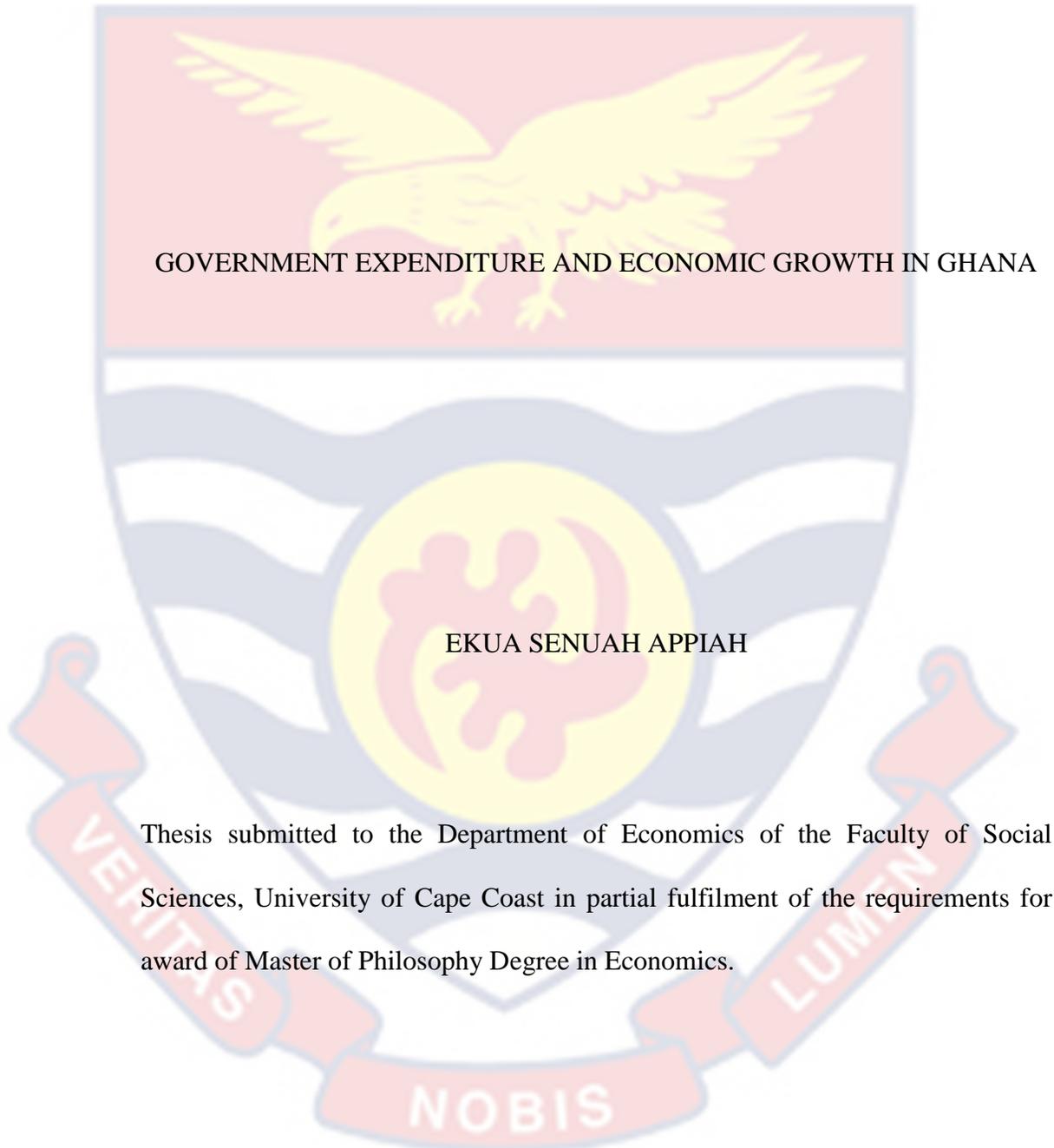UNIVERSITY OF CAPE COAST

GOVERNMENT EXPENDITURE AND ECONOMIC GROWTH IN GHANA

EKUA SENUAH APPIAH

2014

UNIVERSITY OF CAPE COAST

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EKUA SENUAH APPIAH

Thesis submitted to the Department of Economics of the Faculty of Social Sciences, University of Cape Coast in partial fulfilment of the requirements for award of Master of Philosophy Degree in Economics.

NOVEMBER, 2014

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Name: Ekua Senuah Appiah

Signature:……………………….   Date: ………………………………

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Name: Dr. Camara K. Obeng

Signature:…………………………   Date:……………………………….

Co-Supervisor's Name: Dr. Mark K. Armah

Signature:…………………………   Date:……………………….............

ABSTRACT

The study investigated the relationship between government expenditure and economic growth in Ghana. It considered both aggregated and disaggregated government expenditure. Annual time series data from 1985 to 2012 was employed for the aggregated analysis while at the disaggregated level, annual time series data from 1985-2010 was employed due to data constraint. The study resorted to the maximum likelihood estimation (MLE) technique and cointegration among the variables was established within the framework of autoregressive distributed lag (ARDL). A piece-wise linear regression was used to examine the possibility of government expenditure threshold.

The results of the ARDL indicated that aggregate government expenditure negatively affects growth in the long run but positive in the short run. According to the Granger causality test the study found that there is a unidirectional causality running from economic growth to government expenditure, which supports Wagner's Law. The results based on the disaggregated analysis point to the fact that capital expenditures promote economic growth whiles recurrent expenditures retard growth in Ghana. The study also found the existence of government expenditure threshold.

Based on these findings the following policy recommendations are suggested: the government must restructure its expenditures by cutting down its recurrent expenditures while increasing capital expenditures. However, increase in government expenditure must be done cautiously as excessive increase will deter economic growth in the long run.

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ACKNOWLEDGEMENTS

My sincere gratitude goes to my Principal Supervisor, Dr. Camara K. Obeng and Co-supervisor, Dr. Mark K. Armah for their tremendous tutelage, constructive criticisms and corrections that helped shape the thesis. My sincere appreciation goes to Dr. Isaac Bentum-Ennin, Prof. Samuel Kobina Annim, Dr. Peter B. Aglobitse and Mr. Nkansah K. Darfor for their suggestions, encouragement and support.

I am also grateful to the African Economic Research Consortium (AERC) and the Association of African Universities (AAU) for their financial support in the course of writing this thesis.

Finally, I would like to express my appreciation to DSP Tony Arthur, Mr. Simon Ocran, Mr. Emmanuel Wiafe, Mr. William Godfred Cantah, Mr. Joseph Adin and all my colleagues for their encouragement during times of difficulties.
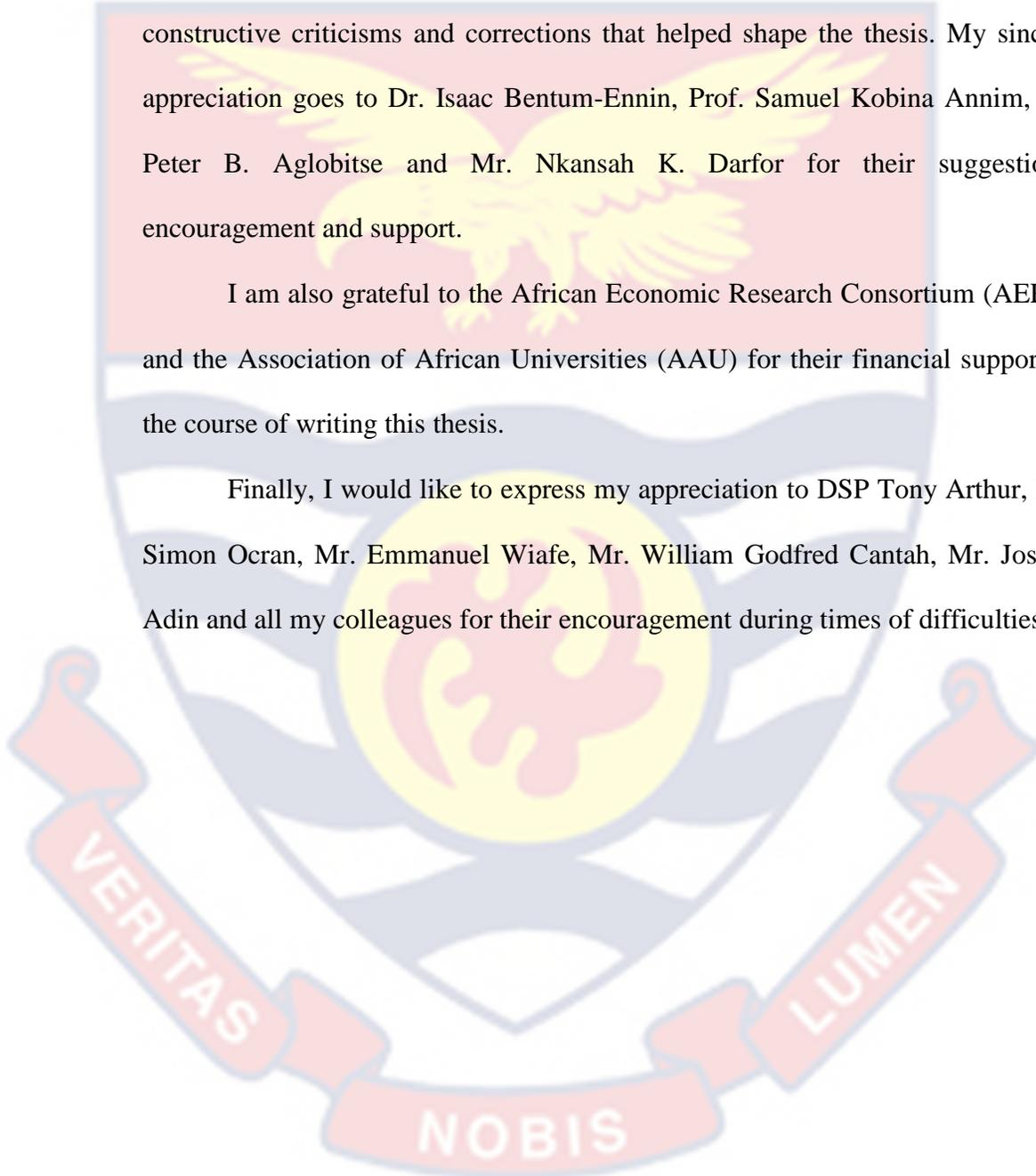
DEDICATION

To my parents: Mr. Fred Appiah and Miss Agnes Aggrey, my siblings: Paapa,

Adwowa, Baawah and Kofi and lastly, Mr. Michael Opoku Twum.

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LIST OF ACRONYMS

ADF	Augmented Dickey-Fuller
ADI	Afrian Development Indicators
AIC	Akaike Information Criterion
ARDL	Autoregressive Distributed Lag
ARMA	Autoregressive Moving Averages
BoG	Bank of Ghana
CPI	Consumer Price Index
CUSUM	Cumulative Sum of Recursive Residuals
CUSUMSQ	Cumulative Sum of Squares of Recursive Residuals
ECM	Error Correction Model
ECT	Error Correction Term
ERP	Economic Reform Programme
GDP	Gross Domestic Product
GMM	Generalised Method of Moments
HDI	Human Development Index
HIPC	Highly Indebted Poor Country
IMF	International Monetary Fund
MDAs	Ministries, Department and Agencies
MoFEP	Ministry of Finance and Economic Planning
MLE	Maximum Likelihood Estimation
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares

PP	Phillips-Perron
RESET	Regression Specification Error Test
SAB	Structural Adjustment Programme
SBC	Schwarz Bayesian Criterion
SIC	Swartz Information Criterion
STAR	Smooth Transition Autoregressive
TAR	Threshold Autoregressive
TFP	Total Factor Productivity
UECM	Unrestricted Error Correction Model
VAR	Vector Autoregressive
WDI	World Development Indicators
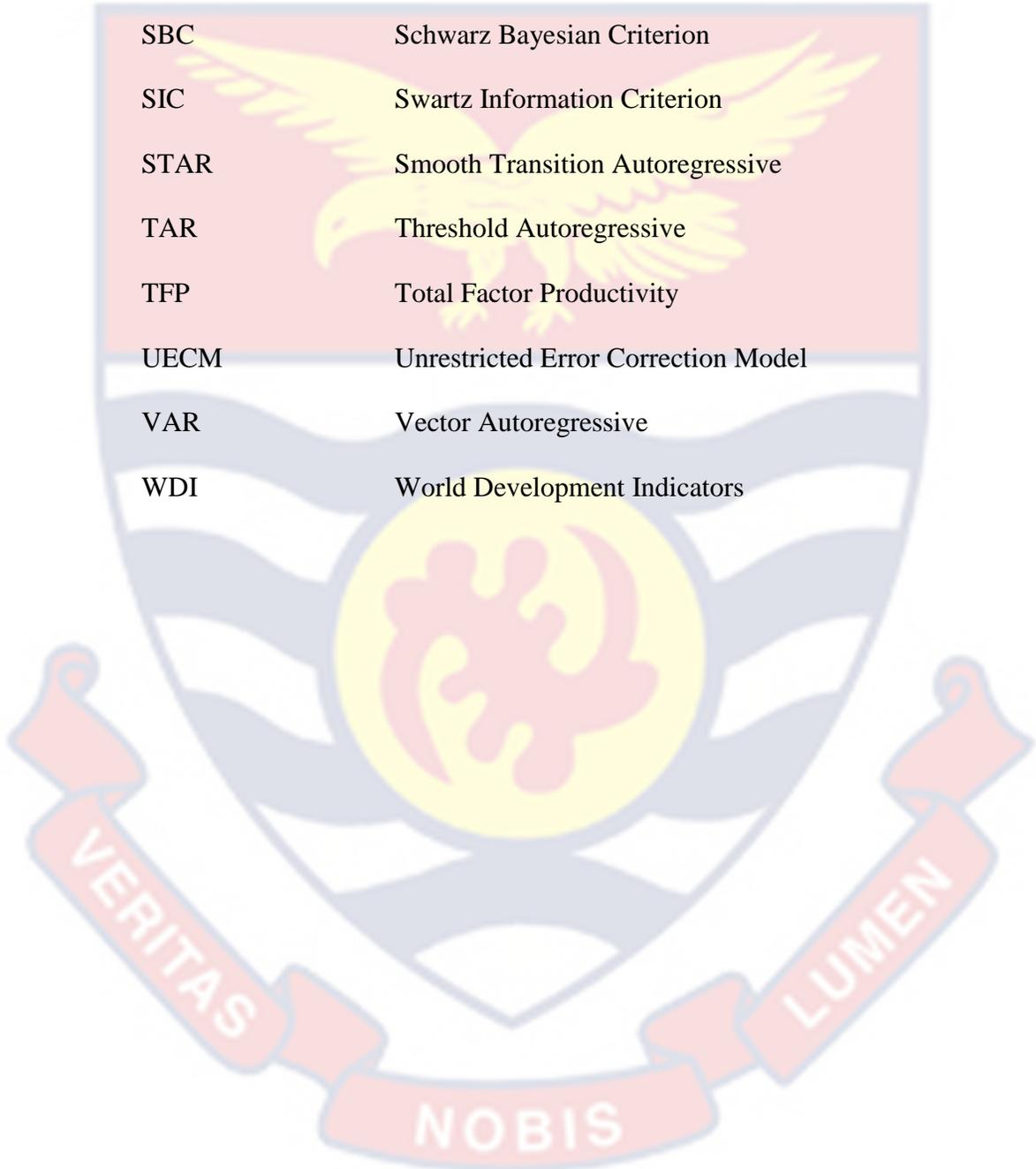
CHAPTER ONE

INTRODUCTION

Background to the Study

Governments play a very crucial role in enhancing a country's macroeconomic performance. In fact, as far back as 1651, Thomas Hobbes described life without the government as "nasty, brutish and short" and argued that the law and order provided by the government was an important component of a civilized life (Gwartney, Holcombe & Lawson 1998). This view however was in sharp contrast with that expressed by the classical economists. The classicalists argued vehemently that, the forces in decentralized markets would lead to order but not chaos and resources would be allocated to produce goods that are valued most in the society. Hence the economy will function effectively without any government intervention.

The debate on the role of the government was rekindled after the Great Depression which occurred between 1929 and 1940, which saw unemployment reach 25 percent in the U.S. and averaged more than 17 percent for a decade (Cohn, 2007). Keynes (1936) found the inability of the classical economists to explain the causes of the Great Depression and thus questioned their laissez-faire "do nothing" policy recommendations for responding to high unemployment rate. Keynes believed that the economy did not have to remain mired in depression or recession after the downward spiral in aggregate demand. To Keynes, expansionary government policies could "prime the pump", increase aggregate demand, re-employ people who would re-spend their incomes and induce new

production to re-employ others, and so on − the multiplier effect. Hence, from the viewpoint of Keynes, what blocked the recovery of the economy were the laissez-faire doctrines of the orthodox or the classical economists that assured everyone that the economy would automatically right itself in the long run. The Great Depression continued throughout the 1930s and what rescued the U.S. and the English economies was massive government spending.

In the 1980s, the political ascendency of conservative governments in United States, Canada, Britain and West Germany came with a neoclassical counterrevolution in economic theory and policy formulation. In developing countries, the revolution emphasized the need for freer markets and deemphasized public ownership, government planning and regulation of economic activities (Adelman, 2000). The fundamental argument of the neoclassical counterrevolution is that, underdevelopment in most developing countries is the consequence of poor resource allocation arising from incorrect pricing policies and most importantly, too much government intervention. In fact, the leading writers of the counterrevolution school argued strongly that, it is the state or government intervention of economic activities that slows the pace of economic growth. Hence they argued that the best action governments can undertake to promote development is to minimize their economic roles.

The neoliberals maintain that by allowing the operation of competitive free markets, privatizing state–owned enterprises, eliminating the plethora of government regulations and price regulations in factor, product and financial market will stimulate economic efficiency and eventually lead to economic

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growth (Todaro & Smith, 2003). In fact, contrary to the claims of the dependency theorists, the neoclassical counterrevolution stressed that the major cause of underdevelopment is not necessarily due to the predatory activities of the First World (advanced countries) or International Agencies but the heavy government size accompanied with corruption, inefficiency and lack of incentives that permeate in most developing countries. The neoliberals maintained that if underdeveloped economies intend to break from this shackle, then there is the need to promote free market or laissez-faire economies. This implies that governments should allow the invisible hand to regulate resource allocation which would lead to growth and consequently economic development. They attributed the success of the Asian Tigers: South Korea, Malaysia and Taiwan to the free market system and the failures of Africa and Latin America to heavy government intervention (Todaro & Smith, 2003).

The neoclassical counterrevolution can be divided into three component approaches: the free-market approach, the public choice approach and the market friendly approach. The free market approach argues that the market alone is efficient – the product market provides the best signals for investment activities, the labour market also react to these new industries in appropriate ways, producers similarly know best what to produce and how to produce efficiently, and lastly, product and factor prices reflect accurate scarcity values of goods and resources now and the future. Competition is thus very effective if not perfect, information and technology is freely available and nearly costless to absorb.

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Under these conditions, government intervention in the economy is distortionary and counterproductive (Adelman, 2000).

Public choice theory also maintains that governments do nothing right. The theory assumes that, politicians, bureaucrats, citizens and the state act solely from a self-interest perspective, using the power and authority of government for their own selfish interest. Politicians use government resources to consolidate and maintain their positions, power and authority. Similarly, bureaucrats and public officials use their position to extract bribes from rent-seeking citizens. Finally, governments use their powers to confiscate private property from individuals (Grochova & Otáhal, 2012). The net result is not only a misallocation of resources but also a general reduction in individuals' freedoms. The conclusion here is that, minimal government is the best.

The market-friendly approach recognizes that there are many imperfections in the LDCs product and factor market and that government do have a role to play in facilitating the operations of free market by investing in physical and social infrastructure, health care facilities and educational institutions and by providing suitable climate for private enterprise to operate (Todaro & Smith, 2003).

These inconsistencies is sometimes explained by arguing that the impact of additional government expenditure on the economy differs depending on the existing level of government expenditure, suggesting there might be a threshold of government expenditure implying nonlinear relationship between the level of government spending and macroeconomic performance (Barro, 1991; Armey,

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1995;Vedder & Gallawey,1998). The key idea is that government has an important role in promoting economic performance through its spending policies by protecting private property, providing state infrastructure and generally, providing public goods. But over-expanding the government expenditure may cause distortions and misallocation of resources which would adversely affect the economy. In addition, a number of empirical studies have suggested that the impact of government expenditure on output depends on the composition of that expenditure as some expenditure could either be productive or unproductive (Irmen & Kuehnel, 2009)

In spite of the position of the Keynesian and the neoclassical economists, government expenditure policies have been a major component of economic policies for growth and development in many countries with Ghana not being an exception. Figure 1 shows the trend of government expenditure and economic growth for Ghana between the years 1985 and 2012.
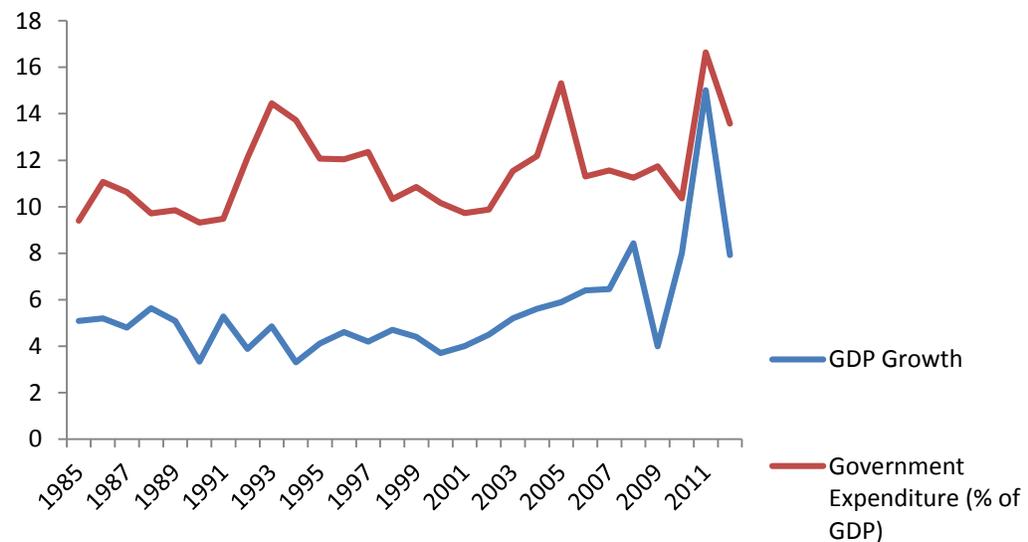
Figure 1: Trend of Government Expenditure and Economic Growth Rates
Source: African Development Indicators (2013)

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From Figure 1, it can be observed both government expenditure and economic growth rate has experienced series of fluctuations. For instance the substantial increase in salaries and other benefits to civil servants in the run up to the presidential and parliamentary elections in 1992 and 1996, also accounted for the huge expenditure outlay during the 1990s (Oshikoya & Tarawalie, 2008).

Between2001 and 2008, the country experienced a significant and continuous rise in economic activities with the economic growth rate moving from its initial 4 percent in 2001 to 7.3 percent in 2008. This was largely due to major debt reliefs such as HIPC and foreign assistance. The HIPC initiative was basically to help Ghana reduce poverty and promote economic growth through debt reliefs. Total expenditure for 2011 amounted to GH¢12,743.7 million (23.9% of GDP), compared with GH¢9,211.5 million (19.9% of GDP) recorded in the corresponding period in 2010. This represented an increase of 38.3 per cent. The surge in the pace of government spending was mainly on account of increased discretionary spending particularly by the Ministries, Departments and Agencies (MDAs). Statutory payments made for the period under review totaled GH¢8,354.4 million (15.6% of GDP) reflecting an expansion of 35.5 per cent over payments in the corresponding period of 2010 (MoFEP, 2012).

The growth rate for the post-HIPC era increased by more than 1 percent compared to that of the 1990-2000 periods. The remarkable growth performance reflected the general increase in government spending, mostly resulting from investment and consumption expenditures. Figure 2, illustrates the trend of government   capital   and   recurrent   expenditures.
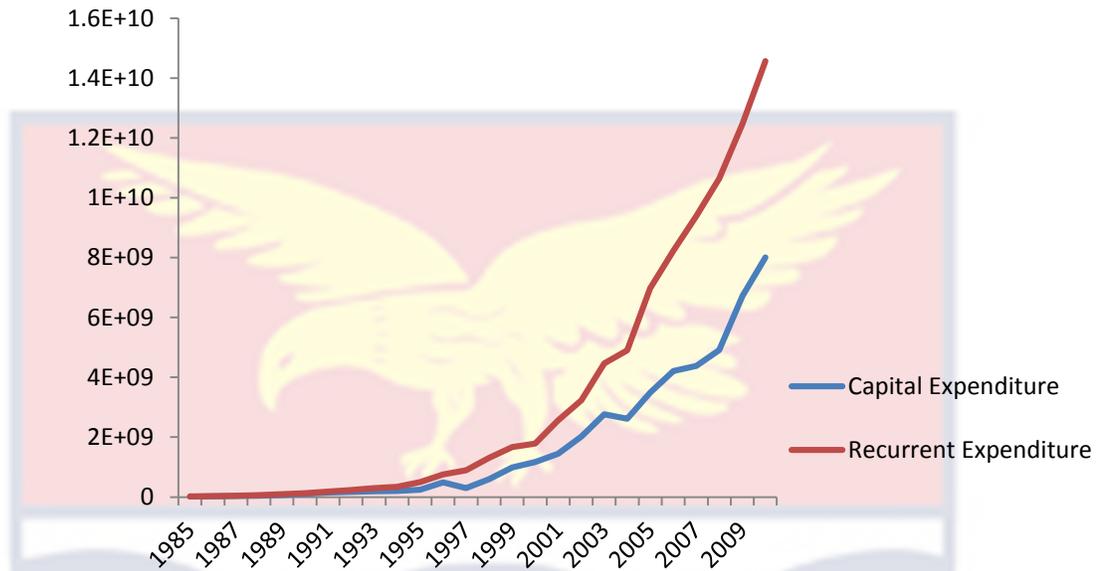
Figure 2: Trend of Government Capital and Recurrent Expenditures.
Source: African Development Indicators (2013)

In respect of the composition of government expenditure, consumption spending has over the years continually accounted for more than 45 percent of total expenditures. The payment of wages and salaries by government accounts for the bulk of expenditures included in government consumption expenditures. Government investment spending has generally increased over the past three decades from as low as 1.3 percent of GDP in 1980 to about 11 percent of GDP in 2008. Similar to government investments, transfer payments have been rising steadily since 1980 and in recent times have grown in significance in terms of its proportion to government expenditures. Transfers represented 5.7 percent of total expenditures in 2001 and increased to around 19 percent of expenditures in 2008.

According to the Bank of Ghana's monetary policy and fiscal development report for 2012, total interest payments for 2011 amounted to GH¢1,557.8 million (2.9% of GDP). This exceeded the outturn of GH¢1,380.4 million (3.0% of GDP) registered in the corresponding period in 2010 by 12.9 per cent. Domestic interest payments constituted about 84.0 per cent of the total interest payments for the period lower than the 81.5 per cent recorded in a similar period in 2010. The wage bill (including pensions, gratuities and other wage related expenditure) amounted to GH¢5,226.4 million (9.8% of GDP). This amount absorbed 54.9 per cent of domestic revenues mobilised over the one year period. Compared to the corresponding period in 2010, the wage bill recorded a growth of 52.6 per cent. Discretionary payments for the period amounted to GH¢4,389.3 million (8.2% of GDP) compared with the GH¢ 3,045.6 million (6.6% of GDP) recorded by the end of the fourth quarter of 2010 (BoG, 2012).

The period spanning the 1970s and early 1980s witnessed an expansionary fiscal policies reflected in growing public expenditures. With revenues lagging behind, this created sustained budget deficits which were financed mainly from the banking system (Loloh, 2011).Public finance literature recognizes four broad means through which a country can finance its budget deficit. These include the following: using its cash reserves, sale of state assets like properties, shares in companies and even state enterprises, printing more currency in order to increase money supply and borrowing from the central and/or Deposit Money Banks (DMBs) or from the general public internally and externally. It must be noted that, each method employed in financing the expenditure has its own economic

implications. The Government of Ghana over the years has utilized more or less all of these means but the major source of financing the budget has been borrowing from both the banking and the private sector (Amoah & Loloh, 2008). High domestic borrowing does not only raise domestic debt profile but it also impinges on inflation and interest rates and hurt the long run growth path of the economy.

Domestic financing of the budget deficit in 1999 was 83% of the overall financing or 5.4% of GDP, out of which 93 percent or 5.1 percent of GDP came from the banking sector, of which 21 percent or 1.1% of GDP came from BoG. It is significant to note that by the year 2000, domestic financing of the deficit shot up to 102% of the overall financing or 8.8 percent of GDP; the banking sector's share was 80% or 7.0% of GDP, and Bank of Ghana's share of the banking sector was 94% or 6.6 percent of GDP. Such level of Central Bank financing of the budget deficit is consistent with the high inflation and the considerable macroeconomic instability witnessed between 1999 and 2000(Amoah & Loloh, 2008).The domestic debt stock stood at US$12,569.83 million at the end of August 2013. Of this amount, 27.5 percent was in short-term instruments (instruments with maturities of 1 year and below), 48.72 percent in medium-term instruments and 21.6 per cent in long-term instruments, while standard term loan (usually with commercial banks) constituted 2.18 percent.

The composition of the deficit financing has undergone a paradigm shift. In 2001, the government succeeded in traditional debt rescheduling (exceptional financing) of up to 22.3 percent of the overall deficit. And since 2003, exceptional

financing mainly related debt relief (Cologne terms) constitute a large proportion of the overall deficit financing, averaging over 40 percent between 2003 and 2007. With legal restriction and West Africa Monetary Zone (WAMZ) criterion now setting a limit on the Central Bank's ability to finance the deficit, emphasis also shifted from domestic financing to external financing.

Ghana's external debt stock, comprising public and publicly guaranteed debt as at end August 2013 stood at US$10,167.13 million as against US$5,007.9 million in December 2009. As at end August 2013, multilateral debt stood at US$4,177.39 million representing 20.91 per cent of the total debt stock. Other concessional facilities amounted to US$1,453.5 million, (7.66 per cent), Export credits was US$1,059.68 (5.31 per cent), Commercial debt US$1,074.65 (5.38 per cent), Bilateral facilities were US$867.39 million (4.34 per cent), and International capital market bonds were US$1,530.51 million (7.66 per cent).

The increasing trend of government expenditure coupled with huge government debt as a result of persistent budget deficit calls for the need to re-examine the impact of government expenditures in fostering economic growth.

Statement of the Problem

Economic theory does not provide a definite conclusion about effect of the government expenditure on economic growth. Indeed, there are circumstances in which lower levels of government spending would enhance (or hinder) economic growth and other circumstances in which higher levels of government spending would be desirable (or undesirable). Even though a substantial volume of

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empirical research has been directed towards identifying the exact relationship between government spending and economic growth, there has been mixed findings. For instance Nketiah-Amponsah (2009), Afonso & Alegre (2008) to mention a few found a negative relationship whiles Sinha (1998) found a positive relationship.

Existing empirical literature however displays a disturbing trend as most conclusions are drawn based either on the experiences of a set of developed or developing countries or on the basis of large samples consisting of a mixture of developed and developing countries. Hence there remains little by way of understanding the process by which government expenditure policies of a particular country shape the prospect of economic growth for that particular country. It is important to emphasize that a time series country study is potentially more informative, although the findings cannot be generalized to other countries. Greiner, Semmler and Gong (2005) emphasized that a time series perspective on economic growth may be more useful to pursue in designing growth and development strategies. In Ghana, the only study known of is that of Nketiah–Amponsah (2009). However he fails to examine the possible non-linear relationship that could exist between government expenditure and growth as postulated by Barro (1991), Armey (1995) and Vedder & Gallaway (1998) therefore the study intends to bridge this gap by testing if government expenditure has a threshold.

In addition, given the upward trend of government expenditure coupled with huge government debt, there is the need to re-examine the effects of

government spending on growth by paying particular attention to the various components of government expenditures. This would ensure that government expenditure is efficiently utilized and economic growth will not be hindered.

Objectives

The general objective of this study is to critically analyze the relationship between government expenditure and economic growth.

Specifically, the study intends to:

1. determine the long run relationship between aggregate government expenditure and economic growth;

2. analyze the short run relationship between aggregate government spending and economic growth;

3. explore the nature of causal relationship between aggregate expenditure and economic growth;

4. examine the long run relationship between the components of government expenditure and economic growth;

5. investigate the short run relationship between the components of government expenditure and economic growth; and

6. verify the existence of a threshold of aggregate government expenditures.

Hypotheses

➤ H_0: There is no long run relationship between aggregate government expenditure and economic growth.

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H_1:   There is a long run relationship between aggregate government expenditure and economic growth.

➢ H_0:   There is no short run relationship between aggregate government expenditure and economic growth.

H_1:   There is a short run relationship between aggregate government expenditure and economic growth.

➢ H_0:   There is no causal relationship between aggregate government expenditure and economic growth.

H_1:   There is a causal relationship between aggregate government expenditure and economic growth.

➢ H_0:   There is no long run relationship between the components of expenditure and economic growth.

H_1:   There is a long run relationship between the components of government expenditure and economic growth.

➢ H_0:   There is no short run relationship between the components of expenditure and economic growth.

H_1:   There is a short run relationship between the components of government expenditure and economic growth.

➢ H_0:   There is no threshold of aggregate government expenditure.

H_1:   There is a threshold of aggregate government expenditure.

Significance of the Study

The study will serve as a platform to assess the importance of government expenditure in promoting economic growth in Ghana since empirical literature does not provide any definite conclusion. The disaggregated analysis will enable policymakers to determine which component of the aggregate government expenditure will boost economic growth more. In so doing, policy makers will be well informed when allocating the nation's scarce resources. In addition, by testing the possibility of the existence of a threshold of government expenditure, policymakers will be more conscious how much to spend.

The study is therefore intended to assist policymakers to carry out fiscal policies, particularly in relation to government spending, that are will enhance economic growth.

Scope of the Study

This study aimed to critically analyze the relationship between government expenditure and economic growth in Ghana. Annual time series data set for the period 1985 to 2012 was used for the aggregate analysis however due to data constraint annual time series data set for the period 1985 to 2010 was used for the disaggregated analysis. The study utilized the Autoregressive Distributed Lag (ARDL) model otherwise known as the bounds testing approach to cointegration developed by Pesaran and Shin (1999) and Pesaran, Shin and Smith (2001). A piece-wise linear regression was employed to verify the existence or otherwise of government expenditure threshold.The study employed the following

variables: economic growth, aggregate government expenditure, total capital expenditure, total recurrent or current expenditure, consumer price index and tax revenue.

Organization of the Study

This study is organized into five chapters. Chapter one is the introductory chapter. It presents the background to the study, problem statement, research objectives, the hypotheses, significance and scope of the study as well as organization of the study. Chapter two contains the review of relevant literature. Chapter three presents the methodological framework and techniques employed in conducting the study. Chapter four presents and discusses the results of the study with reference to the literature. The final chapter presents the summary, conclusions and recommendations of the study.

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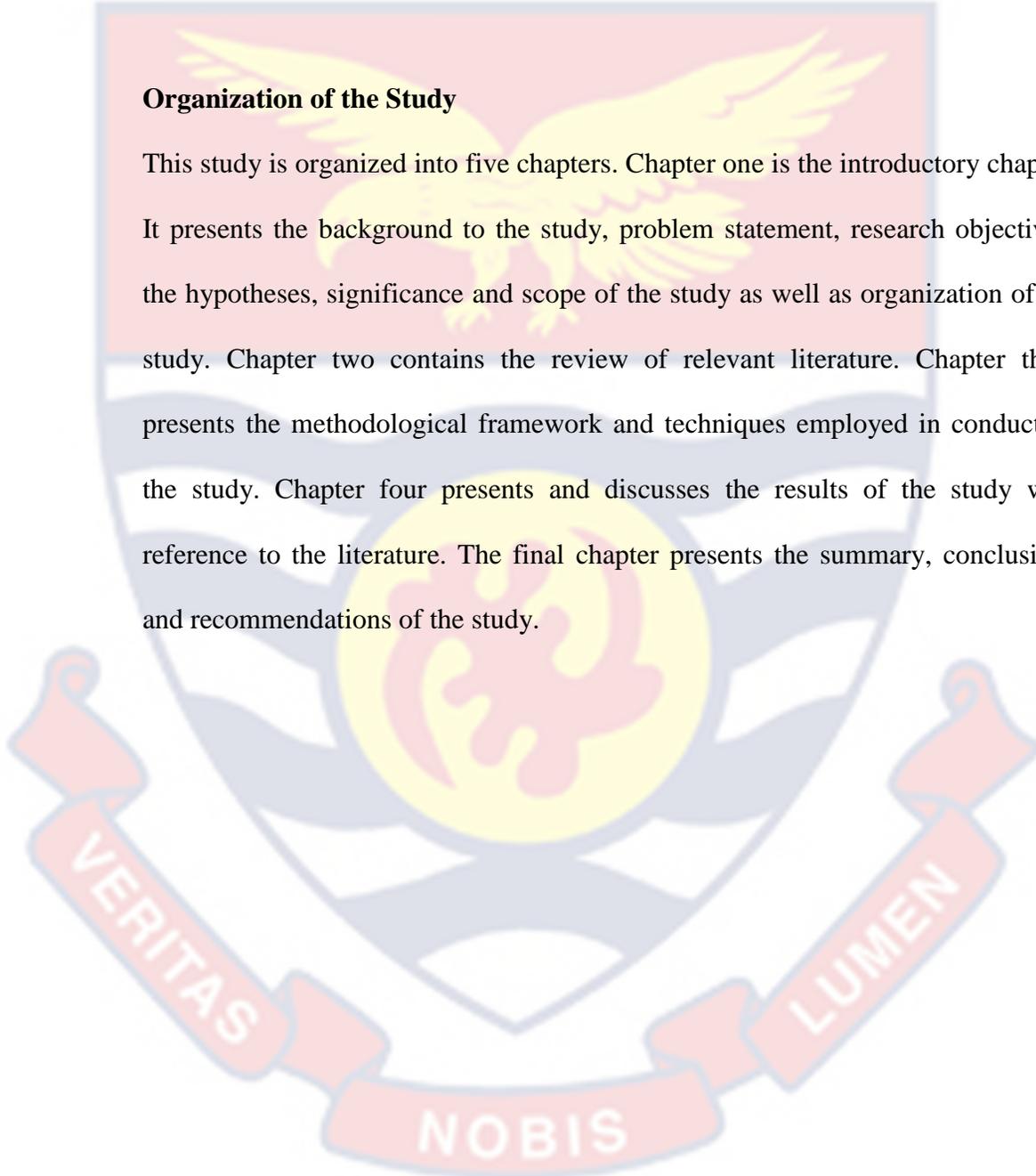
CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

The general objective of this chapter is to present a review of the relevant literature regarding government expenditure and economic growth. It is structured into three main sections. The first section discusses the trend of Ghana government's expenditure and economic growth. The second section presents the theories that underpin the study. It discusses the role of the government, the growth theories of government expenditure and the concept of optimal size of government expenditure. The other part highlights some growth theories with specific emphasis on neoclassical and endogenous growth theories. The third section presents the empirical literature review. It reviews empirical works on the subject matter and it is divided into two subsections. First, the study considers empirical works on the relationship between government expenditure and economic growth whiles the last of the section presents literature on optimal government expenditure.

Trend of Government Expenditure and Economic Growth in Ghana

Since independence, the trend of economic growth in Ghana has been characterized by series of fluctuations. Even though the country experienced moderate growth rate at the early stages of independence, one would have expected that these high rates of growth would have continued to spur the country into becoming a high-income country by the end of the twentieth century. But the

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economy began to experience a slowdown in the growth of GDP by 1965. Aryeetey, Fosu and Bawumia (2002) mentioned that, Ghana's economic growth was turbulent for much of the period after 1965 and only started stabilizing after 1983. Between 1965 and 1984, the country experienced periods of negative economic growth rates. This was attributed to the decline in the production of cocoa, minerals and timber, which were the main foundation of the nation's exports, within that period. For instance, cocoa exports reduced from 382,000 metric tonnes in 1974 to 159,000 metric tonnes by 1983 (World Bank, 1987).

Before the implementation of the Economic Reform Programme (ERP), political instabilities, internal and external shocks (including drought in 1975-77 and 1981-83, oil price hikes in the 1970s and a sharp decline in the terms of trade) led to the poor growth performance (Karikari, 1995). The economy's budget system prior to the ERP was characterized by persistent deficits and debts. The accumulation of deficits and debts, among other reasons, occurred as a result of government's overdependence on private sector borrowing to finance fiscal gaps. Deficit financing became a key source of budgetary support in the economy which caused the share of government borrowing from domestic banks to increase from 49 percent in 1970 to 86 percent in 1982 (Kusi, 1998). The result of the continuous domestic borrowing was a crowding out of the private sector from the credit market (Aryeetey & Harrigan, 2000) and as well reducing private investments. The poor performance of the economy therefore called for the implementation of the Economic Reform Programme (ERP) and the Structural

Adjustment Programme (SAP), with the aim of halting the downward trend in economic growth and stabilizing the macro economy.

The growth rate for the initial years after the implementation of the ERP (1984-89) was around 5.7 percent, which was far better than the -3.4 percent growth rate recorded for the 1979-83 period. Budget deficits were reduced from 2.7 percent of GDP in 1983 to a surplus of 0.7 percent of GDP in 1989. Aryeetey and Kanbur (2008) noted that, the economy responded positively to the economic reforms as it recovered from its negative growth rate of 5% in 1983 to an immense positive economic growth rate of about 8% in the following year. Since the implementation of the ERP and SAP, the country has seen consistent, stable, and positive economic growth, with annual growth rates averaging 5.4% (World Bank, 2013).

During this period the gap between government expenditures and government revenues widened while growth rate remained fairly steady. Growth rates ranged between 3.3 percent and 5.6 percent for the period between 1987 and 2000. Total expenditures before the implementation of the ERP declined from 18.8 to 16.2 percent of GDP during 1983-91. This decline was due the fall in transfer payments and government consumption expenditures by 2.0 and 6.6 percent of GDP respectively while investment expenditures increased from 3.3 percent to 5.1 percent of GDP (MoFEP, 2012). As a proportion of GDP, deficit for the period was around 1.6 percent and has since been widening. This was basically a reflection of the rocketing nature of government expenditures at that time – total expenditure rose from 14.3 in 1986 to around 28 percent of GDP in

2000. The average total government revenue as a share of GDP increased slowly from 11.5 percent during the ERP-1986 period to about 17.5 percent for the years between 1986 and 2000. The increase in government revenue did not translate much into economic growth because much of it was spent on consumption rather than investment. Consumption spending between 1986 and 2000 increased by almost 20 percent of GDP whereas that of investment spending increased by only 2.5 percent of GDP.

In terms of the fiscal performance of the ERP, the World Bank's assessment was positive but it observed that there was still room for improvement (Aryeetey & Harrigan 2000). The structural adjustment programme (SAP) was implemented in 1986 to complement the on-going ERP. The fiscal objectives of the SAP remained largely similar to that of the ERP: it was implemented to help Ghana achieve fiscal stability and enhance productivity through international trade. The fiscal outcome of the SAP after a decade and a half showed little progress and its implications on economic growth was less satisfactory.

Although the nation continues to enjoy high economic growth rates, average economic growth of 5.4% is seen as woefully inadequate given that the country in 1993 set itself to become an upper middle income country by 2020 (Fosu & Aryeetey, 2008). For this target to be achieved, it was estimated using a Harrod-Domar model that the economy needed to grow, on average, at 8% to achieve this goal (Institute of Economic Affairs, 1992). The economy did not show any capacity of achieving this target in five years after the targets were set. The economic and growth performance of the country had been characterized by

the non-attainment of macroeconomic targets. Particularly, while GDP was expected to grow between 7.1% and 8.3% in the period 1996-2000, actual growth was between 4.2% and 5.0% (Fosu & Aryeetey, 2008). The situation of significant divergence between actual and targeted macroeconomic figures is best reflected by developments in 1999. For example, in 1999, real GDP growth of 4.4% was 1.1% less than the targeted growth; end-of-period inflation was 4.3% higher than targeted, and budget deficit was 3% higher than what was targeted. This trend of non-attainment of macroeconomic targets persisted up to 2002 (Centre for Policy Analysis, 2003).

Developments following the successful implementation of the Highly Indebted Poor Country (HIPC) initiative, which brought huge debt relief to the country and the discovery of oil in commercial quantities have seen the country making a lot of progress towards a becoming an upper middle income country. GDP growth accelerated from 4% in 2001 to a 14.4% in 2011 while per capita GDP growth has increased from U.S. $270.43 in 2001 to U.S. $1570.13 in 2011 (World Bank, 2013). Nonetheless, the country needs to put in more efforts to become an upper middle income by 2020, given that the average growth rate of the economy is still less than 8% and the fact that the economy is still hugely dependent on primary commodities as its major exports. Fosu and Aryeetey (2008) noted that, the inability of the Ghanaian economy to grow beyond an average of 6.0% per annum is basically due to the absence of structural transformation of the economy. This is influenced by the fact that macroeconomic

policies have not been grounded in a comprehensive and reliable long-term development framework.

Theoretical Literature Review

This section presents the relevant theories which underpin the study. The first part of this section discusses the role of the government in the economy, theories of government expenditure growth and the concept of optimal government expenditure. The subsequent part highlights some growth theories with specific emphasis on neoclassical and endogenous growth theories.

Justification for a Government

The Minimal Government Argument

The most fundamental motivation for the existence of the government follows from the observation that an entirely unregulated economic activity could not operate smoothly in a very sophisticated way (Hindriks & Myles, 2006). This implies that an economy will not function effectively if there were no property rights (the rules governing the ownership of property) or contract laws (the rules defining the conduct of trade). This is because without property rights, satisfactory exchange of commodities or services could not take place given the lack of trust that would exist between contracting parties. Property rights thus ensure that the participants in a trade receive what they expect and if they not satisfied, it opens an avenue to seek for redress. Examples of contract laws include the formalization of weights and measures and the obligation to offer

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product warranties. These laws encourage trade by removing some of the uncertainties in transactions. The minimal state argument can be traced back to Hobbes in the 17th century, who viewed the government as a social contract that enabled people to escape from the anarchic "state of nature" where their competition in pursuit of self-interest would lead to a destructive "war of all against all".

The authors maintain that, the institution of property rights is the first step away from this anarchy but property rights and contract laws is not sufficient in itself. Unless they can be policed and upheld in law, they are of limited importance. However, such law enforcement cannot be provided free of cost. Enforcement officers must be employed and courts must be provided where redress can be sought. In addition, a society would also face a need for the enforcement of more general criminal laws. Moving beyond this, a country needs to defend it territories against any external aggression. This implies the provision of defence for the nation.

The minimal state argument therefore provides contract laws, supervises it and defends the economy against any external aggression. The minimal state does nothing more than this, but without it an organized economic activity cannot take place. This provides a justification for the need for a government.

The Market versus the Government

Moving beyond the basic requirements for an organized economic activity, there are other situations where government intervention in the economy

can potentially increase welfare. The situations where government intervention may be necessary can be divided into two categories: those that involve market failure and those that do not (Hindriks & Myles, 2006).

When there is market failure, the argument for considering whether intervention would be beneficial is compelling. For example, if an economic activity generates externalities (effects that one economic agent imposes on another without their consent), so that there is a divergence between private and social costs and the competitive outcome is not efficient, it may be necessary for the state to intervene to limit the inefficiency that results . The latter point can also be extended to other cases of market failure, such as those connected to the existence of public goods and imperfect competition. Reacting to such market failures is intervention motivated on efficiency grounds (Leach, 2004).

It must be stressed that this reasoning does not imply that intervention will always be beneficial. In every case, it must be demonstrated that the government actually has the ability to improve upon what the unregulated economy can achieve. This will not be possible if the choice of policy tools is limited or government information is restricted. It will also be undesirable if the government is not benevolent. While some useful insights follow from the assumption of an omnipotent, omniscient and benevolent policy maker, in reality it can give us very misleading ideas about the possibilities of beneficial policy intervention. It must be recognized that the actions of the government and the feasible policies that it can choose are often restricted by the same features of the economy that make the market outcome inefficient.

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Furthermore, a government managed by non-benevolent officials and subject to political constraints may fail to correct these market failures and may instead introduce new costs for its own operation. It is important to recognize that this potential for government failure is as important as market failure (Stiglitz, 1989). However the very power to coerce raises the possibility of its misuse. Although the intention of creating this power is that its force should serve the general interest, nothing can guarantee that once public officials are given this monopoly power, they will not try to abuse this power in their own interest (Hindriks & Myles, 2006).

Equity

In addition to market failures, government intervention can also be motivated by the observation that the economy may have a widespread of income inequality, opportunity or wealth. This may occur even if the economy is efficient in a narrow economic sense. In such circumstances, the level of economic welfare as viewed by the government may well be raised by a policy designed to alleviate these inequalities. This is the reasoning through which the provision of state education, social security programmes and compulsory pension schemes are justified.

However, the gains from these policies are with respect to normative assessments of welfare, unlike the positive criterion lying behind the concept of economic efficiency (Hindriks& Myles, 2006). In the cases of both market failure and welfare-motivated policies, policy intervention concerns more than just the

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efficient collection of public resources. The reasons for the failure of the economy to reach the optimal outcome have to be understood and a policy that can counteract these has to be designed.

Efficiency

When determining the relevance of economic policy, governments are faced with two conflicting issues. Firstly, they are all concerned with organizing economic activity so that the best use is made of economic resources. This is the efficiency side of policy design. To varying degrees, governments are also concerned to see that the benefits of economic activity are distributed fairly—the equity aspect of policy design.

The difficulty facing the government is that the requirements of equity and efficiency frequently conflict. It is often the case that the efficient policy is highly inequitable, whilst the equitable policy can introduce significant distortions and disincentives. Given this fact, the challenge for policymakers is to design a policy that ensures the correct trade-off between equity and efficiency, which is informed by the relative importance it assigns to each.

Theories of Government Expenditure Growth

Musgrave and Rostow's Development Model

The basis of the development model of public expenditure growth is that the economy experiences changes in its structure and needs as it develops. Thus by tracing the nature of the development process from the beginning of

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industrialization through to the completion of the development process, a story of why government expenditure rises can be told. Aladejare(2013) highlights the stages of development as postulated by Musgrave and Rostow to include the following:

The early stage of development is regarded as the period of industrialization during which the population moves from the countryside to the urban areas. Therefore in order to meet the needs that result from this movement, there is a requirement for a significant infrastructural expenditure in the development of cities. The typically rapid growth experienced in this stage of development results in a substantial increase in expenditure and the dominant role of infrastructure determines the nature of expenditure.

During the middle stage of development, the infrastructural expenditure of the public sector becomes increasingly complementary with expenditure from the private sector. Developments by the private sector, such as factory construction, are supported by investments from the public sector, e.g. the building of connecting roads. As urbanization proceeds and cities increase in size, so does population density. This generates a range of externalities such as pollution and crime. An increasing proportion of public expenditure is then diverted away from spending upon infrastructure to the control of these externalities.

Finally, in the developed phase of the economy, there is less need for infrastructural expenditure or for the correction of market failure. Instead, expenditure is driven by the desire to react to issues of equity. This results in transfer payments, such as social security, health and education, becoming the

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main items of expenditure. Of course, once such forms of expenditure become established, they are difficult to ever reduce. They also increase with heightened expectations and through the effect of an ageing population.

Although this theory of the growth of expenditure coincides broadly with the facts, it has a number of weaknesses. Most importantly, it is primarily a description rather than a theoretical explanation. Hence from an economic perspective, the theory is lacking in the sense that it does not have any behavioral basis but is essentially mechanistic. Thus in the development model, the change is just driven by the exogenous process of economic progress.

The Wagner's Law

Adolph Wagner, a German economist made an in-depth study relating to rise in government expenditure in the late 19th century. Based on his study, he propounded a law called "The Law of Increasing State Activity". Wagner's law states that, "as the economy develops over time, the activities and functions of the government increase" (Lamartina & Zaghini, 2011). The content of Wagner's Law was an explanation of this trend and a prediction that it would continue. In contrast to the basic developments models, Wagner's analysis provided a theory rather than just a description and an economic justification for the predictions.

According to Permana and Wika, (2014), the basis for the theory consisted of three distinct components. Firstly, it was observed that the growth of the economy resulted in an increase in complexity in the society. This required continuous introduction of new laws and development of the legal structure which

implied continuing increases in public sector expenditure. Secondly, there was the process of urbanization and this increased the externalities associated with it. The final component underlying the Wagner's Law is what distinguishes it from the development model—Wagner argued that the goods supplied by the government have a high income elasticity of demand. This claim appears reasonable, for example education, recreation and health care. Given this fact, economic growth which raised incomes would lead to an increase in demand for these products. In fact, the high elasticity implies that government expenditure would rise as a proportion of income. Its main failing is that it concentrates solely on the demand for public sector services.

Peacock and Wiseman (P-W) Hypothesis

In 1961, Peacock and Wiseman conducted a study on the nature of increase in government expenditure in England. P-W suggested that the growth in public expenditure does not occur in the same way as Wagner theorized. The duo chose the political propositions instead of the organic state where it is deemed that government like to spend money, people do not like increasing taxation and the population voting for ever-increasing social services.

According to Peacock and Wiseman's hypothesis, government spending tends to evolve in a step-like pattern, coinciding with social upheavals, particularly wars (Aladejare, 2013). P-W adopted a clearly inductive approach to explaining the growth of government expenditure. When P-W observed that expenditure over time appeared to outline a series of plateaus separated by peaks,

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and that these peaks coincided with periods of war and preparation for war they were led to expound the "displacement effect" hypothesis (Henry & Olekalns, 2002).

Peacock and Wiseman viewed the period of displacement as reducing barriers that protect local autonomy and increasing the concentration power over public expenditure to the central government. During the process of public expenditure centralization, the role of state activities tend to grew larger and larger. This can be referred to the concentration process of increasing public sector activities.

The Classical versus the Keynesian Argument

The classical economists believe that government intervention brings more harm than good and that, the market alone should carry out most of the economic activities. In his Welfare of Nations, Adam Smith (1776) promoted the "laissez-faire" economy where the profit motive was to be the main cause of economic development. The classical economists assumed that if the economy was perfect, it is always at full employment level, wage rate and rate of interest is self-adjusting and as a matter of fact, the budget should always balance as savings is always equal to investment. Since they believe that the economy was always at its full employment level, their objective was certainly not growth.

Following the Great Depression, the classical economists argued that strong trade unions prevented wage flexibility which resulted in high unemployment. On the contrary, the Keynesians, led by John Maynard Keynes

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(1883-1946) favoured government intervention in order to correct the market failures. In 1936, Keynes' work, "General Theory of Employment, Interest and Money", strongly criticized the classical economists for placing so much emphasis on the long run. He believed that, the depression required government intervention as a short term cure hence emphasized increased government spending. This implies that expansionary government spending policy is a tool that brings stability in the short run but this need to be done cautiously as too much of public expenditure lead to inflationary situations while too little of it leads to unemployment.

This "pump priming" concept did not necessarily mean that government should be excessively big. Instead, Keynesian theory emphasized that government spending— especially deficit spending—could provide short-term stimulus to help end a recession or depression. The Keynesians even argued that policymakers should be prepared to reduce spending once the economy recovered in order to prevent inflation, which they believed would result from too much economic growth (Mitchell, 2005).

Government Expenditure and Economic Growth Nexus

It is worthwhile to analyze the mechanism through which government expenditure may lead to economic growth. The analysis is carried out within the aggregate demand-aggregate supply (AD-AS) framework. Aggregate demand refers the quantity of all goods and services demanded in the economy at any given price level whereas aggregate supply refers to the total quantity of goods

and services that firms produce and sell at any given price level. Unlike the aggregate-demand curve, which is always downward sloping, the aggregate-supply curve shows a relationship that depends crucially on the time horizon examined. In the long run, the aggregate-supply curve is vertical, whereas in the short run, the aggregate-supply curve is upward sloping.

A conceptual picture of the Wagner's law and Keynesian hypothesis can be analytically depicted by AD-AS framework. The national income identity is given as:

$$Y = C + I + G + NX \tag{1}$$

where Y represents GDP (national income), C refers consumption, I represents investment, G is government expenditure, and NX is net exports (exports minus imports).

Clearly, G is defined as a component of GDP that an increase in G will simultaneously cause higher Y depending on domination of the multiplier or the crowding out effects. The inter-relationships between Y and G can be depicted from AD-AS framework in which the shift of AD curve is affected by the expenditure components such as C, I, G, and NX.

$$AD \equiv Y = C + I + G + NX \tag{2}$$

From the Keynesian point of view, an expansionary fiscal policy (increasing G) shift the AD curve to the right, this moves the existing market equilibrium to a new equilibrium in the short-run resulting a higher level of output (Y, real GDP), and a higher of price level (P). Over time, the short-run AS curve will shift to the left to in order restore equilibrium.

Similarly, the AD-AS framework depicts the mechanism rationalized in Wagner's law. An increase in Y (real GDP) raises C (as the households use part of the additional income for buying goods and services) and I increases as well through accelerator effect. The government spending (G) is exogenously determined by the government. Wagner's law views government spending as an endogenous factor that is driven by the growth of national income.

On the other hand, as policy variable government expenditure may cause a reallocation of resources among the components of government expenditure─ increasing the expenditure on a particular component may lower the allocation on other components and this mechanism determines what the actual output will be. Thus, the overall (net) result of Keynesian hypothesis or Wagner's law is ambiguous. For instance, increasing expenditure on wages and salaries may increase consumption expenditure as the civil servants will spend part of the income for purchasing goods and services, thus real GDP increases – Keynesian hypothesis, while higher defence spending may increase imports and hence reduce net exports. Consequently real GDP decreases.

The Concept of Optimal Government Expenditure

The optimal or threshold of government expenditure is a point at which any further rise in government spending will have negative effects on the growth of the economy (Abounoori & Nademi, 2010). Barro (1991), Armey et al. (1995), Rahn et al. (1996) and Scully (1998, 2003) did theoretical and empirical research and popularized the existence of an optimal size of government as depicted by an

inverted U curve illustrating the non-linear relationship between government spending and economic growth.

As the size of government expands from zero, growth rate of the economy begins to increase and as the government size continues to grow, expenditures are channeled into less productive activities, causing the rate of economic growth to diminish and eventually decline (Herath, 2012). Figure 3 represents the threshold of government spending.
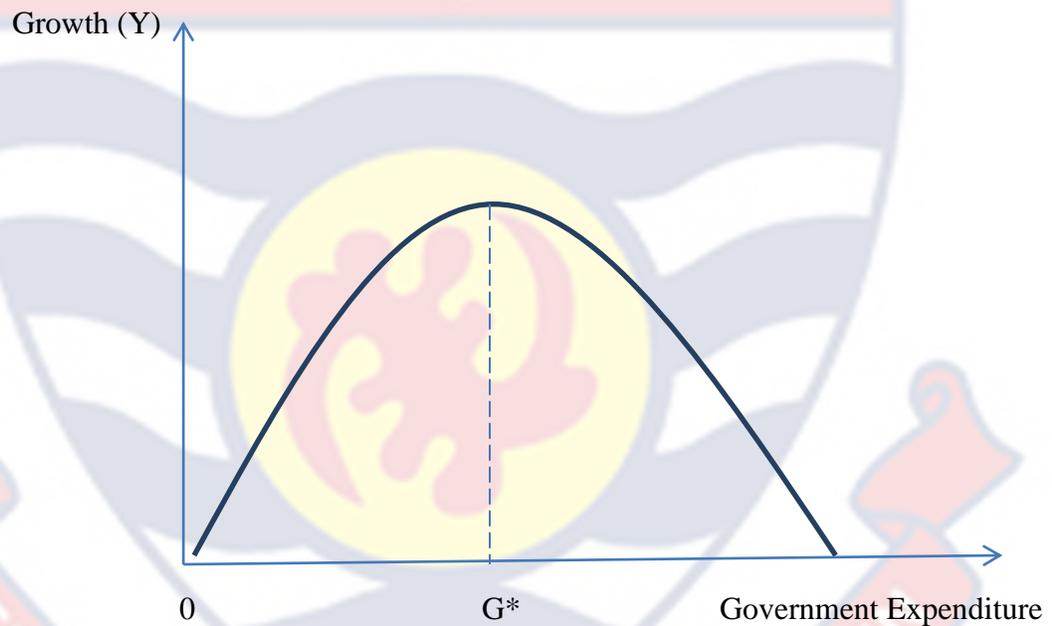
Growth (Y)

G* represents the optimal level of government Spending

**Figure 3: The Non-linear Relationship between Government Expenditure
        and Economic Growth**
Source: Abounoori andNademi, (2010)

From Figure 3, if government spending is zero, presumably there will be no growth because enforcing contracts, protecting property and developing of

infrastructure would be very difficult if there were no government spending at all. In other words, some government spending is necessary for the successful operation of the rule of law. Economic activity is very low or nonexistent in the absence of government, but it increases dramatically as the core functions of government are financed. Mitchell (2005) highlights the following as circumstances under which additional government spending could deter economic growth:

The first is the issue regarding extraction cost. Government spending requires costly financing choices. The government cannot spend money without first taking that money from its citizens or borrowing either internally or externally. All of the options used to finance government spending have adverse consequences on the functioning of the economy. Taxes discourage productive economic behaviour whiles borrowing consumes capital that otherwise would be available for private investment and in extreme cases, may lead to higher interest rates. Inflation debases a nation's currency, causing widespread economic distortion.

The second factor relates to displacement cost. Government spending displaces private-sector activity. Every dollar that the government spends means one less dollar in the productive sector of the economy. This reduces growth because whereas economic forces guide the allocation of resources in the private sector, political forces determine how resources should be distributed. In general, governments do not use resources efficiently which results in less economic output. Gwarntey et al, (1998) explained that the political process is much less

dynamic compared to the market process. The reason being that whiles competition rewards alertness, it also imposes an immediate and definite punishment on those who make bad economic decisions and thereby reduces the value of resources. In spite of this, adjustment to changes in the economic environment is much slower in the public sector compared to the private sector. The required time for the correcting errors (for example, bad investments decisions) and adjustments to changing circumstances, new information and improved technologies is lengthier for governments than the private sector. Furthermore, to a large degree, growth is a discovery process. As entrepreneurs discover new and improved technologies, better methods of production, and opportunities that were previously overlooked, they are able to combine resources into goods and services that are more highly valued [Kirzner, (1973, 1997); Schumpeter, (1912)]. This is the central element of wealth creation and growth. Reliance on markets and the presence of economic freedom facilitate this process better. Clearly, the implication is that the expansion of government relative to the market sector slows this important source of economic growth.

Another explanation for the downward sloping portion of the government expenditure −growth curve as put forward by Mitchell (2005) is the behavioral subsidy cost. Government spending encourages destructive choices. For instance, welfare programmes encourage people to choose leisure over work− unemployment insurance programmes provide an incentive to remain unemployed, disaster insurance programmes encourage construction at disaster prone areas. These are all examples of government programmes that may reduce

economic growth and thereby diminish national output because they promote misallocation or underutilization of state resources.

The next factor is the behavioral penalty cost. Government spending discourages productive choices. Government programmes often discourage economically desirable decisions. Savings is important to help provide capital for new investment, yet the incentive to save has been misallocation or underutilization of resources undermined by government programmes that subsidize retirement, housing, and education. Other government spending programmes like free maternal healthcare may generate a negative economic impact because of people may take advantage to increase childbirth which may eventually increase population growth rate.

The other issue has to do with market distortion cost. Government spending distorts efficient resource allocation. Buyers and sellers in competitive markets determine prices in a process that ensures the most efficient allocation of resources, but some government programmes may interfere with competitive markets. In both healthcare and education, government subsidies to reduce out-of-pocket expenses have created a "third-party payer" problem. However, when individuals use resources without paying for them, they become less concerned about price. This undermines the critical role of competitive markets, causing significant inefficiency in sectors such as healthcare and education.

Last but not least, government spending may inhibit innovation. Competition and the desire to increase income and wealth, individuals and entities in the private sector constantly search for new options and opportunities.

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Economic growth is greatly enhanced by this discovery process of "creative destruction." Government programs, however, are inherently inflexible, both because of centralization and because of bureaucracy.

Review of some Growth Models

Neoclassical Growth Theories

The Classical economists, including Adam Smith (1776), David Ricardo (1817), and Thomas Malthus (1798) and much later, Frank Ramsey (1928), Allyn Young (1928), Frank Knight (1944) and Joseph Schumpeter (1934), provided many of the basic ingredients that appear in modern theories of economic growth. These ideas include the basic approaches of competitive behaviour and equilibrium dynamics, the role of diminishing returns and its relation to the accumulation of physical and human capital, the interplay between per capita income and the growth rate of population, the effects of technological progress in the forms of increased specialization of labour and discoveries of new goods and methods of production and lastly, the role of monopoly power as an incentive for technological advance.

Neoclassical economic analysis was resolutely micro-oriented with a focus on the utility-maximizing behaviour of individuals and the profit-maximizing actions of perfectly competitive firms. The macroeconomic perspective inherent in a concern for economic growth and in the distribution of income among classes that had motivated the classical economists gave way to a narrower interest in the conditions required for equilibrium prices and quantities in individual markets.

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From a chronological viewpoint, the starting point for modern growth theory is the classic article of Ramsey (1928), a work that was several decades ahead of its time. Between Ramsey and the late 1950s, Harrod (1939) and Domar (1946) attempted to integrate Keynesian analysis with elements of economic growth. They used production functions with little substitutability among the inputs to argue that the capitalist system is inherently unstable. Since they wrote during or immediately after the Great Depression, these arguments were received sympathetically by many economists. Although these contributions triggered a good deal of research at the time, very little of this analysis plays a role in today's thinking.

The next and more important contributions were those of Solow (1956) and Swan (1956). The key aspect of the Solow–Swan model is the neoclassical form of the production function, a specification that assumes constant returns to scale, diminishing returns to each input, and some positive and smooth elasticity of substitution between the inputs. This production function is combined with a constant saving rate rule to generate an extremely simple general equilibrium model of the economy.

Solow (1956) basically argued that if production activity takes place under neoclassical production conditions of variable proportions and constant returns to scale, there would be no resistance between natural and unwarranted growth rates. The system is self-adjusting to any given rate of growth of labour force and ultimately approaches a state of steady proportional expansion. In order to distinguish his growth model from the Harrod-Domar model and its fixed capital-

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output ratio, Solow specified a production function that allows factors to be constantly substituted for each other. The implication of such constant substitution is that, the marginal product of each factor is variable, and depends on how much of the factor that is already used in production and how many other factors it is combined with (Van den Berg , 2001).

An important assumption of the Solow model is that each factor of production is subject to diminishing returns. Also, the production function satisfies the properties that: the marginal products of inputs nears infinity as inputs are reduced to zero and nears to zero as inputs are increased infinitely. This clearly exposed the inherent weakness in the Harrod-Domar model that a constant rate of saving and investment could bring perpetual economic growth. Solow therefore argued that, the existence of diminishing returns in the production process, constant investment by itself could not generate permanent growth of an economy. This is because diminishing returns would eventually cause the gains in output from investment to approach zero. Hence, Solow made a key contribution to the theory of economic growth by focusing on long-run growth. Solow argued that long-run growth is basically determined by technological change and not by savings or investment. Saving only affects temporal growth, since the economy will run into diminishing returns as the ratio of capital per labour increases. Thus, the absence of constant improvement in technology, per capita growth will eventually cease (Stern, 2003).

Solow's model is basically based on the assumption that, economic growth occurs as a result of the combination of capital and labour. This gives rise

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to the question: how much of output growth can be attributed to other factors of production apart from labour and capital. To answer this question, Solow disintegrates the growth in output into three components, each identifiable as contribution of one factor of production, that is labour, capital, and total factor productivity. This implied that in the Solow model, long term economic growth is explained by labour augmenting technological change and by the increase of capital per labour.

The TFP is often referred to as the Solow residual. The term residual is suitable, since the estimate represent the part of measured GDP growth that may not be accounted for by labour and capital. The residual refers to the difference between the rate of growth of output and the weighted average of the rates of growth of capital and labour, with factor income shares as weights. The TFP is calculated under the assumption of perfect competition in the labour and capital market as well as the product and service markets.

Endogenous Growth Models

The relatively slow pace of development of many African and South Asian economies caused quite a number of economists to question the validity of any growth model which predicts eventual income convergence. This has led to a critical reexamination of the policy recommendation provided by the neoclassical theorists to accumulate ever more physical capital, that is, to save or borrow more (Cypher & Dietz,2004).According to the author, empirical research on growth using the neoclassical framework typically found that a significant portion of the

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growth rate of a country, often well over 50 percent and more, could not be accounted for by changes in the use of capital and labour, leaving the unexplained Solow residual as the major determinant explaining growth rates. The implication is that, the process of economic growth can be influenced by diverse factors that might reasonably be attributed to this residual—such as the effects of education, technology, business organization, research and development efforts, culture, growing international trade, local politics, and so on—called for much speculation.

In the late 1980s, several models of endogenous growth began to emerge in the economics literature and as a result, economic growth theory experienced a remarkable revival and became once more a very active area of macroeconomic research. The aim of the endogenous growth theory were in twofold: firstly, to overcome the shortcomings of the Solow and Ramsey models which were unable to explain sustained growth, and secondly, to provide a rigorous model in which all variables which are crucial for growth, in particular savings, investment, and technical knowledge, are the outcome of rational decisions (D'Agata & Freni, 2004).

Endogenous growth theories, unlike neoclassical growth theories, do not assume, nor do they find, physical capital accumulation to be the dominant factor that greatly influences economic growth nor in explaining differences in income levels among nations. Perhaps most importantly and controversially, these models discard the neoclassical and classical assumption of diminishing returns as applying to any of the reproducible inputs to production, particularly capital and

labour, but also technology, effectively turning a nation's short-run production function into a long-run, dynamic relationship that can be constantly evolving (Cypher & Dietz, 2004). Although diminishing returns operates in any production process, the advent of high pace of technological progress has tended to negate it or overrule it in the long run. Thus, the classical and neoclassical economists underestimated or even fail to foresee the impacts of technological advances in offsetting the phenomena of diminishing returns

In endogenous growth models, a higher level of investment may not only increase per capita income, as in the neoclassical view, but higher investment rates also can sustain greater rates of growth of per capita income in the future. This is impossible within the traditional neoclassical growth model, which finds that a steady-state income level, determined by the rate of saving and the population growth rate, is the equilibrium outcome of the growth process. If population growth is taken as a constant, higher levels of income simply are not attainable in the neoclassical view without either an increase in the rate of saving or an exogenous boost to the level of technology. This is not the case in the endogenous growth models; it is possible for countries to continue to grow quickly for long periods, even when they already have achieved relatively high incomes. This sustaining of growth rates can occur without an increase in the rate of savings.

By breaking the link between the rate of economic growth and the law of diminishing returns and by removing the ceiling on income per person for any particular rate of savings and investment, endogenous growth models can quite

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easily account for a widening gap in income between poorer and richer nations (Cypher & Dietz, 2004). In most endogenous growth models, one of the most important factors of production contributing to higher and sustained growth has been found to be both the rate of accumulation, as well as the initial stock, of human capital. While these models share some similarities with the capital- and saving-centered neoclassical growth models in their form, the endogenous growth models do not predict the convergence of income levels, even among countries with similar rates of saving, investment and population growth rates. Indeed, these models reveal how it is possible for some countries to continue to grow faster than others far into the future, with both the absolute and relative income gap growing. Endogenous growth models also place a quite different emphasis on what is required to boost a country's economic growth and development possibilities compared to the recommendations derived from the capital-and saving-centered neoclassical-type models.

The major conceptual difference between the Solow's neoclassical growth models and the endogenous growth models is the presumption in the endogenous models that there are not necessarily diminishing returns to the reproducible factors of production, K, the stock of physical capital, to H, the stock of human capital or to technology. Rather it is assumed that constant, or perhaps even increasing, marginal returns are possible. What the endogenous growth models assume is that there are likely to be substantial positive externalities to human capital accumulation and, perhaps, to some physical capital accumulation to the extent that new capital embodies new technology, so that the classical and

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neoclassical result of diminishing returns to K and H are avoided through such society-wide spill-over effects. When the social benefits from human capital accumulation exceed the private benefits, there will be positive secondary and tertiary effects from, say, an increase in a country's average education level or enrollment ratios that reverberate through the economy. More educated and presumably more productive workers not only produce more at their own tasks, but they also interact synergistically with their workmates so that the productivity of other workers also rises, even though their level of education may have remained unchanged. Higher average levels of education among a population also can contribute to learning-by-doing effects, that is, the capacity of labor to build upon its past education and training, so that the same level of human capital input actually is able to improve its productivity over time in the process of producing goods and services on the shop floor, or wherever production takes place.

Learning-by-doing contributes to increases in the potential level of total output without the need for an increase in any additional inputs and with no increase in investment. Learning-by-doing effects increase the productivity and effectiveness of labor. The presumption is that the higher the level of human capital accumulation in an economy, the stronger will be such effects, again breaking the link between growth in labour and human capital accumulation and diminishing returns.

In the endogenous growth theory, the ability to use technology, the ability to develop it and the skills of the labor force available to complement technological knowledge are all formed in and shaped by each particular

economy. In other words, growth is an endogenous process, coming from within each particular economy, with each having a different production function reflecting different quantities and qualities of its inputs.

Empirical Literature Review

Several studies have been carried out to determine the relationship between economic growth and government expenditure. However empirical research findings have produced conflicting results. Some studies have shown that government expenditure has a strong positive relationship with economic growth whiles others have found a strong negative relationship. Furthermore, studies on disaggregated government expenditure have also produced a mixture of findings. Moreover, whiles other studies found a bi-directional relationship between government expenditure and economic growth, others found a unidirectional relationship supporting either Wagner's Law or Keynesian Hypothesis. Empirical literature also provides evidence that supports the existence of government expenditure threshold.

Cross-Country Study

By employing a panel study of 98 countries (a mixture of both developing and developing countries) for the period 1960 to 1985, Barro (1991) regressed average annual growth rate in real per capita GDP on the ratio of real government consumption to real GDP. Based on the outcome of the study, he concluded that the relationship between economic growth and government consumption is

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negative and significant. An important limitation is the sample of countries involved in the study as it is made up of both high and low income countries. Hence the results leave unexplained a good deal of the relatively weak growth performance of countries in sub- Saharan African countries and Latin America. That is, the analysis does not fully capture the characteristics of the typical country on these continents that lead to below-average economic growth. Also by using pooled time series and cross-sectional data for 33 countries in Sub-Saharan Africa for the period 1970-1990, Ghura (1995) produced evidence that points towards the existence of a negative relationship between government consumption and economic growth confirming the findings of Barro (1991).

Within the framework of Keynesian and Wagner's hypothesis Al-Faris (2002) examined the relationship between government expenditure and economic growth in the Gulf Cooperation Council (GCC) countries: Saudi Arabia, the United Arab Emirates, Kuwait, Oman, Bahrain and Qatar using time series annual data for the period 1970-1997. The analysis was done based on multivariate cointegration approach. It was found that there was a unidirectional causality between government expenditure and economic growth with the causality running from GDP growth to public expenditure, which supports Wagner's law. Even though the findings are based on a sample of developing countries only, conclusions drawn from the study cannot be applied to Ghana. This is because the countries involved in the study is a set of oil rich countries hence government expenditure and its components may be totally different from what pertains to Ghana hence the need for a country specific study for Ghana.

By using a panel data set, Yasin (2003) in his paper analyzed the effects of government spending on economic growth in Sub-Saharan Africa by applying the fixed-effects and random-effects estimation techniques on an endogenous growth model. The results from both estimation indicated that government spending on capital formation, trade-openness and private investment spending were all positive and had significant impact on economic growth. However, foreign development assistance did not have any significant impact on economic growth in Sub-Saharan Africa. Even though the author contributes to knowledge by looking at the disaggregated government expenditure, the main limitation of this study is the fact that the author did not explore the existence of a possible threshold of government expenditure.

Similar to the study of Yasin (2003), Bose, Hague and Osborn (2007) examined the growth effects of government expenditure for a panel of 30 developing countries over the 1970s and 1980s. Their results are in twofold: First, the share of government capital expenditure in GDP is positively and significantly correlated with economic growth, but current expenditure is insignificant. Secondly at a more disaggregated level, government investment in education and total expenditures in education are the only outlays that are significantly associated with growth once the budget constraint and omitted variables are taken into consideration. Similarly, Bose et al, (2007) failed to recognize the non-linear relationship between government expenditure and economic growth.

In their study, Afonso and Alegre (2008) examined the relationship between the budgetary components and economic growth using a panel dataset.

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Data from 27 countries in the European Union for period 1970-2006 were used. The authors employed three alternative dependent variables in their growth regression (economic growth, total factor productivity and labour productivity) and ascertained the long-term relationships between the components of the budget and economic growth by using the GMM estimation method. The result showed that there is a significant and a negative impact of public consumption, social security contributions, health and social protection expenditures on economic growth. It also revealed a significant and a positive impact of public investment and education expenditures on economic growth whereas the overall effect of public revenues on economic growth was estimated to be negative. The main limitation to this study is the fact that it is limited to only European countries and as such, the findings cannot be applied to developing countries like Ghana.

By using pooled time series and cross-section data for 7 countries in the South Eastern Europe (SSE) spanning from 1995 to 2005, Alexiou (2009) analyzed the relationship between government expenditure and economic growth. The results indicates that out of five variables used in the estimation, government spending as dependent variable on capital formation, development assistance, private investment and a proxy for trade-openness all have positive and significant effect on economic growth, in contrast of population growth which was found to be statistically insignificant.

Also within an endogenous framework, Chamorro (2010) explored the effects of government spending and its components on the economic growth rate in a set of low and middle-income countries across the world over the period

1975-2000. He employed the Arellano and Bond (1991) GMM technique to evaluate that the growth effects of the different expenditure components. The effects of government expenditures on education, transport and communication were shown to be positive and that of economic affairs was negative. Spending on health and defence however exhibited no significant relationship with economic growth.

Country-Specific Study

The causal relationship between government expenditure and economic growth has further been investigated by Abu-Bader and Abu-Qarn (2003), with evidence from Egypt, Israel and Syria. Multivariate cointegration and variance decomposition approach were employed to analyze the relationship between government expenditure, military spending and economic growth for the period 1975-1998, 1967-1998 and 1973-1998 respectively for each of the countries. The result indicated a bi-directional and a long-run negative relationship between government spending and economic growth when variables were tested within a bivariate system. Furthermore, the causality test within a trivariate system (where government spending was broken down into share of government civilian expenditures in GDP and military expenditure) showed that military burden has a negative impact on economic growth in all the three countries. Lastly, civilian government expenditures exhibited a positive impact on economic growth for both Israel and Egypt.

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Also, Ramayandi (2003) considered the impact of government size (in terms of the spending) on economic growth using a sample of time series data over a period of thirty years in Indonesia. In an endogenous growth model, Ramayandi categorized the expenditures as either productive or unproductive. The findings of the study indicated that the share of government's unproductive expenditure affected economic growth negatively. Furthermore, conflicting with economic theory, the results also revealed that the share of productive government expenditure in Indonesia has a negative impact on economic growth. This, the author explained was as a result of the existence of inefficiencies in the overall management of government budget in Indonesia during the period of study.

In similar vein, Garcia, Herrera and Restpro (2006) provided quantitative evidence supporting the hypothesis that government investment spending propels long-run economic growth using data sets from Chile during the period 1981-2001. Their study aimed at observing the impact of alternative fiscal variables on economic growth using an adjusted overlapping generation model which was developed by Glomm & Rioja (2004). The outcome of their estimations confirmed a positive and a significant relationship between long-run economic growth and expenditures on both infrastructure and education. On the other hand, the outcome illustrated that social security and interest rate payments impact on long-run economic growth negatively due to their crowding-out effects on other productive expenditures.

Saad and Kalakeck (2009) investigated the economic growth effects of government expenditure in Lebanon using a disaggregated analysis based on

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sectorial expenditures. The authors employed the Vector Auto Regression analysis on annual data from 1962 to 2007. Using an endogenous model, the paper found out that government spending on education has a positive effect on economic growth in the long run and a negative impact in the short run while the expenditure on agriculture was shown not to affect economic growth in both time periods. On the other hand, expenditures on both defence and health were shown to be negatively related to economic growth only in the long run.

Nketiah-Amponsah (2009), conducted a study on the relationship between public spending and economic growth in Ghana over the period 1970-2004. Both aggregated and disaggregated data on government expenditure were used. The study showed that aggregate government spending retarded economic growth. The study also revealed that health and infrastructure expenditure promoted economic growth whiles education has no significant impact on growth in the short run. Furthermore, nature of governance (democracy) and political instability (years of change in government and military dictatorship) were significant in explaining Ghana's economic growth over the period under consideration. The study however failed to examine the possible non-linear relationship that could exist between government expenditure and economic growth.

Rehman, Iqbal and Siddiqi (2010), examined the nature and direction of causality in Pakistan between public expenditure and national income along with various selected components of public expenditure by applying Toda-Yamamoto causality test to Pakistan for the period of 1971 to 2006. The study finds a

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unidirectional causality running from GDP to government expenditure, which supports the Wagner's law.

Loto (2011) investigated the impact of sectorial government expenditure on economic growth in Nigeria for the period 1980-2008 and applied Johansen cointegration technique and error correction model. The results inferred that in the short run expenditures on agricultures and education were negatively related to economic growth. However, expenditures on health, national security, transportation, and communication were positively related to economic growth, though the impacts were not statistically significant.

Owolabi, Obiakor and Okwu (2011) examined the contribution of Value Added Tax to Development of Lagos State Economy, using simple regression models as abstractions of the respective sectors considered in the study. The study considered a vector of development indicators as dependent variables and regressed each on VAT revenue proceeds to Lagos State for the study period. The results showed that VAT revenue contributed positively to the development of the respective sectors. On the aggregate, the analysis showed that VAT revenue had a considerable contribution to development of the economy during the study period.

Georgantopoulous and Tsamis (2012) investigated the short run and the long run relationships between money supply, inflation, government expenditure and economic growth by employing the Error Correction Mechanism (ECM) and Johansen co-integration test respectively for Cyprus using annual data from 1980 to 2009. Their findings reveal that public spending promotes economic development in Cyprus. However, deficit financing by the government causes

more liquidity effects but also inflationary pressure in the economy. The results showed that inflation negatively effects economic growth probably due to adverse supply shock. Georgantopoulous and Tsamis concluded that money supply should be allowed to grow according to the real output of the economy but excess growth of money causes inflationary pressure in case of Cyprus.

Bhunia (2012) examined the growth effect of government expenditure on economic growth in India over a period from 1991 to 2010, with a particular focus on sectorial expenditures. Five key sectors were employed (security, health, education, transportation and communication and agriculture). Johansen approach to co-integration and error-correction test were employed. The result indicated that in the short-run, expenditure on agriculture was found to be negatively related to economic growth. The impact of education, though also negative was not significant. The impact of expenditure on health was found to be positively related to economic growth. Nonetheless expenditures on national security transportation and communication were positively related to economic growth, the impacts were not statistically significant.

The relationship between tax revenue and economic growth has been studied by Mullen and Williams (1994), using data from US states from 1969 to 1986, examined the impact of state and local tax structures on the economic performance of states. They concluded that ―lowering marginal tax rates can have a considerable positive impact on growth and that ―creating a less complex tax structure, while maintaining the same average level of taxation, enables sub-national governments to spur economic growth. Similarly, Ogbonna and

Ebimobowei (2012) examined the impact of tax reforms and economic growth of Nigeria using relevant descriptive statistics and econometric analysis and concluded that the various test shows that tax reforms is positively and significantly related to economic growth and that tax reforms granger cause economic growth. Also, that tax reforms improves the revenue generating machinery of government to undertake socially desirable expenditure that will translate to economic growth in real output and per capita basis.

Aladejare(2013) conducted a similar study to examine the relationships and dynamic interactions between government capital and recurrent expenditures and economic growth in Nigeria over the period 1961 to 2010. Real Gross Domestic Product (RGDP) was used as a proxy for economic growth in the study. The analytical technique of Vector Error Correction Model and Granger Causality were exploited. Based on the result findings, it is evident that the Wagnerian and Rostow-Musgrave hypothesis were applicable to the relationship between the fiscal variables used in this study in Nigeria.

Okoro (2013) employed time series data between 1980 and 2011. This study investigated the impact of government spending on the Nigerian economic growth. Employing the ordinary least square multiple regression analysis to estimate the model specified. Real Gross Domestic Product (RGDP) was adopted as the dependent variable while government capital expenditure and government recurrent expenditure represents the independent variables. With the application of Granger Causality test, Johansen Cointegration Test and Error Correction Mechanism, the result shows that there exists a long-run equilibrium relationship

between government spending and economic growth in Nigeria. The short-run dynamics adjusts to the long-run equilibrium at the rate of 60% per annum.

Ogundipe and Oluwatobi (2013) investigated the impact of both government recurrent and capital expenditure on growth performance using an econometric analysis based on Johansen technique for the period of 1970-2009. The study found the component of total expenditure impacting negatively (except education and health) and insignificantly on growth rate; further diagnosis test reveals capital expenditure may likely induce significant impact on growth rate in the long-run. Notable recommendations include, proper management of capital and recurrent expenditure, proper surveillance and quantification of capital spending in order to boost social and human capital, and development of sound institutions void of political influences.

Onakoya and Somole (2013) examined the impact of public capital expenditure on economic growth in Nigeria in the context of macro-econometric framework at sectorial levels. The research adopts a three-stage least squares (3SLS) technique and macro-econometric model of simultaneous equations to capture the disaggregated impact of public capital expenditure on the different sectors of the economy. The study shows that public capital expenditure contributes positively to economic growth in Nigeria. The results also indicate that public capital expenditure directly promotes the output of oil and infrastructure but is directly deleterious to the output of manufacturing and agriculture. The results suggest a positive but insignificant relationship to the services sector. The results however confirm that public capital spending

indirectly enhances economic growth by encouraging private sector investments due to the facilitating role of government in the provision of public goods.

Carter, Craigwell and Lowe (2013) provided empirical evidence on the relationship between the components of government expenditure and economic growth in Barbados. The study employed Dynamic Ordinary Least Squares as well as Unrestricted Error Correction Model to analyse time series data spanning from 1976-2011. Generally the findings suggest that total government spending produces a drag on economic growth, particularly in the short-run, with a much smaller impact over time. Particularly, the results indicate that while outlays on health and social security have little influences on per capita economic growth; government expenditure on education typically has a significant and negative impact on growth, both in the long and short run. In addition, reallocations of government spending from one component to another may have growth-enhancing effects without having to change the level of government spending.

Empirical Literature on the Non-Linear Relationship between Government Expenditure and Economic Growth

Vedderand Gallaway (1998) reached the optimal amount of government expenditure share for America, Canada, and four European countries by specifying a quadratic model. According to their results, the optimal government size for America, Canada, United Kingdom, Italy, Sweden, and Denmark are 17.45%, 21.37%, 20.97%, 22.23%, 19.43%, and 26.14% respectively. However a difficulty with this approach is that it requires knowledge of the shape of the

nonlinearity prior to estimation. An alternative approach is to use a piece-wise linear regression model to test for the existence of a possible nonlinear relationship.

Chen and Lee (2005) employed the threshold regression approach to test for the non-linear relationship between government size and economic growth in Taiwan. They found different threshold value for different government size in Taiwan. First of all, the threshold regime is 22.839% for the "total government expenditure divided by GDP". Secondly, the threshold regime is 7.302% concerning the "government investment expenditure divided by GDP". Lastly, when the variable "government consumption expenditure divided by GDP" is used as the government size, the threshold regime is 14.967%.

Davies (2009) used Human Development Index (HDI) instead of economic growth rate for determining the optimal government size. Two criteria for government size were considered—government consumption expenditures as a share of GDP and government investment expenditures as a share of GDP. By using 154 countries for seven years (1975, 1980 1985, 1990, 1995, 2000 and 2002) and categorizing the countries into two groups (all countries and low income countries), Davies (2009) reached the following conclusions: firstly, the optimal amount of consumption and investment in all countries are 17% and 13%, respectively. Therefore, the optimal size of the government in these countries is 30%. Secondly, in low income countries, the share of consumption expenditures always has positive effect on HDI, while the share of investment expenditure may

have up to 40% negative effect on this indicator. Therefore, a certain size cannot be declared for these countries.

Chiou-Wei et al. (2010) investigated the nonlinear effect of government size on economic growth in South Korea, Singapore, Taiwan, Thailand and Malaysia. The share of government expenditures in GDP was used as an index for government size. The optimal size was estimated by Solow growth model and a dynamic STAR model for the countries individually but in Malaysia, the nonlinear effect did not exist. The threshold values estimated for South Korea, Singapore, Taiwan and Thailand are 10.8%, 11%, 15.9% and 10.8%, respectively

Odawara (2010) analyzed the nonlinear relationship between government spending and macroeconomic performance by estimating a threshold model that relates real GDP growth to three measures of government spending: government consumption spending, government investment spending and total government expenditure as share to GDP. Quarterly data for the United States and four other OECD countries from 1970 through 2008 were employed. Hansen's (1996, 1999 and 2000) method was used to test for the presence of threshold effects and estimate the threshold values. The main findings indicated that there is strong evidence of a nonlinear relationship between government spending and macroeconomic performance for all three measures of government spending in five OECD countries. Also, the pattern of results supported the concept that there may be an optimal size for government spending. The results further showed the importance of compositional effects when examining government spending since the impact on government investment on macroeconomic performance is quite

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different from that for government consumption. Government investment has a positive impact on real GDP growth below the threshold value but a zero impact above the threshold, while there is little support that government consumption has a positive impact except for Japan. Finally, there appeared to be large country-specific variations in terms of the pattern of results. Countries with relatively high average ratios of government spending also have higher threshold values because beneficial aspects of government spending tend to be more extensive. The country's economic activity would be improved by achieving more efficient allocation of government resources and transferring the resources to the private sector

Mehrara and Keikha (2012) used threshold regression model to study the relationship between government size and economic growth during 1967-2007 in Iran. The results indicated that linear methods are not capable to explain the relationship between government expenditure (including investment expenditure, consumption expenditure and total expenditure) and economic growth. The findings indicate government expenditure has positive effect on economic growth, but after crossing a threshold, this effect reverses. The estimated thresholds are 22.8% for total expenditure ratio, 9.8% for investment expenditure and 12.9% for consumption expenditure.

Conclusion

This chapter reviewed extensively the theoretical and empirical literature relevant to the subject matter. The theoretical literature highlighted the

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justification for a government, theories on public expenditure growth, optimal government expenditure and economic growth theories with specific emphasis on neoclassical and endogenous growth models. It was observed that, government played a crucial role in enhancing the growth of the economy through its spending policies. However if the government size becomes excessively largely the pace of economic growth will slow down.

Empirical studies however, have largely focused on either aggregated or disaggregated data on government spending and there are mixed findings on the relationship between government expenditure and economic growth. However, few of the studies examined the non-linear relationship between government expenditure and growth and confirmed the existence of a threshold of government expenditure. However, no such study has been conducted in Ghana. The present study intends to fill these gaps.
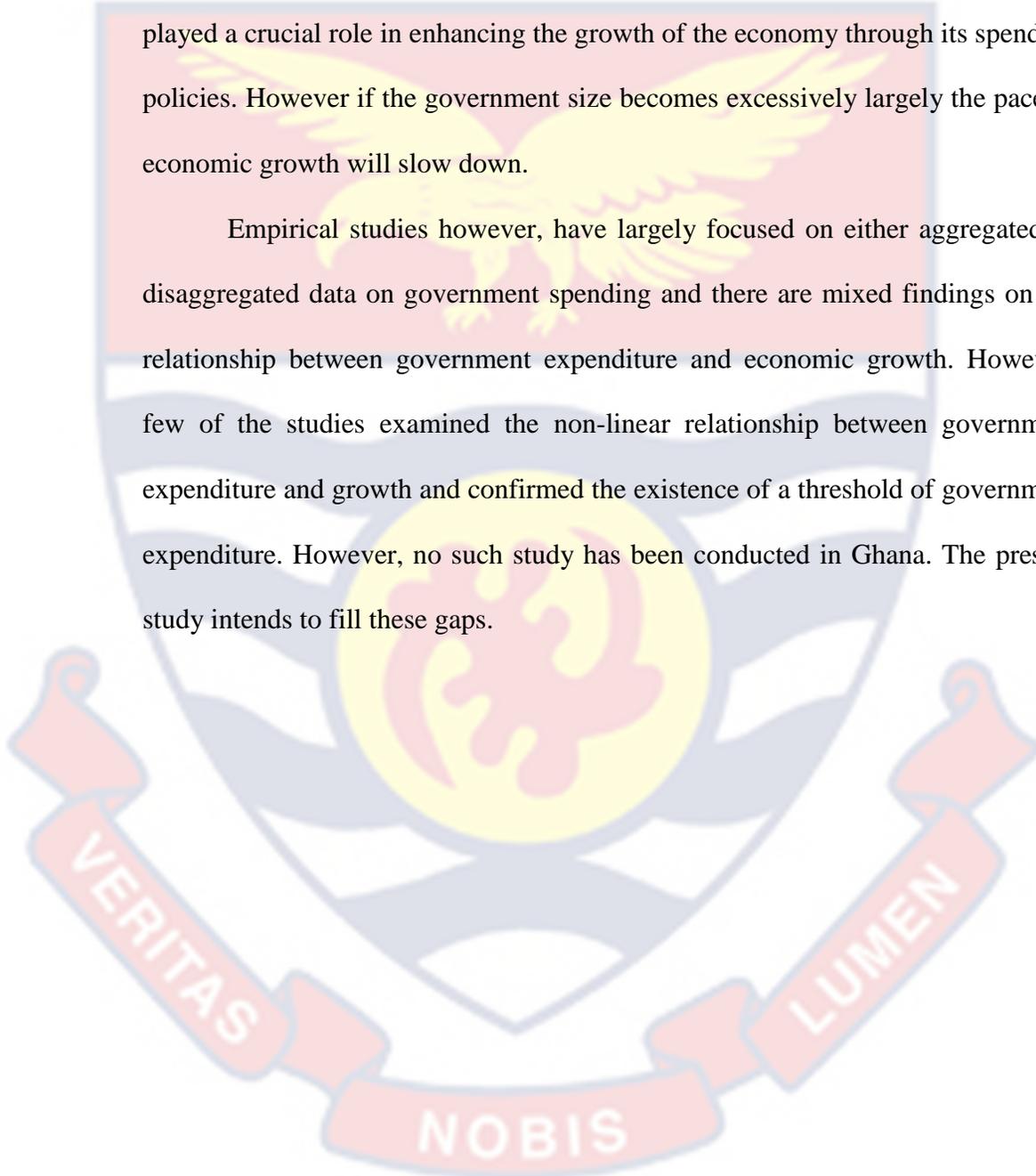
CHAPTER THREE

METHODOLOGY

Introduction

The purpose of this chapter is to present the methodological framework suitable for conducting the study. It presents the methodology of the study with specific reference to the research design, model specification, justification and measurement of the variables, data source and estimation techniques and finally, post estimation diagnostics.

Research Design

In line with the objectives of the study, the positivist philosophy was adopted for the study. This is because the positivists argue that the reality is stable and can be observed and described from an impartial viewpoint without interfering with the phenomena being studied (Levin, 1988). This enables the researcher to study social processes in an objective manner so as to explain relationships between variables under study. The positivist philosophy also enables the use of quantitative approach to research. This makes it suitable for the development of mathematical models in order to investigate the relationship between quantitative measurements.

Based on the positivist philosophy, the study employed the quantitative approach which is appropriate for this study. This approach enables the researcher to put the social world into a structure of causality and annuls the role of human effect through the use of a quantitative instrument such as multivariate statistical

analysis in analysing data as used in this study. More specifically, since the objective of the study is explanatory in nature, the study adopted the explanatory research under the quantitative approach.

Theoretical Model Specification

The study adopted the neoclassical growth model which maintains that growth can arise when capital and labour are augmented by additional inputs in the production function. The presence of the government provides public input which offers some positive externalities for producers which directly affect output. The Solow growth model explains economic growth as resulting from the combination of capital (K) and labour (L)

$$Y_t = f(K_t, L_t) \tag{1}$$

The question that arises from the equation (1) is how much of the increase in output can be attributed exclusively to changes in capital and labour. This is because it is possible for other factors, other than labour and capital to influence output. To resolve this problem, Solow (1956) disintegrates increase in output into three components: physical capital accumulation, growth of labour force and growth of total factor productivity (TFP). The growth of TFP captures the increase in output that is not accounted for by an increase in physical inputs (labour and capital) in the model. Thus, the TFP may be interpreted as the effect of exogenous technological progress that can also be reflected in increasing productive efficiency. To account for this, Solow employed the Cobb-Douglas production function expressed as:

$$Y_t = f(A_t, K_t, L_t, \ell) \tag{2}$$

where Y is output at time t, A is total factor productivity, K is capital stock, L is labour stock and ℓ represents the naperian "e". Applying the Cobb-Douglas production function, Solow stated the equation

$$Y_t = A_t K_t^\alpha L_t^\beta \ell^\varepsilon \tag{3}$$

It is important to note that A is not fixed, but varies with different production functions based on the factors being studied.

Empirical Model Specification

The neoclassical production function described above is used as the basis for specifying the empirical model for this study. This is augmented with an error term. It is important to mention that, literature on economic growth indicates that, there are multitudes of potential variables that can affect the TFP (A). Following Devarajan, Swaroop and Zou, (1996); Herath, (2012) and Bose et al., (2007) the TFP was specified as:

$$A_t = f(GOV, CPI, TR) \tag{4}$$

where GOV denotes aggregate government expenditure, CPI represents consumer price index and TR symbolizes tax revenue. This implies that: $A_t = GOV_t^{\beta_1}, CPI_t^{\beta_2} TR_t^{\beta_3}$ (5)

By substituting (5) into (3) and specifying an extended Cobb-Douglas production function to represent the production of technology of an economy, the study obtains;

$$y_t = \eta K_t^\alpha, GOV_t^{\beta_1}, CPI_t^{\beta_2}, TR_t^{\beta_3}, L_t^{\beta_4}, \ell_t^\varepsilon \tag{6}$$

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By taking the logarithm of the variables in equation (7),

$$In\ y_t = \beta_0 + \alpha lnK_t + \beta_1 lnGOV_t + \beta_2 lnCPI_t + \beta_3 TR_t + \beta_4 lnL_t + \varepsilon_t\ ln\ell_t \quad (7)$$

Let $ln\eta = \beta_0$ and $ln\ell = 1$, equation (7) can be written as

$$In\ y_t = \beta_0 + \alpha lnK_t + \beta_1 lnGOV_t + \beta_2 lnCPI_t + \beta_3 TR_t + \beta_4 lnL_t + \varepsilon_t \quad (8)$$

In order to estimate the growth of the economy, we difference equation (8). This gives,

$$In\ Y_t - In\ Y_{t-1} = \beta_0 + \alpha(lnK_t - \alpha lnK_{t-1}) + \beta_1(lnGOV_t - lnGOV_{t-1}) +$$

$$\beta_2(lnCPI_t - lnCPI_{t-1}) + \beta_3(lnTR_t - lnTR_{t-1}) +$$

$$\beta_4(lnL_t - lnL_{t-1}) + \varepsilon_t \quad (9)$$

Equation (9) can be re-written as

$$\Delta lnY_t = \beta_0 + \alpha \Delta lnK_t + \beta_1 \Delta lnGOV_t + \beta_2 \Delta lnCPI_t + \beta_3 \Delta lnTR_t + \beta_4$$

$$\Delta lnL_t + \varepsilon_t \quad (10)$$

But aggregated government expenditure can be disaggregated into current and capital expenditures. Hence

GOV = CUR + CAP, where CUR and CAP denote current or recurrent expenditure and CAP expenditures respectively.

This implies that (10) can be transformed as:

$$\Delta lnY_t = \beta_0 + \alpha \Delta lnK_t + \beta_1 \Delta lnCUR_t + \beta_2 \Delta lnCAP_t + \beta_3 \Delta lnCPI_t + \beta_4$$

$$\Delta lnTR_t + \beta_5 \Delta lnL_t + \varepsilon_t \quad (11)$$

Definition and Measurement of Variable

Economic growth refers to the sustained increase in the economy's real gross domestic product or national product overtime. Following standard practice,

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real per capita GDP (dY) is used as to measure economic growth (Herath, 2012; Bose et al, 2007; Rahmayantia & Hornb, 2011; Devarajan et al, 1996). Real GDP per capita is real gross domestic product divided by population.

Gross fixed capital formation is used to proxy capital stock. 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). It is important to note that high rate of investment results in high economic growth (Barro & Sala-I-Martin, 1992).

Aggregate government expenditure (GOV) refers to the total general government spending at any level. Government expenditure, according to the Keynesian proposition is expected to raise economic growth. It could however reduce economic growth because of the crowding out effect on private investment.

The IMF classifies government expenditures as follows: the economic classification of expenditure which is based on the type or economic characteristics of expenditure and the functional classification of expenditure which is based on the purpose or function toward which the expenditure is directed. The former is grouped in terms of the type of outlay: capital expenditure which covers payments for the purchase or production of new or existing durable goods (i.e., goods with a life of more than one year) and recurrent expenditure

which in turn includes wages and salaries, other goods and services, interest payments and subsidies. Government capital expenditure is generally composed of expenditures devoted to investments and its related items. It represents that part of government spending that enters into the production function (Barro & Sala-I-Martin, 1992). It includes acquiring and constructing long-term assets such as roads, buildings, other infrastructure, machines and inventories which all add up to the capital stock in the economy. The increase in the capital stock and the other investment spending give rise to future production and hence economic growth

Barro (1991) also considered government recurrent expenditures as that part of government expenditures that enter into the household utility functions. The author argues that such expenditures do not affect production opportunities and thus do not affect the social rate of return on investment. Increases in such expenditures must be accompanied by a proportional increase in taxes or borrowing or some amount of both to finance the increased expenditures. If however the government finances the additional expenses through borrowing, then it can have a crowding-out effect on private investments which may cause output to fall accordingly. This is because government borrowing may draw resources from the private sector and also may drive up interest rates which can also adversely affect private investments. On the other hand, if the government decides to finance these expenses with taxes, then an increase in government's recurrent expenditures will bring about rises in taxes which will cause households consumption to fall. According to Barro and Sala-I-Martin (1992) it will also lower private rate of return on investments. This follows that an increase in

government recurrent expenditures lowers the economy's steady-state growth rate (Barro & Sala-I-Martin, 1992).

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.

Tax revenue (TR) refers to compulsory transfers from individuals, firms and organizations to the central government for public purposes. Certain compulsory transfers such as fines, penalties and most social security contributions are excluded. Taxes are mandatory payments, ruled by laws. Tax revenue is collected from the whole society with differentiated intensity, inspired by considerations of justice, efficiency and effectiveness. The total tax revenue is the sum of the revenues of different kind of taxes, depending on what is taxed. These may include revenue of personal and company income (direct taxes); wealth and assets as real estates and houses; the domestic economic transactions (indirect taxes); international trade, typically through import duties; custom duties; revenue from export.

Labour force (L) consists of the proportion of the population that is economically active. In this study, the proportion of the total population aged between fifteen (15) years and sixty-five (65) years who are active and productive is used as a proxy for the labour force. Jayaraman and Singh (2007) argued that, there can be no growth without the involvement of labor. Solow (1956) and Swan (1956) also recommended that labour force should be incorporated in the growth model because of its impact on the work force, hence the inclusion of labour force in the study. All things being equal, the higher the labour force the higher the supply of labour and hence output.

Data Source and Estimation Technique

Data for the study was obtained from the African Development Indicators. The study employed the maximum likelihood estimation technique to examine the relationship between government expenditure and economic growth. The MLE technique is a statistical method for estimating population parameters (such as the mean and variance) from sample data, which selects as estimates, those parameter values maximizing the probability of obtaining the observed data. The major advantages associated with this estimation technique are that: the maximum likelihood estimation procedure can be applied to a wide variety of models and it generally yields estimators with excellent asymptotic properties (Davidson & MacKinnon, 2004). In addition, several statistical software packages provide excellent algorithms for maximum likelihood estimates and for many commonly

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used distributions. This helps to mitigate the computational complexity of the MLE.

To examine the direction of causality between government expenditure and economic growth, the study employed the Granger causality test within the framework of cointegration and error-correction models. The testing procedure for this involves the following steps. First, the study examined 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. Second, the study proceeds to examine the short-run and long run relationships between the variables using the maximum likelihood based approach proposed by Pesaran and Shin (1999) (Autoregressive Distributed Lag (ARDL) approach to cointegration). The ARDL approach to cointegration is argued to be the single equation equivalence of the maximum likelihood approach of Philips-Hansen's (1990) fully modified ordinary least squares procedure (Pesaran& Shin, 1999).

Also, the stability and diagnostic test statistics of the ARDL model is examined to ensure the reliability and the goodness of fit of the model. Finally, the study applied Granger-causality to test for the causality between government expenditure and economic growth. The causality test is preceded by cointegration testing since the presence of cointegrated relationships has implications for the way in which causality testing is carried out.

Unit Root Tests

It is essential to test for the statistical properties of variables when dealing with time series data. This is because time series data are rarely stationary in level forms. A time series is stationary if its mean, variance and autocovariances are independent of time. Regression involving non-stationary time series often lead to the problem of spurious regression. This occurs when the regression results indicate a high and significant relationship among variables when in fact, no relationship exist. Furthermore, according to Stock and Watson (1988), the usual test statistics (t, F, DW, and R^2) will not possess standard distributions if some of the variables in the model have unit roots.

A variety of unit root tests can be employed to determine the stationarity of the series. This is to ensure a reliable result due to the inherent individual weaknesses of the various techniques. For this reason, the study employed both the PP and the ADF tests. Even though these tests are quite similar, they differ with respect to the way they correct for autocorrelation in the residuals. The PP nonparametric test generalises the ADF procedure, allowing for less restrictive assumptions for the time series under consideration.

The lag-length is chosen using the Akaike Information Criteria (AIC) and Swartz Information Criterion (SIC) for both the ADF and PP test.The sensitivity of ADF tests to lag selection renders the PP test an important additional tool for making inferences about unit roots. The basic formulation of the ADF is:

$$\Delta X_t = \alpha + \delta t + \rho X_{t-1} + \sum_{i=1}^{p} \lambda_i \, \Delta X_{t-1} + \varepsilon_t$$

where X_t represents the series at time t, Δ is the first difference operator, α , δ , β , λ are parameters to be estimated and ε is the stochastic random disturbance term. Thus, the ADF and the PP test the null hypothesis that a series contains unit (non-stationary) against the alternative hypothesis of no unit root (stationary). That is:

$$H_0: \rho = 0$$

$$H_1: \rho \neq 0$$

If the tau value or t-statistic is more negative than the critical values, the null hypothesis is rejected and the conclusion is that the series is stationary. Conversely, if the tau statistic is less negative than the critical values, the null hypothesis is accepted and the conclusion is that the series is non-stationary.

Cointegration Test

A number of techniques for testing the presence of equilibrium long-run relationship among time series variables have been advocated and used by various researchers. Most time series studies have used the Engle-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 (1999) and Pesaran, Shin and Smith (2001) to determine the long-run relationship in bivariate and multivariate frameworks.

The study employed the recently developed Bounds Test approach to cointegration by Pesaran and Pesaran (1997), Pesaran and Shin (1999) which was further extended by Pesaran*et al.* (2001). The bounds test approach to

cointegration is adopted for this study because of the advantages it has over the Johasen approach to cointegration. In the first place, the bounds test approach to cointegration gives more robust results in small samples than the Johasen approach. The ARDL approach to cointegration is more efficient in finite samples compared with the Johansen approach that requires large data samples for one to get a valid result (Pesaran& Shin, 1999).

Another advantage of the ARDL approach to cointegration has over other cointegration procedures is that, whereas the other approaches to cointegration requires that all regressors be integrated of the same other, the ARDL approach can be used whether the regressors are integrated of order one or order zero (.i.e. I(1) or I(0) variables). This implies that the ARDL technique avoids the pre-testing problems related to standard cointegration, 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, however this depends on which unit roots test one employs and different unit root tests could lead to contradictory results (Bahmani-Oskooee, 2004). Employing conventional unit roots tests such as the Augmented Dickey Fuller and the Phillips-Perron tests for instance, may lead to a wrong 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 useful because it avoids these problems.

One difficulty associated with the Johansen cointegration technique that the ARDL approach to cointegration avoids 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 very sensitive to the method used to make these choices and decisions (Pesaran & Shin, 1999). Lastly, with the ARDL approach it is possible that different variables have different optimal lags lengths, whereas in Johansen-type models this is not allowed.

According to Pesaran and Pesaran (1997), the ARDL approach involves the following two steps. In the first step, the presence of any long-term relationship between the variables of interest is determined using an F-test. The second step of 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 proceeded 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). From the analysis, equation (10) and (11) can be expressed in ARDL representation as:

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$$lnY_t = \beta_0 + \sum_{i=1}^{p} \gamma \,\Delta\, lnY_{t-i} + \sum_{i=1}^{p} \phi \,\Delta\, lnK_{t-i} + \sum_{i=1}^{p} \phi_{1i} \,\Delta\, lnGOV_{t-1}$$

$$+ \sum_{i=1}^{p} \phi_{2i} \,\Delta\, lnCPI_{t-i} + \sum_{i=1}^{p} \phi_{3i} \,\Delta\, lnTR_{t-i} + \sum_{i=1}^{p} \phi_{4i} \,\Delta\, lnL_{t-i} +$$

$$lnY_{t-1} + \alpha lnK_t + \beta_1 lnGOV_t + \beta_2 lnCPI_t + \beta_3 lnTR_t + \beta_4 lnL_t +$$

$$v_t \tag{12}$$

Where Δ denotes the first difference operator, P is the lag order selected by the Schwarz Bayesian Criterion (SBC), β_0 is the drift parameter while v_t is the error term which is N (0, δ^2). The parameters γ, φ and ϕ_{ij} are short-run parameters and λ, α and β_{ij} are the long-run multipliers. All the variables are defined as before.

The study begins by estimating equation (12) with the bounds test by employing the OLS method, which is normally the first procedure in the ARDL model. The F-test or Wald test is used to test for the presence of long-run relationship among the variables in equations (12) given as follows: The null hypotheses of no long-run relationship among the variables in equations (12) is tested against the alternative hypotheses of a long- run relationship as follows:

H_0: $\alpha = \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$

H_1: $\alpha \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$

The existence of cointegration among the variables under consideration is tested based on the F-statistics or Wald statistics. Given that, the asymptotic distribution of the F-statistic is non-standard without considering 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. Therefore, 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 assumes that all the variables are I (0), meaning that there is no cointegration among the variables, while the upper bound assumes that all the variables are I (1). So if the calculated F- statistic falls outside the upper critical value, then a null hypothesis of no cointegration will be rejected regardless of whether the variables are I (0) or I (1) implying a long-run relationship among the variables.

However, if the F-statistic falls below the lower bound, then the null hypothesis of no cointegration cannot be rejected. If the F-statistic lies within the lower critical and upper critical bounds, the test is inconclusive and it depends on whether the underlying variables are I (0) or I (1). This necessitates the testing for unit roots on the variables under investigation (Pesaran & Pesaran, 1997).

In order to get the optimal lag length for each variable, the ARDL procedure estimates $(P + 1)^{K+1}$ the number of regressions, where P is the maximum number of lags to be used, and k is the number of variables in the equation (Shrestha & Chowdhury, 2005). The optimal lag length of the ARDL model is selected based on the Schwarz-Bayesian Criterion (SBC) or the Akaike Information Criterion (AIC). The SBC uses the smallest possible lag length and is therefore described as the parsimonious model unlike the AIC which uses the maximum relevant lag length (Jalil & Naveed, 2008).

Provided 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.

$$lnY_t = \mu + \sum_{i=1}^{p} \lambda lnY_{t-i} + \sum_{i=1}^{p} \alpha lnK_{t-i} + \sum_{i=1}^{p} \beta_1 lnGOV_{t-i}$$

$$+ \sum_{i=1}^{p} \beta_2 lnCPI_{t-i} + \sum_{i=1}^{p} \beta_3 lnTR_t + \sum_{i=1}^{p} \beta_4 lnL_{t-i} + v_t \qquad (13)$$

Where ξ is the speed of adjustment of the parameter to long-run equilibrium following a shock to the system and ECT_{t-1} is the residuals obtained from equations (13). The coefficient of the lagged error correction term ξ is expected to be negative and statistically significant to further confirm the existence of a cointegrating relationship among the variables in the model.

Diagnostics Test

Post estimation tests were carried out to ensure the robustness and goodness of fit of the model used for the study. To be sure that the estimates obtained from the model are efficient, the study carried out a serial correlation test. The study employed the Lagrange Multiplier (LM) Test of Breusch (1978) and Godfrey (1978). The LM serial correlation test has some advantages over the Durbin-Watson test for serial correlation. Unlike the Durbin-Watson statistic, the LM test may be used to test for higher order ARMA errors, and is applicable whether or not there are lagged dependent variables. The LM tests the null hypothesis of no serial correlation up to the selected maximum lag length.

The study also employed the Regression Specification Error Test (RESET) proposed by Ramsey (1969) to check whether the functional form of the model used in the study is correctly specified. The RESET is a general test for; omitted variables, incorrect functional form as well as the correlation between regressors and the error term (Hall, Lilien, & Johnston, 1995). The RESET, test the null hypothesis that the correct specification of the model is linear against the alternative that the correct specification is non-linear.

To examine the normality properties of the error term, the study employed the Kurtosis test of normality. Also to make sure the estimated coefficients are efficient heteroscedasticity test was conducted.

The structural stability test is conducted by using the Cumulative Sum (CUSUM) of recursive residuals and the Cumulative Sum of Squares (CUSUMSQ) of recursive residuals as suggested by Pesaran and Pesaran (1997). This was used to determine whether the coefficients of the estimated model are stable over the study period.

Granger Causality Test

The study of causal relationships among economic variables has been one of the main objectives of empirical econometrics. According to Engle and Granger (1987), cointegrated variables must have an error correction representation. One of the implications of Granger representation theorem is that if non-stationary series are cointegrated, then one of the series must granger cause

the other (Gujarati, 2001). To examine the direction of causality in the presence of

cointegrating vectors, Granger causality is conducted based on the following:

$$Y_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} \, \Delta \, Y_{t-1} + \sum_{i=0}^{p} \alpha_{2i} \, \Delta \, X_{t-1} + v_t \qquad (14)$$

$$X_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i} \, \Delta \, X_{t-1} + \sum_{i=0}^{p} \beta_{2i} \, \Delta \, Y_{t-1} + \eta_t \qquad (15)$$

The error terms are assumed to satisfy the criteria $E(\mu_t) = E(\eta_t) = E(\mu_t \mu_s) = E(\eta_t \eta_s) = 0$ and $E(\mu_t \mu_t) = \sigma_\mu^2, E(\eta_t \eta_t) = \sigma_\eta^2$. The causality in

equation (14) should run from Xt to Yt on condition that the estimated

coefficients on the lagged variable Xt are significantly different from zero. Put

differently, the coefficients of αi are different from zero (i.e. $\alpha_i \neq 0$). Also,

causality in equation (15) runs from Yt to Xt provided the estimated coefficients

on Yt as a group are significantly different from zero (i.e. $\beta_i = 0$)). Bidirectional

causality occurs if Xt causes Yt and Yt causes Xt. In other words, the lagged

values of both Xt and Yt as a group in equations (14) and (15) are significantly

different from zero.

Testing the Presence of a Threshold

According to the Barro (1990), Armey (1995) and Rahn (1998), the effect

of government size on economic growth looks like a hump-shaped curve (it is,

non-linear). Therefore, this curve should also be examined while investigating the

effect of government size on economic growth. Odawara (2010), Samimi et

al.(2010), Hajamini & Fahali (2012), Keikha (2012) and Abounoori & Nademi

(2010) resorted to using the two regime threshold autoregressive (TAR) model to examine the non-linear relationship and determine the threshold of government expenditure. A problem in using TARs is that standard maximum likelihood (ML) estimation algorithms cannot be used since the log-likelihood function is not continuously differentiable with respect to the threshold parameter (Coakley, Fuertes & Perez, 2000)

Also, Vedder and Gallaway, (1998) employed a quadratic functional form to conduct a similar study and confirmed the non-linear relationship between government spending and economic growth. However the difficulty with this approach is that it requires knowledge of the shape of the non-linearity prior to estimation (Odawara, 2010).

The study therefore employed the piece-wise linear regression model in investigating the presence or otherwise of a threshold of government expenditure. The model linear regression in equation (10) is therefore specified as given below:

$$y_t = \beta_0 + \beta_1 x_{i1} + \beta_2 (x_t - G_M) x_{i2} + \varepsilon_t$$

Alternatively, the above equation could be formulated piecewise model as:

$$y_t = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2}^* + \varepsilon_t$$

where x_{i2} is a dummy variable (0, if x_{i1} is below the median government expenditure and 1 if x_{i2} the median government expenditure G_M). β_2 is expected to be significant and negative.

Conclusion

The chapter had briefly expatiated on the theoretical underpinnings of the relationship between government expenditure and economic growth. The research design adopted in this study was based the positivist philosophy within the framework of neoclassical economics. Based on this, the study formulated both theoretical and empirical models. The theoretical model adopted in the study is the Solow growth model within the framework of neoclassical economics.

The Solow growth model was augmented with government expenditure, and inflation, money supply, capital as well as labour force serving as control variables. The empirical model was formulated by taking natural logarithms of the variables. This provided the possibility of a smoothened data series. The chapter further described the data set and the sources used in carrying out the study. It also provided a vivid description of the variables used in the research.

The chapter furthermore examined the estimation techniques in which the ARDL approach to cointegration has been expounded on and considered the appropriate technique in carrying out a study of this nature because of the several advantages it has over the other estimation techniques. Unit roots test was outlined as a test to be conducted on the variable series to check that the variables are not integrated of an order higher than one that would render the ARDL modeling inappropriate. The unrestricted error correction models of the empirical model specifications were formed to estimate the short-run adjustment to equilibrium in the ARDL model and the Granger causality test was also indicated

as test to be conducted to establish if there exists any causal relationship among the main variables in the study.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

The objective of this chapter is to present a detailed analysis and discussion of the results of the study. The chapter is structured into five main sessions. The first session presents the descriptive statistics of the relevant variables and the results for both ADF and PP unit root tests are presented and discussed. The second session presents the results of the analysis of the relationship between aggregate government expenditure and economic growth. The results for the Granger-causality test are presented and discussed in the third session. The next session presents the results of the disaggregated analysis. The last session presents the results and discussion on the existence of a government expenditure threshold.

Descriptive Statistics

The study computed the descriptive statistics of the relevant variables involved in the study. From the Table 1, it can be observed that all the variables have positive average values (means). It can also be seen from Table 1 that, capital stock (K) and consumer price index (CPI) are negatively skewed implying that majority of the values are greater than their means. On the other hand, growth of real GDP per capita (dY), government expenditure (GOV), labour force (L) and tax revenue (TR) are positively skewed implying that the majority of values are less than their means. The minimal deviations of the variables from their

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means as indicated by the standard deviations demonstrate that by taking the logs of variables minimize their variances. The Jarque-Bera statistic that shows the null hypothesis that the series are drawn from a normally distributed random process cannot be rejected for all the variables .The probability values confirm the Jarque-Bera statistic that the variables are normally distributed.

Table 1: Summary Statistics of the Variables

	dY	GOV	L	K	CPI	TR
Mean	10.00	20.93	54.24	21.18	1.69	21.62
Median	9.63	21.01	54.02	21.58	2.00	21.52
Maximum	16.05	22.26	57.89	22.89	5.41	22.97
Minimum	6.19	19.72	51.39	19.26	-4.78	20.38
Std. Dev.	2.94	0.59	2.10	0.99	2.96	0.71
Skewness	0.52	0.20	0.18	-0.29	-0.59	0.17
Jarque-Bera	2.71	0.39	2.84	2.24	3.02	2.09
Probability	0.26	0.82	0.24	0.33	0.22	0.35
Sum	380.17	795.20	2061.17	804.86	64.37	821.67
SSq. Dev.	319.72	12.75	163.09	36.99	323.45	18.68
Obs	38	38	38	38	38	38

Note: Std. Dev. is Standard Deviation and SSq. Dev. denotes Sum of Squared Deviation
Source: Estimated from WDI (2013) Data using Microfit 4.1.

Results of the Unit Root Test

Even though**,** the ARDL approach to cointegration can be employed irrespective of the order of integration, it is imperative to perform unit roots test to verify whether the variables are not integrated of an order higher than one in order to extricate the result from spurious regression. This is because the computed F-statistics provided by Pesaran et al. (2001) will not be valid in the presence of I(2) variables.

All the variables were examined by first inspecting their trends graphically (see Appendix A). It can be seen that, all the variables exhibit behaviours of non-stationary series. However, the plots of all the variables in their first differences exhibit stationary behaviour (Appendix B).

Additionally, the Augmented Dickey-Fuller (ADF) and Phillips and Perron (PP) tests were applied to all variables in levels and in first difference in order to formally establish their order of integration. The Schwartz-Bayesian Criterion (SBC) and Akaike Information Criterion (AIC) were used to determine the optimal number of lags included in the test. 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 ADF test for unit root with intercept only in the model for all the variables are presented in Table 2. The null hypothesis is that the series is non-stationary, or contains a unit root. The rejection of the null hypothesis for the

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test is based on the MacKinnon (1991) critical values as well as the probability values.

Table 2: Test for the Order of Integration (ADF)

Levels (Intercept)					First Difference (Intercept)			
Var.	ADF-Statistic	P-Value	Lag	Var.	ADF-Statistic	P-Value	Lag	IO
DY	-1.2798	0.6239	[0]	DY	-5.0730	0.0004***	[0]	I(1)
GOV	0.1276	0.9637	[0]	DGOV	-5.4051	0.0001***	[0]	I(1)
L	-1.4841	0.5273	[5]	DL	-4.8939	0.0005***	[6]	I(1)
K	-1.6161	0.4604	[1]	DK	-6.7881	0.0000***	[0]	I(1)
CPI	-1.6660	0.4365	[3]	DOPN	-4.6087	0.0012***	[0]	I(1)
TR	0.1451	0.9654	[2]	DMS	-5.5939	0.0000***	[2]	I(1)
CAP	-2.6751	0.0923	[0]	DCAP	-5.8979	0.0001***	[5]	I(0)
CUR	-2.1226	0.2380	[0]	DCUR	-6.5112	0.0000***	[0]	I(1)

Note: D represents difference. *** denotes significance level at 1% and OI represents order of integration.
Source: WDI (2013) and Author's Estimation

From the unit root test results presented in Table 2, it can be seen that all the variables are non-stationary at levels. This is because the P-values of the ADF statistic are not statistically significant. However, when the variables are differenced for the first time they become stationary. This is because the null hypothesis of the presence of unit root (non-stationary) is rejected at 1 percent significant levels.

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Table 3: Test for the Order of Integration (PP)

Levels (Intercept)				First Difference (Intercept)				
Var.	PP-Statistic	P-Value	BW	Var.	PP-Statistic	P-Value	BW	IO
DY	-1.4589	0.5386	[3]	DY	-5.1568	0.0003***	[3]	I(1)
GOV	0.3941	0.9800	[1]	DGOV	-5.4068	0.0001***	[6]	I(1)
L	2.5549	1.0000	[4]	DL	-3.5572	0.0119**	[2]	I(1)
K	0.0400	0.9563	[4]	DK	-5.7504	0.0000***	[5]	I(1)
CPI	-7.7282	0.7031	[3]	DCPI	-3.6229	0.0101**	[3]	I(1)
TR	0.4331	0.9818	[4]	DMS	-5.3092	0.0001***	[4]	I(1)
CAP	-2.6751	0.0923	[0]	DCAP	-5.9063	0.0001***	[1]	I(0)
CUR	-2.1127	0.2416	[2]	DCUR	-6.5112	0.0000***	[0]	I(1)

Note: D represents difference. *** denotes significance level at 1% and OI represents the order of integration.
Source: WDI (2013) and Author's Estimation

From the unit root test results in Table 3, the null hypothesis of the presence of the unit root for all the variables in their levels cannot be rejected since the P- values of the PP statistic are not statistically significant at the conventional levels of significance. However, at first difference, all the variables are stationary. This is because the null hypothesis of the presence of unit root (non-stationary) is rejected at 1 percent significant level for all the variables with the exception of consumer price index (CPI) and labour force which is rejected at 5 percent level of significance.

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From Tables 2 and 3, the null hypothesis of the presence of unit roots cannot be rejected for all variables at levels. This is because the P-values of both the ADF and the PP statistic are not significant at all the conventional levels of significance.

Relationship between Aggregate Government Expenditure and Economic Growth

This session presents the results and discussion on the long and short run relationships between aggregate government expenditure and economic growth. In the first step, the presence of any long-term relationship between the variables of interest was determined using an F-test. The second step of the analysis was to estimate the coefficients of the long run relationship followed by the estimation of the short run elasticity of the variables with the error correction representation of the ARDL model.

Bounds Test for Cointegration

In the first step of the ARDL analysis, the presence of long-run relationships is tested using the bounds test for cointegration. Cointegration test enabled the verification of existence of both long run and short-run relationships among the variables of interest. Pesaran and Shin (1997) maintained that performing cointegration test enables researchers to determine whether there exists disequilibrium in various markets. According to Charemza and Deadman (1997), the existence of a cointegrating relationship between the variables implies

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that some adjustment mechanisms exist which keep the errors in the long-run relationship from rising.

The implication is that whenever there is a cointegrating relationship between two or more variables, then theoretically, there exists an error correction mechanism. The error correction term is the lagged residual of the cointegration regression. This provides information about the speed with which the model returns to equilibrium following an exogenous shock. In other words, it determines the speed of adjustment to long-run equilibrium. For this reason, a negative and significant coefficient of the error term is expected.

Pesaran and Shin (1999) proposed a maximum lag length of two (2) for annual data for the bounds testing approach to cointegration. After the determination of the lag length, the F-statistic that is computed within the framework of the Unristricted Error Correction Model (UECM) was compared with the lower and upper critical values in Pesaran and Pesaran (1997). According to Pesaran et al (2001), the lower bound critical value assumes that the explanatory variables are integrated of order zero or I(0), while that of the upper bound assumes that the explanatory variables are integrated of order one or I(1).

Table 4 reports the bounds test results. From the table, the F-statistic for the model with DY as the dependent variable is 11.3504. It exceeds the upper critical bound at one percent significance level. This means that the null hypothesis of no cointegration among the variables in equation (13) is rejected. This suggests the existence of a long-run relationship between economic growth and its explanatory variables.

Table 4: Results of Bounds Test for the Existence of Cointegration

Critical Value Bounds	90% Level		95% Level		99% Level	
Intercept with no trend	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
K=5	2141	3.250	2.823	4.069	3.267	4.540
Dependent Variable						F-Statistic
F(dY) = F(dY | GOV, L, K, CPI, TR)						11.3504

Note: K is the number of regressors.
Source: Estimated from WDI (2013) data using Microfit 4.1 package; the critical values are obtained from Appendix B Case II, statistical tables of Pesaran and Pesaran (2009).

The existence of a cointegrating relationship between economic growth and the explanatory variables in the model means an error correction mechanism exists; therefore, the study proceeded to estimate long-run coefficients and the short-run dynamic parameters.

Long Run Results

This session presents the results and discussion of the long run relationship between aggregate government expenditure and economic growth. Since the study used an annual time series data, the long run is defined as the period beyond one year. The analysis tests the null hypothesis of no long run relationship between aggregate government expenditure and economic growth as

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against the alternative hypothesis of a long run relationship between government expenditure and economic growth.

Since the results of the cointegration analysis indicates the existence of a long run relationship between economic growth and the explanatory variables, the study proceeded to estimate the long run impact of the explanatory variables on economic growth using the ARDL framework. The estimates of the selected ARDL model based on the Schwarz Bayesian Criterion   (1,2,1,1,0,0) are presented in Table 5. The SBC was chosen to ensure parsimony.

Table 5: Long Run Estimates

Dependent Variable: dY				
Variable	Coefficient	Standard Error	T-Ratio	P-Value
GOV	-.8725	.1028	-8.4874	.000***
K	.0258	.0050	5.1600	.000***
L	.2836	.0919	3.0852	.005***
CPI	-.8546	.1018	-8.3936	.000***
TR	.1851	.0784	2.3616	.034**
C	27.9091	4.9383	5.6515	.000***

Note: C denotes the constant term, *** and ** denotes significance at 1% and 5% respectively.
Source: Estimated from WDI (2013) data using Microfit 4.1 package

The long run estimates of the ARDL model in Table 5 show that, GOV and CPI have a negative impact on the growth of output whereas L, K and TR exhibit a positive relationship.

The long run estimates indicate a negative relationship between government expenditure and growth of output. The result from the table shows that, a percentage increase in aggregate government expenditure will lead a reduction in output by 0.8725 percent. This result is in line with the argument put forward by the classical economists. The method of financing government expenditures are likely to retard economic growth depending on what proportion of it is financed through borrowing (either internal or external), money-financing and tax-financing (Gokan, 2002). An increase in government spending financed by borrowing (from the banks) leads to a reduction in loanable funds which leads to an increase in interest rates. Higher interest rate increases the cost of borrowing thereby lowering private investment and consequently leads to a reduction in output levels. Furthermore, higher level of government expenditure financed by debt may preempt physical and financial resources from the private sector by lowering investment and output and hence the growth rate. This confirms the findings of Nketiah-Amponsah (2009) who finds a negative relationship between aggregate government expenditure and economic growth for Ghana.

The result in Table 5 also confirms the a-prior expectation that gross fixed capital formation to GDP contributes positively to the growth of output. The coefficient of capital (K) is positive and statistically significant at one percent. Specifically, a percentage increase in the capital stock of the country will result in

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a 0.0257 percentage increase in output. This positive relationship between capital stock and real GDP is in line with the expectation of classical economic theory. This result is consistent with the conclusion made by Aryeetey & Fosu (2008).

The positive significant relationship between labour force (L) and output in the long run indicates that, the availability of skilled labour in the country would lead to output growth. The result shows that, a percentage increase in the labour force will lead a 0.2836 percentage rise in output. This is consistent with the argument put forward by Jayaraman and Singh (2007) who emphasized that there can be no growth in output without the contribution of labour as an input of production hence, the positive and significant coefficient.

As expected, consumer price index (which is used to control for the effect of price fluctuations) had a negative impact on long run output. The results indicate that a percentage increase in the general price level will lead to a fall in output by 0.8546 percent. This indicates that the price stability of a country is an essential element in attaining economic growth. This is due to the fact that inflation decreases domestic demand and increase the cost of production so it decelerates economic growth. This result also confirms the findings of Georgantopoulous & Tsamis (2012) who also found statistically significant long run negative relationship between inflation and economic growth in Nigeria. In Ghana, Frimpong and Oteng-Abayie (2010) also found a significant negative relationship between economic growth and general price level.

Tax revenue has a positive and significant effect on real GDP growth. The coefficient of 0.1851 implies that in the long run, a percentage increase in tax

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revenue will lead to approximately 19 percent increase in real GDP growth. The positive effect is justified by the fact that tax revenue generated by the government will be used for infrastructural development in the various sectors of the economy which will lead to increase in output in the long run. This result is consistent with the findings of Owolabi et al., (2011); Ogbonna and Ebimobowei (2012); Mullen and Williams (1994) who found a positive and significant effect of tax revenue on economic growth.

The error correction term is generated as follows:

$$ecm = Y + \ .8725 * GOV - .2836 \ .* L \ - .0258 * K \ - .1851 * TR$$
$$+ \ .8546 * CPI - 27.9091 * C$$

Results of the Short Run Dynamic Model

This session presents the results and discussion of the short run relationship between aggregate government expenditure and economic growth. The short run is defined as the period one year and below. The analysis tests the null hypothesis of no short run relationship between aggregate government expenditure and economic growth as against the alternative hypothesis of a short run relationship between government expenditure and economic growth.

Once the long run relationship among the variables has been established within the framework of the ARDL approach to cointegration, the study further estimated the short run relationships. The coefficient of the ECM indicates how fast the variables converge to equilibrium following a shock and it should have a statistically significant coefficient with a negative sign. The negative sign implies

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that any shock that occurs in the short run will be corrected in the long run. Acheampong (2007) maintains that the larger the error correction term in absolute value, the faster the convergence to equilibrium. Bannerjee and Mestre (1998) noted that, a highly significant error correction term further confirms the existence of a long run relationship. Table 6 presents the short run dynamics.

Table 6: Short Run Estimates

Dependent Variable: dY			
Regressor	Coefficient	Standard Error	T-Ratio(P-Value)
dGOV	.2375	.0914	2.5978[.019]**
dGOV1	.2541	.1012	2.5097[.023]**
dK	.0101	.0029	3.5421[.003]***
dL	.2687	.0696	3.8622[.002]***
dCPI	-.7076	.0889	-7.9603[.000]***
dTR	.1533	.0703	2.1810[.044]**
dC	23.1068	6.5469	3.5294[.003]***
ecm(-1)	-.8279	.1206	-6.8661[.000]***

Note: *** and ** denote significance at 1% and 5% respectively.
Source: Estimated from WDI (2013) data using Microfit 4.1 package

From Table 6, the coefficient of the lagged error correction term (ECMt-1) is negative and highly significant at one percent significance level. This actually confirms the existence of a cointegrating relationship among the variables in the model. The ECM represents the rate of adjustment to restore equilibrium in the dynamic model after a disturbance. The coefficient of the error correction term is

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0.8279. This implies that, about 83 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.

From Table 6, the coefficient of the current and the previous government expenditure are both positive and significant at five percent (0.2375 and 0.2541 respectively) although it is negative in the long run. As the government provides social and physical infrastructure through public investment, positive externalities are generated in the form of better investment opportunities for the private sector which accelerates economic growth (Ram, 1986). This result is in line with the Keynesian hypothesis which postulates that, an increase in government expenditure leads to higher economic growth.

Also, the coefficient of capital stock is positive and significant at one percent. This result further supports the theoretical assertion that, capital contributes positively to economic growth. The estimated short run coefficient shows that, the economy will grow by 0.0101percent following a percentage increase in the capital stock of the country. Similarly, the coefficient of the labour force is significant at one percent and has positive effect on short-run growth of the economy. Thus, one percent increase in the labour force will result in a 0.2687 percentage increase in the growth of the Ghanaian economy.

The results also show that the coefficient of CPI in the short run is also negative and significant at 1 percent significance level. Precisely, a 1 percent increase in the rate of inflation will result in 0.7076 percent reduction in economic

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growth. The effect of CPI on growth in the short run is similar to the long run effect.

Tax revenue is positive and significant in the short run. That is, in the short run, there is a percentage increase in tax revenue increases, the economy will growth by 0.1533 percent. In fact tax revenue is a core instrument in the hands of the government to fulfill expenditures and it helps in acquiring sustained growth targets. This is consistent with the findings of Ogbonna & Ebimobowei (2012) and Mullen &Williams (1994) who found a positive and significant effect of tax revenue on economic growth in the short-run.

Model Diagnostics and Stability Tests

According to Hansen (1992), the estimated parameters of a time series data could differ over time. Consequently, it is critical to conduct parameter tests in order to check for model misspecification that may arise as a result of unstable parameters and subsequently lead to bias estimates. Table 7 shows the results for the model diagnostics and goodness of fit.

Table 7: Model Goodness of Fit and Diagnostics

|			
R-Squared	.9378	R-Bar-Squared	.8899
S.E. of Regression	.0355	F-stat. F(7,16)	28.0042 [.000]
Mean of Dependent Variable	.2114	S.D.of DependentVariable	.1071
Residual Sum of Squares	.0164	Equation Log-likelihood	53.3993

Table 7 Continued:

Akaike Info. Criterion		42.3993	Schwarz Bayesian Criterion	35.9200
DW-statistic		2.0161		
Serial Correlation	χ^2_{auto}	.0663[.797]	F(1,24)= .044284[.835]	
Functional Form	χ^2_{Reset} (1)	.5727[.449]	.5727[.449]	
Normality	χ^2_{Norm}(2)	.7915[.673]	Not applicable	
Heteroscedasticity	χ^2_{White}(1)	3.3883[.166]	F(1,34) =3.5326[.169]	

Source: Estimated from WDI (2012) data using Microfit 4.1 package

Table 7 presents the diagnostic and goodness of fit of the model used in the study. The results indicates an R-squared value of .8899 suggesting that about 89%of the total variations in economic growth is explained by variations in government expenditure and the other explanatory variables in the model. Table 7 also shows that the overall regression is significant at one percent {F (7, 16) 28.0042 [.000]}. This implies that the explanatory variables in the model are good predictors of economic growth. Furthermore, the results show that there is no evidence of spurious regression as the Durbin-Watson (DW) is greater than the adjusted R-squared (R-Bar-squared). This result is confirmed by the test for serial correlation. Also, table 7 indicates that the errors are normally distributed and the model passes the Ramsey's RESET for correct specification of the model as well as the white heteroskedasticity test.

Finally, to check the stability of the coefficients of the model, the study employed the CUSUM and CUSUMSQ of recursive residuals stability tests as

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suggested by Pesaran and Pesaran (1997). According to Bahmani-Oskooee (2004), the null hypothesis for this test is that the coefficient vector is the same in every period. The plot of the CUSUM and CUSUMSQ of recursive residual stability test in Figures 4 and 5 indicates that all the coefficients of the estimated model are stable over the study period since they are within the 5 percent critical bounds.
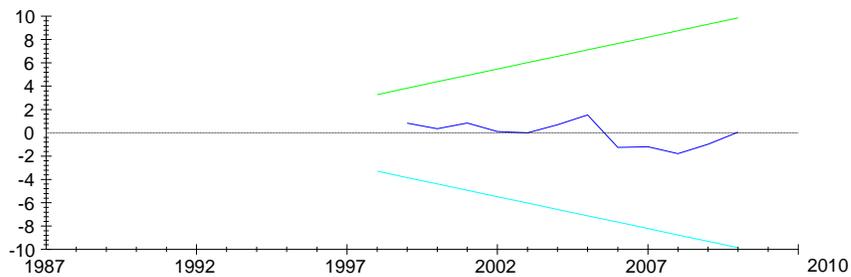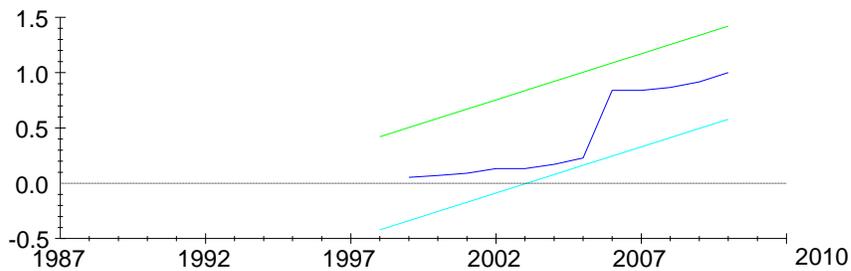

The straight lines represent critical bounds at 5% significance level

Figure 4: Plot of Cumulative Sum of Recursive Residuals
Note: The variable on the vertical axis is residuals whiles the variable on the horizontal axis is years in quarters.
Source: Generated by the author using Microfit 4.1

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The straight lines represent critical bounds at 5% significance level

Figure 5: Plot of Cumulative Sum of Squares of Recursive Residuals
Note: The variable on the vertical axis is residuals whiles the variable on the horizontal axis is years in quarters.
Source: Generated by the author using Microfit 4.1

Granger Causality Test

This part of the analysis seeks to examine the direction of causality between aggregate government expenditure and economic growth. The analysis tests the null hypothesis of no causal relationship between aggregate government expenditure and economic growth as against the alternative hypothesis of a causal relationship between government expenditure and economic growth.

Table 8: Pairwise Granger Causality Tests

Null Hypotheses	F-Stat	Prob	Remarks
GOV does not Granger Cause dY	0.90928	0.4133	Cannot reject H_0
dY does not Granger Cause GOV	3.64622	0.0378**	H_0 is rejected

Source: Estimated from WDI (2012) data using Microfit 4.1 package
Note: ** denote significance at 5%

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Based on the Granger Causality test results in Table 8, the null hypothesis that government expenditure does not Granger cause GDP growth (dY), cannot be rejected. This indicates that government expenditure does not Granger cause real GDP growth. However, the null hypothesis that GDP growth (dY) does not Granger cause government expenditure is rejected. This means that, there is a unidirectional causality running from economic growth to government expenditure, confirming Wagner's Hypothesis. This result is similar to the findings of Al-Faris (2002) and Rahmen et al (2010).

Relationship between the Components of Government Expenditure and Economic Growth

This session seeks to analyze the long and short run relationships between government expenditure and economic growth by paying particular attention to the two main components of the government expenditures: capital and recurrent expenditures.

Bounds Test to Cointegration

The first step in carrying out ARDL cointegration analysis involves testing the presence of long run relationships among the variables of interest. From Table 9, the F-statistic for the model with Real GDP (dY) as the dependent variable is7.4761. It exceeds the upper critical bound at five percent significance level. This suggests the existence of a long-run relationship between economic growth and its explanatory variables.

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Table 9: Bounds Test for the Existence of Cointegration

Critical Value Bounds	90% Level		95% Level		99% Level	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
Intercept with no trend						
K=5	2.262	3.367	2.649	3.805	3.516	4.781
Dependent Variable					F-Statistic	
F(dY)=F(dY | CAP,CUR, L, K, CPI, TR)					7.4761(0.032)	

Note: K is the number of regressors. The critical values are obtained from Appendix B Case II, statistical tables of Pesaran and Pesaran (2009).
Source: Estimated from WDI (2012) Data using Microfit 4.1 package

Long Run Relationship

This session presents the results and discussion of the long run relationship between the components of government expenditure and economic growth. The analysis tests the null hypothesis of no long run relationship between the components of government expenditure and economic growth as against the alternative hypothesis of a long run relationship between the components of government expenditure and economic growth.

Since the results of the cointegration test indicates the existence of a long run relationship between economic growth and the explanatory variables, the study then proceeded to estimate the long run impact of the explanatory variables on economic growth. The long run ARDL model was estimated based on the Schwarz Bayesian Criterion (SBC). Table 10 represents the long run results.

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Table 10: Estimated Long Run Coefficients

ARDL(1,2,1,1,2,0) selected based on SBC		Dependent Variable: dY		
Regressor	Coefficient	Standard Error	T-Ratio	P-Value
CAP	.4857	.1514	3.2079	.008***
CUR	-.1461	.0476	-3.0723	.010**
L	.4177	.0653	6.3924	.000***
K	.3097	.0731	4.2394	.000***
CPI	-.3295	.1108	-2.9723	.011**
TR	.7760	.2122	3.6563	.004***
C	63.5776	23.0283	2.7608	.019**

Note: *** and ** denote significance level at 1% and 5% respectively
Source: Computed by the author using Microfit 4.1

The long run results show that the coefficient of labour force, consumer price index and tax revenue are significant and meet their a priori signs. From the table, the long run relationship between capital expenditures and economic growth is positive. It can be inferred from the table that, if government increases capital expenditure by one percent, output in the long run will increase by 0.4857 percent. This is because ideally, the government invests in projects where social returns are higher than private returns or in other words, because of inherent market failure, private parties may underinvest in these projects (Stiglitz, 1989). Such projects include investments in infrastructure, investments in human capital, etc. These investment projects are characterized by spill-over effects (or externalities) which positively influence the productivity of private sector and

thus raise returns to private capital. As a result of these externalities, private provision of such goods is sub-optimal and leaves space for substantial improvement, which is possible only if the government finances such projects (Stiglitz, 1989). This result is consistent with Loto (2011) who found a positive and significant relationship between capital expenditure and economic growth. It also supports the findings of Afonso & Alegre (2008). The result also confirms the findings of Bose et al (2007) who concluded that the share of government capital expenditure in GDP is positively and significantly correlated with economic growth.

From Table 10, it can be seen that the relationship between current expenditures and economic growth in the long-run is negative. If current expenditures increase by one percent, economic growth in the long run will reduce by 0.1461 percent. Barro and Sala-I-Martin(1992) explain that if current expenditures are financed by distortionary taxes it may lower the return on investment and affect productive incentives of producers and labour. If follows that an increase in government consumption spending lowers the economy's steady-state growth rate hence, the negative impact of government consumption spending (current expenditure). In addition, current spending itself is likely to have no impact on productivity of private sector hence may not affect economic growth. The results confirm the conclusion drawn by the Barro (1991) and Ghura (1995)

The long run relationship between disaggregated government expenditure (current and capital expenditure) presented above is similar to the findings of

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(Okoro, 2013) who finds a positive relationship between capital expenditure and economic growth and a negative relationship between recurrent expenditures and economic growth. Also in their paper, Ogundipe and Oluwatobi (2013) conclude that government capital expenditure may likely accentuate the growth process in the long-run than recurrent expenditure.

Results of the Short Run Dynamic Model

This session presents the results and discussion of the short run relationship between the components of government expenditure and economic growth. The analysis tests the null hypothesis of no short run relationship between the components of government expenditure and economic growth as against the alternative hypothesis of a short run relationship between the components of government expenditure and economic growth.

Once the long run cointegrating model has been estimated, the next step is to model the short run dynamic relationship among the variables within the ARDL framework. Thus, the lagged value of all level variables (a linear combination is denoted by the error-correction term, ECMt-1 is retained in the ARDL model. Table 11 presents the results of the estimated error-correction model is selected based on the SBC.

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Table 11: Estimated Short Run Coefficients

ARDL (1,2,1,1,2,0) selected based on SBC

	Coefficient	Standard Error	T-Ratio	P-Value
dCAP	.2064	.0604	3.4176	.004***
dCUR	-.1182	.1706	-.6930	.499
dL	.3209	.0848	3.7819	.001***
dCPI	-.4722	.1104	-4.2789	.000***
dCPI1	-.4855	.1782	-2.7242	.016**
dK	.2214	.0518	4.2718	.000***
dTR	.4896	.0943	5.1946	.000***
dC	40.1153	13.2754	3.0218	.009***
ecm(-1)	-.63097	.12036	-5.2425	.000***

Note: *** and **denote significance level at 1% and 5% respectively
Source: Computed by the author using Microfit 4.1

The short run impact of recurrent expenditures on gross domestic product is negative and statistically insignificant. This because government consumption may have no direct effect on private productivity (or private property right), but reduce saving and growth through the distorting effects from taxation or government expenditure programmes (Barro, 1991) hence the negative and insignificant result. The result suggests that the government's recurrent expenditures have been inefficient, and that excessive recurrent expenditure has had depressing effect on the Ghanaian economy. Bose et al (2007) also concluded

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that recurrent expenditure had insignificant impact on the growth of developing countries.

On the other hand, capital expenditures impacted positively on the economy. From Table 11, a percentage increase in capital expenditure will cause a 0.2064 percentage increase in economic growth. Applying two different panel data methodologies to seven transition economies in South Eastern Europe, Alexiou (2009) finds evidence for the support of significant positive effect of government spending on capital formation on economic growth. Similarly, Onakoya & Somole (2013) found that public capital expenditure significantly contributes to economic growth in Nigeria positively.

Table 12: Model Diagnostics and Goodness of Fit

R-Squared	.94247	R-Bar-Squared	.87972
S.E. of Regression	.037149	F-stat. F(8,27)	22.5275 [.000]
Mean of Dependent Variable	.21141	S.D. of Dependent Variable	.10711
Residual Sum of Squares	.015180	Equation Log-likelihood	52.3353
Akaike Info. Criterion	41.3353	Schwarz Bayesian Criterion	33.6780
DW-statistic	2.1768		
Serial Correlation	χ^2_{auto}	.2838[.594]	F(1,10)=0.11966 [.737]
Functional Form	χ^2_{Reset} (1)	.2140[.644]	F(1,10)=0.089976[.770]
Normality	χ^2_{Norm}(2)	4.7915[.192]	Not applicable
Heteroscedasticity	χ^2_{White}(1)	.6703[.413]	F(1,22) =.63206[.435]

Source: Computed by the author using Microfit 4.1

The diagnostic test shows that there is no evidence of autocorrelation and the model passes the normality and the test proved that the error is normally distributed. Additionally, the model passes the white test for heteroskedasticity. As shown in Figures 5 and 6, the plot of both the *CUSUM* and *CUSUMSQ* residuals are within the 5 percent critical bound (boundaries). That is to say that the stability of the parameters has remained within its critical bounds of parameter stability. It is clear from graphs that the *CUSUM* and *CUSUMQ* tests confirm the stability of the estimated coefficients.
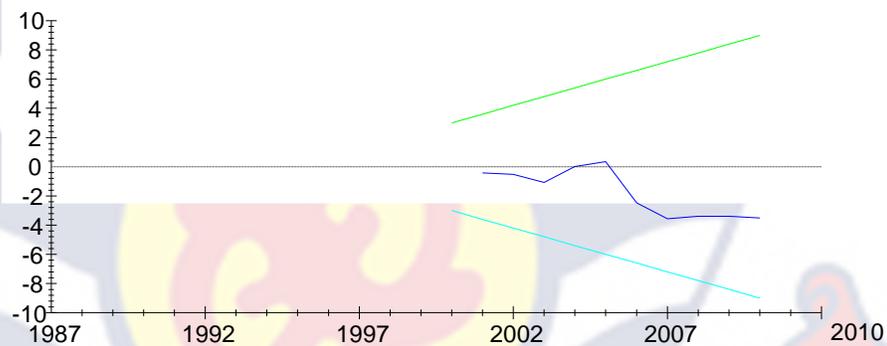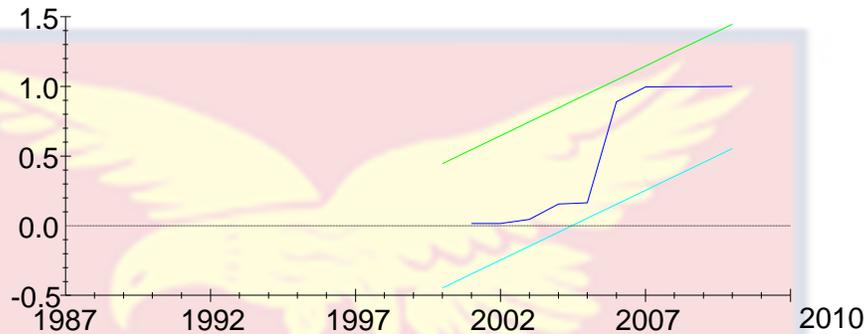

The straight lines represent critical bounds at 5% significance level

Figure 6: Plot of Cumulative Sum of Recursive
Note: The variable on the vertical axis is residuals whiles the variable on the horizontal axis is years in quarters.
Source: Generated by the author using Microfit 4.1

The straight lines represent critical bounds at 5% significance level

Figure 7: Plot of Cumulative Sum of Squares of Recursive Residuals
Note: The variable on the vertical axis is residuals whiles the variable on the
horizontal axis is years in quarters.
Source: Generated by the author using Microfit 4.

Test to Determine the Existence of Government Expenditure Threshold

In order to determine the existence of a threshold of government

expenditure, the linear model in equation (11) is re-specified to include a dummy

variable to capture government expenditure above the median government

expenditure. The null hypothesis of no threshold effect is tested by examining the

significance of the dummy variable created. It is also expected that the coefficient

of the dummy variable (DG) to be negative. This would confirm the existence of

government threshold as postulated by Armey (1995)

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Table 13: Testing the Existence of Government Expenditure Threshold

Dependent Variable: dY

Regressor	Coefficient	Standard Error	T-Ratio	P-Value
dGOV	.2977	.1710	1.7415	.092[*]
DG	-.2748	.0958	-2.8696	.008[***]
dK	.0404	.1285	.3146	.755
dL	.8295	.2556	3.2458	.003[***]
dTR	.5727	.2150	2.6636	.012[**]
dCPI	-.0292	.0097	-3.0148	.005[***]
C	-45.1767	10.6658	-4.2356	.000[***]

Note: ***, ** and * denote significance level at 1%, 5% and 10% respectively
Source: Computed by the author using Microfit 4.1

From table 13, the coefficient of the dummy variable is negative and statistically significant which confirms that government expenditure indeed has a threshold. The results confirm the findings of Barro (1990) and Armey (1995).

Conclusion

This chapter centered on the estimation of the models, presentation and discussion of the results of the study. In this chapter, the time series properties of the data used for estimation, presented and discussed the results. Unit root test employing both the ADF and the PP techniques essentially showed that all the series had to be differenced once to achieve stationarity. This implied that all the series are integrated of order one, $I(1)$. The presence of non-stationary variables

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implied the possibility of the presence of a long-run relationship among the variables, which the study verified using ARDL bounds test.

The results show the presence of long-run and short-run relationship between government expenditure and economic growth. Whereas government expenditure had a positive impact on economic growth in the short-run it had a negative impact in the long-run. Labour force, capital stock and tax revenue had positive effect in both the long-run and short-run. Consumer price index had a negative impact in both the short run and long-run.

The results of the ARDL model selected based on SBC shows that the error correction term (ECM_{t-1}) carried the expected negative sign. The coefficients for all the explanatory variables had the expected signs and they were significant. The diagnostic and parameter stability tests revealed that the model passes the tests of serial correlation, functional form misspecification, non-normal errors and heteroscedasticity at conventional levels of significance and the graphs of the CUSUM and CUSUMSQ indicate the absence of any instability of the coefficients because the plots of these graphs are confined within the 5 percent critical bounds of parameter stability suggesting that all the coefficients of the estimated ARDL model are stable over the study period. The Granger causality test results revealed a uni-directional causality running from between government expenditure and real income per capita.

The results for the disaggregated government show the presence of long-run and short-run relationship between government expenditure and economic growth. Whereas government expenditure had a positive impact on economic

growth in the short-run it had a negative impact in the long-run. Labour force, capital stock and tax revenue had positive effect in both the long-run and short-run. Consumer price index had a negative impact in both the short run and long-run. The results of the ARDL model selected based on SBC shows that the error correction term (ECM$_{t-1}$) carried the expected negative sign. The coefficients for all the explanatory variables had the expected signs and they were significant. The diagnostic and parameter stability tests revealed that the model passes the tests of serial correlation, functional form misspecification, non-normal errors and heteroscedasticity at conventional levels of significance and the graphs of the CUSUM and CUSUMSQ indicate the absence of any instability of the coefficients because the plots of these graphs are confined within the 5 percent critical bounds of parameter stability suggesting that all the coefficients of the estimated ARDL model are stable over the study period.

The result for the piece-wise linear regression model indicates that a threshold for government expenditure exists as the dummy variable created is negative and significant.

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CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The purpose of this chapter is to present the summary, conclusions and recommendations of this study. The summary presents a brief overview of the research problem, objectives, methodology and findings of the study. The conclusions encapsulate the overall outcomes regarding the findings of the study in the light of the hypotheses of the study. The recommendations also present specific remedies to be implemented by specific institutions. The chapter also presents the limitations of the study and offers some directions for future research in the area of government expenditure and economic growth.

Summary

Governments play key roles in the operation of every economy. Government expenditures refer to expenses incurred by the government for the maintenance of itself and provision of public goods, services and works needed to foster or promote economic growth and improve the welfare of people in the society. Policymakers are however divided as to whether government expansion is beneficial for an economy. Advocates of bigger government are of the view that government programs provide valuable "public goods" such as education and infrastructure. In addition, increases in government spending will bolster economic growth by increasing aggregate demand. Proponents of smaller government on the other hand hold an opposite view. They explain that if the

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government becomes excessively big, higher spending will undermine economic growth by transferring additional resources from the productive sector of the economy to the government, which uses them less efficiently. In addition, expanding the public sector complicates efforts to implement pro-growth policies—such as fundamental tax reform and personal retirement accounts—because critics can use the existence of budget deficits as a reason to oppose policies that would strengthen the economy.

Even though there is a plethora of literature on this subject matter, empirical literature has produced a mixture of findings. Hence the effect of government expenditure on economic growth remains inconclusive both theoretically and empirically. Although several studies have dealt with this issue, most of the studies have considered only aggregate government expenditure. However, it must be noted that, each component of the expenditure affect the economy differently−while some components may be growth retarding others may speed up the growth of the economy. Theoretical work done by Barro (1990) and Aschauer (1988) indicate that government expenditure on investment and other productive activities must have a positive link with economic growth while government consumption is anticipated to show growth-inhibiting effects. In addition, most of the empirical literature fails to examine the non-linear relationship between government expenditure and economic growth as theorized by Barro (1990)

Furthermore, although empirical literature on this subject matter is quite extensive, most of the findings have been based on a panel of either developed or

developing countries or a mixture of both. Hence there remains little by way of understanding the process by which government expenditure policies of a particular country shape the prospect of economic growth for that particular country. It is important to emphasize that a time series country study is potentially more informative although the findings cannot be generalized to other countries. For this reason, the study was particularly restricted to Ghana owing to the fact that literature on this subject matter for the country is very limited.

The variables were first tested for the existence of unit roots using the Augmented-Dickey Fuller (ADF) and Phillips-Perron (PP) tests of unit roots. This was done in order to determine their order of integration. The ADF and the PP test indicated that all the variables employed in this study were integrated of order one I(1). The study then proceeded to examine the long-run and short-run relationships between aggregate government expenditure and economic growth using the ARDL approach to cointegration. The result from the cointegration test indicated the existence of a cointegrating relationship between economic growth and its explanatory variables. This outcome justified the estimation of long-run and short-run relationships between real GDP and its explanatory variables including aggregate government expenditure.

The estimates of the ARDL model revealed that aggregate government expenditure and consumer price index have a significant negative relationship with real GDP in the long-run. However tax revenue, labour force and capital stock have positive relationship on economic growth in the long-run. The error correction term was negative and significant. This means that the economy will be

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able to recover from the previous year's shock. More specifically, the error correction term implied that, about 80 percent of the previous year's disequilibrium was adjusted in the current period.

The granger causality test was also employed in this study to identify the direction causality between government expenditure and economic growth. The result revealed a unidirectional relationship between government expenditure and economic growth. The causality runs from economic growth to government expenditure and not otherwise which confirms Wager's hypothesis.

Inspection of the diagnostic and stability test statistics indicated that the estimated model was satisfactory in line with the Lagrange multiplier and F-statistic. The plots of the cumulative sum of recursive residuals and the cumulative sum of squares of recursive residual stability test for the model showed that all the parameters estimated were stable over the study period since they were found to be within the five percent critical bounds level.

The study then proceeded to investigate the relationship between the components of government expenditure and the growth of the economy. The cointegration analysis revealed the presence of long-run relationship between economic growth and the explanatory variables. The long-run results show that capital expenditure has a significant positive relationship on the economy's growth in the long-run whereas recurrent expenditure had a statistically negative relationship. The error correction model also revealed in that in the short run recurrent expenditure although insignificant had a negative impact on growth in the short run.

The diagnostic tests results show that the model passes the test of serial correlation, functional form misspecification, non-normal errors and heteroscedasticity at conventional levels of significance. 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.

Finally the study investigated the presence of a threshold of government expenditure. The linear regression model was re-specified to include including a dummy variable which takes a value of one when the government expenditure is above the median and zero, if otherwise. The results from the piece-wise linear regression indicated that there exists a threshold of government expenditure as the coefficient of the dummy variable was negative and statistically significant.

Conclusions

The main objective of the study was to examine the relationship government expenditure and economic growth in Ghana. The study concentrated on four important issues: the relationship between aggregate government expenditure and economic growth, the relationship between the components of government expenditure and economic growth, the direction of causality between aggregate government expenditure and economic growth and lastly, the study tested for the existence of a threshold for government expenditure. Based on the results obtained in this study the following conclusions were reached:

> an increase in aggregate government expenditure will have a negative effect on the growth of the economy in the long run. However in the short run, an increase in aggregate government expenditure will have a significant positive effect on the growth of the economy. This means that an increase in government expenditure will not necessarily boost the growth of the economy in the long run hence expansionary government expenditure policies may be considered as a short run policy instrument.

> capital expenditures have positive and significant effect on the economy's growth unlike recurrent expenditures. Precisely, an increase in capital expenditures will have a positive impact on the economy both in the long and short run. On the other hand, recurrent expenditures have negative effect on the economy's growth in the long run but insignificant in the short run.

> the findings of the study reveal that the relationship between government expenditure and economic growth is not linear but an inverted 'U'. This suggests that there is a threshold of government expenditures which implies that in some cases, the impact of government spending on real GDP growth is negative above an estimated threshold value.

> the study provides empirical evidence which supports Wagner's Law −as the economy develops over time, the activities and functions of the government increases.

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Recommendations

As indicated in the conclusions above, an increase in government expenditure to boost economic growth can only be considered as a short term policy instrument. That is, economic growth will increase just in the short run period (one year and below). Based on this finding, the government of Ghana is encouraged to undertake contractionary government spending policy measures so as to reduce the negative impact of government expenditures on economic growth.

Furthermore, the disaggregated analysis revealed that expenditures on capital assets are likely to have positive effect on the growth of the economy. In addition increase in recurrent expenditures is likely to retard the growth of the economy. It is therefore recommended that, the government should invest more in capital assets in order to lay the foundation for sustainable growth and development. More importantly, the government should ensure that capital and recurrent expenditures are properly managed in a manner that will raise the nation's production capacity of the economy in order to accelerate economic growth.

Limitations of the Study

The main limitation of the study typical of such studies in developing nations had to do with the limited availability of data on some key variables used for the study (precisely, data on capital and recurrent expenditures). This is

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because in order to produce highly reliable estimates especially with cointegration analysis, long span of annual time series data of all the variables was needed.

Another limitation to the study is obviously the fact that, the study did not consider the effects of the various sub-components of the capital and recurrent expenditures on economic growth. This was due to data and time constraint. This posed challenges in providing specific policy recommendations.

Also, the arbitrary use of the median government expenditure as the threshold value posed challenges in determining the actual threshold value.

Directions for Future Study

In order to provide definite policy recommendations, a more disaggregated analysis must be done by considering the various components of the capital and recurrent expenditures. Also future research must go a step further to determine the threshold value of government expenditure as the present study suggests the existence of a threshold.

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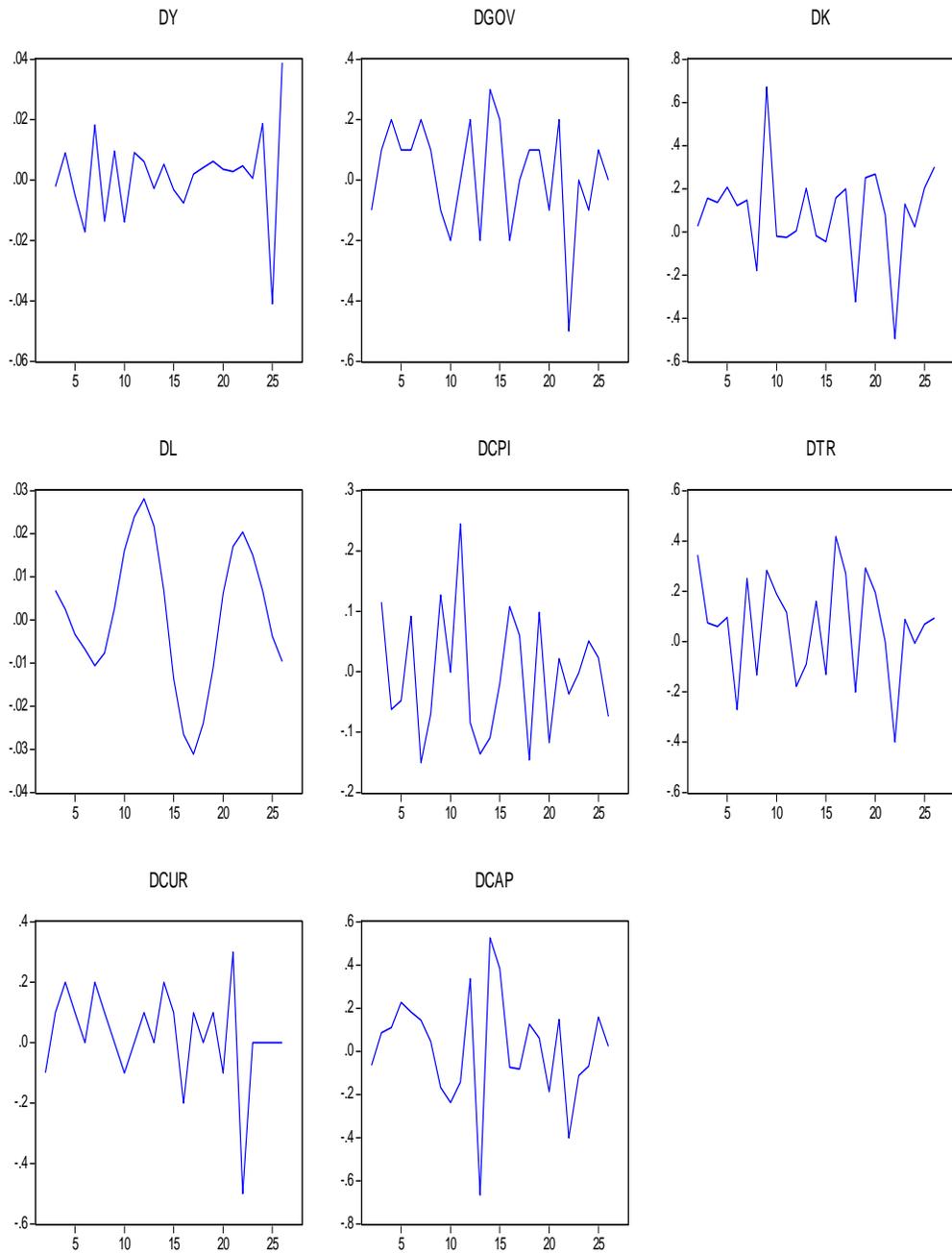
APPENDICES

A: Results of plots of variables in levels

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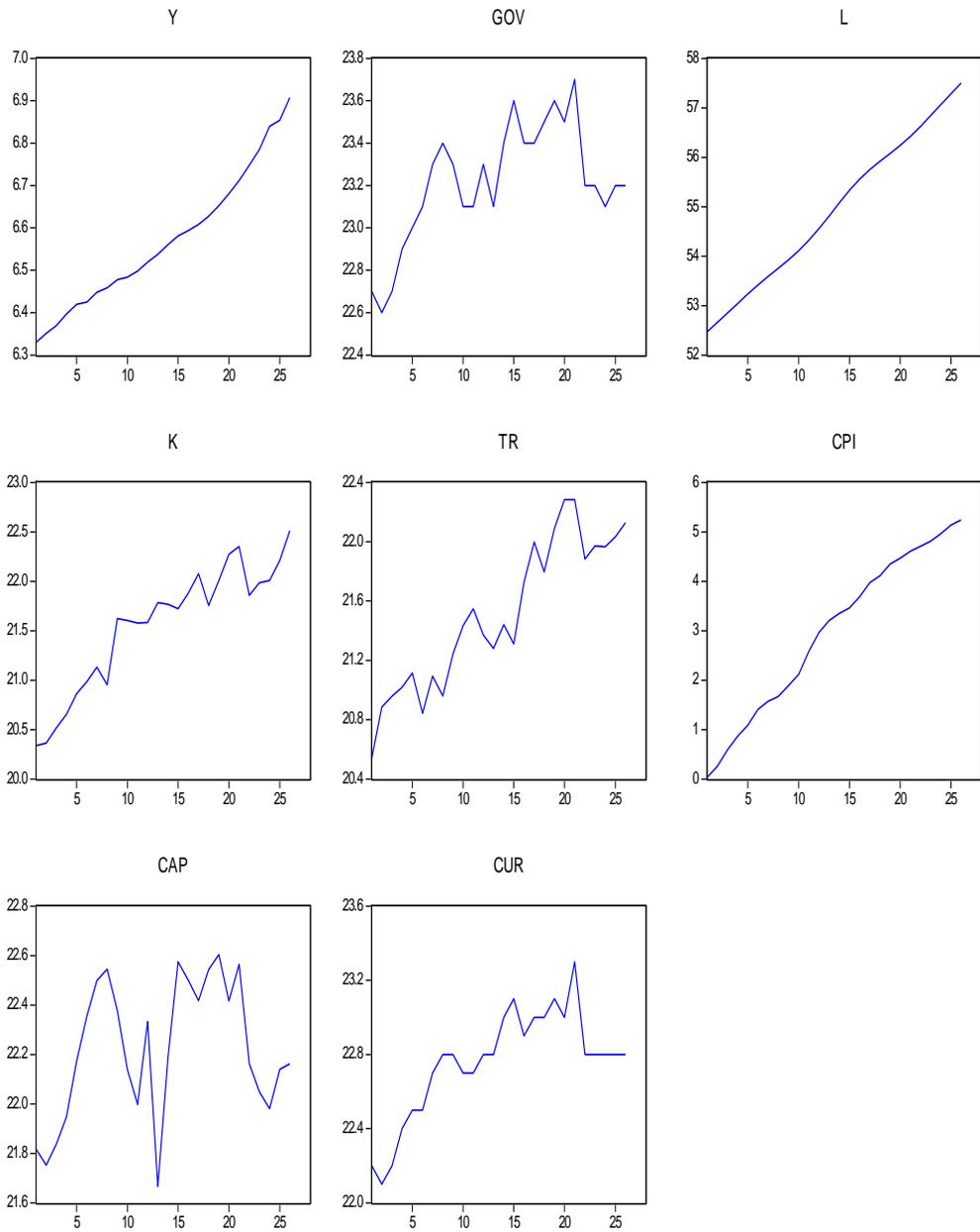
Source: Generated by the author using Eviews 5.0

B: Results of plots of variables in first difference

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Source: Generated by the author using Eviews 5.0

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