UNIVERSITY OF EDUCATION, WINNEBA

EFFECT OF GOVERNMENT SPENDING ON ECONOMIC GROWTH IN GHANA

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DECLARATION

Student's Declaration

I, **EDITH MWINTUMAH** hereby declare that except reference to people's work which have been duly cited, this project work is the result of my own original research and that it has neither in whole nor part been presented elsewhere.

Signature: …….

Date: …….

Supervisor's Declaration

I hereby declare that the preparation and presentation of the project work was supervised by me in accordance with the guidelines on supervision of project works and laid down by the University of Education, Winneba.

Supervisor's Name: Dr. Eric Justice Eduboah

Signature: …….

Date: …….

DEDICATION

I dedicate this work to my husband, Daniel Zineafaar Ob-yang and my children Ezekiel Dosing, Erastus Berewone and Euphemia Mwinkum

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I sincerely express my gratitude to God Almighty. He has done a lot in my life and I am grateful for His countless blessings. I say a big thank you to my supervisor,

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ABBREVIATIONS

WDI	World Development Indicators
CUSUM	Cumulative Sum
CUSUMSQ	Cumulative Sum Squares
GDP	Gross Domestic Product
LEAP	Livelihood Empowerment Against Poverty
NHIS	National Health Insurance Scheme
ERP	Economic Recovery Program
SAPs	Structural Adjusment Programmes
GSS	Ghana Statistical Service
USD	United States Dollars
SSA	Sub-Saharan Africa
GIR	Gross International Reserves
OECD	Organization for Economic Co-operation and Development
ARDL	Auto Regressive Distributed Lag
ECM	Error Correction Model
VAR	Vector Autoregressive
ADF	Augmented Dicker Fuller
IMF	International Monetary Fund
CPI	Consumer Price Index
AIC	Akaike Information Criteria
SBC	Swartz Bayesian Criterion
FMOLS	Fully Modified Ordinary Least Squares
UECM	Unrestricted Error Correction Model
OLS	Ordinary Least Squares

ABSTRACT

Government spending plays an essential role in determining the changes in the level of national income; providing the necessities for potential output and sustaining the wellbeing of the economy. Thus, government spending on goods and services contribute to the productive potential of an economy. This study employed exploratory causal study design to assess the impact of government spending on economic growth within the context of Ghanaian economy. The study use annual time series spanning from 1970 to 2018. Data was collected from World Development Indicators (WDI). The study tested for unit root and co-integration to ascertain the existence of long run relationship among the variables. Based on the result of the unit root test, ARDL model was adopted. The result indicated that there exist both long run and short run relationship among the variables. Also, it was found that in the long run total government expenditure negatively affect economic growth. It was further realized that foreign aid and exchange rate negatively related to economic growth in the long run. Gross fixed capital formation, inflation and trade openness positively affect economic growth in the long run. It was also found that most of the short run results were consistent with the long run results. The findings also shown that there is bi-directional causal relationship between government expenditure and economic growth. The model for the study is free of serial correlation and heteroscedaticity and the model was stable over time as confirmed by cumulative sum (CUSUM) and CUSUMSQ results.

CHAPTER ONE

INTRODUCTION

1.0 Background to the Study

Government spending plays an essential role in determining the changes in the level of national income; providing the necessities for potential output and sustaining the wellbeing of the economy. This alters the distribution of income through transferring the "purchasing power output" from higher level to lower income groups. Government spending can determine the changes in the level of national income to a desired national output or to a new equilibrium of economic growth, however on the contrary, can shift the equilibrium of economic growth lower to one that fulfills the capacity of national income (Chrystal & Lipsey, 2007).

Government spending or expenditure comprises all government consumption, investment, and transfer payments. In national income accounting, the procurement by governments of goods and services for current use, to directly satiate the individual or mutual needs of the community, is classed as government final consumption expenditure. Government makes several expenses in areas such as national defense, agriculture, health, education, communication, transport, energy, social services, national debts servicing, capital investment, and its own maintenance as well as on other countries and governments (Chinweoke, Ray, & Paschal, 2014; Bhunia, 2012).

Government expenditure constitutes the spending of the government for its own maintenance, on the society and the economy as a whole. Lately, governments are increasingly getting involved in economic activities and transfer payments to other governments and/or countries. This according to Maku (2009) has resulted in public expenditure assuming upward trends practically in all countries across the globe.

Appiah (2014) divided government expenditure into capital expenditure and recurrent expenditure. This is further divided into health expenditure, infrastructure expenditure and expenditure on education (Nketiah-Amponsah, 2009), government consumption expenditure, government investment and general government transfers (Twumasi, 2012), general government final consumption expenditure and expenditure on national defence and security but excludes government military expenditures (Kamasa & Ofori-Abebrese (2015).

The debate on the correlation between government spending and economic growth of countries has caught the attention of several economists and researchers across the world for a longer period of time both theoretically and empirically (Nurudeen & Usman, 2010). The government spending growth connection has been an arena of discussion for intellectual exploitation of researchers in a bid to investigate the causal effects. Given the opining views are two main dominant theories, being that of Wagner and Keynes. Initiating a model that government spending is endogenous to economic growth, Wagner (1883) posits that growth in an economy can cause an expansion in government spending. Keynes (1936) on the other hand argues that during a period of recession, economic activities can be spurred up by the use of fiscal policies. According to Keynes (1936) increased government expenses has a great potential of increasing employment, profitability and investment through its multiplier effects on collective demand. Hence, economic growth can be influenced positively by government expenditure; recurrent and capital.

Various empirical studies on the relationship between government expenditure and economic growth have given contradictory results. Some studies suggest that increase in government expenditure on socio economic and physical infrastructures impact on long run growth rate. High levels of government consumption are likely to increase

employment, profitability and investment via multiplier effects on aggregate demand. Thus, government expenditure, even of a recurrent nature, can contribute positively to economic growth. On the other hand, endogenous growth models such as Barro (1990), predict that only those productive government expenditures will positively affect the long run growth rate. If government spending is zero, presumably there will be very little economic growth because enforcing contracts, protecting property, and developing an infrastructure would be very difficult. In other words, some government spending is necessary for the successful operation of the rule of law (Mitchell, 2005).

The economic growth of Ghana has undergone volatile movements over the past four decades (Ho & Njindan, 2018). According to the World Bank (2019), Ghana's economy continued to grow in 2019 with the first quarter gross GDP growth projected at 6.7%, compared with 5.4% in the same period of 2018. The comparatively high quarterly growth was driven by a strong recovery in the services sector which grew by 7.2% compared with 1.2% in 2018. This strong boost in the services sector is a product of the government investment and focus on agriculture as the engine of growth and jobs creation, and the fiscal consolidation is paying off (World Bank, 2018).

1.1 Statement of the Problem

Ghana's economic outlook presents a seemingly disconsolate picture in spite of the numerous government's spending in the various sectors of the economy. Thus, the level of spending does not reflect the level of economic growth. This is against the assertion that economic policy processes, including directed government spending and taxation remain one of the two main sets of macroeconomic tools possessed by governments to boost growth, improve macroeconomic stability, and shape viable

social outcomes (Garry & Valdivia, 2017). According to data from the World Bank, governments in developing countries spend over 40% of their GDP on goods and services (World Bank, n.d). The growing importance of government spending in most countries has prompted a significant amount of research on the relationship between the size of government spending and economic growth (Bojanic, 2013).

The role of government in a developing country like Ghana cannot be overemphasized. As the highest employer and spender, government expends to pay for remuneration, provide social amenities, merit goods, social interventions or transfer payment as well as ensuring growth. Ghana over the years has made significant efforts to reduce poverty, increase income and provide greater access to education, health and other essential social services to its citizens. For instance, the central government has increased its expenditure size by absorbing school fees in all basic schools and senior high schools in the country and building new classroom blocks, implementing the National Health Insurance Scheme (NHIS), the implementation of the Livelihood Empowerment Against Poverty (LEAP), construction of major roads, hospitals, bridges, water and sanitation systems among others, all with the intent of ensuring economic growth and development in Ghana.

Government spending is autonomous, and therefore will spend regardless of the size of revenue, (Cullis & Jones, 2009) emphasizing potential leakages in the circular flow of income and the changing pace of economic growth. Government activities, particularly expenditure, play an active role in promoting macroeconomic performance of a country (Chude & Chude, 2013; Ebaidalla, 2013). For instance, Barro and Redlick (2009) established that economic growth responds measured by real GDP positively to changes in each component of government spending more

importantly current defense spending of the government. However, concerns have, been raised about the level of economic growth particularly in terms of employment, inequality and general improvement in the livelihood of Ghanaians. Moreover, the growth figures have not been matched with improved livelihoods, raising doubts about the trickle-down effects of growth. As pointed out by Price Waterhouse Coopers (2019), Ghana's economy has witnessed declining investments in the public sector over the last few years. For instance, capital expenditure declined from 5.4% of GDP in 2014 to 1.6% of GDP in 2018 which has had negative implications for growth, job creation and public service delivery. Rebalancing expenditures during fiscal consolidation for public investment such as roads, rail and energy should improve public service delivery and create a competitive business environment for the private sector development.

The size and structure of public spending determine the pattern and form of growth in output of the economy. Quartey (2019) asserts that the remunerations and interest payments represents 27.12% and 25.9% respectively in the 2020 budget thus restricting the fiscal space for capital spending. Thus, undoubtedly tax exemptions, high interest imbursement and revenue shortfalls may pose challenges to the economy thereby affecting capital spending and stifling growth.

According to Quartey (2019), Ghana's nominal public debt stock as at the end of September 2019 was GH¢208.56 billion representing 60.55% of GDP. The rate of debt accumulation as at was 20.51% and 14.33% (exclusive of the financial sector bailout). It is not just the size of the debt that matters, but what kind of spending covering the loaned funds. Questions have been raised on the costs and benefits of government expenditures on different items at different times, resource misallocation and inefficiencies in government spending which are significant sources of

distortions in the Ghanaian economy. The yearly Auditor General's reports, financial statement and budgets of government as well as state of the nation's addresses indicate that government spends sometimes in excess of its budget to meet its developmental targets. However, while government expenditure has being on the increase, the economic growth rate continues to fluctuate, sometimes recording negative growth in some critical sectors. The reasons of much of the disparities in the nation's economic growth over time in spite of government spending are not well implicit.

1.2 Objectives of the Study

The main objective of the study is to determine the effect of government spending on the growth of the Ghanaian economy. Specifically, the study seeks to

1. To establish the short run relationship between government spending and economic growth.
2. To establish the long run relationship between government spending and economic growth.
3. To establish the causality between government spending and economic growth

1.3 Research Hypotheses

To assess the effect of government spending on economic growth in Ghana, the null hypotheses are stated as follows:

1. H_o: There is no short run relationship government spending and economic growth in Ghana.

   H_a: There is short run relationship between government spending and economic growth in Ghana.
2. H_0 : there is no long run relationship government spending and economic growth in Ghana.

H_a: There is long run relationship between government spending and economic growth in Ghana.

3. H_0: There is no causality between government spending and economic growth.

   H_a: There is a causality between government spending and economic growth.

1.4 Purpose of the Study

The purpose of the study is to establish the relationship between government spending and the growth of the economy.

1.5 Significance of the Study

A greater number of studies have attempted to investigate the channels through which different types of government spending can affect growth. However, in most cases, such studies have produced inconclusive results as observed by Maingi (2017). The relevance of government spending in any economy cannot be overemphasized. A principal question is whether or not government spending increases the long run steady state growth rate of the economy. The general view is that government spending can be growth-enhancing although the source of financing of such spending can be growth-retarding. Therefore, exploring the growth impact of government spending in a developing economy like Ghana is very essential. On the back of this, it is expected that the findings of the study would provide better insight for economists, researchers and policy makers to identify which sector(s) of the government spending will encourage growth of output more in Ghana. In effect, it will guide policymakers regarding how the scarce resources of the country will be distributed among the government expenditure components. Again, the course of connection between the government expenditure components and economic growth will be established. Lastly, this work will also be an addition to the store of literature on the topic and serve as a guide for further studies.

1.6 Delimitation/Assumptions of the Study

The study assumes that government spending provides financial or capital injection into the local economy translating into supply of liquidity and hence growth of other sectors of the economy.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction

This chapter seeks to review related literature that is, both theoretical and empirical literature on government spending and economic growth. Theories related to this topic will be reviewed and also views and findings from different researcher on this topic and related topics will be analysed in this chapter. The following headings and sub-headings will be discussed under the literature review:

Conceptual review

Theoretical review

Empirical review

2.1 The Concept of Government Spending

The understanding of government spending is widespread with several perspectives of the definition of the concept. For instance, Blanchard (2007) described government spending as the purchase of goods and services by the federal, state or local government and does not include government transfers such as medicare, social security payments or interest payments on the government debt. On the other hand, Chinweoke, Ray, and Paschal (2014) defines government spending or expenditure to comprise all government consumption, investment, and transfer payments. The acquisition by governments of goods and services for current use, to directly satisfy the individual or collective needs of the community, is classed as government final consumption expenditure.

Government acquisition of goods and services intended to create future benefits, such as infrastructure investment or research spending, is classed as government

investment (government gross capital formation). These two types of government spending, on final consumption and on gross capital formation, together constitute one of the major constituents of gross domestic product. Government spending can be financed by government borrowing, or taxes. A change in government spending is a major component of fiscal policy used to stabilize the macroeconomic business cycle (Chinweoke et al., 2014).

According to Bojanic (2013), government spending or expenditure includes all government consumption, investment, and transfer payments. Government spending may be categorized into current and capital expenditure. Current expenditure involves civil servants salaries, and capital expenditure that really affects aggregate demand and ranges from investment in infrastructure and government subsidies. In the view of Twumasi (2012) governments spend to meet the expectations of its citizenry in response to high population growth and increase demand for goods and services. Thus, governments may expend in an attempt to stimulate private investment leading to economic growth.

Rodrigo (2012) asserts that government expenditure provides opportunities to reach the productive potential of an economy and foster growth of national income. That is, government expenditure is important in stimulating aggregate demand to stimulate productive output, increasing induced consumption spending and providing opportunity for higher disposable incomes. The government expenditure can determine changes in the level of national income through their influence in aggregate demand.

According to Barro (1991) high rate of government spending have a negative effect on economic growth rate. Consequently, government inability to control public

spending may hinder economic growth performance in the long-run. Despite the downside risks, Ghana‘s growth prospects are positive in the long-run (Raggl, 2014).

2.2 Ghana’s Economic Development

According to Fosu and Aryeetey (2006), Ghana‘s economy experienced some stability and development after independence from Britain in 1957. At independence, President Kwame Nkrumah sought to use the seeming stability of the Ghanaian economy as a springboard for economic diversification and expansion. He began the process of transiting Ghana from a primarily agricultural economy to a mixed agricultural-industrial one. Using cocoa proceeds as security, Nkrumah took out loans to establish industries that would produce import substitutes as well as process many of Ghana's exports. Nkrumah's plans were ambitious and grounded in the desire to reduce Ghana's vulnerability to world trade. However, the price of cocoa collapsed in the mid-1960s, destroying the fundamental stability of the economy and making it nearly impossible for Nkrumah to continue his plans.

Darko (2015) observed that since the overthrow of Nkrumah in 1966, the Ghanaian economy has experienced high rate of unpredictability in the 1970s and early 1980s due to political instability. Specifically, in 1978, 1979 and 1982 showed negative growth rate partly due to military coups in 1978, 1979, 1981 and 1982 under the leadership of Flight Lieutenant Jerry John Rawlings. In addition, the economy of Ghana nearly collapsed in 1983 when inflation hit 123% because of the devastating drought which reduced the production of main agricultural commodities and other export crops such as cocoa (Anyemedu, 1993).

The fall of export in 1983 decreased both real GDP growth and real gross fixed capital formation because agriculture was the pivot of the Ghanaian economy. This

supports the argument made by Jong-a-Pin (2009) which submits that a high degree of political instability slows down economic growth. Aisen and Veiga (2006) also points out that political instability also lead to higher inflation. Ghana had a relatively high inflation averaged more than 50% a year between 1976 and 1981. But in 1981 inflation rate was 116.5% as a result of the military coup in 1981. According to the World Development report of 1987, a high rate of inflation increases uncertainty, discourages investment, distorts relative prices, and stands in the way of sustainable growth.

Darko (2015) posits that the primary cause of poor macroeconomic performance such as per capita gross domestic product (GDP) and inflation rate in Ghanaian economy of the pre-Structural Adjustment Programme (SAP) era may be attributed to political instability. This has resulted in high volatility of GDP per capita growth from 1975-1984. In developing countries in Africa and Latin America the 1980s were called the lost decade, because it was a decade of negative growth rates (Fischer, 1991). This resulted in the implementation of the Economic Recovery Program (ERP) under the SAPs in 1983. The aim of this program was to restore the Ghanaian economy and its external equilibrium in order to make the economy more efficient and sustainable, and thereby increasing economic growth as well (World Bank 1988, 1990a).

More specifically, Economic Recovery Program One (ERP I), the first phase of the SAPs, emphasized the promotion of the export sector and an enforced fiscal discipline, which together aimed to eradicate budget deficits. This resulted in constant growth in GDP, reduced inflation, created budget surplus, and increased export earnings after 1983. After a year of implementation of the structural reform, the economy responded positively from its negative growth rate of about 5% in 1983 to a hefty positive rate of 8% in 1984. The quick response of economic growth in 1984

was attributed to income received from privatization of state-owned industries and resources. The aim of this policy was to increase efficiency and investment and decrease state spending. This generated a fiscal surplus that increased growth in 1984 after the structural adjustment policy in 1983. Favorable growth continued for the next 30 years, high inflation rate had been reduced to about 12% for the last five years. GDP growth has been exceptionally strong during the last decade averaging 7.38% (Darko, 2015).

According to Alagidede, Baah-Boateng and Nketiah-Amponsah (2013), Ghana's economy has seen a resilient performance in the past three decades with the adoption of market-led economic policies and programmes with little participation of government in direct economic activities. The country's economic recovery from recession in the early 1980s from the economic reform and structural adjustment programme, and the sustained growth since then has earned the country a lot of recommendations in terms of economic achievement. The country an annual average growth of 5.2 % between 1984 and 2010 and became a lower middle income country after a rebasing of its national accounts in 2010 with a change in the base year from 1993 to 2006. This rebasing propelled the annual average growth to 8.3 % between 2007 and 2012. With the coming into force of commercial production of oil which contributed 5.4 percentage points (oil-GDP) to the 15.0 % real GDP growth in that year, Ghana assumed a privileged position as one of the six fastest growing economies in the world that year.

The Ghanaian economy has undergone several changes and available statistics show that the GDP recorded a growth ranging from 4.0% and 15.0% for the period between 2005 and 2013, whilst the size of government's expenditure in nominal terms increased from GH¢2,970.62 million to GH¢26,277.17 million (GSS, 2014). In 2011,

Ghana achieved its highest economic growth of 15.0% as the result of discovery of oil from the Jubilee oil field and high prices of its primary-commodity export in the international market. The revenue from export receipts such as; oil (USD 2.6 billion), gold (USD 4.5 billion) and cocoa USD 1.9 billion) increased Gross Domestic Growth (GDP) and government revenues in 2011 and this contributed significantly to poverty reduction6. This raised the question about the expected impact of natural resources on growth specifically oil rents and non-oil rents (mineral). However, the fiscal deficit fell from 5.9% of GDP in 2010 to an estimated 4.3% in 2011 due to strong revenue performance from exports from oil, gold and cocoa. In 2013 growth decelerated to 4.4%, considerably lower than the growth of 7.9% achieved in 2012. Moreover government consumption expenditure bloated in 2012, which is marked by an unprecedented budget deficit in the history of Ghana of around 12% of GDP. The situation persisted in 2013, with about the same level of budget deficit. In addition, continuing widening of budget deficit has been a major constraint to fiscal and debt sustainability and this has been a major concern among policymakers in Ghana of late. The Ghanaian economy has consistently performed better than Sub-Saharan Africa countries in terms of economic performance. The total economic performance of Ghana has expanded at an average annual rate of 9.70% from 1980 to 2013 compared to other Sub-Saharan Africa (SSA) countries which have recorded an average expansion rate of 7.02%. Additionally SSA average growth rate was higher than Ghana in early 1980s due to political instability but after the structure adjustment reform in 1983 the Ghanaian economy has been better than that of Sub Sahara Africa countries (Darko, 2015).

The World Bank (2019) reported Ghana‘s economy continued to expand in 2019 as the first quarter gross domestic product (GDP) growth was estimated at 6.7%,

compared with 5.4% in the same period of last year. Non-oil growth was also strong at 6.0%. The relatively high quarterly growth was driven by a strong recovery in the services sector which grew by 7.2% compared with 1.2% in 2018. The government continued with its fiscal consolidation efforts in 2019 even though there were still challenges in meeting the revenue targets**.** Fiscal performance for the first half of 2019 showed an overall budget deficit (on cash basis) of 3.3% of GDP higher than the target of 2.9% of GDP. This is because the revenue shortfall of 1.6% of GDP was higher than expenditure cuts of 1% of GDP. Private sector credit grew stronger, supported largely by the well-capitalized banking sector. Inflation continued to be in single digit in the first six months of 2019, gradually rising from 9% in January to 9.5% in April 2019 but reduced to 9.1% in June 2019 mainly driven by low food inflation. Ghana's current account in the first half of 2019 was estimated at a surplus of 0.1% of GDP supported by favorable trade conditions of Ghana's three main export commodities; oil, gold and cocoa, resulting in a trade surplus of 2.8% of GDP. The current account surplus, combined with significant inflows to the capital and financial accounts, resulted in an overall balance of payments surplus equivalent to 1.9% of GDP. With the issuance of the $3 billion Eurobond in March 2019, the international reserves significantly improved in 2019 with Gross International Reserves (GIR) of $8.6 billion (equivalent to 4.3 months of import cover) at the end of June 2019. The Ghana cedi came under considerable pressure in the first quarter of 2019, due to high demand, as importers sought to restock their supplies but, in the second quarter, the domestic currency market became relatively calmer. The Ghana cedi cumulatively depreciated by 8.2% in the year to July 18, 2019. Economic growth is projected to increase to 7.6% in 2019. Non-oil growth is expected to accelerate to 6% as the government's new policies in the agriculture sector and the promotion of agribusiness

begin to take effect. Inflation is expected to remain within the Central Bank's target range of 6-10% over the medium term. The pace of fiscal consolidation is expected to slow in 2019 and the overall fiscal deficit is projected at 4.5% of GDP in 2019 and, in the medium term, it will remain within fiscal rule ceiling of 5% of GDP (World Bank, 2019).

2.3 Types/Areas of Government Spending

According to Idris and Bakar (2017), the major reasons for government expenditure in an economy are to provide the essential and required facilities needed for maintaining of law and order and further enhance allocative efficiency in the presence of externalities and also to provide all the necessary and required infrastructural facilities that will enhance productivity and encourage economic activities in the long-run. This is against the backdrop that private investment alone will not provide the necessary and productive business environment required for long-term growth and sustainable development.

According to OECD (2017) government and/or public expenditures can also be classified by the economic nature of the transaction they entail, from wage compensations of the civil service, one-time capital expenditures, the financing of a subsidy or a cash transfer such as pensions or unemployment benefits, to the procurement of goods or services from the private sector that are used as inputs in the government production (i.e. intermediate consumption).

Government spending may be in different forms or areas of the economic value chain. For instance, Nakyea and Addo (2009) observed that government expenses could be on both marketed and non-marketed goods. Most non-marketed goods are produced by the market in limited quantities due to low price signals associated with them while

marketed goods on the other hand are often expensive and government subsidizes the price of such goods given to consumers by the market. Ketema (2006) posited that the components of government spending included human capital, Investment and consumption.

Appiah (2014) divided government spending into capital expenditure and recurrent expenditure. This is further divided into health expenditure, infrastructure expenditure and expenditure on education (Nketiah-Amponsah, 2009), government consumption expenditure, government investment and general government transfers (Twumasi, 2012), general government final consumption expenditure and expenditure on national defence and security except government military expenditures (Kamasa & Ofori-Abebrese, 2015). Public expenditure is incurred in the form of purchases of goods and services, transfer payments and lending. Purchase of goods and services is intended to carry out governmental activities by the direct utilization of economic resources for example, purchase of articles from the market right from paper clips to military aircraft. Transfer payments and lending are intended to provide enterprises and households with purchasing power to enable them to buy goods and services in the market. In many developed countries, transfer payments for social welfare constitute a sizeable portion of government budgets. In developing countries, some of the functions of transfer payments are performed by subsidies to consumers in the form of below cost sales by state enterprises. This results in public expenditure assuming upward trends practically in all countries across the globe Maku (2009). In the words of Mitchell (2005), government spending is necessary for the successful operation of the rule of law because with zero government spending, presumably there will be very little economic growth as a result of difficulty in enforcing contracts, protecting property, and developing an infrastructure.

In national income accounting, the procurement by governments of goods and services for current use, to directly satiate the individual or mutual needs of the community, is classed as government final consumption expenditure. Government makes several expenses in areas such as national defense, education, agriculture, health, transport, communication, energy, national debts servicing, social services, capital investment, and its own maintenance as well as on other countries and governments (Bhunia, 2012; Chinweoke, Ray, & Paschal, 2014).

According to Nakyea and Addo (2009), government spending may include expenditure on both marketed and non-marketed goods. Many non-marketed goods are produced by the market in limited quantities due to low price signals associated with them while marketed goods are often costly and government subsidizes the prices of such goods given to patrons by the market. Government may decide to supply such goods for free to a point beyond which it will not assist again. For instance, when government decides to provide free education from Junior Secondary School to Senior Secondary School level beyond which parents would have to provide at a fee.

2.4 Theoretical Literature

2.4.0 Theories of Government Spending/ Expenditure

A number of growth theories have been proposed and applied by economist and economic researchers on the government expenditure that try to ascertain the determinants and/or components of same in any given economy. Due to the diversified postulations of these economic theories, there remains no clarity or one universally accepted elements that determine government expenditure.

2.4.1 Wagner Law of Increasing State Activities

Wagner (1893) proposed an expenditure model which states that increases in per capita income is directly proportional to increases government expenditure. Wagner's model is based on the assumption that as a country grows, there will be pressure on government to provide more goods and services to meet the growing economic needs which comes with spending. For instance, government may need to provide certain commercial services like banking facilities, come up with regulations and legislations to ensure law and order which has cost elements to be borne by government.

2.4.2 Keynesian theory

The Keynes (1936) theory postulates that public expenditure is a tool adopted by the government to turn around economic downturns through various spending programmes. Thus, economic growth is an outcome of public expenditure. Keynesian theory upholds that an active role of government spending policy can be effective in managing the economic growth of a country. Keynesian theory views government spending as a variable that could be employed as a policy instrument for growth. With regards to the Keynesian macroeconomic theory, government spending can influence economic growth positively by aggregate demand. Thus, when government increases its spending without crowding-out private consumption then aggregate demand would grow, as well as output and employment. Therefore, an increase in government spending is highly probable to result in an increase in the levels of employment, profitability and investments through the multiplier effect on aggregate demand. Keynesian macroeconomics, therefore, suggests increases in government spending to circumvent economic downturns in an economy and vice versa. This view of Keynes was in contrast with those of classical and neoclassical economic analysis of government spending (Keynes, 1936).

2.4.3 Peacock and Wiseman's Theory of Expenditure

Peacock and Wiseman's (1961) model of the determinants of government spending proposes that government expenditure is possible to increase in times of crisis like wars, droughts and famine because people are willing to pay extra tax. According to Peacock and Wiseman (1961), when government spending increases temporarily during crisis, people expect expenditure to fall back to normal in the near future after the crisis is over. Government income is however displaced upwards and it may become difficult for government to reduce its expenditure even after the crisis to the original level. This argument was corroborated by Barro (1987) in a study in the United Kingdom. Barro (1987) found that temporary increase in government military spending had an effect on macroeconomic variables like interest rate as compared to a permanent increase.

2.4.4 Musgrave and Rostow's Theory of Expenditure

This development model of government expenditure growth was hypothesized by Musgrave (1969) and Rostow (1960). According to Musgrave (1969), public sector investment as a proportion of total investment of an economy is noted to be high due to the fact that, public capital creation is a great necessity at this stage. Where, public sector investment includes basic social infrastructure overheads like education, potable water, law and order, good roads and highways and good health systems. Government after achieving the developmental stage seeks assistance from private sectors in the economy. Musgrave (1969) and Rostow (1973) described the development stage as the take-off stage of every country's growth since it pushes the economy into the middle stages of economic and social development (Ketema, 2006). At this stage, government is said to spend extensively in this area. The proponents of the theory noted that, market failures which stalled an economy's swift drive towards

maturity necessitated the involvement of government in the economy. At the maturity stages of a nation‘s development, a nation‘s expenditure shifts from infrastructure to education, health and welfare services. To support their assertion is the ―Hirschmanian" condition cited in Nakyea and Addo, (2009) which stipulates that the provision of infrastructure at the early stage of development is a ―permissive force" for investor motivation.

2.5 Growth Theories

2.5.1 Neoclassical Growth Theory

Neoclassical growth theory is an economic theory that outlines how a steady economic growth rate result from a combination of three driving forces- labour, capital and technology. The simplest and most popular version of the neoclassical growth model is the Solow-Swan growth model. The National Bureau of Economic Research names Robert Solow Trevor Swan as having the credit of developing and introducing the model of long run economic growth in 1956. The model first considered exogenous population increases to set the growth rate, but in 1957 Solow incorporated technological change into the model. The theory states that short term equilibrium results from varying amount of labour and capital in the production function. The theory also argues that technological change has a major influence on an economy and economic growth cannot continues without technological advancement.

Neoclassical growth theory outlines the three factors necessary for a growing economy. These are labor, capital, and technology. However, neoclassical growth theory clarifies that temporary equilibrium is different from long-term equilibrium, which does not require any of these three factors. This growth theory posits that the accumulation of capital within an economy, and how people use that capital, is

important for economic growth. Further, the relationship between the capital and labor of an economy determines its output. Finally, technology is thought to augment labor productivity and increase the output capabilities of labor.

Therefore, the production function of neoclassical growth theory is used to measure the growth and equilibrium of an economy. That function is Y = AF (K, L).

- Y denotes an economy's gross domestic product (GDP)
- K represents its share of capital
- L describes the amount of unskilled labor in an economy
- A represents a determinant level of technology

However, because of the relationship between labor and technology, an economy's production function is often re-written as Y = F (K, AL).

Increasing any one of the inputs shows the effect on GDP and, therefore, the equilibrium of an economy. However, if the three factors of neoclassical growth theory are not all equal, the returns of both unskilled labor and capital on an economy diminish. These diminished returns imply that increases in these two inputs have exponentially decreasing returns while technology is boundless in its contribution to growth and the resulting output it can produce. Neoclassical growth theory operates on the following assumptions: Capital is subject to diminishing returns: An important assumption of the neoclassical growth model is that capital (K) is subject to diminishing returns provided the economy is a closed economy. Impact on total output: Provided that labor is fixed or constant, the impact on the total output of the last unit of the capital accumulated will always be less than the one before. Steady state of the economy: In the short term, the rate of growth slows down as diminishing

returns take effect, and the economy converts into a –steady-state" economy, where the economy is steady, or in other words, in a relatively constant state.

In conclusion, in the neo classical theory, **o**utput as a function of growth: The neoclassical growth model explicates that total output is a function of economic growth in factor inputs, capital, labor, and technological progress. Growth rate of output in a steady-state equilibrium**:** The growth rate of total output in a steady-state equilibrium is equal to the growth rate of the population or labor force and is never influenced by the rate of savings. Increased steady-state per capita income level: While the rate of savings does not influence the steady-state economy growth rate of total output, it does result in an increase in the steady-state level of per capita income and, therefore, total income as well, as it raises the total capital per head. Long-term growth rate: The long-term growth rate of an economy is solely determined by technological progress or regress.

2.5.2 Endogenous Growth Theory

The endogenous growth was first created due to deficiencies and dissatisfactions in the idea of how exogenous factors determined long-term economic growth. In particular, the theory was established to refute the neoclassical exogenous growth models, as it made predictions about economic growth without factoring in technological change. The endogenous growth theory challenges such an idea by placing importance on the role of technological advancements. Since long term economic growth is derived from the growth rate of economic output per person, it would depend on productivity levels. In turn, productivity would depend on the progress of technological levels. In turn, productivity would depend on the progress of technological change, which relies on innovation and human capital: these factors are considered to be internal to an economy, not external. The endogenous growth theory

states that economic growth is generated internally in the economy, that is, through endogenous forces, and not through exogenous ones. The theory contracts with the neoclassical growth model, which claims that external factors such as technological progress, among others are the main sources of economic growth.

Economists who believe in the endogenous theory emphasize the need for the government to provide incentives and subsides for business in the private sector. It motivates business to invest in research and development so they can continue to drive innovation. There are increasing returns to scale by investing in human capital through education or training programs. Doing so can improve the quality of labour, which increases productivity. The government should enact policies that help entrepreneurs, which creates new businesses and new jobs. Investments should also be made to improve infrastructure and manufacturing processes in order to achieve innovation in production. Intellectual property rights, such as copyrights and patents are incentives for business to expand their operations. According to endogenous growth theory, governmental policies can raise an economy‘s growth rate if the policies are directed toward enforcing more market competition and helping stimulate innovation in products and precesses. There are increasing returns to scale from capital investment in the ―knowledge industries" of education, health, and telecommunications. Private sector investment in research and development (R&D) is a vital source of technological progress in the conomy.

2.6 Relationship between Government Spending and Economic Growth

According to Nworji, Okwu, Obiwuru and Nworji (2012), economic growth denotes an increase in a country‘s potential GDP, though this varies subject to how national product has been measured. Most countries commonly apply fiscal policy achieve accelerated economic growth. Fiscal policy relates to the use of fiscal instruments

such as taxation and spending to stimulate the working of the economic system in order to maximize economic welfare with the principal objective of promoting long-term growth of the economy (Tanzi, 1994).

Nakyea and Addo (2009) identified three primary effects of government spending. The allocative effect which show how government through its expenditure is able to put scarce resources to effective use in producing goods and services. Secondly, the redistributive effect which considers how government through its expenditure bridges income gaps to achieve maximum social welfare in the society. Lastly is the stabilization effect which also defines how government through its expenditure is able to accomplish specific targets in the economy.

Oyinlola and Akinnibosun (2013) trace the theoretical background of the connection between government spending and economic development from the period of Wagner (1883) to Keynes (1936), Peacock and Wiseman (1961), and later to Musgrave (1969). This relationship considers two primary schools of thought. The first school of thought on the effect of government expenditure on economic growth proposed by Wagner (1883) argues that expansion in government spending is the outcome of economic growth since growth of the economy widens the role and the activities of the government, and eventually escalates public expenditure. The second school of thought hypothesized by Keynes (1936) affirmed that public expenditure is a tool adopted by the government to turn around economic downturns through various spending programmes. Therefore, economic growth is an outcome of public expenditure. The Keynesian theory upholds that government spending as a variable which could be used as a policy instrument for growth. From the Keynesian macroeconomic view, government spending can influence economic growth positively through aggregate demand. Thus, when government increases its spending

without crowding-out private consumption then aggregate demand would grow, as well as output and employment.

Todaro and Smith (2003) taking into account the context of the neoclassical growth theories, posits that government activities, especially public spending play no significant role in provoking the long-run economic growth rate of an economy. This is because economic growth is determined by the exogenous variables such as population growth and technological progress rates.

For CEPAL (2014), investment and public spending behaviour do not only affect the rate of capital buildup, but also directly influence productivity which is an essential component of overall macroeconomic growth. Capital accumulation and targeted investments across industries are crucial for long-term growth and structural upgrading. Both public and private sector investment are key for stimulating productivity gains and generating economic expansion, thus creating a virtuous cycle of sustainable growth. Public investment can also enhance the availability of fiscal space, stimulating growth and thus enhancing future revenue streams.

Twumasi (2012) argued that taxes and government spending have significant long-run impacts on the economic growth of Ghana. The study noted that the level of government spending and taxes in an economy can be effective in managing economic growth both in the short run and the long run. It was also manifest that the set of non-fiscal variables in the study also had significant impact on economic growth in Ghana. In a related study by Sakyi and Adams (2012) on the effect of democracy, openness and government spending on economic growth in Ghana for the period 1960–2008 with the help of an Auto Regressive Distributed Lag (ARDL) model, found out that democracy and government spending do not have positive long

run and short-run impact on economic growth but theory was fulfilled when democracy and government expenditure were interacted.

The government of Ghana over the years has attempted to ensure sustained economic growth. This could be seen in the government‘s effort to improve infrastructure, sanitation, health care, education, defense, energy supply, among others (Yearbook, 2013). For instance within the period 2005 and 2013, as the government total expenditure in nominal terms increased from GH¢2,970.62 million to GH¢26,277.17 million, the GDP growth rates ranged between 4.0% and 15.0% with the highest growth rate recorded in 2011 and the least in 2009. Government expenditure and GDP growth over the period was not proportional. Whereas government witnessed continuous increase in its expenditure, the annual GDP growth rates were fluctuating (GSS, 2014).

2.7 Review of Empirical Literature

Antonis (2013) empirically tested the relationship between economic growth and government spending in Greece from 1833 to 1938 using an Autoregressive Distributed Lag (ARDL) Co-integration method of analysis. The study found a positive and statistically significant effect of economic growth on government expenditure in the long run. This result was in line with Wagner‘s hypothesis.

Georgantopoulos and Tsamis (2012) studied the short run and the long run relationships between money supply, inflation, government expenditure and economic growth using the Error Correction Model (ECM) and Johansen co-integration test respectively for Cyprus using annual data from 1980 to 2009. It was found that public spending promoted economic development in Cyprus. Conversely, debit financing by the government caused more liquidity effects and also inflationary pressure on the

economy. The results showed that inflation negatively affected economic growth possibly as a result of adverse supply shock. The authors posited that money supply should be allowed to grow according to the real output of the economy however excess growth of money causes inflationary pressure in case of Cyprus.

In another study by Al-Fawwaz and Al-Sawai'e (2013) which surveyed the correlation between real GDP and government expenditures in Jordan for the period 1990-2010 using the Vector Autoregressive (VAR) model. The results revealed that there is a unidirectional effect from real government spending to real GDP. This result is in contradiction to Wagner's law, but agrees with the Keynesian's theory, which states that expenditure is a part of the effective demand, which affects GDP.

A related study was conducted by Bhunia (2012) in India for the period spanning 1991 to 2010 specifically focusing on sectorial expenditures namely, security, health, education, transportation and communication and agriculture. In the study, Johansen approach to co-integration and error-correction test were employed. The result showed that in the short-run, expenditure on agriculture was negatively correlated to economic growth. The impact of education, though also negative was insignificant. The impact of expenditure on health was found to be positively related to economic growth. However, expenditures on national security transportation and communication were positively related to economic growth, though the impacts were not statistically significant.

Sobhee (2010) empirically assessed the effect of globalization on public spending in Sub – Saharan Africa after controlling for peculiarities. The study had the objective of filling the gap by providing a more robust econometric estimate using Kaufmann et al. (2005) six measures of institutional quality. Findings of the study indicated that

globalization has an impact on public spending, hence making it vulnerable to external risks like a fall in investment and export prices. Moreover, it was found that economic growth was influenced by public expenditure to reinforce Wagner s hypothesis. Institutional quality, Political Instability and Regulatory Quality, were also noted to significantly affect public spending. State control enhancement over market imperfections expanded public sector spending base.

Nurudeen and Usman (2010) carried out a study in Nigeria using a disaggregated approach to determine the components (total capital expenditure, total recurrent expenditure, transport and communication, education and health) of government expenditure that enhances growth for the period of 1970-2008. The study used co-integration and error correction methods of analysis and the econometric results indicated a negative impact of both total capital and recurrent expenditures on economic growth in the long run. However, a similar study by Aladejare (2013) revealed a contrary result. Expenditure on education was found to have a decline on economic growth. The authors explained that, these key components had a negative impact on growth due to improper utilization of allocated funds to the sectors. However, government expenditure on transport, health and communication had a positive effect on economic growth in the long run.

A study conducted by Nketiah-Amponsah (2009) in Ghana on the impact of government spending on economic growth for the period 1970-2004 using time series estimation technique revealed that aggregated government expenditure had a negative effect on economic growth. Another study by Twumasi (2012) assessed the fiscal policy impact on economic growth for the period 1981-2008 where stationarity of variables were checked using the DF-GLS test and the bounds. The empirical results indicated a positive effect of fiscal policy on economic growth. Again, control

variables such as terms of trade, private investments and labour force were found to have a positive impact on economic growth. On the contrary, tax revenue was found to have a negative effect on economic growth. While Ebaidalla (2013) indicated that government expenditure influences economic growth positively, Appiah (2014) highlighted that economic growth drives government expenditure growth in Ghana.

Kamasa and Ofori-Abebrese (2015) investigated the connection between government expenditure growth and economic growth. The study empirically analyzed the causal relationship between government expenditure growth and GDP growth in Ghana for the period 1980–2010 using the vector autoregressive (VAR) and Granger causality analysis developed by Sims (1980) and Granger (1969). Granger causality test conducted provided a unidirectional connection running from GDP growth to government expenditure growth. This finding affirms the Wagner‘s law of expanding state activities for Ghana. The result also proposes that government must focus on policies that would create the enabling environment for growth to thrive rather than increasing its expenditure with the aim of increasing GDP growth.

Branson (2002) has opined that generally economic growth theory describes long-run growth trend of the economy and/or potential growth path. It focuses on the factors that lead to economic growth over time and analysis of the forces that allow some economies to grow rapidly, some slowly and others inhibited. For instance, Ranjan and Sharma (2008) studied the effect of government development spending on economic growth for the period 1950-2007. The study findings revealed a significant positive impact of government expenditure on economic growth. The report also found a co-integration among the variables. Some studies disentangled government expenditures and used a multivariate co-integration analysis to examine the effect of each sector on economic growth. It was proven that in long run, government spending

on education had a positive effect on economic growth, while government spending on defence and health had negative effects on economic growth. Abu and Abdullahi (2010) carried out a short-run analysis of recurrent and capital expenditures and government spending on education, defence, agriculture, health and transport communication sectors effect on the economic development of Nigeria. The study revealed that government's total capital expenditure, total recurrent expenditure, and government expenditure have negative effects on economic growth. Quite the reverse, the rising government expenditure on transport, communication, and health results to an increase in economic growth.

Similarly, Maku (2009) assessed the relationship between government spending and economic growth in Nigeria over the past three decades using time series data to analyze the Ram (1986) model and regression real GDP on private investment and human capital investment. The study tested for the presence of stationary in the variables using the Augmented Dicker Fuller (ADF) unit root test, and used the co-integration test to establish the long-run relationship among variable, and the Error Correction Model (ECM). Empirical results indicated that public and private sector investments had insignificant effects economic growth during the review period. Okoro (2013) investigated the impact of government spending or expenditure on Nigerian economic growth, adopting data spanning a period of 32 years from 1980 to 2011. In the study, real GDP was used as the dependent variable used with government capital spending as well as government recurrent expenditure as independent variables. The results of the study indicated that there was a continuous relationship that existed within government spending. The short run dynamics forces adjusted at a fast rate of 60% per year to the long-run equilibrium relationship.

2.8 Chapter Summary

This chapter captured information on the review of literary works by other researchers and authors in relation to the themes of the study. Literature was reviewed on the concept of government spending, types and/or areas of government spending, Ghana's economic development, theories of government spending or expenditure, relationship between government spending and economic growth. There was also review of empirical and theoretical literature on government spending and economic development.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This section of the study presents a description of the materials and methods used for data collection and analysis. It describes information on the study area, research design, methods, and techniques for data collection, sampling techniques, sources of data and method of data analysis.

3.1 Research Design

The study adopted the exploratory causal study design to assess the impact of government spending on economic growth within the context of Ghanaian economy. Following on the existing theoretical and empirical literature, the study presumes a causal relationship between government spending and economic growth in Ghana. This study design was considered as appropriate, as exploratory research is a preliminary research that clarifies the exact nature of the problem to be solved. It is used to ensure additional research is taken into consideration during an experiment as well as determining research priorities, collecting data and honing in on certain subjects who may be difficult to take note of without exploratory research through techniques, such as secondary research: reviewing available literature and/or data. Causal research, also known as explanatory research is conducted in order to identify the extent and nature of cause-and-effect relationships. Causal research can be conducted in order to assess impacts of specific changes on existing processes. It focuses on an analysis of a situation or a specific problem to explain the patterns of relationships between variables (Zikmund, W.G., Babin, J., Carr, J. & Griffin, 2012).

3.2 Theoretical Model Specification

The theoretical framework in this study is based on the endogenous growth theory which examines the relationship between fiscal policy variables and economic growth in the Ghanaian economy. In line with this, the relationship between output in the economy and the other variables to be used for this study are specified in a general equation (1) below:

$$Y = f(GEX, CV)^{\beta} \quad (1)$$

$$Y = f(GEX^{\beta} CV^{\beta})$$

Where Y is economic growth which has been represented by GDP, GEX is government total expenditure and CV is other control variables that influence economic growth in Ghana.

Equation (1) above is further specified as:

$$GDP = f\left(GEX^{\beta_1}, ODA^{\beta_2}, OPEN^{\beta_3}, INFL^{\beta_4}, EXCH^{\beta_5}, GFCF^{\beta_6}\right) \quad (2)$$

3.3 Empirical Model Specification

$$GDP_t = \beta_0 + \beta_1 GEX_t + \beta_2 ODA_t + \beta_3 OPEN_t + \beta_4 INFL_t + \beta_5 EXCH_t + \beta_6 GFCF_t + \varepsilon_t \quad (3)$$

Natural logarithm is introduced into (2) to give (4)

$$\ln GDPPC_t = \beta_0 + \beta_1 \ln GEX_t + \beta_2 \ln ODA_t + \beta_3 \ln OPEN_t + \beta_4 INFL_t + \beta_5 EXCH_t + \beta_6 \ln GFCF_t + \varepsilon_t \quad (4)$$

Where

GDPPC = real GDP per capita

GEX = Government total expenditure

ODA = Foreign aid

OPEN = Trade openness

INF = Inflation

EXCH = Exchange rate

GFCF = Gross fixed capital formation (Investment)

ε = white noise disturbance error term (which captures all the unobservable factors that affects real GDP per capita)

Ln = Natural logarithm

t = time

β_0 , β_1, β_2, β_3, β_4, β_5, β_6 = Parameters to be estimated

3.4 Definition and measurement of variables

Economic Growth

Economic growth can be explained as the continuous or sustained increase in the real gross domestic product (GDP) or national product of economy overtime. The dependent variable used in this study is real GDP per capita. Real GDP per capita is used to measure economic growth. Real GDP is a measurement of the total economic output of a country divided by the number of people in the country (citizens) adjusted for inflation. It is used to compare the standard of living between countries and over time. Real GDP per capita is used to measure economic growth because real GDP per capita is a better reflection of economic growth or performance than real GDP growth rate.

Government total expenditure (spending) refers to money spent by the public sector or government on the acquisition of goods and provision of services such as education, healthcare, social protection among others. This includes public consumption and public investment and transfer payments consisting of income transfers. Total government expenditure used in this study includes both recurrent expenditure and

capital expenditure. The expected sign of government total expenditure on economic growth depends on whether government is spending more on capital expenditure or spending more on recurrent expenditure.

Foreign aid is the international transfer of capital, goods or services from a country or international organization such as World Bank, IMF for the benefit of the recipient country or its population. Foreign aid can be economic, military, or emergency humanitarian among others. This study used monetary value of all aids received internationally. Foreign aid is expected to stimulate economic growth.

Trade openness implies how open an economy is to international trade. It is one measure of the extent to which a country is engaged in the global trading system. Trade openness is the sum of imports and exports normalized by GDP. That is trade openness is calculated by dividing the aggregate value of imports and exports over a period by the gross domestic product of the same period. The trade-to-GDP ratio is an indicator of the relative importance of international trade in the economy of a country. Trade transactions may directly generate cross-border financial flows including trade credits, exports insurance, and payment facilitation. Openness to trade has negative effect on growth in countries with low financial development, but has insignificant impact in countries with high financial development. Trade openness is conducive to economic growth in low-inflation countries but has insignificant impact on growth in high-inflation countries.

Inflation is measured using consumer price index. Inflation is one of the important determinants of economic growth in Ghana. Consumer Price Index (CPI) is a measure that captures the changes in the price level of a market basket of consumer goods and services purchased by the household. In this study, the CPI is employed to control for

the effect of high oil price on domestic goods and services. Rapid increases in the general price level of the economy may result in uncertainty about the future profitability of investment projects. This is because, higher prices of consumer goods and services may dampen demand for goods and services in the economy and for this reason, investors may resort to more conservative investment strategies than would otherwise be the case, eventually leading to lower levels of investment and economic growth. As a result, the coefficient of CPI is expected to be negative (Georgantopoulos & Tsamis, 2012).

Exchange rate is the rate at which one currency will be exchanged for another. It is also regarded as the value of one country‘s currency in relation to another currency. A strong exchange rate can depress economic. This is because a strong (high) exchange makes exports more expensive, therefore less demand for exports and imports become cheaper, therefore more demand for imported goods (and therefore less demand for domestically produced goods). This will subsequently have a negative impact on economic growth as the net export becomes negative.

Gross fixed capital formation is used as substitution for capital stock (K). Gross fixed capital formation is defined as the total value of additions to fixed assets by domestic enterprises, less disposals of fixed assets during the year, plus additions to the value of non-produced assets such as discoveries of mineral deposits, plants, machinery and equipment purchases; and the construction of infrastructure and commercial and industrial buildings (Baafi, 2010; Barro, 1996). Gross fixed capital formation has generally been considered as the engine of growth of the Ghanaian economy as in most other economies due the additions it makes to capital stock. It is an important factor in the determination of aggregate output. All other things being equal, an increase in the level of capital formation will improve the economy‘s productivity

potential and therefore economic growth. The size of physical capital stock positively affects the level of aggregate demand and also determines the productive capacity of the economy. It is important to emphasize that high rate of capital formation (investment) results in high economic growth (Barro, Mankiw & Sala-i-Martin, 1992). Therefore, the coefficient of physical capital stock is expected to be positive.

3.5 Sources of Data

Based on the topic and the objectives of the study, only secondary data was used. The study made use of annual data from 1970-2018. All the variables of the study were measured or collected annually. Conversely, the secondary data involve an examination of already existing data from World Development Indicators (WDI). That is data was collected from World Development Indicators (WDI) official website for analysis.

3.6 Estimation Techniques

In order to analyse short run and long run relationship between total government expenditure and economic growth maximum likelihood based approach - Autoregressive Distributed Lag (ARDL) model proposed by Pesaran and Shin (1998) has been adopted for this study. The ARDL approach to cointegration is argued to be the single equation equivalence of the maximum likelihood approach of Phillips and Hansen (1990) fully modified ordinary least squares procedure (Pesaran & Shin, 1998). The study has explored the time series properties of the data by employing the Augmented Dickey-Fuller (ADF) and the Phillip-Perron (PP) test to check for the order of integration and stationary. The stability and diagnostic test statistics of the ARDL model is observed to ensure the reliability and the goodness of fit of the model.

Empirically, the ARDL model specification was used to determine the long-run relationships and dynamic interactions between government spending and economic growth using Autoregressive Distributed Lag (ARDL) co-integration test popularly known as Bound Test. This was the appropriate method to be applied for such a study because relative to other multivariate co-integration methods, the bounds test is a simple technique because it allows the co-integration relationship to be estimated. It also allows for long-run and short run parameters of the models to be simultaneously estimated. Hence the Autoregressive Distributed Lag (ARDL) bound test proposed by Pesaran et al. (2001) was used to show the relationship between government spending and economic growth in Ghana from 1970 to 2018.

3.7 Unit Root Tests

Because time series data are usually characterized by spurious regression results, various test need to be conducted to correct errors in the data such as testing for the existence of unit root for each of the variables. It is therefore important to test for the statistical properties of variables when working with time series data. The reason is that time series data are seldom stationary at level forms. A time series is said to be stationary if its mean, variance and auto covariances are independent of time. Generally, regression associated with non-stationary time series produces spurious results or regression. This is the situation when the regression results show a high and significant relationship among variables when no relationship actually exist. Again, with spurious results, the usual test statistics (t, F, DW, and R2) will not have standard distributions if some of the variables in the model have unit roots (Stock & Watson, 1988). A wide range of unit root tests can be used to determine the stationarity of the series. But this study will adopt both the Phillip Perron (PP) tests.

The PP nonparametric test generalises the ADF procedure, by allowing for less restrictive assumptions for the time series being studied. The lag-length has been chosen using the Akaike Information Criteria (AIC) and Swartz Bayesian Criterion (SBC) for PP test..

Accordingly, to the PP test the null hypothesis states that a series contains unit root (non-stationary) against the alternative hypothesis of no unit root (stationary). That is:

$H_o : \rho = o$

$H_a : \rho \neq o$

If the t-statistic is more negative than the critical values, the null hypothesis is rejected and the conclusion is drawn that the series is stationary. On the contrary, if the t-statistic is less negative than the critical values, the null hypothesis is accepted and the conclusion is that the series is non-stationary.

3.8 Co-integration Test

There are a number of techniques that exist for testing the existence of equilibrium long-run relationship among time series variables. Some of these techniques include the Engle and Granger (1987), the Fully Modified Ordinary Least Squares (FMOLS) procedures of Phillips and Hansen (1990); the Johansen (1988); or the Johansen and Juselius (1990); and the Autoregressive Distributed Lag (ARDL) approach by Pesaran and Shin (1998); and Pesaran et al., (2001) to establish the long-run relationship in bivariate and multivariate frameworks. The study adopted the currently developed Bounds Test approach to cointegration by Pesaran and Pesaran (1997), Pesaran and Shin (1998) which was further expanded by Pesaran et al. (2001). The bounds test approach to cointegration is adopted for this study due to its advantages over the Johansen approach to co-integration.

The bounds test approach to co-integration produces more robust results in small samples than the Johansen approach. Thus, ARDL technique is more suitable and efficient for small and finite samples compared with the Johansen approach that requires large data samples for one to get a valid result (Pesaran & Shin, 1998). Also, the ARDL approach to co-integration is most appropriate compared to the other co-integration procedures in the sense that, the other approaches to co-integration require that all regressors be integrated of the same other, but the ARDL approach can be used whether the regressors are integrated of order one or order zero, that is, I(1) or I(0) variables. This implies that the ARDL technique rules out the pre-testing problems related to standard co-integration, which requires that the variables be classified into I (0) or I (1) (Pesaran, Shin, & Smith, 2001). For example, if we are not certain about the stationarity properties of the data, then using the ARDL technique is the most appropriate model for empirical work.

The first step in any cointegration procedure is to identify the degree of integration of each variable in the model. Nevertheless, this depends on which unit roots test one employs and different unit root tests could lead to contradictory results (Bahmani-Oskooee, 2002). Employing conventional unit roots tests such as the Augmented Dickey Fuller and the Phillips-Perron tests for instance, may lead to an erroneous conclusion that unit root is present in a series that is actually stationary around a one-time structural break (Perron, 1991). The ARDL approach is appropriate due to its inherent ability to mitigate these problems. One complexity associated with the Johansen co-integration technique is that the ARDL approach to co-integration ignores what pertains to the large number of choices that must be made. These include choices such as the number of endogenous and exogenous variables to be included in the model, the treatment of deterministic elements, as well as the order of VAR and

the optimal number of lags to be used. The estimation procedures are quite responsive to the method used to make these choices and decisions (Pesaran & Shin, 1999).

Finally, with the ARDL technique, it is possible that different variables have different optimal lags lengths, whereas in Johansen-type models this is not allowed. Pesaran and Pesaran (1997) maintain that, the ARDL technique comprise basic two steps. One, the existence of any long-term relationship between the variables of interest is determined using an F-test. Two, the analysis is to estimate the coefficients of the long-run relationship and determine their values, followed by the estimation of the short-run elasticity of the variables with the error correction representation of the ARDL model. By employing the ECM version of ARDL, the speed of adjustment to equilibrium will be determined.

The study advanced to estimate the short run and long run elasticities by employing the Unrestricted Error Correction Model (UECM) that has unrestricted intercepts and no trends based on the assumption made by Pesaran et al. (2001). Based the analysis, equation (4) can be specified in ARDL framework as:

$$\ln\Delta RGDPP_t =$$

$$\beta_O + \sum_{i=1}^{\rho} \beta_{1i}\, \Delta\ln RGDPP_{t-i} + \sum_{i=1}^{\rho} \beta_{2i}\, \Delta\ln GEX_{t-i} + \sum_{i=1}^{\rho} \beta_{3i}\, \Delta\ln ODA_{t-i} +$$

$$\sum_{i=1}^{\rho} \beta_{4i}\, \Delta\ln OPEN_{t-i} + \sum_{i=1}^{\rho} \beta_{5i}\, \Delta INFL_{t-i} + \sum_{i=1}^{\rho} \beta_{6i}\, \Delta EXCH_{t-i} +$$

$$\sum_{i=1}^{\rho} \beta_{7i}\, \Delta\ln GFCF_{t-i} + \delta_1 \ln RGDPP_{t-1} + \delta_2 \ln GEX_{t-1} + \delta_3 \ln ODA_{t-1} +$$

$$\delta_4 \ln OPEN_{t-1} + \delta_5 INFL_{t-1} + \delta_6 EXCH_{t-1} + \delta_7 \ln GFCF_{t-1} + \xi ECM_{t-1} + v_t$$

(5)

From equation (5) above, Δ represents the first difference operator, ρ is the lag order selected by the Akaike Information Criterion (AIC), β_0 is the drift parameter, and v_t

is the error term which is N (0, δ^2). The parameters βij are short-run parameters and δij are the long-run multipliers. , is expected to be statistically significant to further validate the presence of a co-integrating relationship among the variables in the model.

The study therefore examined the relationship between total government expenditure and economic growth by estimating equation (5) with the bounds test using the OLS method, which is generally the first procedure in the ARDL model. The F-test has been employed for the examination of the existence of long-run relationship among the variables in equations (4) given as follows: The null hypotheses of no long-run relationship among the variables in equations (5) is tested against the alternative hypotheses of a long- run relationship as follows:

$$H_0 : \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 = \delta_8 = \delta_9 = \delta_{10} = 0$$

$$H_a : \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq \delta_6 \neq \delta_7 \neq \delta_8 \neq \delta_9 \neq \delta_{10} \neq 0$$

To test for co-integration among the variables under investigation the F-statistics has been used. Given that, the asymptotic distribution of the F-statistic is non-standard without taking into account the independent variables being I (0) or I (1), Pesaran and Pesaran (1997) have provided two sets of critical values for the different numbers of regressors (k), and whether the ARDL model contains an intercept and/or trend. As a result, the calculated F-statistic is compared with these sets of critical values developed on the basis that the independent variables are I(d) (where $0 \leq d \leq 1$). The lower critical bound presupposes that all the variables are I (0), meaning that there is no co-integration among the variables, but the upper bound presumes that all the variables are I (1). Hence, if the calculated F- statistic falls outside the upper critical value, then a null hypothesis of no co-integration will be rejected irrespective of

whether the variables are I (0) or I (1) indicating a long run relationship among the variables being studied. On the other hand, if the F-statistic falls below the lower bound, then the null hypothesis of no cointegration cannot be rejected. In the same way, if the F-statistic lies within the lower critical and upper critical bounds, then the test is inconclusive and it depends on whether the variables under examination are I (0) or I (1). In the face of this circumstance, the test for unit roots on the variables being studied becomes imperative (Pesaran & Pesaran, 1997).

To be able to identify the optimal lag length for each variable, the ARDL procedure estimates $(P+1)^{k+1}$ the number of variables, where P is the maximum number of lags to be used, and k is the number of regressors in the equation (Shrestha & Chowdhury, 2005). The optimal lag length of the ARDL model is chosen based on the Akaike Information Criterion (AIC). The AIC which makes use of the maximum relevant lag length (Jalil, Ma, & Naveed, 2008). Given that cointegration has been established from the ARDL model, the long run and error correction estimates of the ARDL and their asymptotic standard errors are then obtained.

$$\ln RGDP = \beta_o + \sum_{i=1}^{\rho} \beta_{1i} \ln RGDPP_{t-i} + \sum_{i=0}^{\rho} \beta_{2i} \ln GEX_{t-i} + \sum_{i=0}^{\rho} \beta_{3i} \ln ODA_{t-i} + \sum_{i=0}^{\rho} \beta_{4i} \ln OPEN_{t-i} + \sum_{i=0}^{\rho} \beta_{5i} INFL_{t-i} + \sum_{i=0}^{\rho} \beta_{6i} EXCH_{t-i} + \sum_{i=0}^{\rho} \beta_{7i} \ln GFCF_{t-i} + \upsilon_t \quad (6)$$

3.9 Granger Causality Test

One of the major objectives of empirical econometrics has been the examination of causal relationships among economic variables. Granger causality is mostly used in time series analysis. Granger causality simply means that a variable X granger-causes Y if Y can be better forecasted using the pasts of both X and Y than it can, using the history of only Y. Engle and Granger (1987) are of the view that, co-integrated

variables must have an error correction representation. According to Gujarati and Porter (1999), among the implications of Granger representation theorem is that, if non-stationary series are co-integrated, then one of the series must granger cause the others. To identify the direction of causality in the existence of co-integrating vectors, Granger causality was carried out based on the following:

$$Y_t = \alpha_0 + \sum_{i=1}^{\rho} \alpha_{1i} \Delta Y_{t-1} + \sum_{i=1}^{\rho} \alpha_{2i} X_{t-1} + v_t \quad (7)$$

$$X_t = \beta_o + \sum_{i=1}^{\rho} \beta_{1i} \Delta X_{t-1} + \sum_{i=1}^{\rho} \beta_{2i} Y_{t-1} + \eta_t \quad (8)$$

The assumption here is that the error terms satisfy the criteria

$E(\upsilon_t) = E(\eta_t) = E(\upsilon_t \upsilon_s) = E(\eta_t \eta_s) = 0$ and $E(\upsilon_t \upsilon_t) = \sigma_{\upsilon}^2, E(\eta_t \eta_t) = \sigma_{\eta}^2$

The causality in equation (7) should run from X_t to Y_t on condition that the estimated coefficients on the lagged variable X_t are significantly different from zero. In other words, the coefficients of α_i are different from zero (i.e. $\alpha_i \neq 0$).

In much the same way, the causality in equation (8) runs from Y_t to X_t on condition that the estimated coefficients on Y_t as a group are significantly different from zero (i.e $\beta_i \neq 0$). Bidirectional causality results when X_t causes Y_t and Y_t causes X_t . Thus, the lagged values of both X_t and Y_t as a group in equations (7) and (8) are significantly different from zero (i.e. $\alpha i = \beta_i \neq 0$).

To determine whether the independent variable (X_t) granger-cause the dependent variable (Y) in equation (7), joint significance of the lagged dynamic terms was conducted with the null hypothesis that the independent variable (X) does not granger-cause the dependent variable (Y), against the alternative hypothesis that the independent variable (X) granger-cause the dependent variable (Y).

$H_0: \alpha_1 = \alpha_2 = 0$

$H_0: \alpha_1 \neq \alpha_2 \neq 0$

Also, to find whether the independent variable (Y) granger-causes the dependent variable (X) in equation (8), joint significance of the lagged dynamic terms was conducted with the null hypothesis that the independent variable (Y) does not granger-cause the dependent variable (X), against the alternative hypothesis that the independent variable (Y) granger-cause the dependent variable (X). This joint test is also given as:

$H_0: \beta_1 = \beta_2 = 0$

$H_0: \beta_1 \neq \beta_2 \neq 0$

F-statistic and Wald statistic was used to take decision on null and alternative hypotheses. Four instances were considered. The first is rejecting the null hypothesis in equation (7) but failing to reject the null hypothesis in equation (8) and this implies unidirectional causality from X to Y. The second instance is rejecting the null hypothesis in equation (8) but failing to reject the null hypothesis in equation (7) and this also implies unidirectional causality from Y to X. The third instance is simultaneously rejecting the two null hypotheses in both equations which indicate bi-directional causality and finally, simultaneously failing to reject the two null hypotheses in both equations which indicate no causality between the two variables under consideration.

3.10 Data Analysis Methods

Estimation of the model was done by the application of the E-views software for empirical econometric analysis. The regression output includes other relevant

statistics that enhance further analysis and evaluation. Estimates of model coefficients were evaluated for partial and joint significance of their effects on economic growth.

Employing appropriate econometric technique, government expenditure and economic growth data are used to estimate the specified model for numerical values of the coefficients of explanatory variables, and computation of other statistics relevant for evaluation and operationalizing of the study hypothesis. The estimated model is discussed vis-à-vis stated a priori theoretical expectations about the sign of the numerical values of model coefficients. This provides insight into the nature of the relationship between government spending and economic growth. Subsequently, the estimated model is evaluated for statistical significance and explanatory power after testing for co-integration and stability.

3.11 Chapter Summary

This chapter was basically about methodological issues. This include research design employed, methods employed to analyze data, estimation techniques, source of data, and definition of variables of the study.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

This chapter basically looks at the presentation of data and discussion of results. The various models stated in chapter three of this study has been estimated and discussed in this chapter. The discussion has been done in line with the objectives of this study.

4.1 Descriptive Statistics

Table 1 : Descriptive Statistics

Variable	LGDPPC	LOPEN	LGEX	LGFCF	EXCH	INFL	LODA
Mean	1081.248	62.70377	10.70210	3.28E+09	0.778226	29.43758	7.85E+08
Median	998.3654	65.17055	10.63432	1.41E+09	0.204796	18.13472	6.50E+08
Maximum	1807.064	116.0484	15.30817	1.63E+10	4.350742	122.8745	1.80E+09
Minimum	693.4641	11.54490	5.861290	1.53E+08	0.000102	3.030303	36320000
Std. Dev.	306.0822	25.53229	2.091470	4.57E+09	1.134560	27.66310	5.40E+08
Skewness	0.975872	0.129604	-0.035518	1.906608	1.814987	2.144357	0.354619
Observation	41	41	41	41	41	41	41

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

Table 1 above presents descriptive statistics of the variables of the study. The descriptive statistics considers the mean, median, maximum, minimum, standard deviation and skewness of the variables of interest. These are common measures of determining the variables which are normally distributed. In normally distributed data, the mean and the median should have equal values. The result from table 1 above shows that most of the variables of the study are not normally distributed. This is because most of the variables have their mean significantly different from the standard deviation. From the variables of the study, government expenditure (GEX) is

the only variables which have its mean and median almost equal. This shows that most of the variables are not normally distributed.

According to Musyoka (2008) if the mean is higher than the median then the distribution is positively skewed and distribution is negatively skewed when mean is lower than the median. Thus, from table 1, all the variables have their mean greater than their median and hence all the variables are positively skewed except government expenditure (GEX) is is negatively skewed. Standard deviation is a measure of average distance between each variable and its mean. A low standard deviation indicates that the variable tends to be close to the mean of the data set, while a high standard deviation indicates that the variable spread out over a wider range of values. From table 1, the standard deviation of government expenditure (GEX), exchange rate (EXCH), investment/gross fixed capital formation (GFCF) and foreign aid (ODA) turn out to be relatively low, which indicates that government expenditure (GEX), exchange rate (EXCH), investment/gross fixed capital formation (GFCF) and foreign aid (ODA) are not widely spread away from its mean. Nevertheless, per capital GDP (GDPPC), trade openness (OPEN) and inflation (INFL) happened to be having higher standard deviation, indicating that these variables are widely spread away from their respective mean.

4.2 Stationary Test

Table 2: Augmented Dickey Fuller (ADF) Test Result

Levels			First Difference			
Variables	**ADF Statistics**	**Lag**	**Variables**	**ADF Statistics**	**Lage**	**I(O)**
LGDPPC	-1.6267[0.6970]	3	ΔLGDPPC	-2.961[0.003]***	3	I(1)
LOPEN	-1.5607[0.1595]	3	ΔLOPEN	-3.655[0.001]***	3	I(1)
LODA	-0.8586[0.9471]	3	ΔLODA	-2.6139[0.002]***	3	I(1)
INFL	-8.1635[0.01]***	3	–	-	-	I(0)
LGEX	-1.0622[0.8941]	3	ΔLGEX	-1.981[0.012]***	3	I(1)
REXCH	-1.5192[0.01]***	3	–	-	-	I(0)
LGFCF	-1.7548[0.3241]	3	Δ*L*GFCF	-3.125[0.000]***	3	I(1)

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

Note: *** significant at 1% level of significance, ** indicates significant at 5%, Δ denotes first difference, and I(O) is the order of integration. The values in parenthesis are the P-values.

Table 3: Results of the Phillip-Perron Unit Root Test

Variable	Levels			First Difference		
	None	**Constant**	**Trend & Constant**	**None**	**Constant**	**Trend & Constant**
lnGDPPC	1.2013	0.9956	-1.2093	-4.3076***	-4.4355***	-6.0457***
lnOPEN	-0.1169	-1.3003	-2.1400	-4.8671***	-4.8214***	-4.7499***
lnODA	1.7669	-1.4630	-2.4760	-9.3182***	-10.036***	-10.559***
lNFL	-0.3536	-3.9058***	-5.0479***	-	-	-
lnGEX	-0.6571	-3.3144**	-3.3331*	-7.9705***	-7.9222***	-7.8110***
EXCH	-2.7089***	-0.8781	-1.0826	-2.8668***	-3.9120***	-3.9274**
lnGFCF	2.2634	-1.3702	-3.5760**	-5.8067***	-6.2736***	-6.1768***

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

NB: (*)Significant at the 10%; (**)Significant at the 5% and (***) Significant at the 1%

Table 3 above shows result of Phillip-Perron unit root test for the variables of the study. Although the bounds test (ARDL) approach to co-integration does not necessitate the pretesting of the variables for unit roots, it is however vital to perform this test to verify that the variables are not integrated of an order higher than one. The aim is to ascertain the absence or otherwise of I(2) variables to extricate the result from spurious regression. The variables of the study are real GDP per capita (GPPC), trade openness (OPEN), foreign aid (ODA), inflation (INFL), government expenditure (GEX), exchange rate (EXCH) and gross fixed capital formation (GFCF). Phillip-Perron (PP) and Augmented Dickey Fuller (ADF) Test Result tests were applied to all variables in levels and in first difference in order to formally establish their order of integration. In order to be sure of the order of integration of the variables, the test was conducted with intercept or constant and time trend in the model.

The optimal number of lags included in the test was based on automatic selection by Akaike Information Criterion (AIC). The study used the P-values to make the unit root decision, (that is, rejection or acceptance of the null hypothesis that the series contain unit root) which arrived at similar conclusion with the critical values. The results of PP test for unit root with constant and tend in the model for all the variables are presented in Table 3. The null hypothesis is that the series/variables are non-stationary, that is, contains a unit root. The rejection of the null hypothesis for the test is based on the MacKinnon (1991) critical values as well as the probability values. The unit root test results in Table 3 indicate that, the null hypothesis of the presence of unit root for real GDP per capita (GPPC), trade openness (OPEN), foreign aid (ODA), government expenditure (GEX), and exchange rate (EXCH) in their levels cannot be rejected since the P-values of the PP statistic are not statistically significant

at 5% and 1% levels of significance. However, for inflation (INFL) and gross fixed capital formation (GFCF) at their levels, the null hypothesis of presence of unit root is rejected and hence inflation (INFL) and gross fixed capital formation (GFCF) are stationary at levels at 1% and 5% level of significance respectively. This means that inflation ang gross fixed capital formation are I(0) variables.

Since some of the series (real GDP per capita (GPPC), trade openness (OPEN), foreign aid (ODA), government expenditure (GEX), and exchange rate (EXCH)) are not stationary at levels, first difference operation was carried out on the raw data and the result is displayed in the first difference column of table 2. With constant and trends in the model, at first difference, all the variables, that is, real GDP per capita (GPPC), trade openness (OPEN), foreign aid (ODA), government expenditure (GEX), and exchange rate (EXCH) are stationary. This is because the null hypothesis of the presence of unit root (non-stationary) is rejected because the P-values of the PP statistic are statistically significant at 1 percent significant levels for all the estimates. This means that GDPPC, OPEN, ODA, GEX, and EXCH are integrated of order one I(1).

It is therefore clear from the unit test results discussed above as shown in both table 2 and 3 that the variables are integrated of order one I(1) and order zero I(0). According to Akram (2005) when all the variables are integrate of order or some are integrated of order zero I(0), that is, at levels, ARDL methods can be applied. Since the test results have confirmed the absence of I(2) variables, ARDL methodology is now used for the estimation. The subsequent sections discuss the results of co-integration test, long-run and short-run results.

Table 4: Lag Length Selection for the Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	132.3821	NA	1.82e-12	-7.164691	-6.853621	-7.057310
1	375.0709	374.4342	3.02e-17	-18.23262	-15.74407*	-17.37357
2	443.4389	78.13488*	1.42e-17	-19.33937	-14.67332	-17.72865
3	517.7055	55.16942	1.04e-17*	-20.78317*	-13.93964	-18.42078*

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

Table 4 above shows the result of lad length selection criterion for the model. The lag length selection was based on Akaike Information Criterion (AIC). From the table 2 above, the maximum time lag is 3 based on the VAR approach.

4.3 Testing for the Existence of Long Run Relationship.

In the first step of the ARDL analysis, the presence of long-run relationships in equation (5) is tested. As indicated in the table 2 above, the maximum lag length is 3 in the bounds testing approach to co-integration.

Table: 5 Results of the Bound F Test for Co-integration.

F-Bounds Test			Null Hypothesis: No levels relationship		
Test Statistic	Value	Lag Length	Significant Level.	I(0)	I(1)
F-statistic	9.738677	3	10%	2.12	3.23
			5%	2.45	3.61
			2.5%	2.75	3.99
			1%	3.15	4.43

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

The joint null hypothesis is that lagged level variables (that is, variable addition test) of the coefficients being zero (no co integration). From the table 5 above, a clear conclusion can be drawn that the joint null hypothesis of lagged level variables (that is, variable addition test) of the coefficients being zero (no co integration) is rejected even at 1% level of significance. This conclusion is drawn based on the fact that the F-statistic of 9.738677 is greater than the upper bound critical value of 4.43 at I(1) at 1% level of significance. The results in Table 5 indicate that there is a unique co-integration relationship among the variables when economic growth is normalized. Hence, there is a long-run relationship between economic growth and the explanatory variables in Ghana.

4.4 Long Run Relationship

After establishing the existence of a long run relationship among the explanatory variables and economic growth, the next step is to determine the nature of the long run relationship using equation (3.3.2). The ARDL co-integration method is used to estimate the long-run coefficients and the short-run parameters of equation (5) in chapter 3. This section highlights the long-run estimation results which addressed the objective of this study of a long-run relationship between total government expenditure and economic growth in Ghana. The analysis tests the null hypothesis of no long run relationship between total government expenditure and economic growth as against the alternative hypothesis of a long run relationship between total government expenditure and economic growth. Based on the results in table 5 above, the null hypothesis of no long-run relationship between the variables was rejected. The results of the long run relationship (parameters) of the ARDL model are estimated and the results are shown in Table 6 below.

Table 6: Long Run Coefficients

Dependent Variable; Lngdppc

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGEX	-0.652884	0.129780	-5.030719	0.0003
LGFCF	0.535825	0.046355	11.559104	0.0000
LINFL	0.134240	0.054883	2.445941	0.0308
LODA	-0.091275	0.050774	-1.797677	0.0974
LOPEN	0.601714	0.114118	5.272714	0.0002
LEXCH	-0.209147	0.038618	-5.415830	0.0002
C	-1.936107	0.878640	-2.203527	0.0478

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

As indicated above, table 6 shows result of long run relationships between economic growth and total government expenditure and other explanatory variables in the model. The dependent variable is real GPD per capita (GDPPC) which used to measure economic growth.

The coefficient of total government expenditure (LGEX) in table 6 above is -0.652884 which is significant at 1%. This means in the long run ,total government expenditure is negatively related to economic growth. The result shown that in the long run, when government expenditure increase by 1% the economic growth measured by real GDP per capita will decrease approximately by 0.65 percent. One will expect government expenditure to positively affect economic growth since theories suggest that government expenditure boost aggregate demand and hence increase in productive capacity of the economy. But the possible explanation for this result which shows long run negative relationship between government expenditure and economic growth is that when government spends greater part of its revenue on recurrent expenditure, there will be long run negative effect on economic growth. This

result is typical of Ghana as greater part of our revenue is spent on recurrent expenditure. Ghana as a country borrows money to spend on payment of salaries and other recurrent expenditure and as this continue with any corresponding expansion in the expenditure on the capital expenditure; it will have a negative impact on economic growth in the long run. This finding support the findings of Ram (1986), which found expenditure on the core areas of government has positive effects on economic growth, but government spending on non-core areas has a negative impact on economic growth. Also, Lee, Won, & Jei. (2019) also found a long run negative relationship between government expenditure and economic growth in Korea.

From table 6 above, the coefficient of gross fixed capital formation (LGFCF) is 0.535825 and it is significant at 1% level of significance. This means that in the long run, gross fixed capital formation (investment) is positively related to economic growth. The result shown that when gross fixed capital formation increase by 1% economic growth which is measured by real GDP per capita will increase by approximately 0.54%. As investment increases, productive capacity of the economy is expected to increase and hence increase in economic growth. This finding is in support of Ongo & Vukenkeng (2014). Does gross capital formation matter for economic growth in the CEMAC sub-region? Ongo & Vukenkeng (2014) used gross fixed capital formation to measure private investment and found that private investment has a significant positive association with economic growth. The result also support that of Gibescu (2010), Meyer & Sanusi (2019).

Furthermore, the coefficient of inflation (LINFL) in the table 6 above is 0.134240 which is significant at 5%. This means that inflation positively influence economic growth in the long run. The result shown that when inflation increases by 1%, economic growth will increase by approximately 0.13% in the long run. Inflation is

usually regarded as double edge sword in the sense that in can positively and negatively affect the economy. The positive relation between inflation and economic growth indicated by the result means that in the long run producers take advantage of higher prices of goods and services to increase their productive capacity. As individual producers increase their production due to higher prices of goods and services in order to enjoy higher profits, the aggregate out of the economy will increase and hence increase in economic growth. This finding correspond with that of Ericsson, Irons, & Tryon (2001) which found that output and inflation are positively related in the long run and Iqbal & Nawaz (2009) also found similar result. However this finding contradicts that of Ahiakpor & Akapare (2014) which found that inflation and interest rate has a decreasing impact on economic growth and Behera & Mishra (2017), Mamo (2012), Faria, & Carneiro (2001) also found similar result of negative relationship.

Again, foreign aid (ODA) in the table 6 above has a negative coefficient of 0.091275and it is significant at 10%. This shown that in the long run when foreign aid increases by 1% economic growth will decrease by approximately 0.09%. possible explanation for this result is that when government receives foreign aid in the form of cash, these monies are not spend on productive ventures in the economy in order to get revenue to possibly pay back to foreign donors as many of these aids do not come free. As these aids are not spend on productive ventures in the economy, it will subsequently have negative impacts on the economic growth as little revenue generated will be used to pay for the loans. This is in line with findings of Appiah-Konadu, Junior, Eric & Twerefou (2016) which found that foreign aid and interest payment on external debt have negative impact on growth. But however Karras (2006) found foreign aid to have significant positive impact on economic growth.

Also, trade openness (OPEN) from the table 6 above has a positive long run coefficient of 0.601714 and significant at 1%. This means that trade openness has a long run positive impacts on economic growth. The result indicates that when trade openness increases by 1%, economic growth will also increase by approximately 0.60%. This means that the more open an economy is to international trade, the more that economy growths. This finding support the findings of Keho (2017), Dao (2014), Turan & Seni (2014) and Jawaid (2014) who also found a positive impact of trade openness on economic growth.

Lastly, the coefficient of exchange rate (EXCH) in table 6 above is -0.209147 and it is also significant at 1% level of significance. This means that exchange rate negatively affect economic growth in the long run. The result shown that with a percentage increase in exchange rate, economic growth will decrease approximately by 0.21% in the long run. This is because when Ghana is borrowing from other countries, the transaction is always than in foreign currency, that is, currency of the lending country. As the currency of the receiving country depreciates or the lending country‘s currency appreciates, the debt stock rises and as the debt stock of a country rises Banic & Matic (2017), it negatively affect its economic growth in the long run. Similar result was also found by Karahan (2020), Morina, Hysa, Ergün, Panait, & Voica. (2020), Olofsson (2019), Barguellil, Ben-Salha, & Zmami (2018), Shobande & Odeleye (2015) and Basirat, Nasirpour & Jorjorzadeh (2014).

4.5 Short Run Results

Table 7: Short Run (Error Correction) Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGEX)	0.007930	0.026192	0.302749	0.7673
D(LGEX (-1))	-0.135892	0.046424	-2.927182	0.0127
D(GEX (-2))	-0.117874	0.042568	-2.769079	0.0170
D(LGFCF)	-0.037246	0.029043	-1.282435	0.2239
D(LGFCF(-1))	-0.001641	0.029671	-0.055293	0.9568
D(LGFCF(-2))	0.021535	0.018093	1.190249	0.2570
D(LINFL)	-0.033352	0.011211	-2.974973	0.0116
D(INFL(-1))	0.025781	0.009149	2.817940	0.0155
D(LODA)	-0.016911	0.016047	-1.053883	0.3127
D(LODA(-1))	-0.045699	0.016564	-2.758999	0.0173
D(LOPEN)	0.023884	0.047621	0.501544	0.6251
D(LOPEN(-1))	0.150110	0.066729	2.249557	0.0440
D(LOPEN(-2))	0.090363	0.026855	3.364894	0.0056
D(EXCH)	-0.004618	0.037971	-0.121630	0.9052
D(LEXCH(-1))	-0.134228	0.038595	-3.477844	0.0046
ECM(-1)	0.369147	0.116523	3.168011	0.0081
Cointeq = LGDPPC - (-0.6529*LEXPEN + 0.5358*LGFCF + 0.1342*LINFL -0.0913*LODA + 0.6017*LOPEN -0.2091*LEXCH -1.9361)				

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

The short-run results in table 7 above indicate that any disequilibrium in the system as a result of a shock can be corrected in the long-run by the error correction term.

Hence, the error correction term that estimated the short-run adjustments to equilibrium is generated as follows.

ECM = LGDPPC - (-0.6529*LGEX + 0.5358*LGFCF + 0.1342*LINFL -0.0913*LODA + 0.6017*LOPEN -0.2091*LEXCH -1.9361)

The result from table 7 above shown that government expenditure in the short run has a positive impact on economic growth. The coefficient of D(LGEX) is 0.007930. This means that when government expenditure increases by a percentage in the short run, economic growth will also increase by 0.01 percent. This result affirms the Keynesian's preposition that government expenditure boosts aggregate demand and hence increases in investment and economic growth. But government expenditure is statistically insignificant in the short run and its associated p-value is 0.7673. However, the one period lag coefficient of government expenditure (D(LGEX (-1))) is -0.135892 and statistically significant at 5%. This means that with the negative coefficient of 0.135892 the lag effect of 1% increase in government expenditure would lead to approximately 0.14% decrease in economic growth. Also, two periods lag coefficient of government expenditure (D(LGEX (-2))) is -0.117874 and statistically significant at 5%. This means that with lag effect of 1 percent increase in government expenditure will decrease economic growth by approximately 0.12% in the second period.

Also, from table 7 above, gross fixed capital formation (investment) (D(LGFCF)) has a negative coefficient of 0.037246. This means that in the short run, with a percent increase in gross fixed capital it will lead to approximately 0.037% decrease in economic growth. But however gross fixed capital formation is statistically insignificant in the short run. This means that it actually has no effect on economic growth. However, the one period lag coefficient of gross fixed capital formation (D(LGFCF(-1)) is also a negative value of 0.001641. This means that with lag effect of 1% increase in gross fixed capital formation, it would decrease economic growth by 0.002% but this is statistically not significant. Also, the two periods lag coefficient of gross fixed capital formation (D(LGFCF(-2)) is 0.021535 which means that with

lag effect of a percentage increase in gross fixed capital formation, it would result in approximately 0.022% increase in economic growth. But how ever this is statistically not significant.

Furthermore, the coefficient of inflation (D(LINFL)) in table 7 above is -0.033352 and statistically significant at 5%. This result means that in the short run inflation is negatively related to economic growth. With the negative coefficient of 0.033352, it means that when there is 1% increase in inflation in the short run it will result in 0.033% decrease in economic growth. But the one period lag coefficient of inflation (D(LINFL(-1)) is a positive value of 0.025781which is also statistically significant at 5%.. This means that with lag effect of 1% increase in inflation, it would result in approximately 0.03% increase in economic growth.

From table 7 above, the coefficient of foreign aid D(LODA) is -0.016911 which is consistent with the long-run results. This result indicate that in the short run when there is a percentage increase in foreign aid, it will result in 0.02% decrease in economic growth. This means that foreign aid is negatively related to economic growth in the short run. But however this result is statistically insignificant with a p-value of 0.3127. Furthermore, the one period lag coefficient of foreign aid (D(LODA(-1)) is -0.045699 which is statistically significant at 5%. This means that with lag effect of 1 percent increase in foreign aid will decrease economic growth by approximately 0.05 %.

Also, the result in table 7 above shows that trade openness D(LOPEN) has a positive value of 0.023884. This means that trade openness has a positive impact on economic growth in the short run which is consistent with the long-run results. The result shown that in the short run when there is 1% increase in trade openness, it would lead to

approximately 0.02% increase in economic growth. But this is statistically insignificant in the short run. Also, trade openness has one period lag (D(LOPEN(-1)) coefficient of 0.150110 and statistically significant at 5%. This means that with lag effect of 1% increase in trade openness, it would increase economic growth by 0.15%. Also, the two periods lag coefficient of trade openness (D(LOPEN(-2)) is 0.090363 and statistically significant at 5%. This means that with lag effect of a percentage increase in trade openness, it would result in approximately 0.09% increase in economic growth in the second period.

Also, the coefficient of exchange rate D(LEXCH) is -0.004618. This result indicates that in the short run, exchange rate has negative effect on economic growth which corresponds with the long run results. This means that in the short run when there is 1% increase in exchange rate, it will result in 0.005% decrease in economic growth. But this result is however not statistically significant. However, exchange rate has one period lag (D(LEXCH(-1)) coefficient of -0.134228 which is statistically significant at 5%. This means that with lag effect of 1% increase in exchange rate, it would lead to 0.13% decrease in economic growth.

Last but not least, the results in table 7 also showed positive sign of error correction term lagged one period (ECM(-1)) and it is highly significant at 5 percent significance level.

This confirms the existence of the co-integration relationship among the variables (that is economic growth and government expenditure and other control variables) in the model. The Error Correction Term (ECT) stands for the speed of adjustment to restore equilibrium in the dynamic model following a disturbance. The coefficient of the error correction term (ECM) is 0.369147. This suggests that, about 37 percent of

the deviations from the long term output growth caused by previous year's shocks converge back to the long run equilibrium in the current year. The rule of thumb is that, the larger the error correction coefficient (in absolute terms), the faster the variables equilibrate in the long-run when shocked in the previous period (Acheampong, 2007; Oyinlola & Akinnibosun, 2013).

4.6 Granger Causality

This section presents the results of the Granger Causality test. The test seeks to explore the direction of causality between government expenditure and economic growth in Ghana. The null hypothesis of no causal relationship between government expenditure and economic growth was tested against the alternative hypothesis of a causal relationship between government expenditure and economic growth. Having established cointegration among the variables in table 5 above, Granger causality test was then applied to measure the linear causation between government expenditure and economic growth. The results of the Pair-wise granger causality test are presented in Table 8.

Table 8: Table Results of Pair-wise Granger Causality Tests

Null Hypotheses	F-Stats.	Prob.	Remarks
lnGDPPC does not Granger Cause GEX	0.75717	0.6262	H_0 Rejected
GEX does not Granger cause GDPPC	1.3586	0.2525	H_0 Rejected

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

Table 8 presents granger causality between government spending and economic growth. The result in table 8 clear shows that there exist causal relationship between government spending and economic growth. The null hypothesis of LnGDPPC does not granger cause government spending (GEX) was rejected even at 10% level of

significance and the null hypothesis of government spending does not granger cause LnGDPPC was also rejected. Hence the conclusion that there is a bi-directional causal relationship between government spending and economic growth. This result is in line with Anning, Haisu, & Riti (2017) in the case of Ghana, Uzoma-Nwosu (2018) in the case of Nigeria and Loizides & Vamvoukas (2005), Nyasha & Odhiambo (2019), Abu-Eideh (2015), Kurniawati (2018),

4.7 Model Diagnosis

Cointegration and error correction estimation results are only valid if the residuals of the equations are white noise. Heteroscedasticity and serial correlation diagnostic test were carried out to determine whether the results are robust and good for prediction and policy formulation. Heteroscedasticity, serial correlation and the model stability text are presented in Table 9.

Table 9: Results of the Heteroscedaticity and Serial Correlation Test

Heteroscedasticity Test: Breusch-Pagan-Godfrey		**Null Hypothesis: No Heteroscedasticity**	
F-statistic	1.702458	Prob. F(22,12)	0.1707
Obs*R-squared	26.50727	Prob. Chi-Square(22)	0.2305
Scaled explained SS	1.648738	Prob. Chi-Square(22)	1.0000
Breusch-Godfrey Serial Correlation LM Test:		Null Hypothesis: No Serial Correlation	
F-statistic	1.564676	Prob. F(2,10)	0.2563
Obs*R-squared	8.342172	Prob. Chi-Square(2)	0.0154

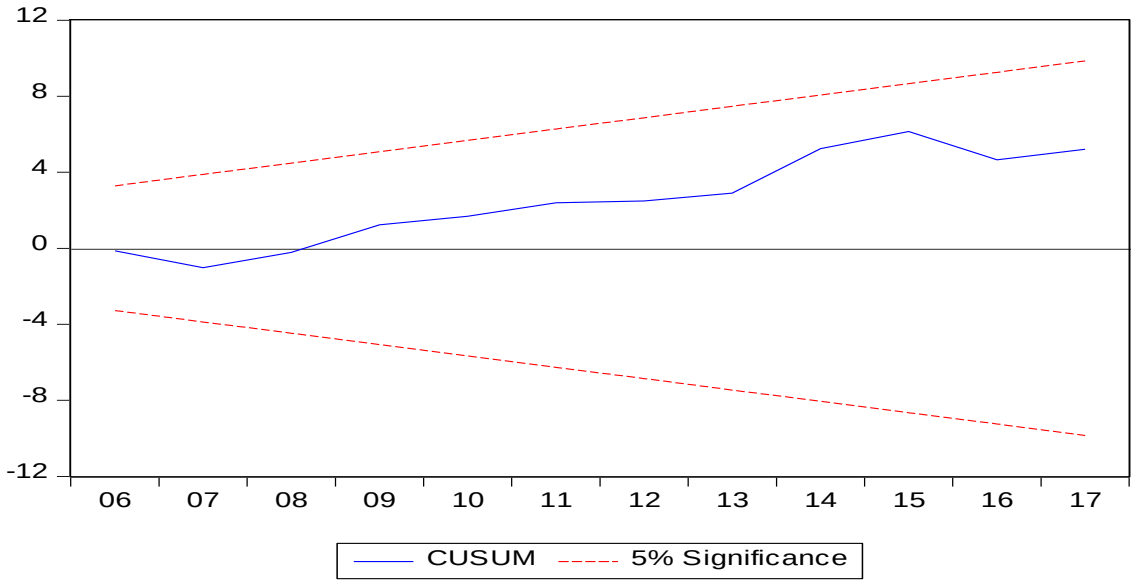
Source: Author‘s computation using Data from WDI, 2019 and E-views 10 econometric software

The first part of table 9 shows result of heteroscedaticity test. The null hypothesis state that there is no heteroscedaticity present in the model against the alternative

hypothesis which state that there is heteroscedaticity present in the model. The probability value (p-value) of the heteroscedaticity test is 0.1707 which is even above 10% hence we fail to reject the null hypothesis and conclude that there is no heteroscedaticity present in the model.

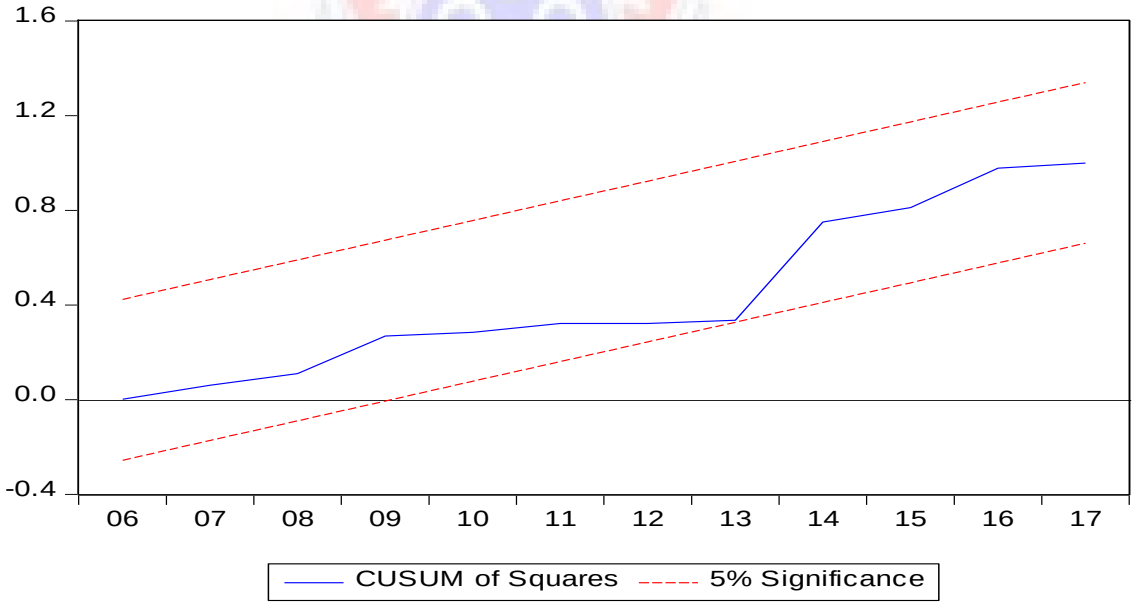
The second part of table 9 shows the result of Breusch-Godfrey serial correlation LM test. The null hypothesis state that there is no serial correlation present in the model against the alternative hypothesis which state that there is serial correlation present in the model. The p-value is 0.2563 which is above 20% and hence we fail to reject the null hypothesis and conclude that there is no serial correlation in the model. These results indicate that the model is good and therefore appropriate for policy formulation and prediction.

To further test the stability of the model, cumulative sum (CUSUM) analysis was carried out (Pesaran & Pesaran, 1997). The result is displayed in figure 1 and 2 below. The cumulative sum test recognizes systematic changes in the regression coefficients or estimates, while the cumulative sum of squares test detects unexpected changes from the constancy of the regression coefficients. The results of the plot of the CUSUM and CUSUMSQ in Figure 1 and Figure 2, respectively lies within the critical bounds at the 5 percent significant confirming the stability of the parameters within the model. Therefore, the study concludes that the model is stable.



Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

Figure 1: Plot of Cumulative sum of square of recursive residuals for ARDL model



Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

Figure 2: Plot of Cummulative Sum of Recursive Residuals for ARDL Model

4.8 Chapter Summary

This chapter was basically about data presentation and discussion. The organization is chapter was guided by the methodology presented in chapter three of this thesis. Also various test discussed in chapter three of this thesis was used to test the hypotheses of the study as stated in chapter one of this thesis and various conclusion was drawn.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the summary, conclusions and recommendations of the study. The summary presents a brief overview of the research problem, objectives, methodology and findings, the conclusions highlight the overall outcomes regarding the findings of the study in light of the hypotheses, and the recommendations provide specific remedies to be implemented by particular agencies. The chapter further provides the limitations of the study and direction for future research.

5.1 Summary

The study sought to determine the impact of total government expenditure on economic growth. This study used annual time series data spanning from 1970 to 2018. The study adopted the exploratory causal study design to assess the impact of government expenditure on economic growth. The study operated on three (3) major objectives. The first objective is to establish the short run relationship between government spending and economic growth and secondly the study sought to establish the long term run relationship between government spending and economic growth and the third objective is to establish granger causality between government spending and economic growth. In achieving these objectives, time series variables on selected macroeconomic variables in Ghana was presented and analyzed using advanced econometric techniques by employing E-views econometric software package version 10.

The first step in the estimation process involved testing for the stationarity properties of the variables using Phillips-Perron (PP) test statistics. The unit roots results suggest

that some of the variables were found to be integrated of either order zero (0) and some of order one (1), implying mixed I(0) and I(1) variables. The Autoregressive Distributed Lag (ARDL) bounds testing approach was then employed to obtain the long and short-run estimates of the variables since it was the most appropriate method given the mixed I(0) and I(1) variables results of the unit root test.

The co-integration analysis revealed the presence of long-run relationship among economic growth, government expenditure, trade openness, foreign aid , exchange rate, inflation gross fixed capital formation. The error correction model also revealed a short run relationship among the variables. It can be said that, most the results in the short-run were consistent with the results in the long-run. The positive and negative effects of most of the variables on economic growth were bigger in magnitude in the long-run than in the short-run.

It was revealed that government total expenditure negatively affects economic growth in the long run. But however, the short run result shown that government total expenditure positively influence economic growth but statistically insignificant. This result was different in the first and second lag periods, as the first and second lag periods revealed that government total expenditure negatively affects economic growth and these results were statistically significant. Also, inflation, trade openness and gross fixed capital formation positively impact on economic growth in the long run and these are statistically significant. However, foreign aid and exchange rate were negatively related to economic growth in the long run but foreign aid seems to be statistically insignificant.

In the short run, the current year gross fixed capital formation and the one year lag gross fixed capital formation negatively affect economic growth. But the second

year‘s lag gross fixed capital formation positively influences economic growth. Inflation in the current year also negatively affects economic growth but positively affects economic growth in the two year lag period. It was also revealed that in the short run foreign aid negatively affects economic growth which was consistent with the long run result. Trade openness was also found to positively affect economic growth in the short run which corresponds with the long run result. Also, exchange rate was found in the short run to negatively affect economic growth and this result also affirms that in the long run. Additionally, the existence of a long-run relationship among the variables was further confirmed by the statistically significant coefficient of the lagged error correction term. The value of the coefficient of the error correction term was found to be 0.369147 which suggests that about 37 percent of the disequilibrium caused by previous years‘ shocks converges back to the long-run equilibrium in the current year. Statistically, any disequilibrium in the Ghanaian economy takes about seven months to restore to equilibrium. The study also revealed that there exist bidirectional granger causality between government spending and economic growth.

The diagnostic tests results show that the model is free of serial correlation and heteroscedasticity at conventional levels of significance. Further, the graphs of the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) show that there is stability of the parameters.

5.2 Conclusions

The main objective of this study is to examine the long run and the short run relationship between government total expenditure and economic growth. The conclusion that can be drawn from this study taking into consideration the findings of the study is that although government expenditure is believed to boost aggregate

demand and hence increase economic growth, it is not always the case. This is in the sense that in our part of the world specifically Ghana, government expenditures are not directed towards productive sectors of the economic. Greater part of the expenditure is on unproductive sectors and recurrent expenditures. This in the long run will not have a positive impact on the economic performance. The positive impact of government expenditure can be realized in the long run when these revenues are spent on productive and capital investment in the economy.

5.3 Recommendations

Taking into consideration the findings of this study, the following recommendations are made:

- Government through the Ministry of Finance should ensure that public spending is geared towards more productive sectors of the economy.
- In order Ghana to reap a positive benefit of foreign aid, the researcher recommend the provision of economic aid which is geared towards capital formation and skills development of labour through education and training rather than political aid since the results show that capital and labour have positive impact on economic growth.
- The researcher will recommend that the policy makers should focus on export promotion strategy to enhance the economic growth in Ghana. Besides, efficient utilization of capital goods should be ensured and reliance on non-capital goods should be less in order to ensure high domestic production in the country
- Also, the researcher will recommend a systematic exchange rate via monetary policy should be properly developed to promote the stability and sustainability of economic growth in Ghana.

5.4 Limitations of the study

The major limitation to this study is time constraint. Due to duration of the programme which is a one year programme, the researcher was occupied with other academic works leaving limited time to work on this project and this serves as great impediment to the conduct of this research work.

5.5 Suggestions for Future Studies

Due to the limitation of this work, the researcher could not delve deep into the selected topic. The study could not consider the effects of various components of government expenditure on economic growth and he would like to suggest to future researcher to consider looking at the effects of the various components government expenditure on economic growth. This study could not also look at the threshold effect between expenditure and economic growth and other future researchers should consider this.

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APENDICES

APENDIX A

Table : Descriptive Statistics

Variable	GDPPC	OPEN	GEX	INV	EXCH	INFL	ODA
Mean	1081.248	62.70377	10.70210	3.28E+09	0.778226	29.43758	7.85E+08
Median	998.3654	65.17055	10.63432	1.41E+09	0.204796	18.13472	6.50E+08
Maximum	1807.064	116.0484	15.30817	1.63E+10	4.350742	122.8745	1.80E+09
Minimum	693.4641	11.54490	5.861290	1.53E+08	0.000102	3.030303	36320000
Std. Dev.	306.0822	25.53229	2.091470	4.57E+09	1.134560	27.66310	5.40E+08
Skewness	0.975872	0.129604	-0.035518	1.906608	1.814987	2.144357	0.354619
Observations	41	41	41	41	41	41	41

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

APPENDIX B

Results of the Phillip-Perron Unit Root Test.

VARIABLE	PP TEST					
	LEVELS			FIRST DIFFERENCE		
	NONE	CONSTANT	TREND & CONSTANT	NONE	CONSTANT	TREND & CONSTANT
lnGDPPC	1.2013	0.9956	-1.2093	-4.3076***	-4.4355***	-6.0457***
lnOPEN	-0.1169	-1.3003	-2.1400	-4.8671***	-4.8214***	-4.7499***
lnODA	1.7669	-1.4630	-2.4760	-9.3182***	-10.036***	-10.559***
lnINFL	-0.3536	-3.9058***	-5.0479***	-	-	-
lnGEX	-0.6571	-3.3144**	-3.3331*	-7.9705***	-7.9222***	-7.8110***
EXCH	-2.7089***	-0.8781	-1.0826	-2.8668***	-3.9120***	-3.9274**
lnGFCF	2.2634	-1.3702	-3.5760**	-5.8067***	-6.2736***	-6.1768***

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

APPENDIX C

Lag Length Selection for the Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	132.3821	NA	1.82e-12	-7.164691	-6.853621	-7.057310
1	375.0709	374.4342	3.02e-17	-18.23262	-15.74407*	-17.37357
2	443.4389	78.13488*	1.42e-17	-19.33937	-14.67332	-17.72865
3	517.7055	55.16942	1.04e-17*	-20.78317*	-13.93964	-18.42078*

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

APPENDIX D

Results of the Bound F Test for Co-integration

F-Bounds Test			Null Hypothesis: No levels relationship		
Test Statistic	Value	Lag Length	Significant Level.	I(0)	I(1)
F-statistic	9.738677	3	10%	2.12	3.23
			5%	2.45	3.61
			2.5%	2.75	3.99
			1%	3.15	4.43

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

APPENDIX E

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXPEN	-0.652884	0.129780	-5.030719	0.0003
LGFCF	0.535825	0.046355	11.559104	0.0000
LINFL	0.134240	0.054883	2.445941	0.0308
LODA	-0.091275	0.050774	-1.797677	0.0974
LOPEN	0.601714	0.114118	5.272714	0.0002
LEXCH	-0.209147	0.038618	-5.415830	0.0002
C	-1.936107	0.878640	-2.203527	0.0478

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

APPENDIX F

Short Run (Error Correction) Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LEXPEN)	0.007930	0.026192	0.302749	0.7673
D(LEXPEN(-1))	-0.135892	0.046424	-2.927182	0.0127
D(LEXPEN(-2))	-0.117874	0.042568	-2.769079	0.0170
D(LGFCF)	-0.037246	0.029043	-1.282435	0.2239
D(LGFCF(-1))	-0.001641	0.029671	-0.055293	0.9568
D(LGFCF(-2))	0.021535	0.018093	1.190249	0.2570
D(LINFL)	-0.033352	0.011211	-2.974973	0.0116
D(LINFL(-1))	0.025781	0.009149	2.817940	0.0155
D(LODA)	-0.016911	0.016047	-1.053883	0.3127
D(LODA(-1))	-0.045699	0.016564	-2.758999	0.0173
D(LOPEN)	0.023884	0.047621	0.501544	0.6251
D(LOPEN(-1))	0.150110	0.066729	2.249557	0.0440
D(LOPEN(-2))	0.090363	0.026855	3.364894	0.0056
D(LEXCH)	-0.004618	0.037971	-0.121630	0.9052
D(LEXCH(-1))	-0.134228	0.038595	-3.477844	0.0046
ECM(-1)	0.369147	0.116523	3.168011	0.0081
Cointeq = LGDPPC - (-0.6529*LEXPEN + 0.5358*LGFCF + 0.1342*LINFL				
-0.0913*LODA + 0.6017*LOPEN -0.2091*LEXCH -1.9361)				

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

APPENDIX G

ADF Test Result

Levels			First Difference			
Variables	ADF Statistics	Lag	Variables	ADF Statistics	Lage	I(0)
GDPPC	-1.6267[0.6970]	3	ΔGDPPC	-2.961[0.003]***	3	I(1)
OPEN	-1.5607[0.1595]	3	ΔOPEN	-3.655[0.001]***	3	I(1)
ODA	-0.8586[0.9471]	3	ΔODA	-2.6139[0.002]***	3	I(1)
INFL	-8.1635[0.01]***	3	–	-	-	I(0)
GEX	-1.0622[0.8941]	3	ΔGEX	-1.981[0.012]***	3	I(1)
REXCH	-1.5192[0.01]***	3	–	-	-	I(0)
GFCF	-1.7548[0.3241]	3	ΔGFCF	-3.125[0.000]***	3	I(1)

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

APPENDIX H

Table Results of Pair-wise Granger Causality Tests

Null Hypothesis	F-Stats.	Prob.	Remarks
lnGDPPC does not Granger Cause GEX	0.75717	0.6262	H_0 Rejected
GEX does not Granger cause GDPPC	1.3586	0.2525	H_0 Rejected

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

APPENDIX I

Model Diagnosis

Results of the Heteroscedaticity and Serial Correlation Test

Heteroscedasticity Test: Breusch-Pagan-Godfrey		Null Hypothesis: No Heteroscedasticity	
F-statistic	1.702458	Prob. F(22,12)	0.1707
Obs*R-squared	26.50727	Prob. Chi-Square(22)	0.2305
Scaled explained SS	1.648738	Prob. Chi-Square(22)	1.0000

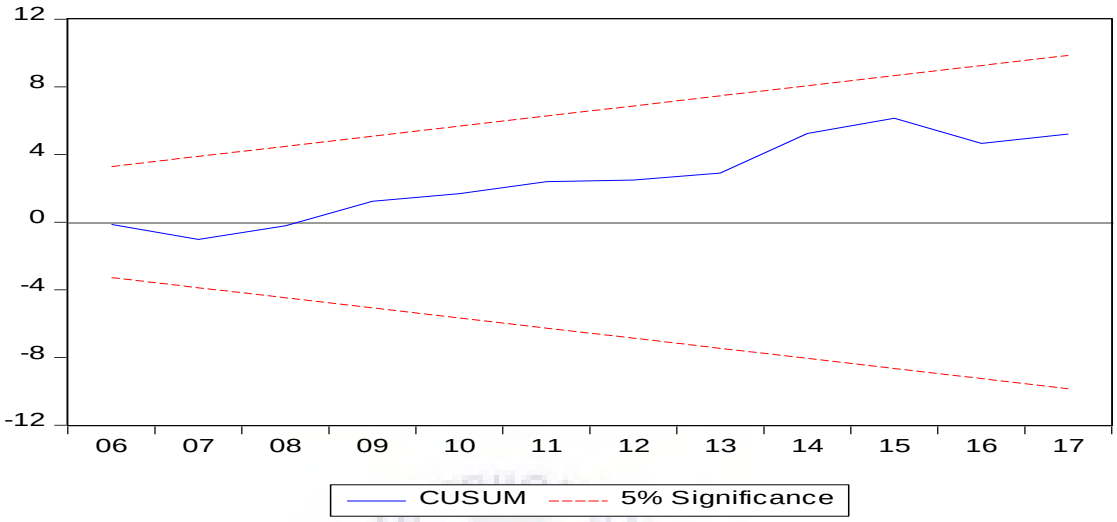
Breusch-Godfrey Serial Correlation LM Test:		Null Hypothesis: No Serial Correlation	
F-statistic	1.564676	Prob. F(2,10)	0.2563
Obs*R-squared	8.342172	Prob. Chi-Square(2)	0.0154

Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

APPENDIX J

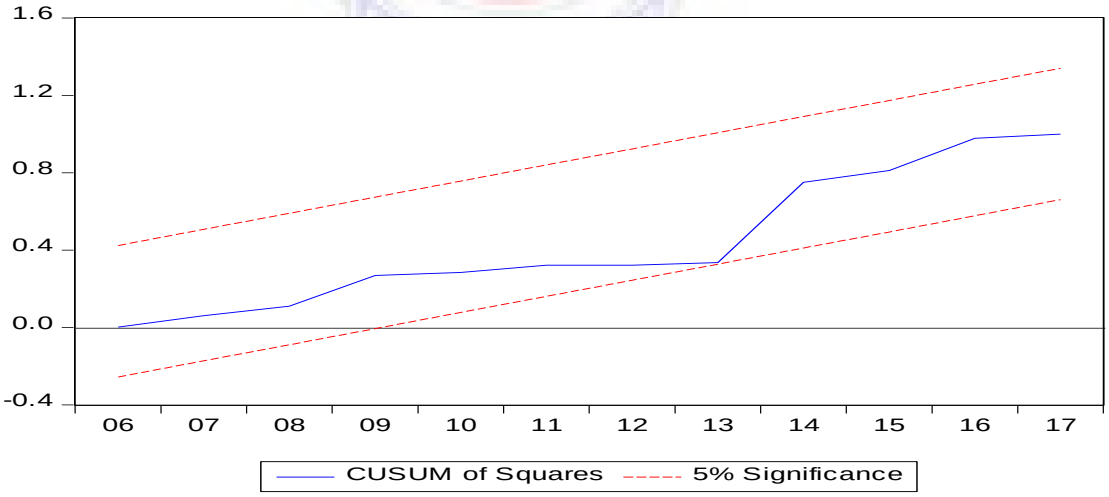
Cumulative Sum (CUSUM)

Plot of Cummulative sum of recursive residuals for ARDL model



Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software

Plot of Cumulative sum of square of recursive residuals for ARDL model



Source: Author's computation using Data from WDI, 2019 and E-views 10 econometric software