150156	98566	25867	36077	37753
2014	89430	208509	152625	102992	26594	36926	38277
2015	91989	208733	153030	109361	27287	38111	39982
2016	94789	211055	159418	114762	27968	39493	39699
2017	96800	212498	168448	118343	28602	38021	38592
Average	-	21.7	4.7	5.5	0.5	0.7	1.1
% share							

Source: KIPPRA (2016); GoK (2019); KNBS (2019).

Table 1.3 and Table A4 (appendix 2) shows detailed GCP per capita (in constant prices) over the period 2013 to 2017. Nairobi, Mombasa, and Kiambu take the lead in the ranking. Similarly, Nyandarua and Elgeyo Marakwet are also ranked high largely by virtue of having sizeable real GCP and comparatively smaller population. Mandera followed by West Pokot and Turkana counties had the smallest real per capita GCP (GoK, 2019). Twenty-one counties, led by Bungoma, Tharaka Nithi, Nyandarua, Elgeyo Marakwet, Siaya and Nyeri grew faster than the average county per capita GCP. However, in 25 counties, per capita GCP growth was slower than the average growth across all the counties. In addition, more than three quarters of the counties were below the national average real GCP per capita, emphasizing significant disparities between the economies of 47 counties in Kenya (Bundervoet *et al.,* 2015). Nationally, GDP per capita stagnated during 2013–2017, but never crashed (World Bank, 2016; GoK, 2018).

Table 1.3 and Table A5 (appendix 2) provides the average contribution for each of the selected counties to GCP over the period 2013-2017. Full list of each county contribution GCP is shown in Table A5 in the appendix 2. Nairobi takes the lead, contributing approximately 21.7 per cent of GCP over the period, followed by Nakuru (6.1%), Kiambu (5.5%) and Mombasa (4.7%), while Isiolo was the smallest contributor at 0.2 per cent based on a five-year period (GoK, 2019; KNBS, 2019). As may be expected, this indicates large disparities in the size of GCP across the counties. There are significant differences in the size of economy across the 47 counties (KIPPRA, 2016). Generally, the leading counties by GCP per capita are associated with large population size and where major urban centers are located. Table 1.3 and Table A5 in appendix 2 further shows counties that are largely dominated by urban centers, notably Nairobi county, Kisumu and Mombasa, had their GCP consistently declining over the period mostly due to growth in agriculture's contribution to gross domestic product. On the other hand, counties with strong presence of agricultural and livestock activities such as Kiambu, Nakuru, Elgeyo Marakwet and Nyandarua, particularly horticulture, livestock and farming, have consistently improved their GCP growth over the review period (GoK, 2019; KNBS, 2019).

Economic literature identifies macroeconomic factors that affect economic growth and they include inflation, deficits of the budget, private investment, tax burdens and government spending. Also, foreign direct investment, openness to trade, political environment (crime rate and political instability) and institutional framework (corruption and property rights) are other variables which affect growth of the economy (Romer, 2001; Chiou-Wei *et al.*, 2010;

Muigai, 2015; Gisore, 2017). The national and county public sector growth has stimulated GDP expansion in recent years. Over a decade the public sector's contribution to GDP growth has more than doubled in Kenya (from 1.1% to 2.5% points of GDP) (SID, 2017; GoK, 2018). The following Table 1.4 shows the various Macroeconomic indicators for Kenya over the years.

Table 1.4: Macroeconomic Indicators for Kenya

YEAR	2012	2013	2014	2015	2016	2017
Real GDP growth rate - %	4.6	5.9	5.4	5.7	5.9	4.9
Total County Expenditure-Billions KES	9.8	193.4	229.3	258	295.3	390.3
Total County Total Revenue-Billions	33.9	241	337	367	370	401.6
Corruption- Average bribe –KES	3251	4601	3789	5649	7081	5059
Human capital- (Secondary)-(million)	1.9	2.1	2.3	2.6	2.7	2.8
Crime rate reported	77852	71832	69376	72490	76986	77992
Electricity consumption (MW)	1302	1354	1468	1512	1586	1656
Total County Employment (000)	37.7	94.7	99.6	110.5	118.9	132.6

Source: KIPPRA (2016); GoK (2018).

From Table 1.4, since introduction of devolved governance system Kenya has experienced economic growth from 4.6 in 2012 to 5.9 in 2016. However, in 2017 GDP growth for Kenya slowed down due to drought and post-election violence experienced (IMF, 2016; World Bank, 2016; GoK, 2019). Table 1.4 reveals that county expenditure and revenue has been increasing. Historically, electric power consumption growth in Kenya influences economic activities and population growth positively. From the Table 1.4, corruption increase still remains an impediment to economic growth of counties through rent seeking and an increase of transaction costs (Murphy *et al*., 1991) that come with it. Crime data show an increasing trend in Kenya. The cost created by crime has an undesirable effect on businesses involved, which involves diverting funds to crime mitigation actions and otherwise depressing local private sector growth in short-run and overall country progression in long-term. Economic literature connects private and public investment in secondary and primary learning to productivity and justification for rise in national and county government allocations for learning and training in Kenya (Islam, 1995). During the same period county governments have experienced increased employment opportunities as a result of increased county allocations and responsibilities (GoK, 2015).

However, in regard to the effect of macroeconomic factors stabilisation and expenditure devolution, opinion is different (Rodden, 2004). The common view is that expenditure devolution causes macroeconomic instability as a result of absence of fiscal discipline between national and sub-national authorities. The general view held about corruption is that devolution can decrease bribe demand and thus accelerate economic activities but may contribute to the dominance of counties by small elite group (Murphy *et al.,* 1991; Rodden, 2004; Choe *et al.,* 2013).

The influence of devolved government spending on sub-national economic growth manifest through various mechanisms in Kenya. First is how devolved units define scope and quality of growth stimulating services, such as public service delivery. Second is the macroeconomic role of counties, such as allocation of resources between capital and recurrent spending. The public financial law of 2012 calls for both local and national government to allocate a minimum of 30 per cent of their budget on development budget (GoK, 2010; World Bank, 2016). Thirdly, the obligation of improved county and state governance is a collective function of both lower tier and central government (Kimaro *et al.,* 2017; Gupta, 2018).

This study focused on County Government Allocation (CGA) proxies for devolution in Kenya. The reason for selecting CGA is due to their trait as unconditional annual intergovernmental transfer funds, which permits county authorities to have option and an autonomy to articulate expansion public policy designed to county priorities, competitive strength and economic potential. Devolved budget policy conditions can affect output and economic expansion in the medium term as well as over the business cycle (Akpan, 2013). In addition, the public budget policy decision may have beneficial or detrimental influence on economic activities in counties (Devarajan *et al.,* 1996; Husnain *et al.,* 2011; Kimaro *et al.,* 2017). The analysis of real GDP growth and corresponding county expenditure in billions is presented in Table 1.5.

Table 1.5: County Expenditure Allocations and Economic Growth (in KES, billions)

Financial Year (FY)	GDP Growth	Capital Expenditure	%	Recurrent Expenditure	%	Absorption Rate %	Non-devolved
2014/2015	5.4	90	35.1	167	64.9	79.1%	1139
2015/2016	5.7	103	35.0	191	65.0	80.4%	1374
2016/2017	5.9	168	43.1	222	56.9	79.9%	1634
2017/2018	4.9	139	33.9	271	66.1	74.0%	1960

Source: IMF (2016); OCOB (2014-2018).

Table 1.5 reveals that county capital expenditure has been small than the recurrent spending in most of the years since inception of devolution in Kenya. Recurrent spending exhibited an increasing trend from around 56.9 per cent of aggregate devolved budget in 2016, to about 66.1 per cent in 2017. This is attributed to increased functions of counties especially in education and health sectors. A particular expenditure challenge affecting many counties is the high recurrent spending. In 2013/14, for 16 counties, the proportion exceeded 50 per cent; in Taita Taveta County, the figure was 73 per cent (OCOB, 2014). In contrast capital expenditure decelerated from 43.1 per cent to 33.9 per cent, 2016-2017. This could be attributed to a lag between capital budgeting process, approval, disbursement and actual spending. In 2014/15, spending conformed to the public financial management of at least 30 per cent spending on development (35.1%), even though several counties (Nakuru, Nairobi, Kisumu, Nyeri, Embu and Kajiado) did not meet the 30 per cent threshold (OCOB, 2015). From economic theory, underspending in development expenditure may have long term adverse effect on Kenyan counties growth potential (Devarajan *et al.*, 1996). However, aggregate county budget execution per year remained stable, for instance from 79.1 per cent in 2014/15 to 79.9 per cent in 2016/17 (KIPPRA, 2016; OCOB, 2018). The national government spending in counties (non-devolved allocation) increased from KES. 1139 in 2014/15 to KES. 1960 billion in 2017/18 (OCOB, 2018). In contrast, county economic growth during the same period was volatile. The share of government expenditure, county and national, on GDP growth in Kenya for 2012 to 2017 period is presented in Table 1.6.

Table 1.6: Government Expenditure share on GDP growth

YEAR	2012	2013	2014	2015	2016	2017
Real GDP growth rate - (%)	4.6	5.9	5.4	5.7	5.9	4.9
National Expenditure - (% GDP)	23.7	23.7	25.9	26.6	25.3	24.6
County Expenditure - (% GDP)	1.0	4.3	5.4	5.4	5.3	5.3

Source: KIPPRA (2016); World Bank (2016); OCOB (2018).

From Table 1.6, it is clear that share of county and national government expenditure on economic growth has been rising, both local and state level. However, the growth of government expenditure is that of double digit while economic growth is expanding at a single digit (GoK, 2017; OCOB, 2018). The increasing wage bill accounts for the rapid growth in county and state budgets over the years (OCOB, 2018). The trends in this Table 1.6 reveal a widening gap between public expenditure, county and national, and economic growth performance and therefore a concern that this study is interested in.

Expenditure devolution measured as a share of county spending to GDP increased from 4.3 per cent of 2013 to 5.4 per cent of 2017. However, economic growth declined from 5.9 per cent by 2013 to 4.9 per cent in 2017. This was mainly attributed to poor governance, electioneer period, poor weather conditions, unfavorable policy conditions and overall diminishing economic performance (KIPPRA, 2016; GoK, 2018). Despite increase in devolved budget county economic growth has remained volatile in Kenyan counties.

Though deceleration of economic growth in 2017 could be as a consequence of drought, 2017/2018 post-election violence and world financial crunch. The role of devolved expenditure on GDP decline in Kenya is not clear. The link between devolved expenditure and growth is not consistent in Kenyan counties (KIPPRA, 2016; KNBS, 2019). Notwithstanding the extensive national and sub-national government strategies and programs to foster economic activities, increase in county public expenditure has tended to grow faster than that of county economic advancement.

Even with the devolved expenditure growth, Kenya's Gross Domestic Product (GDP) growth has been lower than yearly estimated targets, widening income and county disparities and increase in poverty rate over the years. Fluctuating economic growth adversely affects income expansion, regional and income equality growth, poverty reduction and overall

Kenya's macroeconomic stability (KIPPRA, 2016; GoK, 2019). This advances the reservation on if devolved public expenditure is an effective fiscal policy tool for achieving county and national economic growth, planning, equality growth, stabilization, distribution and poverty eradication in Kenya. And if so, how can it be used to address macroeconomic problems in Kenyan Counties.

1.2 Statement of the Problem

Much of the causes of economic growth disparities over time is inconclusive. In particular, the channels through which county expenditure influences county economic growth are yet to be investigated in Kenya. A number of studies (Bagaka, 2008; Mutie, 2014; Maingi, 2017; Muguro, 2017; Mwiathi, 2017) have attempted to analyse the channels through which other types of fiscal devolution such as CDF and LATF can affect economic growth. The empirical findings fail to provide any decisive conclusion on the relation between devolved spending and economic growth, specifically they do not analyse the impact of county expenditure on county economic growth. Despite this uncertainty, theory suggests that devolved expenditure induce regional economic growth (Solow, 1956; Harrod, 1973; Musgrave & Musgrave, 1989; Barro & Sala-i, 2003). The county authorities spend significant sums of money yearly on infrastructure development, health care services, education sector, agriculture and overall administration. From growth theory, when there is a growth in public spending in these categories of expenditure, it is expected that the county economy will expand, but this is not the case in Kenyan counties (GoK, 2018). This can be attributed to non-growth-augmenting allocation that crowd-out expenditures that are expected to improve economic activities (Mutie, 2014; Maingi, 2017). Even with these devolved expenditure growth, Kenya's GCP growth has been lower than yearly estimated targets (6.2%), widening income inequalities, increasing growth volatility, and rise in poverty rate over the years (KIPPRA, 2016; World Bank, 2016; KNBS, 2019). This dismal performance of the funds has cast doubt on whether continued increase in county spending allocation can create a sufficient foundation for country's economic expansion as well as enduring economic growth volatility. This raises the question on whether county government expenditure is an effective fiscal policy tool for stimulating economic growth in 47 counties.

With the devolution process, under new constitution (GoK, 2010), county allocation has been restructured, which is projected to tackle macroeconomic instabilities, county growth disparity and volatility (World Bank, 2016). County spending has also been reorganized to boost economic activities by growing investment budget, particularly those associated with

infrastructure development such as roads and power, and human capital development. However, despite devolution process, county economic performance has not kept pace with expenditure increase. Therefore, there is necessity for a country specific study. Specifically, understanding the effect of county spending on economic growth in counties is crucial for recommendations.

1.3 Objectives of the Study

This study was informed by general and specific objectives captured here-under.

1.3.1 General Objective

The broad objective of this study was to analyse the long-run and short-run effect of county government expenditure on county economic growth in Kenya during the period 2013-2017.

1.3.2 Specific Objectives

i. To evaluate the long-run and short-run effect of county government recurrent expenditure on county economic growth in Kenya.

ii. To determine the long-run and short-run effect of county government capital expenditure on county economic growth in Kenya.

iii. To estimate the long-run and short-run effect of county expenditure absorption rate on county economic growth in Kenya.

iv. To analyse the causality relationship between county governments spending and county economic growth in Kenya.

1.4 Research Hypotheses

i. There is no significant long-run and short-run effect of county government recurrent expenditure on county economic growth in Kenya.

ii. There is no significant long-run and short-run effect of county government capital expenditure on county economic growth in Kenya.

iii. County expenditure absorption rate has no significant long-run and short-run effect on county economic growth in Kenya.

iv. There is no significant causal relationship between county government spending and county economic growth in Kenya.

1.5 Significance of the Study

This study generated information that may be beneficial to other governments in developing countries who continue to experiment with various forms of fiscal decentralization. In their determination to escape from traps of ineffective, inefficient, and highly centralized governance systems which have led to among other things macroeconomic instability. In addition, difference between short-term and long-term effects of devolved expenditure has significant consequences for policy making at local level. By focusing on effects at different time horizons, this study set the basis for an explanation of the apparently contradictory effects of devolved spending on economic performance in Kenya.

There have been limited studies that assessed the influence of devolved spending on economic improvement in underdeveloped nations. Most of the existing studies have used cross-country data which can barely be apportioned to a particular nation (Ezcurra and Rodríguez-Pose, 2010; Wahab, 2011). The question whether expenditure devolution is effective in accelerating economic growth remains inconclusive and possibly may differ according to the governance structure, institutional development, political process, economic progress, form of federalization of the specific nation and their trait as unconditional annual transfer funds. Therefore, calls for a country specific investigations and recommendations. Further, none of these studies (Bagaka, 2008; Mutie, 2014; Mwiathi, 2017) assessed the channels through which devolved spending influences county economic performance in Kenya.

The information compiled in this study is useful to academicians and researchers to carry out a further in-depth investigation on the degree to which the devolved system of governance could affect the overall economic performance of counties. Considering existing studies on county government have only touched in other fields, for instance, Governance (Chebet, 2013), Budget making, Social-Economic issue and Institutions (Gathu, 2014), while overlooking public finance.

This study evaluated various aspects of devolved expenditure that Kenya has had since 2013 and how their performance has impacted on the economic activities of the nation. The gaps found during this study provides a platform for the country in developing the necessary

policy framework. This will help the leaders in county governments pursue the policies that improve the investment climate in the counties, create enough job opportunities and reduce the poverty index which translates to economic growth in long-run. County authorities would also find the conclusions beneficial in future economic planning strategy and policy making to improve economic growth, minimize growth volatility, and eradicate poverty and marginalization.

1.6 Scope and Limitations of the Study

This study considered the 47 counties in Kenya. The choice of counties as a unit of analysis was informed by the fact that devolved units are the center of planning and development. In particular, growing power and functions of devolved units as provider of basic public goods and services and initiating economic development programmes at county level (GoK, 2010; OCOB, 2018; KNBS, 2019). This study is limited to the period 2013 to 2017. The choice of the study period was informed by lifespan of devolution, availability of data and also to provide sufficient degree of freedom. However, due to the short lifespan of devolution this study only observed 5 years, short time dimension is problematic during data analysis, thus this study made use of panel ARDL technique. Panel ARDL framework was preferred since it is reliable and performs well for small sample size data which is appropriate for this study. The econometric results of this study was also limited by the quality of data as reported by different sources; hence data for this study was not free from this apparently common data problem. This limitation originates from the problem of data missing for some years as reported by different county and national institutions. However, such missing data was sought from other sources such as the National Treasury reports, Institute of Economic Affairs' reports, Auditor-General's reports, IMF country reports and Penn World Tables.

1.7 Operational Definition of Terms

Causality: This is a investigation of whether lagged values of one variable help to predict variations in another.

Co integration: It is a linear combination of two non- stationary series each of which is integrated of order one.

County Capital Expenditure: County expenditure applied for creation or renewal of assets.

County Economic Growth: It is a steady expansion in aggregate output of a county as well as improvements in the wellbeing of a majority of the population overtime.

County Government: A geographical unit of devolved government, entrenched in the constitution of 2010. There are 47 counties, each of which has its own government.

County Non-devolved Expenditure: Share of the national budget dedicated to the provision of basic public goods and services in 47 counties.

County Recurrent Expenditure: Expenditures by the counties covering day to day normal services by the county, in terms of wages and salaries, operation and maintenance.

Devolution: It is a constitutional transfer of authority to a lower level such as county level from the national government of Kenya.

Fiscal decentralization: It is the devolving revenue sources and expenditure functions to county.

Gross County Product: it is a geographic analysis of Kenya's economy that provides an estimate of the structure and size of county economies.

Long-run relationships: Is the period when overall price level, contractual wage rate and Expectations may adjust fully to the state of county economy, in contrast to the short-run.

Long- run is considered to be above 1-year, short-run is below 1-year period.

Panel data: A set of observations that combines the time series with cross sectional variation in analysis.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews relevant theoretical and empirical literature. This chapter also captures theoretical frame-work and the conceptual frame-work developed from theoretical literature.

2.2 Theoretical Literature

The study is built on theories on fiscal devolution, economic growth and government expenditure. This study reviewed these theories as follows.

2.2.1 Theories on Fiscal Devolution

This study is grounded on the theories of fiscal devolution that scrutinizes the mechanisms through which decentralized spending stimulates economic growth. The theory on fiscal devolution originates from Musgrave's ideas about the role of state (Musgrave, 1969; Musgrave & Musgrave, 1989). Musgrave (1969) listed three main functions of a state. They include maintenance of stable economy, proper allocation of resources and fair distribution of income. The role of state in maximizing welfare through production and allocation of public goods and services should be assigned the lower tier government following the principal of efficiency criteria which articulate that public goods are better provided by lower level of government (Musgrave & Musgrave, 1989; Rodden, 2004). The national government is also expected to play a secondary role and step in mainly to fill gaps. The national government is assigned the role of providing defense, national security and social welfare services which cannot be left in the hands of the private sector (Ntibagirirwa, 2014). The lower tier governments are responsible for production and provision of public services whose is within their jurisdiction. This theory is applicable to the current structure of governance in Kenya and specifically the separation of responsibilities between county and national government. In Kenya, counties have been mandated to collect tax and have been assigned roles for efficiency and effectiveness in public service delivery (IEA, 2010; Amagoh & Amin, 2012; Ntibagirirwa, 2014; Ganaie *et al.*, 2018).

The theoretical importance of devolution on efficiency and stimulation of economic growth due delegation of powers and responsibilities originated from Tiebout (1956) and Oates

(1999). The theory is based on several decentralization hypotheses. The first school of thought advances diversification hypothesis. It upholds that counties or lower level of governments providing uniform level of public goods and services will cause inefficiency (Oates, 1999). The inefficiency is qualified since different jurisdictions have different levels of tastes and preferences (Tiebout, 1956). Leviathan restraint hypotheses is the second argument. Brennan and Buchanan (1980) advanced the Leviathan restraint hypothesis that as usual the state will always aim to maximize revenue. For state to maximize revenue collection the public debt and income tax should increase, irrespective of existing constitution provisions on protecting the poor and also having a balanced budget. But with advent of devolution governance system, any desire by county government to increase tax will cause movement of tax payers to other devolved units with better business conditions and lower taxes. As a result of sub-national competition, local authorities will always try to attract migrants and maintain the current population by having a friendly tax system and use the available revenue in achieving economic growth (Brennan & Buchanan, 1980; Ganaie *et al.*, 2018). Thus Leviathan restraint hypothesis support a positive relationship between expenditure devolution and economic activities in counties (Amagoh & Amin, 2012; Ganaie *et al.,* 2018; Mose *et al*., 2019).

The third school of thought advanced augmented productivity hypothesis. According to the theorem delegation of power and responsibilities will translate to accountability and transparency at the lower tier level of government (Oates, 1999). The local producers will be encouraged to produce and supply public goods and services according to the preference, tastes and desires of the local citizens. As a result, the cost of provision of public services will reduce accompanied with low prices, improved quality of final products and output growth (Alm & Embaye, 2010).

Fiscal decentralization theorem supported the argument advanced by productivity hypothesis. According to the theory, fiscal devolution increase information to the county government and producers on citizens' desires (Tiebout, 1956; Krugman, 1994). With information sub-national government are more capable than central government to provide public goods and services according to the demand of local population. Krugman (1994) further explained that fiscal decentralization can be a solution to negative economies of scale. Fiscal devolution generates positive impact on economic growth through increasing efficiency and thus overcoming any negative economies of scale originating from production of basic public goods and services.

A theoretical model advanced by Besley and Coate (2003), Faguet (2004) and Morelli and Seaman (2007) explains how lower tier government responds to the production and provision of public goods in the devolved economy. According to Faguet (2004) the delegation of roles between lower level of government and state government depends on the comparative advantage over flow of information and technology at each level of administration. Morelli and Seaman (2007) showed that centralized governance system impedes quality since resources are not utilized efficiently relative to decentralized system of government. In addition, Besley and Coate (2003) established that devolution augments economic and social development in counties if no spillover effect. In conclusion, the theoretical literature on influence of fiscal devolution on economic growth is inconclusive. Thus, empirical analysis is necessary.

2.2.2 Economic Growth Theories

This section reviewed different economic theories that explain economic growth in devolved units. Usually economic growth will consider the potential economic expansion path and the long-run growth trend of the national and sub-national economies (Romer, 1990; Ntibagirirwa, 2014). Table 2.1 shows the evolution of Macroeconomic growth theories over time.

Table 2.1: Historical Evolution of Theories on Growth

Macroeconomics Theories	Emerged
Mercantilism	15th century
Physiocrats	18th century
Classical theorem: Adam Smith; and Thomas Malthus	1776
Innovative Theory: Schumpeter	1912
Keynesian Theories: Maynard Keynes	1930s
Neo-Keynesian theorem: Harrod-Domar	1930s-1940s
Neo-classical Theories: Solow; and RCK	1950s-1960s
Endogenous Theories: Romer; Barro; and Lucas	1980s-1990s

Source: Romer (2001); Branson (2002); Osipian (2007).

Table 2.1 presents the historical evolution of Macroeconomic growth theories. Initial economic growth theories highlighted a variety of aspects of the economy. Mercantilist highlighted presence of surplus in trade, Physiocrats concluded that agriculture is the chief

source of all economic success while the Cameralists advanced state control (centralized governance system) and more tax as a case of economic success (Mendoza *et al*., 1997; Osipian, 2007). Smith and Malthus emphasized an increasing role of rural population growth and fertile land in explaining differences in local and national GDP growth. But, in absence of technological adjustment, high population growth will exhaust supply of fertile land and activate the law of diminishing return. Diminishing returns will trigger reduced wage rate below subsistence level at which point the Malthusian equilibrium is achieved (McDermott, 1999; McCreadie, 2009). According to Schumpeter's theory the success of devolved units depends on the entrepreneur or businessman, that is innovation and creativity at the lower tier of government. The Schumpeter growth theory is seen to be development initiative, foresight and risky (Schumpeter, 1939; Mo, 2001; Lavrov & Kapoguzov, 2006). Further, Institutional growth theory advances the process by which social structures, such as norms, rules, schemes, and routines explain the social and economic behavior of local economic agents and try to explain economic relationship between several macro-economic factors in counties (Scott, 2004).

The Keynesian economic growth paradigm treats government expenditure as an exogenous policy determined variable and economic growth as endogenous and explained by the government expenditure. A key factor in the Keynesian model is that the expansion of aggregate effective demand and lower taxes should contribute to economic growth and pull the local economy out of the depression (Keynes, 1936; Romer, 2001). Keynesian economics is an economic theory of devolved spending in the economy and its influence on output and inflation. Keynesian economics is considered a "demand-side" theory that focuses on changes in the devolved economy over the short-run (Mankiw *et al*., 1992; Ntibagirirwa, 2014).

Harrod-Domar (H-D) growth model concluded that the warranted rate could be influenced by three different components of effective demand coming from the public sector, the private sector, in the form of autonomous investment, and the foreign sector (Harrod, 1973). Further, Harrod (1973) argued that fiscal policy is appropriate to achieve this long-term growth target. It should be used by varying the tax rates while keeping public spending constant. Monetary policy is appropriate instead to deal with what H-D defined as the short-term policy objective of correcting the divergence of the actual rate from the warranted rate and stabilizing the fluctuations of the sub-national and national economy (Mendoza *et al*., 1997; Romer, 2001).

The model stresses the dual role of capital. It holds that capital has the ability to create productive capacity as well as effective demand. The model is an attempt to specify how much national and local income depends on capital and labour that is Y = f (K, L). While labour (L) is abundant in developing countries, capital (K) is scarce. Therefore, capital is a limiting factor to local growth which could be sourced locally or from abroad (other counties). A decline in the rate of development of capital formation is linked with a decline in aggregate output, is a general agreement, since it depends on both capital and the extent of its utilization (Romer, 2001; Ntibagirirwa, 2014). The main limitations of the model are unrealistic assumptions like assuming saving ratio is constant and fixed coefficient of production model. It is also not applicable to unindustrialized nations and specifically counties as it assumes availability of capital and full employment of factors of production (Barro & Sala-i-Martin, 2003).

The Solow neo-classical growth framework is an improvement to the H-D model that incorporated a new element: productivity growth. Solow (1956) expanded the Harrod–Domar model by augmenting labour as input in production model and allowing capital-output ratios to vary relative to Harrod–Domar model assertion (Mankiw *et al*., 1992). Thus Neo-classical growth framework relaxes the assumption of fixed coefficient of production. These modifications allow growing capital intensity to be differenced from technological improvement.

Solow theoretical model concluded that, for state and local, economic growth solely depends on population growth and savings/investment, ceteris paribus (Solow, 1956). Increased savings/ investment rates will stimulate output per worker through accumulation of capital per worker. Solow (1956) cautioned that accumulation of physical capital cannot explain for either the vast growth over time in output per worker or the vast geographic or regional difference in output per worker (Mankiw *et al*., 1992; Mendoza *et al*., 1997; Romer, 2001). The growth model framework predicted technological advancement normally assumed to expand at a constant ‘steady state’- is what accounts for permanent output growth in long-run (Romer, 1990). Any change in population and investment/savings will only cause level effect in local economy (Shift in absolute per capita county GDP) (Branson, 2002; Barro & Sala-i-Martin, 2003).

According to neoclassical regional growth model, economic growth hinges on availability of capital and labour. That is, the supply of capital and labour is the accelerator of economic

activities in sub-national and national level (Mankiw *et al*., 1992). From neo-classical growth theory factors of production will move across lower tier government until returns to factors of production meet. That is labour and capital will keep on moving until equalization of county factor of production is attained. According to Solow growth model (Solow, 1956), fiscal decentralization can be associated with diverse level of efficiency in administration than a unified system, producing a variety level of technology progress and value of productivity. Consequently, with the mechanisms of fiscal federalism, states will observe disparity in their economic progress. From theory, the mechanisms of invention and innovation will get stimulated more efficiently and effectively under devolved system of governance (Solow, 1956; Mankiw *et al.,* 1992; Feld *et al*., 2012). In addition, neoclassical growth theory envisages that local economy with the lowest capital-labor ratios have the lowest wage rates. Local economy with low rent tend to attract more workers or labour force (Feld *et al*., 2012; Spear & Young, 2014).

The Solow growth model can be derived mathematically as shown.

$$Y(t) = F\big(K(t), A(t)L(t)\big) \tag{2.1}$$

where Y(t) is the total aggregate of production of the final products at time t, L(t) is aggregate labour force, K(t) is the capital stock, and A(t) is technology progress at time t. Technology is labour-augmenting. AL is effective labour. Land is ignored (fixed factor). Constant returns to scale (CRTS):

$F(cK, cAL) = cF(K, AL)$ for $c > 0$.

Consider a Cobb-Douglas production framework: $Y = K^{\beta}(AL)^{1-\beta}$. This equation displays CRTS. Assumptions of CRTS allow application of production function in intensive form; the intensive form is relevant because although the production function may have constant returns to scale, each individual input may exhibit diminishing returns.

Setting $c = 1/AL$, $F(\frac{K}{AL},1) = \frac{1}{AL}F(K, AL)$. Denoting $k = \frac{K}{AL}$, $y = \frac{Y}{AL}$ and $f(k) = F(K,1)$, by relating output per unit of effective labour as a function of capital per unit of effective labour $y = f(k)$. Evolution of effective labour in the Solow model, labour and technology expand at fixed exogenous rate n and g.

$$\dot{L}(t) = nL(t)$$

$$\dot{A}(t) = gA(t)\ \text{A(t)}$$

The rate of change of its log is equivalent to the growth rate of a variable.

$$\frac{d\ln L(t)}{dt} = \frac{d\ln L(t)}{dL(t)}\frac{dL(t)}{dt} = \frac{1}{L(t)}\dot{L}(t) = \frac{\dot{L}}{L(t)} = n$$

$$\frac{d\ln L(t)}{dt} = n$$

$$d\ln L(t) = ndt$$

Therefore; $\ln L(1) = \ln L(0) + n$

$$\ln L(2) = \ln L(1) + n = \ln(0) + 2n\,.$$

By continuously substituting, hence have:

$$\ln L(t) = \ln L(0) + nt$$

Similarly, $\ln A(t) = \ln A(0) + gt$. Applying this and taking the initial value $L(t)$ as provided; Equally, $\ln A(t) = \ln A(0) + g(t)\ln\text{A(t)}$.

Thus for the provided initial levels of L and A, this means that labour and technology expand exponentially $L(t) = L(0)e^{nt}$ and $A(t) = L(0)e^{gt}$ respectively. The savings rate, s, is constant and exogenous, and capital decreases at the rate δ per unit of time (Romer, 2001). Dynamics of capital per unit of effective labour: $k = \frac{K}{AL}$

$$\dot{k}(t) = \frac{\dot{K}(t)}{A(t)L(t)} - \frac{K(t)}{\left(A(t)L(t)\right)^2}\left(A(t)\dot{L}(t) + \dot{A}(t)L(t)\right)$$

$$\dot{k}(t) = \frac{\dot{K}(t)}{A(t)L(t)} - \frac{K(t)}{A(t)L(t)}\left(\frac{\dot{L}(t)}{L(t)} + \frac{\dot{A}((t)}{A(T)}\right)$$

$$\dot{k}(t) = \frac{sY(t) - \delta K(t)}{A(t)L(t)} - k(t)\left(n + g\right)$$

$$\dot{k}(t) = sf\left(k(t)\right) - \left(\delta + n + g\right)k(t) \qquad (2.2)$$

The first term *sf(k(t))*, is the actual investment in the physical capital per unit of effective labour. The second element, $(\delta + n + g)k(t)$, is the effective depreciation of capital per unit of effective labour. The steady-state capital per effective per effective labour, k^* is such that

$$sf(k(t)) - (\delta + n + g)k^* = 0 \tag{2.3}$$

At $k*$, investment is equivalent to effective depreciation and k will not change and as a result of inada conditions, there is only single value of k^* (Mankiw *et al.*,1992; Romer, 2001). Behaviour of total variables in the steady-state; Effective labour, AL, expands at the rate $(n + g)$. Capital expands at the exact rate (note that $K = ALk^*$ with k^* constant). Due to CRTS, aggregate output grows at the rate $(n + g)$. Output per unit of effective labour, y, is constant capital per worker, $\frac{K}{L}$, and output per worker, $\frac{Y}{L}$, grow at rate g. In the steady state, all variables grow at constant rates. The capital per unit effective labour k^* is unchanged. Labour and knowledge expands at rates n and g, respectively, Capital $k = ALK$ expands at the rate $(n + g)$, therefore, the equilibrium (steady state) rate of growth of output is explained mainly by the rate of technological improvement (Romer, 2001). At the steady state, hence finally have:

$$sf(k^*) = (\delta + n + g)k^* \tag{2.4}$$

A number empirical studies have highlighted different modifications to neoclassical Solow framework aiming to explain the role of macroeconomic factors in explaining lower tier and national economic expansion. For instance, Mankiw *et al.* (1992) established the major contribution of human capital development in neoclassical Solow growth model (Romer, 1990). Islam (1995) applied panel technique in order to compare with the previous findings of the augmented Solow framework obtained by Mankiw-Romer-Weil (MRW) using cross-section method (Mankiw *et al.*, 1992). Ram (1986) and Barro (1990), in turn, included public spending (local or national) in the neoclassical growth model. Barro (1990) separated the two components of government expenditure, namely investment and consumption expenditure. The growth framework model accounts for the importance of capital expenditure in explaining private capital productivity and explain differences in national and sub-national economic progress.

The Ramsey-Cass Koopmans (RCK) theorem is identical to the neoclassical Solow growth framework; though, savings in the Solow growth framework is exogenous, as opposed to endogenous as in the RCK growth model (Romer, 2001; Spear & Young, 2014). The RCK is built upon Solow model by integrating public expenditure through consumption and risk (Spear & Young, 2014). Both of these growth theories have the identical conclusion once in the steady state: regional output expansion, savings, investment and consumption, all in per worker terms expands at the rate of local technological growth (Ntibagirirwa, 2014).

Endogenous growth theory integrates this 'feedback loop' of knowledge growth influencing the development rate of capital, which affects technological advancement in a country.

$$Y(t) = F\big(K(t), A(t)L(t)\big) \tag{2.5}$$

These theorem accounts for the variation in growth between different regions. It considers different impact of economic integration on economic development, effect of technical and industrial policies, as well as influence of trade and environmental conditions on economic growth (Romer, 1990; Krugman, 1994; Ntibagirirwa, 2014). Technological progress is no longer regarded as unaccounted and due to chance as in the case of neoclassical growth model, but in endogenous growth model becomes itself a variable which can be altered by policy actions and consequently stimulate growth in the local and national economy. Alongside the traditional inputs of capital and labour, knowledge is now included within the production function model. Public policies can modify growth rates by subsidizing research and private investment, taxing consumption, and shifting public resources from recurrent spending to capital expenditure (Romer, 1990). When Solow model fails to explain the growth variation between countries, endogenous growth theories become the alternative to explain the concept of convergence in empirical findings (Mankiw *et al*., 1992; Barro & Sala-i, 2003).

As evidenced, in the Solow neoclassical theory, if the desire to invest or save in new public investment is altered by fiscal policy, this affects the equilibrium capital-output ratio and finally the level of output path, but not the slope. The novel feature of the public policy endogenous growth model of Barro (1990), Mendoza *et al*. (1997), Barro and Sala-i (2003) and Madhumita *et al.* (2019) is that fiscal policy can determine both the level of output path and the steady state growth rate. Thus according to Solow (1956) only population change and technological progress which can stimulate economic growth in devolved units. Capital

spending and distortionary taxation can affect the desires to invest in infrastructure or in human capital expenditure, but in the long-term this will only distort the equilibrium ratios, not the growth rate, but overall there will transitional growth rate in counties. In contrast, endogenous growth conclude that capital spending and distortionary taxation will determine the long-term impact of county growth. But Solow neo-classical and endogenous growth framework deviates only on the long-term estimation. Therefore, if available evidence accounts for short-term behavior only, it cannot discriminate between the two models of growth (Romer, 1990; Romer, 2001; Mutie, 2014).

2.2.3 Theories on Government Expenditure

There are many diverging theories about the reasons of national and sub-national government spending in the economy.

Government expenditure theory, traditionally, received only a scanty attention till lately. Partly, this lop-sided attention in the theory of public expenditure is explained by overall acceptance of the philosophy of laissez-faire and belief in the effectiveness of free market channels (Musgrave & Musgrave, 1989). But, with the advancement of welfare economics the function and responsibilities of the state and sub-national economy has grown and theory of expenditure is gaining attraction in most empirical studies. This trend has been necessitated with the increasing interest of economists in the challenges of income inequalities, resource distribution, marginalization, economic growth, macroeconomics instabilities and poverty growth in grassroots and at the national level (Musgrave, 1969; Bhatia, 2002; Ntibagirirwa, 2014).

The displacement effect theory accounted for variation in growth of government spending in United Kingdom (UK) between 1890 and 1955 (Wiseman & Peacock, 1961). The theory is grounded on the view that, government (local and state) prefers large scale spending and taxation while citizens are naturally tax averse. Any time the country faces external or internal instabilities such as floods, drought, macroeconomic instabilities, global financial crisis, political instability and war, the government would quickly increase spending, through increasing tax rate. Most empirical studies agree that citizens at county and state level will support the government policy at that period (Wiseman & Peacock, 1961; Henrekson, 1993; Madhumita *et al.*, 2019). The theory is related to the Kenyan case since the country has endured so many displacements in terms of political instability, economic growth fluctuations and revenue boom. However, the hypothesis is not comprehensive as there are other times

where spending in devolved units or national economy has increased yet there were no instabilities in Kenya.

Keynes's theory hypothesize that public expenditure is necessary to induce economic activities and advance GDP growth in all level of government (Keynes, 1936). The Keynesian theory contends that any growth in devolved spending will stimulate consumption through expenditure multiplier effect and consequently economic growth. The Keynesian growth framework holds that government expenditure is an exogenous factor that influences economic growth, or public spending can be used as a policy measure to generate employment, and boost growth and economic activities (Keynes, 1936; Nanjala, 2015; Maingi, 2017; Madhumita *et al.*, 2019). The theory is relevant in Kenyan case since past empirical results agree with the conclusion that increased decentralized spending could stimulate national and regional growth (Maingi, 2017).

Wagner's law hypothesizes that the growth in government spending will be more than the proportionate rise in the economic growth and will therefore lead to a relative enlargement of the government sector (Henrekson, 1993; Slemrod *et al*., 1995). Wagner's hypothesis asserts that economic growth leads to increase in real income, which results in increased demand for better infrastructure, health, education, and social welfare services (Wagner, 1958). The demand for such public utilities is due to industrialisation and urbanisation, and it increases perpetually; to continue to provide these services, the local government needs to make huge public expenditures. The theory is relevant in Kenyan case since county expenditure has been growing with increase in responsibilities, revenue and output (KIPPRA, 2016; OCOB, 2019). Wagner's has been criticized on ground that the model lacks a firm theoretical foundation. Further, the Wagner's model ignored the complications of community choice, taste and preferences, by imagining an organic theory of the nation (Brown & Jackson, 1996).

According to Musgrave model over the growth process, as public expenditure as a share of growth rises, the relative proportion of government spending drops (Musgrave, 1969; Musgrave & Musgrave, 1989). This is possible since as the local and national economy expands and more savings becomes available, the private sector experiences growth in capital stock. Now with more and better infrastructure investment in place, the additional public investment and private expenditure are made at a slower rate (Brown & Jackson, 1996; Bhatia, 2002).

Stages of development theorem by Musgrave and Rostow, submitted that the growth of national and local spending would be linked to the structure of economic growth and development in place (Rostow, 1962; Musgrave, 1969; De Schweinitz, 1972). In addition, Rostow (1962) and Musgrave (1969) stages of development model explains how government spending tends to rise when an economy develops from a traditional economy to an industrialised economy. In the first development stage, it is imperative to get investment going. During the middle stages of development, government will continue to supply capital products, while private investment will also start to take off, partly because of the positive external effects of public investment undertaken during the initial phase. In the final phase, public investment by national and sub-national government, expressed as share of county GDP, generally declines due to the fact that most of the essential public infrastructure is already available (Rostow, 1962; De Schweinitz, 1972; Musgrave & Musgrave, 1989; Bhatia, 2002).

2.2.4 Government Expenditure and Economic Growth Causality Hypotheses

There are two channels (Keynes, 1936; Wagner, 1958) through which public expenditure associate with economic expansion. On the one hand, Wagner's hypothesis states that population demand for public goods and services such infrastructure investments and welfare enhancement is income elastic (Wagner, 1958; Henrekson, 1993; Slemrod *et al.,* 1995). Thus any economic growth is usually accompanied by proportionate growth in spending due to the pressure from society for welfare improvement (Brown & Jackson, 1996; Mitchell, 2005; Madhumita *et al.,* 2019). On the other hand, Keynesian hypothesis infer that the desired increase in government expenditure stimulate local economic expansion through the spending multiplier effect on overall demand; an increase in private and public purchase of goods and services will probably grow capital accumulation, production, efficiency, employment opportunities, private sector growth and overall county Gross Domestic Product (GDP) growth (Keynes, 1936; Bhatia, 2002; Branson, 2002). The combination of the two causality hypothesis is presented in a circular flow Figure 2.1.

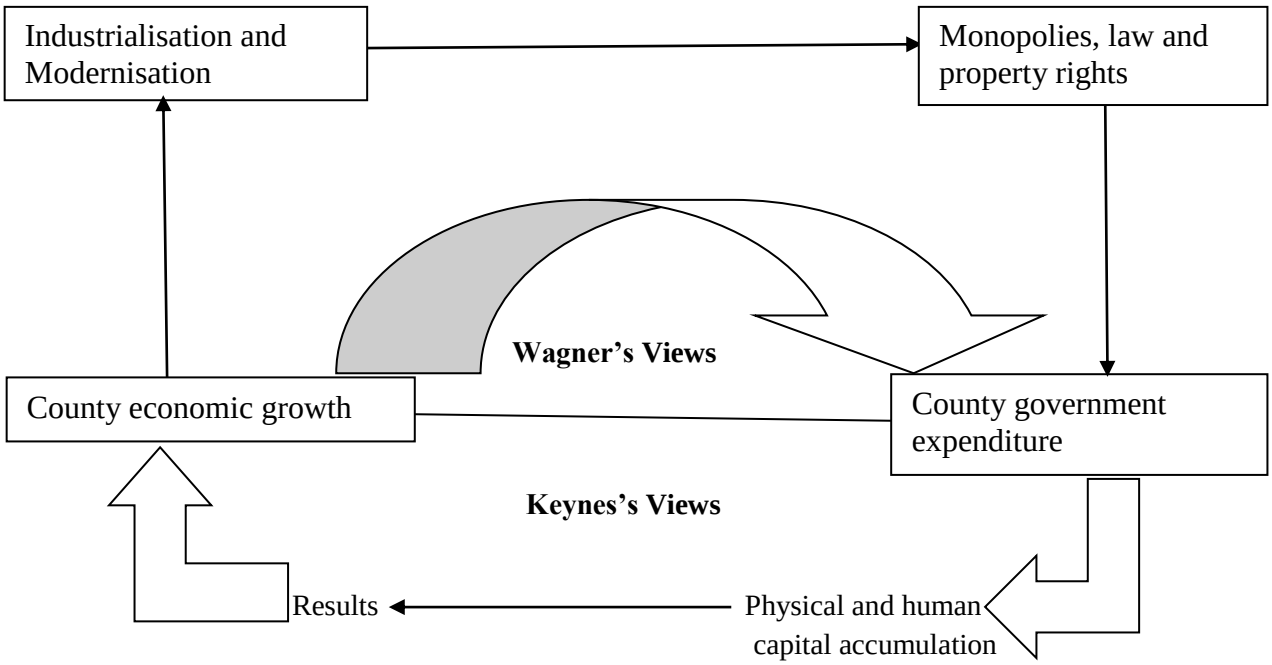


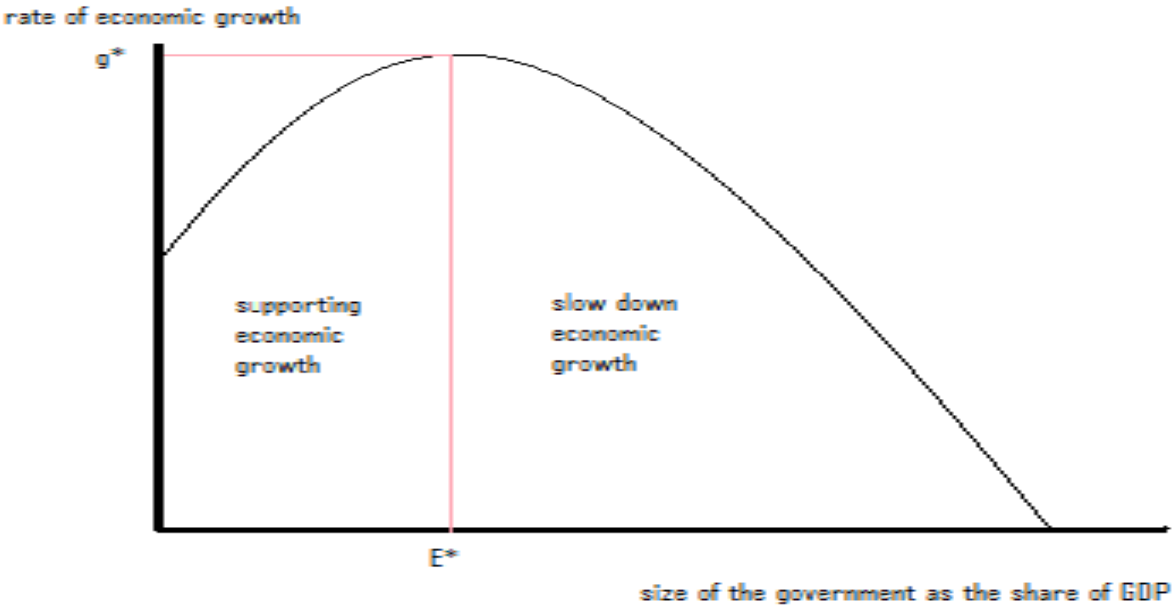
Figure 2.1: Circular Flow of Causality Nexus.

Source: Keynes (1936); Wagner (1958); De Schweinitz (1972); Slemrod *et al.* (1995).

2.2.5 The Optimal Government Expenditure Theories

Armey curve theory by Armey (1995) explained the existence of an optimal size of government as portrayed by inverted U-curve (Rostow, 1962; Armey, 1995; Scully, 2003). In particular, as both local and state government continues to expand as a share of county Gross Domestic Product (GDP), funds are channeled to less productive (and later counterproductive) activities, resulting to decline in economic growth (Vedder & Gallaway, 1998; Leach, 2002; Scully, 2008; Wahab, 2011). This can be attributed to reduction in private capital accumulation due to increase in taxation, crowding out effect and market failure.

In addition, the Armey Curve shows an optimal size of the government E*, where growth maximizing output is attained. Beyond point E*, rising county or national government spending will cause a decline in overall economic growth (Scully, 2003; Aykut, 2011). The optimal point varies county by county and mainly rely on political process, form of decentralization, social factors, demographic factors, macroeconomic factors, regional integration and county wealth (Armey, 1995; Vedder & Gallaway, 1998; Leach, 2002; Aykut, 2011).



***Notes**: g – Gross Domestic Product (Proxy for Economic Growth),*

GE – Government Spending (Proxy for Government Size)

E – Equilibrium T – Time variable

Figure 2.2: Armey Curve.

Source: Rostow (1962); Armey (1995); Leach (2002); Scully (2008).

The Armey Curve is expressed in a modified quadratic form, as follows:

$$(g_{i,t}) = \alpha + \beta(GE)_{it} + \delta(GE)^2_{it} + \gamma T \qquad (2.6)$$

The positive sign on the linear term, GE, is aimed to present the positive influence of increased public expenditure on county GDP growth, while the negative sign for the squared term implies the variable measures any negative effects linked expansion of public spending. Since the squared term rises in value faster than the linear term, the presence of adverse effects from public expenditure eventually will outweigh the benefits, generating downward-sloping portion of the Armey Curve (Armey, 1995; Leach, 2002; Scully, 2008; Husnain, 2011). Vedder and Gallaway (1998) introduced the time variable (T) in order to control the

effect unrelated to public expenditure. Hence, the faster and greater the public spending rises, the greater the probability of ineffective use and decreasing outcome.

A quadratic function can be applied to characterize Armey inverted U curve (Armey; 1995; Heerden, 2008; Facchini & Melki, 2013).

$$(GDP_{i,t}) = a + b(GE)_{it} + c(GE)^2_{it} \quad (2.7)$$

The public expenditure (GE) which guarantees the optimal level of county and national growth (GDP) is derived by taking the first derivative of the function (2.7) in respect to GE and then equated to zero.

$$\frac{\partial GDP}{\partial GE} = b + 2(c)GE_{i,t} \quad (2.8)$$

Equating equation 2.8 to zero gives the optimum government size percentage.

$$GE = -\frac{b}{2c}. \quad (2.9)$$

According to the Scully model (Scully, 2003; Scully, 2008), both government and private sector contribute to economic activities in a devolved unit or a state. Government sector offers public goods funded from tax collected from the population. The remaining part is saved by citizens to use in demanding for public services (Aykut, 2011; Husnain, 2011). The share of the pay of the citizens given to the devolved unit managers is specified by;

$$\frac{T}{Y} = \tau \quad (2.10)$$

where T is tax collected and τ is the associated tax rate or fraction of public sector and Y is the county GDP. The fraction of the private sector in GDP is "1- τ". This can be represented in Cobb-Douglas functional form as;

$$Y_{it} = \gamma \left(\frac{G}{Y}\right)^{\alpha} (1-\tau)^{\beta} \quad (2.11)$$

α and β are the fractions of the private and public sectors respectively. The log transformation of function (2.11) is given by;

$$lnY_{it} = ln\gamma + \alpha\, ln\left(\frac{G}{Y}\right) + \beta \ln(1-\tau) \quad (2.12)$$

This is simplified further as follows;

$$\alpha \left(\frac{Y}{G}\right)\left(\frac{1}{Y}\right) = \alpha\, G^{\beta-1} \quad (2.13)$$

Taking second derivative with respect to G, thus get;

$$\frac{\partial^2 \ln Y}{\partial G^2} = -\alpha G^{-2}$$

This application demonstrates that the value of the first derivative is positive while the second derivative is negative. This reveals that devolved public expenditure influences county Gross Domestic Product (GDP) growth positively but the size of this effect decreases over the time, that is, it affects county GDP growth at declining rate afterward (Husnain, 2011; Wahab, 2011). As it is empirically reviewed that at a low level of county spending, the increase in the tax rate accelerates economic activities, since at this level, county public investment is more productive. While high level of the county government expenditure, a tax increase is associated with a decrease in county Gross Domestic Product growth since most of the public budget at this level is concerned with welfare progress (Heerden, 2008; Hill, 2008; Scully; 2008; Husnain, 2011; Wahab, 2011).

2.3 The Empirical Literature

This section reviewed relevant empirical literature studies on the influence of government expenditure on economic growth. It further provides a critique and summary of the empirical literature.

2.3.1 Effects of Government Expenditure and Economic Growth

The mechanisms through which government expenditure affects economic growth have been investigated in several empirical studies as follows.

Ganaie *et al.* (2018) analyses the effect of fiscal decentralization on economic growth in India's 14 states between 1981 and 2014. The study tested for panel unit root, panel co integration, and used panel dynamic ordinary least squares technique. The findings indicated that devolved expenditure has a significant and positive effect on the state level domestic product. However, the study did not differentiate between long-run and short-run effect. The importance in distinguishing is that there is period between a policy measure and its effect in the overall economy.

Gebreegziabher (2018) examined the influence of government expenditure on economic growth in Ethiopia for the period 1966 to 2014, employing the time series ARDL regression model. The study concluded that recurrent budget and capital spending are key to Ethiopia economic expansion for both short-term and long-term. This study did not consider checking for causality test during regression model analysis.

Maingi (2017) estimated the impact of government spending on economic activities in Kenya for the period 1963 to 2008 using the Ram (1986) growth framework. The study was based on the endogenous economic model. The VAR model was used for estimation in this study and stated that enhanced spending on areas such as human capital and physical infrastructure investment stimulate GDP growth while sectors such as debts servicing, recurrent spending, security and defense were detrimental to Kenya's overall GDP growth.

Mwiathi (2017) examined the effect of fiscal decentralization on regional and income inequalities, human capital growth and poverty rates in Kenya (47 counties) using panel OLS estimation. The study determined that fiscal decentralization reduced poverty head count in counties. In contrast, fiscal decentralization did not have any influence on regional and

income inequalities in counties. This study ignored checking for relationship between fiscal decentralization and economic growth. Further, short-run and long-run analysis were absent.

Hammed (2016) investigated the relationship between economic performance and components of devolved capital expenditures. The study covered South Africa's (234) municipalities over the period between 2003 and 2012. The study applied panel OLS multi-level model estimation analysis. The results provided fairly strong evidence that increased spending on water and sewerage, power and maintenance of projects will translate to positive growth. In contrast increased spending on physical infrastructures like roads and housing were detrimental to South Africa's municipalities GDP growth.

Mutie (2014) determined the effect of devolved funds on economic growth in Kenya (1993-2012). The Ordinary Least Square (OLS) technique was applied to analyse the parameters of the model. Regression results indicated that both decentralized capital spending and recurrent expenditure contributes negatively to GDP growth. This is accredited to the fact that constituencies (CDF) and the defunct local authorities (LATF) used to over rely on grants and fiscal transfers from the central government to fund their budget. This study ignored checking for causality test and also if long-term relationship exists between target variables.

Wahab (2011) scrutinized the effect of total and components of spending variables on economic growth. The study sampled 97 countries, both industrialized and developing, using OLS estimation method. The major conclusion of the study was that while total spending is positively related to growth, recurrent budget was indifferent. However, capital expenditure was found to have positive economic growth effects mainly when its economic growth falls below its trend-growth level; this beneficial outcome was detected to turn negative when capital public expenditure expansion exceeds.

A study in 2010 by Action Aid International-Kenya, "How is our Monies Spent?" The government review in eight Constituencies, 2006-2008, specified that despite increase in CDF and LATF funds allocation to grass root areas, people living below poverty line increased by a one-third. This dismal performance of the devolved funds was attributed to several problems like poor monitoring and evaluation mechanism, failure to involve local citizens on identifying, planning and executing local projects, lack of training on finance management and disparities in devolved projects allocation.

Lessmann (2009) investigated the effect of fiscal decentralization on income and regional inequalities. The study was carried using panel data for 23 OECD nations between 1982 and 2000, using panel OLS estimation method. The study reported that increased fiscal decentralization translates to lower regional inequalities. Hence poor regions benefited more from expenditure transfer than rich ones. The study did not consider the impact of fiscal decentralization on economic performance.

Bagaka (2008) investigated the relationship between Constituency Development Fund (CDF) and economic growth in Kenya. The study employed OLS panel estimation and considered the period between 2004 and 2006. This study concluded that through the CDF funds, a number of health facilities, schools and water collection facilities have been developed. The study noted a mismatch between investment initiation, financing and maintenance of the local project. However, this study employed small sample size during panel regression analysis and thus making it difficult to generalize the conclusions.

M'Amanja and Morrissey (2005) applied the Autoregressive Distributed Lag (ARDL) model on time series data to account for the relationship between the various measures of fiscal policy action on growth in Kenya covering the period 1964-2002. The study categorized spending into two main sets (productive and unproductive). Productive government expenditure is defined to include budget on infrastructure, education sector, health services and economic activities while unproductive expenditure included consumption spending less recurrent spending on education, health, and economic activities. Contrary to expectations, productive expenditure was seen to have a strong negative impact on growth in short-run. Government investment was seen to be supportive of economic activities in the long-run.

Akai and Sakata (2002) studied the relationship between fiscal decentralization and economic growth in 50 states of United States of America (USA) using state level panel series data (1992-1997) and panel OLS estimation technique. The study established that fiscal decentralization was positive and significant during review period. This study measured fiscal decentralization using the ratio of allocated state revenue as a percentage of the country revenue. This study employed spending as a measure because Kenyan counties have minimal autonomy in collecting tax.

Kweka and Morrissey (2000) scrutinized the effect of government expenditure on economic growth in Tanzania (1965-1996) using OLS estimation analysis and Ram (1986) growth framework model. It was established that increased government capital budget has an adverse

effect on economic growth and consumption expenditure was beneficial in relation to growth, and which in specific appears to be linked with improved private consumption. The findings exposed that government spending on human capital was insignificant in Tanzania.

Lin and Liu (2000) found out that fiscal devolution led to substantial positive influence on economic growth in China for 28 provinces (1970-1993). Study used an OLS panel econometric model with growth rate per capita GDP as the dependent variable and the ratio of federalized finance as a percentage of the aggregate public expenditure as the independent variable.

2.3.2 Causal Nexus between Government Expenditure and Economic Growth

This sub-section reviewed empirical literature on the channels through which public expenditure associates with economic growth.

Madhumita *et al.* (2019) applied multivariate panel series analysis, such as panel unit root test, panel co integration, and the Toda–Yamamoto causality check, to study the association between regional growth and federalized expenditure in 28 states of India at different stages of economic progress for the period between 2003 and 2015. Causal association exists from state GDP growth to rise in government expenditure, in agreement with Wagner's conclusion. However, bidirectional causality was detected between both capital and recurrent expenditure to regional growth, and from regional growth to capital and recurrent expenditure for least developed states.

Muguro (2017) sought to examine the relationship of components of government expenditure on economic growth in Kenya between 1963 and 2015. The ARDL and vector auto regression (VAR) test were used to test the causal relation between government expenditure and growth in Kenya during the period of review. The causality results revealed that the association of expenditure components on growth was insignificant. This study ignored assessing the long-run and short-run causality. The significance in distinguishing is that the causal relation differs between time horizons.

Lahirushan and Gunasekara (2015) analyzed the causal association between public expenditure and economic growth of Asian countries in long-term. The countries involved in the study were 44 with observations in each country from 1970-2013. This study used panel OLS econometric model and panel granger causality. This study determined that there exists unidirectional causality from economic growth to public expenditure in Asian countries.

Nanjala (2015) investigated the causal association between public spending and economic growth in Kenya for the period 1963 - 2012. The study applied advanced econometric techniques such as Johansen Cointegration test, Vector Error Correction Model (VECM) and Granger causality test. The results established that government spending and economic growth co-move towards a long-run equilibrium. However, in short-run the findings did not show any causal relationship.

Muthui *et al.* (2013) analysed the relations of government spending on economic growth in Kenya (1964-2011) using the linear approach based on Keynesian theory. The study applied Granger causality test to determine causality between public expenditure and GDP growth which was found to be bi-directional in Kenya.

Yemek (2005) established that there was no granger causality between intergovernmental fiscal transfers, and economic growth and poverty reduction in South Africa (Provincial level). The study applied panel Granger causality analysis. The study used average growth of GDP per capita as the dependent variable and share of provincial expenditure in state expenditure as the variable of interest.

Atsushi (2004) using panel data on 51 countries for the period 1997 to 2001 estimated variables that relate to economic growth using panel OLS and granger causality test. Degree of fiscal devolution was measured by local share of spending to total government budget. The results of the panel model estimation revealed that decentralized public finance has significant causality with economic growth on the sample countries.

Table 2.2 shows the summary of recent empirical literature development related to this study.

Table 2.2 Recent Empirical Studies on the Expenditure-Growth Relationship

Author(s)	Expenditure Variables	Data	Estimation Techniques	Results	Study Gaps
Madhumita *et al*. (2019)	Disaggregate Expenditure	India 2003-2015	Yamamoto causality Panel	Bidirectional causality exist	Cointegration test ignored
Gebreegziabher (2018)	Disaggregate public Expenditure	Ethiopia 1966-2014	ARDL regression Model	Recurrent expenditure was positive	Ignored causality analysis

Gisore (2017)	National Expenditure	East Africa 1985-2015	Panel Data FMOLS	Investment matters	Cointegration test ignored
Muguro (2017)	National Expenditure	Kenya 1963-2015	ARDL model	Causality Exist	Data not disaggregated
Hammed (2016)	Devolved Expenditure	South Africa 2003-2012	Panel data OLS Model	Capital Positive	Ignored recurrent
Nanjala (2015)	National spending	Kenya 1963-2012	Causality Test	Causality Absent	Data not disaggregated
Odhiambo (2015)	Aggregate budget	South Africa 1994-2013	Causality Estimation Time series	Causality Present	Data not disaggregated
Mutie (2014)	Devolved Spending	Kenya 1993-2012	OLS Model	Devolved was insignificant	Cointegration test ignored
Muthui *et al*. (2013)	Sectoral Budget	Kenya 1964-2011	causality test	expenditure matters	Cointegration test ignored
Ezcurra & Rodríguez-Pose (2010)	Devolved regional Expenditure	1990-2005	Panel OLS methods	Decentralization budget was positive	Causality test was not analysed
Akai & Sakata (2002)	Devolved state Expenditure	USA 1992-1997	Panel data regression OLS	Decentralization spending was positive	Cointegration analysis was ignored
Lin & Liu (2000)	Devolved Aggregate Expenditure	China 1970-1993	OLS regression techniques	Decentralization spending was positive	Causality test and analysis was ignored

2.3.3 Summary of Empirical Research Gaps

Overall, despite a recently growing empirical literature on the government expenditure policy, several issues require further examination. These studies (Lessmann, 2009; Ezcurra & Rodríguez-Pose, 2010; Wahab, 2011) paid more attention to industrialized countries and the addition of developing economies were aimed at generating enough degrees of freedom in the course of statistical analysis. Further, the existing empirical studies (Akai & Sakata, 2002; Gebreegziabher, 2018) do not examine the causality test. In addition, the above empirical studies for example, Lessmann (2009) and Oguso (2017), do not provide better understanding on the mechanisms by which devolution expenditure policies shape the prospect of economic growth for economies as they are not only a major difference in the structure (non-devolved and devolved) of government spending between county and national level, but the variance is also reflected in the role of public expenditures on economic activities.

Most of the preceding studies on the relationship between devolution expenditure and growth have, however, focused on the national government levels other than the lower tier government (Akai & Sakata, 2002). These studies do not consider the emerging significance of local or county government in planning and influencing state economic activities. Selected studies that differentiate between national and sub-national governments lump all sub-national governments together to form one collective group (Jin & Zou, 2005). This leads to information loss since sub-national governments have different roles, governance structure and influence on growth. Devolved governments in Kenya, for instance, are a diverse group and perform various roles in the different counties. Lumping together all county governments either within a nation or across nations implies that all forms of sub-national governments are identical, which is not true. Considering these issues, there appear to be room for further investigation on effect of devolved spending on GCP growth in Kenya by using latest disaggregated data and conducting a sub-national specific level study. Further, this study considered different components of devolved expenditure in the model estimation in order to capture the various scopes of the devolution mechanisms in Kenya.

A major criticism of these previous studies is that if regression data is not stationary it may be that, due to the common trends in variables, there can be spurious correlation which imposes upward bias of the estimated coefficients. One way to correct the problem is to run regressions in the form of first differences. Such solution has its own limitations since it estimates only short-run impacts, while the effect is predicted to be long-run (Munnel, 1992). Such analysis can give misleading findings and recommendations. This current study

estimated the Error Correction Model (ECM), which distinguishes between short-run and long-run effects of county fiscal variables on economic growth and determines the speed of adjustment to the long-run equilibrium.

A number of the studies, Lin and Liu (2000), Bagaka (2008), Mutie (2014) and Madhumita *et al*. (2019) made use of time-series and OLS estimation approach which are prone to many econometrics disadvantages like multicolliniality. Further, panel diagnostic tests, stationarity test, and co integration test which are very crucial in modeling were glaringly absent. This could put to question reliability of the models so developed. For instance, Ezcurra and Rodríguez-Pose (2010) study in 21 OECD countries. This current study applied panel ARDL model and conducted panel diagnostic investigations. In addition, the causality result between public expenditures and economic activities is inconclusive in Kenya. Studies by Maingi (2010) and Oguso (2017) show that the causation exists in Kenya but Nanjala (2015) explained that there was no causal relationship in Kenya. This study is, therefore, exceptional in the sense that it is carried out to fill existing gap by analyzing the causality and effect of spending in a panel of 47 counties using county public expenditure components and GCP growth variables.

2.4 Theoretical Framework

A number of empirical studies have introduced diverse adjustments to the Solow neoclassical growth model framework (Solow, 1956) aiming at highlighting the role of a factor(s) in explaining economic growth in national and local level. The augmented Solow growth model was introduced by Mankiw *et al.* (1992), and stresses the significance of including human capital to the Solow framework model. Islam (1995) examine whether or not the findings of the augmented Solow model obtained by MRW using cross-section analysis vary by using different methods, that is panel data estimation. In addition, Barro (1990), added government expenditure component to the Solow production function. By allowing for investment expenditure, which is public spending that increases private capital marginal productivity, such as infrastructure development (Ram, 1986; Barro, 1990). The key assumption is that the national and devolved government expenditure share influences factor productivity via a level effect on the efficiency parameter that controls labour-augmenting technical change (Solow, 1956; Islam, 1995; Romer, 2001).

Ram (1986) model estimated growth production function using data from 115 countries for the period 1960 - 1980. In this study, a regression equation is derived from neoclassical

production function model of Solow (1956) in which the rate of economic expansion is a function of labor, capital accumulation and factor productivity. The study established that the general effect of public spending on growth is positive. The acceptance of the Ram (1986) approach lies in the appearance of a direct link from theoretical framework model to econometric specification (Barro, 1990). Hence, more studies (Kweka & Morrissey, 2000; M'Amanja & Morrissey, 2005; Maku & Olukayode, 2009; Akpan, 2013; Maingi, 2017) embrace this model. This study therefore adopted Ram's theoretical framework model in Kenyan counties.

The starting point of Ram (1986) model is an aggregate neoclassical production function that contain labour augmenting technological progress:

$$Y(t) = F\big(K(t), A(t)L(t)\big)$$

Where Y denotes total real income, the technology parameter A, K is the real capital stock and L is labour. Ram (1986) estimated the following two-sector production function as shown:

$$P = P(L_p, K_p, G) \qquad 2.14$$

$$G = G\big(L_g, K_g\big) \qquad 2.15$$

Where, P= Private sector, G=public sector, L= Labour input, and K=Capital input.

The model assumes that the local or national economy consists of two distinct sectors, the government sector (G) and the private sector (P). The final output of these sectors depends on the labor (L) and capital (K) inputs engaged. It is also assumed that output (size) of the government sector exerts an externality effect on the output of the non-government sector (P). The total national output (Y) is thus defined as follows:

$$Y = P + G \qquad 2.16$$

Ram (1986) and Barro (1990) assumption was that marginal productivities of labour and capital in the government sector are (1+ δ) times the corresponding factor productivities in the private sector. If δ is positive, then the government sector has higher marginal factor productivity. Suppose that the ratio of the respective marginal factor productivities in the two sectors deviates from unity by a factor, δ. That is,

$$G_L/P_L = G_K/P_K = (1+\delta) \qquad 2.17$$

where the lower case subscripts denote partial derivatives (For example, $G_L = \partial G / \partial L$). If δ is positive, then the government sector has higher marginal factor productivity.

Thus, after taking the total differentials (Equation 2.14 to 2.17) for P and G, it is presented as,

$$\partial Y = P_K \partial K + P_L \partial L + \left(\frac{\delta}{1+\delta}\right)\partial G + P_G \partial G \qquad 2.18$$

Where P_K, P_L and P_G refer to the marginal productivities in the private sector. Given that, $\beta_1 = P_K$, $\beta_2 = \frac{P_L}{Y/L}$ and I = ∂K, where I denotes private investment, and ∂G (government investment), substituting into (2.18), dividing through by Y: equation (2.18) can be rewritten as

$$\frac{\partial Y}{Y} = \frac{I}{Y} + \frac{\partial L}{L} + \left(\frac{\delta}{1+\delta} + P_G\right)\left(\frac{\partial G}{G}\right)\left(\frac{G}{Y}\right) \qquad 2.19$$

The rate of increase of overall real per capita GCP is taken as a proxy for economic expansion, $\partial Y/Y$. Gross fixed capital formation by both sectors is used for I/Y, government recurrent spending is used for G/Y, and human capital (proxy for change in labour) for $\partial L/L$. Existing empirical studies exclude $\partial G/G$ from the final estimation to avoid multicollinearity (Kweka & Morrissey, 2000; M'Amanja & Morrissey, 2005; Maku & Olukayode, 2009; Akpan, 2013; Maingi, 2017). This study therefore embraces Ram's (1986) growth model to explain the effect of county governments spending components on economic growth using panel data techniques that allow us to take into account the county-specific and time-specific effects.

2.5 Conceptual Framework

Figure 2.3 conceptualize the theoretical framework to the objectives of this study, the hypotheses and how the procedures of data estimation relate to the problem of this study. Conceptual framework shows the independent variables which include components of county government expenditure (Capital and Recurrent), county expenditure Absorption rate, Non-devolved spending, Corruption rate, Electricity consumption, Crime rate and Human capital while the dependent variable is County economic growth (per capita Gross County Product growth). Control variables were selected from the large body of literature on economic growth determinants as reviewed by Ram (1986), Barro and Sala-i (2003), Vidyattama (2010) and World Bank (2016). In between the dependent and independent variables are the intervening variables which are not controlled for. The intervening variables comprise of Political instabilities, Environmental factors, External shocks and Domestic policies.

In this context, this study analysed whether county expenditures have substantial long-run and short-run effect on growth using panel ARDL model. The capital and non-devolved expenditure were expected to influence economic growth positively through the mechanism of improved investment and increased consumption, respectively. County investment in physical infrastructure is a critical prerequisite for capital accumulation in the private sector for the long-run economic growth. Non-devolved expenditure can influence economic growth positively by improving purchasing power of the population into the county economy. Recurrent spending is expected to have a negative impact on county growth. This is true when most resources are channeled to consumption. This means less resources will be available for investment and thus retard county growth. Human capital is expected to be positive since an improvement in human capital (skilled) expands productivity and economic growth in long-run. Also, access to affordable electricity power is a prerequisite to realizing economic expansion and reduced regional and income disparities in counties. Almost all consumption and production activities in county level use hydroelectric energy. Corruption diminishes economic outcomes in counties. This is attributed to an increase of transaction cost and uncertainty, rent seeking, ineffective and inefficient investments, and misallocation of production factors that come with corruption. Further, crime imposes large costs to private and public sectors which have a negative effect on local investment and economic activities in long-run. In addition, because economic growth is often tied to public and private expenditure, failure to spend budgeted money directly affects the rate at which the county economy expands.

Finally, this panel analysis aimed to determine the relation between devolved expenditure and economic growth using Engle-Granger causality approach (Engle & Granger, 1987). This is a test of whether lagged values of one variable help to predict changes in another. Hence, a variable G (components of devolved governmemt expenditure) is said to granger cause another variable real GCP per capita growth, y $(G \rightarrow y)$ if past values G can predict present values of y. Figure 2.3 provides the Conceptual Framework of this study.

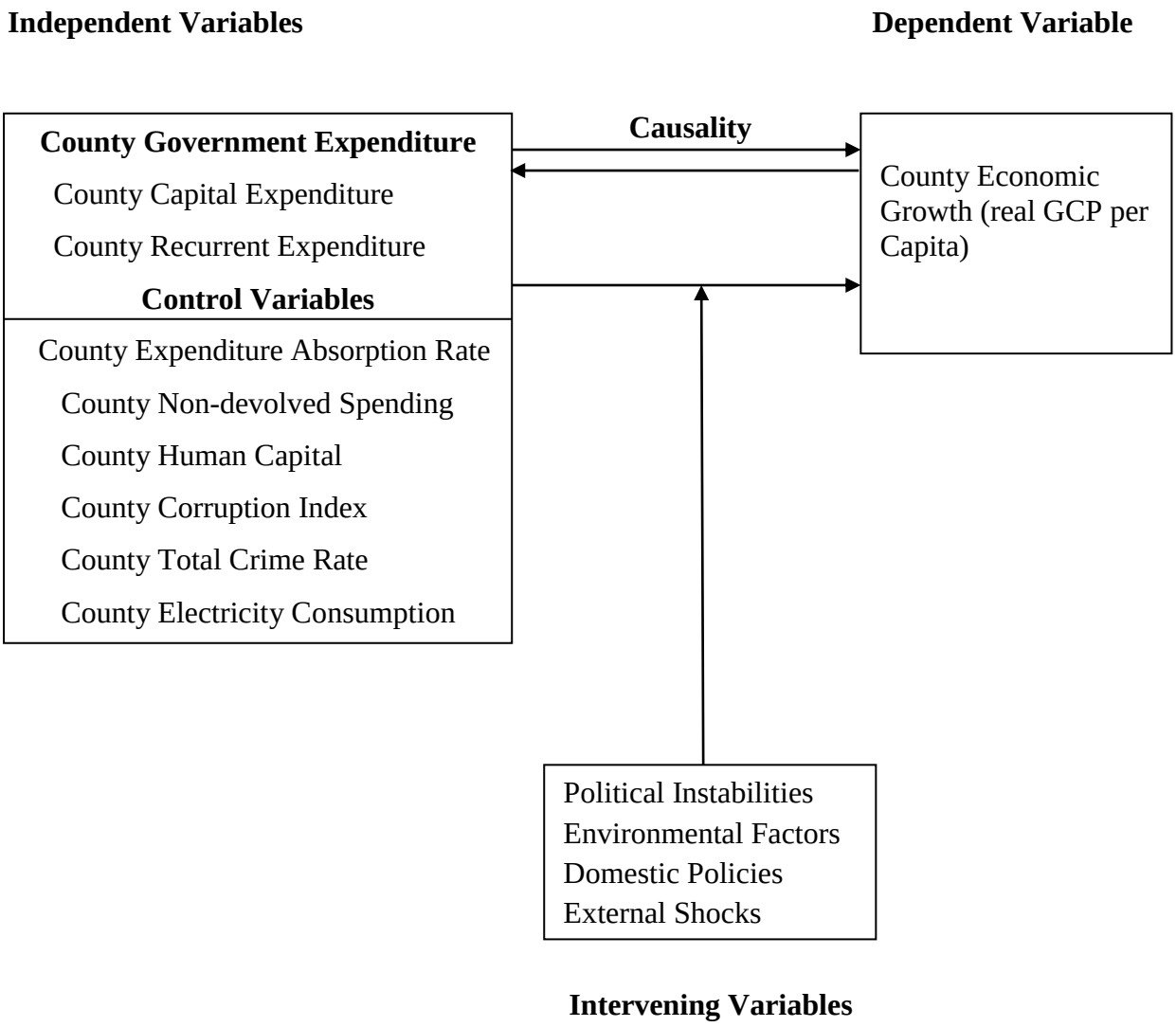


Figure 2.3: Conceptual Framework Showing Effect of County Expenditure on Economic Growth.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

In this chapter, a substantial methodological base for the study is presented. The chapter discusses the research design that was adopted for the study, study area, data type and sources, model specification and ends with panel analysis techniques.

3.2 Research Design

This study applied quantitative research design so as to analyse the effect of county government expenditure on economic growth in Kenyan counties. The selected research design is appropriate to the study as it capture the trends of county government spending and its effects on county economic growth in Kenya. It allows for a broader study, involving a greater number of variables, and enhancing the generalization of the findings. This was carried out in the period 2013 - 2017 using annual series secondary data for 47 counties and panel ARDL technique, resulting in 235 county-year observations. Panel data technique permitted control for unobserved county government heterogeneity. In addition, the combination of cross-sections and times-series data enhance the quantity and quality of the panel data set applied.

3.3 Study Area

This study was carried in Kenya. Kenya is located in the continent of Africa. Kenya lies across the equator and is found in the eastern coast part of Africa. Maps of World indicate that Kenya's latitude and longitude lie between 0.0236° S and 37.9062° E (Maps of the World, 2020). Kenya's total area covers 580,367 square kilometers, making it 49th largest country in the universe, with 11,227 square kilometers of water and 569,140 square kilometers of land (Kenya Open Data Project, 2012; GoK, 2016; Maps of the World, 2020). The geography, political, economic and social structure of Kenya is diverse, varying across Kenya's 47 devolved units. Nairobi County is Kenya's seat of power and is found in the south central part of the nation. The population of Kenya is 47,564,296 (2019) and GDP per capita is estimated at $2,010 (KNBS, 2019; Maps of the World, 2020). The country's currency is the Kenyan Shilling (KES).

The Government Republic of Kenya (GoK) is the national government of Kenya composed of 47 counties, each county with its own semi-autonomous government headed by an elected governor. This study was carried out in 47 Kenyan counties. This is because in the study period, there has been a significant transfer of funds to 47 county governments by the central government in order to address income and regional inequalities, poverty rate and stimulate economic activities in counties (GoK, 2018; OCOB, 2019). This study focused on county government allocation proxies for devolution in Kenya. The reason for selecting county government allocation is due to their trait as unconditional annual transfer funds, which permits county managers to have option and an autonomy to articulate expansion public policy designed to county priorities, competitive strength and local economic potential. In addition, this study used a maximum of 47 county observations in regressions model to avoid the possible analysis problem of different sample sizes in this relatively small sample (Mo, 2001; Vidyattama, 2010). Further, the previous empirical studies have pointed out against generalization of findings from cross section and panel studies to a specific nation such as Kenya since they may be at different levels of economic development (Mwiathi, 2017). Hence there was a need to carry out an empirical study that specifically focus on an individual country such as Kenya to establish if it is devolved public expenditure influences economic growth. Furthermore, sub-national study allows enhanced analysis of the influence of county expenditure on economic growth thus enabling to provide some policy recommendations appropriate for Kenya and specifically 47 county governments (Mutie, 2014; Mwiathi, 2017).

The choice of county as unit of analysis was informed by the fact that devolved units are the centers of development planning and in specific the growing responsibilities of the county administrations in provision of basic public services, welfare services and initiating local economic development (IEA, 2010; KIPPRA, 2016; GoK, 2018). This renewed interest in fiscal devolution is further fuelled by the general acceptance that county spending is an effective policy instrument for increasing the efficiency and effectiveness of fiscal devolution and subsequent economic growth in Kenya. Figure 3.1 shows the map of 47 devolved units (47 counties) in Kenya covered by the study.

Figure 3.1: Map showing the 47 Counties in Kenya covered by the Study.

*Source***:** Kenya Open Data Project (2012); KNBS (2019); Map of the World (2020).

3.4 Data Type and Sources

This study employed secondary panel data set of 47 counties in Kenya. Secondary panel data was preferred in this study because it is readily available, cheaper and easily accessible (Kothari, 2004; Kombo & Tromp, 2006). A key strength of panel data set is that it includes all unobserved time-invariant county-specific elements, for example culture, or geographical area, by including county fixed effect (Greene, 2012). The panel data is from previous publications and government records which could only be sourced from secondary sources. Published data and government records were the most preferred secondary source of information for data collection. Published data is the most reliable secondary source of information (Kothari, 2004; Baltagi, 2008). This study utilized annual data from Statistical abstracts, Economic surveys, Gross County Product report, County Budget Implementation Review reports, County Integrated Development plans, Kenya Power and Lighting Company reports, National Police Service (NPS) reports, and Ethics and Anti-Corruption Commission (EACC) reports. Secondary sources generated quantitative data. Quantitative data analysis is preferred in evaluation since it provides quantifiable and easy to comprehend output. Quantitative data is associated with economic growth performance of counties in terms of real GCP per capita and fiscal devolution variables. Data collection schedule were used to collect the panel data set for this study. The collected panel data was entered in the data sheet where cleaning was carried out correctly to confirm reliability and validity.

3.5 Model Specification

This process consisted of choosing an appropriate functional form for the regression panel model and selecting which variables to include. Building on previous studies (Ram, 1986; Facchini & Melki, 2013), a simple growth equation model (3.1) is formulated.

$$lnY_{i,t} = \beta lnX_{i,t-1} + \gamma ln\, G_{i,t-1} + \mu_i + v_t + \varepsilon_{i,t} \qquad (3.1)$$

Where, $\ln Y_{i,t}$ - the dependent variable - County economic growth (Constant price in 2009)

$lnX_{i,t-1}$ - set of explanatory variables apart from components of county expenditure

$\ln G_{i,t-1}$ – the county government expenditure variables

β and γ - are parameters to be estimated

μ_i – county fixed effects v_t – time fixed effects $\mathcal{E}_{i,t}$ – the error term

and the subscripts i and t represent county and time period respectively.

Following studies of Barro (1991), Mankiw *et al*. (1992), Kalio (2000), Kweka & Morrissey (2000) and Facchini and Melki (2013), logs (ln) of the target variables were taken for the estimation of the model so as to allow for regression coefficients to be treated as elasticities. An advantage of expressing the variables in natural logarithmic form is to reduce the problem of heteroskedasticity and also achieve stationarity in the lower order of integration (Gujarati, 2004; M'amanja & Morrissey, 2005). Another advantage is that first difference of log transformed series indicates returns/growth rate. In addition, the equation function variables were lagged so that to shun serial correlation between error terms and to support the reliability and validity of the findings (Gujarati, 2004). Finally, the lag is chosen to reflect the fact that county expenditure often take time before their effects on output growth can be registered (Devarajan *et al.*, 1996).

Thus, panel model to be estimated is specified in logarithm form as:

$$y = f(\, rg, cg, ng, ag, hc, cr, tc, ec),$$

$$\begin{aligned} \ln y_{i,t} = {} & \beta_0 + \beta_1 \ln rg_{i,t-1} + \beta_2 \ln cg_{i,t-1} + \beta_3 \ln ng_{i,t-1} + \beta_4 \ln ag_{i,t-1} + \beta_5 \ln hc_{i,t-1} + \beta_6 \ln cr_{i,t-1} \\ & + \beta_7 \ln tc_{i,t-1} + \beta_8 \ln ec_{i,t-1} + \varepsilon_{i,t} \end{aligned} \quad (3.2)$$

Where, $lny_{i,t}$ - County economic growth (Real per capita GCP growth),

$lnrg_{i,t}$ - County government recurrent expenditure,

$lncg_{i,t}$ - County government capital expenditure,

$lnng_{i,t}$ - County government non-devolved expenditure,

$lnag_{i,t}$ - County absorption rate of government expenditure,

$lnhc_{i,t}$ - County human capital,

$lncr_{i,t}$ - County corruption rate,

$lntc_{i,t}$ - County total crime rate,

$\ln ec_{i,t}$ - County electricity consumption.

Estimation process of the effect of county government spending involved disaggregating devolved fiscal data it into two levels of spending components, namely county recurrent and county capital expenditure as captured in first two objectives (Devarajan *et al.*, 1996). The

basis for doing so was that one constituent of the economic theory argues that county capital (ln cg) spending is a significant factor in stimulating GCP growth (Barro, 1990; Mitchell, 2005). In contrast, county recurrent (ln rg) budget has been qualified as hampering county economic performance (Ram, 1986; Barro, 1990; M'amanja & Morrissey, 2005). In addition to the components of county expenditure, there are other variables that influence county economic growth. In order to eliminate the effects of the variables on growth, they were included in the control variable set. This study used regional economic growth determinant variables as listed by Vidyattama (2010) study in Indonesia. Therefore, this study used non-devolved spending (ln ng), corruption index (ln cr), total crime rate (ln tc), human capital (ln hc), electricity consumption (ln ec) and absorption rate of county expenditure (ln ag) as the study control variables.

3.5.1 Meeting the Objectives

To analyse objectives (**i), (ii),** and (**iii**), that is, the effect of individual component of county government spending (recurrent and capital) and county budget absorption rate on county economic growth, panel ARDL equation 3.2 was estimated. In order to achieve objective (**iv**), empirical analysis was performed by using Engle-Granger causality test. This is analysis of whether lagged values of one variable help to predict variations in another. Hence, a variable G (county governmemt expenditure) is supposed to granger cause another variable real GCP growth, y , $(G \rightarrow y)$ if past values G can help predict present values of y. The analysis for Granger causality test was conducted by estimating equations (3.2) with respect to components of devolved government expenditure while holding the other study variables constant.

3.5.2 Justification for Panel Data Approach

Combining time series and cross-sectional data set is beneficial for four key reasons. First, economic growth outcome of counties differs substantially over time. In addition, the time-series aspect of the variables of interest gives much of the information ignored in cross sectional analysis. Secondly, panel data analysis can improve upon the subjects that cross-sectional data set fails to address, such as controlling for county specific effects and likelihood of potential endogeneity of the explanatory variables (Gujarati, 2004; Baum, 2006; Greene, 2012). Thirdly, the use of panel data estimation allows increasing the sample size, and the increase in the degrees of freedom is important when a relatively large number of independent variables are estimated (Greene, 2012). Finally, panel data set estimation is to

examine the dynamics of adjustment (Islam, 1995; Ivanov & Lutz, 2005; Plasmans, 2005; Baltagi, 2008; Greene, 2012).

3.5.3 Justification, Measurement of Variables and Sources of Data

This section describes variables which are analysed in the study.

County Economic Growth (real Gross County Product per capita)

Gross County Product (GCP) is the total value of output (goods and services) produced in the county economy. Economic growth is the dependent variable of this study, and some studies adopted the indicator per capita GDP (Barro, 1991; Yushkov, 2015; Brueckner & Lederman, 2018; Liu *et al.*, 2018), whereas some scholars used the GDP growth rate (Mutie, 2014; Hammed, 2016; Maingi 2017) as a measure of economic growth, at national level. However, GCP growth rate data are not available for Kenyan counties, 2013-2017, resulting in the study to adopt per capita GCP in final estimation following Levine and Renelt (1992), Barro and Sala-i-Martin (2003), Easterly and Levine (2003), Sachs (2003) and Vidyattama (2010) studies. Furthermore, Vidyattama (2010), Yushkov (2015) and Liu *et al.* (2018) studies used per capita gross regional product (GRP) as the dependent variable in the sub-national level studies.

As established in the growth literature (Lin & Liu, 2000; Barro & Sala-i-Martin, 2003; Easterly & Levine, 2003; Sachs, 2003; Vidyattama, 2010), this study used the growth of county output per capita as a function of county expenditure and the control variables. The accurate measurement of county economic growth is real per capita GCP (at constant 2009 prices in KES). It removes the effect of inflation. Real per capita GCP is a measure of a county's economic output shared equally among its citizens. It is an indicative measure of a county's standard of living and is derived by dividing a county's Gross County Product by its total population (World Bank, 2016). Consequently, both the economic size and population of the respective counties drive this measure. The level of real GCP per capita is also linked to the level of social expenditures per capita across counties, which can be expected to have a direct and reducing effect on the poverty rate (Brueckner & Lederman, 2018). In addition, real per capita GCP grows over time, and its growth rate does not tend to diminish in long-run (Solow, 1956; Romer, 2001). The GCP per capita growth variables data were obtained from World Bank report-Kenya, annual Economic Survey reports and Gross County Product report-Kenya.

County Government Expenditure Components

County government expenditure on capital goods is supposed to add a country's physical capital (infrastructure investment) which, in turn, could complement private sector productivity and increase economic growth in the process (Mitchell, 2005; Kakar, 2011). According to Keynesian theory, county spending can improve positively to economic growth by adding purchasing power into the local population (Keynes, 1936; Romer, 2001). The sign of the variable is therefore expected to be positive. But recurrent expenditure is expected to give a negative result, since most recurrent expenditure is for consumption purposes. Consumption expenditure is ineffective on the grounds of crowding - out phenomenon that is, as public goods are substituted for private goods, thus causing lower local private spending (Mitchell, 2005; Abu & Abdullahi, 2010; Vidyattama, 2010). However, according to Barro (1990) theorem, recurrent public spending on public sector such as education, health and general administrative is able to enhance economic expansion through development in worker productivity and efficiency. Capital /recurrent expenditure were measured as county total capital /recurrent expenditure respectively (at constant 2009 prices in KES), as used in Barro (1990), Mitchell (2005) and Vidyattama (2010) studies. The fiscal variables were obtained from annual Statistical Abstracts and annual County Budget Implementation Review Reports.

Absorption Rate of County Government Expenditure

Absorption rate of county expenditure denotes the share of the actual county spending out of the targeted budgeted spending. The share is an important tool in shaping the efficiency and overall performance of the Kenyan counties as regards to utilization of the intended devolved budgets (Njeru, 2003; OCOB, 2013). If budget absorption rate is lower there will be deterioration of the county economy (Claudia & Goyeau, 2013). This study expected absorption rate to play a key role in explaining GCP growth in the county economy, as for these counties budget represents a significant source of financing the capital investments in short-run. County economic growth is often tied to public and private expenditure; failure to spend budgeted money directly affects the rate at which the economy expands in long-run (Becker *et al.,* 2012; Ionica *et al.,* 2017). The sign of the variable is therefore expected to be positive. In order to calculate the absorption rate, the study estimated the actual expenditure to pre-allocated budget share as explained by Claudia and Goyeau (2013) and OCOB (2013).

Pane data for this variable was obtained from annual Statistical Abstracts and annual County Budget Implementation Review reports.

County Non-devolved Government Expenditure

The link between devolved expenditure and county growth may generate a spurious correlation resulting from disregarding the prevailing differences in the size of the national government public sector in the different counties (Ezcurra & Rodríguez-Pose, 2010). Non-devolved budget was measured as the share of total national government spending (less county government expenditure), which is a better indicator of national government activity on counties (Ezcurra & Rodríguez-Pose, 2010). To estimate non-devolved expenditure, this study distributed national government expenditure (less county government expenditure) among the sub-national units in proportion to their share of the population (Bundervoet *et al.*, 2015). National spending per person adds to the better understanding of the priority and significance a country and population places on public sector goods and services (Ram, 1986; Mo, 2001). Keynesian macroeconomic theory posits that non-devolved expenditure can accelerate economic growth through growing purchasing power of the citizens (Keynes, 1936; Romer, 2001). Non-devolved expenditures accelerate purchase for goods and services, which in turn allows suppliers to intensify use of their productive capacities by employing additional labour and capital, and therefore to grow supplies in county economy, thus the expected sign is positive. The data for this variable was obtained from annual National Budget Implementation Review reports and Statistical Abstracts.

County Human Capital

County human capital includes all types of public and private investments made to grow human knowledge, such as formal education, informal learning, on-the-job training, and learning by doing. Human capital is added in the production growth model since human capital can grow life level through increasing productivity, more employment openings and stimulate economic expansion in long-run. According to Mankiw *et al.* (1992), mechanisms for human capital investment include formal and informal education, primary research, on-the job training, learning by doing, innovation and invention. According to Barro (1991) improved education ensures smooth economic expansion over time and is key for sustainable growth. Gemmell (1996) explained that human capital varies according to the country's level of development. For instance, in Organization for Economic Co-operation and Development (OECD) countries tertiary education is key, secondary in middle income nations and primary

for developing nations. Kenya has been ranked as a lower middle income country because its per capita GDP crossed a World Bank threshold (GoK, 2016). Thus during the study period, 2013-2017, Kenya was at one-time low income economy (2013) but now a middle income economy (2014-2017), as a result this study used both primary and secondary enrolment as proxies for human capital following studies of Barro (1991), Gemmell (1996) and Vidyattama (2010).

The overall school enrolment rate at a specific level of schooling is often used to measure human capital development in the economic literature because the quality of the data on schooling level is usually better (Romer, 1990; Barro, 1991; Mankiw *et al.,* 1992; Islam, 1995; Mo, 2001; Fournier & Johansson, 2016). For instance, Barro (1991) studied the relationship between per capita income and human capital in 98 countries for the period 1960-1985, during the estimation the empirical study used school-enrolment rates (Primary and Secondary levels) as proxies for human capital. Thus following studies of Barro (1991) and Mankiw *et al.* (1992) the overall school enrolment (Primary and Secondary) was employed as a proxy for county human capital. The coefficient is expected to be positive, the accumulation of human capital advances labour force productivity, aids technological innovations and inventions, increases returns to capital stock, and makes economic growth more sustainable in counties (Islam, 1995; Appleton & Teal, 1998). Data for the variable was collected from annual Statistical Abstracts.

Total County Crime rate

Crime is an act or a case of negligence that is against the law and punishable upon conviction. Crime rate is factored in the panel growth regression analysis since it is one of the main elements that influences household, firm and government location decisions. The cost instigated by crime has a negative effect on county private businesses, which involves diverting resources to crime prevention measures in short-run and otherwise discouraging private investment and GCP growth in long-run (Cardenas, 2007; Detotto & Pulina, 2009). Detotto and Pulina (2009) examined whether rise in crime rate implies reduced economic growth in Italy from the period of 1970 to 2004. Using ARDL technique, the study determined that all crime typologies have a negative effect on economic activity. The study highlighted that homicides, robbery, extortion and kidnapping have an adverse effect on economic growth (Detotto & Pulina, 2009). Therefore, the sign of the variable is expected to be negative. Total Crimes reported to the police service by county was used as a proxy,

following Detotto and Pulina (2009) study. Total county crime data represented any illegal activity crime documented by the national police service, which include violent crime, homicide, robbery and resident burglary. The panel data used in the study was retrieved from annual National Police Service reports-Kenya and annual Economic Survey reports.

County Corruption rate

Refers to dishonest or deceitful behavior by those in county authority. Corruption perceptions index is negative in relation to economic growth (Murphy *et al*., 1991; Hanousek & Kochanova, 2015). This is attributed to an increase of transaction costs and uncertainty, rent seeking, misallocation of production factors, and inefficient private investment decisions that come with corruption (Choe *et al.*, 2013). The sign of the variable is expected to be negative. Following Hanousek and Kochanova (2015) study, average bribe by county in Kenyan Shillings (KES) was used as a proxy. The secondary data was obtained from Ethics and Anti-Corruption Commission (EACC) annual reports-Kenya.

County Electricity Consumption

As previous economic literature has suggested, economic growth depends highly on energy inputs (Aslan, 2014; Wen-Cheng, 2016). Almost all production process and consumption activities in county level use hydroelectricity power. More so, as a major source of energy, availability of electricity power aids the process of achieving residential and domestic needs, positively adds to labour and capital productivity, increase export of goods and services (Narayan & Smyth, 2005; Hammed, 2016; Wen-Cheng, 2016), provides employment opportunities and eases poverty problems; this ultimately improves socio-economic development (Hammed, 2016). The sign of the variable is expected to be positive. Following studies by Aslan (2014) and Wen-Cheng (2016), electricity consumption in Kilowatts by county was used as a proxy. Data was retrieved from the Kenya Power and Lighting Company annual reports and Kenya Power Distribution Master Plan report.

3.6 Panel Data Analysis Techniques

In this section, panel analysis techniques for this study is presented. This section discusses descriptive statistics analysis, panel unit root test, panel co integration test, panel ARDL model specification and ends with panel Granger causality analysis technique.

3.6.1 Descriptive Statistics

In order to gain an understanding of the trend and behaviour of the target variables in the specification model, this study employed descriptive analysis. They provide simple summaries about the sample and the measures. The measures of central tendency employed were mean, median and mode. The measures of variability include maximum, minimum, standard deviation, coefficient of variation, kurtosis and skewness. The skewness test demonstrates whether the distribution is concentrated to a central value (symmetric) or has long tails (asymmetric). The test for peakness (Kurtosis) indicate how the variable distribution is peaked relative to normal distribution. Further, Pearson Correlation (r) is used to analyse the degree of association between the regressors and dependent variable (Gujarati, 2004; Greene, 2012).

3.6.2 Panel Unit Root Test

The panel unit root test was employed in order to check for the presence of non-stationary in the panel regression model in order to reduce chances of spurious findings (Greene, 2012). Macroeconomic time series, cross sectional and panel series data are generally characterised by stochastic trend which can be removed by differencing (Munnel, 1992; Gujarati, 2004; Baltagi, 2008), since the study variables are expected to be integrated of the same order. If the panel series feature a unit root, they are better considered as non-stationary mechanism that have no tendency to return to a long-run deterministic trend. Also, the variance of the panel series is time-dependent and goes to infinity as time approaches infinity, which translates to serious challenges during panel estimation. In addition, non-stationary series suffer permanent effects from random shocks, thus, panel series with unit roots will usually follow a random walk (Greene, 2012).

Further, this is to make sure that the variables are not integrated of higher order than I (1) or I (2). This is because a number of panel, cross-sectional and the time series data variables are non-stationary. Even though panel ARDL co integration technique permits study variables to be stationary at various order of integration, however, the unit root estimation is still essential to guarantee that none of the variables are integrated of higher order I (2). If any variable is integrated of higher order, 2, the panel ARDL cointegration technique is no longer appropriate since the F-statistic estimated by panel ARDL of Pesaran *et al*. (2001) will no longer be applicable. In addition, panel unit root test is applied to determine whether all the variables are stationary to avoid spurious regression results and misleading output with no

economic sense. Spurious results arise when the R^2 is greater than the value of Durbin Watson. Consequently, panel standard error of the analysed factors will become inefficient and biased; and p-value and t-ratio become void and can lead to producing ambiguous result with no economic sense (Munnel, 1992; Gujarati, 2004).

The standard tests for panel unit root are Harris–Tzavalis (HT) test, Augmented-Dickey Fuller (ADF) test, Phillips - Perron (PP) test, Im-Pesaran-Shin (IPS) test and Levin-Lin-Chu (LLC) test. This study adopted HT (1999) and LLC (2002) techniques to verify the presence of unit root. These tests allow for heterogeneous serially correlated errors, and suitable for data sets with small number of panels like in this study. The statistics is best suited when N range between 10 and 250 and when T range between 5 and 250 (Baltagi, 2008; Kunst *et al*., 2011). If T is very small, the estimate is small and has low influence. The HT and LLC panel unit root test is specified as follows:

$$\Delta X_{i,t} = \alpha_i + \beta_i X_{i,t-1} + \sum_{j=1}^{k} \gamma_{i,j}\ \Delta X_{i,t-j} + \ \varepsilon_{i,t} \qquad 3.3$$

Where Δ is first difference operator, $X_{i,t}$ is dependent variable, $\varepsilon_{i,t}$ is the white-noise disturbance with a variance $\sigma^2$of ,1,…, N indexes sample (county) and 1,…,T indexes time (year).

3.6.3 Panel Cointegration Tests and ARDL Model Specification

Panel cointegration analysis has also become significant for the analysis of error correction models (ECM). The concept of error correction refers to the adjustment process between short-run disequilibrium and a desired long-run equilibrium (Kunst *et al*., 2011). Panel cointegration regression estimation is applied to account for stationary linear or cointegration relations between non stationary panel series data variables. The importance of panel cointegration test is its instinctive ability for solving problems that arise when estimating non-stationary variables, specifically those assumed to carry long-run equilibrium relationship (Granger *et al.*, 1995). If non-stationary variables are analysed in a regression model, one as a dependent variable and the other as regressor, statistical inferences will be problematic (Engle & Granger, 1987; Gujarati, 2004; Greene, 2012). Panel cointegration estimation is also significant during the analysis of error correction model (ECM). The

approach of error correction model accounts for the adjustment mechanisms between long-run equilibrium and expected short-run outcome (Granger *et al.*, 1995; Kunst *et al.*, 2011).

This study applied the panel co integration tests developed by Kao and Chiang (2001) and Pesaran *et al.* (2001). The application F-bounds cointegration approach of Pesaran *et al.* (2001) does not involve pre-testing the variables to determine their order of integration since the analysis can be applied regardless of whether they are only an I(0) or I(1) or both (Pesaran *et al.*, 2001; Hassler & Wolters, 2006). Pesaran *et al.* (2001) noted two sets of critical values exist. This critical values provide critical value bounds for all categorizations of the independent variables into purely I(0), purely I(1) or jointly cointegrated. But these critical values bounds are produced on sample sizes of 500 and 1000 observations and 20000 and 40000 replications, respectively (Pesaran *et al.*, 2001; Narayan, 2004; Narayan & Smyth, 2005). However, as noted by Narayan and Smyth (2005), such critical values cannot be applied for small sample sizes like the one in this study. Considering the small sample size in the current study, this study extracted the suitable critical values from Narayan (2004) which are generated for small sample sizes of between 30 and 80 observations.

The panel Kao test is superior to other co integration tests, since is built on the Engle Granger two-step method, and enforces homogeneity on the variables in the panel data set (Kao & Chiang, 2001). In addition, Augmented-Dickey Fuller (ADF) test is used to confirm the null hypothesis of no cointegration (Narayan & Smyth, 2005). Besides, panel Kao cointegration tests is residuals based taken from Engle and Granger (1987) two step approach. However, Johansen Fisher cointegration test is a system based cointegration test for the whole panel set. Therefore, panel Kao cointegration is more comprehensive (Kao & Chiang, 2001; Ivanov & Lutz, 2005).

Thus, equation 3.1 and 3.2 were reformulated as a panel ARDL regression framework, to determine the underlying relationship between regressors and dependent variables, to obtain models (3.4) and (3.5), respectively.

$$\Delta \ln Y_{i,t} = \sum_{i=1}^{k} \beta \Delta \ln X_{i,t-1} + \sum_{i=1}^{k} \gamma \Delta \ln G_{i,t-1} + \mu_i + v_t + \varepsilon_{i,t} \qquad 3.4$$

$$\Delta lny_{i,t} = \beta_0 + \sum_{i=1}^{k} \beta_1 \Delta lnrg_{i,t-1} + \sum_{i=1}^{k} \beta_2 \Delta lncg_{i,t-1} + \sum_{i=1}^{k} \beta_3 \Delta lnng_{i,t-1} + \sum_{i=1}^{k} \beta_4 \Delta lnag_{i,t-1} + \sum_{i=1}^{k} \beta_5 \Delta lnhc_{i,t-1} + \sum_{i=1}^{k} \beta_6 \Delta lncr_{i,t-1} + \sum_{i=1}^{k} \beta_7 \Delta lntc_{i,t-1} + \sum_{i=1}^{k} \beta_8 \Delta lnec_{i,t-1} + \varepsilon_{i,t} \quad 3.5$$

The main strength of panel ARDL estimation technique are: The technique proposes that once the lag order of the panel ARDL regression has been determined, the model addresses autocorrelation and endogeneity problems; the technique allows for a mixture of stationary and non-stationary variables as independent variables; panel ARDL analysis is more appropriate for small or finite sample size when compared to the other co integration methods; and panel ARDL model integrates sufficient number of lags to capture the data generating process in general to specific modeling analysis (Pesaran *et al.,* 2001; Gujarati, 2004; M'amanja & Morrissey, 2005; Narayan & Smyth, 2005; Hassler & Wolters, 2006).

Basically the panel ARDL technique involved the following steps. First, it involves testing of the long-run relation among the variables under consideration by the use of F-statistic. This is ascertained by modeling a conditional error correction form of the panel ARDL framework for the specification concerned (Narayan, 2004; Ivanov & Lutz, 2005; Hassler & Wolters, 2006). Second step is to check if the variables have long-run relationship, this study applied the panel ARDL F-bounds co integration test. When co integrating is confirmed, the long-run equilibrium and short-run dynamic adjustments of the panel ARDL framework are attained. At this stage of analysis, panel diagnostic test statistics of the selected panel ARDL framework is examined from short-run adjustment process. The error correction framework of the series can be represented as follows:

$$\Delta lnY_{i,t} = \sum_{i=0}^{k} \beta \Delta lnX_{i,t-1} + \sum_{i=0}^{k} \gamma \Delta ln\, G_{i,t-1} + \gamma ECM_{i,t-1} + \varepsilon_{i,t} \quad 3.6$$

$$\Delta \ln y_{i,t} = \beta_0 + \sum_{i=0}^{k} \beta_1 \Delta \ln rg_{i,t-1} + \sum_{i=0}^{k} \beta_2 \Delta \ln cg_{i,t-1} + \sum_{i=0}^{k} \beta_3 \Delta \ln ng_{i,t-1} + \sum_{i=0}^{k} \beta_4 \Delta \ln ag_{i,t-1} + \sum_{i=0}^{k} \beta_5 \Delta \ln hc_{i,t-1} + \sum_{i=0}^{k} \beta_6 \Delta \ln cr_{i,t-1} \sum_{i=0}^{k} \beta_7 \Delta \ln ec_{i,t-1} + \sum_{i=0}^{k} \beta_8 \Delta \ln tc_{i,t-1} + \gamma ECM_{i,t-1} + \varepsilon_{i,t} \quad 3.7$$

In this model γ_t is the impact multiplier or short-run dynamic effect that measures the immediate impact that a change in G_t will have on change in Y_t. On the other hand ECM_{t-1} is the feedback effect or adjustment effect, and shows how much of the disequilibrium is being corrected, that is, the extent to which any disequilibrium in the previous period effects any adjustment. The error-correction model (ECM) estimated will capture both the short-run and long-run adjustment equilibrium mechanism.

Theoretically, the coefficient of ECM_{t-1} variable is supposed to have negative sign for convergence. For theoretical meaningfulness, the coefficient of the error term should range from zero to one in absolute term and is always negative (Narayan, 2004). The element ECM_{t-1} is the error correction term which captures the long-run relationship. ECM has the advantage of retaining both short-run and long-run information. ECM helps in determining both the short-run and long-run effects of explanatory variables. The importance in differentiating these two impacts arises for the three reasons. First, they can have contradictory effects on the dependent variable. Second, there is a period between a policy action and its impact in the county economy expansion. Lastly, the resulting coefficients of the effect differs in size and magnitude.

3.6.4 Panel Granger Causality

Panel cointegration between explanatory and dependent variables does not stipulate the direction of causation between the study variables. Theoretical literature submits that there is at least one- way direction causation among target variables (Ivanov & Lutz, 2005; Nanjala, 2015). Thus panel Granger causality (1988) analysis is applied, if two study variables are cointegrated, in order to account for short-run association between variable. The Granger causality test scrutinize if variable Y's present value can be accounted by its own past value and whether the explanatory power could be enhanced by including the past value of another

variable X. From econometric analysis if the coefficient of X is found to be statistically significant, X is said to Granger cause Y. Past studies have established a bi-directional granger causality while others find a uni-direction causality originating from economic growth to public expenditure or vice versa while others find no causality (Granger *et al.*, 1995; Ivanov & Lutz, 2005; Nanjala, 2015).

This study used the framework of Engle and Granger (1987), Granger (1988) and Granger *et al.* (1995) for causality test. Granger (1988) demonstrated that causal relationship between target variables can be determined within the framework of ECM, with co integrated variables. Significant and negative coefficient of ECM is expected to represent long-run association between variables and significance of lagged explanatory variables will represent short-run dynamic causality relation (Granger *et al.*, 1995). The short-run and long-run relation is therefore established from the following panel ARDL model, for case where per capita Gross County Product (GCP) growth is the explained variable:

$$\Delta lnY_{i,t} = \sum_{i=0}^{k} \gamma \Delta ln\, G_{i,t-1} + \gamma ECM_{i,t-1} + \mu_i + v_t + \varepsilon_{i,t} \qquad 3.8$$

Where, Δ depicts the first difference operator, ECM is the error correction model obtained from the long-run co integrating relation from the previous specified panel ARDL equation 3.2. In each panel data regression model, to confirm long-run causality relations γ is expected to reveal a negative and significant sign.

Further, the Engle and Granger (1987) framework suggest two step procedures to determine the long-run equilibrium and short-run dynamic relations between government spending and economic performance. In the first step, the long-run framework as stated in equation (3.2) is estimated and in the next step, this study generated the residuals from the long-run panel model, then this study defined the lagged residuals attained as the error correction model (ECM). The analysis of panel Vector Error Correction Model (VECM) was as shown:

$$\Delta lnY_{i,t} = \sum_{i=0}^{k} \beta \Delta lnX_{i,t-1} + \sum_{i=0}^{k} \gamma \Delta ln\, G_{i,t-1} + \gamma ECM_{i,t-1} + \mu_i + v_t + \varepsilon_{i,t} \qquad 3.9$$

Where the term Δ depicts first difference operator, i (1,…,k) is lag length determined by the Akaike Information Criterion (AIC), and $\gamma ECM_{i,t-1}$ is the estimated lagged error correction model (ECM) achieved from the long-term co integrating relations (equation 3.2). The element γ is the adjustment coefficient, and $\varepsilon_{i,t}$, is the error term, which is characterized with a zero mean and constant variance. The main strength of ECM, which is obtained from panel ARDL by linear transformation, it incorporates the long-run equilibrium with the short-run adjustment dynamics without losing the long-run information (Granger *et al.*, 1995).

3.7 Post Estimation Panel Diagnostic Tests

The panel estimation findings are usually biased, inconsistent and inefficient if econometric problems such as heteroscedasticity, serial correlation, model mis-specification and correlation of error term occur in the panel regression model. Therefore, panel diagnostic examination is significant to ensure the regression model is free from standard econometric problems.

3.7.1 Testing for Serial Correlation

Serial correlation (or autocorrelation) is the violation of classical assumption (observations of the error term are uncorrelated with each other). Serial correlation is expected to occur in time series data, cross sectional series data and panel data set. Autocorrelation causes the expected variances of the model coefficients be inconsistent and biased, and therefore hypothesis analysis will no longer be valid. As usual, the t-statistics will tend to be higher and R^2 will be overestimated in the regression model. There are different methods of testing autocorrelation including Wooldridge test and Breusch-Godfrey autocorrelation Lagrange Multiplier (LM) approach. Since the approach is grounded on the notion of Lagrange multiplier approach, it is occasionally stated to as LM test for autocorrelation. In this study, autocorrelation test was established using Breusch-Godfrey autocorrelation LM approach as it allows for the case where higher order lagged dependent variable are included as regressor (Newey & West, 1987). Breusch-Godfrey autocorrelation LM test is able to identify higher orders of serial correlation as well as the lagged dependent variable in contrast to Durbin-Watson. Ways of eliminating autocorrelation is by generalized differencing, the generalized least squares (GLS) estimator, and using heteroskedasticity and autocorrelation (HAC) panel robust standard errors (Dougherty, 1992; Ivanov & Lutz, 2005).

3.7.2 Testing for Heteroscedasticity

Heteroscedasticity (the violation of homoscedasticity assumption) is detected when the size of the error term varies across values of explanatory variable. Therefore, the t-values for the expected coefficients cannot be reliable. Breusch-Pagan test and modified Wald test were applied to test for heteroscedasticity (Breusch & Pagan, 1980; Gujarati, 2004). If heteroscedasticity is detected, then it can be corrected using panel robust standard errors (Newey & West, 1987; Driscoll & Kraay, 1998; Greene, 2012).

3.7.3 Testing for Cross-Sectional Dependence

This assumption says that the error terms in the two regression functions, at the same point in time, are correlated. This can be attributed to existence of common shocks, unobserved mechanisms that become part of the error term ultimately and spatial autocorrelation (Baltagi, 2008; Greene, 2012). Contemporaneous correlation/ cross-sectional dependence (CD) can lead to bias in tests results. Cross-sectional dependence (CD) is tested by applying Breusch-Pagan Lagrange Multiplier test or Pesaran (2004) CD test for cross-section dependence in data panel set. To correct, the study can ideally use panel robust standard errors developed by Driscoll and Kraay (1998), which handle arbitrary forms of spatial dependence in conjunction with heteroskedasticity and autocorrelation.

3.7.4 Ramsey RESET Test

The regression model is mis-specified if the estimation process can be better approximated by non-linear functional form. Misspecification of model can lead to biased coefficients and error term, which in turn leads to incorrect inference and models. Ramsey Regression Equation Specification Error Test (RESET) approach was applied. Ramsey RESET test can only be employed to test wrong functional form of regressor and dependent variables. If mis-specification is detected, it can be corrected by use of instrumental variable (IV) panel regression analysis. Specification errors can lead to endogeneity which can be resolved by using instrumental variable (IV) or two-stage least squares (2SLS) panel regression technique. Also data transformations, like taking logarithms and squares often narrow the range of data.

3.8 Research Outputs

A research output is a particular dissemination, publication, presentation, communication or pathway in which research evidence is made available to people other than the author. This study disseminated the following research outputs and activities to appropriate research outputs system (ROS) and institutions. Table 3.1 presents the research outputs and activities from this study.

Table 3.1 Research Output

System Category	Description	How to record
Public Forum Presentations	Think-tank forum that influence public policies in Kenya.	Public expenditure policy briefs
Research Publications	Full peer reviewed journal articles	Scholarly journal name, volume, and number
Conference Papers	Abstract for research paper	Published conference book of abstracts
Proposed Model	This study proposes a two-way relationship model.	Ability of the model to produce expenditure aware recommendations
Thesis	PhD Thesis	PhD Degree in Economics

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents findings from the data that was analysed. It is divided into two sections. The first section presents descriptive findings of the variables such as the summary statistics and correlation matrix results. Descriptive statistics summary is used to describe the trends of the target variables. Secondly, it presents panel unit root test results, panel co integration results and panel Granger causality findings using panel autoregressive distributed lag (ARDL) approach to co-integration to establish whether the variables have a long-run relationship.

4.2 Descriptive Analysis

Descriptive statistics summary for all the study variables were obtained to present the basic characteristics of the panel data employed in this study.

4.2.1 Descriptive Statistics for Key Study Growth Variables

Descriptive statistics summary of economic growth (real Gross County Product per capita) and explanatory variables are used to describe the trends of the target variables under study. The study used central tendency such as mean and the measures of variability included minimum, maximum, standard deviation, kurtosis and skewness. The skewness test shows whether the distribution is concentrated to a central value (symmetric) or has long tails (asymmetric). The test for peakness (Kurtosis) indicates how the distribution is peaked relative to normal distribution. The summary of the descriptive statistics of the main target variables under study are presented in Table 4.1.

Table 4.1 Descriptive Statistics Results of GCP and Growth Variables

Variable	Observations	Mean	Standard Deviation	Min	Max	Skewness	Kurtosis
$ln\ y$	235	4.805	0.172	4.413	5.327	0.604	0.563
$ln\ cg$	235	2.647	1.090	-0.658	3.806	-1.595	1.323
$ln\ rg$	235	3.275	0.532	1.288	4.324	-1.234	0.970
$ln\ ng$	235	3.245	0.305	2.479	4.225	0.736	1.043
$ln\ ag$	235	1.865	0.100	1.236	2.022	-2.454	9.648
$ln\ cr$	235	3.476	0.464	2.124	4.912	-0.002	0.771
$ln\ hc$	235	5.338	0.307	4.512	5.859	-0.786	0.156
$ln\ tc$	235	3.078	0.327	1.964	3.966	-0.120	0.252
$ln\ ec$	235	7.595	0.645	6.424	9.402	0.524	-0.107

***Notes**: all the absolute values of the independent and dependent variables are expressed in natural log (ln) model so as to allow for regression coefficients to be treated as elasticities.* $ln\ y$ *- real per capita Gross County Product (GCP) (proxy for county economic growth),* $ln\ cg$ *- County government capital expenditure,* $ln\ rg$*- County government recurrent expenditure,* $ln\ ng$ *- County government non-devolved expenditure,* $ln\ ag$ *- Absorption rate of County government expenditure,* $ln\ hc$ *- County Human capital,* $ln\ cr$ *- County Corruption rate,* $ln\ tc$ *- County Total Crime rate,* $ln\ ec$*- Electricity Consumption.*

The panel data result presented in Table 4.1 indicates that on average from 2013 to 2017, each county unit spent 2.647 of county capital expenditure per year, with a range of between -0.658 and 3.806. The descriptive summary also reveals that the share of devolved recurrent expenditure ranges from 1.288 to 4.324 with a mean of 3.275 per year. This observation implies that on average the proportion of recurrent expenditure consumed by the 47 counties was higher compared to the capital spending. This can be justified since most of devolved functions were on recurrent budget like health services, education sector activities and general county administration. However, the capital expenditure allocation in most counties was below the legal requirement of at least 30 per cent development spending (GoK, 2010; IMF, 2016; OCOB, 2019). This could be attributed to a lag between capital budgeting, disbursement and actual spending. For instance, in financial year (FY) 2013/2014, capital

expenditure execution averaged only at 35 per cent of the total approved capital budget (OCOB, 2015). In addition, the 2017/2018 fiscal data reveal that most counties allocated minimal funds towards development expenditure, where only few counties allocated one-third of their budget to investment budget (OCOB, 2018). This poor allocation of funds in county infrastructure development may slow long-run county economic expansion (Mutie, 2014). On the side of county economic growth, the share of per capita GCP growth in counties averaged 4.805 per year with a range from 4.413 to 5.327 over the review period. This observation implies that during the study period, 2013-2017, county economic growth was positive although varied between 47 counties. The main source of volatility was exogenous factors (fluctuating export commodity prices) and domestic (general election cycle) shocks (World Bank, 2016; GoK, 2017). As may be expected, this indicates large disparities in the size of GCP per capita across the 47 counties. There are significant differences in the size of local economy across the 47 devolved governments (KIPPRA, 2016; GoK, 2019). Nonetheless, many of the counties with a small share to real GCP are growing at a faster rate, signifying potential for catch-up but also due to the base effect (KNBS, 2019). On average, only Elgeyo Marakwet County documented a double-digit growth during 2013 to 2017 period (KNBS, 2019). This was attributed to improved agricultural and livestock activities in Elgeyo Marakwet region (GoK, 2019).

Other descriptive findings, from Table 4.1, are that investment and consumption county government budget have relatively larger variation compared to the other variables in the panel specification framework. For instance, the county capital spending ranges between -0.658 and 3.806, while recurrent spending ranges between 1.288 and 4.324. This may indicate that county capital and recurrent expenditure may be volatile in counties. As they are determined by the budget allocation as specified by several macroeconomic factors, county responsibilities, local revenue, intergovernmental transfers and grants from the central government. Economic Growth was volatile across the 47 counties during 2013 to 2017. This volatility may potentially be attributed to domestic shocks such as political instability and drought effect on agriculture (World Bank, 2016). The share of GCP growth in counties ranges from 4.413 to 5.327 with an average of 4.805 over the review period. The positive but volatile GCP growth since 2013 will translate to rapid poverty reduction. The wide range among the minimum and the maximum values for the most variables indicates a large heterogeneity across the devolved units. The county absorption rate of expenditure, on the other hand, has the smallest variation among the variables. The share of absorption rate of

spending in devolved units' ranges from 1.236 to 2.022 with a mean of 1.865 over the study period. This may infer that development outside the economy has not had any significant influence on the local economy. This can also be attributed to stable average absorption rate of aggregate expenditure experienced in 47 counties (KIPPRA, 2016; GoK, 2018). These overall improvements are conjecturally attributed to the effectiveness of OCOB's oversight role and other factors such as legal requirement of at least 30 per cent development spending (OCOB, 2015). For instance, budget execution had minimal change during the study period from 79.1 per cent in 2014/15 to 79.9 per cent in 2016/17 (KIPPRA, 2016; OCOB, 2017). The narrow range among the minimum and the maximum values for the absorption expenditure element specifies a small heterogeneity across the 47 counties. More so, high and stable execution of county budget might convey economic stability in Kenyan counties.

Table 4.1 shows that, the study has used 235 observations. Thus, this study used a maximum of 235 observations in panel regressions model to avoid the possible analysis problem of different sample sizes in this relatively small sample (Mo, 2001; Vidyattama, 2010). County capital expenditure has large standard deviation among all the target variables, which suggests that devolved capital expenditure is highly volatile as compared to other target variables. The standard deviation for all the target variables which is the standard summary statistics for disparities over time indicates sufficient variable variant over time and across the panel backing regression analysis. The results show that county capital spending starts from negative to positive. Other target variables start from positive. The negative sign for capital spending is attributed to the decline in its growth especially in the beginning of devolution where the investment expenditure was less than 1 per cent in most counties. This situation is different from capital expenditure variable whereby between 2013 and 2017 the devolved recurrent expenditure was more than 1 percent of the aggregate devolved government expenditure (OCOB, 2017).

Skewness is the tilt in the distribution and should be within -3 and +3 range for normally distributed series. As presented in Table 4.1, all the target variables fall within this range indicating they are normally distributed. The panel data series also exhibited a negative skewness for all the variables except GCP per capita, electricity energy consumption and non-devolved expenditure. This means that more observations were concentrated on the left hand side of the average. Negatively skewed distributions have a long left tail, which can mean a greater chance of extremely negative outcomes from the variables of this study. Since the peak of the distributed data was right of the average value, that would mean that the target

variables experienced data with more than the average value. Extreme negative or positive skewness implies that the local economy can experience extreme returns (either positive or negative per capita GCP growth) due to change in explanatory variables.

Kurtosis accounts for the relative peakedness or flatness of the distribution relative to normal distribution. The normal distribution has a kurtosis of 3. If this kurtosis statistic equals three and the skewness is zero, the distribution is normal. The series has a kurtosis of less than three for all the target variables except county absorption rate of expenditure and this means that their distribution has values that are widely spread around the mean and the probability for extreme values is less than that of a normal distribution. However, the absorption rate of devolved expenditure has a kurtosis of greater than three which indicate that the distribution has values concentrated around the mean and thicker tails hence a high possibility for extreme values. A Kurtosis of greater than 3 on absorption rate can be justified since all counties experienced above 60 per cent absorption rate of expenditure rate during the period under review (OCOB, 2016). According to county budget report for 2013/14, counties on aggregate spent 63 per cent of all the budgeted money (OCOB, 2014; World Bank, 2014). A high kurtosis of the absorption rate of devolved expenditure implies that the counties will experience occasional extreme returns (either positive or negative county GDP growth). More so, economic activity is often tied to budget execution, failure to spend budgeted funds directly affects the rate at which the local economy grows. Less volatile and high absorption growth rate impacts the consumption rate, production activities and accelerates local GCP growth in long-term.

4.2.2 Correlation Matrix of GCP per capita and Growth Variables

In this study, Pearson Correlation (r), the most commonly used bivariate correlation technique, was conducted to examine the strength and direction of the relationship between the target variables. The correlation matrix results are presented in Table 4.2.

Table 4.2 Correlation Matrix Results

	$ln\ y$	$ln\ cg$	$ln\ rg$	$ln\ ng$	$ln\ ar$	$ln\ cr$	$\ln ec$	$ln\ hc$	$ln\ tc$
$ln\ y$	1								
P value	-								
$ln\ cg$	0.035	1							
P value	0.5890	-							
$ln\ rg$	0.248***	0.82***	1						
P value	0.0001	0.0000	-						
$ln\ ng$	-0.058	0.031	-0.166**	1					
P value	0.3757	0.6372	0.0111	-					
$ln\ ag$	0.054	0.47***	0.42***	0.001	1				
P value	0.4130	0.0000	0.0000	0.9950	-				
$ln\ cr$	0.127*	0.071	0.102	-0.088	0.120*	1			
P value	0.0527	0.2760	0.1193	0.1767	0.0668	-			
$\ln ec$	0.635***	0.096	0.34***	-0.56***	0.074	0.034	1		
P value	0.0000	0.1407	0.0000	0.0000	0.2575	0.603	-		
$ln\ hc$	0.213***	0.19***	0.42***	-0.61***	0.16**	0.004	0.612***	1	
P value	0.0010	0.0030	0.0000	0.0000	0.0149	0.950	0.0000	-	
$ln\ tc$	-0.47***	0.095	0.35***	-0.59***	0.080	0.040	0.771***	0.739***	1
P value	0.0000	0.1472	0.0000	0.0000	0.2228	0.539	0.0000	0.0000	-

Notes*: *** indicates significant at 1 per cent, ** indicates significant at 5 per cent, * indicates significant at 10 per cent.* $ln\ y$ *- real per capita Gross County Product (GCP) (proxy for county economic growth),* $ln\ cg$ *- County government capital expenditure,* $ln\ rg$*- County government recurrent expenditure,* $ln\ ng$ *- County government non-devolved expenditure,* $ln\ ag$ *- Absorption rate of County government expenditure,* $ln\ hc$ *- County Human capital,* $ln\ cr$ *- County Corruption rate,* $ln\ tc$ *- County Total Crime rate,* $\ln ec$*- Electricity Consumption.*

The correlation matrix Table 4.2 gives the associations between study variables at conventional significance level. The strength of the association is based on the Pearson correlation coefficient, *r*, can take a range of values from +1 to -1. A value of zero (0) will imply that study variables have no association among themselves. A value greater than 0 will

depict a positive relation; that is, as the value of one study variable increases, so does the value of the other variable. A value less than 0 signify a negative correlation between the target variables.

The correlation coefficient between county economic growth and recurrent expenditure was positive and statistically significant at 5 per cent level. This implies that devolved government consumption spending contribute positively to GCP per capita growth by improving purchasing power of the population in the county economy. The correlation coefficient between real GCP per capita and electricity power use was positive and significant at 5 per cent. The positive relationship suggests increase in consumption of electricity power will accelerate rate of economic growth through increased production (agriculture and manufacturing) activities in the county economy (Hammed, 2016). As real energy prices decreases, the cost of doing private business in local economy reduces, thus accelerating economic activities in full business cycle. Correlation coefficient of Human capital and GCP was positive and significant at 5 per cent level. Local workers with more education tend to have higher remunerations, which then increases economic growth through improved saving, spending and worker productivity. In addition, from the findings the relation between coefficient of county investment spending and economic growth was insignificant at any conventional level. Usually, the county investment budget disbursed relative to consumption budget is insignificant and may not have been enough to have a positive and potential significant association with county economic performance (OCOB, 2014).

From the Table 4.2, findings show a fairly high correlation coefficient (-0.467) between GCP per capita and crime rate which is negative and significant at 5 per cent level. The negative correlation of county crime can translate to reduced economic activities, which will hamper creation and maintenance of well-developed and functioning local economic system and in the end discourage domestic private investment. Further, findings show county corruption has a relatively low insignificant correlation coefficient (0.127). This is an indication that corruption may not have any significant relation with county economic performance in Kenya at 5 per cent level. This may be attributed to under reporting of corruption cases to the Ethics and Anti-Corruption Commission (EACC) by Kenyans. Generally, most of the target variables revealed a value less than 0.5 relation index which suggests a low probability of the problem of multicollinearity in the study panel data set.

4.3 Panel Unit Root Tests

To elude spurious results, stationary time series in target data is essential. Panel data unit root test was applied to rule out the presence of non-stationary time series, common unit root or individual unit root. Panel Harris–Tzavalis (HT) unit root test was conducted in this study. This test is appropriate for panel data set with small sample size like in the current study and it allows for heterogeneous serially correlated errors (Harris & Tzavalis, 1999; Alemayehu *et al*., 2012). The major weakness of the Levin-Lin-Chu (LLC, 2002) test is the assumption of homogeneity that each individual specific mechanism is similar across all cross-sectional units of the data set (Ivanov & Lutz, 2005; Alemayehu *et al.*, 2012). From econometric literature this assumption, homogeneity, disputes issues of devolved unit interdependence since each county unit is supposed to affect and be influenced by another county (Gujarati, 2004; Alemayehu *et al.*, 2012). In contrast, the Harris–Tzavalis test permits each individual specific mechanism in each cross section to differ (Harris & Tzavalis, 1999).

Accordingly, Harris and Tzavalis (1999) test was applied at level and at first difference and result reported in Table 4.3. While applying the panel Harris–Tzavalis (HT) test, the study picked the lag length on the augmentation term based on whether the exclusion of lagged term causes serial correlation in the panel test equation's error term.

Table 4.3 Results of the Panel Unit Root Tests Using HT

Variable	Statistic	Z	P-Value	Variable	Statistic	Z	P-Value	Order of I
$ln\ y$	0.5352	0.495	0.6896	$\Delta ln\ y$	-0.676	-12.8***	0.0000	I(1)
$ln\ cg$	0.1754	-4.6***	0.0000					I(0)
$ln\ rg$	0.1627	-4.8***	0.0000					I(0)
$ln\ ng$	0.4469	-0.747	0.2276	$\Delta ln\ ng$	-0.094	-5.9***	0.0000	I(1)
$ln\ ag$	0.1697	-4.7***	0.0000					I(0)
$ln\ cr$	-0.3738	-12.3***	0.0000					I(0)
$\ln ec$	0.1999	-4.2***	0.0000					I(0)
$ln\ hc$	0.6827	-2.570	0.9949	$\Delta ln\ hc$	-0.458	-10.2***	0.0000	I(1)
$ln\ tc$	0.2110	-4.1***	0.0000					I(0)

Notes: *The null hypothesis is that the series is non-stationary or the series has a unit root. Indicates *** 1% significance level, ** 5% significance level and *10% significance level,* Δ *element indicates that the first difference of the variable was take, order of I-integration.* $ln\ y$ *- real per Capita Gross County Product (GCP) (Proxy for county economic growth),* $ln\ cg$ *- County government capital expenditure,* $ln\ rg$*- County government recurrent expenditure,* $ln\ ng$ *- County government non-devolved expenditure,* $ln\ ag$ *- Absorption rate of County government expenditure,* $ln\ hc$ *- County Human capital,* $ln\ cr$ *- County Corruption rate,* $ln\ tc$ *- County Total Crime rate,* $ln\ ec$*- Electricity Consumption.*

The results in Table 4.3 indicate that all the target variables are stationary at their level except per capita GCP, human capital and non-devolved county expenditure at 5 per cent level of significance. Thus the null hypothesis of non-stationary for all cannot be rejected and hence the panel series contains a unit root. But, they become stationary after the first difference implying that the variables are integrated of order one, I (1). Though, differencing of a non-stationary series solves the problem of spurious regression results, it leads to a loss of important information about long-run properties of the target variables. However, the main strength of ECM, which is obtained from panel ARDL by linear transformation, it retains both short-run and long-run information.

4.4 Panel Co integration Tests

The econometric theoretical argument of panel co-integration estimation is that even if individual variable is non-stationary, the group of variables may drift together. This implies that a linear combination of more than one variable to be stationary, even if are not individually. Thus the justification here is to check for the absence of co integration by establishing whether long-run relationship exists for individual panel variables or for the panel as a whole (Gujarati, 2004; Narayan, 2004; Narayan & Smyth, 2005). In this study, ARDL F-bounds test for panel co integration was conducted and the result for co integration analysis between real GCP per capita and the study regressors is presented in Table 4.4.

Table 4.4 F-Bounds Test Results for Panel Co integration Relationship

Test Statistics	Value	Lag	Significance Level	Bounds Critical values	
F-Statistics	8.214380**	4		I(0)	I(1)
			1%	2.45	3.79
K	8		5%	1.91	3.11
			10%	1.66	2.79

***Notes**: Null hypothesis: No level relationship, indicates *** 1% significance level, ** 5% significance level, and * 10% significance level. The lag length 4 was selected based on the AIC. Critical values were obtained from Narayan (2004) case II, restricted trend intercept and number trend for 47 observations, pp 26-28. The number of regressors is 8.*

From the result in Table 4.4 the computed F-statistic of the model was 8.21 which is higher than the upper bound critical value (3.11) at 5 per cent level of significance. This implies that there exists a long-run relationship among the real Gross County Product per capita and regressors in the panel regression model.

As a further robustness check, this study re-estimated co integration using the panel Kao (Kao & Chiang, 2001) test which is superior to other panel co integration tests, since is founded on the Engle-Granger two-step mechanism, and assumes homogeneity on the variables in the panel. Table 4.5 presents the Kao residual panel co integration results which confirm a long-run relationship among real GCP per capital and explanatory variables in the panel estimation model.

Table 4.5 Kao Residual Panel Co integration Test Results

	t- statistic	P- Value
ADF	-3.064099***	0.0011
Residual Variance	0.000419	
HAC variance	0.000306	

***Notes:** The null hypothesis is that No co integration, indicates *** 1% significance level, ** 5% significance level and * 10% significance level.*

In the case of Kao residual panel co integration test, from the result in Table 4.5, all the statics are statistically significant at 5 per cent level, confirming the presence of long-run relationship between the target variables.

4.5 Long-Run and Short-Run Panel ARDL Model Analysis

To determine the long-term elasticities, this study employed the panel ARDL specification technique (Pesaran *et al.*, 2001). The main strength of panel ARDL test is that it is more robust and performs better for small sample size like in this study. Basically the panel ARDL method involved testing of the long-run relationships between the members under consideration by the use of F-statistic (Ivanov & Lutz, 2005; Narayan & Smyth, 2005; Hassler & Wolters, 2006).

After analyzing the long-run co-integrating model, the study proceeded to model the short-run dynamic parameters within the panel ARDL framework model (Hassler & Wolters, 2006). The importance in differentiating these two effects arises for the three motives. First, the impact as a result of fiscal policy action takes time. Second, they can have contradictory effects on local growth variable. Finally, the coefficients of the effect can differ in magnitude and size.

4.6 Regression Results of the Long-run Panel ARDL Framework

Following the confirmation of long-run panel cointegration relation between the explanatory variables and real GCP per capita growth, this study estimated the long-run coefficients of panel ARDL (1, 0, 1, 0, 3, 0, 1, 1, 1) chosen based on the Akaike Information Criterion (AIC). Both ARDL- Akaike Information Criterion (AIC) and the ARDL-Schwarz Bayesian Criterion (SBC) analysis performs better in small sample data sets. However, ARDL-AIC performs slightly better in a number of the observations which implies that ARDL-AIC is a consistent model selection criterion while ARDL-SBC is not. This implied that in a small-sample case and annual nature as it is with this study, the ARDL-AIC should be selected in comparison to other panel estimation criterion because it often gives a more parsimonious specification. In addition, the optimal lag length (1, 0, 1, 0, 3, 0, 1, 1, 1) was determined so that to shun serial correlation between error terms and to support the reliability and validity of the findings.

4.6.1 Long-Run Effect of Government Recurrent Expenditure on Economic Growth

The panel regression analysis was conducted to capture the effect of county government recurrent expenditure on county economic growth. This panel ARDL regression estimation is meant to achieve objective one of this study. Table 4.6 presents the result on effect of county government recurrent expenditure ($ln\ rg$) on county economic growth in the long-run.

Table 4.6 Long-Run Regression Results Based on AIC-ARDL (0, 1, 0, 1, 0, 1, 1, 3)

Variable	Coefficient	Standard error	t- Statistics	P-value
$ln\ rg$	0.199515***	0.070196	2.842272	0.0049
$ln\ cg$	0.071553	0.092460	0.773876	0.4399
$ln\ ag$	0.443697**	0.188628	2.352237	0.0196
$ln\ ng$	0.381221***	0.053286	7.154250	0.0000
$ln\ ec$	0.184176***	0.044249	4.162305	0.0000
$ln\ tc$	-0.161680**	0.071938	-2.247493	0.0256
$ln\ hc$	0.168296*	0.088961	1.891799	0.0598
$ln\ cr$	0.300932***	0.064302	4.679937	0.0000
$Cons$	0.312010	0.464699	0.671424	0.5028
LM Test	F(4,212) = 0.990024		Prob > F = 0.4139	
Breusch - Pagan Test	F(16,215) = 13.14***		Prob > F = 0.0000	
Pesaran CD	(z) = -1.38348		Pr = 0.1665	
Ramsey-Reset Test	F(1,215) = 0.291460		Pr = 0.5898	
Goodness of Fit Test	F statistics = 83.59***		P-value(F) = 0.0000	
	R^2 = 0.88137		Adjusted R^2 = 0.87313	

*Notes: *** indicates significant at 1 per cent, ** indicates significant at 5 per cent, * indicates significant at 10 per cent.* $ln\ y$ *- real per Capita Gross County Product (GCP) (Proxy for county economic growth),* $ln\ cg$ *- County government capital expenditure,* $ln\ rg$*- County government recurrent expenditure,* $ln\ ng$ *- County government non-devolved expenditure,* $ln\ ag$ *- Absorption rate of County government expenditure,* $ln\ hc$ *- County*

Human capital, $ln\ cr$ *- County Corruption rate,* $ln\ tc$ *- County Total Crime rate,* $ln\ ec$*-Electricity Consumption.*

The individual panel ARDL result revealed that the effect of county recurrent expenditure on economic growth is positive and statistically significant in long-run. Since the result is significant at 5 per cent level of significance, null hypothesis is rejected at 5 per cent level of significance. Specifically, 1 percentage point increase in devolved recurrent spending would cause an increase in real GCP per capita by 0.20 percentage point in Kenyan counties. This is attributed to the ability of county recurrent spending to improve the purchasing power of the population in the local economy. The result confirmed the fact that there could be productive county consumption spending as there could be productive investment spending in the long-run. Further, most functions of counties are on recurrent spending like health, education and pre-primary service. County recurrent budget on health and education services, for example, has the likelihood of inspiring and growing workers' productivity and thus county growth in long-run (Kweka & Morrissey, 2000; Gisore *et al.,* 2014). Furthermore, the significant relationship in counties can be attributed to high recurrent budget allocation. For example, the approved budget allocation on recurrent and development spending was 62.0 per cent and 38.0 per cent, respectively, in 2014/2015 (OCOB, 2015). In addition, Kenya's private consumption expenditure recorded the highest growth since 2013, of 7 per cent in 2017, accelerating further GCP growth (GoK, 2018; KNBS, 2019). The influence of the recurrent spending will be long-term if the economy is exposed to persistent underemployment like Kenyan counties case.

The result is consistent with other studies (Kweka & Morrissey, 2000; Mudaki & Masaviru, 2012; Akpan, 2013; Gebreegziabher, 2018) on positive effect of recurrent expenditure on economic growth in long-run. For instance, Gebreegziabher (2018) established that in the long-term, the effect of increased government consumption spending has a positive and significant effect on the expansion of Ethiopian economy. The expansionary recurrent county government spending, as argued in economic literature, can stimulate growth of the output through expenditure multiplier in long-run until resources are fully employed in Kenyan counties.

In contrast, Obben (2013), Mutie (2014), Hammed (2016), Maingi (2017) and Oguso (2017) found a negative relationship between recurrent expenditure and economic growth. For instance, Oguso (2017) argued that a rise in share of recurrent expenditure in sectoral

economy has a significant negative influence in the long-run economic growth in Kenya. Implying, an increase in recurrent spending is likely to cut growth rate given that in order to fund them, higher taxes must be introduced which will negatively impact the investment decisions by the private sector and thus on economic progression in long-term. This slows down economic activities in the short-term and shrinks private and public capital accumulation in long-term. However, other studies (Lin, 1994; Muguro, 2017) reported insignificant result in the long-run. For example, Muguro (2017) determined that in the long-run the effect of consumption expenditure on economic growth is insignificant in Kenya. In addition, Lin (1994) obtained diverse findings, that is, recurrent public spending is insignificant in advanced countries, but influences positively growth in underdeveloped nations.

4.6.2 Long-Run Effect of County Capital Expenditure on Economic Growth

Table 4.6 reports the result of the panel regression analysis on the effect of county Capital government expenditure (ln cg) on county economic growth in the long-run. This panel ARDL regression analysis was meant to achieve objective two of this study.

From the results in Table 4.6, the effect of county capital expenditure on real GCP growth was positive but insignificant at any conventional level of significance in long-run. Since the result is insignificant at 5 per cent level of significance, null hypothesis is accepted at 5 per cent level of significance. The result generally revealed that devolved capital expenditure did not have substantial effect on economic growth in 47 counties during the period under review. This can be justified since most of devolved responsibilities were on recurrent budget like health services, education sectors and general administration. Usually, there is always a delay between capital budgeting, disbursement and actual execution in counties. Most often, the actual capital amount disbursed relative to recurrent expenditure is very small and may not have been enough to have a substantial effect and expected positive influence on county GDP growth (OCOB, 2016). In addition, low budget execution rate on capital expenditure and the underdeveloped state of physical infrastructural may hinder country private investment in lower tier of government (OCOB, 2017; GoK, 2018). Such a weak infrastructural base, late disbursement, poor absorption rate, corruption, and over reliance on conditional grants and fiscal transfers from the central government to fund their bills could have accounted for the insignificant effect between capital spending and GCP growth in counties, 2013-2017.

For instance, most counties under spent in financial year 2013/2014, arriving at an aggregate absorption rate of 63 per cent, with consumption spending averaging at 80 per cent of the approved budget, while capital expenditure was executed only at 35 per cent of total allocated budget (OCOB, 2015) indicating that many of its development programmes were not implemented by the end of budget cycle. More so, the completeness of the initiated development projects is key for full county investment productivity. Most of physical infrastructure investments are generally long-run initiative for growth. Its conclusion entails availability of stable public investment budget for a long period. If insufficient budget is allocated to the county public infrastructure, it will be a waste of resource, and therefore will have insignificant influence on expansion in the long-run (Hammed, 2016). A good case of wastage of public resources is incomplete investment projects. This will not lead to local economic growth but crowding out private investment and thus retard overall country economic expansion in long-run.

In addition, the local private sector is not developed enough to be able to internalize all the advantages associated with well-developed county public infrastructure (Ihugba, 2014). Wahab (2011) and Ihugba (2014) observed that public expenditure is only beneficial at margin whereby extra county expenditure past margin will become fruitless. Wahab (2011) established that contribution of capital expenditure on growth turns insignificant or diminish once capital spending exceeds its trend-growth. Further, Ihugba (2014) stated that public expenditure turns into unproductive when the law of diminishing return arises and additional surge of county budget. Capital expenditure remains insignificant at county level for dynamics such as poor planning and budget making process, late disbursement and budgeting of capital funds, corruption and mismanagement of funds; these derails Kenyan counties from meeting economic achievement to the fullest (Muguro, 2017; OCOB, 2017).

The above finding is consistent with the results of other studies like, Nanjala (2015) and Muguro (2017), which point to insignificant relationship in Kenya in the long-run. In contrast, other studies, M'Amanja and Morrissey (2005), Wahab (2011), Oguso (2017) and Gebreegziabher (2018), established that a positive significant relationship exists in long-run. This type of public spending could be associated with the productive spending that Barro and Sala-i (2003) identified to be an extra factor to the growth production function. This county physical infrastructure, as explained in theoretical framework, is essential to grow productivity and to gear up the state for take-off into the middle stages of country economic advancement. County physical investment in key physical infrastructure is vital for capital

buildup in the county private sector for the long-run county economic attainment (Harrod, 1973; Barro, 1990; Romer, 2001). Further, other studies, Mutie (2014) and Maingi (2017), determined a long-term negative relation exist in Kenya between capital public spending and economic performance.

4.6.3 Long-Run Effect of Expenditure Absorption rate on Economic Growth

The finding on effect of county public expenditure absorption rate (ln ag) on county economic growth in the long-run is presented in Table 4.6. This panel ARDL regression estimation is meant to achieve objective three of this study.

The estimated coefficient of County expenditure absorption rate is positive and statistically significant in the long-run at 5 per cent significance level. Specifically, an increase in the absorption rate of expenditure by 1 per cent will prompt a 0.44 per cent increase in real GCP per capita in counties in the long-term. Since the finding is significant at 5 per cent level of significance, null hypothesis is rejected at 5 per cent level of significance. The significant relationship can be attributed to improved execution of budget in counties, over 65 per cent on average (OCOB, 2016), and thus increasing private capital accumulation and inducing further county growth. Further, this demonstrates that economic growth is often tied to public expenditure, that is, failure to spend county budgeted money directly affects the rate at which the county economy expands in the long-run. The Low absorption rate of spending adversely influences both the consumption activities and the production process in counties (Njeru, 2003).

County absorption rate of public expenditure is determined by a number of factors such as ability of National Treasury to disburse funds on time for sustained growth, corruption control and the political process involved. Late fund transfer will slow economic growth and increase macroeconomic instabilities in counties (Njeru, 2003). Low absorption rate of budget funds has been credited to a wide range of aspects, including failure by the National authority to transfer the equitable share of resource in time and Integrated Financial Management Information System (IFMIS) connectivity challenges in the Counties (OCOB, 2017; GOK, 2018). The net effect of the unfortunate scenario is that the government's war against diseases, poverty, illiteracy, insecurity, growth disparities and other macroeconomic instabilities will never be worn (Aiyar & Ruthbah, 2008). The Controller of budget paint an improved execution rate on county expenditure in most counties on 2014/2015 report (OCOB, 2015). These improvements are usually attributed to the effectiveness of OCOB's

oversight role and other factors such as legal requirement of at least 30 per cent investment spending. Furthermore, the interest of leaders being reelected may have incentivized the devolved units to devote more resources on infrastructure projects (OCOB, 2017). The findings are in agreement with Becker *et al.* (2012) study in Europe but contrast Claudia and Goyeau (2013) study in Europe and Ionica *et al*. (2017) study in Romania on role of fund utilization on economic growth.

4.6.4 Long-Run Effects of Control Variables on County Economic Growth

This study incorporated a number of control variables to explain the influence that other macroeconomic factors would have on county economic growth as reviewed by Vidyattama (2010). Regarding the control variables, non-devolved county spending, crime rate, electricity energy consumption, human capital development and corruption rate have significant coefficients at conventional level of significance.

From Table 4.6 findings, effect of non-devolved county government expenditure on real GCP per capita is positive and statistically significant at 5 per cent level, implying that the efficiency and effectiveness of national spending exceeded the adverse effect of higher taxes and transfer payment to fund local expenditure budget and thus accelerating growth and reducing income disparity. This implies that 1 per cent increase in non-devolved government spending will cause a 0.38 per cent rise in county economic activities in long-run. The advantages of increased non-devolved government spending include: the employment of fiscal policies like transfer payments and income taxes which can cause more equitable redistribution of resources in long-run; the supply of public goods and services by national government which may constitute a sizeable segment of county total citizens demand; and the role of national government as enabler in the county markets characterized with market failures. For financial year (FY) 2016/2017, non-devolved expenditure was KES.1959.6 billion in comparison to aggregate devolved expenditure of KES.319.1 billion (OCOB, 2017). Hence considering low allocation to counties, national government expenditure is a significant factor in stimulating county economic output in long-run through increased local private capital accumulation in the panel growth model.

The result is consistent with other studies (Yemek, 2005; Abu-Eideh, 2015; Lahirushan & Gunasekara, 2015; Kimaro *et al.*, 2017) conclusion that non-devolved expenditure accelerates economic expansion in long-run. For instance, Lahirushan and Gunasekara (2015) concluded that in long-term a beneficial effect exists between national public expenditure and GDP

growth in the Asian region. In contrast, other panel studies like Folster and Henrekson (2001), Dar and Khalkhali (2002) and Ezcurra and Rodríguez-Pose (2010) showed negative relation exists between public spending and overall GDP progress in long-run.

Table 4.6 shows that, the coefficient of human capital is positive and significant at the 10 per cent level. Since county human capital is significant at 10 per cent level of significance, null hypothesis is rejected at 10 per cent level of significance. From the finding, it implies a 1 per cent rise in human capital will translate to a 0.17 per cent increase in economic growth in long-run. This result can be attributed to increase in county and national government education sector allocations, leading to increase in productivity for private factors of production and the accumulation of physical and human capital (skilled), thus inducing economic growth (Appleton & Teal, 1998; Fournier & Johansson, 2016). In addition, the government of Kenya offers primary and secondary education to population at no cost or at subsidised level. Hence increase in overall enrollment in schooling as a result of subsidised secondary education and free primary education, thus improving county human capital development (GoK, 2015; KIPPRA, 2016).

The result supports the endogenous economic growth theory which postulates that productivity growth depends on the development of human capital at local and national level. The theory attributes human capital improvement to the significance of schooling in increasing labour force productivity, and efficiency of labour through increasing cognitive stock or capability. Human capital development explains economic growth through direct and indirect channels. First, human capital through labour as a factor is included in the private and public production function. In that case of capital accumulation, human capital stock would directly generate production output. Secondly, human capital indirectly will raise capital. In this way, the level of human capital affects overall local productivity growth (Cohen & Soto, 2007; Adawo, 2011).

The result is similar with the findings of Husnain *et al.* (2011), Gebrehiwot (2015), Kartal *et al.* (2017) and Gebreegziabher (2018) that the relation between human capital and economic growth is positive in long-run. For instance, Gebrehiwot (2015) argued that overall school enrollment is the key contributor to real economic progress in Ethiopia in the long-term. In contrast, Afzal *et al*. (2010) and Adawo (2011) found that that the relationship between schooling (primary, secondary and tertiary education) and economic growth is negative in the long-run. Adawo (2011) concluded that secondary school input and tertiary institutions

depressed growth in Nigeria in long-term. In addition, other studies, Kweka and Morrissey (2000), Cardenas (2007) and Gisore *et al*. (2014), concluded that the effect of human capital development and economic growth is indifferent. According to Kweka and Morrissey (2000) and Gisore *et al*. (2014), public budget on human capital development is indifferent in the regression growth model, since the influence of schooling (education) should have very long lags in East African countries. Cardenas (2007) observed human capital expansion affects capital productivity loss in Colombia but has no influence on the economic expansion.

Effect of electricity consumption on real GCP per capita is positively related and significant at 5 per cent level of significance in long-run. This means that 1 per cent growth in electric power consumption causes a 0.18 per cent rise in economic activities by county. Any expansion in electricity energy consumption is estimated to stimulate agriculture process and industrial activities at local and national level as an additional input in the production function. Further, economic growth expansion will also impact the demand for electricity power. Access to affordable electricity power is a prerequisite for continued growth and solution to poverty problems through increased production, consumption and output growth. Almost all investment and consumption activities in devolved units use electricity power (Odhiambo, 2010; Shaari *et al.*, 2012; Bayer, 2014; Wen-Cheng, 2016).

Empirical results support the findings, for example, Odularu and Okonkwo (2009), Odhiambo (2010), Shaari *et al.* (2012), Aslan (2014), Bayer (2014), Hammed (2016) and Wen-Cheng (2016) but Javid *et al.* (2013) contrasted the result. For instance, Shaari *et al.* (2012) examined the dynamic relation between economic growth and power consumption in Malaysia between 1991 and 2011. The results showed that economic growth in Malaysia depends on electricity consumption. Odhiambo (2010) investigated the dynamic relations between economic expansion and electricity use in Kenya for the period 1972 to 2006. The study showed that electricity power is vital for Kenya's future economic progress. Bayer (2014) determined the effect of electricity energy consumption on GDP growth of emerging nations for the period 1970 and 2011. The finding established that electricity energy consumption has a beneficial effect on the economic expansion in the whole panel data and specifically electric power demand has the smallest effect on GDP growth in Indonesia economy, while it had the significant effect in Hungary economy. However, Javid *et al.* (2013) examined the long-run effect of real GDP per capita and electricity consumption for Pakistan between 1971 and 2008 and the result was negative. This finding by Javid *et al.* (2013) can be justified. As real energy prices increase, the cost of doing business in local

economy increases, thus hampering economic activities in full business cycle (Javid *et al.*, 2013). That is attributed to reduction in production levels, increase unemployment rate, less local government revenue, increase in commodity prices as a result of employing alternative power sources to produce, and accordingly hampering economic activities in the devolved economy.

Corruption was significant and positive at 5 per cent level of significance in Kenyan counties. Specifically, the result indicates that 1 per cent rise in county corruption index in the long-run will lead to a 0.30 per cent surge in per capita economic growth. The result is against our prior expectation that corruption perceptions rate has significance and negative effect when linked to county economic growth. The result showed corruption may be a factor stimulating county economic growth in long-run. In contrast, EACC (2017) survey report listed corruption as one of the top three problem facing Kenya today after poverty and unemployment, thus contradicting this result. However, this result can be attributed to the data on the number of reported corruption cases to EACC, which under-estimate considering that not many bribe demand cases are actually reported annually in Kenya. Further, numerous studies (Mo, 2001; Pellegrini, 2011; Hanousek, & Kochanova, 2015) have proven that the negative and significant relationship between corruption and economic growth is likely to vanish when other macroeconomics specific variables are incorporated in the panel regression model (Pellegrini, 2011). Furthermore, Mo (2001) and Pellegrini (2011) argued that the effect of corruption on economic growth becomes positive or statistically insignificant after including human capital, trade openness, investment and political instability in the panel regression framework.

Some past studies postulate that corruption can help overcome bureaucracy, inefficiency and ineffective provision of public goods and services, stiff laws, specifically when nations' governance system and institutions are weak, corrupt and function poorly (Nguyen *et al*., 2017). For instance, Méon and Weill (2010) and Nguyen *et al*. (2017) argued that corruption has a beneficial effect on economic expansion through reducing barriers from bureaucracy and lack of transparency of the judicial system and, hence, increases the efficiency of an economy by removing obstacles to private sector investment and increasing county economic growth in long-run. Other studies support ambiguous effects of corruption on growth (Mo, 2001; Heckelman & Powell, 2010; Hanousek & Kocenda, 2011; Pellegrin, 2011; Hanousek, & Kochanova, 2015). For example, Hanousek and Kocenda (2011) explained that the effect (positive or negative) of corruption on private sector expansion and local economic growth,

entirely depend on the country and its institutions in place. A third stream (Nobuo *et al*., 2005; Choe *et al.,* 2013) argues that corruption negates local economic success. This is attributed to ineffective and inefficient private investment, rent seeking, high transaction cost and misallocation of domestic factors of production (Murphy *et al*., 1991; Nobuo *et al*., 2005; Choe *et al.,* 2013).

The results of the panel regression analysis support the hypothesis that crime rate has a 5 per cent significance level and negative effect on county economic growth. The result revealed that a 1 per cent rise in crime rate and violence result to 0.16 per cent decline in per capita Gross County Product (GCP) growth rate in long-term. The effect of increase in crime rate has a negative and significance influence on the county economy, which can obstruct private sector development and functioning of the overall local economy. The effects of crime on county private businesses can be particularly damaging because they can involve both short-run costs and long-run consequences for economic development, by diverting resources to crime prevention measures and otherwise discouraging private investment and thus slowing county economic growth in long-run (Cardenas, 2007). Specifically, there is a risk of a vicious circle, where violence plagued counties get insignificant productive investment and hence offer few beneficial employment opportunities. The lack of employment chances, in turn, could lead unemployed to engage in violent and criminal activities (Detotto & Pulina, 2009; McCollister *et al.*, 2010).

A number of empirical studies argue that total crime rate will influence negatively the economic progress of a country or region (Cardenas, 2007; McCollister *et al.*, 2010), whereas other conclude that the effect is unclear (Goulas & Zervoyianni, 2012) or even absent (Ray & Ishita, 2009). Crime rate influences human capital development both directly and indirectly by reducing both tangible and intangible welfare of individuals and the society as a whole (McCollister *et al*., 2010). In addition, Detotto and Pulina (2009) specifically highlighted that homicides, robbery, extortion and kidnapping have a strong adverse effect on aggregate economic growth.

The coefficient of determination (adjusted R^2) test is used to show the total variation of the dependent variable that can be explained by the explanatory variables. The adjusted R^2 is 0.87, which implied that 87 per cent of the variations in the dependent variable (real Gross County Product per capita) are explained by the changes in independent variables in the panel regression model within the period under review, which implies that the panel regression

model has a fairly good fit since it explains the largest variation of the dependent variable. This result is supported by the F-statistics which shows that it is statistically significance at 1 per cent. The results show that the regressors are statistically significant and different from zero at 1 per cent. The joint effect of these components of county government spending and control variables on per capita GCP growth is statistically significant as revealed by the calculated F-Statistic and its probability.

Before interpretation of the findings of the study panel model, different post estimation panel diagnostic tests were conducted. The objective was to identify the best panel regression technique and also authenticate the findings (Gujarati, 2004). It is a precondition that for a classical linear estimation the error term be normally distributed, with a constant variance and zero mean (Gujarati, 2004; Baltagi, 2008). This study used Breusch-Godfrey serial correlation LM test in panel data. From Table 4.6 result, the p-value was greater than 0.05 (0.4139), the study failed to reject the null hypothesis and concluded that the data set did not have first-order serial correlation. Breusch-Pagan test was conducted to test for heteroscedasticity, from above result the p-value was below 0.05 (0.000) and as such it was significant hence revealing that heteroscedasticity was a problem in the panel regression model. This study used panel robust standard error to correct it. Contemporaneous correlation was tested using Pesaran cross-sectional dependence (CD) test of independence. From the result cross-sectional dependence was not a problem, since 0.1665 was above the P value 0.05. Lastly, Ramsey reset result (0.5898 > 0.05) showed that the panel model was well specified and did not suffer from omitted variable at 5 per cent level of significance, this study failed to reject the null hypothesis of correct model specification. This indicated that this study panel functional form is correct.

4.7 Regression Results of the Short-run Panel ARDL Model

After the long-run co-integrating panel model has been estimated, the next step was to model the short-run dynamic parameters within the panel ARDL specification framework model. Here, the lagged value of all level variables (a linear combination is denoted by *CointEq*) was retained in the ARDL model (Hassler & Wolters, 2006). Before ARDL short-run estimation, the optimal lag length (1, 2, 0, 0, 3, 1, 1, 1,4) was chosen based on the Akaike Information Criterion (AIC) so that to shun serial correlation between error terms and to support the reliability of the results.

4.7.1 Short-Run Impact of County Recurrent Expenditure on Economic Growth

Consistent with the long-run results, the estimated short-run panel regression findings revealed similar conclusions, as presented in Table 4.7.

Table 4.7 Short-Run Regression Results Based on AIC-ARDL (1, 2, 0, 0, 3, 1, 1, 1, 4)

Variable	Coefficient	Standard error	t- Statistics	P-value
$\Delta ln\ rg$	0.040953**	0.015780	2.595308	0.0102
$\Delta ln\ cg$	0.000490	0.009827	0.049851	0.9603
$\Delta ln\ ag$	0.116742**	0.049062	2.379463	0.0183
$\Delta lnng$	0.116576***	0.033189	3.512520	0.0006
$\Delta ln\ cr$	-0.029637***	0.010583	-2.800470	0.0056
$\Delta ln\ hc$	0.112542***	0.024184	4.653604	0.0000
$\Delta ln\ ec$	0.187711***	0.013471	13.93495	0.0000
$\Delta ln\ tc$	-0.256716***	0.027281	-9.410220	0.0000
$\Delta ln\ y$	0.117091*	0.068099	1.719430	0.0873
ect_{t-1}	-0.244890***	0.027968	-8.756001	0.0000
$Cons$	0.312010***	0.051681	6.037182	0.0000
LM Test	F(2,213) = 0.76965		Prob > F = 0.4645	
Breusch - Pagan Test	F(17,214) = 10.04***		Prob > F = 0.0000	
Pesaran CD	(z) = -1.12439		Pr = 0.2608	
Ramsey-Reset Test	F(1,214) = 0.662835		Pr = 0.4165	
Goodness of Fit Test	**F statistics** = 29.89***		P-value(F) = 0.0000	
	R^2 = 0.675147		Adjusted R^2 = 0.664995	

Notes: **** indicates significant at 1 per cent, ** indicates significant at 5 per cent, * indicates significant at 10 per cent.* $ln\ y$ *- real per Capita Gross County Product (GCP) (Proxy for economic growth),* $ln\ cg$ *- County government capital expenditure,* $ln\ rg$*- County government recurrent expenditure,* $ln\ ng$ *- County government non-devolved expenditure,* $ln\ ag$ *- Absorption rate of County government expenditure,* $ln\ hc$ *- County Human capital,* $ln\ cr$ *- County Corruption rate,* $ln\ tc$ *- County Total Crime rate,* $ln\ ec$*-*

Electricity Consumption. Δ *- First difference operator,* ect_{t-1}*- representing the error - correction term.*

Table 4.7 presents the short-run regression findings of the impact of devolved recurrent spending on economic growth. In the short-run county recurrent government expenditure is positive and statistically significant at five per cent level of significance. This finding is consistent with the long-run result. Since the result is significant at 5 per cent level of significance, null hypothesis is rejected at 5 per cent level of significance. The result show that 1 per cent increase in devolved recurrent spending will lead to a 0.04 per cent increase in county economic growth in short-run. Since this result is contrary to conventional wisdom and economic theory, the study posits that the result should cautiously be interpreted as a special case for the 47 county government economies in the short-run, which are not only characterized by poor institutional quality and corruption but also with a very weak capital infrastructural base.

This finding can be attributed to a high recurrent allocation being experienced in most counties and hence increasing purchasing power of the local population in the short-term (OCOB, 2018). Higher recurrent expenditures of the devolved units stimulate demand for products, which in turn allows county producers to increase use of their productive capacities by hiring new capital and labor and thus grow output (Romer, 2001; Chen & Lee, 2005). The influence of the recurrent spending will be short-lasting, if there is no underemployment in county. However, the impact of higher county public spending on growth may continue only for a very short term since such growth in demand is artificial by the nature (has nothing mutual with stable changes in consumer's tastes and preferences and does not change level of total productivity in the economy) (Romer, 2001; Mitchell, 2005; Mutie, 2014).

With regard to recurrent expenditure, the result of this study is in agreement with the findings obtained by scholars like Ag'enor (2007), Mudaki and Masaviru (2012), Claudia and Goyeau (2013) and Gebreegziabher (2018). According to Keynes (1936) macroeconomic theory increase in county spending can positively contribute to economic growth by injecting purchasing power to the county citizens in the short-run (Keynes, 1936; Romer, 2001). Further, according to Barro (1990), county recurrent budget on county public sector such as education and health services is able to enhance county growth by expansion in local work force productivity. County consumption spending may positively impact county growth by its impact on publics' ability and willingness to work, consume, save and invest (Ag'enor,

2007). Contrasting studies by Mutie (2014), Maingi (2017) and Gupta (2018) found a negative relation between consumption spending and economic growth. For instance, Mutie (2014) OLS model regression results observed that decentralized recurrent finance contributed negatively to growth in Kenya. According to World Bank (2014) and IMF (2016) growing public recurrent budget is usually at the expense of public development spending or the private investment which in most cases causes crowding out effect and finally impedes GCP development in devolved units. In contrast, studies by Muguro (2017) and Oguso (2017) established that consumption spending has no substantial impact on economic performance in Kenya in the short-term.

4.7.2 Short-Run Impact of County Capital Expenditure on Economic Growth

From the result in Table 4.7, the impact of county capital expenditure on real GCP per capita is insignificant in the short-run. Since the result is insignificant at 5 per cent level of significance, null hypothesis is accepted at 5 per cent level of significance. This finding is consistent with the long-run result. The result generally reveal that capital expenditure did not contribute to economic expansion in devolved units during the study period. Capital budget is usually seen as expenditure creating future benefits, as there could be some intervals between when it is incurred and when it takes effect on the county economy. They are more discretionary and are made of new programs that are yet to reach their stage of completion (Ag'enor, 2007).

In addition, there is always a gap between county public investment initiation, budgeting, disbursement and actual spending. Usually, the actual capital amount budgeted relative to consumption budget is very small and may not be enough to have a positive and significant influence on county growth in short-term in Kenya. More so, poor infrastructural base, late disbursement, corruption and poor absorption rate explains the insignificant impact between county growth and capital spending in short-run. For example, the 2017/2018 fiscal data reveal that most counties allocated minimal funds towards capital spending, where only few counties allocated one-third of their budget to infrastructure development budget (OCOB, 2018).

County investment budget spending does not influence county growth in the short-run. So, they either did not impact output through increase in public investment or the positive impact of increased county infrastructure investment is offset by the adverse impact of increasing taxes. In order to finance investment budget, the counties reduce a certain amount of labour

and capital from the county private sector. Since a certain time passes before county investment programs becomes beneficial, in short-term county investment budget reduces private investment and thus impedes further county growth (Maingi, 2017). In short-term the dominant consequence of such a fiscal policy action is primarily a fall in county output of public goods and services. Withdraw of funds from county private sector generally arises in the sense that to complete county infrastructure investment program it is essential to make spending on a long-lasting basis. Hence, poorly developed county physical infrastructure may distort the local economy making it inefficient and ineffective. For instance, lack of well-developed roads in counties can cause vertical integration of the production process and inspire unproductive centralization system of governance (Hammed, 2016).

Increased public investment spending may crowd out domestic private investment, that is, increase in public expenditure reduces county growth given that in order to finance them higher taxes must be introduced which adversely affects investment decisions of local citizens and thus overall economic activities. This slows down economic activities in the short-term and dwindles capital accumulation in the long-term. More so, increase in taxes reduces purchasing power of the population, hence slowing demand for public commodities in the short-term (Bagaka, 2008).

Intuitively, public investment expenditure by the counties is expected to raise capital accumulation, which in turn will raise local economic activities in the short-term. However, the low development expenditure affects project plans such as roads, electricity transmission, power plant, communication, infrastructure and water (Hammed, 2016). Further, poorly developed roads and communication networks may distort the economic structure making it less effective and inefficient. In such case unproductive centralization may be favored. Wu *et al.* (2010) and Hanousek and Kocenda (2011) argued that developing economies, which are typically characterized by underdeveloped institutions, poor governance and corruption, would normally make public spending to be insignificant to overall county GDP growth.

Further, this might be as a result of the fact counties relied on conditional grants from the central authority and development partners to finance their budgets. As it is postulated by economic literature, such conditional grants might not contribute to substantial county GDP growth in comparison to unconditional grants (Bagaka, 2008; Mutie, 2014). For instance, in 2015/2016 in order to fund the public expenditure, devolved units were estimated to have received KES.21.9 billion as aggregate conditional grants from the national treasury and

donors, locally generated KES.57.66 billion from county sources, and KES.37.19 billion cash balance brought forward from the previous year (2014/15) (OCOB, 2015).

The above findings agree with the results of Muguro (2017) and Oguso (2017) that the impact of capital spending on economic expansion is insignificant in Kenya in the short-run. However, this finding contrasts other studies, Maingi (2017) and Gebreegziabher (2018) that positive relationships exist in short-run. Further, Wahab (2011) and Mutie (2014) found a negative impact between the target variables in the short-run.

4.7.3 Short-Run Impact of Absorption Rate of Expenditure on Economic Growth

From the result in Table 4.7, county expenditure absorption rate is positive and significant at 5 per cent level in short-run. This result is consistent with the long-run result. Specifically, an increase in the county absorption rate of expenditure by 1 per cent will cause a 0.12 per cent increase in real GCP per capita of counties in the short-run. Since the result is significant at 5 per cent level of significance, null hypothesis is rejected at 5 per cent level of significance. The significant relationship can be attributed to enhanced budget execution in counties, on average above 60 per cent (OCOB, 2018). Further, economic growth is often tied to budget execution, failure to spend budgeted money directly affects the rate at which the economy expands in the short-term. If budget fund utilization rate is lower there will be deterioration of the economy.

Low absorption of budget funds has been accredited to a wide range of factors, including failure by the National Treasury and National Assembly to disburse the equitable share of income to devolved units in time and thus slowing overall economic activities in Kenyan counties (Njeru, 2003; Aiyar & Ruthbah, 2008; GoK, 2015; OCOB, 2017). The finding illuminate with those of Becker *et al.* (2012) study in Europe but contrast Claudia and Goyeau (2013) study in Europe and Ionica *et al*. (2017) study in Romania on effect of fund utilization on overall economic growth. Specifically, Claudia and Goyeau (2013) concluded that the budget execution rate, both for rural economic development and cohesion allocation, has no influence on the short-run economic performance in Europe.

4.7.4 Short-Run Impacts of Control Variables on County Economic Growth

This study incorporated a number of control variables to account for the influence that other macroeconomic factors might have on county economic activities in the short-run.

Impact of county non-devolved government expenditure on real GCP per capita was positive and statistically significant at 5 per cent level. This demonstrates that 1 per cent increase in non-devolved budget will cause a 0.12 per cent increase in county economic performance in short-run. This result is in agreement with the long-run result. Hence considering low allocation to counties, national government expenditure is essential for county economic growth in short-run through increased county private capital accumulation. Non-devolved government expenditures increase local population purchasing power for public goods and services, which in turn permits suppliers to grow use of their productive capacities by engaging new labour and capital, and thus expanding supply in the county economy (Romer, 2001).

Empirical studies by Atsushi (2004), Yemek (2005), Wahab (2011), Abu-Eideh (2015) and Kimaro *et al.* (2017), revealed that non-devolved funds have significant positive relations with economic performance in short-term, hence supporting the findings of this study. In addition, Muguro (2017) found insignificant impact in Kenya in the short-run. However, the outcomes by other model estimation, Folster and Henrekson (2001), Dar and Khalkhali (2002) and Ezcurra and Rodríguez-Pose (2010), revealed that non-devolved funds have significant negative relations with economic growth in short-run. This is possible if state government has employed fiscal policy instrument excessively which causes increased borrowing or taxation to fund the national government budget, and this will affect negatively economic progress in the short-run. Wahab (2011) concluded that excessive use fiscal programs will turn negative once national spending exceeds its trend economic growth. Further, non-devolved public budget crowds-out private sector investment, that is, surge in county spending is likely to shrink GCP growth given that in order to fund them, higher taxes must be applied which have negative influence on private investment and thus slow long-run local economic growth. This slows down overall Gross County Product (GCP) surge in the short-term and shrinks capital buildup in long-run. Further, increase in taxes reduces purchasing power of the county citizens, hence slowing purchase for public commodities in the society in the short-run.

Impact of electricity energy consumption on GCP per capita is positively related and statistically significant at 5 per cent level of significance in short-run. This means that 1 per cent increase in electricity energy consumption translate to a 0.19 per cent rise in county growth. This finding is the same with the long-run result. An increase in electricity power use is estimated to cause economic growth and its shortage may cause a slowdown in the

development process. Access to inexpensive power is an essential to realizing local growth and poverty eradication in Kenyan counties. Almost all agricultural and manufacturing activities in county level use electricity power. Energy power provision can stimulate local economy positively. Especially, low real power prices reduce the cost of running private business, leading to a positive impact on per capita GCP in the short-term. Empirical result agrees with the findings of Odularu and Okonkwo (2009), Odhiambo (2010), Shaari *et al.* (2013), Aslan (2014) and Wen-Cheng (2016), but Javid *et al.* (2013) contrasted the empirical conclusion.

The coefficient of human capital is positive and significant at the 5 per cent level in the short-run. Null hypothesis is rejected at 5 per cent level of significance. From the finding, it implies a 1 per cent increase in human capital will lead to a 0.11 per cent increase in GCP growth in short-run. This result can be attributed to increase in net enrollment in secondary and primary school as a result of subsidised secondary education and free primary education in Kenya. According to macroeconomic thought, development of human capital grows labour force productivity, increases invention and innovations, accelerate returns to capital, and makes economic expansion to be sustainable, which in turn, support poverty reduction strategies in 47 counties. In addition, from microeconomics approach, schooling and learning increases the chances of getting employment opportunities in the labour industry and grows individual earning and consumption capacities (Cohen & Soto, 2007).

According to Mankiw *et al.* (1992), Solow model augmented with human capital and physical capital is more capable of describing GCP growth variations between counties, and mostly the counties are likely to converge at a rate predicted by the Solow growth framework model. The endogenous growth framework, however, hold investment in human capital and technology is an important contributor in county economic expansion. While other studies conclude that the output of labour at steady state depends on skilled human capital, innovation and invention capacities. Further, income per worker is influenced by the average schooling attainment of a worker. Furthermore, these studies assume that human capital development has non-diminishing returns; as it produces the stock of technology that accelerate county economic growth in short-run and long-term (Mankiw *et al.*, 1992; Islam, 1995; Romer, 2001).

This result is consistent with several studies such as Husnain *et al*. (2011), Gebrehiwot (2015), Kartal *et al*. (2017), Mohsin *et al.* (2017) and Gebreegziabher (2018) which argument

a positive link between target variables. Such findings are in agreement with the argument of endogenous growth models that an increase in human capital (skilled) stock grows productivity of workers (Cohen & Soto, 2007). However, Afzal *et al*. (2010) and Amir and Shahid (2012), argues that the impact of school education on economic growth is negative in the short-run. In contrast, Kweka and Morrissey (2000), Cardenas (2007), Adawo (2011) and Gisore (2017), found human capital to be insignificant. For instance, Adawo (2011) argued that in the short-term secondary school input has no major influence on economic growth. In addition, Rajkumar and Swaroop (2008), Wu *et al.* (2010) and Hanousek and Kocenda (2011) stated that public spending on schooling is less likely to lead to better outcomes if devolved units have poor governance structure and corruption, which is, on average, a characteristic of underdeveloped countries.

Corruption is negative and statistically significant at 5 per cent level in the short-run. The empirical result indicates that a 1 per cent increase in county corruption rate will lead to 0.03 per cent decline in county economic growth. This finding contrast with the long-run result. Thus, corruption hampers county economic growth by distorting other macroeconomic factors in devolved units in the short-run (Hanousek, & Kochanova, 2015). County corruption incidence can result in resource misallocation when decisions on how public funds will be invested, or which private sector businesses to be approved, are made by a corrupt county government authority (Choe *et al.*, 2013). For instance, Rodden (2004) observes that when the central government decentralizes resources to the lower tier governments, these resources are then allocated to individuals according to their preferences. Due to corruption, allocated county funds may not necessary reach their intended recipients or be used for the envisioned purpose and thus impeding county economic growth in short-run. There are several mechanisms, through which corruption hampers county economic success in short-term. They include reduced domestic investment, exaggerated government spending, distorted budget that favour allocation in less efficient public programs with more scope of corruption and manipulation while ignoring human capital and physical capital programs (Murphy *et al*., 1991).

In addition to backlog of cases, corruption incidence has contributed to lack of confidence in the Judiciary by the population. Corruption undermines local economic growth by distorting the rule of law and weakening institutional foundations and reforms in which county economic growth depends on (Murphy *et al.*, 1991; Rodden, 2004; Choe *et al.*, 2013; Hanousek, & Kochanova, 2015). The indirect influence of county bribe incidence on

economic growth is transmitted via its negative impact on local private business, human capital budget and physical infrastructure spending. Corruption tends to neglect education sector and health services in favor of county sectors where corruption is not easily detected. It also tends to increase the budget size but also reduces the productivity of local investment and that of the state (Choe *et al.*, 2013).

This result is similar to those of Murphy *et al*. (1991) and Choe *et al.* (2013) that corruption negatively affects economic performance in the local economy. Also, other studies reported ambiguous impacts of corruption (Mo, 2001; Nobuo *et al*., 2005; Hanousek & Kocenda, 2011; Pellagrin, 2011). For example, Nobuo *et al*. (2005) concluded that the impact of corruption on economic expansion is insignificant in USA. In contrast, Heckelman and Powell (2010) and Nguyen *et al*. (2017) point out corruption has a positive impact on growth by reducing obstacles from bureaucratic structure in place, and lack of transparency of the judiciary system.

County Crime rate is negative and significant at 5 per cent level of significance in relation to county economic growth. This implies that 1 per cent increase in county crime rate will result to 0.26 per cent decrease in county economic growth in the short-term. Crime increase imposes large costs to private and public sectors which have a negative impact on local private investment and GCP per capita in short-run. The impact of crime rate on private business involves both long-term and short-term costs. The most common short-run costs to local private business are protection and extortion costs (McCollister *et al.*, 2010). Extortion cost results when local industries pay an extortionist fee in order to reduce victimization by extortionist in counties. While for protection racket, firms pay some amount of money for protection from criminal behavior from other sources (Detotto & Pulina, 2009). A number of studies report that crime slows economic activities of a country or devolved unit (Cardenas, 2007; McCollister *et al.*, 2010), whereas other concludes that the impact is insignificant (Ray & Ishita, 2009; Goulas & Zervoyianni, 2012).

The short-run result also indicates that coefficient of previous real per capita Gross County Product (GCP) has a positive and statistically significant impact on present economic growth at 10 per cent. The finding shows that 1 per cent increase in previous real GCP per capita leads to 0.12 per cent increase in the present real GCP per capita. This means therefore that in the short-run previous county economic performance will have positive impact on current GCP expansion, the so called carry-over effect. The result highlights the significance of

understanding county growth dynamics in previous year and the outlook for present year. One of the most important drivers of enlarged carry-over effect of real GCP growth is increase in productivity accumulation in counties. Productivity will grow as a new process of production or technology is introduced and diffuse through the local economy. Also, human development will lead to labour force receiving better training and knowledge, this will make labour force to be more productive and accelerate future economic growth. In addition, increased budget on devolved infrastructure development like communication, roads, air and sea transport, and hydroelectric power will induce more productivity in the local economy. Developed local infrastructure investment will improve private investment productivity and, therefore, enhance future economic activities.

The constant in an estimation regression equation is the value of the dependent variable that the independent variables take on zero values. It is the autonomous rate of per capita GCP growth in short-run. It refers to economic growth which does not depend on any variable in the panel regression model. From the panel regression result, the constant is 0.31. This study rejects the null hypothesis and conclude that $ß_0$ is statistically significant at 5 per cent level of significance. This conforms to study expectation that county economic growth will be determined by other variables outside the panel regression framework model. From the finding it implies that some of those county macroeconomic variables, not considered in this study, will have a positive impact on county economic growth in short-run.

The estimated coefficient of the error correction term (ECT) has the appropriate negative sign (-0.24) and statistically significant at 1 per cent. However, ECT_{t-1} is quite low, that of -0.24, implying that equilibrium slowly converge to long-run equilibrium in counties. This implies the speed of adjustment is 0.24 per cent which is relatively low where 24 per cent of disequilibrium is corrected in the first year. The implication is that disequilibrium can persist for a long period of time, hence explaining the significance of the lagged effects on county GCP growth in Kenya. This means that disequilibrium can exist for a long period in 47 counties. A study carried in Kenya by Nanjala (2015) concluded that economic growth and government spending co-move towards long-run equilibrium in a slow speed. The speed of adjustment was estimated at 3.6 per cent after a short-run fluctuation in the equilibrium. However, Nanjala (2015) made use of aggregate (national level) data in contrast to this study.

The estimated coefficient of determination shows that the regressors jointly explain 67 per cent of the variation in the dependent variable which means it fits the data well. This result is

supported by the F-statistics which shows that it is statistically significance at 1 per cent. Further, the panel regression function passed all diagnostic tests namely Breusch-Godfrey autocorrelation Lagrange Multiplier (LM) test which shows that autocorrelation is not a problem in the panel regression model. Ramsey RESET test shows that the panel regression model is well specified and the panel function did not suffer from contemporaneous correlation as shown by the mean value of Pesaran cross-sectional dependence (CD) test. However, heteroscedasticity was a problem but the study employed panel robust standard error to correct it.

4.8 Causality Test between County Expenditure and Economic Growth

This study estimated the panel regression model framework of Granger (1988) and Granger *et al.* (1995). This model suggests two step procedures to determine the short-run and long-run panel dynamic relations between county expenditure components and GCP per capita growth (Granger, 1988). The test for Granger causality was conducted by estimating equations (3.2) with respect to components of county public expenditure while holding the other study variables constant.

In order to determine the integrating level of target variables, conventional panel unit root test such as HT (1999) and LLC (2002) were applied. From Table 4.3 result (Panel Unit Root Test), all panel variables were stationary at level except GCP per capita growth, human capital and non-devolved county expenditure at 5 per cent level of significance. Thus the three elements were differenced in the panel regression model in order to avoid spurious findings.

Before the panel cointegration test was applied, the optimal lag length for estimation was conducted. The optimal lag length was selected using the Akaike Information Criterion (AIC). The selection of optimal lag order shuns the spurious effect of panel model conclusions (Ivanov & Lutz, 2005). The panel series optimum lag length from the AIC is 4 because the higher order lag structure naturally provides a better fit for the data. After obtaining the optimum lag (1, 4) using AIC, Kao panel cointegration test was applied and result presented in Table 4.5 (Kao Panel cointegration result). Panel Kao test is superior to other co integration tests, since is founded on the Engle-Granger two-step mechanism, and assumes homogeneity on the variables in the panel (Kao & Chiang, 2001; Narayan, 2004). The panel Kao result reported in Table 4.5 shows all the statics are statistically significant at 5 per cent level, confirming the presence of long-run relationship between the target

variables. This suggest that there exist a long-run panel cointegration relation between dependent and explanatory elements.

The panel vector error correction model (VECM) is used to correct the disequilibrium in the cointegration relationship, as well as to test for long-run and short-run causality between cointegrated variables. However, if cointegration is not detected during analysis, then the panel VECM is reduced to panel vector autoregressive (VAR) framework, and the panel Granger causality tests is applied to establish causal links between target variables (Ivanov & Lutz, 2005). Since the model contained co integration relation between the variables, then the study proceeded to panel VECM analysis which captures long-run relationship with respect to components of county expenditure while holding the other study variables constant. Thus the long-run findings are shown in Table 4.8.

Table 4.8 Vector Error Correction Estimates

Co integrating Eq.	**CointEq1**			
$ln\ y(-1)$	1.000000			
$ln\ rg(-1)$	-0.19952***			
	(0.070196)			
	(-2.842272)			
$ln\ cg(-1)$	-0.003284			
	(0.009403)			
	(-0.349222)			
$ln\ ng(-1)$	-0.38122***			
	(0.053286)			
	(-7.154250)			
$Cons$	0.312010			
Error Correction:	$\Delta ln\ y$	$\Delta ln\ cg$	$\Delta ln\ rg$	$\Delta ln\ ng$
$CointEq1$	-0.24489**	-0.25664*	-0.052484	-0.028358
	(0.027968)	(0.16563)	(0.07461)	(0.05958)
	(-8.756001)	(-1.54945)	(-0.70348)	(-0.47595)

Long- run equation

Error correction term (ECT)

Notes: *indicates *** 1 per cent significance level, ** 5 per cent significance level, and * 10 per cent level of significance.* $ln\ y$ *- Real per capita Gross County Product,* $ln\ cg$ *- County*

government capital expenditure, $ln\ rg$*- County government recurrent expenditure,* $ln\ ng$ *- County government non-devolved expenditure,* Δ *- First difference operator,* ect_{t-1}*- representing the error -correction term.*

From Table 4.8 (long-run panel equation), recurrent and non-devolved county government expenditure are significant and positively related to county economic expansion at 5 per cent significance level in the long-run (sign changes because of Error Correction Term). The result can be qualified that government spending augments the aggregate purchase of goods and services, which stimulates economic growth depending on spending multipliers that accelerate economic expansion in long-run. However, capital spending had no influence in the long-run. This can be attributed to low capital spending allocation in most counties and crowding out effect in the local economy.

After estimating the long-run panel VECM model (Table 4.8), this study proceeded to conduct short-run panel Granger causality test (Granger *et al.*, 1995). With panel co integration, the dynamic causal relations between variables are formulated in a panel vector error correction function. This makes it possible for this study to determine both long-term and short-term relation, respectively, on the chi-square, χ^2- test of the lagged first differenced terms for each right-hand-side variable and the t-test of the error correction term (ECT). This Granger causality regression analysis was to achieve objective four of this study. The causality estimate results are presented in Table 4.9.

Table 4.9 Panel Granger Causality Results

Independent Variables					
	Short-run Dynamic Causality				Long- run Causality
Dependent Variables	χ^2 -statistics of lagged 1st differenced term [p-value]				Coefficient (t-ratio)
	$\Delta ln\ y$	$\Delta ln\ cg$	$\Delta ln\ rg$	$\Delta ln\ ng$	ect_{t-1}
$\Delta ln\ y$	--	21.243*** [0.0007]	1.622513 [0.8985]	23.913*** [0.0002]	-0.2449*** (-8.75600)
$\Delta ln\ cg$	2.075015 [0.8387]	--	43.40629*** [0.0000]	19.702*** [0.0014]	-0.2566* (-1.54945)
$\Delta ln\ rg$	10.32753* [0.0665]	13.3329** [0.0205]	--	56.935*** [0.0000]	-0.0525 (-0.70348)
$\Delta ln\ ng$	10.13794* [0.0714]	1.608199 [0.9003]	20.53866*** [0.0010]	--	-0.0284 (-0.47595)

***Notes**: *** indicates significant at 1 per cent, ** indicates significant at 5 per cent, * indicates significant at 10 per cent.* $ln\ y$ *- Real per Capita Gross County Product (GCP) (Proxy for county economic growth),* $ln\ cg$ *- County government capital expenditure,* $ln\ rg$*- County government recurrent expenditure,* $ln\ ng$ *- County government non-devolved expenditure,* Δ *- First difference operator,* ect_{t-1}*- representing the error -correction term. The figure in the parenthesis (…) represents as t-statistic and the figure in the squared brackets […] denotes as p-value for Chi-square* χ^2*.* Δ *- First difference operator,* ect_{t-1}*- representing the error -correction term.*

Following empirical results, from Table 4.9, long-run causality running from capital, recurrent and non-devolved county expenditure to economic growth is established by the coefficient of the error-correction term in the growth function, which is negative and statistically significant. Specifically, the coefficient of the ECM term in the growth function is −0.2449 and its t-statistic is statistically significant at the 1 per cent level of significance. This means that about 24 per cent of the disequilibrium is corrected each year in counties. This is on account when county economic growth was employed as the dependent variable.

This result is consistent with those of Abu-Eideh (2015) and Nanjala (2015) who established that government spending Granger cause economic expansion in long-run. However, it contrasted Odhiambo (2015) conclusion that economic growth Granger-causes public spending in long-run in Kenya. This finding supports Keynesian hypothesis in Kenyan counties that county public expenditure stimulates county economic growth through Keynesian channel.

When capital, recurrent and non-devolved expenditure are used as the dependent variable, there is no causality detected since the error correction term is not significant at 5 per cent. The absence of a long-run causality moving from county economic growth to components of county expenditure implies that economic growth macroeconomic policies can be implemented without adversely affecting the size of county government expenditure.

In this study panel granger causality approach is conducted to check the short-run direction of Granger relation between county spending components and economic growth and the finding is presented in Table 4.10.

Table 4.10: Short-run Granger Causality Tests between Expenditure and Growth

Direction	F-Statistic	P-Value	Conclusion
$\ln cg \longrightarrow \ln y$	21.24291***	(0.0007)	Uni-directional causality running from capital expenditure to GCP growth
$\ln y \longrightarrow \ln cg$	2.075015	(0.8387)	
$\ln rg \longrightarrow \ln y$	1.622513	(0.8985)	Uni-directional causality running from GCP growth to recurrent expenditure
$\ln y \longrightarrow \ln rg$	10.32753*	(0.0665)	
$\ln ng \longrightarrow \ln y$	23.91296***	(0.0002)	Bi-directional relationship running from non-devolved expenditure to economic growth and vice versa
$\ln y \longrightarrow \ln ng$	10.13794*	(0.0714)	

***Notes**: *** indicates significant at 1 per cent, ** significant at 5 per cent and * significant at 10 per cent,* $ln\ y$ *- Real per Capita Gross County Product (GCP) (Proxy for economic growth),* $ln\ cg$ *- County government capital expenditure,* $ln\ rg$*- County government recurrent expenditure,* $ln\ ng$ *- County government non-devolved expenditure.*

Table 4.10 show that there is a short-run unidirectional causality flowing from per capita GCP growth, county capital and non-devolved spending to recurrent expenditure. This is supported by the corresponding F statistics in the recurrent estimation, which are statistically significant. These results imply that past values of county capital spending have a predictive ability in influencing the current values of recurrent county expenditure - any variation in capital devolved expenditures will lead to a change in consumption budget in counties in short-term. The results suggest that there is switching of federalized expenditures between capital and recurrent expenditure in counties and that the public expenses on capital can be substituted to take care of recurrent county expenditures in short-run (Romer, 1990; World Bank, 2016; Gisore, 2017; OCOB, 2018).

Table 4.10 result shows that there exist a bi-directional relationship running from non-devolved expenditure to county economic growth or from county economic growth to non-devolved expenditure. These result is in support of the theoretical predictions of both Keynesian and Wagner's conclusion in Kenya. A key factor in the Keynesian model is that the expansion of aggregate effective demand should contribute to sub-national economic growth through national expenditure multiplier channel. Higher non-devolved expenditure of the county public spending stimulate demand for goods and services, which in turn allows local suppliers to intensify use of their productive capacities by engaging new labour and capital, and thus to enlarge output in short-run and ultimately Gross County Product (GCP) growth in the long-run. Wagner's (1958) law postulates that the increase in national spending will be more than the comparative rise in the country output and will thus result in a relative increase of the government size (Henrekson, 1993; Slemrod *et al*., 1995). The theory is relevant in Kenyan case since national expenditure has been increasing with rise in economic activities (OCOB, 2017; KNBS, 2019). This finding is consistent with those of Muthui *et al.* (2013) in Kenya, Odhiambo (2015) in South Africa and Madhumita *et al.* (2019) in India regional analysis who found a bi-directional causality running national expenditure to economic growth and vice versa. However, the findings of this study contrast studies by Nanjala (2015) and Muguro (2017) who found no short-run causality in Kenya. The

contradicting result can be attributed to the use of sub-national government expenditure level data set other than the aggregate national level data set.

Finally, these findings show that there exist a uni-directional link moving from county recurrent expenditure to economic growth in Kenyan counties, in the short-run. Intuitively, consumption expenditure by the county government is supposed to raise local private capital accumulation, which in turn will stimulate economic activities in the short-run (Muguro, 2017). This finding is in agreement with Abu-Eideh (2015) and Odhiambo (2015) conclusion on uni-directional causality in the short-term. However, the results of this study contrast studies by Yemek (2005) and Nanjala (2015) who found no causality in the short-term. The contrast can be accredited to the type of data set used. For instance, Nanjala (2015) used aggregate national data set during the analysis in contrast to this study. Further, Yemek (2005) established that there was no clear correlation between intergovernmental fiscal transfers, and economic growth and poverty reduction in South Africa in the short-run.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents summary of the findings contained in the preceding chapter. Based on the findings a number of conclusions are drawn and recommendations made. Areas for further investigation are also suggested.

5.2 Summary

This study set out to estimate empirically the long-run and short-run effects of county government expenditure on county economic growth in Kenya, 2013-2017. In order to achieve the specific objectives, this study disaggregated expenditure further into recurrent and capital spending. This study used panel econometric techniques such as testing for panel unit root test using Harris and Tzavalis (1999) test so as to avoid the problem of spurious outcomes that arise due to non-stationary data. Using Kao panel testing approach to co integration the study estimated the long-run static relationship and short-run dynamic relationship of the model. The findings of this study established that there exist a co integration relationship among the real GCP per capita and the regressors in the model. Panel diagnostic tests were applied to ensure the estimates are free from standard econometric problems. The coefficients of the effect of these were shown to differ in magnitude, sign and direction. However, the overall fit of the regression models suggests that the target variables explain significant amount of fluctuation of economic growth in Kenyan counties. The first objective of this study was to estimate the long-run and short-run effects of county recurrent expenditure on economic growth in counties. The finding revealed that the effect of recurrent expenditure is positive for economic growth. The effects of recurrent spending in long-run and short-run were 20 percentage points and 4 percentage points, respectively, on economic growth. However, on the second objective, there was no evidence of impact of capital expenditure on GCP growth. Further, on the third objective, increase in share of absorption rate of expenditure will stimulate county economic growth by 44 percentage points and 12 percentage points, both for long-run and short-run respectively. The overall result revealed that county government expenditure has been a key driver of per capita GCP growth in recent years.

5.3 Conclusions

This study analysed the effects of devolved expenditure on economic growth in Kenyan counties. Since expenditure devolution in Counties is implemented in various forms such as capital devolved expenditure and recurrent devolved expenditure, the effects of each of these were analysed. The conclusions from the results are presented as follows.

From the finding this study conclude that county recurrent spending stimulate economic growth in Kenyan counties. This was true on both long-run and short-run panel regression analysis. This finding generally confirms the fact that there could be productive recurrent spending as there could be productive investment spending in counties. The county recurrent spending accelerate growth through increasing purchasing power of the population through demand for raw materials, which ultimately creates new jobs and induce county economic growth. The significant relationship in counties can be attributed to high recurrent budget allocation experienced over the years. Furthermore, most functions of counties are on recurrent spending like health, education and pre-primary service. As established by Barro (1990), county recurrent expenditure on key sectors such as health and education is able to stimulate economic activities through enhancement in workers' productivity in counties.

The result of this study conclude that county capital public expenditure has no substantial effect on GCP growth. The result generally established that county capital government expenditure was unproductive in 47 counties during the period under review. In most cases as reported by counties, actual amount of capital budget was very low relative to recurrent budget. Underspending on county public investment such as physical infrastructure, slow private accumulation and impede long-run economic expansion in Kenyan counties.

The findings of the panel regression estimation conclude that increased county budget execution induce county economic growth positively. This demonstrates that county economic growth is often tied to public expenditure, that is, failure to utilize budgeted money directly affects the rate at which the county economy expands in the long-run and short-run. Underutilization of budgeted funds will adversely affect both production process and consumption activities of the county economy.

On the basis of causality findings, the study infer that components of devolved expenditure causes county economic growth in long-run. This conformed to Keynesian theorem that growth in the devolved expenditure induce GCP expansion in counties. In contrast, this study

confirms the absence of Wagner's hypothesis in Kenya, which postulates that increase in economic growth should cause an increase in devolved expenditures. In a nutshell, causality tests apparently specify that only Keynes theory is valid in counties. Further, the findings conclude that there is switching of expenditures between investment and consumption in counties and that the government budget on capital can be substituted to take care of recurrent budget in the short-run.

The findings on control variables used in this study confirm the significance of non-devolved expenditure, human capital and electricity consumption in influencing positively economic activities in counties. Electricity consumption is a crucial ingredient for real GCP expansion in long-run and short-run. As the demand for energy input increases, county agricultural and manufacturing activities similarly rises. A rise in electric power consumption is likely to lead to higher growth and its shortage may cause a slowdown in the economic growth process in counties. Further, the coefficient of human capital is positive and significant in both short-term and long-term. The finding conclude that increased overall school enrollment should stimulate county growth through accumulation of human capital in counties. Non-devolved expenditure is able to accelerate GCP growth both in long-run and short-run. This finding point at the importance of national government investment actions and consumption activities at county level. Specifically, in counties where there exist inadequate infrastructural facilities as provided by counties and where the local private sector is not established adequately to play its expected functions in the lower tier economy.

The damage caused by crime and violence has a negative effect on the county economy, which can lead to serious obstructions for the creation and maintenance of well-functioning economy in both short-term and long-term. Further, county corruption is negative in relation to GCP growth in the short term. Corruption is able to hinder local economic growth through reduced domestic investment, distorted allocation of budget away from human capital and physical capital development in counties. Further, it provides opportunities towards less-efficient public projects that provide more possibility for manipulation and bribe-taking opportunities in counties. It also tends to increase the budget size but also slows overall productivity in infrastructure investment.

The estimated coefficient of the error correction term (ECM) in short-run panel ARDL regressions models is too low, implying that the adjustment process towards equilibrium is

fairly low, hence explaining the significance of lagged terms. This means that disequilibrium will exist for a long period in Kenyan counties.

The equation in the model demonstrated a good fit from the coefficient of determination, R^2, and the F-statistic. From the empirical results, the study conclude that county expenditure components have long-run and short-run effects. The effect of county public expenditure on county economic growth depends entirely on county macroeconomic specifics, the nature and design of devolved expenditure and the extent of fiscal delegation.

Before model estimation a number of panel diagnostic investigations were conducted. This panel tests were necessary in order to establish the best technique of econometric analysis and also to validate the findings. The error term is expected to be normally distributed, with a constant variance and zero mean. Consistent with the long-run results, the short-run dynamic regression model passed all the panel diagnostic tests carried out in this study except heteroscedasticity, which was corrected by use of panel robust standard error. Thus the panel regression model employed was free from standard econometric problems.

5.4 Recommendations

The findings of this study have a number of recommendations to various institutions including the County Governments, Commission on Revenue Allocation, National Government, Private investors and Donors.

From a recommendation standpoint, this study submits that for a robust GCP growth, recurrent county expenditure is necessary as it stimulates an increase in economic activities depending on expenditure multipliers. The increase in county recurrent spending is found to have a positive effect on county growth. However, it is critical to recognize that very high level of recurrent county spending may not serve interest of county capital expenditure, as shown by insignificant result of county capital expenditure on county GCP growth. Further, high level of consumption expenditure through increase in taxes and land rates may not serve the interest of underprivileged county citizens.

Since county capital spending has no influence on economic growth in Kenyan counties. This study thus recommends that county government should allocate more funds on public infrastructure development and human capital activities. Since capital expenditure is insignificant, there is need for the county authorities to reduce government recurrent expenditure so as to free resources which can be used for development purposes. A

restructuring of county expenditure as recommended above, giving more allocation to capital expenditure is not only key for enhancing development, but also for attaining a more sustained fiscal adjustment. In order to cut the rate of growth of consumption spending on allowances and salaries, the county managers need to streamline its civil services to the minimum by suspending recruitments and only increasing salaries in line with the county economic growth accomplishment.

The analysis conclude that high absorption rate of expenditure is a major cause of GCP growth. The study suggests that in order to hasten fund utilization in counties and hence sustain GCP growth; the county government authorities would have to solve integrated financial management information system (IFMIS) connectivity problems on implementation and integration, National treasury and Parliament disburse funds in time and accelerate budget approval by County Assemblies.

Granger causality results show that there is a short-run uni-directional relations from capital to recurrent expenditure. Thus, if policy makers in counties consider switching spending from one component to another, especially in the context of counties where there is a tremendous scarcity of resources and physical infrastructure, standard economic literature envisages that switching from recurrent to capital expenditures would give higher economic returns. This is because devolved units usually lack physical infrastructures that help promote productivity and growth.

The mechanisms of the effect of devolved expenditure on economic growth can be traced in two levels: In short-run the county authorities target economic boom through following Keynesian policies, but they should be careful the share of recurrent expenditure is not above the optimal level since it will disadvantage capital budget. In such situation, any increase above optimal level will reduce GCP growth. In the long-run, county authorities will favour policy of government intervention for rapid economic expansion. But it should be noted such a policy may or may not impede county economic growth. The process of economic growth in counties will depend on both components of devolution expenditure and unique economic features of the specific county.

Since the county economic growth and devolved expenditure co-move towards long-run equilibrium, the county authority should establish robust monitoring and evaluation team to monitor and evaluate public financed investments in infrastructure, health and education sectors in order to have value for budget spent on delivery of public goods and services in the

county economy, and propel counties to maximum welfare gains and achieve sustainable GCP growth.

National Government expenditure has the potential to stimulate the local economy growth and remove market failures in counties. This study therefore recommends that national government should increase its non-devolved spending on infrastructure and human capital development in counties. Especially since counties are underspending on infrastructure investment. However, the national government authorities should decrease its government size to an ideal one by developing a policy on budget trimming, encourage public private partnership, privatization of public firms and outsourcing to reduce its spending and in turn reduce public borrowing.

In order to encourage human capital growth which is vital for county economic growth this study recommends. County managers to increase infrastructure investment in primary and secondary education. This will grow educational performance and quality which eventually improve human knowledge and thus stimulate county growth. Therefore, county authorities should initiate public policies that will boost quality and sustain overall education development. Study recommends an increase of absorption capacity of the education sector funds in the capital budget, increase school enrollment, encourage private sector participation, employ more teachers and reduce cost of education to ensure productivity growth. National government should increase overall educational sector budget allocation for further worker productivity growth in 47 counties.

Electricity energy is a crucial ingredient for GCP growth in counties. As a result, progress should be done to provide electricity power to as much percentage of the county citizens as possible by private sector, donors, sub-national and national government. The central government should allocate more funds to electricity power infrastructure; this will ensure that there is enough power supply in rural areas; and households and firms should find new ways of capitalizing in energy conservation methods so as to ensure energy saving and sustainability. For sustainable electricity consumption, this study calls for manufacturing (small scale and large scale) sector to invest in technology that conserve energy or uses alternative and cheap sources of energy other than electric power consumption.

It is highly recommended that the county government should strengthen strategies for fighting corruption in county public offices. This study recommends high degree of accountability and transparency at different sectors in order to prevent channeling of

devolved funds to ghost projects by county officials. Parliament need to change the existing laws to allow transmission of Auditor-General's reports directly to EACC and Directorate of Criminal Investigations (DCI) for quick investigations, and eventual prosecutions by the Director of Public Prosecution (DPP) to tame corruption in counties. Further, there is need for national government to increase her funding of anti-corruption agencies such as EACC, DCI and DPP in order to arrest and penalize those who divert and embezzle public resources. Furthermore, education system can be reformed to combat corruption by including anti-corruption courses in the curriculum.

The findings also revealed that crime rate has negative effect on economic growth in devolved units. To mitigate, this study suggests that there is need for the national government to increase budget allocation to Directorate of Criminal Investigation and National Police Service, and increasing government expenditure to the public-this might discourage citizens to engage in criminal activities due to different motives, but the most credible one being financial constancy.

The Commission on Revenue Allocation (CRA) should allocate revenue sharing based on historical allocation and expenditure of ministries, agencies and departments. Further, it is recommended that devolution units be allocated with unconditional grants to increase its efficiency and grow public investment on physical infrastructure and human capital development. Unconditional grants will afford fiscal autonomy to devolved units and therefore induce local economic growth through fiscal policy process and increased efficiency.

Donors and development partners should support the initiatives spearheaded by the devolved units by partnering and identify areas they can contribute by proving support to public infrastructural investment and economic development platforms. Donors should help counties to bridge budget deficit so that counties are able to provide vital public services to the county citizens. For instance, funding of investment infrastructure will stimulate county growth and ease other macroeconomic instabilities such as budget deficits. The private sector should partner with county managers and national authorities in delivery of basic public services and infrastructure projects through Public-Private Partnerships (PPPs) initiatives. This will help to fill the gap of underspending in capital expenditure by most counties.

5.5 Areas for Further Research

This study sought to estimate the effects of county government expenditure on county economic growth in Kenya. For detailed analysis of influence of devolved expenditure on economic growth future studies should consider the following areas;

Extend macroeconomic analysis to include a more comprehensive disaggregation of devolved units spending by functions in line to the traditional ministries. Such a disaggregation would allow extension of the estimation and differentiate among the effects of health, education, infrastructure, agriculture, roads, housing and water expenditure on county economic growth and their contribution towards realization of sustainable development goals (SDGs) by 2030.

Macroeconomic analysis should be extended to include the source of funds (tax revenue, intergovernmental transfer, grants, public debt and budget deficit) used to finance public expenditure, need to be identified and taken into account in the analysis. For this reason, some extra macroeconomic factors should be included as control variables during panel estimation.

The empirical work in this study is done on the macroeconomic level, while the analysis of mechanisms through which county government expenditures become effective should mostly involve microeconomic investigations.

Analyse the effects of county expenditure on income and regional disparities, poverty reduction, human capital development, health outcomes, and regional integration and trade development.

Although the emphasis of this study is only on measuring the effect of county spending on county economic activities, a significant issue to address in future study is what informs county authority judgment to allocate budget among different spending components. Specifically, the role of demographic dynamics factors, social factors, economic shocks, political system and governance structure.

The quality of devolved government expenditure should be taken into account more accurately in the link with the governance variables, in light of recent empirical findings establishing that governance variables can explain the variances in the effect of county government expenditure on county economic growth (Rajkumar & Swaroop, 2008; Wu *et al.*, 2010; Hanousek & Kocenda, 2011).

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APPENDICES

Appendix I: List of Counties in Kenya

Code	County	Code	County
KE01	Mombasa	**KE25**	Samburu
KE02	Kwale	**KE26**	Trans Nzoia
KE03	Kilifi	**KE27**	Uasin Gishu
KE04	Tana River	**KE28**	Elgeyo Marakwet
KE05	Lamu	**KE29**	Nandi
KE06	Taita-Taveta	**KE30**	Baringo
KE07	Garisa	**KE31**	Laikipia
KE08	Wajir	**KE32**	Nakuru
KE09	Mandera	**KE33**	Narok
KE10	Marsabit	**KE34**	Kajiado
KE11	Isiolo	**KE35**	Kericho
KE12	Meru	**KE36**	Bomet
KE13	Tharaka-Nithi	**KE37**	Kakamega
KE14	Embu	**KE38**	Vihiga
KE15	Kitui	**KE39**	Bungoma
KE16	Machakos	**KE40**	Busia
KE17	Makueni	**KE41**	Siaya
KE18	Nyandarau	**KE42**	Kisumu
KE19	Nyeri	**KE43**	Homa Bay
KE20	Kirinyaga	**KE44**	Migori
KE21	Muranga	**KE45**	Kisii
KE22	Kiambu	**KE46**	Nyamira
KE23	Turkana	**KE47**	Nairobi
KE24	West Pokot		

Source: GoK (2010); OCOB (2017).

Appendix II: Raw Data Used in this Study

Table A1: Data Collection Schedule

General Information about the County

1. County Name ……...……...…..
2. County Code ……..
3. County Governor……
4. County Land Area (sq kms)……...
5. Main economic activity of the County……....

Please provide the following information

VARIABLE	SPECIFICS	2013	2014	2015	2016	2017
County Economic Growth Measures	Real GCP in KES					
	Real GCP Per Capita					
County Government Expenditure Variable (KES)	Capital expenditure KES					
	Recurrent expenditure					
	Absorption rate %					
National government Expenditure	Non-devolved expenditure KES					
County Human capital (School Enrolment by Level)	Primary school enrollment					
	Secondary school					
County Crime rate	Crimes reported (000)					
County Electricity (KW)	Power Consumption					
County Corruption rate- KES	Average bribe by County					
County Population	Population by County					
County Revenue (KES)	Total Grants (Millions)					
	Total Transfer (Millions)					
County Infrastructure Development	Tarmacked Road (KM)					
	Access to piped water					

Where absolute values are not available, indicate the estimated per cent increase or decrease

Thank you for your co-operation. God Bless you.

Table A2: Gross County Product (Constant KES, Millions)

Code	County	2013	2014	2015	2016	2017
KE01	Mombasa	160412	168871	175259	188909	206409
KE02	Kwale	37054	38606	40846	42979	46173
KE03	Kilifi	55703	56650	62560	63009	66381
KE04	Tana River	15381	19261	15906	17635	18094
KE05	Lamu	11668	11670	12963	12908	14121
KE06	Taita taveta	20265	22380	22784	25369	25982
KE07	Garissa	20187	20660	21532	22264	22931
KE08	Wajir	18099	18579	19571	20129	20908
KE09	Mandera	17418	18230	19044	19889	20725
KE10	Marsabit	15253	14992	16822	17505	18369
KE11	Isiolo	7627	8045	8569	8769	9253
KE12	Meru	85906	92610	98371	102725	105150
KE13	Tharaka-nithi	25407	26940	28879	30104	34861
KE14	Embu	47862	46221	51568	49765	52604
KE15	Kitui	46672	44908	54111	48686	52257
KE16	Machakos	110535	114111	125878	128037	134410
KE17	Makueni	45774	47918	52679	53801	53201
KE18	Nyandarua	57619	62159	69975	76615	82099
KE19	Nyeri	61770	69186	70047	75075	80376
KE20	Kirinyaga	44321	47060	48896	51588	53396
KE21	Muranga	71411	75294	77958	82859	85519
KE22	Kiambu	173544	184974	200328	214399	225457
KE23	Turkana	36762	38631	41805	43020	43308
KE24	West Pokot	21060	22341	23889	25648	25561
KE25	Samburu	10851	11374	11401	12879	12980
KE26	Trans Nzoia	53757	56827	60453	60170	63092
KE27	Uasin Gishu	75263	81806	86213	91532	91221
KE28	Elgeyo Marakwet	37351	39228	44010	50113	54622
KE29	Nandi	51714	53627	55506	60416	59505
KE30	Baringo	29482	31784	36394	37634	39212
KE31	Laikipia	28148	29962	33823	38826	38864
KE32	Nakuru	161073	177446	187767	206545	216295

KE33	Narok	66087	67520	71301	76077	79118
KE34	Kajiado	52287	55260	59055	64747	65588
KE35	Kericho	61968	64879	66656	71760	72226
KE36	Bomet	51877	55358	56024	62453	64971
KE37	Kakamega	76720	81061	86312	88894	91299
KE38	Vihiga	24691	26663	28702	30249	31466
KE39	Bungoma	64970	75514	76615	80985	86606
KE40	Busia	28654	30829	32887	34050	37776
KE41	Siaya	32623	36088	40677	42337	44893
KE42	Kisumu	100347	105662	108266	112865	115128
KE43	Homabay	42127	44836	46557	49630	51811
KE44	Migori	39681	43159	45360	46881	52047
KE45	Kisii	63320	66562	70505	73584	77680
KE46	Nyamira	42385	45377	44618	52346	50595
KE47	Nairobi	803710	834952	883376	941968	998160
Total		**3,205,896**	**3,386,075**	**3,592,808**	**3,808,627**	**3,992,703**

Source: GoK (2019); KNBS (2019).

Table A3: Real Gross County Product Growth Rates (in %)

Code	County	2014	2015	2016	2017	Average
KE01	Mombasa	5.3	3.8	7.8	9.3	6.6
KE02	Kwale	4.2	5.8	5.2	7.4	5.7
KE03	Kilifi	2.9	10.4	0.7	5.4	4.9
KE04	Tana River	25.2	-17.4	10.9	2.6	5.3
KE05	Lamu	0	11.1	-0.4	9.4	5.0
KE06	Taita taveta	10.4	1.8	11.3	2.4	6.5
KE07	Garissa	2.3	4.2	3.4	3	3.2
KE08	Wajir	2.7	5.3	2.9	3.9	3.7
KE09	Mandera	4.7	4.5	4.4	4.2	4.5
KE10	Marsabit	-1.7	12.2	4.1	4.9	4.9
KE11	Isiolo	5.5	6.5	2.3	5.5	5.0
KE12	Meru	7.8	6.2	4.4	2.4	5.2
KE13	Tharaka-nithi	6	7.2	4.2	15.8	8.3
KE14	Embu	-3.4	11.6	-3.5	5.7	2.6

KE15	Kitui	-3.8	20.5	-10	7.3	3.5
KE16	Machakos	3.2	10.3	1.7	5	5.1
KE17	Makueni	4.7	9.9	2.1	-1.1	3.9
KE18	Nyandarua	7.9	12.6	9.5	7.2	9.3
KE19	Nyeri	12	1.2	7.2	7.1	6.9
KE20	Kirinyaga	6.2	3.9	5.5	3.5	4.8
KE21	Muranga	5.4	3.5	6.3	3.2	4.6
KE22	Kiambu	6.6	8.3	7	5.2	6.8
KE23	Turkana	5.1	8.2	2.9	0.7	4.2
KE24	West Pokot	6.1	6.9	7.4	-0.3	5.0
KE25	Samburu	7.5	0.2	13	0.8	5.4
KE26	Trans Nzoia	5.7	6.5	-0.6	4.9	4.1
KE27	Uasin Gishu	8.7	5.4	6.2	-0.3	5.0
KE28	Elgeyo Marakwet	5	12.2	13.9	9	10.0
KE29	Nandi	3.7	3.5	8.8	-1.5	3.6
KE30	Baringo	7.8	14.5	3.4	4.2	7.5
KE31	Laikipia	6.4	12.9	14.8	0.1	8.6
KE32	Nakuru	10.2	5.8	10	4.7	7.7
KE33	Narok	2.2	5.6	6.7	4	4.6
KE34	Kajiado	5.7	6.9	9.6	1.3	5.9
KE35	Kericho	4.7	2.7	7.7	0.6	3.9
KE36	Bomet	6.7	1.2	11.5	4	5.9
KE37	Kakamega	5.7	6.5	3	2.7	4.5
KE38	Vihiga	8	7.6	5.4	4	6.3
KE39	Bungoma	16.2	1.5	5.7	6.9	7.6
KE40	Busia	7.6	6.7	3.5	10.9	7.2
KE41	Siaya	10.6	12.7	4.1	6	8.4
KE42	Kisumu	5.3	2.5	4.2	2	3.5
KE43	Homabay	6.4	3.8	6.6	4.4	5.3
KE44	Migori	8.8	5.1	3.4	11	7.1
KE45	Kisii	5.1	5.9	4.4	5.6	5.3
KE46	Nyamira	7.1	-1.7	17.3	-3.3	4.9
KE47	Nairobi	3.9	5.8	6.6	6	5.6

Source: GoK (2019); KNBS (2019).

Table A4: Per Capita GCP, 2013-2017 (Constant Prices, KES)

Code	County	2013	2014	2015	2016	2017
KE01	Mombasa	150156	152625	153030	159418	168448
KE02	Kwale	50111	50411	51528	52401	54439
KE03	Kilifi	43635	43338	46236	45007	45853
KE04	Tana River	56300	68069	54308	58191	57740
KE05	Lamu	101008	97541	104671	100734	106557
KE06	Taita taveta	62751	66998	65623	70828	70316
KE07	Garissa	49357	49618	5792	51543	52099
KE08	Wajir	41652	41998	43455	43864	44712
KE09	Mandera	25867	26594	27287	27968	28602
KE10	Marsabit	49771	48432	53796	55407	57541
KE11	Isiolo	50571	52813	55689	56404	58907
KE12	Meru	60194	64252	67570	69843	70759
KE13	Tharaka-nithi	66098	69398	73654	75998	87106
KE14	Embu	88118	84258	93070	88904	93013
KE15	Kitui	43180	41741	49799	44354	47122
KE16	Machakos	95622	97742	106747	107475	111668
KE17	Makueni	49186	50983	55492	56100	54907
KE18	Nyandarua	89072	94203	103975	111622	117295
KE19	Nyeri	82090	90138	89475	94029	98717
KE20	Kirinyaga	77364	80530	82035	84866	86137
KE21	Muranga	69845	72195	73288	76377	77301
KE22	Kiambu	98566	102992	109361	114762	118343
KE23	Turkana	37753	38277	39982	39699	38592
KE24	West Pokot	36077	36926	38111	39493	38021
KE25	Samburu	41494	43038	41637	45383	44147
KE26	Trans Nzoia	57666	58815	60482	57998	58725
KE27	Uasin Gishu	73952	77556	78891	80816	77772
KE28	Elgeyo Marakwet	88660	89844	97289	106889	112502
KE29	Nandi	60328	60361	60304	63331	60229
KE30	Baringo	46605	48478	53580	53480	53810
KE31	Laikipia	61943	63618	69318	76775	74205
KE32	Nakuru	88248	93801	95806	101684	102826

KE33	Narok	68245	67273	68569	70591	70887
KE34	Kajiado	66828	68145	70293	74360	72738
KE35	Kericho	71787	72517	71912	75974	74469
KE36	Bomet	62931	64794	63292	68163	69128
KE37	Kakamega	43049	44728	46824	47397	47843
KE38	Vihiga	41477	44044	46615	48267	49330
KE39	Bungoma	37112	42417	42312	43978	46244
KE40	Busia	54696	57869	60693	61788	67404
KE41	Siaya	35434	38321	42240	43012	44633
KE42	Kisumu	94751	97540	97735	99681	99504
KE43	Homabay	39989	41609	42252	44066	45019
KE44	Migori	39582	42089	43258	43740	47521
KE45	Kisii	50274	51667	53518	54647	56455
KE46	Nyamira	64818	67841	65233	74876	70822
KE47	Nairobi	212543	208509	208733	211055	212498
Average		**76,710**	**78,817**	**81,365**	**83,951**	**85,689**

Source: GoK (2019); KNBS (2019).

Table A5: County Share of GCP, 2013-2017

Code	County	2013	2014	2015	2016	2017	Average
KE01	Mombasa	4.8	4.9	4.6	4.6	4.4	4.7
KE02	Kwale	1.1	1.1	1.1	1.1	1.1	1.1
KE03	Kilifi	1.7	1.6	1.7	1.6	1.6	1.6
KE04	Tana River	0.5	0.6	0.4	0.5	0.4	0.5
KE05	Lamu	0.4	0.4	0.4	0.4	0.4	0.4
KE06	Taita taveta	0.7	0.7	0.7	0.7	0.7	0.7
KE07	Garissa	0.6	0.6	0.6	0.6	0.5	0.6
KE08	Wajir	0.6	0.6	0.5	0.5	0.5	0.5
KE09	Mandera	0.5	0.5	0.5	0.5	0.5	0.5
KE10	Marsabit	0.5	0.5	0.5	0.5	0.5	0.5
KE11	Isiolo	0.2	0.2	0.2	0.2	0.2	0.2
KE12	Meru	2.8	2.9	3	3	3.1	2.9
KE13	Tharaka-nithi	0.8	0.8	0.8	0.8	0.9	0.8
KE14	Embu	1.5	1.4	1.5	1.4	1.3	1.4

KE15	Kitui	1.4	1.3	1.5	1.3	1.3	1.4
KE16	Machakos	3.4	3.2	3.3	3.2	3.1	3.2
KE17	Makueni	1.4	1.4	1.5	1.4	1.3	1.4
KE18	Nyandarua	2.1	2.2	2.6	3	3.3	2.6
KE19	Nyeri	2	2.1	2.1	2.2	2.3	2.2
KE20	Kirinyaga	1.4	1.4	1.4	1.3	1.3	1.4
KE21	Muranga	2.3	2.2	2.3	2.3	2.4	2.3
KE22	Kiambu	5.4	5.4	5.5	5.6	5.6	5.5
KE23	Turkana	1.2	1.2	1.2	1.1	1	1.1
KE24	West Pokot	0.7	0.7	0.7	0.7	0.6	0.7
KE25	Samburu	0.3	0.3	0.3	0.4	0.4	0.4
KE26	Trans Nzoia	1.8	1.8	1.7	1.5	1.6	1.7
KE27	Uasin Gishu	2.4	2.5	2.4	2.3	2.2	2.3
KE28	Elgeyo Marakwet	1.3	1.3	1.6	1.9	2.1	1.7
KE29	Nandi	1.6	1.6	1.6	1.6	1.6	1.6
KE30	Baringo	1	1	1.1	1.2	1.2	1.1
KE31	Laikipia	0.9	0.9	1	10	1.2	1
KE32	Nakuru	5.4	5.7	6	6.6	6.9	6.1
KE33	Narok	2.2	2.1	2.2	2.3	2.4	2.2
KE34	Kajiado	1.6	1.5	1.5	1.5	1.4	1.5
KE35	Kericho	1.9	1.8	1.9	1.8	1.8	1.8
KE36	Bomet	1.7	1.7	1.8	2	2.1	1.9
KE37	Kakamega	2.4	2.4	2.5	2.4	2.4	2.4
KE38	Vihiga	0.8	0.8	0.8	0.8	0.8	0.8
KE39	Bungoma	2.1	2.4	2.3	2.3	2.4	2.3
KE40	Busia	0.9	1	1	1	1.2	1
KE41	Siaya	1	1.1	1.2	1.2	1.3	1.2
KE42	Kisumu	3.2	3.1	2.9	2.8	2.6	2.9
KE43	Homabay	1.4	1.4	1.4	1.5	1.5	1.4
KE44	Migori	1.2	1.3	1.2	1.2	1.3	1.2
KE45	Kisii	2	2.1	2.1	2	2.2	2.1
KE46	Nyamira	1.3	1.3	1.3	1.5	1.4	1.4
KE47	Nairobi	23.5	22.7	21.5	20.9	19.8	21.7

Source: GoK (2019); KNBS (2019).

Table A6: County Recurrent Expenditure, 2013-2017 (in KES Millions)

Code	County	2013	2014	2015	2016	2017
KE01	Mombasa	892.58	5097.8	5625.39	5570.44	6390.49
KE02	Kwale	195.79	2064	2449.22	2543.64	3803.95
KE03	Kilifi	136.73	3586.9	4585.87	4743.5	5711.10
KE04	Tana River	101.334	1292.8	1293.5	1614.58	1767.24
KE05	Lamu	27.11	609.2	1141.04	1588.9	1526.22
KE06	Taita taveta	121.85	1492.4	2558.37	2948.67	2979.38
KE07	Garissa	176.77	1682.6	3676.63	3945.5	4681.5
KE08	Wajir	406.09	1866.9	2673.72	3966.7	4559.41
KE09	Mandera	205.23	2522.6	4106.65	4101.76	4365.46
KE10	Marsabit	194.98	1923.8	2468.41	3042.8	3349.74
KE11	Isiolo	110.56	1535.8	1758.97	2127.49	2200.22
KE12	Meru	362.52	3256.6	3985.25	4550.23	6105.03
KE13	Tharaka-nithi	141.541	1665.4	1798.28	1905.3	2227.13
KE14	Embu	180.33	2597.4	3177.16	3024.85	3660.08
KE15	Kitui	310.69	2935.6	3936.51	4098.7	4625.95
KE16	Machakos	292.24	3387.8	5051.74	5788.69	5805.22
KE17	Makueni	234.98	2536.5	3132.92	4001.25	4885.98
KE18	Nyandarua	180.21	2319.9	2643.28	3195.13	3320.3
KE19	Nyeri	314.25	340.5	3739.11	3804.18	4464.4
KE20	Kirinyaga	172.57	1493	2282.39	3075.46	3163.04
KE21	Muranga	277.11	2474.2	3071.21	3327.59	4394.89
KE22	Kiambu	655.9	5527.6	6478.73	8161.63	831.08
KE23	Turkana	223.8	1484.2	3232.78	3757.05	5031.5
KE24	West Pokot	215.36	19.4	2388.54	2755.6	3238.44
KE25	Samburu	135.55	1516.1	1664.65	2503	2903.56
KE26	Trans Nzoia	232.94	2014.2	2875.38	3543.53	4293.25
KE27	Uasin Gishu	504.06	2528.8	3102.98	3991.47	4134.22
KE28	Elgeyo Marakwet	82.93	1321.9	2264.74	2274.58	2797.01
KE29	Nandi	176.51	1872	2399.08	3019.66	3497.04
KE30	Baringo	234.89	2444.2	2945.57	3415.48	3748.09
KE31	Laikipia	278.07	2311.9	2410.57	2676.56	3166.58

KE32	Nakuru	298.8	5386.4	6603.89	8154.72	8613.38
KE33	Narok	392.52	3775.1	4279.95	5130.3	5323.29
KE34	Kajiado	221.2	2248.5	3507.55	3595.71	3811.52
KE35	Kericho	195.52	2168.8	3035.26	3135.78	3517.22
KE36	Bomet	200.1	1834.4	2359.91	2769.96	3322.59
KE37	Kakamega	293.13	3699.8	4380.18	5605.76	5636.36
KE38	Vihiga	153.01	2120.1	2234.6	2037.97	2925.55
KE39	Bungoma	263.91	3595.8	4584.1	5251.9	6147.99
KE40	Busia	268.4	2161.1	2971.44	3409.77	3917.79
KE41	Siaya	149.88	2082.5	2704.84	3098.21	3646.81
KE42	Kisumu	412.74	4427.5	4411.18	4611.29	4855.29
KE43	Homabay	188.56	2661	3416.24	1373.01	4319.67
KE44	Migori	281.12	3238.7	2857.39	3720.31	3949.18
KE45	Kisii	267.98	3193.2	4254.77	5399.74	5970.72
KE46	Nyamira	275.26	1680.8	2361.64	3033,54	3522.39
KE47	Nairobi	3879.79	15901.5	18724.24	19784.87	21078.91

Source: OCOB (2013-2017).

Table A7: County Capital Expenditure, 2013-2017 (in KES Millions)

Code	County	2013	2014	2015	2016	2017
KE01	Mombasa	1.92	112	2092.04	2774.61	2743.15
KE02	Kwale	0	8865.3	2027.44	3257.63	2056.69
KE03	Kilifi	60.17	426.2	2986.44	3725.87	4473.13
KE04	Tana River	0	32.2	1057.7	2250.44	1779.13
KE05	Lamu	0	119.9	575.98	916.56	467.34
KE06	Taita taveta	0	518.5	948.54	513.56	405.65
KE07	Garissa	0	486.8	2919.64	2600.9	2442.06
KE08	Wajir	0	2562.1	3899.39	3800.35	3688.78
KE09	Mandera	9.03	941.5	4913.9	5450.7	5831.48
KE10	Marsabit	0	584.3	1919.57	2235.94	2791.75
KE11	Isiolo	61.59	532.3	1086.5	1118.64	1266.24
KE12	Meru	0	566.1	2268.19	1661.35	2238.99
KE13	Tharaka-nithi	0	532.7	906.38	790.94	546.72
KE14	Embu	61.59	148	625.79	932.31	2099.16

KE15	Kitui	0	506.3	2964.74	3771.92	3688.65
KE16	Machakos	35.44	2281.2	2033.66	2539.96	3343.57
KE17	Makueni	0	603.4	1251.01	1504.47	1436.53
KE18	Nyandarua	0	569.9	1289.09	1679.72	1642.72
KE19	Nyeri	27.76	934.1	1076.11	1161.27	1220.7
KE20	Kirinyaga	47.23	308.8	902.57	1065.09	1083.54
KE21	Muranga	60.42	1381.1	2348.13	2719.23	2037.43
KE22	Kiambu	0	1151.1	2287.33	2265.67	2510.49
KE23	Turkana	0	1925.1	5782.35	6402.92	6159.91
KE24	West Pokot	0	934.8	1697.63	1595.3	1565.65
KE25	Samburu	0.22	574.4	1618.18	1156.64	1263.84
KE26	Trans Nzoia	0	1007.5	1215.89	1789	1711.19
KE27	Uasin Gishu	61.44	203.8	2434.49	2220.83	1460.35
KE28	Elgeyo Marakwet	47.2	391.8	1122.66	653.94	1167.67
KE29	Nandi	99.32	551.8	2287.94	1974.92	1803.76
KE30	Baringo	0	366.5	1215.55	1273.08	1466.3
KE31	Laikipia	51.47	316.8	979.23	1317.55	1549.09
KE32	Nakuru	0	477.6	1600.23	2230.89	2049.83
KE33	Narok	3.1	457.6	2379.01	2008.6	2150.67
KE34	Kajiado	55.03	576.5	1025.56	1544.66	1250.4
KE35	Kericho	23.59	642.4	1245.44	1676.54	2022.5
KE36	Bomet	0	1718.5	2053.95	2300.87	1491.95
KE37	Kakamega	61.42	1518.9	3107.15	4246.53	5208.76
KE38	Vihiga	0	366.9	1271.17	970.28	793.12
KE39	Bungoma	92.57	562.1	2560.7	3022.9	1844.19
KE40	Busia	39.2	311.8	2025.02	2487.21	1963.61
KE41	Siaya	0	380.4	1466.72	1835.09	1983.35
KE42	Kisumu	12.46	98.9	1346.36	1828.68	1982.57
KE43	Homabay	0	1371.5	1862.9	1903.11	1417.52
KE44	Migori	61.59	1008.7	1905.87	2152.73	1869.61
KE45	Kisii	61.69	1575.7	2283.52	2540.71	2014.89
KE46	Nyamira	0	726.1	1277.79	1284.15	979.21
KE47	Nairobi	0	1873.4	2298.32	4166.16	3779.73

Source: OCOB (2013-2017).

Table A8: County Overall Absorption Rate (%), 2013-2017

Code	County	2013	2014	2015	2016	2017
KE01	Mombasa	79	44.6	78.2	85.6	78.4
KE02	Kwale	64.6	66.7	68.7	76.2	73.7
KE03	Kilifi	38.2	59.9	76.1	73.5	76.4
KE04	Tana River	41.4	41.3	50.2	84.6	77.3
KE05	Lamu	17.2	44.2	68.4	78.8	62.1
KE06	Taita taveta	59	68.9	84.6	83.3	72.7
KE07	Garissa	60.1	44.8	84.1	88.4	94.1
KE08	Wajir	97.3	82.5	90.5	93.9	95
KE09	Mandera	52.4	49.6	80	83.1	84.8
KE10	Marsabit	74.4	65.3	76.3	84.1	90.1
KE11	Isiolo	63.2	74.3	84.2	86.9	92.5
KE12	Meru	81.8	67.3	80.7	75.5	82.3
KE13	Tharaka-nithi	67.5	85.2	68.3	70.7	70
KE14	Embu	62.8	68.2	76.2	69	85.6
KE15	Kitui	63	53	72.1	77.8	75.8
KE16	Machakos	39.2	75.7	76.5	71.1	84.1
KE17	Makueni	45.6	61.9	62.9	58.3	83.8
KE18	Nyandarua	66.3	85.3	88.3	87.1	87.6
KE19	Nyeri	60.8	93.9	88.4	79.1	78.1
KE20	Kirinyaga	73.2	59.5	77.7	86.7	81
KE21	Muranga	70.7	75.3	90.6	87.6	78.3
KE22	Kiambu	69	71.7	84.5	90.8	97.2
KE23	Turkana	62.2	41.9	68.7	75.2	77.9
KE24	West Pokot	22.2	79.8	96.6	90.1	91.6
KE25	Samburu	59	71.9	79.3	82.3	89.3
KE26	Trans Nzoia	43	68.3	77.6	86.7	87.3
KE27	Uasin Gishu	91.9	59.2	79.9	82.4	72.5
KE28	Elgeyo Marakwet	64	65.8	90	76.1	83.7
KE29	Nandi	99.2	62.2	90.3	87.6	76.8
KE30	Baringo	87.7	77.1	83	79.4	80.1
KE31	Laikipia	97.8	79.2	78.4	77	79

KE32	Nakuru	29.8	58.4	74	74.3	70.7
KE33	Narok	83.6	57.8	82.9	87.1	82.3
KE34	Kajiado	78	75.2	80	75.3	72.2
KE35	Kericho	84.1	77.4	88.9	86.4	88.9
KE36	Bomet	74.1	98.4	97.8	98.1	86.2
KE37	Kakamega	72.8	54.1	70.8	80	87.7
KE38	Vihiga	63.2	76.2	73.6	68.9	73.8
KE39	Bungoma	82.1	47	96.7	82.3	76.3
KE40	Busia	90.9	57.4	79	80.3	77.9
KE41	Siaya	52.2	57.8	70.9	71	79.6
KE42	Kisumu	79.3	64	61.8	72.5	66.8
KE43	Homabay	62.1	75.9	105.2	88.2	85.2
KE44	Migori	84.6	76.8	82.1	80.8	75.3
KE45	Kisii	81	81.1	72.8	87.8	86.5
KE46	Nyamira	65.2	70.5	77.8	79.2	80.3
KE47	Nairobi	89	70.5	82.2	82.3	71.5

Source: OCOB (2013-2017).

Appendix III: Data Analysis Output

Table A9: Descriptive Statistics Summary

	CYK	K	R	N	A	CO	E	T	H
Mean	4.805296	2.646623	3.275224	3.244761	1.864810	3.476315	7.595216	3.077580	5.338409
Median	4.790904	3.097049	3.466208	3.190643	1.887054	3.525045	7.567738	3.107888	5.380736
Maximum	5.327447	3.806378	4.323848	4.224560	2.022016	4.911477	9.402003	3.965813	5.858709
Minimum	4.412746	-0.657577	1.287802	2.478833	1.235528	2.123852	6.423892	1.963788	4.512044
Std. Dev.	0.171517	1.089697	0.531752	0.304713	0.100247	0.464504	0.644591	0.326362	0.307410
Skewness	0.604126	-1.595201	-1.234265	0.735538	-2.453932	-0.001739	0.523524	-0.120098	-0.786371
Kurtosis	3.562820	4.322893	3.969638	4.043155	12.64769	3.770536	2.893098	3.251968	3.156043
Jarque-Bera	17.39626	116.8019	68.87304	31.84482	1147.242	5.813686	10.84661	1.186570	24.45827
Probability	0.000167	0.000000	0.000000	0.000000	0.000000	0.054648	0.004413	0.552509	0.000005
Sum	1129.245	621.9565	769.6776	762.5189	438.2303	816.9340	1784.876	723.2313	1254.526
Sum Sq. Dev.	6.883854	277.8606	66.16580	21.72694	2.351593	50.48887	97.22656	24.92378	22.11316
Observations	235	235	235	235	235	235	235	235	235

Table A10: Panel F- Bounds Cointegration Test

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	8.214380	10%	1.66	2.79
k	8	5%	1.91	3.11
		2.5%	2.15	3.4
		1%	2.45	3.79

t-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-8.756001	10%	-1.62	-4.09
		5%	-1.95	-4.43
		2.5%	-2.24	-4.72
		1%	-2.58	-5.07

Table A11: Panel Kao Residual Cointegration Test

Kao Residual Cointegration Test
Series: CYK A E H T K R N CO
Date: 03/22/20 Time: 17:33
Sample: 2013 2017
Included observations: 235
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

	t-Statistic	Prob.
ADF	-3.064099	0.0011
Residual variance	0.000419	
HAC variance	0.000306	

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID)
Method: Least Squares
Date: 03/22/20 Time: 17:33
Sample (adjusted): 2015 2017
Included observations: 141 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-1.339147	0.123611	-10.83352	0.0000
D(RESID(-1))	0.209673	0.081905	2.559958	0.0115

R-squared	0.545256	Mean dependent var	0.003898
Adjusted R-squared	0.541985	S.D. dependent var	0.021780
S.E. of regression	0.014740	Akaike info criterion	-5.582376
Sum squared resid	0.030202	Schwarz criterion	-5.540549
Log likelihood	395.5575	Hannan-Quinn criter.	-5.565379
Durbin-Watson stat	1.890628		

Table A12: ARDL/PMG Equation Estimation Model

Dependent Variable: CYK
Method: ARDL
Date: 03/21/20 Time: 15:12
Sample (adjusted): 4 235
Included observations: 232 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): R K N CO A E H T
Fixed regressors:
Number of models evalulated: 1562500
Selected Model: ARDL(1, 0, 1, 0, 3, 0, 1, 1, 1)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
CYK(-1)	0.755110	0.034276	22.03030	0.0000
R	0.048859	0.016134	3.028257	0.0028
K	-0.012858	0.007607	-1.690298	0.0924
K(-1)	-0.008800	0.004025	-2.186535	0.0299
N	0.093357	0.018504	5.045365	0.0000
CO	0.023073	0.009082	2.540569	0.0118
CO(-1)	0.020984	0.009096	2.306900	0.0220
CO(-2)	0.002914	0.009064	0.321501	0.7481
CO(-3)	0.026723	0.008892	3.005452	0.0030
A	0.108657	0.046160	2.353908	0.0195
E	0.187711	0.015070	12.45556	0.0000
E(-1)	-0.142609	0.016235	-8.783846	0.0000
H	0.112542	0.029547	3.808943	0.0002
H(-1)	-0.084237	0.029134	-2.891375	0.0042
T	-0.256716	0.030945	-8.295902	0.0000
T(-1)	0.234873	0.030205	7.775877	0.0000

R-squared	0.881369	Mean dependent var	4.806731
Adjusted R-squared	0.873131	S.D. dependent var	0.172133
S.E. of regression	0.061312	Akaike info criterion	-2.679223
Sum squared resid	0.811969	Schwarz criterion	-2.441517
Log likelihood	326.7898	Hannan-Quinn criter.	-2.583358
Durbin-Watson stat	1.999064		

*Note: p-values and any subsequent tests do not account for model selection.

Table A13: Panel Diagnostic Tests Results

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	13.14334	Prob. F(16,215)	0.0000
Obs*R-squared	114.7163	Prob. Chi-Square(16)	0.0000
Scaled explained SS	308.4643	Prob. Chi-Square(16)	0.0000

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 4 lags

F-statistic	0.990024	Prob. F(4,212)	0.4139
Obs*R-squared	4.254220	Prob. Chi-Square(4)	0.3727

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in residuals
Equation: Untitled
Periods included: 5
Cross-sections included: 47
Total panel observations: 235
Cross-section effects were removed during estimation

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	1755.387	1081	0.0000
Pesaran scaled LM	14.50379		0.0000
Bias-corrected scaled LM	8.628792		0.0000
Pesaran CD	-1.383478		0.1665

Ramsey RESET Test
Equation: UNTITLED
Omitted Variables: Squares of fitted values
Specification: CYK CYK(-1) R N A K K(-1) CO CO(-1) CO(-2) CO(-3) E E(-1) H H(-1) T T(-1)

	Value	df	Probability
t-statistic	0.539871	215	0.5898
F-statistic	0.291460	(1, 215)	0.5898
Likelihood ratio	0.314293	1	0.5751

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.001099	1	0.001099
Restricted SSR	0.811969	216	0.003759
Unrestricted SSR	0.810870	215	0.003771

LR test summary:

	Value
Restricted LogL	326.7898
Unrestricted LogL	326.9470

Table A14: VEC-Granger Causality Tests Results

VEC Granger Causality/Block Exogeneity Wald Tests
Date: 03/17/20 Time: 14:04
Sample: 1 235
Included observations: 229

Dependent variable: D(CYK)

Excluded	Chi-sq	df	Prob.
D(K)	21.24291	5	0.0007
D(R)	1.622513	5	0.8985
D(N)	23.91296	5	0.0002
All	80.56296	15	0.0000

Dependent variable: D(K)

Excluded	Chi-sq	df	Prob.
D(CYK)	2.075015	5	0.8387
D(R)	43.40629	5	0.0000
D(N)	19.70243	5	0.0014
All	70.04255	15	0.0000

Dependent variable: D(R)

Excluded	Chi-sq	df	Prob.
D(CYK)	10.32753	5	0.0665
D(K)	13.33293	5	0.0205
D(N)	56.93455	5	0.0000
All	102.2778	15	0.0000

Dependent variable: D(N)

Excluded	Chi-sq	df	Prob.
D(CYK)	10.13794	5	0.0714
D(K)	1.608199	5	0.9003
D(R)	20.53866	5	0.0010
All	89.58546	15	0.0000

Appendix IV: Abstract of Publications

African Journal of Business Management (Academic Journals).
DOI:10.5897/AJBM2019.8824.Vol. 13(13), pp. 428-437. DOI:10.5897/AJBM2019.8824.
Publication date: July 31st 2019.

The Effect of County Government Expenditure on Gross County Product in Kenya: A panel Data Analysis

Abstract

From previous studies, the effects of expenditure on economic growth appear to provide mixed results. Despite this uncertainty, theory suggests that expenditure induce growth. In Kenya, economic growth has been fluctuating despite the devolved expenditure increasing over time. It is against this background that this study was carried out to investigate empirically the short-run and long-run effect of components of county spending on growth in Kenya using panel data set over the period 2013 to 2017. Employing Harris-Tzavalis test, the study tested for the panel unit root and found that all variables were non-stationary at their level except gross county product (GCP), human capital and non-devolved spending. To check if the variables have long-run relationship, this study applied F bounds test. The result for this test revealed that there exists a long-run relationship among the GCP growth and regressors in the model. Once co-integrating was confirmed using F-bound, the long-run and ECM estimates of the ARDL model were obtained. The ARDL results revealed that spending on recurrent expenditure exerts a positive and significant effect on economic growth both in short-run and long-run hence confirming Keynesian theory in Kenya. However, capital expenditure was insignificant during the study period. From a recommendation standpoint, this study submits that the policymakers need to put in place policies that will improve budget allocation and execution so as to improve expenditure increase to capital infrastructure. This is necessary since counties lack infrastructures that help promote private capital accumulation and consequently county GCP.

Journal of Economics and Sustainable Development www.iiste.org. DOI: 10.7176/JESD/10-14-12. Vol.10, No.14, pp. 119-125. Publication date: July 31st 2019.

Growth Effects of Non-Devolved Government Expenditure: Evidence from ARDL Approach to Co integration

Abstract

Although it is theoretically expected that fiscal decentralization leads to efficient provision of local public services and induces economic growth, there is a mixed outcome of the non-devolved and devolved effect on economic expansion across earlier empirical studies. This could be due to non-growth-enhancing expenditures that crowd-out outlays that are meant to boost economic growth. Further, devolved allocation is small, about 15 % of total revenue, to full stimulate economic growth in Kenya. However, national government spends a substantial amount in counties to complement devolved expenditure. Therefore, the issue of which non-devolved expenditure by national government can foster permanent movements in county economic growth becomes core. The panel ARDL and Kao co integration technique were used to test the linkage between non-devolved expenditure and economic growth in Kenya during the period, 2013-2017. The panel ARDL regression results revealed that the effect of non-devolved expenditure on economic growth was positive and significant in both long-run and short-run. The findings provide a basis for recommendation on the need for national government to increase budget allocation and execution in counties to complement devolved expenditure and also stimulate county economic growth in long-run.

Appendix V: Transmittal Letter

Naftaly Gisore Mose
Egerton University
Department of Economics
P.O Box 536-20115
Egerton.
15-01-2018.

To whom it may concern,

Dear Sir/Madam,

I am Naftaly, a PhD student at the Egerton University undertaking PhD in Economics. I am conducting a study entitled ***'Analysis of County Government Expenditure and County Economic Growth in Kenya.'*** To facilitate this study, you are kindly requested to participate in providing the necessary data. The information obtained will be held confidential and will only be used in this study for the intended purpose.

Thank you in advance for your co-operation.

Yours faithfully

Naftaly Gisore Mose

Appendix VI: Research Permit

THIS IS TO CERTIFY THAT:
MR. NAFTALY GISORE MOSE
of EGERTON UNIVERSITY , 0-20107
NJORO,has been permitted to conduct
research in *All Counties*

on the topic: *EFFECT OF COUNTY GOVERNMENT EXPENDITURE ON COUNTY ECONOMIC GROWTH IN KENYA: A PANEL DATA ANALYSIS, 2013-2017*

for the period ending:
20th February,2019

Permit No : NACOSTI/P/18/89917/21360
Date Of Issue : 20th February,2018
Fee Recieved :Ksh 2000

.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation

Source: NACOSTI, 2018.