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AN EMPIRICAL ANALYSIS OF FISCAL DEFICIT IN GHANA

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DECLARATION

I hereby declare that this thesis submitted is my own work towards the Master of Philosophy degree in Economics and that it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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DEDICATION

To my sweet twin mothers Miss Christiana Frimpong I and Miss Christiana Frimpong II who through their care, love, support and prayers have contributed tremendously in making my tertiary education a success. Mums I am highly indebted to you for providing me the opportunity to accomplish this thesis and all I can tell you is;

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(2 Samuel 2:6)

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ABSTRACT

Persistent fiscal deficit constitute a major problem facing Least Developed Countries (LDCs). In Ghana, fiscal deficits still persists despite the potentials of the Ghanaian economy and efforts made by various governments to reduce the country's public debt. Therefore, this study attempts to analyze fiscal deficit in Ghana. Specifically, the study seeks to identify the factors determining fiscal deficit and investigate its effect on exchange rate and inflation in Ghana. The bounds testing approach to co-integration and (ECM) error-correction models, developed within an Auto-Regressive Distributed Lag (ARDL) framework is applied to annual data for the period 1980 to 2013 to examine the long-run equilibrium relationship between fiscal deficit and its determinants, exchange rate and its covariates and inflation and its covariates. The results of the bounds test indicate that there exists long-run relationship between fiscal deficit and its determinants, exchange rate and its covariates and inflation and its covariates. The empirical findings from the ARDL model reveal that fiscal deficit in Ghana is affected by international trade, broad money supply and government revenue in the long run, but have no effect on fiscal deficit in the short run. The findings however indicate that GDP, total debt servicing and democracy affect fiscal deficit significantly in both the short and long run. Democracy was found in this study to be an important determinant of fiscal deficit in both the long run and short run while government consumption expenditure was only significant in determining fiscal deficit in the short run. The findings further reveal a robust evidence of a negative effect of fiscal deficit on exchange rate in both the long and short runs whereas the effect of fiscal deficit on inflation is only significant in the short run. Policy implications drawn based on the findings include; enforcing stringent fiscal measures to restrain government spending, targeting higher GDP growth and stimulating export promotion.

TABLE OF CONTENTS

LIST OF TABLES

Table **Page**

LIST OF FIGURE

Figure **Page**

LIST OF ACRONYMS

ADF……Augmented Dickey-Fuller

AIC……....….Akaike Information Criterion

ARDL……..Autoregressive Distributed Lag

BMS……Broad Money Supply

BoG……Bank of Ghana

B&FT……...Business and Financial Times

CPI……Consumer Price Index

CUSUM……Cumulative Sum

CUSUMSQ……..……Cumulative Sum of Squares

DW……...……Durbin Watson

ECM……....Error Correction Model

EDL……..……External Debt and Liabilities

ERP……..Economic Recovery Programme

EU……...…European Union

EXCH……...……Exchange Rate

FD……Fiscal Deficit FDI…….Foreign Direct Investment

FINSAP……..…….Financial Sector Adjustment Programme

FINSSIP……..Financial Sector Strategic Plan

GDP……Gross Domestic Product

HIPC……Highly Indebted Poor Country

IBC…….....Intertemporal Budget Constraint

IEA…….....Institute of Economic Affairs

IMF……..International Monetary Fund

INF…….……..Inflation

LDCs……..…Least Developed Countries

OLS……....Ordinary Least Squares

PDR……...……Peoples Democratic Republic

PP…….…….Phillips-Perron

SAP……....Structural Adjustment Programme

SSSS……..Single Spine Salary Structure

TDS…….Total Debt Servicing

TGE……Total Government Expenditure

TGR……..……Total Government Revenue

TRA…….……..International Trade

VAT…….……Value Added Tax

WDI……World Development Indicator

WPI……..…..Wholesale Price Index

3SLS……..Three Stages Least Squares

CHAPTER ONE INTRODUCTION

1.1 Background to the Study

Persistent fiscal deficit constitute a major problem facing Least Developed Countries (LDCs). The orthodox definition of fiscal deficit is the excess of government expenditure over government total revenue, usually generated during one fiscal year (Tešić et al., 2014). Fiscal deficit emanates from excess government expenditure demand over limited government revenue that requires net lending to finance the deficit. In the Ghanaian economy, there has been persistent tendency towards fiscal deficit since independence and what causes this deficit in Ghana has been an unanswered issue to both economists and politicians (Antwi et al., 2013).

Although economic growth in the Ghanaian economy was remarkable for some years, it was associated with rising public debt and fiscal deficit. Ghana's fiscal deficit for the end of the 2014 fiscal year was 10.10% of GDP, higher than that of the previous year's 8.5% of GDP. This fiscal deficit was to be financed with foreign and domestic borrowing. Bank of Ghana has already indicated an increase in external debt and liabilities (EDL). At the end of 2014, external debt was US$ 13 billion and domestic debt was GH¢ 34.6 billion. Ghana's total public debt increased from GH¢ 51.9 billion in 2013 to GH¢ 76.1 billion by close of 2014 and further increased to GH¢ 88.2 billion at March ending 2015, indicating 65.3% of GDP (Bank of Ghana, 2015).

Fiscal deficit is not certainly a bad thing. It is imperative to note that Ghana's government can run some fiscal deficits with the intention of stimulating economic growth by building up enough capital stock. This would put the Ghanaian economy on its steady-state growth path so that debt could be issued to cover the fiscal deficit and the debt issued to be repaid in the future to sustain economic growth (Doh-Nani, 2011). Also, Tešić et al. (2014) argues that in conformity with the

principles of classical economists, public debt and for that fiscal deficit are acceptable only in special situations and for short term requirements of public expenditure, whilst their permanent presence are accepted only in situations of funding capital projects whose rate of return is greater than the rate of interest on borrowings.

However, the huge and persisting fiscal deficit in Ghana could signal numerous disturbing signs about the economy. It could suggest that government is spending money on unproductive programs which do not raise productivity (IEA, 2014). It could further suggest that the tax collection machinery is ineffective, making substantial percentage of people to evade tax payments or the tax collection lag is too long. As a consequence, the Institute of Economic Affairs (IEA) argues that the prevalence of high fiscal deficit is an essential element that could ruin Ghana's ability to progress to upper middle income status. The institute further argued that these deficits are unsustainable and fiscal deficit tends to worsen in Ghana during election years with associated increase in debt levels (IEA, 2014).

This increasing and persistent fiscal deficit has been a worry for both the monetary authority (Bank of Ghana) and fiscal authority (Ministry of Finance) and to an extreme extent led to a mixed reaction between both authorities. For instance, ahead of the presentation of the 2013 budget, Ghana's finance minister indicated they have taken an economic and fiscal stance to tackle the fiscal challenges that led to the deficit overrun in 2012 and that they would not repeat some of the mistakes they made in 2012 (Business World, 2013). In a reaction to the fiscal deficit, the governor of the Bank of Ghana in a monetary policy briefing called on the finance minister to review the 2014 year's budget and introduce new actions so as to fast-track the ride to economic recovery. The governor made this known when he asserted that consolidating fiscal policy will entail a further aggressive stance in the second part of 2014 and that government ought to carry on revenue

enhancing measures and expenditure rationalization to achieve the 2014 fiscal deficit target of 8.5 percent of GDP (B&FT, 2014).

Successive governments in Ghana have over the years been trying to reduce fiscal deficit but each year actual fiscal deficit far exceed projected fiscal deficit, thus raising concerns. For instance in 2012 the projected fiscal deficit of 6.7 percent of GDP almost doubled to 12.1 percent at the end of 2012. This persistent increase in fiscal deficit might influence several major macroeconomic indicators in the Ghanaian economy. As such, the effects of fiscal deficit should be clarified in order to raise appropriate policy recommendations. It is generally agreed that cutting fiscal deficit will result in a fall in interest rates but its real effects on exchange rate and inflation is not clear cut.

Some participants at the August 1995 Jackson Hole symposium on "Budget Deficits and Debt: Issues and Options" argued that exchange rate would be strengthened by deficit reduction, while others argued it would be weakened. Unfortunately the evidence available in the literature for both type of arguments do not readily resolve the debate. In the early 1980s, increasing fiscal deficit in USA and Germany led to the appreciation of the domestic currencies while in the 1990s increasing fiscal deficit in Italy, Finland and Sweden led to depreciation of the domestic currencies.

Also, Buiter (1985) argued that, the fear that the fiscal deficit will eventually be monetized and thus lead to inflation is a deep rooted one among economic agents. Often, the recurring question by most economists is whether larger fiscal deficits are always associated with higher inflation. Sargent and Wallace (1981) answered the question affirmatively by arguing that fiscally dominant governments running persistent deficits have sooner or later to finance those deficits with money creation (seigniorage), thus producing inflation but their answer is blurred, because governments

finance deficits by borrowing domestic and abroad as well as printing money. With this concern, it is significant to find the factors that determine fiscal deficit in the Ghanaian economy and investigate its effect on exchange rate and inflation in Ghana.

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1.2 Statement of the Problem

Historically, the economy of Ghana is bedeviled with huge fiscal deficits. Nevertheless, in the past decade especially after 2010 (the year Ghana became an oil exporting country), the trend in fiscal deficit has been widening which hit a high value of 12.1% of GDP in 2012. This high record of fiscal deficit and the increasing foreign debt buildup have raised concerns regarding the extent to which it poses serious risks for the economy. The level of fiscal deficits as well as its repercussions has been the most debated issue in recent times because Ghana is now an oil producing country.

After decades of economic reforms, Ghana signed onto the Highly Indebted Poor Country (HIPC) initiative in the early 200s with the objective of reducing the external debt of the country. The HIPC initiative undoubtedly helped reduce the total size of fiscal deficit (cash basis) which was 9.81 percent of GDP in 2000 to 2.96 percent of GDP in 2005. Likewise, the public debt stock dropped from 187.3% of GDP in 2000 to 26.2% of GDP in 2006 (Asiamah et al., 2014).
However, subsequent happenings from 2006 have exposed the inherent structural weakness in Ghana's fiscal policy system. From a three-decade low level of 26.2% of GDP in 2006, public debt to GDP ratio in Ghana increased to 65.3% at March ending 2015, with 5.3% above the IMF's critical threshold for debt of 60% of GDP (Bank of Ghana, 2015).

From the discussion above it could be seen that fiscal deficits still persists in Ghana despite the potentials of the Ghanaian economy and efforts made to reduce the country's public debt. As to what really causes this widening fiscal deficit in the Ghanaian economy and its subsequent impact

on Ghana's economy has not been dealt with in the literature. Also, exchange rate and inflation are the most widely debated macroeconomic issues in Ghana hence the focus on these two macroeconomic variables. However, the effects of fiscal deficit on exchange rate and inflation is not certain in the literature both theoretically and empirically hence the need to investigate the effects of fiscal deficit on exchange rate and inflation.

Previous studies on fiscal deficit in Ghana focused on budget deficit sustainability (Doh-Nani, 2011; Asiama et al., 2014); none examined fiscal deficit and its effects on exchange rate and inflation in Ghana. Obviously, no study was found that analyses fiscal deficit in Ghana. This means that there have been limited academic discussions on the possible causes of fiscal deficit and its effects on exchange rate and inflation in Ghana. Hence, it is against this backdrop that this study proposes to fill the knowledge gap by providing an analysis of fiscal deficit in Ghana. Therefore, this study is an effort to find out the economic and non-economic factors responsible for Ghana's fiscal deficit and investigate the effects of fiscal deficits on exchange rate and inflation in Ghana.

1.3 Objectives of the Study

The main objective of this study is to analyze fiscal deficits and its effects on exchange rate and inflation in Ghana.

Specifically, the study will

1. Examine the trends in fiscal deficit, government revenue and government expenditure in Ghana.
2. Identify the factors determining fiscal deficit in Ghana.
3. Investigate the effects of fiscal deficits on exchange rate and inflation in Ghana.

1.4 Research Questions

1. What are the trends in fiscal deficit, government revenue and government expenditure in

Ghana?

2. What are the factors determining fiscal deficit in Ghana?
3. What are the effects of fiscal deficit on exchange rate and inflation in Ghana?

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1.5 Justification

Fiscal deficit is an area in modern economics which is of great concern to institutions like the Ministry of Finance, the Bank of Ghana, International Monetary Fund (IMF) and World Bank etc. The analysis of fiscal deficits and its effects on exchange rate and inflation will contribute to better understanding of the economic structure of Ghana. The following argument justifies the purpose of the study.

It is anticipated that the study determine the extent to which both economic and non-economic factors influence fiscal deficit in Ghana. This will reveal whether Ghana's fiscal deficit is solely dependent on economic factors or non-economic factors or both. In this case, we can also make use of the analysis of the effects of fiscal deficit on exchange rate and inflation to predict the trends and trajectory of fiscal deficit in Ghana. Also, investors and other stakeholders in the economy such as multinational corporations that rely mostly on fiscal deficit as a determinant of foreign direct investment (FDI) will benefit from the information that will be revealed in this work. This will aid their decision in making investment choices to ensure the safety of their investment which may be affected without proper understanding of the fiscal deficit situation.

Furthermore, the study is expected to offer a basis for policy discussions on prospective economic reforms in managing the factors responsible for Ghana's fiscal deficit. Also, the study is expected to provide recommendations to guide policy-makers in formulating policies directed at efficient allocation of resources since the responsiveness of economic and non-economic factors to fiscal

deficit changes is important to policy makers. The research is expected to reveal the malaise in Ghana's fiscal deficit and eventually presents a study capable of making contribution to economic policy.

Again, much research has not been carried out in the area of fiscal deficit and its effects on exchange rate and inflation in Ghana. Equally this work could set off the mark for further research into the determinants of fiscal deficit and bring to light other factors that may be in play. This will contribute to the stock of literature and policy issues relating to fiscal deficit in Ghana, in particular. This study is therefore relevant since Ghana's fiscal deficit and debt have been rising rapidly. The study appropriately, serves as added supplement for researchers to investigate actions taken by government to manage the factors responsible for the fiscal deficit in Ghana.

1.6 Scope of the Study

The study is conducted in Ghana. The context of the study is fiscal deficit and its effects on exchange rate and inflation in Ghana over a thirty-four year period from 1980 to 2013. It emphasizes on determinants of fiscal deficit and the effects of fiscal deficit on exchange rate and inflation in Ghana. The sample period is chosen because of availability of data.

1.7 Organization of the Study

This study is divided into five main chapters. The rest of the chapters are covered as follows. The second chapter shows literature review relevant to the subject matter. It deals with both theoretical and empirical literature. Chapter three looks at the method of study. It includes model specification and analytical procedure. The fourth chapter discusses the estimated results while the final chapter summarizes and concludes the study. Recommendation for policy making is also highlighted in the final chapter

CHAPTER TWO

LITERATURE REVIEW

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2.1 Introduction

This chapter seeks to explore and present relevant literature on fiscal deficits. Because the scope of this study is to analyze fiscal deficits and its effects on exchange rate and inflation in Ghana, the review of literature which forms the substance of this chapter have been purposely restricted to cover those publications that are relevant to the various facets of this study. The purpose of this chapter is to establish the foundation for the study and identify a framework within which secondary data would be contextualized. Issues identified and discussed are categorized into two parts; theoretical and empirical. In both parts, the review is sub-divided into determinants of fiscal deficits and the effects of fiscal deficit on exchange rate and inflation in Ghana.

2.2 Theoretical Review of the Determinants of Fiscal Deficits

This section considers the review of basic theories on the determinants of fiscal deficit. It begins with the review of the tax smoothing theory and the phenomenon of tax competition, followed by the theory of government as a "Leviathan", the political theory of government debt and the model of redistribution and finally debt as a strategic theory of government deficit.

2.2.1 Tax Smoothing Theory and the Phenomenon of Tax Competition

Barro (1979) in his paper "On the Determination of Public Debt" offers an explanation for the creation of public debts. His model was later known as the equilibrium approach to fiscal policy or the popular 'Tax Smoothing Theory'. The tax smoothing model of government debt is a normative benchmark from which political economy models of budget deficit diverge (Lucas and

Stokey, 1983 and Alesina and Perotti, 1997).

Barro's standard tax smoothing theory argument notes that the government, who is a "benevolent social planner" maximizes the utility of the representative agent (citizen), whereby certain amount of spending in every period is financed through taxes on labour income. Barro explains public debt in terms of the utility maximizing choice of a representative agent where the government is faced with exogenous shocks (usually described as wars or recessions) to planned spending or expected revenues.

Barro (1979) argues that the aim of the government is to keep the tax rate constant. He further stressed that if we vary tax rates in response to shocks to sustain a balanced budget, then the extra burden of taxation would be larger than it would be if taxation were held constant at the level which produced long-term budget balance. According to this tax-smoothing explanation, public debt smooths shock-induced variations in tax rates, and thereby minimizes the excess burden associated with taxation.

Barro (1979) notes that when the government's aim is to maintain a constant tax rate, intertemporal budget constraints determines the level of taxes implying that the present value of government expenditure has to be equal to the present value of tax revenues. When public deficits result in an increase in the debt, the agents (citizens) know that the government will need to raise taxes. Making an inference from the "theory of permanent income", each agent (citizen) determines his level of consumption according to the present value of his future income, it is equivalent to finance spending by taxation. Taxes are distortionary because they affect the supply of labour. Therefore, given the distortionary effects of taxation, the optimum strategy of the government is to use fiscal surpluses and deficits to smooth the economy, assuming a definite spending path: deficits occur when spending is temporarily high and a surplus when spending is low. Hence according to the

model, budget deficits follows economic cycles: low in periods of economic growth, high in periods of recession.

According to Alesina and Perotti (1997), notwithstanding its validity as a normative theory, the tax-smoothing theory is deficient as a positive theory of fiscal deficit. In fact, this explanation does not answer the questions of why there has been a debt accumulation in the past years. Positive contributions have searched for political and institutional determinants of deficits and public debts. Also, an earlier work by Alesina and Tabellini (1990) looks at the phenomenon of tax competition in which increasing taxes excessively by the government is prevented because it could lead to capital flight and eventually diminish the overall welfare of the economy.

2.2.2 The Theory of Government as a "Leviathan"

In the language of Brennan and Buchanan (1980) as pertained in their theory of government as a "leviathan", the government attempts to collect an additional rent from the citizens by increasing tax revenues and fiscal deficits in excess of what would be needed to finance the provision of public goods. Buchanan and Brennan (1980) hold the view that the only truly effective constraints on government in the long run are contained in constitutional rules that limit government's power to tax, issue debt and print money. However, they argued that political competition is not an effective constraint on government owing to the rational ignorance of voters, the uncertainties inherent in majority rule cycling and outright collusion among elected officials making the government able to extract this extra rent from the citizens. Accordingly, Brennan and Buchanan (1980) argue that due to ineffective political competition, the "leviathan" theory holds that governments try to get control of as much of the economy as possible.

Notwithstanding their argument, the "leviathan" theory is not consistent with the early decades of stable government spending.

An argument to support the theory of government as a "leviathan" is evident in an earlier work by Wagner (1882). Wagner (1882) argue that due to the direct relationship between public expenditure and the level of economic growth, the proportion between the amount of total spending and income grows in relative and absolute terms. Wagner (1882) stated that the increase in public expenditure is attributed to three (3) factors. Firstly, as a result of a rise in population density and urbanization, the fundamental function of the state is augmented thereby leading to increase in public expenditures. Secondly, the increasing role of the state as a provider of social welfare particularly education, health and the redistribution of income lead to increase in public debts and deficits. And lastly, change in technology and the needed scale of capital for investment activity as well as the increasing participation of the state in production and regulation sectors also serves to increase public expenditures.

2.2.3 Political Theory of Government Debt and the Model of Redistribution

The inter-temporal form of fiscal decisions creates links across generations. If every generation cares enough about its offspring, the finite horizon of each generation is immaterial. However, redistributive models emphasize the fact that public debt can redistribute the tax burden across generations. This behavior is hindered by intergeneration altruism: present generation care about future generations (Pinho, 2004).

Cukierman and Meltzer (1989) developed a theory of budget deficits that focused on the intergenerational redistributive aspect of government debt. The theory assumes that in the present generation there are poor and rich parents. To rich parents debt policy is indifferent because they leave a positive bequest to the future generation which can compensate any change in present taxes and deficits through adjustments in their bequests. Poor parents would like to run government deficits thereby borrowing from future generations. Therefore, rich parents are indifferent to public

debt while poor ones favor public debt. Usually, because society is mostly made up of poor people, the resultant social choice will likely lead to debt. These poor individuals will advocate for present tax reduction without an accompanying decrease in present government expenditures. Hence, in a democratic political system, the greater the share of poor people (bequest constrained individuals) in the population, the more likely it is for the government to run higher deficits.

2.2.4 Debt as a Strategic Theory of Government Deficit

In this model, debt is used as a strategic variable. The idea is that current policy maker can influence the economic conditions that his successors will inherit through his choice of fiscal policy. It is argued that, if the government foresees a possibility of loss in the coming election, it can strategically influence the policy of its successor through debt. Thus, in a political game between current and future governments debt is a commitment device where future tax revenues are committed to debt service.

When various governments take advantage of this strategic possibility at different times as a political game it lead to an accumulation of the debt level above the optimal level prescribed by the tax-smoothing theory. Petersson (2001) makes a clear cut distinction of the two different approaches, which stress on strategic considerations in making debt policy. The first one was developed by Alesina and Tabellini (1989) and the second one by Persson and Svenson (1989) in which governments with different preferences alternate in office in both contributions.

Firstly, Alesina and Tabellini (1989) developed the positive theory of government deficit which is based on the assumption of a two-party system where the two parties diverge regarding their preferences about government spending composition. Alesina and Tabellini (1989) emphasized that each government strategically use public debt to influence the choice of its successors.

Hence, the time path of public debt is the outcome of the strategic interaction of different governments which are in office at different periods resulting in differing fiscal policies. The theory indicates that the equilibrium stock of public debt tends to be larger than with a benevolent social planner as in the case of the tax-smoothing theory who is certain of his future reappointment. The intuition is that, disparity among interchanging governments and uncertainty about the current or future election's result prevent the party in office from fully internalizing the cost of leaving debt to its successors.

In a more generalized term, to explain the variations in debt policies pursued by different or by the same nation at different periods, the theory attribute this to differences in political institutions. Accordingly, the model concluded that the equilibrium level of public debt tends to be higher with increased degree of polarization between interchanging governments, a greater probability that the present government will not be re-elected and when the government faces constraints in providing at least a minimum level of each type of public good.

Persson and Svenson (1989) questioned the level of government spending. They considered a left-wing government and a liberal or conservative government. The conservative government desires lower amount of spending than the liberal government. Persson and Svenson (1989) argue that strategic deficits are used by present governments to constraint the spending decisions of possible successors. Lizzeri (1999) also maintains that strategic deficits are aimed at voters to secure electoral victory in elections or future elections which is consistent with the earlier work by Persson and Svenson (1989). Persson and Svenson (1989) in their paper "Why a Stubborn Conservative Government would run a Deficit" concluded that this present an appealing idea of a stubborn conservative government which leaves huge deficits to constrain the liberal successor's public spending.

2.3 Theoretical Review of the Effects of Fiscal Deficit on the Macroeconomy

Bernheim (1989) argues that, there are three paradigms regarding the economic effects of fiscal deficits in general: Neoclassical, Ricardian and Keynesian. Tas (1992) and Feldstein (2004) both agree with the classifications made by Bernheim regarding the economic effects of fiscal deficits. Although Tas (1992) introduced an additional theoretical view concerning the economic effects of fiscal deficits which is the "standard view", the study will only concentrate on the three paradigms. This is because the underlying assumptions and conclusions of the Standard View are consistent with the neoclassical paradigm. On the basis of these three authors the study classifies the economic effects of fiscal deficits in theory under three main paradigms namely;

i. The Neoclassical Paradigm

ii. The Keynesian paradigm iii.

The Ricardian Paradigm

2.3.1 The Neoclassical Paradigm

According to Bernheim (1989), the neoclassical model is predicated on three central features. First, the neoclassical paradigm assumes that every individual's consumption is determined as the solution to an inter-temporal optimization problem in which borrowing and lending roles are allowed at the interest rate in the market. Secondly, individuals have finite lifespans where every consumer is a member of a definite generation or cohort in which successive generations' lifespans overlap. Third, in all periods, it is generally assumed that there is market clearing.

Diamond (1965) made the first approach to formally study the effects of fiscal deficits within the context of neoclassical paradigm where he argued that a permanent rise in the national income to domestically held debt ratio reduces the steady-state ratio of capital to labour. He argues that

interest rate will rise because consumers are unwilling to hold the initial volume of physical capital and bonds including new bonds at the initial interest rate. To him, increasing interest rates stimulate additional saving and investment will fall until equilibrium in the capital market is reestablished. Diamond (1965) concluded that persistent government deficits crowd out private capital accumulation. Also, Auerbach and Kotlikoff (1986) in their more complex policy simulation analysis emphasize that the instantaneous effect of temporary fiscal deficit may be very small and possibly perverse. However, they were quick to add that the wealth impacts add up over time and every temporary deficit finally crowd out private capital formation.

Bernheim (1989) argue that the magnitude of fiscal deficits indicates a fall in savings by government and will have a detrimental effect on growth apart from putting pressure of interest rate. The overall saving rate will fall if the fall in government saving is not totally nullified by an increase in private saving. He further argued that in a full employment situation, the fall in national saving necessarily implies increased consumption in a closed economy. Investment and real interest may remain unaffected in an open economy; however huge external borrowing, appreciation of the local currency and reduction in exports are required to finance the reduction in national savings. In both circumstances net national saving drops and consumption increases.

The neoclassical paradigm concludes that deficit increase lifetime consumption by pushing taxes to the forthcoming generations. The neoclassical paradigm further stresses the empirical implications from Hayashi (1985) and Yotsuzuka (1986). If rational consumers are farsighted and have access to perfect markets, then permanent deficit significantly reduce capital accumulation while temporary deficit have either perverse or negligible effect on most macroeconomic variables including saving, rate of interest and consumption. The effect of permanent deficit does not change qualitatively if majority of consumers are myopic or liquidity constrained. The conclusion that a

permanent rise in the ratio of national income to debt reduces the accumulation of capital does not change. It is imperative to note that in the neoclassical paradigm the emphasis is not on temporary effects of fiscal deficit but on the permanent effects of fiscal deficit since the evidence that bears on the effects of temporary deficits is not useful for testing this paradigm.

2.3.2 The Keynesian Paradigm

In the usual Keynesian view, it is assumed that some resources are unemployed while a larger number of individuals are either myopic or liquidity constrained. According to Bernheim (1989), the second assumption assures that total consumption is very sensitive to variations in disposable income. He further stressed that this two central features is what distinguish the Keynesian school of thought from the neoclassical school of thought.

Eisner (1989) argues that when some resources are unemployed, output will expand through a multiplier process when the rise in autonomous government expenditure is financed by borrowing. However, Bernheim (1989) argues that in the simplest and most naïve Keynesian model, when fiscal deficit increases by US$1 output will grow by the inverse of MPS (marginal propensity to save). In the normal IS-LM framework of economics, this output growth increases money demand. If supply of money is fixed (ie the deficits is financed by bonds), the rate of interest need to increase and private investment drops. This consequently decreases output and partially nullifies the Keynesian multiplier effect.

Bernheim (1989) is of the view that most typical Keynesians argue that fiscal deficits does not necessarily crowd out private investment. Eisner (1989) submits that an increase in total demand improves the lucrativeness of private investments and results in increasing investment at any specified interest rate. Therefore, in spite of deficits raising interest rate, it may also stimulate total saving and investment.

The Keynesian school concludes that a major proportion of the population is thought of as myopic or liquidity constrained. Out of current disposable income, there is a very high propensity to consume for these people. There is an instantaneous and quantitatively important effect of a temporary tax reduction on total demand. If the resources in the economy are previously under-employed, national income increases leading to second round effects and the well-known Keynesian multiplier effect. Since deficits stimulate both national income and consumption, saving and capital accumulation need not be adversely affected. Thus, properly timed deficits have beneficial consequences (Eisner, 1989).

Generally speaking, there are three main protestations to the Keynesian view on fiscal deficits by most economists particularly neoclassicals. First, having recognized the importance of unemployed resources, the Keynesians have either still not reached a wholly acceptable theory that explains the presence of unemployment or the newly proposed more comprehensive Keynesians' unemployment theory is yet to be widely accepted. Thus, in the language of Bernheim (1989), Keynesian argument is an exercise in blind faith without a more comprehensive theory of unemployment.

Secondly, the Keynesian view on fiscal deficit presumes that the government can "fine tune" fiscal policy. If we accept that deficits stimulate total demand, then it follows that there are situations in which this stimulation may be harmful. Even the most committed Keynesian is ready to admit that, at full employment real deficits crowd out private investment and increase inflation rate (Bernheim, 1989). Current experience highlights the political realisms: deficits are difficult to be reduced once they are established. The idea that political structure can fine tune fiscal policy is farfetched because budget policy is determined by parliament (or congress in other jurisdiction) where the minority will have its say but the majority will always have its way.

Finally, the Keynesian paradigm predominantly describes the temporary effects of fiscal deficits. Certainly it is fundamentally compatible with the neoclassical view which mainly concerns the effects of permanent deficits. However, Bernheim (1989) argues that the Keynesians provide misleading advice to policy makers by failing to make a distinction between temporary and permanent deficits.

2.3.3 The Ricardian Paradigm

In the Ricardian paradigm, it is generally observed that deficits purely postpone taxes and that deficits are seen as neutral in terms of their effect on growth. The deficit incurred in the present period is precisely the same as the current value of future taxes that is needed to pay off the increase to debt which resulted from the deficit incurred. Intuitively, it means government expenditure must be paid for, either now or future and the current amount of spending must be the same as the current amount of tax and non-tax revenue (Barro, 1974, 1989).

The preceding argument so far indicates that the current amount of taxes would not change as long as the current amount of spending did not change. This implies that the substitution of fiscal deficit for present taxes has no effect on total demand for goods. In view of this, fiscal deficits and taxation have equivalent effects on the economy (thus, the Ricardian Equivalence theorem). (Barro, 1974, 1989) argues that such deficits have no effect on total demand if household expenditure decisions are based on the current value of their incomes that takes into consideration the current value of their liabilities in the future. This implies that, as a result of fiscal deficit, current government saving will fall but will be offset by a related rise in private saving that leaves national saving and for that matter investment unaffected. Hence, there are no impact on real rate of interest, investment and public debt. Also, in an open economy, fiscal deficits would not cause current account deficits since preferred private saving increases enough to avoid foreign borrowing.

The premise for the Ricardian equivalence theorem is that the economy is made up of foresighted people, discount rates are the same as the government's discount rate on expenditure and individuals have enormously long-time horizons to evaluate the current amount of future taxes. This made neoclassicals such as Bernheim to concede that the present discounted value of taxes depends only upon real government spending and not the timing of taxes. Bernheim (1989) emphasize that, this foresight gives rise to a "Say's law" for deficits: the demand for bonds always rises to match government borrowing. As a result, temporary or permanent deficits have no real effects because once the timing of taxation does not affect an individual's life time budget constraint; it cannot change his consumption decisions.

However, there have been several theoretical objections to the Ricardian equivalence theorem and for that matter the Ricardian conclusions. There is actually finite time horizon where individuals do not leave forever and therefore do not care about taxes charged after their death. Also, there is imperfect loan market in reality where loans between individuals with good access and individuals with bad access take place even in instances where such loans are not viable due to transaction costs. Again, people are not certain about future taxation and incomes which imply that fiscal deficits raises total consumer demand and decrease desired national saving (Eisner, 1989). There are several other limitations of the Ricardian equivalence (eg. See Tas, 1992). Bernheim (1989) reiterated that theoretical arguments accept the possibility of many individuals making altruistically inspired transfers. But, they do not suggest that the Ricardian view that assumes that nearly all individuals are parties to such transfer is highly incredible.

To conclude on the theoretical effects of fiscal deficits, Feldstein (2004) argue that individuals differ in their behavioral response in critical respects per these three alternative schools of thought. To him, the Keynesian world is occupied by myopic, liquidity constrained individuals who behave

under money illusion and have a high propensity to consume from current disposable income. The Ricardian view conceives individuals of the world as farsighted, fully informed and altruistic. The neoclassical paradigm conceive people as having wealth portfolios and farsighted enough to plan consumption over their life cycle. The effects of fiscal deficit on the macroeconomy are summarized and presented in table 2.1.

Table 2.1: Effects of Fiscal Deficit on the Macroeconomy and Salient Features of alternative Paradigms

	Neo-Classical	Ricardian	Keynesian
Consumers	Finite, life-time horizon	Infinite time perspective through altruistic transfers	Myopic, liquidity constrained
Employment of resources	Full employment	Full employment	Underemployment
Effect on private saving	Private saving falls	Private saving remains unaffected	Private saving rises
Effect on consumption	Aggregate demand increases	No effect	Aggregate demand increases
Effect on interest rate	Interest rate increases	No effect	Interest rate increases
Effect on investment	Investment falls because deficits crowd out private investment	No effect	Investment increase because deficits need not crowd out private investment

Contention	Fiscal deficits detrimental	Fiscal deficits irrelevant	Fiscal deficits beneficial

Source: Author's Compilation, 2016.

2.4 Empirical Review of the Determinants of Fiscal Deficit

As a result of the magnitude of the economic difficulties that bedeviled Africa, various governments resorted to policies to alleviate the citizenry from economic hardship. The resultant effect of this policy is the huge and persistent fiscal deficit facing Africa. The issue has been analyzed by Murwinrapachena et al. (2013). The objective was to empirically examine the economic causes of South Africa's budget deficit covering 1980-2010 using annual time series data. To determine the impacts of chosen variables on South Africa's budget deficits, they used Vector Error Correction Model (VECM) as the analytical method. The results revealed that the effect of unemployment, government investment, foreign reserves and economic growth on budget deficits is positive whereas that of foreign debt is negative. It can be deduced that South Africa's budget deficits to a larger extent is due to macroeconomic imbalances and problems like high foreign debt and reserves, high rates of unemployment and high government investment expenditures.

Kalim and Hassan (2013) examined the factors influencing fiscal deficit in Pakistan between 1976 and 2010 using fully modified OLS to estimate the long run coefficients. The findings show that broad money supply, international trade and total debt servicing all significantly influence fiscal deficit in both the long run and short run. However, economic growth was only significant in determining fiscal deficit in the short run in Pakistan.

Anwar and Ahmad (2012) analyzed the political determinants of budget deficit in Pakistan. Time series annual data from 1976 to 2009 was taken and ARDL technique was employed to investigate the equilibrium long run relation between budget deficit and cabinet size and democracy in Pakistan. The findings reviewed that large government (cabinet) size significantly adds to budget deficit. The result also showed that although democracy help to reduce budget deficit, its influence was weak. The study concluded that budget deficit in Pakistan is significantly influenced by political factors.

Agnello and Sousa (2009) assessed the economic, political and institutional causes of volatility in public deficit. A panel of 125 nations was pooled from 1980 to 2006 using a system-GMM estimator as the analytical method. The findings show that low democracy and high political instability is associated with public deficit volatility. The result further suggested that an extra change in cabinet increases volatility in deficit by 15%. In sum, this study suggests that institutional and political factors account for volatility in public deficit significantly.

Bayar and Smeets (2009) investigated the institutional, economic and political causes of budget deficit using an extended data set of EU countries spanning from 1971 to 2006. The relevant econometric method used to analyze the annual time-series data for the period under study was cross-section regression. The results show that higher GDP will minimize fiscal deficits as a result of an increase in tax revenue. It further reveals that high real interest rate causes huge fiscal deficit as a result of high cost of debt servicing, though its impact not strong. Change in unemployment is significantly related to budget deficits since it will increase government expenditure. The strongest of all the institutional factors used was the Maastricht Treaty. It was evident that there is a significant drop in deficits after signing the Maastricht Treaty for the EU countries observed.

Due to the opportunistic behavior of the government, the results further suggest more deficits in election years and low otherwise, ceteris paribus.

Pasten and Cover (2010) made a great effort to expose how public sector deficit is influenced by political factors. Annual time series data between 1832 and 2000 for Chile was taken using an inter-temporal model of public finance as the analytical method. It was evident that political instability can cause taxes to be tilted to the future and the result is fiscal deficit that is suboptimal. This happens in the sense that political instability gives the government a motivation to implement a myopic fiscal policy in order to raise its chances of being re-elected into office. The government does this by advancing expenditure or deferring taxes which in turn inflict a progressive trend in the deficit process as well as financial crisis.

Farajova (2011) look at the connection between budget deficit and macroeconomic essentials in Azerbaijan during 1992 to 2005. The study applied ARDL co-integration technique together with Granger causality test to show the short and long runs dynamics of the variables used in the analysis. In the long-run, the study found evidence that GDP, exchange rate, current account, inflation and real interest rate cause budget deficit. However, in the short-run, it was found that only real interest rate and current account strongly cause budget deficit while there is a minimal effect from inflation.

2.5 Empirical Review of the Effects of Fiscal Deficit on Macroeconomic Variables

Feldstein (2004) argues that, no clear consensus among economist has been reached theoretically or empirically if funding government expenditure by incurring deficit is beneficial, detrimental or neutral regarding its real effects. This section looks at the empirical review of the effects of fiscal deficit on exchange rate and inflation since that forms the focus of study's third objective.

2.5.1 Fiscal Deficit and Exchange Rate

Burney and Akhtar (1992) studied exchange rate determination and government budget deficit in Pakistan from 1972 to 1990. They aimed at analyzing the impact of budget deficit on exchange rate. Using regression analysis, the study reported that government budget deficit affected real exchange rate directly and indirectly via price level in Pakistan.

In more recent years, khan et al. (2002) analyzed the relationship between budgetary deficits and exchange rate in Pakistan. Their purpose was to examine the correlation between budget deficit and exchange rate in floating exchange rate regime with data from 1982 to 1998. They used regression analysis and found out that the estimated regression coefficient indicates direct and indirect impact of budget deficit on exchange which confirms the earlier work by Burney and Akhtar (1992).

Gulcan and Bilman (2005) also studied exchange rate budget deficit relationship in Turkey. Their aim was to examine the impact of budget deficit reduction on exchange rate between the Turkish lira and the United States dollars. They employed co-integration method and causality test to investigate the likely impact of reduction in budget deficit on exchange rate during 19602003 in Turkey. It was evident that in the long run, a 1 percent increase in budget deficit as a share of GDP will cause exchange rate to rise by 288.023 points implying a direct relationship between budget deficit and exchange rate in Turkey.

Korsu (2009) examines how the external sector of Sierra Leone is affected by fiscal deficit. Applying Three Stages Least Squares (3SLS), he used annual data between 1971 and 2005 to perform counterfactual policy simulation. The result shows that sustaining budget deficit reduction is a requirement to attaining monetary restraint which has real exchange rate depreciation as ultimate external sector benefits.

Phouthanouphet and Phouuphet (2013) studied the relationship between fiscal deficits and exchange rate. Their purpose was to investigate the dynamic association between real exchange rate and budget deficit in Lao Peoples Democratic Republic (PDR) from 1980 to 2010. They applied ARDL co-integration technique together with VAR analysis to give proof for the short run and long run dynamics between fiscal deficits and real exchange rate. They found no long run relation between real exchange rate and budget deficit in the case of Laos.

2.5.2 Fiscal Deficit and Inflation

Terrones and Catao (2005) analysed the relation between inflation and fiscal deficit. They employed panel techniques for 107 countries over 1960-2001 using ARDL and found out a strong direct relation between inflation and fiscal deficit in developing and high-inflation group of nations but not in developed and low-inflation economies.

Khundrakpam and Pattanaik (2010) assessed fiscal deficit-inflation nexus in India for the period 1953-2009. They used annual time series data and employed the Unrestricted Error Correction Model (UECM) as analytical method. It was evident that a 1% increase in fiscal deficit is associated with a 0.6% increase in inflation (WPI). They further argued that fiscal deficit can lead to inflation either directly or indirectly. According to them, fiscal deficit directly lead to inflation by raising aggregate demand thereby causing demand pull inflation or indirectly through money creation. With the money creation, when the supply of money increase and is not associated by an increase in output then there could be inflation which confirms the monetarists' argument that inflation is a monetary phenomenon.

Ekanayake (2012) studied the connection between inflation and fiscal deficit. Their objective was to test the hypothesis of no relation between inflation and fiscal deficit in LDCs with emphasis on Sri Lanka. An Autoregressive Distributed Lag (ARDL) technique was used to analyse the 1959-

2008 annual time series data. The findings revealed that a 1% rise in the proportion of fiscal deficit to narrow money will lead to 11% rise in inflation. It was further evident that the inflation-fiscal deficit link tends to be weaker when there is no public sector wage.

Odim et al. (2014) investigated the causality between fiscal deficit and inflation in Nigeria between 1970 and 2010. They used regression and granger causality method of analysis by making use of annual data for the sample under consideration. It was evident that fiscal deficit causes inflation. Also, it takes almost two years for the effect of fiscal deficit on inflation to be felt from the estimated structural model of inflation in Nigeria.

Solomon and Wet (2004) examined the inflation-deficit nexus in Tanzanian. They sampled 1967-2001 time series data using cointegration procedure as the analytical technique. They established significant inflationary effects for increases in the budget deficit due to monetization of the budget deficit.

2.6 Conclusion

In a nutshell, this chapter has reviewed relevant literature on fiscal deficits both theoretically and empirically. This review has focused to a great extent on determinants of fiscal deficits and the effects of fiscal deficit on macroeconomic variables (exchange rate and inflation). This is because these have proved to be most important in explaining the broad pattern of the factors influencing fiscal deficit and its effect on exchange rate and inflation especially with a single country or group of countries of which Ghana is no exception. In the review, it was evident that a large number of works have been done on determinants of fiscal deficits and the effects of fiscal deficit. However, it is clear there is not much works in Africa and in particular Ghana.

In one side of the review, many economic and non-economic factors have been identified as determining fiscal deficits. The economic factors include, total debt servicing, international trade, GDP, broad money supply, interest rate, international trade and unemployment among others while the non-economic factors are either political or institutional. Democracy, cabinet size, election and political instability are some of the political determinants of fiscal deficit identified in the literature. On the other side, the effects of fiscal deficit can be looked at from the Neoclassical, Keynesian and Ricardian perspective theoretically. Empirically, it is evident that fiscal deficit affects the macroeconomy through exchange rate and inflation.

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CHAPTER THREE

RESEARCH METHODOLOGY

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3.1 Introduction

Chapter three describes the econometric methods employed to test the research hypotheses of this study stated in chapter one. The chapter begins with type and sources of data, theoretical framework, specifications of the models used, definition of variables and their measurement. Also, the estimation techniques used are dealt with at the later part of this chapter.

3.2 Type and Sources of Data

The data for this work is time series annual data on fiscal deficit of the Ghanaian economy over the period 1980 to 2013. Annual data from 1980 to 2013 are used largely due to the issue of availability of data. The 34 years secondary data is sourced from the World Bank, Bank of Ghana and the International Monetary Fund (IMF). The IMF data are taken from its annual publication series – International Financial Statistics Yearbook, whilst the data from the World Bank are taken from its annual publication – African Development Indicators. Specifically, gross domestic product (GDP), international trade, total debt servicing, government consumption expenditure, external debt stock, fiscal deficit and exchange rate data are taken from the World Bank while government revenue and expenditure, inflation and exchange rate are taking from the IMF. Also, broad money supply data is taking from Bank of Ghana.

3.3 Econometric Methodology

3.3.1 Theoretical Framework

The model adapted for the study is specified based on Baro's (1979) "tax-smoothing" theory.

The theory notes that the government who is a "benevolent social planner" maximizes the utility of the citizenry, whereby certain amount of spending in every period is financed through taxes on labour income. The theory stresses that public debt and for that matter fiscal deficit cushions shock-induced discrepancies in tax rates thereby minimizing the extra cost accompanying taxation. Intuitively, Barro's tax-smoothing theory explains that what causes fiscal deficit is the desire of the government in power to lessen distortions related to increasing taxes.

The starting point is the following budget constraint picked from Gosh (1995) who used Baro's (1979) tax-smoothing model to derive the optimal path of taxes (i.e. fiscal deficit) given the path of a benevolent government's spending for our purpose. During any period t, the government chooses a tax path that minimizes the present value of the distortionary cost of taxes:

$$C_t = \frac{1}{2}\sum_{s=t} E(\tau_s^2 I_t), \quad 0 < \beta < 1. \qquad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

From equation (1), the distortionary cost of non-lump sum taxes during any period *s* is proportional to the square of the average tax rate during the period, τ_s defined to be total collection of taxes divided by GDP (See also Bohn (2005) and Pasten and Cover (2010)). Also, *E* is the expectation operator, I_t is the information set available to the government during period *t*, and β is the government's subjective discount factor. It is assumed that the government minimizes equation (1) subject to its dynamic budget constraint:

$$D_{t+1} = D_t + r D. \quad _t(G_t - \tau_t . Y_t) \qquad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where D_t is the stock of government debt at the beginning of period t, G_t is the exogenous level of government expenditures (net of interest) in period t, Y_t is output during period t, and r is the constant real interest rate. The left hand side of equation (2) defines the fiscal deficit (FD_t) and can be iterated forward to yield:

$$\frac{1}{(1+r)_{s=t}} Y_s - (1+r) D_{t-1} = \sum_{s=t} \frac{1}{(1+r)_{s=t}} G_s + \lim_{s\to\infty} \frac{1}{(1+r)_{s=t}} D_{s-1} \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

After dividing each variable in equation (3) by Y_t and assuming output grows at a constant rate n allows the intertemporal budget constraint (IBC) to be written as:

$$R^{s-t} - (1+d)_{t-1} = \sum_{s=t} R^{s-t} g_s + \lim_{s\to\infty} R^{s-t} d_s \quad \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Where lower-case letters represent the corresponding variables now expressed as a share of output, and $R = (1 + n)/(1 + r) < 1$ is the effective discount factor. Applying a similar normalization to the one period budget constraint in equation (2) yields:

$$(1+n)\, d_{t-1} - (1+n)\, d_t = g_t - t \quad \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

In finance literature, it is common to interpret a non-zero value for the limit term in equation (4) as a bubble. Hence, for many authors (e.g. Trehan and Walsh, 1988, 1991; Cashin et al., 1998; Hakkio and Rush, 1991; Hamilton and Flavin, 1986; Quintos, 1995) a non-zero value for $\lim_{s\to\infty} R^s$

$_{t\square}$ indicates that the process generating d_t is non-sustainable. Otherwise, $\lim R\ d^{s\ t\square}{}_{s}\ \square 0$

……. (6) $_{s\square\square}$

Minimizing (1) subject to (5) and (6) yields the optimal tax rate for each period:

$$\square\square_t \square[(r\ n\ d\ g\square\ )_{\ t}\ \square\ _t)] \quad \text{……. (7)}$$

Where $g_t \square\ \square(1\ R)\square R\ E\ g^{s\ t\square}{}_{t}(\ )_s$ is the permanent value of government spending and when $\gamma = 1$, $_{s\ t\square}$

the government is following the tax-smoothing model and (to use the terminology of Ghosh (1995) and Cashin et al. (1999)) the resulting fiscal deficit is called the tax-smoothing component of the fiscal deficit.

With the tax-smoothing theory, it has been noted that governments normally run deficits during recessions and wars where national income is low when there is recession or government purchases are high when there is war. In this case, the government discounts the future at a relatively high rate, where taxes are tilted toward the future because the government must increase taxes over time in order to service its accumulating debt. Equation (7) implies that the tax-smoothing component of the deficit can be defined as:

$$FD\ g_{t}\ \square\ \square\ \square_{t^{r}\square^{\square 1}{}_{t}} \quad \text{…… (8)}$$

Where FD_t is the tax-smoothing component of the deficit and $g_t^r \square\ \square(r\ n\ d)_{\ t}\square g_t$ represents public spending inclusive of interest.

Lucas and Stokey (1983) and Alesina and Perotti (1997) argue that, the tax-smoothing model of government debt is a normative benchmark from which political models of budget deficit diverges. The model has been used to investigate the determinants of fiscal deficit in many studies (Bohn (2005) and Pasten and Cover (2010)).

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3.3.2 Model Specification

The study employed the model used by Kalim and Hassan (2013) to investigate the important factors influencing fiscal deficit using fully modified OLS model in Pakistan for the period 1976-2010. They modeled fiscal deficit as a function of selected economic variables as follows:

$$FD_t = f(TGDS, M, \varepsilon_t, \varepsilon_t) \quad \ldots\ldots\ldots\ldots (9)$$

Where FD, T, G, DS and M, , , represent fiscal deficit, international trade, GDP, total debt servicing and broad money supply respectively.

In major part of existing relevant literature, fiscal deficit is seen to be influenced by economic growth, unemployment, government investment, international trade, total debt servicing, political instability, democracy, real interest rate and broad money supply among others (see e.g. Murwinrapachena et al., 2013, Kalima and Hassan, 2013, Agnello and Sousa, 2009, Farajova, 2011). The premise of the tax-smoothing theory in explaining the causes of fiscal deficit is tax revenue and consumption expenditure. Therefore, following the model used by Kalim and Hassan (2013) after some modifications to suite the Ghanaian economic environment and based on the tax-smoothing theory as well as taking Ghana's democratic dispensation into consideration, the study models fiscal deficit as a function of selected economic and political variables as follows:

$$FD_t = f(GDP, TDS, TRA, BMS, TGR, GCE, DEM) \quad \ldots\ldots\ldots (10)$$

The explanatory variables are converted to natural logs. However, *FD* and *DEM* are not changed to logs since *FD*and *DEM* data contain negative and zero figures respectively. From equation (10), the operational model for fiscal deficit becomes estimable in a semi-log form as follows:

$$FD_t = \alpha_0 + \alpha_1 \ln GDP_t + \alpha_2 \ln TDS_t + \alpha_3 \ln TRA_t + \alpha_4 \ln BMS_t + \alpha_5 \ln TGR_t + \alpha_6 GCE + \alpha_7 DEM_t + \varepsilon_t \quad \ldots\ldots\ldots\ldots (11)$$

Where

FD = Fiscal deficit as a percentage of GDP

GDP= Real per capita GDP

TDS = Total debt servicing as a percentage of GDP

TRA = International trade as a percentage of GDP

BMS = Broad money supply as a percentage of GDP

TGR = Total government revenue as a percentage of GDP

GCE = Government consumption expenditure as a percentage of GDP

DEM = Dummy of democracy as a measure of democracy

ε_t = The error term

To investigate the effects of fiscal deficit on exchange rate and inflation in Ghana, the study tested the second hypothesis by modeling exchange rate and inflation as functions of fiscal deficit and other selected variables that influence exchange rate and inflation respectively as follows:

$$EXCH_t = f(FD, INF, INT, EDS, \varepsilon_t, \ldots) \quad \ldots\ldots\ldots\ldots (12)$$

$$INF = f(FD_t, BMS_t, INT, EXCH, EDS_t, \varepsilon_t, \ldots) \quad \ldots\ldots\ldots\ldots (13)$$

Where *EXCH* , *INF* , *INT* and *EDS* denote exchange rate, inflation, interest rate and external debt stock respectively. All other variables maintain their previous descriptions.

Equations (12) and (13) are estimated in log forms as follows:

$$\ln EXCH_t = \alpha_0 + \alpha_1 FD_t + \alpha_2 \ln INF_t + \alpha_3 \ln INT_t + \alpha_4 \ln EDS_t + \varepsilon_t \quad \ldots\ldots\ldots (14)$$

$$\ln INF_t = \beta_0 + \beta_1 FD_t + \beta_2 BMS_t + \beta_3 \ln INT_t + \beta_4 EXCH_t + \beta_5 \ln EDS_t + \varepsilon_t \quad \ldots\ldots\ldots (15)$$

Therefore equations (11), (14) and (15) become the empirical model specifications for this study where equation (11) concerns the determinants of fiscal deficits, equation (14) looks at the effects of fiscal deficit on exchange rate and equation (15) considers the effects of fiscal deficit on inflation.

3.3.3 Definition and a priori Expectation of Variables in the model

3.3.3.1 Variables in the model for the determinants of fiscal deficit

- **Real per capita GDP (GDP)**

Real per capita GDP is obtained by dividing real GDP by population and in this study real per capita GDP is a proxy for economic growth. GDP is the total amount of goods and services produced within the boundaries of an economy over a specific time period measured in market prices. When the value of GDP is adjusted for price changes (inflation or deflation), then we have real GDP which is also known as "inflation-corrected" GDP. The study expects fiscal deficit to decrease with increasing real GDP per capita.

- **Total Debt Servicing (TDS)**

Total debt servicing looks at the annual debt amortization of the country. That is, how much the country pays annually to its creditors. In this study total debt servicing is attained by taking the ratio of total debt servicing to real GDP. Total debt servicing indicates that if Ghana is heavily amortizing its debt along with interest then the Ghanaian government has limited amounts available with it in order to invest in social sector development and infrastructure as well as dealing with real macro-economic problems like unemployment, inflation, low rate of economic growth and trade imbalance etc. The study expects fiscal deficit to increase with increasing total debt servicing.

- **International Trade as a share of GDP (TRA)**

In this study, trade as a share of GDP is measured by expressing the value of trade as a ratio of real GDP. International trade is considered as the difference between imports and exports. Conventionally, trade as a share of GDP should influence fiscal deficit negatively where the country's exports are greater than its imports. Notwithstanding this, the study expects fiscal deficits in Ghana to increase when trade as a share of GDP increases thereby contradicting the conventional wisdom. The rationale for this a priori expectation is that over the years Ghana's trade balance have remained negative where her imports always exceeds her exports (Quartey,

2010). As a result, the low foreign exchange earnings are unable to contribute significantly to government revenue and at the same time, government must commit itself to making payments against the high imports which ultimately put pressure on government expenditure.

- **Broad Money Supply (BMS)**

Broad money supply as a percentage of GDP is considered a determinant of fiscal deficit in Ghana. This is achieved by dividing M2+ by the real GDP and used as proxy for supply of money. M2+ is made up of the totality of currency outside banks, demand deposits excluding those of the central government, bank and traveler's cheques and other securities such as certificates of deposit and commercial paper. Nnanna (2006) argues that the proportion of broad money supply to GDP is usually utilized as a measure of financial repression (financial sector deepening). Therefore, the measure of financial repression measures the increased provision of financial services to the financial sector based on the liquidity of money. A higher ratio indicates a highly developed financial sector while a lower ratio is an indication of a backward financial sector. The study anticipates that broad money supply as a share of GDP will reduce Ghana's fiscal deficit when the government have more credit to finance its deficit due to increase in money supply. Also, the study expects broad money supply to influence inflation positively since

Friedman argues that inflation is always and everywhere a monetary phenomenon.

- **Total Government Revenue (TGR)**

Total general government revenue is taken as a proxy for total government revenue. Total general government revenue is seen as the state or local government tax revenues, other ordinary fiscal revenue and funds from public borrowing. The study makes use of total government revenue as a percentage of GDP by dividing total general government revenue by GDP. The study anticipates decreasing fiscal deficit to be associated with increasing total general government revenue. This

is because as government revenue increases, all other things being equal there will be enough funds to finance government expenditure thereby leading to a fall in
fiscal deficit.

- **Government Consumption Expenditure (GCE)**

General government consumption expenditure is taken as a proxy for government consumption expenditure. General government consumption expenditure includes all government expenditures for the purchases of goods and services that include compensation for employees.

National defense and security expenditures are included in general government consumption expenditure but government military expenditures are not included. The study makes use of government consumption expenditure as a percentage of GDP by dividing government consumption expenditure by GDP. The study expects government consumption expenditure to affect fiscal deficit positively since an increase in government consumption expenditure will worsen fiscal deficit given the limited revenue of the government.

- **Democracy (DEM)**

Democratic rule is a period where the government in power is elected by the people through a general election in which there is freedom of expression, movement, association, right to vote, right to live, minority and civil society groups acting as gate keepers of the economy etc. This period promotes favorable investment climate since there is stability in the socio-political environment. On the hand, autocratic rule is a period characterized by military regime in which both civil and political liberties of the people are taken away. Due to its dictatorship everyone must conform to the will of the ruling government in which there is no room for objecting the government in power (Amengor, 2012). The study used dummy as a measure of democracy where

1 refer to democracy and 0 refer to autocracy. The coefficient of democracy variable in the model is expected to be negative.

3.3.3.2 Variables in the models for the effects of fiscal deficit

- **Exchange Rate (EXCH)**

Real exchange rate is nominal exchange rate adjusted by price change differential between home country and the rest of the world. That is real exchange rate is the rate at which goods between the home country and the rest of the world are traded. Exchange rates are important for 2 main reasons; first, it can be used as an indicator of competitiveness in the foreign trade of the country and second, it determines the real cost of imports and exports. In this study, exchange rate is taken as the local currency (Ghana cedis (GH¢)) per unit of the United States of America dollars (US $). The study expects fiscal deficit to affect real exchange rate negatively. Also, the study anticipates exchange rate to affect inflation positively.

- **Inflation (INF)**

Inflation is the persistent rise in the general price level of goods and services or the reduction in the purchasing power per unit of money; measured by the CPI (Consumer Price Index) reflecting the annual percentage variation in the cost to the average consumer of purchasing a fixed basket of goods and services that may be fixed or changed at specified intervals, such as yearly. According to Friedman, inflation is always and everywhere a monetary phenomenon. In this regard, if government decides to finance the deficit with seignorage revenue there is a high probability of leading to inflation.

However, Sargent and Wallace (1981) argue that the correlation between inflation and fiscal deficit is dynamic. In the case of fiscal dominance, fiscal deficit determine the present value of seignorage but not necessarily current seignorage. This is because borrowing allows governments

to allocate seignorage intertemporaly, meaning that fiscal deficits, seignorage and inflation need not be contemporaneously correlated. The discussion so far reveals a diverse opinion on the effects of fiscal deficit on inflation. Notwithstanding these diverse effects, this study expects higher fiscal deficits to lead to higher inflation. This is because increase in fiscal deficit will induce inflation due to higher aggregate demand which will result in an increase in expenditure and supply of money to monetize the increase in the fiscal deficit.

- **Interest rate (INT)**

Real interest rate is the interest rate investors expect to receive after investment which is approximately the prime rate or bank rate. Real interest rate is nominal interest rate minus inflation rate as per the Fisher's equation. There are competing views about the effects of real interest rate on exchange rate and inflation. While some see a positive relationship, others see a negative relationship. This notwithstanding, the study anticipated interest rate to influence exchange rate negatively and inflation positively.

- **External Debt Stock (EDS)**

External debt stock is the debt owed to people and institutions other than nationals. It is the total of public, publicly guaranteed and private debtors that are guaranteed for repayment by a public entity. External debt stock can be short term or long term or a combination of the two provided it is owed to nonresidents of a country. The study expects external debt stock to influence fiscal deficit positively.

3.4 Measurement of Fiscal Deficit

Generally, fiscal deficit represents the situation whereby the expenditures of the government are greater than that of its income. The measurement of fiscal deficits in less developed countries has raised many conceptual and practical issues with the resultant effect being lack of uniformity among countries (Blejer and Cheasty, 1991). Conventionally, fiscal deficit is either measured on the basis of cash or the basis of accruals (payment order). On the basis of cash, fiscal deficit is simply the difference between fiscal revenue and total cash-flow expenditure whereas on accruals basis, fiscal deficit records accrued spending and income flows irrespective of whether they involve cash payment or not.

For the purpose of this study, the "cash basis measure" will be used to measure fiscal deficit. This is because, with the "accrual basis measure" it is difficult to determine the appropriate degree of coverage of the "consolidated public sector" accounting for some of the operations performed by different public entities. In this case, fiscal deficit per this study is total government expenditure minus total government revenue. The dataset of fiscal deficit as a share of GDP is obtained by first subtracting the overall government revenue from the overall government expenditures. Secondly, we take the ratio of the difference between government revenue and government expenditure to GDP for the period 1980-2013. This study attempts to find out some of the important factors which cause fiscal deficit in Ghana as well as the effects of fiscal deficit on exchange rate and inflation in Ghana. The study expects fiscal deficit to influence exchange rate negatively and inflation positively.

3.5 Trend Analysis of Fiscal Deficit, Exchange Rate and Inflation

Qualitative analysis is used to show the trends in fiscal deficit, government revenue and inflation. The qualitative analyses used in this study are bar graphs to visualize the trends in fiscal deficit, government revenue and inflation in the period under consideration.

3.6 Estimation Techniques

This section presents the time series modeling strategies employed to estimate the parameters in the models specified in equations (11), (14) and (15) so as to accomplish the objectives of the study. In providing a guide on the appropriate data transformation and choice of estimator that ensures efficient and consistent identification of model parameter, recent econometric analysis of time series data follows three sequential steps. The first step is to determine the stationarity of the variables. Step two is to establish the existence of a long run relationship between the variables. The third step is to estimate the short run dynamics of the model's convergence to equilibrium in order to recover all lost information in the original model estimated in the long run.

3.6.1 Stationarity Test (Unit root test)

Gujarati (2003) argues that a stochastic process is stationary if its mean and variance are constant over time and the value of the covariance between the two time periods depends on only the distance between the two time periods and not on the actual time at which the covariance is computed. This implies that if the underlying time series are non-stationary, their behavior can be studied for only the period of time under consideration and as a consequence, it is not possible to generalize it to the other periods and in that sense making use of the results for the purpose of forecasting will be misleading. Hence to escape the problem of spurious outcomes, it is important to examine the time series data for their stationarity properties using the Augmented

Dickey-Fuller (ADF) unit root test proposed by Dickey and Fuller (1979) and the Phillips-Perron (PP) unit root test proposed by Phillips and Perron (1988). The unit root test regression without trend variable is specified as:

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum_{j=1}^{p} \beta_j \Delta y_{t-j} + \varepsilon_t \quad \text{..... (16)}$$

Where y_t is the variable whose time series properties are being investigated, ε_t is error term, Δ is difference operator and p is number of lags. The study test whether $\alpha_0 = 0$ (null hypothesis (the series are not stationary))

The unit root test regression with trend variable is specified as:

$$\Delta y_t = \alpha_0 + \alpha_1 t + \alpha_1 y_{t-1} + \sum_{j=1}^{p} \beta_j \Delta y_{t-j} + \varepsilon_t \quad \text{..... (17)}$$

Where t is the time or trend variable. The null hypothesis is $\alpha_0 = 0$ and if the null hypothesis is rejected, then y_t is stationary around a deterministic trend.

In both equations (16) and (17) of the unit root test, the null hypothesis is that the series is nonstationary. The ADF and PP test statistics are modified t-statistic where autocorrelation occurs and are computed by adding the lagged values of the regressand Δy_t. We accept or reject the null hypothesis by examining the t-ratio of the lagged term (calculated value) compared with the tabulated (critical) value of tau (τ) from the Dickey-Fuller tables. If the calculated value is lower than τ (critical value), then the null hypothesis is accepted otherwise reject the null hypothesis if τ is greater than t. If we reject the null hypothesis, then the series is stationary and the assumption

is that the series is integrated of order one I(1). Lazaridis et al. (2005) argues that in a situation where the variables are non-stationary, the test is repeated using the dependent variable as the second difference $\Delta^2 y_{t-1}$ and so forth till we have a stationary transformation of the original variable.

KNUST

3.6.2 ARDL Cointegration Procedure

Once the order of integration has been determined, a standard cointegration testing procedure is used to establish the presence of long run relationship. Two or more variables are cointegrated if each individual variable is non-stationary (has one or more unit roots) but there is stationarity in a linear combination of the variables. This implies that a non-stationary economic time-series may produce stationary relationships if they are cointegrated. Given the drawbacks of the Johansen Cointegration technique as argued by Pesaran et al. (2001), the Autoregressive Distributed Lag (ARDL) bounds procedure is used. The ARDL approach to cointegration is considered for the study mainly for its advantages over the Johansen Cointegration. The advantages are;

i. The bounds test results are robust for small samples (ie 30 to 80 observations as in the case of this study of 34 observations).
ii. The ARDL technique produces consistent estimates of the long run normal coefficients regardless of the underlying regressors being I(1) or I(0).
iii. ARDL gives unbiased estimations of the long run model and a valid t-statistics even when some of the explanatory variables are endogenous.

The ARDL (p, q, r, s, u, v, w, x) model used for this study is specified as:

$$\Delta FD_t = \alpha_0 + \sum_{i=1}^{p} \beta_i \Delta FD_{t-1} + \sum_{i=1}^{q} \gamma_i \ln GDP_{t-1} + \sum_{i=1}^{r} \delta_i \ln TDS_{t-1} + \sum_{i=1}^{s} \varphi_i \ln TRA_{t-1}$$

$$\sum_{i=1}^{} \alpha_i \ln BMS_{t-1} \sum_{i=1}^{} \beta_i \ln TGR_{t-1} \sum_{i=1}^{} \gamma_i \ln GCE_{t-1} \sum_{i=1}^{} \delta_i DEM_{t-1} \quad \ldots\ldots (18)$$

$$\alpha_1 FD_{t-1} \alpha_2 \ln GDP_{t-1} \alpha_3 \ln TDS_{t-1} \alpha_4 \ln TRA_{t-1} \alpha_5 \ln BMS_{t-1} \alpha_6 \ln TGR_{t-1}$$
$$\alpha_7 \ln GCE_{t-1} \alpha_8 DEM_{t-1} \alpha_t$$

Where Δ is the first difference operator, ε is the error term, α_0 is the constant term. The parameters $\alpha, , , , , ,$ *and* on the difference of the regressors denote the short run dynamics of the model to be estimated through the error correction framework and α_i are the long run multipliers in the ARDL model.

3.6.3 Error Correction Model

There is the problem of misspecification of variables and loss of some important information involved in testing differenced variables when the variables are cointegrating. In order to avoid this problem, Banerrjee et al. (1998) developed the Error Correction Model (ECM) approach. The study proceeds by estimating the ECM where the error correction terms (*ecm*) derived from the cointegrating vectors are included as regressors in the estimation procedure so as to recover all the information that was lost in the long run original estimation process. This is specified as:

$$\Delta FD_t = \alpha_0 \sum_{i=1}^{p} \sum_{i=1}^{q} \sum_{i=1}^{r} \sum_{i=1}^{s} \sum_{v=1}^{u} \alpha_i FD_{t-1} \sum_{i=1}^{} \beta_i \ln GDP_{t-1} \sum_{i=1}^{} \gamma_i \ln TDS_{t-1} \sum_{i=1}^{} \delta_i \ln TRA_{t-1} \sum_{i=1}^{} \varphi_i \ln BMS_{t-1}$$
$$\sum_{i=1}^{} \omega_i \ln TGR_{t-1} \sum_{i=1}^{} \lambda_i \ln GCE_{t-1} \sum_{i=1}^{} \mu_i DEM_{t-1} \theta ecm_{t-1} \varepsilon_t \quad \ldots\ldots\ldots\ldots (19)$$

From equation (11), the coefficients denote the short run dynamics coefficients of the model's convergence to equilibrium. *ecm*is the residual that is gotten from the estimated cointegration

model of equation (10). □ measures the speed of adjustment to attain equilibrium in the case of shocks to the system.

3.7 Stability Test

The stability test is performed check if the estimated regression equations are stable during the sample period. This study adopts the stability test proposed by Brown et al. (1975). In Brown et al.'s stability test, the plots of Cumulative Sum (CUSUM) and Cumulative Sum of Square (CUSUMSQ) test will be utilized. The significance of these tests is that movements of the CUSUMSQ and CUSUM residuals beyond the critical line are suggestive of unstable estimated coefficients and the parameter variance over the entire sample period.

3.8 Conclusion

This chapter has given a thorough description of the variables used as well as the models specification. It also dealt with the estimation techniques used for the determinants of fiscal deficits and the effects of fiscal deficit on exchange rate and inflation.

KNUST

CHAPTER FOUR

RESULTS AND DISCUSSION

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4.1 Introduction

This chapter presents and discusses the empirical results from the study. The chapter is organised into five sections. The trend of fiscal deficit, government revenue and expenditure are examined in the first section of this chapter while the time series features of the data are analysed in section two. In section three, the results of the long run and short run fiscal deficit function are presented and discussed in detail. The fourth section presents the empirical results of the effects of fiscal deficit on exchange rate and inflation while the final section considers the model diagnostic and stability tests. The study made use of EViews 9 in obtaining all estimations.

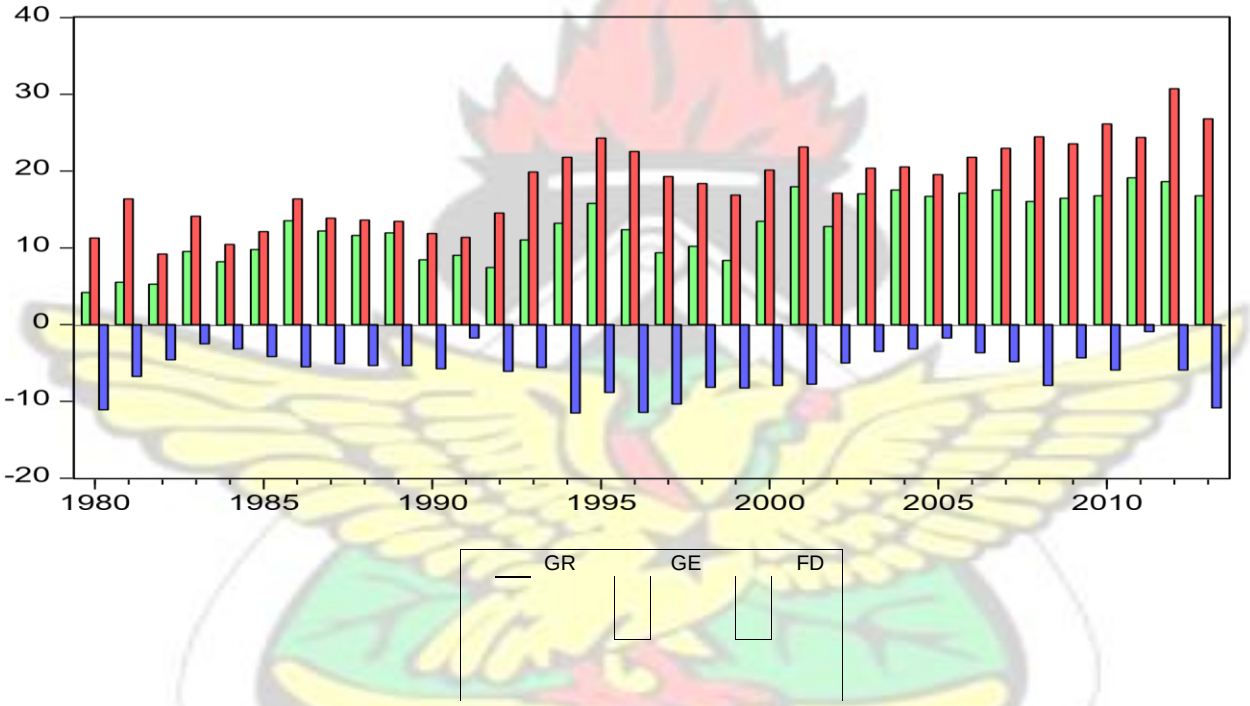
4.2 Trend Analysis of Government Revenue, Government Expenditure and Fiscal Deficit

This section shows the trend analysis of Government Revenue (GR), Government Expenditure (GE) and Fiscal Deficit (FD) that was carried out for the Ghanaian economy during the period under review. Specifically, bar charts are used to illustrate the trends in GR, GE and FD and the results are presented in Figure 1.

From Figure 1, the findings of the trends in GR, GE and FD are all presented as a percentage of GDP. From the findings, GR increased from 1980 to 1989, fluctuated between 1990 and 2002 and maintained stability after 2002 to 2013. GR was spread between 4 and 19 percentages of GDP with the lowest GR in 1980 whereas the highest GR is 2011. Considerably, periods from 1980 to 1983 recorded the lowest GR because the period experienced political instability and prolonged drought that hit the country leading to a drop in production and subsequently a reduction in government

revenue. The introduction of the Structural Adjustment Programme (SAP) and the Economic Recovery Programme (ERP) as a means of reviving the economy raised GR from 1983 to 1989 and later started oscillating between 1990 and 1999. Subsequent adoption of the Financial Sector Adjustment Programme (FINSAP) and Financial Sector Strategic Plan (FINSSIP) stabilized GR from 2001 to 2013.

Figure 1: Trends in Government Revenue, Government Expenditure and Fiscal Deficit in Ghana from 1980 to 2013



Source: Author's own Computation, 2016.

The findings also reveal that GE has been increasing over the period under consideration except for 1980 to 1982. GE was spread between 9 and 31 percentages with the highest GE in 2012 and the lowest in 1982. 2012 recorded the highest GE because that was the period government had to deal with salary arrears due to the Single Spine Salary Structure (SSSS) which led to intense labour agitation and labour unrest as well as preparation towards the 2012 general elections and the power crisis that hit the country. The early 1980's recorded low GE because most of Ghana's

donor supports were not forthcoming due to political instability during that period. There was stability in GE from 2002 to 2007 due to the International Monetary Fund's (IMF) "bailout" (conditionality) and the Highly Indebted Poor Country (HIPC) initiatives that the country adopted of which stringent spending is the guarantee for receiving subsequent monies from the programmes. This notwithstanding, GE started increasing from 2008 to 2013.

It is not surprising to see from Figure 1 above that Ghana has experienced fiscal deficit throughout the period under review since GE has always exceeded GR. Fiscal imbalance was spread between -1 and -12 percentages with -1 being the lowest FD that was recorded in 2011 and -12 the highest deficit recorded in 1994. There is no stability in Ghana's fiscal deficit over the period under review since it is evident from Figure 4.1 that fiscal deficit exhibits oscillation in its trends.

The discussions reveal that trends in GR and GE are consistent with trends in fiscal deficit in Ghana. This is because fiscal deficit occurs when government expenditure exceeds government revenue. On the basis of this, we proceed to the next section to find out the possible factors that have influenced fiscal deficit in Ghana over the period under consideration.

4.3 Discussion of Time Series Properties

4.3.1 Results of the Unit Root Test

Most time series data are non-stationary and as a result, examining the time series properties of the data before any other analysis and inferences can be made is always necessary. This is because, the existence of unit root in time series data imply that shocks to the variables tend to have permanent effect while shocks to the variables that are stationary only have temporary effect and overtime, the effect dies out. Intuitively, the presence of unit root in time series data poses an estimation challenge to researchers since it has a high potential of leading to spurious regression.

In identifying the determinants of fiscal deficit in Ghana and its effects on exchange rate and inflation, the stationarity status of all the variables in the models specified for the study were examined to determine the order of integration. The Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) tests were applied to all the variables in levels and in their first difference.

The study made use of the Mackinnon (1991) critical values as well as the probability value (pvalue) in making the decision to accept or reject the null hypothesis. The null hypothesis is that the series contains unit root (series is not stationary). The findings of the ADF and PP tests for unit root are presented in Table 4.1.

From Table 4.1, both the ADF and PP tests indicate that at the log level (with and without linear trend), *FD*, ln *BMS*, ln*TGE*, ln*TGR*, ln *EXCH* and ln *INF* are stationary as we reject the null hypothesis of unit root at any of the error levels. We reject the null hypothesis of unit root for *FD*, ln*BMS*, ln*TGE*, ln*TGR*, ln*EXCH* and ln *INF* at the 5%, 10%, 5%, 5%, 5% and 1% level of significance respectively. This further suggests that *FD*, ln*BMS*, ln*TGE*, ln*TGR*, ln*EXCH* and ln *INF* are integrated of order zero [I(0)].

However, the ADF and PP tests from Table 4.1 show that ln*GDP TDS TRA GCE DEM*, ln , ln , ln , , ln*EDS* and ln *INT* are non-stationary at the log levels (with and without linear trend) as we accept the null hypothesis of no unit root at any of the error levels. This notwithstanding, ln*GDP*, ln*TDS*, ln*TRA*, ln*GCE DEM*, , ln *EDS* and ln *INT* became stationary after first differencing for both the ADF and PP tests. At the first difference, we reject the null hypothesis of unit root for ln*GDP*, ln*TDS*, ln*TRA*, ln*GCE DEM*, , ln*EDS* and ln *INT* all at 1% level of significance. This implies that ln*GDP*, ln*TDS*, ln*TRA*, ln*GCE DEM*, , ln*EDS* and ln *INT* are integrated of order one [I(1)].

Table 4.1 Results of the Unit Root Test

LEVELS				
	Augmented Dickey-Fuller		Philips-Perron	
Variable	Constant	Constant with Trend	Constant	Constant with Trend
FD	-3.499**	-3.384*	-3.499**	-3.384*
ln*GDP*	3.157	0.046	3.157	-2.319
ln*TDS*	-1.198	-1.809	-1.299	-1.809
ln*TRA*	-1.388	-1.437	-1.406	-1.679
ln *BMS*	-1.235	-3.216*	-1.261	-3.218*
ln*TGE*	-3.464**	-4.069**	-3.555**	-4.070**
ln*TGR*	-2.935*	-3.776**	-2.943*	-3.747**
ln*GCE*	-1.702	-3.067	-1.774	-3.247*
DEM	-1.548	-2.937	-1.643	-2.969
ln *EDS*	-1.465	-1.683	-1.668	-1.683
ln *EXCH*	-3.357**	-1.289	-6.558***	-1.157
ln *INT*	-1.829	-2.012	-1.781	-1.924
ln *INF*	-3.545**	-5.292***	-3.445**	-5.438***
FIRST DIFFERENCE				
	Augmented Dickey-Fuller		Philips-Perron	
Variable	Constant	Constant with Trend	Constant	Constant with Trend
ln*GDP*	-4.590***	-5.801***	-2.836*	-3.434*
ln*TDS*	-5.334***	-5.348***	-5.334***	-5.346***
ln*TRA*	-4.602***	-4.845***	-4.599***	-4.876***
ln*GCE*	-5.046***	-5.119***	-5.046***	-5.149***
DEM	-5.477***	-5.487***	-5.477***	-5.489***
ln *EDS*	-5.046***	-5.119***	-5.046***	-5.149***
ln *INT*	-7.341***	-7.350***	-7.341***	-7.352***

*, ** and *** denote the rejection of the null hypothesis of unit root at 10%, 5% and 1% respectively Source: Author's own Estimation, 2016.

From the discussion so far, none of the variable is of I(2) and have clearly shown a case of mixed order of integration of I(0) and I(1). In this situation, we are justified to apply the bounds testing approach proposed by Pesaran et al. (2001) to test for the existence of long run equilibrium relationship between fiscal deficit and its determinants, exchange rate and its covariates as well as inflation and its covariates. The study further tests for the presence of a long run equilibrium relationship among the variables and the degree of correlation among the variables.

4.3.2 Estimated Correlation Matrix of the Variables

Prior to estimating the fiscal deficit function and the effects of fiscal deficit on exchange rate and inflation, the correlation matrix among the variables was computed to determine the potential presence of severe multicolinearity among the regressors including the regressand. This was done in two parts; the first part considered the variables in the fiscal deficit function which is presented in Table 4.2.

Table 4.2: Correlation Matrix for the Fiscal Deficit Model

Variables	*FD*	ln*GDP*	ln*TDS*	ln*TRA*	ln *BMS*	ln*TGR*	ln*GCE*	*DEM*
FD	1.0000							
ln*GDP*	-0.0568	1.0000						
ln*TDS*	-0.2677	-0.6890	1.0000					
ln*TRA*	-0.1320	0.6287	-0.0502	1.0000				
ln *BMS*	-0.1301	0.7971	-0.3829	0.7221	1.0000			
ln*TGR*	0.1443	0.6385	-0.3360	0.7653	0.5992	1.0000		
ln *GCE*	-0.2138	0.7069	-0.2478	0.6888	0.6210	0.5397	1.0000	
DEM	-0.4135	0.6457	-0.3099	0.5972	0.7897	0.3470	0.6033	1.0000

Source: Author's own Estimation, 2016.

It is evident from Table 4.2 that the correlation between *FD*and ln *GDP* is -0.057 while the correlation between ln*TDS* and *FD*is -0.268. In the same vein, the correlation between ln*TRA* and *FD*is -0.132 while the correlation between ln *BMS* and *FD*is -0.130. *FD*and ln*TGR* have a positive correlation of 0.144 while ln*GCE* and *FD*have a negative correlation of -0.214. The correlation between *DEM* and *FD*is -0.414 while the correlation between *DEM* and ln *GDP* is 0.646. *DEM* and ln*TDS* have a negative correlation of -0.310 while *DEM* has a positive correlation of 0.597 with ln*TRA*. *DEM* has a positive correlation of 0.789 with ln *BMS* while the correlation between *DEM* and ln*TGR* is 0.347. The correlation between *DEM* and ln*GCE* is 0.603 while ln*GCE* and ln*TGR* have a positive correlation of 0.540.

Also, the correlation matrix results from Table 4.2 show that ln *GCE* and ln*TDS* have a negative correlation of -0.248 while ln*GCE* has a positive correlation of 0.621 with ln *BMS* . ln*GCE* has a positive correlation of 0.689 with ln*TRA*while the correlation between ln *GCE* and ln *GDP*is 0.707. The correlation between ln*TGR* and ln*GDP*is 0.6385 while ln*TGR* and ln*TDS* have a negative correlation of -0.336. ln*TGR* has a positive correlation of 0.765 with ln*TRA* while the correlation between ln*TGR* and ln *BMS* is 0.599. ln *BMS* and ln*GDP* have a positive correlation of 0.797 while ln *BMS* and ln*TDS* have a negative correlation of -0.383. The correlation between ln *BMS* and ln*TRA* is 0.722 while ln*GDP* and ln*TRA* have a positive correlation of 0.629. The correlation between ln*TRA* and ln*TDS* is -0.050 while the correlation between ln*TDS* and ln *GDP* is -0.689.

The second part looks at the variables in the effects of fiscal deficit on exchange rate and inflation which is also presented in Tables 4.3 and 4.4 respectively.

Table 4.3: Correlation Matrix for the Exchange Rate Model

Variables	ln *EXCH*	*FD*	ln *INF*	ln *INT*	ln *EDS*
ln *EXCH*	1.0000				
FD	-0.0127	1.0000			
ln *INF*	-0.6388	-0.2010	1.0000		
ln *INT*	0.0773	-0.4808	0.2815	1.0000	
ln *EDS*	0.0574	-0.1867	0.2056	0.7412	1.0000

Source: Author's own Estimation, 2016.

Table 4.4: Correlation Matrix for the Inflation Model

Variables	ln *INF*	*FD*	ln *BMS*	ln *INT*	ln *EXCH*	ln *EDS*
ln *INF*	1.0000					
FD	-0.2010	1.0000				
ln *BMS*	-0.5367	-0.1301	1.0000			
ln *INT*	0.2815	-0.4808	-0.1383	1.0000		
ln *EXCH*	-0.6388	-0.0127	0.7269	0.0773	1.0000	
ln *EDS*	0.2056	-0.1867	0.0759	0.7412	0.0574	1.0000

Source: Author's own Estimation, 2016.

The correlation matrix results from Table 4.3 show that ln *EXCH* and *FD* have a negative correlation of -0.013 while ln *EXCH* has a negative correlation of -0.639 with ln *INF* . ln *EXCH* has a positive correlation of 0.077 with ln *INT* while the correlation between ln *INT* and *FD* is -0.481. The correlation between ln *INT* and ln *INF* is 0.282 while ln *INF* and *FD* have a negative correlation of -0.201. ln *EDS* has a positive correlation of 0.057 with ln *EXCH* while the correlation between ln *EDS* and *FD*is -0.187. The correlation between ln *EDS* and ln *INF* is 0.206 while ln *EDS* and ln *INT* have a positive correlation of 0.741.

Finally, the correlation matrix results from Table 4.4 show that ln *INF* and *FD* have a negative correlation of -0.201 while ln *BMS* has a negative correlation of -0.538 with ln *INF* . ln *INF* has a positive correlation of 0.282 with ln *INT* while the correlation between ln *INT* and *FD* is 0.481. The correlation between ln *INT* and ln *BMS* is -0.138 while ln *BMS* and *FD* have a negative correlation of -0.130. ln *EXCH* and ln *INF* have a negative correlation of -0.639 while ln *EXCH* has a negative correlation of -0.013 with *FD*. ln *EXCH* has a positive correlation of 0.727 with ln *BMS* while the correlation between ln *EXCH* and ln *INT* is 0.0773. The correlation between ln *EDS* and ln *INF* is 0.206 while ln *EDS* and *FD* have a negative correlation of -0.187. The correlation between ln *EDS* and ln *BMS* is 0.076 while ln *EDS* and ln *INT* have a positive correlation of 0.741. ln *EDS* and ln *EXCH* have a positive correlation of 0.057.

In making the decision regarding multicollinearity, when the zero-order (pair-wise) correlation coefficient between two regressors is high, that is, more than 0.8, then multicollinearity is a serious problem (Gujarati, 2003). None of the regressors have correlation coefficient of more than 0.8 from the correlation matrix table. As such, using Gujarati (2003) as a rule of thumb, the study can conclude that there is no multicollinearity or at best there is no much problem of multicollinearity

among the variables in the determinants of fiscal deficit as well as the effects of fiscal deficit on exchange rate and inflation respectively.

4.3.3 Results of the Bounds Test for Cointegration

The ARDL technique to cointegration was applied to the model to establish the existence of long run relationship among the variables using the bounds test. The null hypothesis was that there is no cointegration among the variables. As a rule of thumb, the computed F-statistic is compared with the upper bound critical value before any inference could be drawn (Pesaran et al., 2001). The findings of the bounds test for cointegration analysis for the fiscal deficit model, exchange rate model and inflation model are presented in Table 4.5.

Table 4.5 Results of the Bounds Test for the Existence of Cointegration

		95% Level		90% Level	
Model	Computed F-statistic	Lower Bound	Upper Bound	Lower Bound	Upper Bound
FD f GDP TDS TRA BMS TGR GCE DEM , , , , , ,	7.320110**	2.32	3.5	2.03	3.13
EXCH f FD INF INT EDS , , ,	7.600042**	2.86	4.01	2.45	3.52
INF f FD BMS INT EXCH EDS , , , ,	11.57588**	2.62	3.79	2.26	3.35

** denotes the rejection of the null hypothesis of no cointegration at 5% level of significance

Source: Author's own Estimation, 2016.

It is argued by Pesaran et al. (2001) that if the calculated F-statistic value lies between the bounds then the test is inconclusive. However, if the F-statistic value lies above the upper bound, the null hypothesis of no cointegration is rejected otherwise accept the null hypothesis of no cointegration

if the F-statistic value lies below the lower bound. From Table 4.5, it can be seen that the calculated F-statistic value of 7.320 for the fiscal deficit model is beyond the upper bound critical value of 3.5 at the 5% significance level. Also, the computed F-statistic value of 7.600 for the exchange rate model is higher than the upper bound critical value of 4.01 at the 5% significance level. Again, the computed F-statistic value of 11.576 for the inflation model is greater than the upper bound critical value of 3.79 at the 5% significance level. These findings imply that the null hypothesis of no cointegration can be adequately rejected for all the models and hence there is long run relationship between fiscal deficit and its determinants, exchange rate and its covariates as well as inflation and its covariates. After establishing the existence of cointegration, the next step is to estimate the long run parameters of the fiscal deficit model in equation (3), the exchange rate model in equation (6) and the inflation model in equation (7).

4.4 Results of the Long Run Determinants of Fiscal Deficit

In section 4.3.3, the results of the bounds test showed cointegration between fiscal deficit and its determinants. In this section, to attain the second specific objective of the study, the long run coefficients of equation (3) are estimated from the ARDL (1, 0, 0, 1, 1, 1, 1, 1) selected based on Akaike Information Criterion (AIC). The ARDL (1, 0, 0, 1, 1, 1, 1, 1) results are presented in Table 4.6. Note that FD and DEM are in levels and the remaining regressors are in logs.

Table 4.6: Estimated Long Run Coefficients of the Fiscal Deficit Model

ARDL (1,0,0,1,1,1,1,1) selected based on AIC 33 observations used for estimation from 1981 to 2013				
Variable	Coefficient	Standard Error	T-Ratio	P-value
ln*GDP*	-9.738696*	5.037986	-1.933053	0.0683
ln*TDS*	-3.758486***	1.131529	-3.321601	0.0036

ln*TRA*	3.930830**	1.522929	2.581098	0.0183
ln *BMS*	8.844040**	3.808729	2.322045	0.0315
ln*TGR*	-4.763271*	2.339340	-2.036160	0.0559
ln*GCE*	-2.377250	2.995171	-0.793694	0.4372
DEM	-7.669556***	1.653197	-4.639226	0.0002
Constant	43.263663	24.634547	1.756219	0.0952

*, ** and *** denote statistical significance at 10%, 5% and 1% respectively Dependent variable is *FD*

Source: Author's own Estimation, 2016.

The results from Table 4.6 reveal that in the long run, government consumption expenditure influences fiscal deficit negatively though statistically significant. The coefficient of government consumption expenditure is -2.377 and it implies a 1 % rise in government consumption expenditure will reduce fiscal deficit in Ghana by approximately 0.02%. This contradicts the economic a priori expectation of the study.

The results from Table 4.6 reveal that in the long run, real per capita GDP influences fiscal deficit negatively and is significant statistically at the 10% level of significance. The coefficient of real GDP per capita is -9.739 and it implies a 1 % rise in real per capita GDP will reduce fiscal deficit in Ghana by approximately 0.10%. Intuitively, when economy is growing (increase in real per capita GDP) it provides higher employment and tax revenues, lower safety net expenditure and lower ratio of debt to GDP. When the economy grows, government tax revenue will be increased without increasing taxes. With economic growth, companies pay more corporate tax, workers' pay more income tax and people pay more VAT. High real per capita GDP growth is a less painful way to reduce fiscal deficit since you need not increase taxes nor cut expenditure.

This re-affirms both the economic a priori expectation of the study and previous works by Farajova (2011) for Azerbaijan and Bayar and Smeets (2009) for European Union countries but contradicts the findings of Murwinrapachena et al. (2013) for South Africa.

Furthermore, the results from Table 4.6 also indicate that in the long run, total debt servicing influences fiscal deficit negatively and is significant statistically at the 1% significance level. The coefficient of total debt servicing of -3.758 means that a 1% increase in total debt is capable of reducing fiscal deficit in Ghana by 0.04%. This revelation contradicts both the economic a priori expectation of the study and the work of Kalim and Hassan (2013) in Pakistan which posits that total debt servicing impacts positively on fiscal deficit. The negative relationship between total debt servicing and fiscal deficit is an indication that the amortization of previous loans reduces the size of public debt and that allows the government to earmark meager amounts for paying its debt in the current year. Since the government will be servicing meager debt in the current year, then the government will have more money to spend on its expenditure in the economy which will eventually decrease the fiscal deficit.

Additionally, the results from Table 4.6 show that in the long run international trade has a direct effect on fiscal deficit in Ghana and is significant statistically at 5%. The coefficient of international trade is 3.931 and signifies that a 1% rise in international trade leads to a 0.04% rise in fiscal deficit in Ghana. The intuition is that Ghana's trade balance have remained negative over the years where her imports always exceeds her exports as argued by Quartey (2010). This means the government needs more money to import goods into the country and this can be achieved by incurring deficits. This confirms the economic a priori expectation of the study as well as an earlier work by Kalim and Hassan (2013) for Pakistan.

Also, the results from Table 4.6 suggest that fiscal deficit in Ghana increases with increasing broad money supply and is significant statistically at the 5% significance level. The coefficient of broad money supply is 8.844 implying that a 1% increase in broad money supply will lead to a rise in fiscal deficit by 0.09%. Broad money supply does not have the expected sign and therefore contradicts both the study's economic a priori expectation and the work of Kalim and Hassan (2013) for Pakistan. The study expected a negative relationship between supply of money and fiscal deficit where an increase in money supply will help the government in financing its deficit thereby reducing the overall fiscal deficit. This notwithstanding, the contradictory findings indicate that when money supply increase without an increase in output to commensurate the increase in money supply it will lead to inflation. Government planned expenditure will increase due to inflation which will then worsen the already fiscal deficit as a result of limited revenue and higher price levels. Hence, money supply will increase Ghana's fiscal deficit through its impact on inflation.

Again, the results from Table 4.6 indicate that fiscal deficit in Ghana decreases with increasing total government revenue which is also significant statistically at the 10% significance level. The coefficient of total government revenue (-4.763) is indicating that a 1% increase in total government revenue will result in about 0.05% reduction in fiscal deficit in Ghana. Total government revenue has the expected sign which re-affirms the economic a priori expectation of the study. The intuition is that when government revenue increase through revenue enhancing measures, government will have enough revenue to finance its deficit and ultimately reduce fiscal deficit in Ghana. For instant, some of the revenue enhancing measures can be resource mobilization, restructuring public sector enterprises to be independent of government's budgetary resources to recover at least user cost and adopting moderate and simplified tax structure that is

broad enough to capture most of the hitherto exempted informal sectors. This in no doubt will help reduce fiscal deficit once government revenue is enhanced.

Last but not least, the results from Table 4.6 reveal that democracy which is dummy influences fiscal deficit negatively in Ghana and is significant statistically at the 1% significance level. The coefficient of democracy (-7.669) is implying that when Ghana's democratic dispensation is strengthened by 1% there is a higher tendency of reducing fiscal deficit by 7.67%. This is because when democracy is strengthened, parliament will have to scrutinize and approve government expenditures. Also, if the government is spending recklessly then civil society groups, the media, religious leaders, traditional leaders and social commentators among others will discuss the issue to sensitize the government to be cautious of its spending. All these are possible when democracy is strengthened to guarantee freedom of speech and association among others where these actors act as gate keepers of government spending. This in no doubt will help reduce fiscal deficit in Ghana in the long run. This finding contradicts the work of Anwar and Ahmad (2012) for Pakistan but confirms the study's economic a priori expectation as well as previous study by Agnello and Sousa (2009) for LDCs.

In sum, in the long run, the study found real GDP per capita, total debt servicing, total government revenue and democracy to be significantly influencing fiscal deficit negatively in Ghana while international trade and broad money supply were found to be significantly influencing fiscal deficit positively in Ghana. Also, the study found democracy to be an important significant determinant of fiscal deficit in Ghana in the long run. Hence the study rejects the null hypothesis and settle that fiscal deficit in Ghana is not independent of international trade, real GDP per capita, total debt servicing, total government revenue, broad money supply and democracy in the long run. However, the study fails to reject the null hypothesis for government consumption expenditure

and conclude that fiscal deficit is independent of government consumption expenditure in the long run.

4.4.1 Results of the Short Run ECM for the Determinants of Fiscal Deficit

In the previous section, the long run model was estimated and this section is to model the short run dynamic relationship among the variables in the ARDL framework. The ECM helps to reconciling the short run behavior of an economic variable with its long run behavior by evaluating the adjustments that happen among the different variables to reestablish the long run equilibrium in response to the short run disturbances. The ECM of ARDL (1, 0, 0, 1, 1, 1, 1, 1) for fiscal deficit is estimated and presented in Table 4.7. Note that FD and DEM are in levels and the remaining regressors are in logs.

Table 4.7: Estimated Short Run ECM for the Fiscal Deficit Model

ARDL (1, 0, 0, 1, 1, 1, 1, 1) selected based on AIC 33 observations used for estimation from 1981 to 2013				
Variable	Coefficient	Standard Error	T-Ratio	P-value
□ln*GDP*	-9.493079*	5.133917	-1.849091	0.0801
□ln*TDS*	-3.663695***	1.198339	-3.057311	0.0065
□ln*TRA*	-2.425571	2.163780	-1.120988	0.2763
□ ln *BMS*	-2.849057	3.572041	-0.797599	0.4350
□ln*TGR*	-0.182901	1.961711	-0.093235	0.9267
□ln*GCE*	8.196298***	2.470706	3.317391	0.0036
□*DEM*	-4.952065***	1.618649	-3.059381	0.0065
ecm□1	-0.974779***	0.145375	-6.705288	0.0000

$$ecm\ FD = -9.7387*\ln GDP - 3.7585*\ln TDS - 3.9308*\ln TRA - 8.8440*\ln BMS - 4.7633*\ln TGR - 2.3773*\ln GCE - 7.6696*DEM - 43.2637*C$$

R-squared	0.822884	**Mean of Dependent Variable**	0.009091
Adjusted R-squared	0.701700	**S.D of Dependent Variable**	3.159751
S.E. of Regression	1.725757	**Akaike Info. criterion**	4.225625
Sum of Squared Residual	56.58654	**Schwarz Bayesian Criterion**	4.860507
Log likelihood	-55.72282	**Hannan-Quinn Criterion**	4.439244
F-statistic (P-value)	6.790341 (0.0001)	**Durbin-Watson Statistic**	2.382344

* and *** denote statistical significance at 10% and 1% respectively Dependent variable is *FD*

Source: Authors own Estimation, 2016.

The R-squared and F-statistic values for the fiscal deficit model from Table 4.7 indicate that the overall regression is significant at 1%. Specifically, the R-squared value of 0.823 shows that up to about 82.30% of the variations in the regressand (fiscal deficit) are explained by the regressors while 17.70% of the variations in fiscal deficit are explained by factors outside the model. The Fstatistic values further suggest the joint significance of the regressors at 1% in the ECM for the fiscal deficit model.

The results from Table 4.7 reveal that the coefficient of lagged ECM is significantly negative at the 1% significance level. This confirms there is convergence to achieve long run equilibrium. The coefficient of the ECM of -0.975 implies that about 97.5% deviations from equilibrium can be adjusted in the long run within one year. That is, it takes (1/0.974779 = 1.026) a little over one year to achieve long run and stable equilibrium when there is a shock to the system. This is because the speed of adjustment is very strong.

Again, the results of the short run ECM from Table 4.7 show that the influence of total government revenue on fiscal deficit remained negative in the short run as well but this time around not statistically significant unlike the long run that was significant at the 10% significance level. Also, the coefficients of international trade and broad money supply do not only change to negative in the short run but are also not significant statistically.

Also, as in the long run the results of the ECM from Table 4.7 further show that real GDP per capita influenced fiscal deficit negatively in the short run too and is significant statistically at the 10% significance level. The coefficient of real GDP per capita of -9.493 suggests that a 1% rise in real per capita GDP will lead to about 0.09% decrease in fiscal deficit in the short run in Ghana. Higher employment and tax revenues are associated with high GDP growth where companies pay more corporate tax and workers' pay more income tax without an increase in tax. This means that a rise in real per capita GDP in the short run tends to reduce fiscal deficit in the Ghanaian economy. This confirms both the economic a priori expectation of the study and previous works by Farajova (2011) for Azerbaijan and Bayar and Smeets (2009) for European Union countries but contradicts the findings of Murwinrapachena et al. (2013) for South Africa.

The results of the ECM from Table 4.7 indicate that the coefficient of total debt servicing maintained its negative and significant impact on fiscal deficit at the 1% level of significance in the short run as well. The coefficient of total debt servicing of -3.664 means that a 1 % increase in total debt is capable of reducing fiscal deficit in Ghana by about 0.04 %. This finding indicate that even in the short run total debt servicing still affects fiscal deficit negatively which contrasts both the economic a priori expectation of the study and the work of Kalima and Hassan (2013) in Pakistan which posits that total debt servicing impacts positively on fiscal deficit. This implies that payment of accrued short term debts both foreign and domestic will relief government of its debts.

In this regard, government will have more revenue to finance its expenditure thereby incurring minimal deficits.

Unlike the long run estimates, the results from Table 4.6 indicate that the short run coefficient of government consumption expenditure show that government consumption expenditure influences fiscal deficit positively and statistically significant at the 10% level of significance. The coefficient of government consumption expenditure of 8.196 suggests that a 1% rise in government consumption expenditure will lead to about 0.08% rise in fiscal deficit in the short run in Ghana. This confirms the economic a priori expectation of the study. This implies that as government consumption expenditure increase relative to its revenue, fiscal deficit worsens. Since most government consumption expenditures are statutory and recurrent, their occurrences are inevitable and as such its increase will cause fiscal deficit to rise given the relatively limited government revenue.

Finally, the results of the short run ECM from Table 4.7 indicate that the coefficient of democracy maintained its negative influence on fiscal deficit in the short run and is also statistically significant at 1% level of significance. The coefficient of democracy (-4.952) is implying that when Ghana's democratic dispensation is strengthened by 1% there is a higher tendency of reducing fiscal deficit by about 4.95%. This finding confirms both the study's economic a priori expectation and previous study by Agnello and Sousa (2009) for LDCs but contradicts the work of Anwar and Ahmad (2012) for Pakistan. This is because parliament will scrutinize and approve government expenditures when democracy is strengthened. Also, civil society groups, the media, religious leaders, traditional leaders and social commentators among others will sensitize government to be cautious of its reckless spending when democracy is strengthened. This in no doubt will help reduce fiscal deficit in Ghana in the short run.

In a nutshell, in the short run, the study found real GDP per capita, total debt servicing and democracy to be significantly influencing fiscal deficit negatively in Ghana while government consumption expenditure was found to be significantly influencing fiscal deficit positively in Ghana. Also, the study still found democracy to be an important significant determinant of fiscal deficit in Ghana even the short run. Hence the study rejects the null hypothesis and settle that fiscal deficit in Ghana is not independent of real GDP per capita, total debt servicing, government consumption expenditure and democracy in the long run. However, the study fails to reject the null hypothesis for international trade, government revenue and broad money supply and conclude that fiscal deficit is independent of international trade, government revenue and broad money supply in the short run.

4.5 Results of the Long run effects of fiscal deficit on exchange rate

In section 4.3.3, the results of the bounds test disclosed cointegration between exchange rate and its covariates. In this section, to achieve the third objective of the study, the long run coefficients of equation (6) are estimated from the ARDL (3, 1, 3, 1, 0) selected based on Akaike Information Criterion (AIC). Also, the focus on only the relationship between exchange rate and fiscal deficit under this section since the emphasis of this section is to look at the effects of fiscal deficit on exchange rate in Ghana. The ARDL (3, 1, 3, 1, 0) results are presented in Table 4.8. Note that FD is in levels and the remaining variables are in logs.

Table 4.8: Estimated Long run Coefficients of the effects of fiscal deficit on exchange rate

ARDL (3, 1, 3, 1, 0) selected based on AIC
31 observations used for estimation from 1983 to 2013

Variable	Coefficient	Standard Error	T-Ratio	P-value

FD	-0.652445[*1]	0.198676	-3.283959	0.0041
ln *INF*	1.655686	1.821737	0.908850	0.3754
ln *INT*	-7.185691[***]	2.411020	-2.980353	0.0080
ln *EDS*	2.372671[**]	0.931850	2.546194	0.0203
Constant	5.247100	2.889172	1.816126	0.0860

The results from Table 4.8 indicate that in the long run, fiscal deficit affects exchange rate negatively and is statistically significant at the 1% significance level. The coefficient of fiscal deficit is -0.652 and this means that a 1% increase in fiscal deficit is capable of causing exchange rate in Ghana to fall by 65.2%. This revelation confirms the economic a priori expectation of the study as well as the work of Khan et al (2004) who posits that budget deficit (fiscal deficit) impacts negatively on exchange rate for Pakistan. However, this finding contradicts the work of Gulcan and Bilman (2005) for Turkey and Korsu (2009) for Sierra Leone who found out a positive impact of fiscal deficit on exchange rate. The negative relationship between exchange rate and fiscal deficit is an indication that the domestic currency devalues when fiscal deficit increases due to the fall in exchange rate. This will make exchange rate unstable due to increasing fiscal deficit and to achieve stability in exchange rate, fiscal deficit must be reduced.

[1] and [***] denote statistical significance at 5% and 1% respectively Dependent variable is ln *EXCH*

Source: Author's own Estimation, 2016.

The results from Table 4.8 reveal that in the long run, inflation influences exchange rate positively though not statistically significant. This confirms the economic a priori expectation of the study though not significant.

Also, the results from Table 4.8 indicate that in the long run, external debt stock influences exchange rate positively and is statistically significant at the 5% level of significance. The coefficient of external debt stock is 2.373 and it implies a 1% rise in external debt stock will cause exchange rate in Ghana to rise by approximately 2.37% in the long run. This re-affirms the economic a priori expectation of the study. This is because as the external debt stock increase, government will need more foreign currencies to pay its accumulated external debt. When this happens there will be higher demand for foreign currencies relative to the domestic currency hence making the exchange rate to rise.

Finally, the results from Table 4.8 reveal that in the long run, interest rate affects exchange rate negatively and is statistically significant at 1% significance level. The coefficient of interest rate is -7.186 and this means that a 1% increase in interest rate will cause exchange rate in Ghana to fall by about 7.19%. This confirms the economic a priori expectation of the study. Interest rate affects exchange rate negatively because high interest rate attracts foreign direct investment (FDI) which increase the demand for domestic currency relative to supply thereby causing exchange rate to fall.

In a nutshell, in the long run, the study found fiscal deficit to be significantly affecting exchange rate negatively in Ghana while interest rate and external debt stock that were controlled for were found to be significantly affecting exchange rate negatively and positively respectively in Ghana. Hence the study rejects the null hypothesis and concludes that fiscal deficit affects exchange rate in Ghana in the long run.

4.5.1 Results of the Short Run ECM for the Effects of Fiscal Deficit on Exchange Rate

In the previous section, the long run model for exchange rate was estimated and this section is to model the short run dynamic relationship among the variables within the ARDL (3, 1, 3, 1, 0) framework. The ECM of ARDL (3, 1, 3, 1, 0) for exchange rate is estimated and presented in Table 4.9 to show how the short run reconciles with its long run behavior.

The R-squared and F-statistic values for the exchange rate model from Table 4.9 indicate that the overall regression is significant at 1%. Specifically, the R-squared value of 0.8723 shows that up to about 87.23% of the variations in the regressand (exchange rate) are explained by the regressors while 12.77% of the variations in exchange rate are explained by factors outside the model. The F-statistic values further suggest the joint significance of the regressors at 1% in the ECM for the exchange rate model. Note that FD is in levels and the rest are in logs.

Table 4.9: Estimated Short run ECM for the effects of fiscal deficit on exchange rate

ARDL (3, 1, 3, 1, 0) selected based on AIC observations used for estimation from 1983 to 2013			31	
Variable	Coefficient	Standard Error	T-Ratio	P-value
Δln *EXCH* Δ1	0.099351	0.139530	0.712041	0.4856
Δln *EXCH* Δ2	-0.256262*	0.102391	-2.502775	0.0222
Δ*FD*	-0.020912*	0.011992	-1.743805	0.0982
Δln *INF*	-0.000071	0.085082	-0.000836	0.9993
Δln *INF* Δ1	0.067696	0.051529	1.313741	0.2054

Δln *INF* Δ2	-0.144896***	0.048758	-2.971718	0.0082
Δ ln *INT*	-0.102430	0.187017	-0.547705	0.5906
Δln *EDS*	0.220296**	0.078836	2.794357	0.0120
*ecm*Δ1	-0.092847***	0.028393	-3.270027	0.0043

*ecm*Δln *EXCH* Δ0.6524**FD*Δ1.6557*ln *INF*Δ7.1857*ln *INT* Δ 2.3727*ln *EDS* Δ5.2471**C*

R-squared	0.872301	**Mean of Dependent Variable**	0.286103
Adjusted R-squared	0.787168	**S.D of Dependent Variable**	0.317843
S.E. of Regression	0.146633	**Akaike Info. criterion**	-0.706677
Sum of Squared Residual	0.387021	**Schwarz Bayesian Criterion**	-0.105328
Log likelihood	23.95350	**Hannan-Quinn Criterion**	-0.510652
F-statistic (P-value)	10.24634 (0.00001)	**Durbin-Watson Statistic**	2.320058

*, ** and *** denote statistical significance at 10%, 5% and 1% respectively Dependent variable is EXCH

Source: Author's own Estimation, 2016.

The results from Table 4.9 reveal that the coefficient of lagged ECM is significantly negative at the 1% level of significance. This confirms that there exists convergence to achieve long run equilibrium. The coefficient of the ECM of -0.093 implies that about 9.30% of deviations from equilibrium can be adjusted in the long run within one year. That is, it takes (1/0.092847= 10.77) more than 10 years to achieve long run and stable equilibrium when there is a shock to the system. This is because the speed of adjustment is not very strong and that account for why it takes too long a time for equilibrium to be established when there is a shock to the system.

Again, the results of the short run ECM from Table 4.9 show that the influence of interest rate on exchange rate remained negative in the short run as well but this time around not statistically

significant unlike the long run that was significant at the 1% significance level. The coefficient of interest rate of -0.102 indicate that a 1% rise in interest rate cause exchange rate to fall by approximately 0.10% in the short run. Also, the coefficient of inflation does not only change to negative in the short run but is also not significant statistically. The coefficient of inflation of 0.00007 indicate that a 1% rise in inflation cause exchange rate to fall by about 0.00007% in the short run. The lag of exchange rate (previous year's exchange rate) influences the present year's exchange rate positively in the short run but not statistically significant. The coefficient of previous year's exchange rate of 0.099351 suggests that a 1% increase in previous year's exchange rate will cause the present year's exchange rate to rise by about 0.10% in Ghana in the short run.

The results from Table 4.9 above further indicate that the coefficient of fiscal deficit maintained its negative and significant effect on exchange rate in the short run as well. However, unlike the long run where fiscal deficit was statistically significant at the 1% significance level, fiscal deficit is statistically significant at 10% level of significance. The coefficient of fiscal deficit is -0.021 and this implies that in the short run, a 1 % increase in fiscal deficit will cause exchange rate in Ghana to fall by about 2.10%. This revelation confirms the economic a priori expectation of the study as well as the work of Khan et al (2004) who posits that budget deficit (fiscal deficit) impacts negatively on exchange rate for Pakistan. However, this finding contradicts the work of Gulcan and Bilman (2005) for Turkey and Korsu (2009) for Sierra Leone.

Finally, the results of the short run ECM from Table 4.9 indicate that the coefficient of external debt stock maintained its positive influence on exchange rate in the short run and is also statistically significant at the 5% level of significance. The coefficient of external debt stock is 0.220 and it implies a 1% rise in external debt stock will cause exchange rate in Ghana to rise by approximately 0.22% in the short run. This re-affirms the economic a priori expectation of the

study. This is because as the external debt stock increase, government will need more foreign currencies to pay its accumulated external debt. When this happens there will be higher demand for foreign currencies relative to the local currency hence making the exchange rate to rise.

In sum, in the short run, the study found fiscal deficit to be significantly affecting exchange rate negatively in Ghana while external debt stock that was controlled for was found to be significantly affecting exchange rate positively in Ghana. Hence the study rejects the null hypothesis and concludes that fiscal deficit affects exchange rate in Ghana in the short run.

4.6 Results of the Long Run Effects of Fiscal Deficit on Inflation

In section 4.3.3, the results of the bounds test also confirmed cointegration between inflation and its covariates. In this section, to achieve the third objective of the study, the long run coefficients of equation (7) are estimated from the ARDL (1, 1, 1, 1, 0, 0) selected based on Akaike Information Criterion (AIC). The ARDL (1, 1, 1, 1, 0, 0) results are presented in Table 4.10. Note that FD is in levels and the remaining variables are in logs.

Table 4.10: Estimated Long Run Coefficients of the Effects of Fiscal Deficit on Inflation

ARDL (1, 1, 1, 1, 0, 0) selected based on AIC 33 observations used for estimation from 1981 to 2013				
Variable	Coefficient	Standard Error	T-Ratio	P-value
FD	-0.110140**	0.043118	-2.554362	0.0177
ln *BMS*	0.009190	0.596626	0.015403	0.9878
ln *INT*	-0.381334	0.458053	-0.832511	0.4137
ln *EXCH*	-0.111784*	0.056861	-1.965911	0.0615
ln *EDS*	0.512085**	0.236625	2.164126	0.0411
Constant	1.299429	2.361507	0.550254	0.5874

* and ** denote statistical significance at 10% and 5% respectively Dependent variable is ln *INF*

Source: Authors own Estimation, 2016.

The results from Table 4.10 reveal that in the long run, interest rate influences inflation negatively but not statistically significant. This contradicts the economic a priori expectation of the study. Also, though broad money supply has the expected sign of positively influencing inflation in Ghana in the long run, it is not statistically significant.

The results from Table 4.10 further indicate that in the long run, fiscal deficit affects inflation negatively and is statistically significant at the 5% significance level. The coefficient of fiscal deficit is -0.110 and this means that a 1 % increase in fiscal deficit will lead to a fall in inflation in Ghana by 11.0 % in the long run. This finding contrasts the economic a priori expectation of the study as well as the works of Khundrakpam and Pattanaik (2010) in India, Ekanayake (2012) for Sri Lanka, Odim et al (2014) for Nigeria and Solomon and Wet (2004) in Tanzania who found increasing inflation to be associated with rising fiscal deficit. This suggests that fiscal deficit is not monetized since an increase in fiscal deficit leads to a fall in inflation. This indicate that fiscal deficit is instrumental in long run price stabilization and possibly price reduction provided fiscal deficit is directed towards the productive sectors of the economy. This implies that fiscal deficit incurred is directed towards the productive sectors making production more efficient thereby reducing cost of production and ultimately output price reduction.

Also, the results from Table 4.10 reveal that in the long run, exchange rate affects inflation negatively and is statistically significant at 10% significance level. The coefficient of exchange rate is -0.112 and it means that a 1% rise in exchange rate will cause inflation in Ghana to fall by about 0.11%. Exchange rate affects inflation negatively through interest rate. High interest rate attracts FDI which increases the demand for the domestic currency. As the demand for the

domestic currency increases, exchange rate falls. Inflation would have risen up due to the higher interest rate that attracted FDI. Hence inflation increases as exchange rate falls.

Lastly, the results from Table 4.10 indicate that in the long run, external debt stock influences exchange rate positively and is statistically significant at the 5% level of significance. The coefficient of external debt stock is 0.512 and it implies a 1% rise in external debt stock will cause inflation in Ghana to rise by approximately 0.51% in the long run. This re-affirms the economic a priori expectation of the study. This is because as the external debt stock increase, government will need more foreign currencies to pay its accumulated external debt. When this happens there will be higher demand for foreign currencies relative to the domestic currency hence making the exchange rate to rise in the long run.

In a nutshell, in the long run, the study found fiscal deficit to be significantly affecting inflation negatively in Ghana while exchange rate and external debt stock that were controlled for were found to be significantly affecting inflation negatively and positively respectively in Ghana.

Hence the study rejects the null hypothesis and concludes that fiscal deficit affects inflation in Ghana in the long run.

4.6.1 Results of the Short Run ECM for the Effects of Fiscal Deficit on Inflation

In the previous section, the long run cointegration model for inflation was estimated and this section is to model the short run dynamic relationship among the variables within the ARDL (1, 1, 1, 1, 0, 0) framework. The ECM of ARDL (1, 1, 1, 1, 0, 0) for inflation is also estimated and presented in Table 4.11 to show how the short run reconcile with its long run inflation model.

The R-squared and F-statistic values for the inflation model from Table 4.11 indicate that the overall regression is significant at 1%. Specifically, the R-squared value of 0.8736 shows that up

to about 87.36% of the variations in the regressand (inflation) are explained by the regressors while 12.64% of the variations in inflation are explained by factors outside the model. The Fstatistic values further suggest the joint significance of the regressors at 1% in the ECM for the inflation model.

The results from Table 4.11 disclose that the coefficient of lagged ECM is significantly negative at the 1% level of significance. This confirms that there exists convergence to achieve long run equilibrium. The coefficient of the ECM of -0.831 means that about 83.10% of deviations from equilibrium can be adjusted in the long run within one year. That is, it takes (1/0.831195= 1.203) a little over one year to achieve long run and stable equilibrium when there is a shock to the system. This is because the speed of adjustment is very strong and that explains why it takes very little time for equilibrium to be established when there is a shock to the system.

Table 4.11: Estimated Short Run ECM for the Effects of Fiscal Deficit on Inflation

ARDL (1, 1, 1, 1, 0, 0) selected based on AIC
33 observations used for estimation from 1981 to 2013

Variable	Coefficient	Standard Error	T-Ratio	P-value
ΔFD	-0.006233	0.025575	-0.243731	0.8096
Δ ln *BMS*	-2.084579** [2]	0.534161	-3.902532	0.0007

[2] , ** and *** denote statistical significance at 10%, 5% and 1% respectively Dependent variable is INF

Source: Authors own Estimation, 2016.

Δln *INT*	1.039184***	0.356829	2.912274	0.0078
Δln *EXCH*	-0.092914*	0.050494	-1.840091	0.0787
Δln *EDS*	0.425643**	0.187145	2.274395	0.0326
ecm(-1)	-0.831195***	0.112069	-7.416786	0.0000

ecm = ln *INF* – 0.1101**FD* – 0.0092*ln *BMS* – 0.3813*ln *INT*

– 0.1118*ln *EXCH* – 0.5121*ln *EDS* – 4.0959**C*

R-squared	0.873639	**Mean of Dependent Variable**	-0.044294
Adjusted R-squared	0.824194	**S.D of Dependent Variable**	0.723767
S.E. of Regression	0.303470	**Akaike Info. criterion**	0.697981
Sum of Squared Residual	2.118167	**Schwarz Bayesian Criterion**	1.151468
Log likelihood	-1.516689	**Hannan-Quinn Criterion**	0.850566
F-statistic (P-value)	17.66872 (0.0000)	**Durbin-Watson Statistic**	2.049335

Moreover, the short run ECM results from Table 4.11 reveal that the coefficient of broad money supply this time is negative and also statistically significant in influencing inflation in the short run at the 1% level of significance. The coefficient of broad money supply is -2.085 and it signifies that a 1% increase in broad money supply will cause inflation to fall by about 2.09% in Ghana in

Again, the results of the short run ECM from Table 4.11 show that the influence of fiscal deficit on inflation remained negative in the short run as well but this time around not statistically significant unlike the long run that was significant at the 5% significance level. The coefficient of fiscal deficit of -0.006 indicate that a 1% rise in fiscal deficit will cause inflation to fall by approximately 0.60% in the short run.

the short run. This contradicts the economic a priori expectation of the study. Broad money supply affects inflation negatively through its impact on interest rate. When money supply increase there will be excess supply of money over the demand for money and as a result interest rate will fall. When interest rate falls, producers will secure loans at relatively lower rates thereby reducing cost of production which will ultimately reduce output price. As output price continues to fall, there will be a general fall in the prices of goods and services (a fall in inflation). This implies that the negative relationship between money supply and inflation is evident through interest rate.

Unlike the long run estimates, the results of the ECM from Table 4.11 indicate that the short run coefficient of interest rate show that interest rate influences inflation positively and is statistically significant at the 1% level of significance. The coefficient of interest rate of 1.039 suggests that a 1% rise in interest rate will lead to about 1.04% rise in inflation in the short run in Ghana. This confirms the economic a priori expectation of the study. Higher interest rate means producers acquire loans at relatively higher rates. When this happens, cost of production goes up and output price will increase if the demand for output is relatively inelastic. When this continues for a while there will be a general rise in the prices of goods and services (inflation) due to the increase in interest rate.

Also, the results of the short run ECM from Table 4.11 indicate that the coefficient of exchange rate maintained its negative influence on inflation in the short run and is also statistically significant at the 10% level of significance. The coefficient of exchange rate is -0.093 and it implies that a 1% rise in exchange rate will cause inflation in Ghana to fall by approximately 0.09% in the short run. Exchange rate affects inflation negatively through interest rate. High interest rate attracts FDI which increases the demand for the domestic currency. As the demand for the domestic

currency increases, exchange rate falls. Inflation would have risen up due to the higher interest rate that attracted FDI. Hence inflation increases as exchange rate falls.

Finally, the results of the short run ECM from Table 4.11 indicate that the coefficient of external debt stock maintained its positive influence on exchange rate in the short run and is also statistically significant at the 5% level of significance. The coefficient of external debt stock is 0.426 and it implies a 1% rise in external debt stock will cause inflation in Ghana to rise by approximately 0.43% in the short run. This re-affirms the economic a priori expectation of the study. This is because as the external debt stock increase, government will need more foreign currencies to pay its accumulated external debt. When this happens there will be higher demand for foreign currencies relative to the local currency hence making the exchange rate to rise.

In sum, in the short run, the study found fiscal deficit to be insignificantly affecting inflation negatively in Ghana while interest rate and external debt stock that were controlled for were found to be significantly affecting inflation positively in Ghana. Also, broad money supply and exchange rate that were controlled for were found to be significantly affecting inflation positively in Ghana in the short run. Hence the study fails to reject the null hypothesis and concludes that fiscal deficit does not affect inflation in Ghana in the short run.

4.7 Models Diagnosis and Stability Tests

This section is divided into two (2) sections. The first part is the models' diagnostic tests while the second part is concerned with the stability tests of the models. In the first part, diagnostic tests like serial correlation, functional form, heteroscedasticity and normality of the model are considered as diagnostic checks for the estimated ARDL models. In the second part, the Cumulative Sum

(CUSUM) and Cumulative Sum of Squares (CUSUMSQ) are the two stability tests conducted in relation to the estimated models. The results of the diagnostic tests are presented in Table 4.7.

Table 4.12: Model Diagnostic statistics

Test Statistic	Fiscal Deficit Model	Exchange Rate Model	Inflation Model
X^2_{Auto} (1)	2.293517 [0.1313]	1.353431 [0.2864]	0.309034 [0.7374]
$X^2_{F.\ form}$ (1)	0.584755 [0.4544]	0.021073 [0.8863]	0.479030 [0.4961]
X^2_{Norm} (2)	1.667394 [0.434440]	0.586720 [0.745754]	0.550724 [0.759297]
X^2_{Hetero} (1)	0.463590 [0.5012]	0.966593 [0.5111]	0.396042 [0.9244]

X^2_{Auto}, $X^2_{F.\ form}$, X^2_{Norm} and X^2_{Hetero} are lagrange multiplier statistics for test of serial correlation, functional form misspecification, normal errors and heteroscedasticity respectively. These statistics follow Chi-Square distribution with degree of freedom in parenthesis ( ) whiles values in parenthesis [ ] are P-values.

Source: Author's own Estimation, 2016.

The null hypotheses for testing serial correlation (autocorrelation), correct functional form, normality and heteroscedasticity are: no autocorrelation, correct functional form, normally distributed residuals and no heteroscedasticity (homoscedasticity) respectively. The autocorrelation test is based on the lagrange multiplier test of residual serial correlation while the functional form is based on Ramsey's RESET test using the square of the fitted values. Also, the normality test is based on a test of Skewness and Kurtosis of residuals whereas the heteroscedasticity test is based on the regression of squared residuals on squared fitted values.

From Tabble 4.12, it is evident that we fail to reject the null hypotheses at the 5% level of significance for the given P-values of 0.1313, 0.2864 and 0.7374 for no autocorrelation for the fiscal deficit model, exchange rate model and inflation model respectively. Also, we fail to reject the null hypotheses at the 5% level of significance for the given P-values of 0.4544, 0.8863 and

0.4961 for correct functional form for the fiscal deficit model, exchange rate model and inflation model respectively. Furthermore, we fail to reject the null hypotheses at the 5% level of significance for the given P-values of 0.4344, 0.7458 and 0.7593 for normally distributed residuals for the fiscal deficit model, exchange rate model and inflation model respectively. Finally, we fail to reject the null hypotheses at the 5% level of significance for the given P-values of 0.5012, 0.5111 and 0.9244 for no heteroscedasticity for the fiscal deficit model, exchange rate model and inflation model respectively.

With this revelation, it is proven that the fiscal deficit model, exchange rate model and inflation model respectively passes all the diagnostic tests. This shows that the fiscal deficit model, exchange rate model and inflation model respectively do not suffer from any problem related to serious serial correlation, functional form, normal distribution and heteroscedasticity respectively. In addition to showing the results of the normality test in Table 4.7, the graphical results of the normality tests for the various models are presented in APPENDIX D.

The second part of this section considers the stability test. The stability of coefficients in a regression is very important in any standard econometric analysis. This study utilizes the CUSUM (Cumulative Sum) and the CUSUMSQ (Cumulative Sum of Squares) of recursive residuals to test for the stability of the coefficients in the fiscal deficit, exchange rate and inflation regression models respectively. The stability test shows whether or not the parameter estimates are stable over time (Pesaran et al, 2001). Stability test is justified in time series data analysis when there is uncertainty about any structural change that might have taken place. The CUSUM and CUSUMSQ results are shown in APPENDIX E.

The null hypothesis of the CUSUM and CUSUMSQ is that the coefficient vector is the same in every period (Bahmani-Oskooee, 2004). The CUSUM and CUSUMSQ statistics are plotted

against the critical bound at the 5% level of significance. Bahmani-Oskooee (2004) argues that if the plots of these statistics remain within the critical bounds at the 5% level of significance then we fail to reject the null hypothesis and conclude that all the coefficients are stable. From Appendix 3, the plots of both the CUSUM and CUSUMSQ residuals are within the 5% critical bound for all the three models. It is now evident from all graphs in APPENDIX E that both the CUSUM and CUSUMSQ tests affirm the stability of the coefficients of the fiscal deficit, exchange rate and inflation functions respectively which ensures a stable relationship between the variables in the model.

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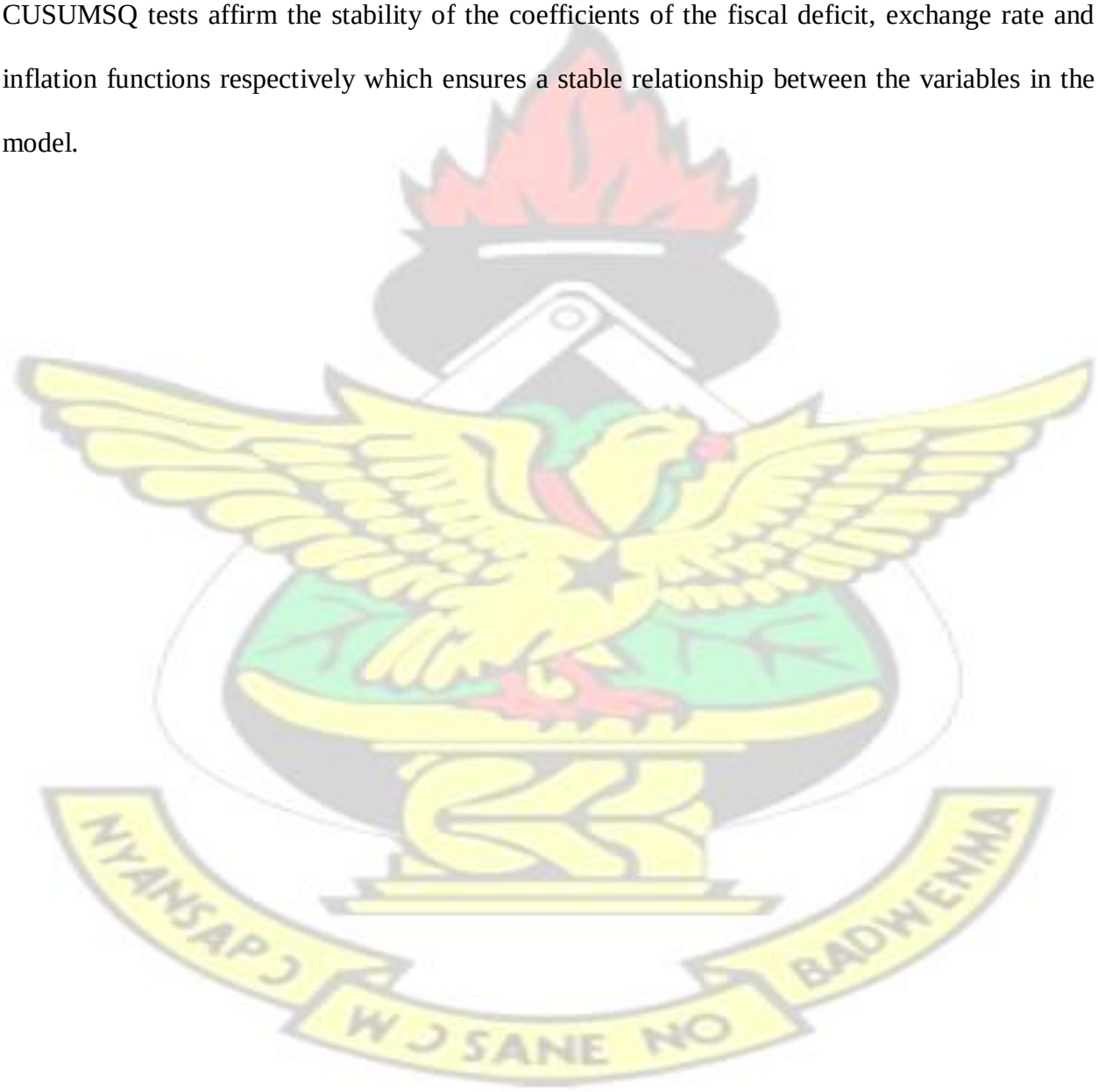

CHAPTER FIVE

SUMMARY OF MAJOR FINDINGS, CONCLUSION AND POLICY IMPLICATIONS

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5.1 Introduction

This chapter is organized into four sections. The first is a summary of the major research findings emanating from the study. The next is about the main conclusions drawn from the study based on the research findings and the third section involves policy implications drawn from the study. The final section is limitations of the study and recommendations for further studies.

5.2 Summary of Major Findings

The main purpose of the study was to analyze fiscal deficit and its effect on exchange rate and inflation in Ghana from 1980 to 2013 using annual time series data from the IMF, Bank of Ghana and the World Bank. The analysis was done by first regressing fiscal deficit on six economic variables and democracy. Secondly, the study investigated the effects of fiscal deficit on exchange rate and inflation controlling for other macroeconomic variables in an ARDL model. The adoption of the ARDL model was motivated by the fact the variables used were a mix of I(0) and I(1) and the need to capture both the short run and long run dynamics. The study also examined the trending behavior of fiscal deficit, government revenue and government expenditure.

The results of the bounds test for cointegration disclosed that there exist long run equilibrium relationship for the fiscal deficit model, exchange rate model and inflation model respectively. Summarized below are major findings from the study's trend analysis as well as the long run and short run models.

Firstly, the study found that Ghana recorded fiscal deficit throughout the entire period under consideration. This is evident from the fact that government expenditure have been increasing while government revenue have either remained stable or oscillate downwards and in any period under consideration, government expenditure exceeded government revenue.

Secondly, the study found that in the long run fiscal deficit model, GDP, total debt servicing, total government revenue and democracy significantly influence fiscal deficit in Ghana negatively where an increase in any of these variables will lead to a reduction in fiscal deficit. Also, it was found that in the long run international trade and broad money supply influenced fiscal deficit positively in Ghana and hence an increase in any of the two variables will result in rising fiscal deficit. In the short run of the fiscal deficit model, GDP, total debt servicing and democracy maintained their significant and negative influence on fiscal deficit and government consumption expenditure also changed to positively influence fiscal deficit significantly. Unlike the long run, international trade and broad money supply changed signs to affect fiscal deficit negatively though not statistically significant while total government revenue also maintained its negative sign but not statistically significant.

Finally, the study found that both the long run and short run effects of fiscal deficit on exchange rate were negative. The results suggest that an increase in fiscal deficit will lead to a fall in exchange rate and ultimately cause the domestic currency to devalue. Also, the study found that although the long run and short run effects of fiscal deficit on inflation remained negative, it was only significant in the long run.

5.3 Conclusions

This study sought to analyse fiscal deficit and its effects on exchange rate and inflation in Ghana from 1980 to 2013. Three main objectives were investigated; the first objective analysed the trends in fiscal deficit, government expenditure and government revenue. The second objective investigated the determinants of fiscal deficit. The last objective examined the effects of fiscal deficit on exchange rate and inflation. The study used the ARDL framework in achieving these objectives. Bounds test has been applied to find out the existence of long run relationship among the variables in the models. From an evaluation of the overall results and analysis, it can be concluded that this research work reinforced or opposed the findings by other researchers in similar studies.

The study concludes that fiscal deficit in Ghana is determined by real GDP per capita, total debt servicing, international trade, broad money supply, total government revenue, government consumption expenditure and democracy. Also, fiscal deficit affects exchange rate and inflation negatively in Ghana during the period under co (Ghosh, 1995) (Placeholder3)nsideration. Lastly, while government revenue was found to be relatively stable or oscillating, government expenditure was found to be increasing which account for the persistent fiscal deficit in Ghana from 1980 to 2013.

5.4 Policy Implications

The major findings of this study have important implications for fiscal policy in Ghana. The premise is that fiscal deficit is a serious challenge of modern time and must be addressed earnestly. Based on the major findings, the ensuing policy implications can be drawn from this study.

1. The finance ministry should enforce stringent fiscal measures by restraining all needless government expenditures while the Ghana revenue authority put in place revenue

enhancing measures at the same time. Total government expenditure that increased continuously throughout the entire period under consideration is unjustified looking at the relatively stable or falling levels of government revenue. Broadening the tax net to capture majority of the informal sector who get away without paying taxes and reducing the tax collection lag through an efficient tax collection system is the first step towards this. The second step is the adoption of austerity measures by all at all levels of government and administration.

2. Higher GDP growth should be targeted by the government to improve the overall growth and development of the economy. This is because higher GDP will help in reducing fiscal deficit in Ghana. Higher GDP growth can be achieved when investors both domestic and foreign invests in the economy. Domestic and foreign investors will invest on the condition that there is political stability, rule of law, transparency, general security, favorable business climate, reliable energy supply among others. All these are important in improving productivity in the short run and economic growth in the long run which will ultimately help bring down the country's fiscal deficit.
3. The government may give a priority to amortizing its accrued debt either by enhancing revenue mobilization or generating internal resources for funds so that fiscal deficit in the long run can be reduced.
4. Because Ghana's trade balance has remained negative over the years, efforts should be made to stimulate export promotion. This can be done through value addition, adherence to strict international standards so that Ghana's export can compete on the international market and exploring more avenues in non-traditional exports. Also, import substitution industries should be the focus of the government to cut down the country's imports.

5. Since an increase in broad money supply leads to an increase in fiscal deficit in Ghana, the focus of the monetary authority may be to reduce the supply of money. This will restrict credit to the government and will compel the government to focus on generating more revenue like widening the tax base.

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5.5 Limitations of the Study and Recommendations for Further Studies

Several limitations were encountered in the course of the study. The study was hindered by financial and material constraints as well as time. Secondary data was needed on variables like wage bill and unemployment but were not available; these would have helped in the analysis. However, these problems seem not to have significantly affected the findings presented in this study, since they corroborate both the theoretical and empirical knowledge on the determinants of fiscal deficit and its effects on exchange rate and inflation.

There are other factors which might be important in determining fiscal deficit but are not considered in the present study. Also, fiscal deficit can affect the real sectors of the economy.

Thus, examining the effects of fiscal deficit on Ghana's real sector within the ARDL model can also be considered in future studies. Besides, other modeling techniques can be used to analyse the data used for the present study in future studies to ascertain if there is a significant difference in the results by different methods.

NYANSAPƆ WƆ SANE NO BADWENMA

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APPENDICES

APPENDIX A: ARDL Results for the Fiscal Deficit Model Appendix A1: Bounds Test for the Fiscal Deficit Model

ARDL Bounds Test
Date: 03/13/16 Time: 14:29
Sample: 1981 2013
Included observations: 33
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	7.320110	7

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.03	3.13
5%	2.32	3.5
2.5%	2.6	3.84
1%	2.96	4.26

Test Equation:
Dependent Variable: D(FD)
Method: Least Squares
Date: 03/13/16 Time: 14:29
Sample: 1981 2013
Included observations: 33

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	-5.992964	2.023293	-2.961985	
D(LNTRA)				0.0080
D(LNBMS)	-8.351809	3.903698	-2.139461	0.0456
D(LNGR)	0.469847	2.257438	0.208133	0.8373
D(LNGCE)	8.102878	2.737925	2.959496	0.0081
D(DEM)	-3.954683	1.756731	-2.251160	0.0364
C	37.98683	35.09076	1.082531	0.2926
LNGDP(-1)	-5.970994	6.372300	-0.937023	0.3605
LNTDS(-1)	-2.593937	1.384335	-1.873778	0.0764
LNTRA(-1)	3.708728	1.726311	2.148354	0.0448
LNBMS(-1)	4.204977	4.304632	0.976849	0.3409
LNGR(-1)	-3.051268	2.373697	-1.285449	0.2141

LNGCE(-1)	-7.029530	2.471295	-2.844472	0.0104
DEM(-1)	-4.897434	1.768684	-2.768970	0.0122
FD(-1)	-0.871628	0.155243	-5.614597	0.0000

R-squared	0.822884	Mean dependent var	0.009091
Adjusted R-squared	0.701700	S.D. dependent var	3.159751
S.E. of regression	1.725757	Akaike info criterion	4.225625
Sum squared resid	56.58654	Schwarz criterion	4.860507
Log likelihood	-55.72282	Hannan-Quinn criter.	4.439244
F-statistic	6.790341	Durbin-Watson stat	2.382344
Prob(F-statistic)	0.000111		

Appendix A2: Long Run and Short Run Results for the Fiscal Deficit Model

ARDL Cointegrating And Long Run Form
Dependent Variable: FD
Selected Model: ARDL(1, 0, 0, 1, 1, 1, 1, 1)
Date: 03/13/16 Time: 14:32
Sample: 1980 2013
Included observations: 33

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	-9.493079	5.133917	-1.849091	
D(LNGDP)				0.0801
D(LNTDS)	-3.663695	1.198339	-3.057311	0.0065
D(LNTRA)	-2.425571	2.163780	-1.120988	0.2763
D(LNBMS)	-2.849057	3.572041	-0.797599	0.4350
D(LNGR)	-0.182901	1.961711	-0.093235	0.9267
D(LNGCE)	8.196298	2.470706	3.317391	0.0036
D(DEM)	-4.952065	1.618649	-3.059381	0.0065
CointEq(-1)	-0.974779	0.145375	-6.705288	0.0000

Cointeq = FD - (-9.7387*LNGDP -3.7585*LNTDS + 3.9308*LNTRA + 8.8440 *LNBMS -4.7633*LNGR -2.3773*LNGCE -7.6696*DEM + 43.2637)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.

	-9.738696		-1.933053	
LNGDP		5.037986		0.0683
LNTDS	-3.758486	1.131529	-3.321601	0.0036
LNTRA	3.930830	1.522929	2.581098	0.0183
LNBMS	8.844040	3.808729	2.322045	0.0315
LNGR	-4.763271	2.339340	-2.036160	0.0559
LNGCE	-2.377250	2.995171	-0.793694	0.4372
DEM	-7.669556	1.653197	-4.639226	0.0002
C	43.263663	24.634547	1.756219	0.0952

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APPENDIX B: ARDL Results for the Exchange Rate Model

Appendix B1: Bounds Test for the Exchange Rate Model

ARDL Bounds Test
Date: 03/13/16 Time: 14:45
Sample: 1983 2013
Included observations: 31
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	7.600042	4

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Test Equation:
Dependent Variable: D(LNEXCH)
Method: Least Squares
Date: 03/13/16 Time: 14:45
Sample: 1983 2013
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
		0.158293		
D(LNEXCH(-1))	0.189674		1.198243	0.2464
D(LNEXCH(-2))	-0.275053	0.119779	-2.296328	0.0339
D(FD)	-0.015374	0.013772	-1.116315	0.2790
D(LNINF)	0.030824	0.110555	0.278808	0.7836
D(LNINF(-1))	-0.079195	0.089527	-0.884594	0.3880
D(LNINF(-2))	-0.142820	0.057591	-2.479908	0.0233
D(LNINT)	-0.019729	0.214868	-0.091819	0.9279
C	0.458009	0.439391	1.042373	0.3110
FD(-1)	-0.053972	0.024471	-2.205564	0.0407
LNINF(-1)	0.142683	0.168643	0.846065	0.4086
LNINT(-1)	-0.490388	0.181057	-2.708481	0.0144
LNEDS(-1)	0.105468	0.095786	1.101079	0.2854
LNEXCH(-1)	-0.090951	0.037397	-2.432041	0.0257

R-squared	0.872301	Mean dependent var	0.286103
Adjusted R-squared	0.787168	S.D. dependent var	0.317843
S.E. of regression	0.146633	Akaike info criterion	-0.706677
Sum squared resid	0.387021	Schwarz criterion	-0.105328
Log likelihood	23.95350	Hannan-Quinn criter.	-0.510652
F-statistic	10.24634	Durbin-Watson stat	2.320058
Prob(F-statistic)	0.000010		

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Appendix B2: Long Run and Short Run Results for the Exchange Rate Model

ARDL Cointegrating And Long Run Form
Dependent Variable: LNEXCH
Selected Model: ARDL(3, 1, 3, 1, 0)

Date: 03/13/16 Time: 14:47
Sample: 1980 2013
Included observations: 31

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
		0.139530		
D(LNEXCH(-1))	0.099351		0.712041	0.4856
D(LNEXCH(-2))	-0.256262	0.102391	-2.502775	0.0222
D(FD)	-0.020912	0.011992	-1.743805	0.0982
D(LNINF)	-0.000071	0.085082	-0.000836	0.9993
D(LNINF(-1))	0.067696	0.051529	1.313741	0.2054
D(LNINF(-2))	-0.144896	0.048758	-2.971718	0.0082
D(LNINT)	-0.102430	0.187017	-0.547705	0.5906
D(LNEDS)	0.220296	0.078836	2.794357	0.0120
CointEq(-1)	-0.092847	0.028393	-3.270027	0.0043

Cointeq = LNEXCH - (-0.6524*FD + 1.6557* LNINF -7.1857*LNINT + 2.3727 *LNEDS + 5.2471)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	-0.652445	0.198676	-3.283959	
FD				0.0041
LNINF	1.655686	1.821737	0.908850	0.3754
LNINT	-7.185691	2.411020	-2.980353	0.0080
LNEDS	2.372671	0.931850	2.546194	0.0203
C	5.247100	2.889172	1.816126	0.0860

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	11.57588	5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.26	3.35

APPENDIX C: ARDL Results for the Inflation Model

Appendix C1: Bounds Test for the Inflation Model

ARDL Bounds Test
Date: 03/13/16 Time: 14:53

Sample: 1981 2013
Included observations: 33

5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

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Test Equation:
Dependent Variable: D(LNINF)
Method: Least Squares
Date: 03/13/16 Time: 14:53
Sample: 1981 2013
Included observations: 33

Variable	Coefficient	Std. Error	t-Statistic	Prob.
		0.026903		
D(FD)	0.011794		0.438375	0.6652
D(LNBMS)	-1.400169	0.532766	-2.628111	0.0150
D(LNINT)	1.335462	0.359296	3.716883	0.0011
C	-1.039451	2.432115	-0.427386	0.6731
FD(-1)	-0.066150	0.042985	-1.538908	0.1375
LNBMS(-1)	0.600493	0.612080	0.981070	0.3368
LNINT(-1)	0.209199	0.450570	0.464298	0.6468
LNEXCH(-1)	-0.150683	0.054809	-2.749224	0.0114
LNEDS(-1)	0.118700	0.211408	0.561474	0.5799
LNINF(-1)	-0.872756	0.119946	-7.276219	0.0000

R-squared	0.873639	Mean dependent var	-0.044294
Adjusted R-squared	0.824194	S.D. dependent var	0.723767
S.E. of regression	0.303470	Akaike info criterion	0.697981
Sum squared resid	2.118167	Schwarz criterion	1.151468
Log likelihood	-1.516689	Hannan-Quinn criter.	0.850566
F-statistic	17.66872	Durbin-Watson stat	2.049335
Prob(F-statistic)	0.000000		

Appendix C2: Long Run and Short Run Results for the Inflation Model

ARDL Cointegrating And Long Run Form

Dependent Variable: LNINF
Selected Model: ARDL(1, 1, 1, 1, 0, 0)
Date: 03/13/16 Time: 14:56
Sample: 1980 2013
Included observations: 33

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FD)	-0.006233	0.025575	-0.243731	0.8096
D(LNBMS)	-2.084579	0.534161	-3.902532	0.0007
D(LNINT)	1.039184	0.356829	2.912274	0.0078
D(LNEXCH)	-0.092914	0.050494	-1.840091	0.0787
D(LNEDS)	0.425643	0.187145	2.274395	0.0326
CointEq(-1)	-0.831195	0.112069	-7.416786	0.0000

Cointeq = LNINF - (-0.1101*FD + 0.0092*LN BMS - 0.3813* LNINT - 0.1118 *LNEXCH + 0.5121*LNEDS + 1.2994)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FD	-0.110140	0.043118	-2.554362	0.0177
LNBMS	0.009190	0.596626	0.015403	0.9878
LNINT	-0.381334	0.458053	-0.832511	0.4137
LNEXCH	-0.111784	0.056861	-1.965911	0.0615
LNEDS	0.512085	0.236625	2.164126	0.0411
C	1.299429	2.361507	0.550254	0.5874

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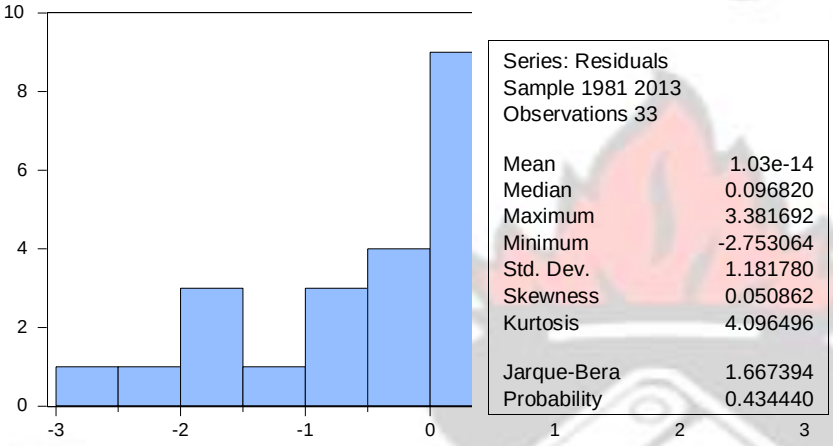
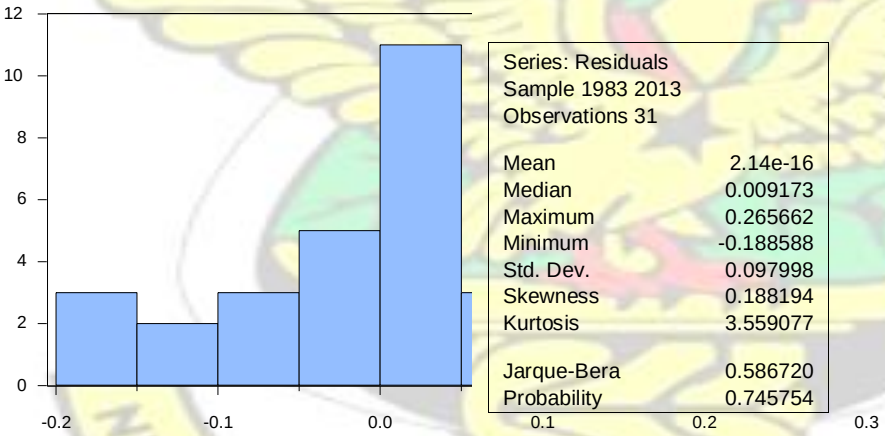
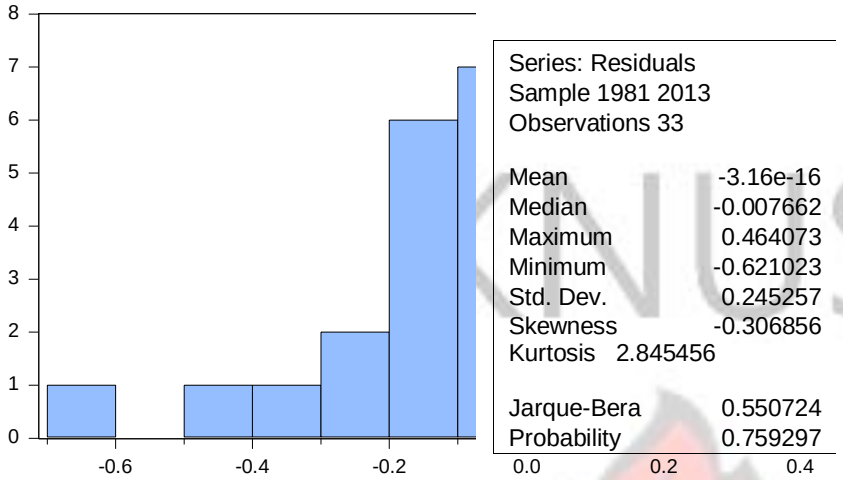
APPENDIX D: TESTS FOR NORMALITY Appendix D1: Normality Test for the Fiscal Deficit Model



Appendix D2: Normality Test for the Exchange Rate Model

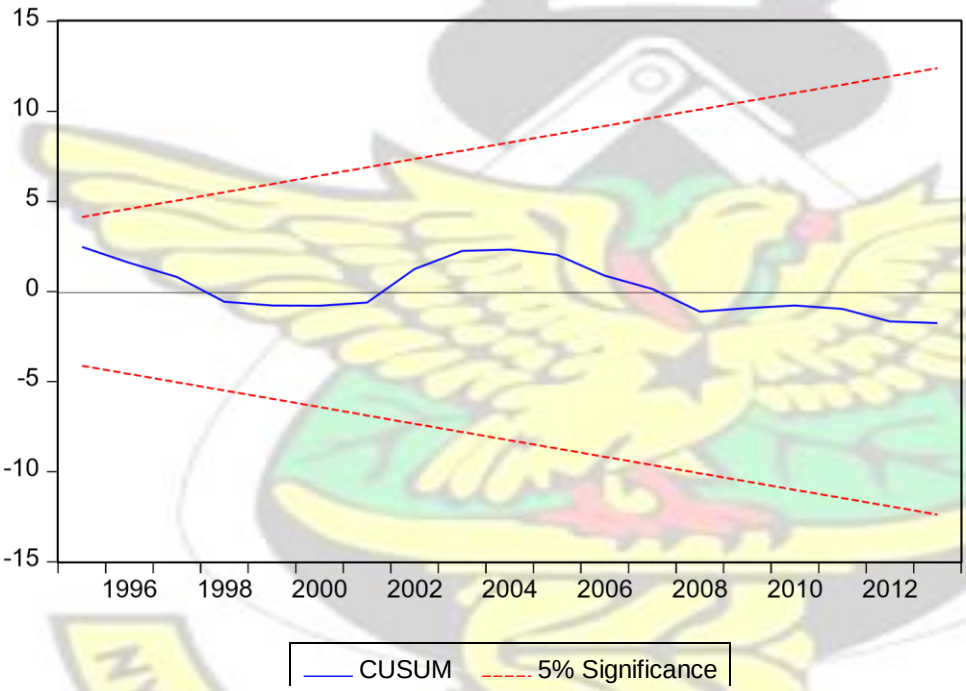


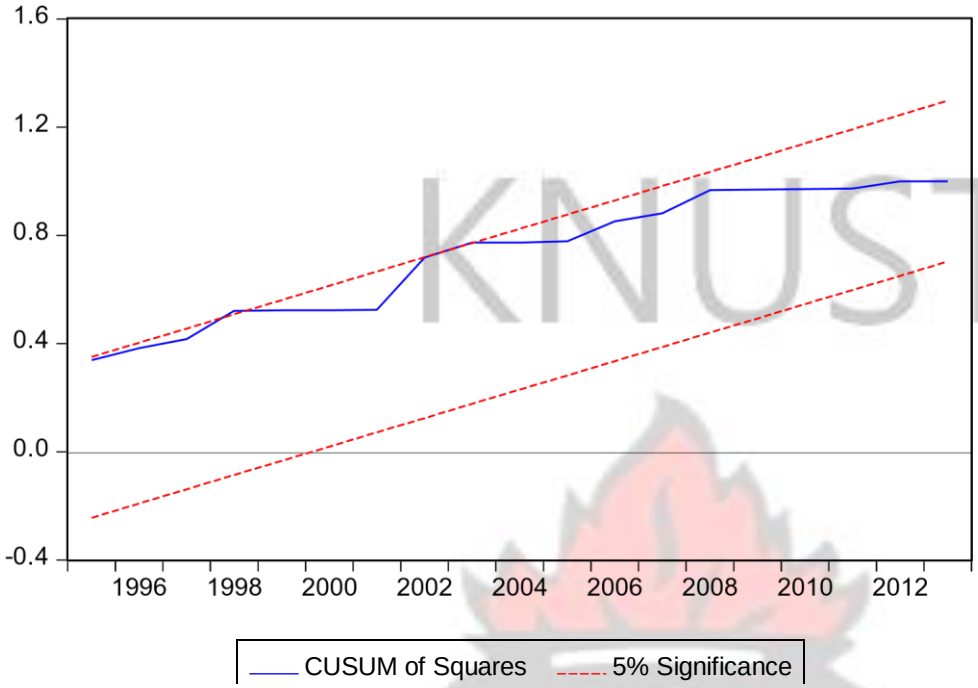
Appendix D3: Normality Test for the Inflation Model



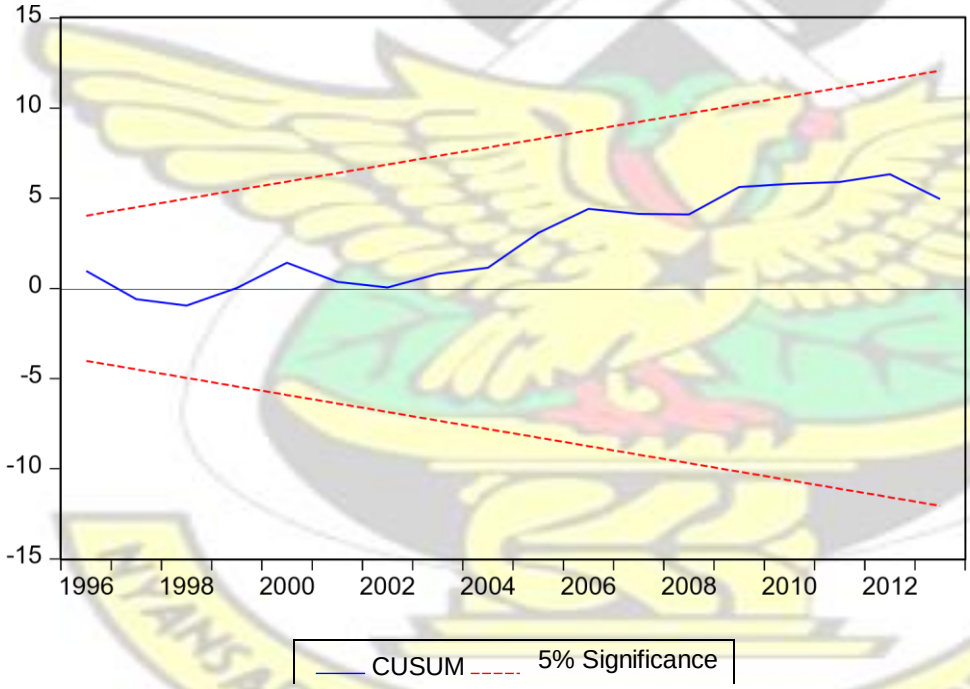
APPENDIX E: CUSUM and CUSUMSQ Tests

Appendix E1: CUSUM and CUSUMSQ Tests for the Fiscal Deficit Model





Appendix E2: CUSUM and CUSUMSQ Tests for the Exchange Rate Model



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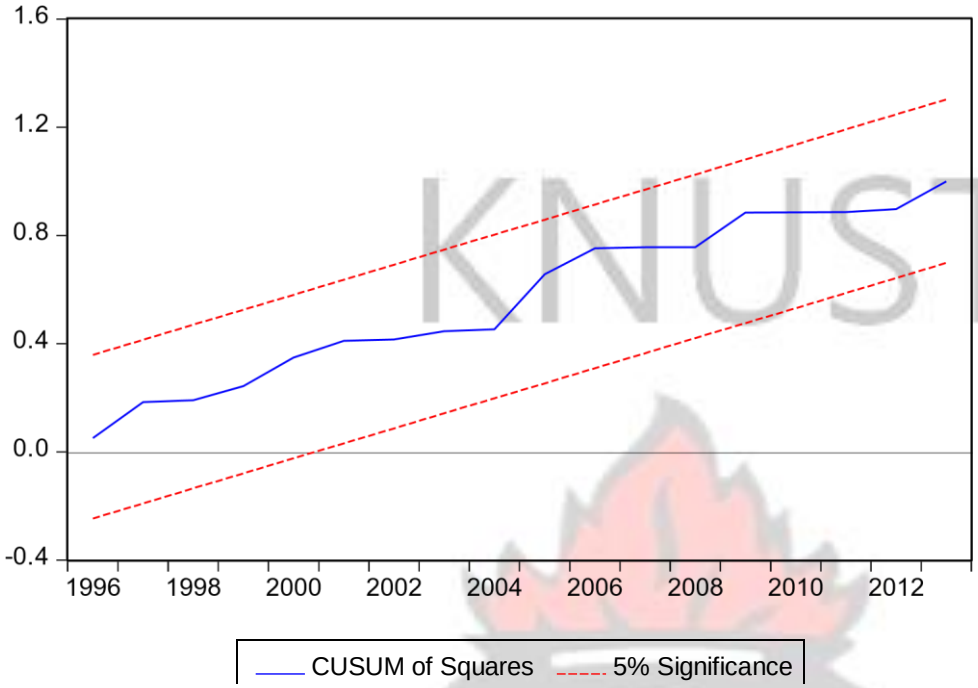
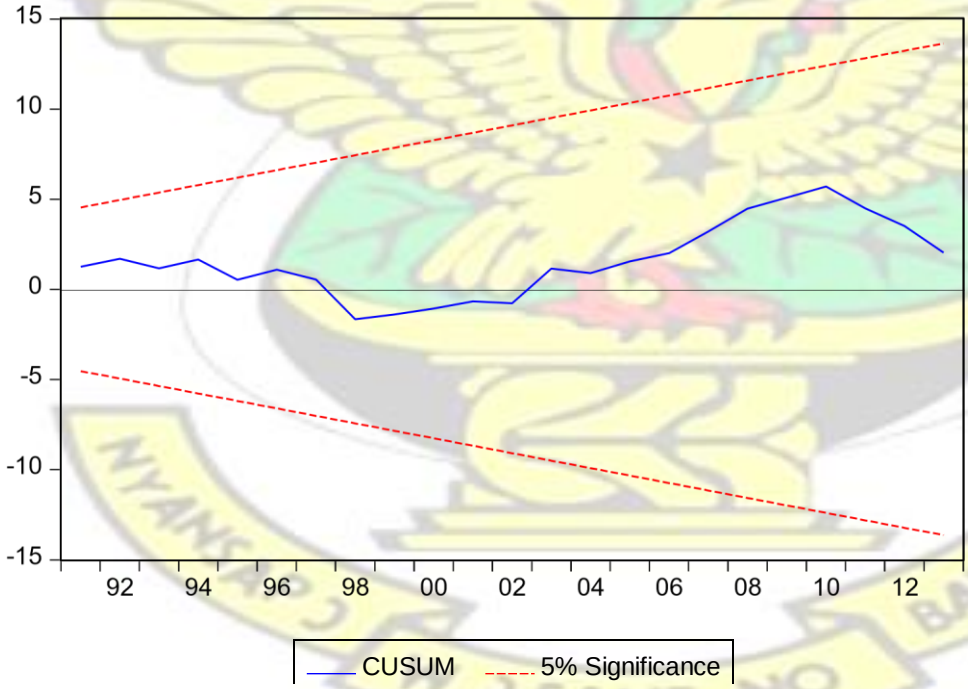


Appendix E3: CUSUM and CUSUMSQ Tests for the Inflation Model



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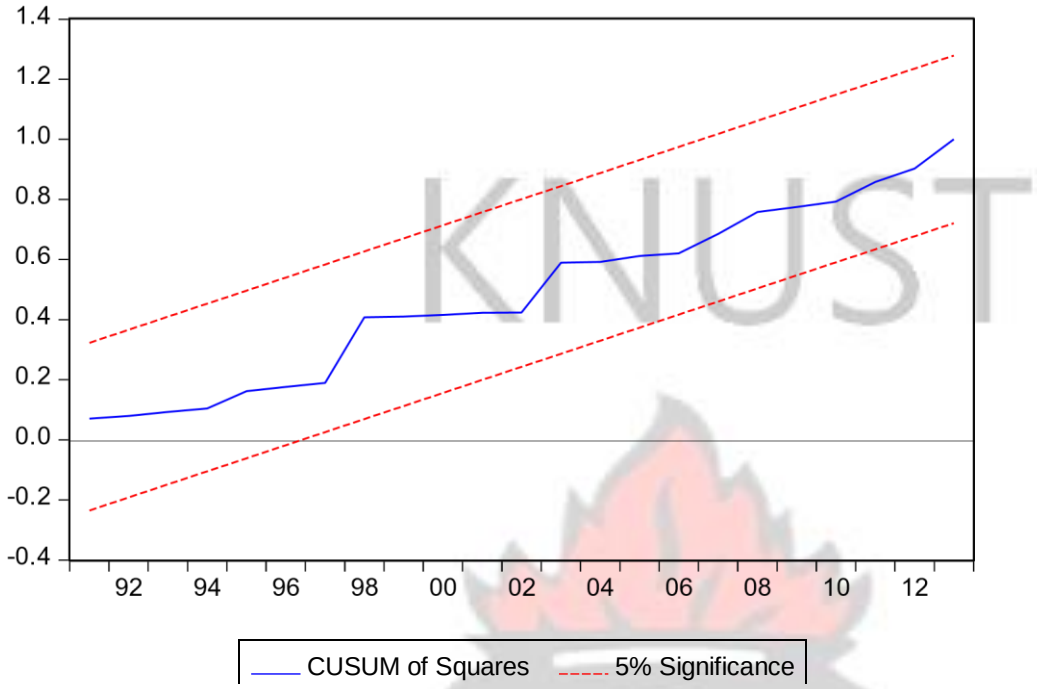

APPENDIX F: DATA

YEAR	FD	lnGDP	lnTDS	lnTRA	lnEXCH	lnINF	lnINT	DEM	lnGCE	lnBMS	LNGR	LNGE	lnEDS
1980	-11.1	6.514797	1.279046	2.869098	-8.19928	3.913425	2.60269	1	2.412695	3.010128	1.419971	2.414663	3.455315
1981	-6.7	6.450338	1.035322	2.310457	-8.19928	4.757922	2.970414	1	2.173642	2.93226	1.705838	2.790674	3.598849
1982	-4.6	6.345803	1.014776	1.843773	-8.19928	3.104388	2.351375	0	1.868895	2.986187	1.65058	2.212989	3.607418
1983	-2.5	6.264273	1.28427	2.446244	-7.03273	4.811164	2.674149	0	1.76837	2.581731	2.248551	2.641982	3.72399
1984	-3.1	6.312834	1.1132	2.934635	-5.62774	3.680477	2.890372	0	1.982277	2.532108	2.102914	2.33911	3.80431
1985	-4.1	6.330125	1.280665	3.188163	-5.21516	2.332672	2.917771	0	2.240539	2.778819	2.27192	2.489977	3.925852
1986	-5.5	6.350776	1.403231	3.603095	-4.71995	3.20134	3.020425	0	2.403963	2.810607	2.602616	2.792391	3.892543
1987	-5.1	6.369294	2.128728	3.825335	-4.17566	3.684245	3.157	0	2.364084	2.83615	2.493288	2.628285	4.197658
1988	-5.3	6.396816	2.371868	3.743498	-3.9009	3.44551	3.258097	0	2.272949	2.903069	2.446426	2.607493	4.099737
1989	-5.3	6.419374	2.174654	3.715664	-3.61246	3.227784	3.258097	0	2.286944	2.851284	2.476706	2.595628	4.161534
1990	-5.7	6.424699	1.840953	3.754858	-3.42296	3.617895	3.496508	0	2.231253	2.731767	2.126206	2.47199	4.168902

1991	1.7	6.448238	1.514911	3.749229	-3.30326	2.892117	2.995732	0	2.249515	2.729159	2.195445	2.428424	4.160913
1992	-6.1	6.458203	1.583411	3.828502	-3.13075	2.308181	3.401197	1	2.493831	3.010621	1.998909	2.670279	4.207263
1993	-5.6	6.4778	1.616969	4.03723	-2.73535	3.217268	3.555348	1	2.67065	2.984671	2.395438	2.984924	4.358252
1994	-11.5	6.483471	1.853213	4.127475	-2.34791	3.213673	3.496508	1	2.619098	3.115292	2.578473	3.077957	4.560286
1995	-8.8	6.498294	1.808711	4.050446	-2.12098	4.08533	3.806662	1	2.491011	3.058237	2.758553	3.187137	4.463481
1996	-11.4	6.519227	1.878277	4.279509	-1.81065	3.840764	3.806662	1	2.488542	3.034472	2.514304	3.114626	4.445552
1997	-10.3	6.537343	2.010314	4.447368	-1.58574	3.328096	3.806662	1	2.514112	3.157851	2.234841	2.954754	4.437115
1998	-8.1	6.560742	1.875739	4.389493	-1.46462	2.682676	3.610918	1	2.334487	3.116622	2.315699	2.908375	4.455439
1999	-8.2	6.580943	1.734797	4.403116	-1.32184	2.518395	3.295837	1	2.383552	3.179719	2.111909	2.821736	4.455836
2000	-7.9	6.593585	2.092652	4.754007	-0.60712	3.226575	3.295837	1	2.319601	3.284289	2.59697	3.00072	4.862255
2001	-7.7	6.60823	1.687264	4.700898	-0.33365	3.493637	3.295837	1	2.274429	3.29287	2.884689	3.138836	4.834634
2002	-5	6.62702	1.214107	4.579742	-0.23267	2.695724	3.198673	1	2.28978	3.448399	2.544197	2.839722	4.780955
2003	-3.5	6.651999	1.810074	4.577667	-0.14299	3.283725	3.068053	1	2.44523	3.466048	2.834213	3.013867	4.658594
2004	-3.1	6.680532	1.178945	4.601868	-0.10592	2.535645	2.917771	1	2.499205	3.508556	2.863172	3.02252	4.449005
2005	-1.7	6.711872	1.141307	4.586716	-0.09841	2.715899	2.74084	1	2.728386	3.442659	2.81463	2.971798	4.213898
2006	-3.64	6.747885	0.346127	4.188488	-0.08725	2.390154	2.525729	1	2.42515	3.118834	2.836971	3.080579	2.89758
2007	-4.82	6.784491	-0.05123	4.179819	-0.06694	2.373298	2.60269	1	2.447454	3.184698	2.862201	3.130569	3.031162
2008	-7.92	6.839815	0.048013	4.24153	0.056246	2.804701	2.833213	1	2.419693	3.285038	2.769396	3.194255	2.995124
2009	-4.29	6.854108	0.062577	4.270992	0.342738	2.957548	2.890372	1	2.462472	3.330775	2.799717	3.15487	3.323071
2010	-5.91	6.907318	0.137293	4.322512	0.358391	2.370951	2.60269	1	2.337499	3.390136	2.816007	3.261169	3.380763
2011	-0.88	7.024428	-0.11063	4.541329	0.413334	2.166403	2.525729	1	2.811997	3.4151	2.951101	3.192696	3.382702

2012	-5.85	7.086882	0.276553	4.616887	0.58546	2.214931	2.70805	1	3.043913	3.407179	2.922624	3.424686	3.457632
2013	-10.8	7.139	0.683654	4.497442	0.669904	2.451723	2.772589	1	2.815307	3.356897	2.816785	3.285263	3.521377

Source: Authors Calculation Using Annual Data from the World Bank WDI 2014, IMF"s IFS 2014 and Bank of Ghana (BoG) 2014

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