UNIVERSITY OF CAPE COAST

THE EFFECT OF FISCAL BALANCE ON PUBLIC DEBT IN GHANA

BY

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DECLARATION

Candidate's Declaration

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

Candidate's Signature: …… Date: …….

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Supervisors' Declaration

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

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ABSTRACT

Increasing public debt in Ghana has been a major concern to the nation. There are several factors that influence the public debt which includes the fiscal balance, that is either a deficit or a surplus. This study investigated the influence of fiscal balance on total public debt. The results reveal that fiscal deficit increases total debt and domestic debt while surpluses lead to an increase in the external debt though the long run relationship between fiscal deficit and external debt is not significant. Other variables that were included in the model are foreign direct investment, GDP growth rate, gross fixed capital formation, inflation at consumer price index, trade openness, current account balance, executive constraint, interest payment, population growth rate and democratization. It is recommended that since fiscal deficit is detrimental to both the total debt and domestic debt, the government must consider reducing its expenditure through fiscal adjustments. Also, the government agencies that are in charge of the revenue must consider the broadening of their tax base in order to reduce the deficits. If the domestic revenue increases, the deficit would reduce as well and thereby reducing the public debt.

KEY WORDS

Autoregressive distributed lags

Fiscal deficits

Public debt

Domestic debt

External debt

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DEDICATION

This thesis is dedicated to my entire family and friends

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LIST OF ACRONYMS

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criterion
AR	Autoregressive
ARDL	Autoregressive Distributive Lag
CAB	Current Account Balance
CPI	Consumer Price Index
CUSUM	Cumulative Sum
CUSUMSQ	Cumulative Sum of Squares
DD	Domestic Debt
DEMOC	Democratization
DF	Dickey Fuller
ECM	Error Correction Model
ED	External Debt
ERP	Economic Recovery Program
FB	Fiscal Balance
FDI	Foreign Direct Investment
FMOLS	Fully Modified OLS estimation
GDPG	Gross Domestic Product Growth Rate
GFCF	Gross Fixed Capital Formation
GMM	Gaussian Mixture Model
IMF	International Monetary Fund
INT	Interest payment

KPSS	Kwiatkowski-Phillips-Schmidt-Shin
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
OPEN	Trade Openness
PGR	Population Growth Rate
PP	Phillip Perron
SBC	Schwarz Bayesian Criterion
SIC	Swartz Information Criteria
SNA	System of National Account
TD	Total debt
VAR	Vector Autoregressive
VECM	Vector Error Correction model
WDI	World Development Indicator
XCONST	Executive Constraint

CHAPTER ONE

INTRODUCTION

Background to the Study

From 2008 to 2016, Ghana has experienced a substantial growth in her debt stock. Public debt became a major concern after Ghana had reached the critical 60% mark of debt to GDP ratio according to the budget statement, which is an IMF and World Bank benchmark for classifying a debt stock as dangerously high. The country has been dependent almost solely on borrowing for any project it embarks on recently. This is an issue of concern to many researchers. Ghana's external debt and total public debt stock rose substantially after its Multilateral debt relief initiative (MDRI) in 2005-2006, which indicates a rise in risks to debt sustainability. The highly expansionary fiscal position in 2006-2008, financed by external borrowing triggered a very rapid deterioration in the country's debt sustainability. This trend was inflated by the resulting balance of payments pressures and currency depreciation, which led to a revaluation of foreign currency-denominated claims relative to domestic GDP.

The debt surge was effectively ceased when the country's access to market financing was closed off due to the global financial crisis in 2007-2008.Ghana's public debt stood at US$8.1 billion at the end of 2008, which was equivalent to 34.8 percent of GDP. This reflected an amount larger than previously assumed fiscal deficit in 2008 (14.5 percent of GDP, or 4 percentage points higher than that of the previous year) as well as the impact of the currency depreciation on the foreign debt-to-GDP ratio. Public sector external and domestic debts were almost equal in

size as the year 2008, each close to US$4 billion (17.4 percent of GDP each). External debt rose rapidly from 10.7 percent in 2006 to 17.4 percent of GDP in 2008 which reflects the US$750 million Eurobond issued at end-2007, together with new concessional bilateral financing and loans contracted from the IDA over the period following the multilateral debt relief initiative.

External debt summed up to US$6.2 billion at end-2010, up from US$4.0 billion in 2008, reflecting largely borrowing from bilateral and multilateral institutions, including the IMF under the ECF program. Non-concessional and other commercial borrowings were at a more modest pace. Total public debt of GH₵17.5 billion at the end of 2010 was higher than projected by the IMF in the combined first and second reviews under the Extended Credit Facility (ECF) programme. The total public debt at end-2010 represented 38.9 percent of GDP, some 1.0 percentage point higher than the projected figure in the fund's 2010 debt sustainability analysis. This reflected a larger than programed fiscal deficit and the associated increases in domestic financing. In addition, the government continued to accumulate domestic payment arrears in 2010.

At end-2010, the outstanding stock of arrears and public liabilities in respect of SEO debts was estimated at 9 percent of GDP, which was not previously reflected in the public debt data (IMF, 2015). About one-third of these liabilities were to be cleared in 2011 through a mixture of cash payments and bond issues. The arrears element was therefore added to the debt balance at the end of 2011 and any residual balance was to be regularized through cash outlays or bond issues in 2013, adding to the debt burden over that period. Ghana's public debt situation

worsened after 2012 as the country faced a high risk of debt distress and increased overall debt vulnerability. Total public debt rose sharply from GH₵35.1 billion or 48.4 percent of GDP in 2012 to GH₵76.1 billion, equivalent to 67.1 percent of GDP in 2014 and by end March 2015, the total public debt stock had reached GH₵88.2 billion, representing 65.3 percent of GDP.

This implies that the debt stock increased by GH₵53.1 billion or over 151 percent between December 2012 and March 2015, made up of GH₵6.2 billion in 2012, GH₵16.8 billion in 2013, GH₵24.2 billion in 2014, and GH₵12.0 billion in the first three months of 2015. Of the end-March 2015 public debt stock, GH₵51.7 billion, equivalent to 38.3 percent of GDP, was external debt, implying that external debt increased by GH₵35.0 billion, or some 210 percent, between 2012 and March 2015 (Table 1). Ghana has long relied on foreign assistance or loans from international financial institutions to supply part of its foreign currency needs. But non-concessional external debt stock increased significantly from US$90.1 million to US$838 million in 2008, and then to USD1.45 billion in 2012.

In 2007 and the last two years also the country borrowed from the international financial markets, selling Eurobonds, which were denominated in dollars. The government also plans to issue another Eurobond in 2015 to raise US$1.0 billion, bringing to a total of US$2.75 billion Eurobonds issued in three consecutive years. This has enabled the country's external debt to once again overtake domestic debt as the major contributor to total public debt (see Table 1). The sharp increase in non-concessional external financing reflected the fundamental changes in the country, notably the overall strong performance of the

economy and, more importantly, the middle-income status achieved by the country in 2010. But while the gradual shift from concessional to non-concessional borrowing does not directly affect the size of the total public debt and thus the debt-to-GDP ratio, it has serious implications for the country's debt sustainability as most of the non-concessional loans have shorter maturities and larger debt service costs.

The sudden surge in borrowing in Ghana is due to a variety of factors, including the rapid growth and better economic policies pursued in the country (notably between 2009 and 2012), low global interest rates, and continued economic stress in many major advanced economies, especially in Europe. It appears that cheaper external debt than domestic debt has also been a major contributory factor behind the country's increased borrowing from the international capital market. For instance, in January 2013, the government would have paid about 4.3 percent on a 10-year borrowing in dollars (reflected in secondary market yields on the offering). However, had the government borrowed in local currency domestically, the interest rate would have been at least 23 percent on three-month treasury bills.

After inflation differentials are taken into account, the difference between the U.S. dollar and local currency borrowing costs reached 10.6 percentage points (5.4 percentage points, taking into account currency depreciation). This difference was due in part to changes in the policy environment, i.e., monetary policy was tightened in 2012 and the fiscal deficit increased significantly. But the difference was also due to a low external cost that reflected foreign investors 'search for yield,

their confidence in the country's willingness to repay its debt obligations, and its ability to do so because of its positive growth prospects. Another factor was the underdeveloped domestic debt markets with an investor base dominated by commercial banks which raises domestic borrowing costs and probably the effects of restricting foreign investors from buying domestic government securities with a maturity of less than three years.

Long-term external debt constituted 100 percent of the total external debt stock in 2006-2012, and was owned mainly by official (multilateral and bilateral) creditors. Official creditors accounted for on average 81.1 percent of the total external debt during 2007-2012, comprising an average of 48.5 ,7 percent for multilateral creditors and 32.6 percent for bilateral creditors. Private creditors' share in the total external debt averaged 18.8 percent over 2007-2012. Over the years there has been consistent increase in the debt till debt to date. This calls the for the attention of this study.

Problem Statement

Public funding has been crucial in developmental projects, financing capital and budgetary support (Suma, 2007). After independence, Ghana attempted to achieve a certain level of development and growth. The funds to achieve this objective was scarce hence the need for borrowing. Ghana's debt started growing after independence due to the failure to service the previous debt. Also, the concessional aid of Ghana reduces as it is moving towards middle-income status

and this has led to non-concessional borrowing to meet its external financing needs (Mensah et al., 2014).

A number of identified studies reveal factors responsible for the high debt accumulation in African countries. Brafu-Insaidoo (2016), for instance, found fiscal balance to be an important determinant of external debt accumulation in Ghana. The interest payment which is a key determinant of external debt has been excluded in this work. Also, the effect of domestic debt has been overlooked. Ghana's domestic debt forms about 46 percent of the total debt hence its effect should not be overlooked. This thesis fills the existing research gap by looking at the influence of fiscal balance on both the external and domestic public debt. Al-Fawwaz (2016) studied the determinants of public debt in Jordan by using the ARDL technique He however excluded the influence of fiscal balance on public debt. The fiscal balance is very important in the analysis with the view that it indicates the role of the government on the public debt. This work therefore addresses the gap by including the fiscal balance variable in the model.

Another previous study is by Samia et al (2017), who studied the macroeconomic determinants of public debt in Tunisia. The limitation of this study is that it does not disaggregate the public debt into domestic and external public debt and this work seeks to address this gap as well. Ameyaw (2017) also studied the determinants of public debt. The limitation of this study is that the variables influencing the public debt are too few. This work includes more variables in the analysis.

Purpose of the Study

The main purpose of the study is to

1. analyze the effect of fiscal balance on public debt in Ghana.

Specifically, the study seeks to quantitatively:

2. Examine the effect of fiscal balance on domestic debt in both the short run and the long run

3. Investigate the effect of fiscal balance on external debt in the short and long run

Hypothesis of Study

1. H0: There is no short and long run effect of fiscal balance on public debt.

   H1: There is a short run and long run effect of fiscal balance on public debt.

2. H0: There is no short and long run effect of fiscal balance on external debt.

   H1: There is a short and long run effect of fiscal balance on external debt.

3. H0: There is no short and long run effect of fiscal balance on domestic debt.

   H1: There is a short and long run effect of fiscal balance on domestic debt.

Significance of Study

Managing public debt is one of the main problems in Ghana. For effective management of the debt, the government must know the factors that contribute to the high debt in the country. Policy makers have always had a problem knowing

the appropriate policies that would help the country in reducing the public debt. The relationship between some economic variables with the public debt have been investigated. Also, it is shown how these variables affect both the domestic and external debt. This will help to come out with the appropriate strategies that would bring Ghana's debt under control by looking at the degree of influence the variables have over the public debt.

According to Outlook (2003), fiscal policy is less effective in countries that have high public debts. This means other factors are likely to influence debt more which is investigated in this work as well. Another importance of this work is to add to literature to broaden knowledge on the subject of public debt.

Delimitation of the Study

This study establishes the relationship between fiscal balance and public debt by the use of time series data from the year 1983 to 2016. Autoregressive Distributed lag model is used in the analysis. It is also known as the bounds testing approach to cointegration developed by Pesaran and Pesaran (1997) and later by Pesaran, Shin and Smith (2001). The study employed the following variables: public debt (also disaggregated into domestic and external debt), fiscal balance, foreign direct investment, GDP growth rate, gross fixed capital formation, inflation at consumer price index, trade openness, current account balance, executive constraint, interest payment, population growth rate, and democratization.

Limitation of the Study

The major limitation of this studies is the limited data. The study period could be extended backwards further than 1983 but this was not possible because data was not available for those years the variables used.

Organisation of the study

This study is structured into five chapters. Chapter one, which has been already presented. Chapter two, the next chapter, presents the overview of fiscal balance and public debt in Ghana. This chapter reviews relevant theoretical and empirical literature underpinning fiscal balance and public debt. The chapter three entails the methodology, which explains the techniques adopted in conducting the research. The chapter four is about the results and discussions. This is where the findings are discussed in relation to the literature review. Chapter five concludes and summarises all the chapters.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter explains the various theories underlying public debt and fiscal deficit. The theories reviewed include the Ricardian Equivalent theory, classical theory of public debt, neoclassical theory of public debt, Keynesian theory of public debt and the Post -Keynesian theory of public debt. It also includes the empirical reviews that explain the relationship between public debt and fiscal balance.

Ghana's Economy and Public Debt

In 1992, 1993, 1996 and latter half of 1999, there was poor performance of the Ghanaian economy, pertaining to growth and development which was coupled with occasional fiscal slippages. The fiscal balance for these years are negative according to the WDI data. The crises in the following years are as a of result poor management, in particular through the uncontrolled spending during elections, fiscal indiscipline (high government spending in pre-election period) and unfavorable external economic conditions (low cocoa and gold prices and high oil prices). Inflation increased, interest rates were unreasonably high and the exchange rate depreciated rapidly. There was a persistence in fiscal imbalances which caused the government to borrow more from the domestic economy and this also resulted to the problem of crowding out in the private sector. The fiscal deficits have resulted to high domestic borrowing, while the large inflows of external aid continued. This was helpful to the economic machinery at the time all facets were not working. By

the beginning of 2000, the domestic debt of Ghana has increased to almost 20 percent of national output, while the interest payment on the debt is more than both the health and education expenditure put together. The total government debt can be accrued to the poor performance of the public sectors in the country. The interest payment is far more than development and this has not helped the country (World Bank and IMF, 2001). Also, Ghana had the statutory obligation of servicing its external debt. Still in the year (2000), the stagnating growth was worsened by a decline in the price of the country's major exports and price shocks of crude oil. This has worsened the macroeconomic risk (Databank Economic Group Research, 2009) in 2001, the current account induced balanced of payments worsened and this completely distorted the foreign exchange market. The cedi has undergone depreciation, which has affected the domestic producers; however, exporters were favored in this situation. The problem of inflation also got worse (Sowa, 2002). Large fiscal deficit has resulted to very large debt stock that could not be sustained in the early 2000s. This was what resulted to the debt relief initiative under HIPC in the year 2001. The debt relief has caused Ghana's debt-to-GDP percentage has reduced from 198% of GDP in the year 2000 to 41% in 2006. After this relief, the debt began to shoot up again due to the 50th anniversary celebrated coupled with the hosting of the African cup of Nations among others (Databank Economic Group research, 2009).

An Overview of Ghana's Total Debt

The figure below represents Ghana's total debt in US dollars. It ranges from 1983 to 2015. (Source: World Development Indicator).

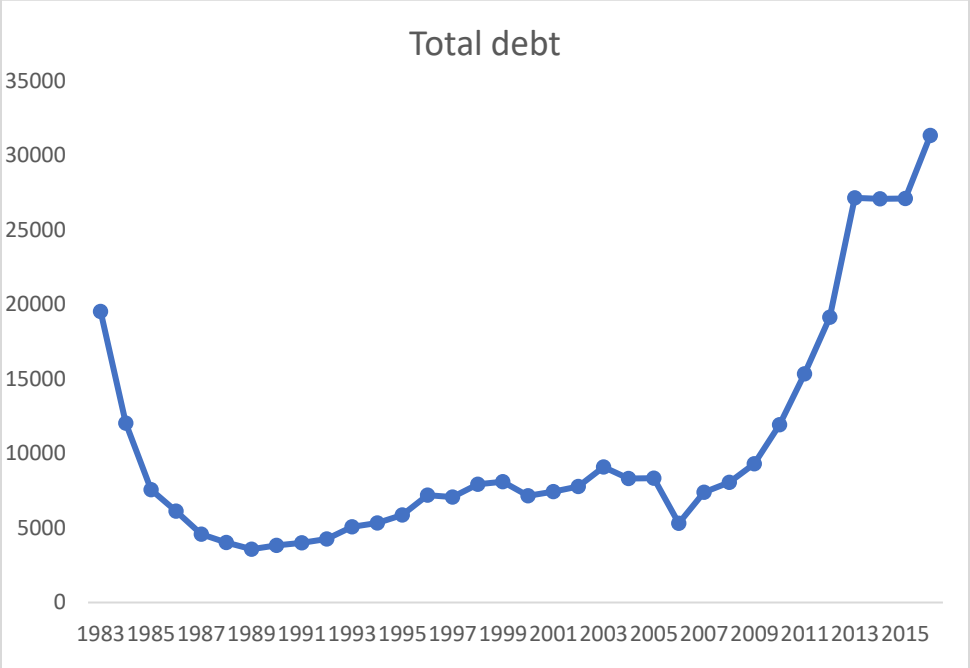


Figure 1-Total debt over the period 1983-2016

Source: Author's own construct using Excel 2016

There are a lot of factors that influence the trend of Ghana's debt. Some of these factors are domestic while the others are external. From Figure 2, it can be seen that the debt is falling initially. (from 1983 to 1989). In 1983, Ghana experienced a negative growth rate and this has led to a high amount of debt. Since 1984, Ghana began to recover and there has been an increase in economic growth for about 5% each year until 1990.

It then begins to increase and then fall through to the year 2005. In 2006, there is a tremendous fall in the total debt and this is due to full debt relief and debt forgiveness that has been granted to Ghana under the International debt relief

initiative by World Bank's International Development Agency, International Monetary Fund and the African Development Bank.

After 2006, Ghana's total debt kept increasing rapidly except for 2012 to 2015 where there seem to be no change in the debt stock and then a drastic increment finally in 2016. This picture clearly depicts that the economy is not doing well when it comes to debt servicing.

Relationship Between Domestic Debt and External Debt

The diagram below exhibits the trend and nature of Ghana's domestic and external debt over the years.

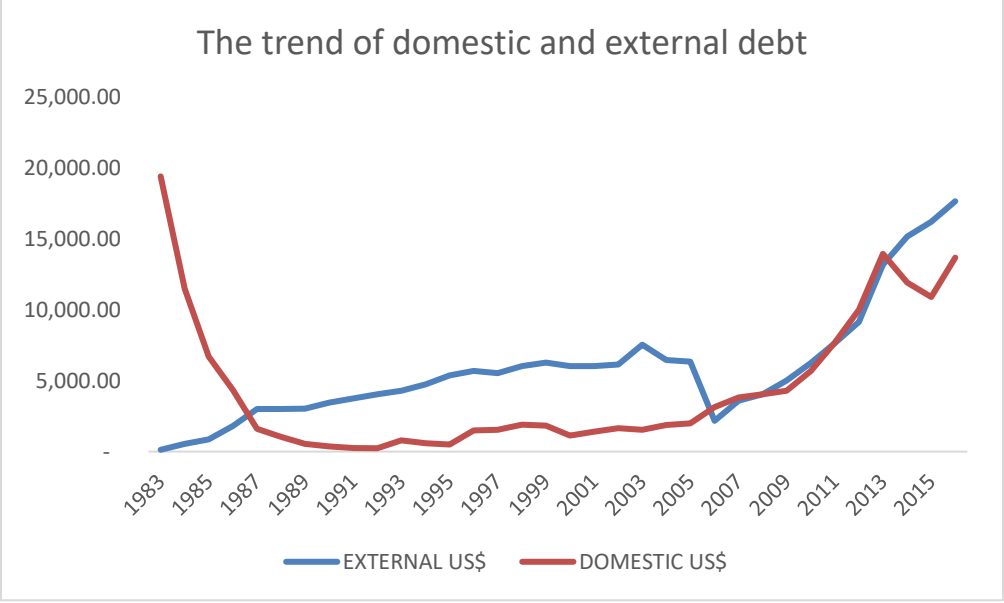


Figure 2-Relationship Between Domestic Debt and External Debt

Source: Author's own construct using Excel 2016

From the diagram above, it can be seen that the domestic debt was at its peak in the year 1983 while the external debt was at its minimum. This was likely as a result of the drought Ghana went through in that year. There was no external

debt because in that year the GDP growth rate was negative and the country was not credit worthy. After 1983, the domestic debt begun to decrease while the external debt also started increasing. This shows an inverse relationship between the two. After 1987, the external debt was bigger than the domestic debt through to 2006 where the external debt has drastically fallen. This is also due to the debt forgiveness. External and domestic debt both increase simultaneously until 2013 where external debt continuous to increase.

It can also be seen from the diagram that for about 10 years ago, there has not been so much gap between the domestic and external debt. This is why policy makers should not get worried about only external debt. For a long time now, there has been overemphasis on external debt without looking at the measures to address the problem of increasing domestic debt. This is the reason this work seeks to combine the two types debt in the analysis. External debt gets higher and higher even after the debt forgiveness. The situation is not getting any better. This tells us that debt forgiveness cannot help in solving the problem of Ghana's external debt.

Domestic Debt

The public debt consists of both the domestic debt and the external debt. The domestic debt has been a topic that is avoided when there's a talk on public debt. It is not only dangerous to borrow overseas but also within the economy. Reinhart (2010) says domestic debt is huge and accounts to almost two thirds of the total public debt. This research was done by taking 64 countries and performing a cross country analysis. This work however does not overlook the effects of

domestic public debt. If the domestic debt is overlooked, it can pose a huge problem to the private sector since the state borrows from the private sector. In this study, the domestic debt would be included in the public debt to analyze the fiscal influence on it.

The reason for the issuance of domestic debt

The need for domestic debt is as a result of the government deficit not being able to be fully funded through external borrowing and monetary policy implementation. In general, a deficit involves a change in the government net assets which can either be financed through the drawing down of assets or incurring new liabilities which could be of domestic and foreign nature. Using assets means the sale of property or reduction in deposits. This type of financing is constrained by the feasibility of privatization and this gives the government the option of borrowing domestically or externally to finance a large part of the fiscal deficits. The choice between foreign and domestic borrowing is based on the interest rates, the maturity structure and the risk involved. Most of the sub-Saharan African countries are resulting to external borrowing since the interest rates are usually below the market interest rates and with a high maturity period. These terms of external borrowing are more favourable compared to the domestic borrowing. One of the risks involved with the external borrowing is the currency risk which can increase along with foreign indebtedness. Beaugrand, Loko, and Mlachila (2002) however believe that the best way to finance fiscal deficits is through external

borrowing so far as it is available because they are most attractive compared to the high domestic interest rate.

Despite the advantages possessed by domestic borrowing, governments may still consider borrowing domestically due the following reasons. First, before the government borrows outside, it is assessed by its current Economic performance by the aid agencies' budget which the country may not meet. Secondly, international aid is associated with the financing of capital projects and do not often finance the recurrent expenditure of government. If this happens, then governments with large budget deficits are compelled to go into the domestic savings which includes domestic debt in clearing the budget gaps. Domestic debt is also used in achieving monetary policy targets. This is usually associated with countries with large balance of payment surpluses which is as a result of large aid inflows or export of oil. With this, the foreign exchange increases liquidity which undermines macroeconomic stability. The Central bank hence intervenes by the sale of government or central bank bills to stem inflationary pressures from too much liquidity.

Risk of domestic debt financing

Borrowing domestically can have severe consequences on the economy. First, domestic debt servicing takes away a great portion of government revenue especially when the domestic interest rates are very high compared to the domestic ones. Usually the interest on domestic debt rises quickly with short maturity period alongside with the outstanding debt stock especially in shallow financial markets.

In such markets, the financial resources are limited which implies that an increase in the debt stock will increase the domestic interest rate. The interest rates could be more severe if the investor base is narrow since a particular group of investors may hold the government hostage. (World Bank & IMF, 2001). A diverse source will reduce the monopoly power of some investors. This will not only reduce the costs associated with the debt but also reduce the roll-over risks. Therefore, a very significant way to manage debt is through the broadening of the investor base. This can be achieved by encouraging retail investors and also the development of pension and retirement funds to encourage these in government bonds.

Another risk concerning domestic borrowing is the crowding out of private investment. Through the issuing of domestic debt, government taps into the domestic private savings which could otherwise be used by the private sector. This is as result of an increase in domestic interest rates which affects the private investment. Even if the interest rate is under control, the domestic borrowing can lead to credit rationing and crowding out in the private sector (Easterly & Fischer, 1990). The presence of capital account restrictions since banks cannot easily circumvent higher interest rates through foreign borrowing. Finally, an investor base dominated by commercial banks may worsen the above-mentioned problems associated with the domestic borrowing. This will cause the government debt to increase more and more in the absence of nonbank investors such as pension funds and retirement funds to which the government could sell its debt in order to prevent the problem of crowding out. (World Bank & IMF, 2001).

The maturity of domestic debt

The government debt should always comprise adequately of both short-term and long-term paper. If the debt is only short term, the government may face problems of a sudden increase in interest rates due to frequent roll-overs of the debt which will raise the debt servicing highly. Also, there is a high administrative cost when there is a short-term maturity period of the debt. The investors look at the maturity period of debt since it is an investment opportunity for them. Government debt is the only investment opportunity besides lending to the private sector since there are no stock markets or the stock markets are highly illiquid (Gelbard & Leite, 1999). Blending the longer-term is very important for the investors to balance their assets with their liabilities so that the banks can increase profitability by taking a risk of the interest rate. The long-term paper also comes with its own disadvantages as well. First of all, the market may not agree on the long-term paper due to the risk of inflation and the default risks involved. It may also not be advanced sufficiently to take a long-term loan due to the lack of institutional investors (Impavido, Musalem, & Tressel, 2003). Last but not least, the government itself may avoid the long-term paper knowing that given a positively sloped yield curve, a long- term paper involves a higher interest payment.

External Debt

The external debt situation in Ghana continues to worsen as the debt to GDP ratio is on a rise. The export earnings are spent to service the external debt. The debts of many African countries are so huge compared to the foreign exchange

earned that they cannot service all with their foreign exchange. The debt of Ghana has increased so largely after it has enjoyed the debt forgiveness in 2005-2006. The country has borrowed largely thereafter that there has been a consistent increase in the external debt.

Theoretical Review on Public Debt

These theories explain the relationship between fiscal deficit and public debt.

Classical Theory of Public Debt

In the 18th century, most of the economists were in favor of public debt until the 19th century. The classical economists believe in the laissez faire system and do not expect the government to interfere in any economic activity. Equilibrium occurs automatically according to the classical economists. Government is not allowed to raise funds in the form of public debt. Also, it was said the government expenditure is wasteful and unproductive. As the supply of money is constant, any amount transferred to the public center would be incurred by the private employment and private expenditure and the funds borrowed would be withdrawn from productive uses to the unproductive channels. According to Adam Smith, public debt puts unnecessary burden on the community.

Another classic economist J.B Say looks at the functions of state of government in relation with his work on public finance, according to him, men in society have needs in common which gives rise to private consumption and these needs can be satisfied by the society. This cooperative effort can only be obtained when there is

an institution that controls the affairs of the society to see to it there is obedience in the limits permitted by the form of state Government.

J.B Say propounded the law of the market, which says that 'demand creates its own supply.' This suggests that there should be minimal intervention of the government in the affairs of the state, J.B Say was also not in support of public debt. According to him, there is a remarkable distinction between an individual borrower and a government borrower. He argues that while the individual borrows capital for consumption and expenditure, the government borrowing is unproductive because the capital is consumed and loss. The nation is also burdened with the repayment of interest on the loans which is a net addition to capital.

For David Ricardo, he refers to public debt as one of the worst things created to afflict a nation. Ricardo (1871). He however made some modifications in the views of Adam Smith and J.B Say by pointing out that the burden of annual debt was in the annual interest transfers but in the loss of original capital. He was of the view that the presence of debt did not affect the tax paying ability of a nation hence the payment of interest on taxes can cause capital movement to other countries. David Ricardo came up with the Ricardian Equivalence theory in the 19th century.

Ricardian Equivalence

This theory is formulated by David Ricardo in the 19th century. It expresses Ricardo's case against public borrowing. It explains that when a government increases its spending through public debt, demand is not affected since the public

would save the extra money towards expected increase in future taxes that would be used to finance the debt. Robert Barro further elaborates the Ricardian equivalence. Ricardo equivalence stipulates that a person's consumption is based on the future value after the tax is offset. Since the consumers believe that whatever money is gotten would be used to pay future taxes, the government does not stipulate demand through spending. In summary, the theory tries to explain that whether the government increases its spending through taxes or through external debt, demand remains unchanged.

There have been a lot of arguments against this theory. The assumptions underlying this theory are regarded not viable. The following are the assumptions regarding the theory:

1. Income Life cycle hypothesis which means the consumers smooth their consumption over a lifetime.

2. Consumers have rational expectations so when the tax is cut, they anticipate a rise in future taxes.

3. There is a perfect capital market for households to borrow in order to finance their consumption expenditure.

4. Intergenerational altruism meaning the taxes can be shifted to the next generation.

National debt according to T.R Malthus was not evil which it was supposed to be. He argues that those who live on the interest from external debt ensure effective

consumption which boost production. Also, he said debt once created is not a problem. Malthus later modified his view that is similar to the classical that the taxation in the payment of the tax is harmful. Debt must be paid off since its presence can be dangerous due to the changes in the value of money. The classical theory has mainly been criticized for two reasons. First of all, not every government expenditure is unproductive. Also, the view that the payment of debt is pushed to the future generations is not always true. The future generations do not inherit only liabilities but also assets.

Neoclassical View on Public Debt

The neoclassical Economist built upon the views of the classical economists. An important study welfare theory was developed by an economist called A.C Pigou. He based his study on the utilitarianism. In his 'Economics is Welfare' he said the main motive of studying Economics is for social improvement. Pigou talks about the ideal output. and says it is only when the ideal output fails that the state intervention is justified. Neutrality was his point, that the state should be neutral in the affairs of the nation. Pigou also said that if the monopoly market takes over perfect competition then the government can levy taxes on the monopolist.

1. State subsidies or state ownership is favored in the case of externalities
2. Public goods such as roads, telecommunications etc. should be state provided.

In a nutshell, both the classical and neoclassical economists believe in laissez-faire and self-adjustment market mechanism, which does not involve the interference of government. However, the state was to ensure the enforcement of the security laws through the police services.

Keynesian Theory of Public Debt

After the depression that has occurred in 1930, modern theories of public debt were developed. Public debt was seen more as a public asset than a liability. Public debt was assumed to cause a full employment since deficit spending makes the economy better. Keynes was of the view that public deficit results to full employment of resources that the private sector cannot employ. Keynes did not demarcate productive and unproductive expenditure as done by the classical economists. He argued borrowing for consumption expenditure is as good as borrowing for investment expenditure consumption expenditure induces the investment expenditure.

Keynes analysis reached its climax in AP Lerner's functional finance where he viewed government, government revenue and government debt as the sole instruments for the control of community expenditure. These were seen as the tools in used to achieve stable employment.

The Functional Finance theory says that, the absolute size of a nation's debt is not a problem at all and however large the interest repayment is, it does not burden the society as a whole. The on-burden thesis gives importance to some advantage of public borrowing. The economic effect of public debt should be

looked at in the light of the kind of expenditure for which the debt is incurred and in terms of its potential in generating an amount of income. The modern theory looks at the net burden of public debt. The theory further explains that additional flow of income generated by increased debt financed expenditure facilities the payment of taxes will be used to serve the debt. When there is unemployment, increase in public debt contributes to current capital for nation that would otherwise have not taken place. In addition, the modern theory also states that public borrowing promotes the development of more and more institutionalized sources of savings like Banks, Stock and Capital Market/ Markers and Insurance Companies. Public at large also can invest their savings in government bonds due to growth of public debt. This is what J.M. Buchanan calls "New Orthodoxy" which is based on three assumptions according to him. These assumptions are as follows:

1. Public debt creation does not involve the transfer of primary real burden to future generation
2. The analogy that is between the private debt and public debt is wrong.
3. There is a sharp and important difference between internal and external debt.

Post-Keynesian Theories on Public Debt

The post-Keynesian theories of public debt arise from the background of increasing debt and the developed nation going through a phase of inflation and price rise. Government spending was also increasing at a high rate and the non-developmental part of it was high as well. These new theories therefore revive the

arguments as to whether public debt is a burden or not and to measure the burden of public debt as well.

Buchanan (1958), public principles of public debt challenged the modern theories view that says that public debt is not a burden to the society and the burden of public debt cannot be shifted to the future generation. J.E Meade and R.A. Musgrave later agreed to Buchanan's idea. Buchanan tried to prove that in most general case:

1. The primary real burden of public debt is shifted to future generation.
2. The analysis public debt and private debt is fundamentally correct.
3. The external debt and domestic debt are fundamentally the same.

The Buchanan Thesis

The no burden thesis and the perception that primary real burden of debt cannot be shifted to the future generation according to Pigou's thesis that existed unchallenged until 1958 when it became lively after the publication of Buchanan's monograph. Buchanan in his work "Public Principles of Public Debt" explained what the "future generation" means. He considered the future generation as any set of individuals living in a time period after the debt had been created. He further explained that the actual length of time is not important at all. This means if we take this year as period one in which debt has been incurred, then those living in the subsequent periods are considered as the future generation. Buchanan also said he will not be concerned about whether public debt can be postponed to our children or grandchildren but rather focus on whether the debt can be postponed or not.

Buchanan's concept tried to refute that the primary burden of public debt cannot be shifted forward.

The "New Orthodoxy" argues that the burden of the debt is suffered by the people living at the time of debt creation because they sacrifice goods and services from private employment to the hands of government. Buchanan however opposed that by saying voluntary loan has no sacrifice. "If an individual freely chooses to purchase a government bond, he is, presumably, moving to a preferred position on his utility surface by so doing. He has improved, not worsened, his lot by the transaction. This must be true for each bond purchaser, the only individual who actually gives up a current command over economic resource. Other individuals in the economy are presumably unaffected, leaving aside for the moment the effects of the public spending. Therefore, it is impossible to add up a series of zeroes and/or positive values and arrive at a negative total. The economy, considered as the sum of the individual economic units within it undergoes no sacrifice or burden when debt is created."

Buchanan distinguishes between citizens' taxpaying role and bond purchasing role. He therefore objects to the notion that the government expenditure is borne by the citizens.

In a democratic society, individuals who are the taxpayers bear the cost of government expenditure but it is borne at different times under the two different methods of finance. If the debt is issued, the responsibility of tax-paying and the burden of government expenditure are both shifted to future periods. Buchanan opposes the prevailing argument that future generations bear no burden of any

public expenditure finance by debt which is incurred in the current periods because interest receivers and taxpayers are members of the same generations. The burden or objective cost of public expenditure is the reduction in taxpayers' consumption of private goods and services. The difference in the position of the taxpayers under the two methods of finance becomes crucial. As citizens, taxpayers individually vote for the State government project and the method of finance. They choose taxation if the burden is to be borne at once. They select debt finance if the reduction in consumption is to be postponed. A taxpayer will implicitly borrow the real resources from bond purchasers in the initial periods in exchange of giving them a future control over real future resources. Buchanan says the taxpayer at the time of incurring debt does not sacrifice anything because he has not paid any tax for the wasteful project. The burden therefore rests on the future taxpayers at the time of the debt repayment. Thus, the future generation bears the full burden of public debt. He continues by saying, "If the debt is created for productive public expenditure, the benefits to the future taxpayers must of course be compared with the burden so that, on balance, we may suffer a net benefit or a net burden. But a normal procedure is to separate the two sides of the accounts and to oppose a burden against a benefit, and this future taxpayer is the only one to whom such burden may be attributed."

In his 'Fiscal Theory & Political Economy: Selected Essays' he defines burden as a reduction in the utility of the individual and (utility is a function of current consumptions and current net worth) if he knows the correct amount of tax that is to be paid in future for service and offset the debt, then he bears no burden because it is the objective counter part of the earlier reduction in utility. So far

shifting the burden to future, there must surely be an uncertainty concerning future taxes (public debt illusion). However, in his latter paper he rejects this concept of burden. He now accepts burden or objective cost of public expenditure to the reduction in taxpayer's consumption of private goods and services.

Buchanan's additional thesis is that the analogy between private debt and public debt is fully valid because "Borrowing takes the place of "earning" additional revenue through taxation for governments. Borrowing in either case is a means of securing additional current purchasing power without undergoing supplementary current cost. The costs of expenditures currently undertaken are effectively are shifted to future time periods. In such future periods creditors hold a primary claim against the revenue or income of either the individual or government." Ferguson (1964).

Buchanan's third proposition states that the internal debt and the external debt are fundamentally of the same character. He argues that the purchase of government securities voluntarily gives up command over current usage of resources in exchange for a return in the future period in both cases. He responded to the objection that external public debt is more burdensome by stating that the total national income must always be larger in the external case.

The fallacy in Buchanan's hypothesis is that he does not define the "real burden" clearly. Also, his definition of a future generation means that one person can belong to many different generations.

The Bowen-Devis-Kopf Thesis

Because of the limitations in the thesis of Prof. Buchanan, three economists from the Princeton University, William G. Bowen, Richard G. Davis and David H. Kopf came out with new reasoning that challenges the validity of the thesis of Pigou. They are of the view, "If the real burden of the debt is defined as the total amount of private consumption goods given up by the community at the moment of the time the borrowed funds are spent, the cost of the public project must be borne by the generation alive at the time the borrowing occurs." Pigou in his thesis maintained that a project that is financed out of consumption places no burden on the future generation which is contrary to the view of Bowen, Davis and Kopf who argued that even if bonds are purchased out of consumption, the burden will still be shifted to the future generation. They made the following assumptions.

1. A full employment economy with price stability as visualized by Buchanan.

2. First generation all of whom are 21 years old at the time of the government's loan expenditure say in the year Y. After 44 years when the members of the first generation are 65 years old, and the rest of the population is made up of G2 and the members are 21 years old. Next is G3 that follows the same age sequence and subsequent generations.

At the time of financing, G1 purchases the bonds out of consumption and at the time of retirement G1 sells the bonds to G2 who subscribes out of consumption expenditure and G1 utilizes the sale proceeds to cater for the consumption expenditure. Their story starts with G1 on the screen in the year say Y0 purchasing X amount of government bonds, purchasing entirely through reduction in the

consumption expenditure. Thus, the consumption of G1 will reduce in the year he buys the bonds, Y0 by X. But after 44 years, which is in Y44, G1 sells the entire bonds to G2 and uses the entire proceeds on its consumption. This is why they say the consumption of G1 is not reduced. During their lifetime the members of G1 will spend the sale proceeds, while the consumption expenditure of G2 will be reduced at the time. It will take up to another 44 years and then G2 will receive the sales proceed, X from G3 and that will be spent on their consumption; the consumption of G3 will be reduced. The cycle comes to an end when the bonds are paid back. For this reason, extra taxes will be levied. The generation living at that time of the imposition of taxes will bear the burden of the tax. But the amount X that it has paid to the preceding generation through its reduction in the consumption will be a net loss and a burden shifted on account of borrowing. If there were tax financing it would not have been the case. The analysis can be expressed as follows:

Table 1: Year Generation Consumption

YEAR	GENERATION	CONSUMPTION
Y0	G1	-X
Y44	G1 G2	+X -X
Y88	G2 G3	+X -X

It is seen that in year Y0 when the G1 has purchased the bonds of value X, the consumption has reduced, but the consumption of every next generation is deferred by 44 years and this continues till it is paid off. G1 simply makes a temporary reduction in its consumption. In the year actual and permanent reduction in expenditure is made by the generation surviving at the time of the final payment. Thus, to them G1 has shifted the burden to that generation. Regarding the interest payments on the bonds Bowen, Davis and Kopf argue that, "Interest payments on the debt repayment some burden on each and every generation that must pay taxes to such payments" Kopf (1960) As interest is a kind of payment to compensate the preference of present consumption to future consumption they are of the view that, "So long as people have a positive rate of time preference they will feel that they have made a sacrifice, if they give up a certain amount of consumption in their youth and then receive back exactly the same amount of consumption in their old age. But if we assume that the interest rate on the state government bonds approximates the interest payments on the national debt, then the interest payments on the national debt serves to compensate the owners of the debt for their willingness to forego consumption early in life.

On this note, it was concluded that "As the government expenditure is financed entirely out of reduction in consumption, the capital equipment remained what it would have been if the government expenditure had not been incurred, yet G1 has shifted part of the burden to G2, G3 . . .Gn. party because, "The deferment of consumption by the G1 from Y0 and Y44 is sacrifice that G1 never recoups."28

Their analysis is based on the fact that G1 does not reduce the capital stock of the economy; G2 receives the same stock of capital from G1 if there were no government expenditure or government borrowing. This argument does not make sense when examined deeply. They said G1 purchases bonds by sacrificing the consumption of X in year Y0 and later recover that loss in year 44, Y44 by consuming the sales proceeds. Thus, according to them G1 does not impair the capital stock of the economy at all which is not true. This is because the capital inherited to G2 would be much smaller. If G1 had purchased the bond from its savings, the capital that would be transferred to G2 would get smaller because an amount X would not have been enough for capital formation between the years Y0 and Y44.

The assumption they made that the two generations are not overlapping and also G1 selling bonds to G2 and all that are two unreasonable and impractical assumptions. If it happens that G2 does not pay for the bonds transfer but rather inherit the bonds from G1, then the assumption that the consumption of X after 44 years is totally flawed. In their case also, it is important for the government to repay the debt out of its surplus during the lifespan of the surviving generation at the time of the redemption. "This can easily be avoided if maturing bonds are always replaced by new borrowing." Shoup (1962).

Their argument would be valid only when taxation is included as a redemptive measure. Bowen, Davis and Kopf do not consider the productive and unproductive character of the project. If the project financed by the government tends to be productive, then even if government loses the initial consumption

according to them, then we could say that the benefits of the project would offset the initial losses in consumption.

S.E. Harris observes, “Once the economist, in a more realistic mood allowed for unemployment, assumed elasticity in monetary supplies and agreed that government expenditure could be productive and need not necessarily be wasteful the case for public borrowing was strengthened.”. Harris (1947) . A.H. Hansen also declares that, “Public debt is an essential means of increasing employment and has become an instrument of economic policy today.” Hanson (1941). Harold G. Moulton maintains that, “Public debt is a national asset rather than liability and it is essential for the economic prosperity of the country.” Groves (1958).

An asset of one man becomes the liability of another hence when we take the aggregate economy, the asset would cancel out the liability. Harold G. Moulton further explains “For every debtor there is also a creditor, it follows that the existence of an internally held national debt in and of itself will not impoverish a nation as debtors than it will enrich it as creditors.” American Economics Review.

The advocates of the no burden thesis say that the internal debt is no problem if the bonds are held by the people paying the tax in the same proportion as the tax they pay. According to them it creates no economic burden because it is a transfer of money from one pocket to another. This is however unrealistic because it is not possible to tax only taxpayers. Government securities would however be given up if it was possible.

B.U. Ratchford explains the bond holder takes his interest income for granted. He reasons, quite correctly, that he might have put his funds into other

securities and therefore, he should not be penalized for having bought government bond. Even though the taxes he pays come back to him in interest he will try just as hard to escape them, he will regard them with as much distaste, and they will influence his economic decisions and actions just as much as though they went to pay interest to someone else" Dange (1991).

In the Keynesian analysis, demand is a very important aspect since full employment depends on it and it is also dependent on the consumption function and investment function. Keynes advocated that for an effective demand to be maintained, the state has to regulate consumption and also the state investment must strengthen the state investment on the other hand. The fundamental postulate behind the "general theory" is that the state is liable for the stability in the state and also expending employment and the national income. Keynes states, "I am somewhat skeptical of the success of a merely monetary policy. I expect to see that State taking an ever-greater responsibility for directly organizing investment. And "that a somewhat comprehensive socialization of investment will prove the only means of securing an approximation to full employment." Underwood (1990). Keynes sees monetary expansion, public investment and other forms of state activities as a means of prosperity.

Deficit financing, taxation and other fiscal measures that threatens consumption are not to be relied upon so much during unemployment and depression. Income redistribution could be attained through both public expenditure and progressive tax system. Keynes used his concepts in formulating state government's policies in economic and social areas. He used the consumption

function to explain the importance of high rate consumption expenditure. This can be attained through a more equal desirability of steep progressive taxation and large governmental expenditure for social service. He also said that government investment in public works does not only increase by the amount of public outlays but increases in some multiples of it. Keynesian policies revolution into practical policies and advocate the state's intervention in the affairs of the economy.

There later came some economies that follow Keynes the (Keynesians) expanded and built on the ideas of Keynes. These include: A. H. Hansen, N. Kaldor, R. G. Musgrave, J. K. Galhraith etc. A.H. Hansen in his "Fiscal policy and Business Cycles" explained with statistical proof the growth of State activity as regards public works, transport, railways etc., Prof. R. A. Musgrave developed his "Multiple Theory of Budget Determination" in which he introduced a conceptual framework through which basic objectives and functions of States were discussed in the shape of budgetary decisions.

To conclude the views of the "new orthodoxy",Prof. Buchanan concluded that the creation of public debt transfers no primary burden to the future generation. Also, he said the analogy between public debt and private debt is a fallacy. He finally said there is a sharp contrast between internal and external debt. Buchanan further established his personal revolt against the 'no burden thesis'.

Fiscal Balance and Public Debt

In the standard neoclassical model, fiscal deficits (all other things being equal) will decrease the national savings and increase aggregate demand

(Elmendorf and Mankiw, 1998). This results to the problem of increasing government debt.

EMPIRICAL STUDIES ON PUBLIC DEBT

Fiscal Balance and Public Debt

A lot of empirical work has been done by different people in various countries to investigate the effect of fiscal balance on external debt. Some of this work would be assessed thoroughly to help understand this topic better.

In the empirical literature review, the determinants that influence the external debt and domestic debt would be looked into. The structure is as follows, the influence each of the variables has on public debt would be reviewed.

Brafu-Insaidoo (2016) tested three main working hypotheses including "fiscal deterioration causes an increase in a country's external debt stock." After testing the hypothesis, he concluded that fiscal deterioration (deficit) results to the accumulation of Ghana's external debt. To achieve these results, he used the data from the Ministry of Finance and Economic Planning and also World Development Indicator database from the year 1970 to 2013. The estimation technique adopted is the Autoregressive distributed lag model. The gap however in this work is the domestic debt that has been excluded. The results will be more significant if the domestic debt is added to the external debt to find the effect of fiscal deficit on the total public debt.

Awan et al (2015) studied the determinants of external debt in Pakistan using the ARDL model for the period, 1976-2010. It was concluded in this work that fiscal deficit is positively related to external public debt. Also, the cointegration technique had been used to find the long run equilibrium relationship and the error correction model approach was used to analyze the short run dynamics. Alfaidi (2002) in the Determinants of public debt in Egypt concluded that the main cause of external debt is as a result growing budget deficit. An increase in the budget deficit increases the external debt. this is in conformity with the theory of most economists, Sachs and Larrain (1993), Colander and Gamber (2002), Dornbusch and Fisher (1990), Gordon (2003), Gartner (2003) and Menize (2005). They established that fiscal deficits are financed through borrowing.

Bader et al (2009) in the work Determinants of Public debt in Jordan using the cointegration analysis technique found that, fiscal deficit is positively related to external debt. The time series data samples range from 1980-2005. In this analysis, the domestic debt was excluded. Also, he found how the explanatory variables affect both the external and domestic debt. However, the ARDL would have been a better model for the study. Saleh and Harvie (2005) considered public deficits as the source of the high foreign indebtedness in the Lebanese economy. They also confirmed that the deficits increase the public debt. According to them fiscal deficits are financed both externally and domestically.

Kwakye (2012) for the period 2000-2012 emphasized the importance of keeping the fiscal deficit under control so that there can be a sustainable debt service. He also suggested that the borrowed resources must be used in profitable

ways so that the debt can be serviced. According to IMF (2013) on a debt sustainability analysis, Ghana's public debt showed that Ghana's debt situation became worse as a result of fiscal slippages and the expansionary fiscal policy in the year 2012. It was found that the poor external outlook such as low export revenue attributed to the poor debt situation in the country.

Omrane (2017) studied the determinants of public debt growth, a case study for Tunisia. The VECM model for the period 1986-2015 has been used. It was found that budget deficits are positively related to public debt. it was found that fiscal deficit was the main determinant of public debt among all other determinants. Folorunso and Falade (2013) investigated the relationship between fiscal deficit and public debt in Nigeria using the Error Correction approach. The study was for the periods 1970-2011. It has been found that there is a positive relationship between fiscal balance and public debt. the ARDL model could be used instead to find the long run and short-run relationship.

GDP Growth Rate and Public Debt

The GDP growth rate is another variable that will be included in the scope of this work. A priori, we expect the GDP growth rate to be positively related to the external debt. This empirical review will throw more light on how the GDP growth rate affects the external debt. Evan et al (2015) researched the macroeconomics determinants of external debt and found using the time series data from the year 1970-2013. It was found that the GDP growth rate is one of the macroeconomic determinants of external debt. The unit root test was conducted on the variables and

it was found that the variables are stationary after first differencing. The problem with this research is that none of the fiscal variables has been included in the model.

Brafu-Insaidoo (2016) on "Fiscal Performance, Liberalization and External Debt in Ghana" using the data set from the year 1970 to 2013 and the ARDL estimation technique, concluded in his study that in the short run, as the gross domestic output increases the external debt increase but due to financial deepening, the external debt reduces usually after three years. Benedict et al (2014) researched the topic, Determinants and Sustainability of External Debt in a Deregulated Economy: A Cointegration Analysis from Nigeria (1986-2010). With the use of the statistical method, it was concluded that the gross domestic product affects the external debt.

Al-Fawwaz (2016) investigated the determinants of external debt in Jordan using the data from 1990 to 2014. The ARDL model was used to achieve this purpose. It was found that the external debt is negatively related to GDP per capita. Harmon (2012) studied the impact of public debt on three major economic indicators (inflation, GDP growth and interest rates) in Kenya on the period 1996 to 2011. Adopting a descriptive research design and simple linear regression models, it was found that the GDP growth rate is negatively related to the public debt.

Trade Openness and Public Debt

Trade openness is the extent to which a country engages in global trade and also the degree to which it allows other countries to trade with its domestic market. The following empirical collections show the effect trade openness has on public

debt. Awan et al (2015) studied the determinants of external debt in Pakistan using the ARDL model for the period, 1976-2010. In this work, it was found that trade openness is a determinant of external debt and has a positive relationship as it increases the debt stock.

Al-Fawwaz (2016) investigated the determinants of external debt in Jordan using the data from 1990 to 2014. The ARDL model was used to achieve this purpose. It was found that trade openness is positively related to the external debt. Kizilgol et al (201) studied the relationship between trade openness and external debt. The ARDL model through the application of GMM was used for the time series data for the years 1990-2012. It was found that trade openness affects external debt positively both in the long run and the short run. This study however is limited to only external debt.

Bolukbas (2016) studied the relationship between trade openness and external debt in Turkey. The cointegration method has been used in analyzing the time series data from the year 1998-2011. The study found that the trade openness is positively related to the external debt. this relationship was limited to only the external debt and not the total debt. Osuji and Olowolayemo (1998) investigated the effect of trade openness on external debt for Sub-Saharan African countries. The time series data for the years 1972-1992 has been used and the panel regression analysis has been adopted. According to the results, external debt increases as the trade openness increases. This study is not current however.

Zefar and Butt (2008) studied the relationship between trade liberalization and external debt in Pakistan. The ARDL and ECM model has been used in the

analysis for a time series data from 1972-1987. The study explains a long run positive relationship between the trade openness and external debt. Dery (2016) using the Panel regression analysis for 46 Sub-Saharan countries. it was found that the GMM estimation shows that the external debt increases the external debt initially and later reduce the external debt over time. Zakaria (2012), for the period 1972-2010 studied the effect the trade openness has with the external debt and concluded that the trade openness has a positive and significant relationship with the external debt. this is a case study of Pakistan. The GMM analysis was adopted.

Topal and Keyifli (2016) studied how the external debt is influenced by the trade openness with a case study of 34 OECD countries for the time period 1998-2014 using the Panel regression analysis. It was concluded that the trade openness leads to an increase in the external public debt. Ibhagui (2018) in his paper found that countries with current account deficits and high openness also experience an increase in their external debt stock. The panel regression analysis was used. The case study is Sub-Saharan African countries for the period 1985-2013.

Inflation and Public Debt

Bildirici and Ersin (2007) empirically studied the economic relationship between inflation and domestic debt for nine countries using the period of 1980 – 2004 using FMOLS (Fully Modified OLS estimation) and VEC model. The results show that in countries that experience high inflation, the inflationary process was feeding on increasing costs of domestic debt. As a result, the increasing debt to GDP ratios led these countries to borrow at higher interest rates and with lower

maturity rates. Ahmad et al. (2012) confirm that inflation is a critical problem in many countries, especially in the less developed countries. Using the OLS regression estimation, their paper empirically studies the effect of domestic debt on inflation in Pakistan for the period 1972 to 2009. The research observes domestic debt and domestic debt servicing enhance the price level in Pakistan. The estimated results show the volume of domestic debt and domestic debt servicing have significantly positive effects on price level. Authors argued that treasury bills make up a large proportion of total domestic debt and the interest rate are main reasons to enhance price level.

Harmon (2012) studies the impact of public debt on three major economic indicators (inflation, GDP growth and interest rates) in Kenya on the period 1996 to 2011. Adopting a descriptive research design and simple linear regression models, the research finds out there is a weak positive relationship between the public debt and inflation while links between public debt – GDP growth as well as public debt – interest rates are negative. Akitoby et al. (2014) studies the influence of low or high inflation on the public debt in the G-7 countries. The results of stimulation indicate that if inflation were to fall to zero for five years, the average net debt would increase by about 5 percentage points over the next five years. In contrast, raising inflation to 6 percent for the next five years would decrease the average net debt by about 11 percentage points under the full Fisher effect and about 14 percentage points under the partial Fisher effect. It implies that higher inflation could help reduce the public debt somewhat in advanced economies.

According to Hilscher et al. (2014), theoretically higher inflation will reduce the real value of the government's outstanding debt. The authors propose a method based on an ex-ante perspective of the government budget constraint, detailed information on debt, and a set of pevansible counterfactuals. By applying this method to the United States in 2012, the authors estimate that the impacts of higher inflation on the fiscal burden are modest. Moreover, these authors also propose that a more promising way to inflate away the public debt is to use financial repression. The results of the study show that a decade of repression combined with high inflation could wipe out almost half of the debt.

Nastansky et al. (2014) use quarterly data for Germany over period of 1991 – 2010 to empirically investigate the relationship between public debt and inflation. Authors analyzed the transmission from public debt to inflation through money supply and long-term interest rate within a vector error correction model estimated by Johansen approach. The estimated results show that the public debt level has a significantly positive effect on consumer prices. That means public debt statistically causes inflation vice versa.

Interest Payment and Public Debt

Falade (2013) investigated the relationship between fiscal deficit and public debt in Nigeria using the Error Correction approach. The study was for the periods 1970-2011. The result could mean that high domestic interest rate leads to high rate of debt in the country. In this analysis also, the rate of interest has been used instead of the interest payment. Cellini and Prezzavento (2016) investigated the influence

of interest payment on government debt and government spending by the use of the Granger Causality test. The results show that there is no effect of the dynamics of interest payments upon the dynamics of primary public expenditure.

Harmon (2012) studies the impact of public debt on three major economic indicators (inflation, GDP growth and interest rates) in Kenya on the period 1996 to 2011. Adopting a descriptive research design and simple linear regression models, real interest rate is said to have a negative relationship with the public debt. This study will rather consider the interest payment rather than the rate. Omrane et al (2017), investigated the macroeconomic determinants of public debt in Tunisia using Vector Error Correction model for the period 1986-2015. The interest rate is said to have a positive relationship with debt, meaning an increase in interest rate increases the debt. the interest payment was not considered but rather the interest rate. This study will rather consider the interest payment rather than the rate.

Foreign Direct Investment and Public Debt

Sinha et al. (2011) examined those factors that influence the public debt in middle and high-income group countries using panel regression. 31 countries were taken and a time period of 30 years. It was found that foreign direct investment has no effect on high-income countries but significantly influences the debt accumulation in middle-income countries. Fuentes (2012) found the influence of foreign direct investment on Sovereign debt in Latin America. The data was taken from the world bank for the years 1990 to 2012. It was found from the linear regression model shows that foreign direct investment is positively related to debt.

Gross Fixed Capital Formation and Public Debt

Aizenman and Marion (2009), who also found that inflation reduces the value of debt. Gross fixed capital formation has a negative and significant impact on public debt.

Omrane et al (2017), investigated the macroeconomic determinants of public debt in Tunisia using Vector Error Correction model for the period 1986-2015. It was concluded that the gross fixed capital formation is negatively related to the external debt. This implies that when there is an increase in gross fixed capital formation, the public debt reduces. Swamy (2015) studied the macroeconomic determinants of government debt in sovereign countries. the study. The Panel Granger Causality testing is employed in the analysis. Gross fixed capital formation has a positive effect on debt.

Current Account Balance and Public Debt

Sinha et al. (2011) examined those factors that influence the public debt in middle and high-income group countries using panel regression. 31 countries were taken and a time period of 30 years and it was found that current account significantly affects debt. Ibhagui (2017) on "External debt and current account adjustments: The role of trade openness". Analyzed empirically using large panel data samples of Sub-Saharan African countries between 1985 and 2013 and found that external debt mostly sets the tone for the subsequent adjustment of current

account deficits in SSA. However, the current account deficits of countries with high openness expand significantly from increases in external debt.

Mehta and Kayumi (2013) studied the effect of current account deficit on external debt and foreign exchange rates. The study was for the period 1990 to 2012. The Study also covers analysis of the components of India's Total External Debt that includes long term debt and short-term debt. Also, the correlation between the current account balance and external debt has been studied and it was found that current account balance has a negative relationship with that external public debt and that shows a deficit.

Executive Constraint and Public Debt

Dincecco (2011) examines European countries during the early modern period. He found that, when a country adopted annual budgets (thereby constraining the executive), it typically experienced an improvement in its yield spread against the British consol. Dasgupta, Dasgupta and Ziblatt (2016) examine European and Latin American countries over the 19th century. They show that suffrage expansions worsened debt credibility (measured by yield spreads) in countries with unconstrained executives but not in countries with constrained executives. Bittencourt (2014) investigated the main determinants of government and external debt in the young democracies of South America for the period 1970 to 2007 with the use of the dynamic panel time-series analysis. It was found that executive constraint has a positive significant relationship with debt.

Population Growth Rate and Public Debt

Swamy (2015) studied the macroeconomic determinants of government debt in sovereign countries. the study. The Panel Granger Causality testing is employed in the analysis.it was found that population growth has a negative effect on debt. Sinha et al. (2011) examined those factors that influence the public debt in middle and high-income group countries using panel regression. 31 countries were taken and a time period of 30 years. Population density is negatively related to the public debt. instead of the population density, this work would consider the population growth rate instead.

Trussel et.al (2014) also emphasize that municipalities with the highest number of elder population or even lower ratio of labor force to total number of inhabitants exhibit huge financial problems. It is precisely this age group that associates the idea that the increase of sovereign debt levels in the economy will mean an increase in their welfare, while for the younger age groups the size of debt implies a reduced prosperity since they would be responsible for the debt servicing. Bittencourt (2014) investigated the main determinants of government and external debt in the young democracies of South America for the period 1970 to 2007 with the use of the dynamic panel time-series analysis. It was found that population is negatively related to debt.

Democratization and Public Debt

Lokar (2013) studied Public debt, Democracy and Transition. A comparison between states is carried out and it is shown, that sometimes, if the politicians in

power are not able to keep such variables under control, the managing teams must be changed and sometimes even democratic rule altogether has to be discontinued, in order to save difficult situations. Brafu-Insaidoo (2016) on the topic, "Fiscal Performance, Liberalization and External Debt in Ghana" tested three main working hypotheses including "fiscal deterioration causes an increase in a country's external debt stock." He concluded that the analysis rejects the null hypothesis that institutionalized democracy accumulates external debt.

CHAPTER THREE

RESEARCH METHODS

Introduction

The methodology explains the procedure and the appropriate tools used in conducting this study. The methodology includes the research design, type and the source of data, both the empirical and theoretical model employed, also how the variables have been measured. It also includes the estimation technique and data analysis.

Research Design

To analyze the relationship between public debt and fiscal balance in Ghana, the quantitative research design has been adopted. This approach entails the positivist philosophy underpinning quantitative methodology. The quantitative research design has several advantages compared to the qualitative design. The positivists are interested in looking at the society, as a whole hence using qualitative data is what can easily be used for generalization in the economy.

The numerical data also allows for comparison since it is in numbers. Information can be represented on graphs when the data involved is quantitative. When quantitative data is used, it is very easy for the individual to be detached from the research because anyone that takes the work can analyze the results hence it is said to be objective. Even though quantitative research design has the following

advantages, it has a shortfall because it does not predict the actions of the individuals in the future compared to the qualitative design.

Theoretical Model Specification

The relationship between fiscal deficit and public debt has been reviewed in chapter two. The debt dynamics theory basically breaks down the contribution of drivers of public debt accumulation into the various macroeconomic components such as the nominal interest rate, inflation, the exchange rate, the primary balance, GDP growth (see Mupunga & LeRoux, 2014; World Bank, 2005).

Empirical Model Specification

The model of Zeaiter (2009) would be modified for the purpose of this estimation.

$$TD_t = f(FB_t, INFCPI_t, FDI_t, GFCF_t, GDPG_t, XCONST_t, OPEN_t, CAB_t) \quad (1)$$

$$DD_t = f(FB_t, INT_t, FDI_t, GFCF_t, GDPG_t, PGR_t\ XCONST_t, DEMOC_t) \quad (2)$$

$$ED_t = f(FB_t, FDI_t, OPEN_t, INT_t, PGR_t, CAB_t, GDPG_t, DEMOC_t) \quad (3)$$

Where FB_t is the fiscal balance, $INFCPI_t$ is the inflation at current price index, FDI_t is the foreign direct investment, $GFCF_t$ is the gross fixed capital formation, $GDPG_t$ is the gross domestic product growth rate, PGR_t is the population growth rate, $XCONST_t$ is the executive constraint, $DEMOC_t$ is the democratization, $OPEN_t$ is the trade openness, CAB_t is the current account balance, INT_t is the

interest payment on debt, TD_t is the total debt, DD_t is the domestic debt, ED_t is the external debt.

Equations (1), (2), (3) can be expressed in the econometric form, the following long run relationships are established from equations (1), (2) and (3) to estimate equations (4), (5) and (6) which are in the semi-log form. Equation (1) explains the total debt, equation (2) explains the domestic debt while equation (3) explains the external debt.

$$\Delta lnTD_t = \beta_0 + \beta_1 FB_t + \beta_2 INFCPI_t + \beta_3 FDI_t + \beta_4 GFCF_t + \beta_5 GDPG_t + \beta_6 XCONST_t + \beta_7 OPEN_t + \beta_8 CAB_t + \varepsilon_t \quad (4)$$

$$\Delta lnDD_t = \beta_0 + \beta_1 FB_t + \beta_2 lnINT_t + \beta_3 FDI_t + \beta_4 GFCF_t + \beta_5 GDPG_t + \beta_6 PGR_t + \beta_7 XCONST_t + \beta_8 DEMOC_t + \varepsilon_t \quad (5)$$

$$\Delta lnED_t = \beta_0 + \beta_1 FB_t + \beta_2 FDI_t + \beta_3 OPEN_t + \beta_4 lnINT_t + \beta_5 PGR_t + \beta_6 CAB_t + \beta_7 GDPG_t + \beta_8 DEMOC_t + \varepsilon_t \quad (6)$$

Where ln represents the natural logarithm and Δ is the difference operator. FB_t is the fiscal balance, $INFCPI_t$ is the inflation at current price index, FDI_t is the foreign direct investment, $GFCF_t$ is the gross fixed capital formation, $GDPG_t$ is the gross domestic product growth rate, PGR_t is the population growth rate, $XCONST_t$ is the executive constraint, $DEMOC_t$ is the democratization, $OPEN_t$ is

the trade openness, CAB_t is the current account balance, INT_t is the interest payment on debt, TD_t is the total debt, DD_t is the domestic debt, ED_t is the external debt. In this analysis the dependent and independent variables were chosen based on empirical and theoretical study. The coefficients β_0, β_1, β_2, β_3, β_4, β_5, β_6, β_7, and β_8 are the parameters that would be estimated in total debt, domestic debt and external debt. β_0 is the drift components, t is the time while ε is the error term.

Measurement of Variables

Fiscal balance is the difference between government revenue and government expenditure. The government revenue is the government taxes. Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors and is divided by GDP. WDI (2016). Inflation is measured by the consumer price index. It reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.

Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and

so on); plant, machinery, and equipment purchase; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the 1993 SNA, net acquisitions of valuables are also considered capital formation.

For the measurement of GDP growth rate, annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Trade Openness is proxied as the sum of exports and imports of goods and services measured as a share of gross domestic product. Current account balance is the sum of net exports of goods and services, net primary income, and net secondary income.

Annual population growth rate for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. Interest payments include interest payments on government debt--including long-term bonds, long-term loans, and other debt instruments--to domestic and foreign residents. For the executive constraint, indexes are used to represent the level of constraint. Executive Constraints, 1 -

Unlimited Authority (there are no regular limitations on the executive's actions), 2 - Intermediate Category, 3 - Slight to Moderate Limitation on Executive Authority (There are some real but limited restraints on the executive), 4- Intermediate category, 5 - Substantial Limitations on Executive Authority (The executive has more effective authority than any accountability group but is subject to substantial constraints by them), 6 - Intermediate category, 7 - Executive Parity or Subordination (Accountability groups have effective authority equal to or greater than the executive in most areas of activity) Other codes: -66 - interruption period (e.g. occupation by foreign forces), -77 - interregnum period (collapse of central authority), -88 - transition period (a period within new institutions, policies are introduced). The democracy index also is measured on an index starting from 0-10. rescheduling or refinancing. The data are on a disbursement basis and cover flows from all bilateral and multilateral donors. Data are in current U.S. dollars. Regional and unspecified allocations are excluded from aggregate data.

A priori Expected Signs

From equation (4), β_1 is expected to be negative ($\beta_1 < 0$) according to the empirical study of Omrane (2017). The negative sign indicates a budget deficit, which increases public debt. β_2 is expected to have a negative sign ($\beta_2 < 0$) since inflation at current price index reduces public debt according to Akikoby et al (2014). β_3 is expected to have a negative sign ($\beta_3 < 0$) according to Fuentes (2012). β_4 is also expected to have a negative sign ($\beta_4 < 0$) according to Aizenman and Marion (2009). β_5, the coefficient of GDP growth rate is expected to be

negative according to Al-Fawwaz (2016). β_6 is expected to be have a negative relationship according to Dincecco (2011). β_7, the coefficient of trade openness is expected to be positively related to public debt as found by Topal and Keyifli (2016). Finally from equation (4), β_8 is negatively related to the public debt as found by Mehta and Kayumi (2013). From equations (5) and (6), most of the independent variables are the same as that in equation (4) and have the same influence on the dependent variables. The coefficient of interest payment is positive as found by Falade (2013). The coefficient of population growth rate has a negative sign according to Swamy (2015). The coefficient of democratization is positively related to the public debt according to Brafu-Insaidoo (2016). The dependent variables including the interest payment are logged in order to minimize the problem of heteroscedasticity.

Data Type and Source

Secondary data is used in the analysis and it has been obtained from the World Development Indicators Online database except for the fiscal which was obtained from the External Resource Mobilization Division of the Ministry of Finance and Economic Planning and Bank of Ghana's Quarterly Bulletin (various issues). It has been compared to other sources to ensure validity and consistency. The observations range from 1983-2016 which is a period of 34 years. The data type is solely time series. Also, the data for executive constraint and democracy index is obtained from Polity IV.

Estimation Procedure

The Autoregressive Distributed Lag (ARDL) model approach to cointegration and error correction has been used to investigate the hypothesis of this study. Also the Augmented Dickey-Fuller (ADF) and Kwiatkowski-Philips-Schmidt-Shin (KPSS) test statistics have been used for the analysis of time series properties of this data set. This was done by conducting unit root test to check for the stationarity.

Unit Root Tests

The unit root tests are test of stationarity. A time series is stationary if a shift in time does not cause a change in the shape of the distribution. The ARDL approach unlike the Johansen approach does not necessarily require the pretests, unit root test. (Pesaran et al 2001). Quotara (2004) however argued that this could only I the order of integration is $I(0)$ or $I(1)$. In the case where the order of integration is $I(2)$, the assumption made by Pesaran et al (2001) will not hold. There is therefore always the need to carry out the unit root test to verify the ARDL methodology assumptions. This study begins with the analysis of the order of integration of the variables.

Time series data can be used to predict the future using the data in the past. The forecasting becomes invalid in the case where the future is different from the past and this happens as a result of a non -stationary variables or variables with a unit root. Most time series are not stationary in their original state of measurement and sometimes after adjustments; they may still exhibit trends and seasons. When

a time series data is non-stationary, it is regarded as a problem. Most economists do not agree with the use of non-stationary time series since it could lead to a spurious relationship (Yule, 1926).

A spurious relationship is when two non-stationary series assume a high R squared while in actual sense the variables have no economic relationship. This is why testing for the unit root is very important and should be done first and foremost with time series variables.

Engel and Granger (1987) came up with a method by integrating the cointegration with the error correction mechanism. The problem with this model is that, the cointegration approach is inappropriate in the case where the variables are more than. If the variables are more than two, a better alternative is the Johansen's test (Johansen, 1991). This method is based on the Vector Autoregressive (VAR) model. Variables are said to be cointegrated if the linear combination of their data time series are stationary. The random walk is an example of a non-stationary series. That is;

$$X_t = X_{t-1} + \varepsilon_t \qquad (7)$$

Where $\varepsilon_t \sim iid(0, \sigma_\varepsilon^2)$ and this is generated by a white noise process. If $X0 = 0$, we have $Xt = \sum_{i=1}^{t} \mathcal{E}_t$

X_t is given as $t\sigma^2$ and X_t gets larger and larger as the time, t increases. Forecasting becomes a problem with such a series because the variance of the error approaches infinity as the forecast horizon falls. This is what makes the mean value of Xt meaningless. It is very necessary to perform the unit root test since most of the time

series variables are not stationary. The Dickey Fuller test and Augmented Dickey Fuller test are the common test used for non-stationarity. This study will use the Augmented Dickey Fuller (ADF) test and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test to test for stationarity in these variables.

The model employed by the ADF test used to test for the unit root test is given below:

$$\Delta X_t = \beta_1 + \beta_{2t} + \alpha_t \sum_{i=1}^{p} \Delta X_{t-1} + \varepsilon_t \quad (8)$$

Where,

- X_t is the variable in question
- t is the time trend
- Δ is the difference operator
- p is the number of lags
- ε_t is the stochastic error term

From equation 8, we can derive the hypothesis as below;

$H_0: \beta = 0$ (X_t is non-stationary)

$H_1: \beta < 0$ (X_t is stationary)

From this hypothesis above, if the t-statistics calculated is less than the critical values, the null hypothesis is rejected which implies the alternative hypothesis would be accepted. The Augmented Dickey Fuller test (ADF), which is

a modified version of the DF, ensures that the unit root tests are valid even with the presence of serial correlation of unknown form, say AR(p) process. This may be done by augmenting the equation with lagged values of the differenced variables. For the DF lagged dependent variables are included on the right-hand side. However, in ADF test the lagged are added on the right-hand side. The augmentation improves the statistical fit of the equation and is more efficient now with the added information in the equations as seen in equation (8). Hence with ADF test we can assume that error term is independently and identically distributed (iid). The number of lags is carefully chosen so as to produce serially uncorrelated error terms. Enders (2004) noted that if too few lags are included, the test changes in unknown manner, conversely, if the lags are too many the power of the test is reduced. The right side of p will be estimated using the highest significant lag order of the series by the use of Akaike Information Criterion (AIC) and Schwartz-Bayesian Criterion (SBC).

Another test that serves as an alternative, has been introduced by Kwiatkowski, Phillips, Schmidt and Shin (henceforth KPSS). In the KPSS model, the observations are in three different components known as the deterministic trend, a random walk and the stationary error term. The model is presented below:

$$X_t = \Omega_t + V_t + \varepsilon_t \tag{9}$$

$$V_t = t - 1 + \mu_t \tag{10}$$

Where X_t for t=1,2,…,T is the variable of interest, t is the deterministic trend, Vt is the random walk process and ε_t is the error term of equation 9 which is

stationary by assumption. μ_t denotes the error term of equation 10 and by assumption is a series of identically distributed independent random variables of expected value equal to zero and constant variation. From equation 10, v_o is constant and corresponds to an intercept. $\sigma\mu$ of the random walk process V_t in equation (8) and (9) equals zero. If $\Omega=0$, the null means that X_t is stationary around a r_0. If $\Omega\neq0$ then the null means that Xt is stationary around a linear trend. If the variance $\sigma\mu$ is greater than zero, then Xt is non-stationary (as sum of a trend and random walk), due to presence of a unit root.

The KPSS tests are meant to complement the unit root test for example, the Dickey Fuller test. The most famous unit root test known among the Economists is probably the KPSS test. The problem with this model is that it rejects the true hypothesis too often leading to undue preference for the hypothesis of unit root or non-stationarity.

Autoregressive Distributed Lag Approach to Cointegration (Bound Test)

The relationship between fiscal balance and external debt could be investigated through the use of different methods. The following methods have been used widely in similar analysis: Engle and Granger (1987) test, fully modified OLS procedure (FMOLS) of Phillips & Hansen (1990), maximum likelihood-based Johansen (1991) and Johansen-Juselius (1990) tests. However, all the above-mentioned methods are weak since they do not provide robust results and they render inefficient results. It is as a result of these problems that the Autoregressive Distributed lag model is preferred. The use of the Autoregressive Distribute Lag (ARDL) model has many advantages over several other models. One key advantage

is that it is significant whether a series is integrated of order one, I(1) or of order zero, I(0) or even mutually cointegrated. It also produces more robust results. This model has a consistent long run coefficient as well. It is advantageous in the sense tht it provides both the long run and short run relationships. Moreover, a dynamic error correction model (ECM) is derived from the ARDL for the integration of short run dynamics with the long run equilibrium. Due to these advantages possessed by the ARDL, it would be used in the analysis of this work and this is due to the advantages it possesses over other models.

The ARDL model unlike the Johansen Cointegration method avoids problem with large number of dependent and independent variables to be included. Endogeneity is not a problem in the ARDL model as long as this model is free of residual correlation.

Serial correlation and endogeneity problems are corrected with the appropriate lags in the ARDL model. It is also able to differentiate between endogenous and exogenous variables even if the explanatory values are exogenous. (Pesaran & Pesaran, 1999; Pesaran et al., 2001).

The ARDL approach adopts the Ordinary Least Square (OLS) to test for the long run relationship among the variables by carrying out an F-test for the joint significance of the coefficient of the lagged variable in the model. That is by regressing a variable on others in the model. For example, the total debt is taken as the dependent variable and regressed on the independent variables and afterwards the fiscal balance, which is an independent variable, is regressed on the other

independent variables. this is repeated for all the variables and after running all these regressions, it is observed that the total number of regressions run are equal to the number of variables used in the model.

The F-statistics of all the regressions are more important compared to the OLS regressions of first differences. The F-statistics is important because it tests the hypothesis that the coefficients of the lagged levels are zero. For the bound test the ARDL error correction model is given as below;

$$\Delta In\,TD_t = x_0 + \sum_{i=1}^{n} x_1\,\Delta FB_{t-i} + \sum_{i=1}^{n} x_2\,\Delta FDI_{t-i} + \sum_{i=1}^{n} x_3\,\Delta GDPG_{t-i} + \sum_{i=1}^{n} x_4\,\Delta GFCF_{t-i} + \sum_{i=1}^{n} x_5\,\Delta INFCPI_{t-i} + \sum_{i=1}^{n} x_6\,\Delta OPEN_{t-i} + \sum_{i=1}^{n} x_7\,\Delta CAB_{t-i} + \sum_{i=1}^{n} x_8\,\Delta XCONT_{t-i} + y_1 FB_{t-i} + y_2 FDI_{t-i} + y_3 GDPGF_{t-i} + y_4 GFCF_{t-i} + y_5 INFCPI_{t-i} + y_6 OPEN_{t-i} + y_7 CAB_{t-i} + y_8 XCONST_{t-i} + \varepsilon_t \qquad (11)$$

$$\Delta In\ DD_t$$

$$= x_0 + \sum_{i=1}^{n} x_1\,\Delta FB_{t-i} + \sum_{i=1}^{n} x_2\,\Delta GFCF_{t-i} + \sum_{i=1}^{n} x_3\,\Delta GDPG_{t-i} + \sum_{i=1}^{n} x_4\,\Delta FDI_{t-i}$$

$$+ \sum_{i=1}^{n} x_5\,\Delta INFLQ_{t-i} + \sum_{i=1}^{n} x_6\,\Delta lnINT_{t-i} + \sum_{i=1}^{n} x_7\,\Delta PGR_{t-i} + \sum_{i=1}^{n} x_8\,\Delta DEMOC_{t-i}$$

$$+ \sum_{i=1}^{n} x_9\,\Delta XCONT_{t-i} + y_1 FB_{t-i} + y_2 GFCF_{t-i} + y_3 GDPG_{t-i} + y_4 FDI_{t-i}$$

$$+ y_5 lnINT_{t-i} + y_6 INFLQ_{t-i} + y_7 PGR_{t-i} + y_8 DEMOC_{t-i} + y_9 XCONST_{t-i}$$

$$+ \varepsilon_t \qquad (12)$$

$$\Delta In\ ED_t = x_0 + \sum_{i=1}^{n} x_1\,\Delta FB_{t-i} + \sum_{i=1}^{n} x_2\,\Delta FDI_{t-i} + \sum_{i=1}^{n} x_3\,\Delta OPEN_{t-i}$$

$$+ \sum_{i=1}^{n} x_4\,\Delta lnINT_{t-i} + \sum_{i=1}^{n} x_5\,\Delta PGR_{t-i} + \sum_{i=1}^{n} x_6\,\Delta CAB_{t-i}$$

$$+ \sum_{i=1}^{n} x_7\,\Delta GDPG_{t-i} + \sum_{i=1}^{n} x_8\,\Delta DEMOC_{t-i} + y_1 FB_{t-i} + y_2 FDI_{t-i}$$

$$+ y_3 OPEN_{t-i} + y_4 lnINT_{t-i} + y_5 PGR_{t-i} + y_6 CAB_{t-i}$$

$$+ y_7 GDPG_{t-i} + y_8 DEMOC_{t-i}$$

$$+ \varepsilon_t \qquad (13)$$

The three equations explain the total debt (TD), domestic debt (DD) and external debt (ED) where Δ is the first difference operator, x_0 is the drift parameter and ε_t is the error term x_1 to x_9 are the short run parameters while y_1 to y_9 are the long run parameters. The n denotes the maximum lag to get the long run relati onship, the

coefficient of the lagged variables are restricted to zero and the cointegration is tested by estimating an OLS regression. This would be done by choosing an optimal lag based on the least values of the Akaike Information Criteria (AIC) and also the Schwarz Bayesian Criteria. These are chosen because they help in selecting a more parsimonious ARDL model. To determine the presence of Cointegration, an F-test is conducted for the joint significance of the coefficients of the lagged level variables. The null hypothesis says there is no cointegration against the alternative hypothesis that says there is a cointegration. The hypothesis is specified below:

$H_0: y_1 = y_2 = y_3 = y_4 = y_5 = y_6$ (there exists no long run relationship)

$H_1: y_1 \neq y_2 \neq y_3 \neq y_4 \neq y_5 \neq y_6$ (there is a long run relationship)

For this hypothesis tested, the value of the F-statistic would be compared to the critical value. According to Pesaran et al. (2001) the lower bound critical values imply that the explanatory variables are integrated of order zero, $I(0)$ and the upper bound critical values imply the variables are integrated by order one I (1).

When the F-statistic value is less than the lower bound critical value, then we fail to reject the null hypothesis and therefore conclude therefore conclude there is no cointegration between the variables. However, if the F-statistic value is greater than the upper bound critical value, we accept the null hypothesis which implies there is a long run equilibrium relationship between the variables under study. In the case where the F-statistic value is between the upper and the lower bound critical values, the result is then inconclusive.

After establishing that variables are cointegrated which means a long run relationship between the variables exist, we can go ahead to estimate the long run relationship with the equation below:

$$In\,TD_t = x_0 + \sum_{i=1}^{n} x_1\,FB_{t-i} + \sum_{i=1}^{n} x_2\,FDI_{t-i} + \sum_{i=1}^{n} x_3\,GDPG_{t-i} + \sum_{i=1}^{n} x_4\,GFCF_{t-i} + \sum_{i=1}^{n} x_5\,INFCPI_{t-i} + \sum_{i=1}^{n} x_6\,OPEN_{t-i} + \sum_{i=1}^{n} x_7\,CAB_{t-i} + \sum_{i=1}^{n} x_8\,XCONT_{t-i} + \lambda ECM_{t-1} + \mu_t \quad (14)$$

$$In\,DD_t = x_0 + \sum_{i=1}^{n} x_1\,FB_{t-i} + \sum_{i=1}^{n} x_2\,GFCF_{t-i} + \sum_{i=1}^{n} x_3\,GDPG_{t-i} + \sum_{i=1}^{n} x_4\,FDI_{t-i} + \sum_{i=1}^{n} x_5\,INFLQ_{t-i} + \sum_{i=1}^{n} x_6\,lnINT_{t-i} + \sum_{i=1}^{n} x_7\,PGR_{t-i} + \sum_{i=1}^{n} x_8\,DEMOC_{t-i} + \sum_{i=1}^{n} x_9\,XCONT_{t-i} + \lambda ECM_{t-1} + \mu t \quad (15)$$

$$In\ ED_t = x_0 + \sum_{i=1}^{n} x_1\, FB_{t-i} + \sum_{i=1}^{n} x_2\, FDI_{t-i} + \sum_{i=1}^{n} x_3\, OPEN_{t-i} + \sum_{i=1}^{n} x_4\, lnINT_{t-i} + \sum_{i=1}^{n} x_5\, PGR_{t-i} + \sum_{i=1}^{n} x_6\, CAB_{t-i} + \sum_{i=1}^{n} x_7\, GDPG_{t-i} + \sum_{i=1}^{n} x_8\, DEMOC_{t-i} + \lambda ECM_{t-1} + \mu t \qquad (16)$$

Where λ is the speed of adjustment parameter and ECM_{t-1} is the error correction term lagged one year. The coefficient λ measures the speed of adjustment to obtain equilibrium in the event of shocks to the system. The coefficient of this lagged error correction term (λ) is expected to be negative and statistically significant in order to further confirm the presence of cointegrating relationship among the variables in the model.

Post-Estimation Tests

To determine the reliability of the goodness of fit test, the following diagnostic tests and stability tests are performed. These include heteroscedasticity, autocorrelation, normality and function form. Also, the CUSUM and CUSUMSQ are used to perform the stability test

Conclusion

There has been different work done on the relationship between fiscal balance and public debt mostly in different countries, this work therefore seeks to empirically examine the relationship that exist between fiscal balance and public

debt. For robust results, natural logarithms have been taken of some of the variables. The source of the data has been provided and the data type as well which is a time series data. The data has been verified to test for validity and how genuine it is. The chapter has also explained the pre-estimation test that has been carried out. The test was performed to check whether the variables are integrated by order zero or order one.

The ADF test and the KPSS test were also performed to make sure there is no spurious result. The estimation technique employed has also been specified as the ARDL model. This model has been chosen due to the benefit it has over other models. This model was used to estimate both the short-run and long run relationship between the fiscal balance and public debt.

Also, the unrestricted error correction model was formed to in order to obtain the ARDL model. This chapter also talks about the post-estimation test such as autocorrelation, stability, heteroscedasticity, normality and the functional form in order to test how reliable the goodness of fit test is. This systematic method will however guide us into our estimation in the next chapter, (Results and Discussion).

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter explains the relationship that exists between fiscal balance and public debt in Ghana. The various descriptive statistics that would be discussed, include the unit root test which is conducted by the use of the ADF test and the KPSS test as discussed in the previous chapter. It will also discuss the bound test for the specification of fiscal balance and total public debt, domestic debt and external debt. The results are in the cointegration and long run form. After which the stability tests have been obtained which is the CUSUM test. The post estimation tests include the serial correlation, normality test and heteroskedasticity and the Ramsey Reset. All these have been obtained through the use of E-views computer software.

Table 2: Descriptive Statistic

	DEBT	D_DEBT	E_DEBT	FB	FDI	GDPG	GFCF	INFLCPI	OPEN	CAB	XCONST	INT	PGR	DEMOC
Mean	10398.52	4511.326	5887.190	-4.28	3.30	5.45	19.87	24.85	69.17	-6.073	-1.26	99863412	2.63	1.65
Median	7674.335	1888.223	5452.150	-4.18	1.76	4.82	21.54	17.75	71.90	-6.26	0.00	72718000	2.58	3.00
Maximum	31343.69	19412.23	17658.06	2.145	9.52	14.05	30.93	122.87	116.05	1.33	3.00	2.80E+08	3.48	8.00
Minimum	3578.280	235.3900	126.9038	-13.78	0.05	3.30	3.76	8.73	11.54	-12.49	-88.00	28916000	2.25	-88.00
Std. Dev.	7628.723	4946.909	4163.759	3.94	3.33	2.19	6.82	21.07	26.87	3.66	15.40	72224559	0.30	16.22
Skewness	1.551415	1.363167	1.383333	-0.36	0.72	2.17	-0.65	3.18	-0.34	0.02	-5.49	1.68	1.35	-5.17
Kurtosis	4.184667	3.924881	4.600498	2.62	1.92	8.30	2.55	14.97	2.25	2.05	31.48	4.62	4.60	29.16
Jarque-Bera	15.62724	11.74175	14.47272	0.95	4.58	66.62	2.68	260.52	1.44	1.29	1320.12	19.74	1120.72	1120.72
Probability	0.000404	0.002820	0.000720	0.62	0.10	0.00	0.26	0.00	0.49	0.52	0.00	0.00	0.00	0.00
Sum	353549.5	153385.1	200164.4	-145.38	112.29	185.33	675.58	845.00	2351.62	-206.49	-43.00	3.40E+09	89.26	56.00
Sum Sq. Dev.	1.92E+09	8.08E+08	5.72E+08	511.57	365.95	158.18	1535.76	14653.78	23820.88	443.20	7818.62	1.72E+17	3.01	8679.77
Obs	34	34	34	34	34	34	34	34	34	34	34	34	34	34

From Table 1, it can be inferred from the descriptive statistic that the average total debt (DEBT) over the years 1983 to 2016 is US$10398.52 and this shows that the nation's total debt is huge. The domestic and external debt are US$4511.326 and US$5887.190 respectively. This is an indication that the external debt is more the domestic debt on an average. The difference however is not too vast. The mean inflation rate at the consumer price index is 24. 85% indicating a relatively high rate of inflation over an average year. the average amount of interest that is paid on the total debt is US$ 99863412. The average foreign direct investment is about 3.30% as a share of gross domestic product. The mean fiscal balance is -4.28 with the negative signifying that it is a fiscal deficit. This means that Ghana records a deficit of this value on an average every year. The trade openness has a mean of 69 .17% and the average gross fixed capital formation is 19.87%. inflation at current price index (INFCPI) has a mean of 24.85%. the average executive constraint index is -1.26. the average interest rate is 18.23 in the log form. There is a negative current account of -6.07. The mean population growth rate is 2.62 and the average democracy index is 1.85.

The maximum amount of total debt is $31343.69 and the minimum debt ever recorded over the years being $3578.28. The maximum and minimum domestic debt are $19412.23and $235.39 respectively while the external debt has a maximum and minimum of $17658.06 and $126.9038 respectively. Fiscal balance has a maximum value of 2.68% (which is a surplus) and a minimum of -13.78 % (which signifies a deficit) as a percentage of GDP. The maximum foreign direct investment is 9.52% while it's minimum value is 0.05. The maximum GDP growth

rate is 14.05% while it's minimum is 3.30%. the gross fixed capital formation has a maximum value of 30.93% and a minimum of 3.76%. Maximum inflation at current price index is 17.75% against a minimum of 12.29%. Trade openness has a maximum value of 116.05% and a minimum value of 11.54%. the maximum current account balance 1.32% and a minimum of -12.49%. the maximum index of executive constraint is 3.0 and the minimum index is -88. The maximum interest paid on debt $2.80E+08 while the minimum interest $28916000. The maximum interest on debt shows the interest paid on debt is really huge compared to the debt stock. The maximum and minimum values of population growth rate are 3.48% and 2.25% respectively. Lastly, the maximum index of democracy is 8 with a minimum index of -88.

The standard deviation of the variables shows how far away from the mean the variables are. The variable with the highest standard deviation is trade openness with a standard deviation of 26.87 and population growth rate has the least standard deviation of 0.3. All the variables are slightly and positively skewed except for fiscal balance, trade openness and gross fixed capital formation which are slightly and negatively skewed. The kurtosis ranges from 1.92 to 31.48 the foreign direct investment has the lowest kurtosis of 1.92 with the executive constraint recording a kurtosis value of 31.48. the Jarque Bera is for the normality test. This is asymptotically chi squared distributed with a degree of freedom of 2. (Asteriou and Hall, 2011).

The null hypothesis states that, the variables are normally distributed while the alternative hypothesis states that the variables are not normally distributed.

From the table above, most of the Jarque Bera values are not significant and accepts the null hypothesis of normality however the p-values of external debt, GDP growth rate, inflation at consumer price index, executive constraint, population growth rate and democracy are small hence not normally distributed.

Unit Root Test

The unit root test is conducted to test for the cointegration before we proceed in using the ARDL approach or bound test approach to cointegration. For this study the cointegration test has been conducted and all the variables are either cointegrated of order zero, $I(0)$ or of order one, $I(1)$. There must be a cointegration of order one or zero because in the bound test it is assumed that the variables are cointegrated of order zero or order one. Two different tests have been conducted to check if the variables are stationary of order zero or of order one. The Augmented Dickey-Fuller test and the Kwiatkowski-Phillips-Schmidt-Shin test. This was conducted to check for the order of integration.

The ADF test is examined on the basis of the null hypothesis that the considered variable has a unit root. The Schwartz-Bayesian Criterion (SBC) and Akaike Information Criterion (AIC) were used to determine the optimal number of lags to be included in the test. The ADF test provided a p-value for making the unit root decision. Thus, if the p-value is insignificant, then we fail to reject the null hypothesis but if the p-value is significant, then we reject the null hypothesis of presence of unit root.

Table 3: Results of Unit Root Test (with constant only): ADF Test

Variable	ADF statistics	Variable	ADF statistics	$I(0)$
	Levels		**First Difference**	
Debt	0.7563 [0.9916]	ΔDebt	-4.0412 [0.0038] ***	$I(1)$
D_Debt	-2.7582 [0.0754] *	ΔD_Debt	-4.5979 [0.0009] ***	$I(0)$
E_Debt	1.2099 [0.9976]	ΔE_Debt	-4.2967 [0.0019] ***	$I(1)$
FB	-3.3570 [0.0201] **	ΔFB	-8.4550 [0.0000] ***	$I(0)$
FDI	-0.7397 [0.8227]	ΔFDI	-4.8481 [0.0004] ***	$I(1)$
GDPG	-3.4420 [0.0164] **	ΔGDPG	-8.4590 [0.0000] ***	$I(0)$
GFCF	-2.6081 [0.1015] *	ΔGFCF	-6.9122 [0.0000] ***	$I(0)$
INFLCPI	-8.1081 [0.0000] ***	ΔINFLCPI	-4.2642 [0.0024] ***	$I(0)$
OPEN	-2.1615 [0.2234]	ΔOPEN	-5.2079 [0.0002] ***	$I(1)$
CAB	-2.7498 [0.0767] *	ΔCAB	-5.6797 [0.0000] ***	$I(0)$
XCONST	-78.2440 [0.0001] ***	ΔXCONST	-12.1724 [0.0000] ***	$I(0)$
LINT	-0.7930 [0.8080]	ΔLINT	-7.1032 [0.0000] ***	$I(1)$
PGR	-1.4725 [0.5339]	ΔPGR	-7.6246 [0.0000] ***	$I(1)$
DEMOC	-52.6223 [0.0001] ***	ΔDEMOC	-9.0675 [0.0000] ***	$I(0)$

Note: ***, ** and * indicates the rejection of the null hypothesis of non-stationary at 1%, 5% and 10% level of significance, Δ denote first difference, and $I(0)$ is the order of integration. The values in parenthesis are the P-values.

Source: Authors' own construct using E-views 10 Package.

Table 4:Results of Unit Root Test (with constant and trend): ADF Test

Variable	ADF statistics	Variable	ADF statistics	$I(0)$
	Levels		**First Difference**	
Debt	-2.0894 [0.5325]	ΔDebt	-4.9449 [0.0019] ***	$I(1)$
D_Debt	-6.2955 [0.0001] ***	ΔD_Debt	-4.7369 [0.0034] ***	$I(0)$
E_Debt	0.0242 [0.9946]	ΔE_Debt	-4.5334 [0.0053] ***	$I(1)$
FB	-6.0638 [0.0001] ***	ΔFB	-8.3953 [0.0000] ***	$I(0)$
FDI	-2.2817 [0.4317]	ΔFDI	-4.7867 [0.0028] ***	$I(1)$
GDPG	-3.4672 [0.0598] **	ΔGDPG	-8.2989 [0.0000] ***	$I(0)$
GFCF	-3.1121 [0.1202]	ΔGFCF	-7.0291 [0.0000] ***	$I(1)$
INFLCPI	-3.8650 [0.0261] **	ΔINFLCPI	-4.2396 [0.0117] ***	$I(0)$
OPEN	-1.9892 [0.5856]	ΔOPEN	-5.4462 [0.0006] ***	$I(1)$
CAB	-4.1828 [0.0124] ***	ΔCAB	-5.5866 [0.0004] ***	$I(0)$
XCONST	-30.4862 [0.0000] ***	ΔXCONST	-6.4163 [0.0001] ***	$I(0)$
LINT	-2.5239 [0.3153]	ΔLINT	-6.9753 [0.0000] ***	$I(1)$
PGR	-1.0896 [0.9148]	ΔPGR	-7.3562 [0.0000] ***	$I(1)$
DEMOC	-30.4341 [0.0000] ***	ΔDEMOC	-2.2338 [0.4512]	$I(0)$

Note: ***, ** and * indicates the rejection of the null hypothesis of non-stationary at 1%, 5% and 10% level of significance, Δ denote first difference, and $I(0)$ is the order of integration. The values in parenthesis are the P-values.

Source: Authors' own construct using E-views 10 Package.

From tables 3 and 4, the ADF test shows that the most of the variables are stationary at levels and all the variables are stationary at the first difference. The p-values are significant for all the variables at the first difference which shows the

null hypothesis should be rejected hence some of the variables are I(0) and all are I(1) according to the ADF test.

Table 5: Results of Unit Root Test (with constant only): KPSS Test

Variable	KPSS statistics	Variable	KPSS statistics	$I(0)$
	Levels		**First Difference**	
Debt	0.4426 ***	ΔDebt	0.5509 ***	$I(0)$
D_Debt	0.2612 ***	ΔD_Debt	0.5546 ***	$I(0)$
E_Debt	0.5858 ***	ΔE_Debt	0.2447 ***	$I(0)$
FB	0.4307 ***	ΔFB	0.2968 ***	$I(0)$
FDI	0.6588 ***	ΔFDI	0.1199 ***	$I(0)$
GDPG	0.2419 ***	ΔGDPG	0.1080 ***	$I(0)$
GFCF	0.6529 ***	ΔGFCF	0.5000 ***	$I(0)$
INFLCPI	0.7154 ***	ΔINFLCPI	0.3232 ***	$I(0)$
OPEN	0.5756 ***	ΔOPEN	0.1776 ***	$I(0)$
CAB	0.5923 ***	ΔCAB	0.1269 ***	$I(0)$
XCONST	0.2744 ***	ΔXCONST	0.5000 ***	$I(0)$
LINT	0.6536 ***	ΔLINT	0.5000 ***	$I(0)$
PGR	0.5463 ***	ΔPGR	0.2515 ***	$I(0)$
DEMOC	0.4449 **	ΔDEMOC	0.5000 ***	$I(0)$

Note: ***, ** and * indicates the rejection of the null hypothesis of non-stationary at 1%, 5% and 10% level of significance, and $I(0)$ is the order of integration.

Source: Authors' own construct using E-views 10 Package.

Table 6: Results of Unit Root Test (with constant and trend): KPSS Test

Variable	KPSS statistics	Variable	KPSS statistics	$I(0)$
	Levels		**First Difference**	
Debt	0.1727 ***	ΔDebt	0.0998 ***	$I(0)$
D_Debt	0.1906 ***	ΔD_Debt	0.1465 ***	$I(0)$
E_Debt	0.1051 ***	ΔE_Debt	0.1429 **	$I(0)$
FB	0.1076 ***	ΔFB	0.1396 ***	$I(0)$
FDI	0.1265 **	ΔFDI	0.0817 ***	$I(0)$
GDPG	0.1106 ***	ΔGDPG	0.0945 ***	$I(0)$
GFCF	0.2029 ***	ΔGFCF	0.3022	$I(0)$
INFLCPI	0.1164 ***	ΔINFLCPI	0.1353 ***	$I(0)$
OPEN	0.1550 ***	ΔOPEN	0.0498 ***	$I(0)$
CAB	0.0928 ***	ΔCAB	0.1262 **	$I(0)$
XCONST	0.0666 ***	ΔXCONST	0.5000	$I(0)$
LINT	0.1381 **	ΔLINT	0.5000	$I(0)$
PGR	0.1520 ***	ΔPGR	0.1005 ***	$I(0)$
DEMOC	0.0675 ***	ΔDEMOC	0.5000	$I(0)$

Note: ***, ** and * indicates the rejection of the null hypothesis of non-stationary at 1%, 5% and 10% level of significance, and $I(0)$ is the order of integration.

Source: Authors' own construct using E-views 10 Package.

The KPSS test is the alternative test used in this study to confirm the stationarity of the variables as against the ADF test. In order to select the bandwidth, the Newey-West Bandwidth is used for the maximum bandwidth to be selected. The KPSS test has a null hypothesis of stationarity of the variables thus,

no unit root. The decision rule is that if the KPSS test statistic is lesser than the critical value we accept the null hypothesis that the variable considered is stationary. But if the KPSS test statistic is greater than the critical value then we reject the null hypothesis.

From tables 5 and 6, it can be seen that all the variables are stationary at the $I(0)$ according to the KPSS test. We fail to reject the null hypothesis which states there's no unit root test. Since there's no variable which is $I(2)$, the ARDL methodology can be used for the estimation.

Table 7: Bounds Test for Total Public Debt

Significance	Lower Bounds	Upper Bounds
10%	1.92	2.89
5%	2.17	3.21
2.5%	2.43	3.51
1%	2.73	3.90
Test Statistics	Value	K
F-Statistics	7.191233	7

Source: Authors' own construct using E-views 10 Package.

In order to determine the cointegration thus a long run testing approach within the ARDL framework to test for possible presence of cointegration. The ARDL model selection is based on the Schwartz Bayesian Criterion (SBC). The result in following shows that there exists a stable long run relationship among the variables included in equation. The computed F-statistics of 7.19 is larger than the

upper bound critical value of 3.51 at 5 percent levels of significance. In this case the null hypothesis of no cointegration is rejected implying that there is a stable long run equilibrium relationship among the variables (cointegration) in equation. This implies that there is a long run relationship among the variables included in estimated model. The estimated short and long run coefficients for the total public, external and domestic public debts are presented following

Table 8: Cointegration Form for Total Public Debt

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FB)	-0.029124***	0.007246	-4.019567	0.0008
D(FDI)	0.012255	0.014985	0.817797	0.4242
D(GDPG)	-0.000103	0.008741	-0.011836	0 .9907
D(GFCF)	0.006947	0.007135	0.973667	0.3431
D(INFLCPI)	0.003004**	0.001043	2.880878	0.0099
D(OPEN)	0.000920	0.002025	0.454039	0.6552
D(CAB)	0.005067	0.007473	0.677976	0.5064
D(XCONST)	-0.001629*	0.000923	-1.765454	0.0944
CointEq(-1)	-0.397796***	0.047211	-8.425884	0.0000

Source: Authors' own construct using E-views 10 Package.

Table 9: Long-Run Coefficients for Total Public Debt

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FB	-0.150434***	0.031804	-4.730085	0.0002
FDI	0.135727**	0.034851	3.894539	0.0011
GDPG	-0.011624	0.029002	-0.400809	0.6933
GFCF	0.087755**	0.029880	2.936910	0.0088
INFLCPI	0.004983	0.006723	0.741191	0.4681
OPEN	-0.010570	0.006072	-1.740644	0.0988
CAB	0.122238	0.036662	3.334218	0.0037
XCONST	-0.004700	0.004049	-1.160873	0.2609
C	7.660859	0.397754	19.260276	0.0000

Source: Authors' own construct using E-views 10 Package

We have established in the previous section that a long run (co-integration) relationship exists among the variables included in equation. Given this, we proceed to estimate the short and long run coefficients in order to achieve the objectives of the study. The results above show that, in the short and long run there is a negative relationship between the total debt and fiscal deficits. This therefore means deterioration in the fiscal balance would cause the public debt to increase. This does satisfy the a-priori expectation of the coefficient of the fiscal balance variable. It shows that, a unit increase in the fiscal balance (deficit in this case) will cause the total debt to rise by 15 percent approximately in the long run and 2.9 percentage point rise in the short-run holding all other factors constant, at all level of significance. This conforms to the study of Omrane (2017), who sought to find the determinants of public debt growth, a case study for Tunisia. The VECM model for

the period 1986-2015 has been used. It was found that budget deficits are positively related to public debt. The study therefore concluded that fiscal deficit was the main determinant of public debt among all other determinants. Also the Falade (2013), investigating the relationship between fiscal deficit and public debt in Nigeria using the Error Correction approach also found out that there is a positive relationship between fiscal balance and public debt. Brafu-Insaidoo (2016), Awan et al (2015) and Alfaidi (2002), all sought and concluded that fiscal deficit positively affects external debt. Moreover with the rise in external debt with thus increase total debt, and as such conforms to the findings of the study.

Foreign direct investment has a positive relationship and significant relationship with the total debt. This result is not consistent with the a-prior expectations. The result shows that a unit increase in the foreign direct investment leads to a 14 percent increase in the total debt. In the long run and 1.2 percent increase in the short-run holding all other variables constant and so we reject the null hypothesis and conclude that there exists some significant relationship between the two variables in the long run at 5% level of significance but insignificant in the short-run. However, these results conform to the findings of Fuentes (2012), who also found the influence of foreign direct investment on Sovereign debt in Latin America. His conclusion from the linear regression model shows that foreign direct investment is positively related to debt.

In consistence to the findings of the study Al-Fawwaz (2016) and Harmon (2012), this results again depicts that, in the long run and short-run there exist a negative relationship between GDP growth and the total debt. This does satisfy the

a-prior expectation of the coefficient of the GDP growth variable. It shows that a one percent increase in GDP growth declines the total debt. Specifically, a unit increase in the GDP growth will deteriorate the total debt by a 1. 16 percentage point in the long run whilst causing a 0.01 percent fall when all other variables are held constant. Particularly Al-Fawwaz (2016) and Harmon (2012), after investigating the determinants of external debt in Jordan and the impact of public debt on three major economic indicators (inflation, GDP growth and interest rates) in Kenya all found and concluded that GDP is negatively related to public debt. Brafu-Insaidoo (2016) however on "Fiscal Performance, Liberalization and External Debt in Ghana" concluded that in the short run, as the gross domestic output increases the external debt increases but due to financial deepening, the external debt reduces usually after three years. Though the result obtained shows a negative relationship, the effect between GDP growth and the total debt is insignificant at both time periods. We therefore fail to reject the null hypothesis and conclude that GDP growth has no significant relationship with the total debt in the long run.

The coefficient of gross fixed capital formation has a positive and statistically significant relationship with the total debt in the long run but insignificant in the short-run. This is in contradiction with the a priori sign expectation. That is one percent increase in gross fixed capital formation causes an increase in the country's total debt. And thus specifically, a unit increase in gross fixed capital formation causes approximately 0.7 percent rise in the short-run and a 9-percentage point rise in Ghana's total debt at 10 percent level of significance in

the long run. So, we fail to accept the null hypothesis and conclude therefore that there exists a significant relationship between gross fixed capital formation and total debt in the long run. This finding does not conform to the study of Omrane et al. (2017), who investigated the macroeconomic determinants of public debt in Tunisia using Vector Error Correction model for the period 1986-2015 and concluded that the gross fixed capital formation is negatively related to the external debt, this can be as a results difference environmental and economic background of both countries. The finding however is consistent with the study of Swamy (2015), who also after studying the macroeconomic determinants of government debt in sovereign countries found out that Gross fixed capital formation has a positive effect on debt.

Regarding the long run coefficient of inflation at consumer price index, the result shows a positive and insignificant relationship between inflation and the total debt but significant in the short-run. This implies that a unit increase in inflation leads to a rise in the total debt by approximately 50 percent in the long run but a 0.3 percentage point rise in the short-run. This contradicts the a-priori sign expectation. This then conforms to the study by Hilscher et al. (2014). According to them, theoretically higher inflation will reduce the real value of the government's outstanding debt. The authors therefore estimated that the impacts of higher inflation on the fiscal burden are modest and proposed also that a more promising way to inflate away the public debt is to use financial repression. The results of the study show that a decade of repression combined with high inflation could wipe out almost half of the debt. Also, Akitoby et al. (2014), in finding the influence of low

or high inflation on the public debt in the G-7 countries, their results of stimulation indicated that if inflation were to fall to zero for five years, the average net debt would increase by about 5 percentage points over the next five years. In contrast, raising inflation to 6 percent for the next five years would decrease the average net debt by about 11 percentage points under the full Fisher effect and about 14 percentage points under the partial Fisher effect. It implies that higher inflation could help reduce the public debt somewhat in advanced economies. In contrast the study Nastansky et al. (2014) used quarterly data for Germany to empirically investigate the relationship between public debt and inflation and concluded the public debt level has a significantly positive effect on consumer prices. This contradiction might be as a result of the Authors analyzing the transmission from public debt to inflation through money supply and long-term interest rate.

In contrast to the expected a-priori signs, the coefficient of trade openness is negative but significant at 10 percent in the long run whilst positive but insignificant in the short-run. This indicates that a unit change (increase) in trade openness causes approximately a percentage point decrease in the public debt of the country and contradicts the a-priori sign expectation in the long run. However, there is a 0.009 percent rise in the public debt as a result of a unit increase in the trade openness in the short-run. The long run finding is inconsistent with the study Awan et al. (2015), Al-Fawwaz (2016) and, Osuji and Olowolayemo (1998), who all sought to find the relation between trade openness and external debt and concluded that there exists a significant positive relationship between trade openness and external debt. Apparently, Osuji and Olowolayemo (1998),

conducted their study on some sub-Sahara African countries which the study area of this research is inclusive. Moreover the short-run results conform to the studies reviewed above. Therefore, the difference in these findings may be the focus, as this study concentrated on both the long and short-run periods on only Ghana and total debt whilst the other studies might consider only a particular period (short-run) and concentrated on the external debt and to some extent different sub-Sahara African countries. Moreover, since total debt comprises the external debt, it makes sense to accept the criticisms and contradiction between this study and the other reviewed works.

Moreover, there exists a positive long and short-run relationship between current account balance and total debt, so this shows a surplus in the current account. The result therefore depicts that a unit increase in the current account balance leads to a significant 12 percentage point increase in the total debt of the country in the long run and an insignificant 5 percentage points decrease in the short-run. However, this does not conform to the a-priori expected signs. Inconsistency to long run results, this study agrees to the conclusion of the study Sinha et al. (2011), that current account significantly affects debt. However, the results do not fall in line with some studies such as Mehta and Kayumi (2013) who in estimating the effect of current account deficit on external debt and foreign exchange rates concluded that current account balance has a negative relationship with that external public debt and that shows a deficit. We therefore reject the null hypothesis at all levels of significance and conclude that there exists a significant long run relationship between current account balance and total debt.

Executive constraint has a negative insignificant long run relationship with total debt but a significant relationship in the short-run. This is to say a unit rise in executive constraint is associated with a 4 percent fall in total debt in the long run but a 1 percentage point decrease in the short-run at a 10 percent significant level. This does conform to a-priori sign expected. The findings contradict the study of Bittencourt (2014) who investigated the main determinants of government and external debt in the young democracies of South America. He concluded that executive constant has a positive significant relationship with debt. Also, Dasgupta and Dasgupta and Ziblatt (2016) in examining the European and Latin American countries over the 19th century. They show that suffrage expansions worsened debt credibility (measured by yield spreads) in countries with unconstrained executives but not in countries with constrained executives.

Table 10: Diagnostic Test

Test	Statistic	P-value
Serial Correlation	0.9329	0.4138
Heteroscedasticity	0.9533	0.5288
Normality	2.2432	0.3258
Functional form	3.3184	0.0862

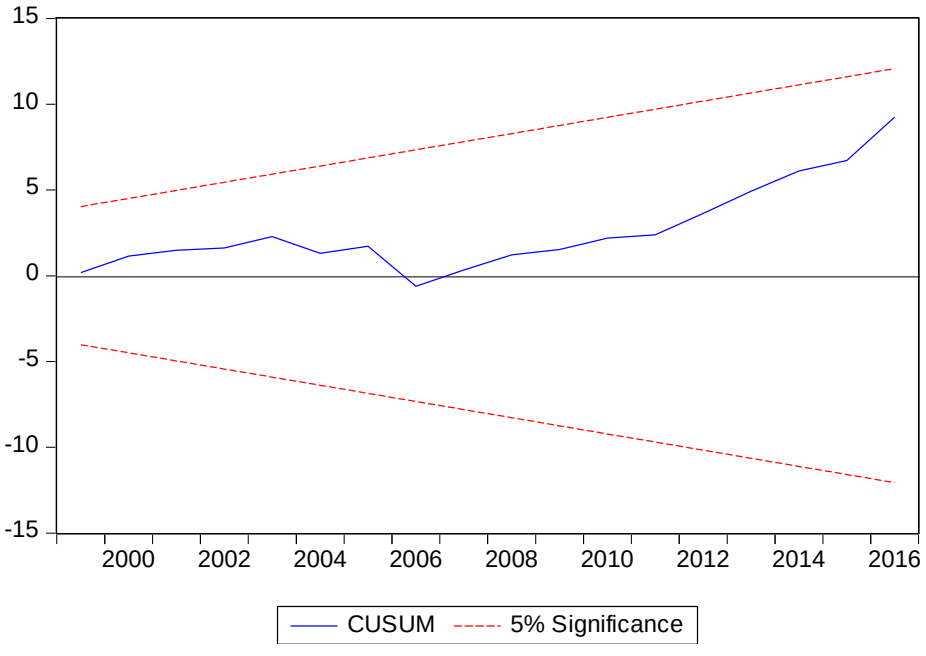
Source: Authors' own construct using E-views 10 Package

A normality test is also conducted to make sure that the error term is randomly normally distributed with zero mean and constant variance. The test displayed in table 10 shows the variables are peaked looking at the kurtosis value

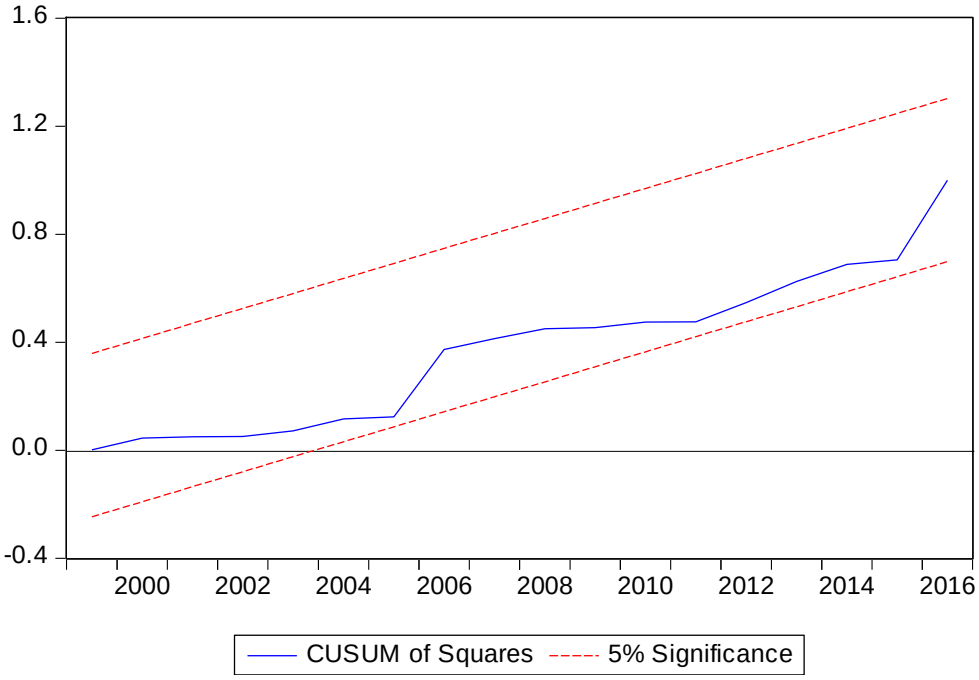
of 3.6, which is obviously greater than the jarque-bera value of 2.2. Thus, the model is statistically normally distributed about the mean.

From table 10, the illustration is a diagnostic test for identifying the presence of serial auto-correlation and Heteroskedasticity in the model, therefore be noticing that the probability values of 0.41 and 0.52 respectively, we therefore fail to reject the null hypothesis of homoscedasticity and no serial auto-correlation at all conventional levels of significance. We therefore conclude there do not exist Heteroskedasticity and serial auto-correlation in the model. This means the error term for the model is constant and as such the standard errors are in good fit and thus proves the statistical reliability of the coefficient estimates and that observations on the error term are statistically independent as well as uncorrelated.

Stability Test



Source: Authors' own construct using E-views 10 Package.



Source: Authors' own construct using E-views 10 Package.

In addition, to determine if the estimated regression equations are stable throughout the sample period, plots of the CUSUM and CUSUMQ tests as proposed by Brown et al (1975) and suggested by Pesaran et al (2001) within the ARDL framework are performed. If the plot of these statistics remains within the critical bound of the 5% significance level, the null hypothesis that all coefficients in the model are stable cannot be rejected. Hence it can be concluded that the regression equation is stable throughout the sample period considered.

This test is taken to determine if there exist any sort of nonlinearity in the specified model estimated. However, the F-test statistics depicts the model is significant at a 10% level of significance, we therefore reject the null hypothesis and conclude that there exist nonlinearity and misspecification in the model.

Table 11: Bounds Test for Domestic Debt

Significance	Lower Bounds	Upper Bounds
10%	1.99	2.94
5%	2.27	3.28
2.5%	2.55	3.61
1%	2.88	3.99
Test Statistics	Value	K
F-Statistics	10.09072	6

Source: Authors' own construct using E-views 10 Package.

In order to determine the possible presence of cointegration thus a long run testing approach within the ARDL framework to test for cointegration. The results are presented in Table above. The ARDL model (1, 1, 0, 0, 0, 2 and 2) selection was based on the Schwartz Bayesian Criterion (SBC). The result in Table shows that there exists a stable long run relationship among the variables included in equation. The computed F-statistics of 10.1 is larger than the upper bound critical values at all levels of significance. In this case the null hypothesis of no cointegration is rejected implying that there is a stable long run equilibrium relationship among the variables (cointegration) in equation. This implies that there

Table 12: Short Run Results for Fiscal Balance and Domestic Public Debt

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FB)	-0.083394***	0.015332	-5.439283	0.0000
D(GFCF)	0.000696	0.008362	0.083203	0.9347
D(GDPG)	0.036441**	0.014232	2.560562	0.0203
D(FDI)	-0.010700	0.024724	-0.432774	0.6706
D(LINT)	-0.132053	0.135667	-0.973361	0.3440
D(LINT(-1))	-0.681781***	0.168368	-4.049348	0.0008
D(PGR)	-1.026514	0.766829	-1.338647	0.1983
D(PGR(-1))	-5.316157***	1.147167	-4.634160	0.0002
D(XCONST)	-0.261664***	0.061324	-4.266939	0.0005
D(DEMOC)	0.256278***	0.060878	4.209721	0.0006
CointEq(-1)	-0.786286***	0.072350	-10.867788	0.0000

Source: Authors' own construct using E-views 10 Package.

Table 13: Long Run Results for Fiscal Balance and Domestic Public Debt

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FB	-0.210300***	0.031652	-6.644224	0.0000
GFCF	-0.001561	0.020646	-0.075618	0.9406
GDPG	0.056585	0.033979	1.665291	0.1142
FDI	-0.050577	0.038296	-1.320673	0.2041
LINT	0.845466**	0.279934	3.020230	0.0077
PGR	2.665623**	0.701492	3.799936	0.0014
XCONST	-0.419512***	0.062058	-6.760029	0.0000
DEMOC	0.415527***	0.060704	6.845137	0.0000
C	-17.123556**	5.740694	-2.982837	0.0084

Source: Authors' own construct using E-views 10 Package.

From this table presented above the results shows that fiscal balance has a long and short-run negative impact on the domestic debt of the country. This therefore means a unit deterioration in fiscal balance (deficit) is associated with a 21 percentage point increase in the domestic debt in the long run but 8 percentage points rise on average ceteris paribus, in the short run at the highest level of statistical significance and thus meets the a-priori expected sign. We therefore reject the null hypothesis and conclude that there exists a significant impact of fiscal balance on the domestic debt of the country.

In conformity to the expected a-priori restriction, GFCF negatively and insignificantly affects the LD_DEBT in the long run but a positive relationship with LD_DEBT in the short-run. This therefore reports as a unit change in GFCF leads

a 0.2 percent decrease in LD_DEBT in the long run ceteris however a 0.06 percentage points decease in the short-run at paribus. So, we fail to reject the null hypothesis and conclude therefore that, there is no significant relationship between these two variables.

Also, the coefficient of the GDP growth indicated an insignificant positive relationship with the domestic debt in the long run however a significant positive relationship in the short-run. A unit increase in the GDP growth rate causes a rise in domestic debt by 1.2 percent in the long run. Though the sign of the coefficient does not confirm the a-prior expected sign, the result is statistically insignificant. We therefore fail to reject the null hypothesis and state that GDP growth rate does not have any significant impact on the domestic debt.

The results depicted above shows that foreign direct investment in the long run is statistically insignificant but has negative impact on the domestic debt of the country in both long and short-run time periods. Specifically, it indicates that a unit increase in FDI results to a 5 percent reduction in domestic debt in the long run and a percentage point reduction in the short-run, ceteris paribus. This is consistent with the a-priori expected sign but is in contrast with the Fuentes (2012). His study sought to find the influence of foreign direct investment on Sovereign debt in Latin America. It was found from the linear regression model that foreign direct investment is positively related to debt. Similarly, the study Sinha et al. (2011), in examining those factors that influence the public debt in middle and high-income group countries concluded foreign direct investment has no effect on high income

countries but significantly influences the debt accumulation in middle-income countries.

The long run result indicates that the coefficient of interest payment shows a positive significant relationship with domestic debt whilst there exists a negative short-run insignificant relationship. The results indicate that a one percent increase interest payment causes 0.85 percentage points increase in the domestic debt in the long run Ceteris paribus, on average at a 5% level of significance but a 0.13 percentage fall in the short-run. This result confirms the a-prior expectations of interest payment in the long run but not in the short-run. Moreover, the short-run results are in consistence with the findings Cellini and Prezzavento (2016), who concluded that there is no effect of the dynamics of interest payments upon the dynamics of primary public debt expenditure after they investigated the influence of interest payment on government debt and government spending. Also, the study of Harmon (2012), upon finding the impact of public debt on three major economic indicators (inflation, GDP growth and interest rates) in Kenya. Adopting a descriptive research design, concluded that real interest rate is said to have a negative relationship with the public debt. However, the log-run analysis confirms to the study Omrane et al (2017), when he investigated the macroeconomic determinants of public debt in Tunisia. His findings reported that interest rate has a positive relationship with debt.

The result shows a statistically significant positive coefficient of population growth to the domestic debt in the long run and a negative but insignificant relationship in the short-run. Specifically, a percentage increase in population

growth in the long run leads to a 270-percentage rise in the country's domestic debt, ceteris paribus at a 1 % significance level whilst this leads a 102 percent fall in the short-run period. This short-run result falls in line with the a-priori expected sign but not the long run period estimation. The short-run estimation is therefore consistent with the study Swamy (2015) who sought to find the macroeconomic determinants of government debt in sovereign countries. It was found that population growth has a negative effect on debt. Sinha et al. (2011) examined those factors that influence the public debt in middle and high-income group countries using panel regression. 31 countries were taken and a time period of 30 years. Population density is negatively related to the public debt. Trussel et.al (2014) also added his voice, by emphasizing that municipalities with the highest number of elder population or even lower ratio of labor force to total number of inhabitants exhibit huge financial problems. They suggested, is precisely this age group that associates the idea that the increase of sovereign debt levels in the economy will mean an increase in their welfare, while for the younger age groups the size of debt implies a reduced prosperity since they would be responsible for the debt. Similarly, Bittencourt (2014) investigated the main determinants of government external debt in the young democracies of South America for the period 1970 to 2007 with the use of the dynamic panel time-series analysis. He found out that population is negatively related to debt.

The coefficient of executive constraint is negative and statistically significant to the domestic debt in the long run and short-run time periods. Apparently, a unit increase in executive constraint index causes domestic debt to

fall by 42 percent in the long run whilst leading to a 26 percentage points fall in the short-run, ceteris paribus on average at all conventional levels significance. This result does conform to the a-priori expected sign. The finding contradicts the study of Bittencourt (2014) who investigated the main determinants of government and external debt in the young democracies of South America. He concluded that executive constraint has a positive significant relationship with debt. Also, Dasgupta and Dasgupta and Ziblatt (2016) in examining the European and Latin American countries over the 19th century. They show that suffrage expansions worsened debt credibility (measured by yield spreads) in countries with unconstrained executives but not in countries with constrained executives.

Finally, in both the long and short-run time periods, the coefficient of democracy indicates a positive relationship with the domestic debt. This is consistent with the a-priori expected sign. The report shows that on average, ceteris paribus a unit increase in democracy index in the long run is associated with a 42 percent rise in domestic debt and in the short-run indicates a 26 percent rise all at the highest level of significance. This finding therefore both in the two time periods are in consistence with the study of Brafu-Insaidoo (2016), who conducted a study on the topic, "Fiscal Performance, Liberalization and External Debt in Ghana" tested three main working hypotheses including "fiscal deterioration causes an increase in a country's external debt stock." He concluded that the analysis rejects the null hypothesis that institutionalized democracy accumulates external debt.

Table 14: Diagnostics Test for Domestic Debt

Test	Statistic	P-value
Serial Correlation	0. 0822	0.1592
Heteroscedasticity	1.2953	0.3025
Normality	0.5074	0.7759
Functional form	1.2071	0.2882

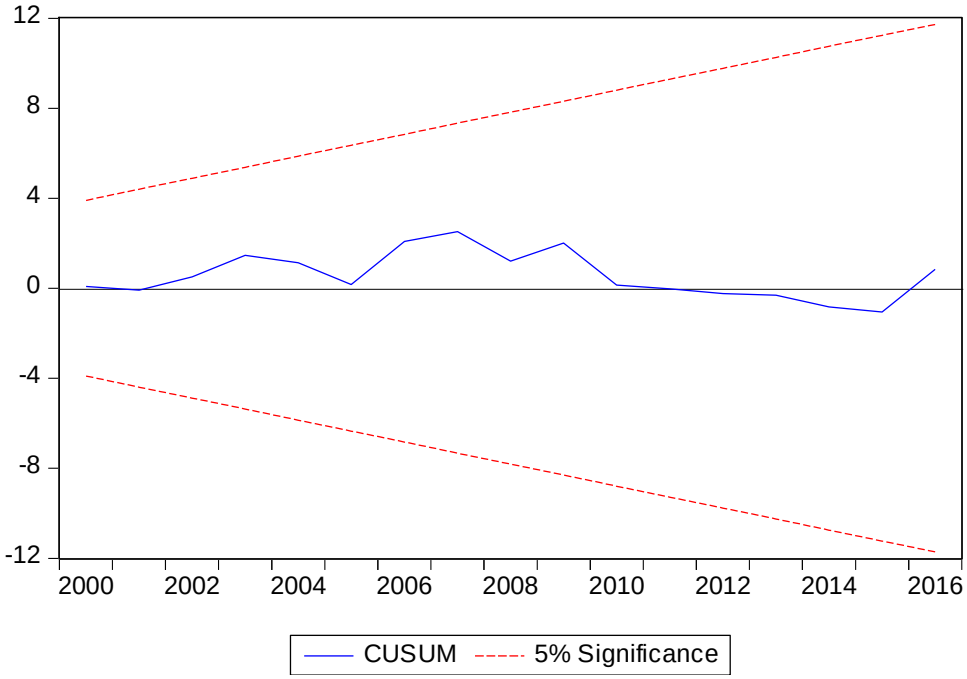
Source: Authors' own construct using E-views 10 Package.

The histogram normality test displayed above show the variables are peaked looking at the kurtosis value of 2.6, which is obviously greater than the Jarque-Bera value of 0.5. This therefore depicts normality in the model.

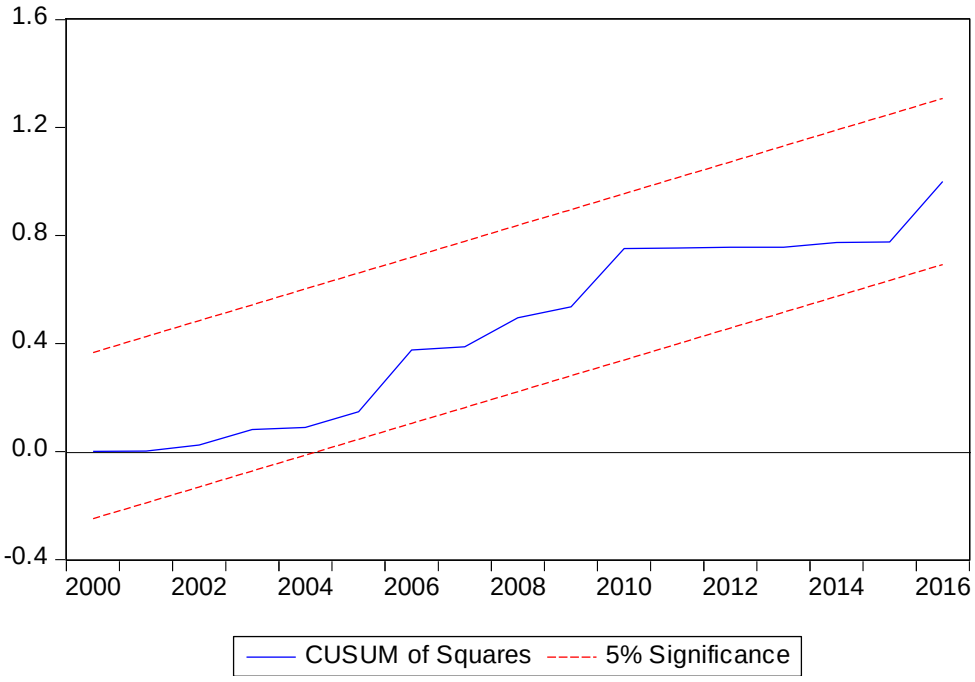
The above illustration is a diagnostic test for identifying the presence of serial auto-correlation and Heteroskedasticity in the model, it can therefore be noticed that their probability values of 0.16 and 0.3 respectively are greater than all conventional levels of significance We therefore fail to reject the null hypothesis of homoscedasticity and no serial auto-correlation among the variables in the model. So this means there exist no heteroskedasticity and serial auto correlation in the model estimated.

Also, we are to determine if there exist any sort of nonlinearity and misspecifications in the specified model estimated. However, from the probability of the F- statistics (0.28), the test therefore suggested is insignificant. So, we fail to reject the null hypothesis and conclude that there does not exist any sort of nonlinearity and misspecification in the model.

Stability Test



Source: Authors' own construct using E-views 10 Package.



Source: Authors' own construct using E-views 10 Package.

In order to determine if the estimated regression equations are stable throughout the sample period, plots of the CUSUM and CUSUMQ tests as proposed by Brown et al (1975) and suggested by Pesaran et al (2001) within the ARDL framework are performed. The CUSUM and CUSUMQ residuals line within the 5% critical value bounds implying stability in the model. Hence it can be concluded that the regression equation is stable throughout the sample period considered.

Table 15: Cointegration Form for External Debt

Significance	Lower Bounds	Upper Bounds
10%	1.70	2.83
5%	1.97	3.18
2.5%	2.22	3.49
1%	2.54	3.91
Test Statistics	Value	K
F-Statistics	9.381319	7

Source: Authors' own construct using E-views 10 Package

In determining the possible presence of cointegration thus a longrun testing approach within the ARDL framework to test for cointegration. The results are presented in Table above. The ARDL model selection was based on the Schwartz Bayesian Criterion (SBC). The result in Table shows that there exists a stable long run relationship among the variables included in equation. The computed F-

statistics of 9.38 is larger than the upper bound critical value of 3.49 at 5 percent level of significance. In this case the null hypothesis of no cointegration is rejected implying that there is a stable long run equilibrium relationship among the variables (cointegration) in equation. This implies that there is a long run relationship among the variables included in estimated model.

Table 16: Short Run Results for External Debt

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDI)	-0.023234	0.025753	-0.902176	0.3767
D(FB)	0.033785**	0.013391	2.522954	0.0194
D(OPEN)	0.009445**	0.003069	3.077961	0.0055
D(LINT)	0.484814**	0.145828	3.324550	0.0031
D(PGR)	-0.043712	0.449611	-0.097223	0.9234
D(CAB)	0.001528	0.010457	0.146124	0.8852
D(GDPG)	-0.026217*	0.015020	-1.745439	0.0949
D(DEMOC)	-0.000178	0.001588	-0.112341	0.9116
CointEq(-1)	-0.586968***	0.084206	-6.970616	0.0000

Source: Authors' own construct using E-views 10 Package

Table 17: Long Run Results for External Debt

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	0.064440*	0.037099	1.736947	0.0964
FB	0.012918	0.025997	0.496928	0.6242
OPEN	0.009851	0.003941	2.499788	0.0204
LINT	0.511938***	0.066382	7.712043	0.0000
PGR	-0.458482	0.409492	-1.119636	0.2749
CAB	0.039741	0.031518	1.260866	0.2206
GDPG	-0.034277	0.030625	-1.119229	0.2751
DEMOC	-0.003613	0.003838	-0.941405	0.3567

Source: Authors' own construct using E-views 10 Package

From this table also presented above the results indicates foreign direct investment has a long run positive but a short-run insignificant negative impact on the external debt of the country. This therefore means a unit increase in foreign direct investment is associated with a 6 percent rise in the external debt at a 10% level of statistical significance but a 2-percentage point fall in the short-run on, average ceteris paribus. This meets the short-run a-priori sign expectation. Empirically this finding contrasts the study of Fuentes (2012) who in determining the influence of foreign direct investment on Sovereign debt in Latin America found from the linear regression model that foreign direct investment is positively related to debt.

Contrary to the expected a-priori restriction, fiscal balance is insignificantly and positively related to the external debt in the long run but significant in the short-run. This therefore means, as there is a unit increase in fiscal balance (surplus) in the long run leads to a 1.3 percentage point decrease in external debt and a 3 percent decrease in the short-run, ceteris paribus. The study Awan et al (2015), indirectly conforms to this result. Upon finding the determinants of external debt in Pakistan, it was concluded in this work that fiscal deficit is positively related to external public debt. The study Alfaidi (2002) in the Determinants of public debt in Egypt also had a similar conclusion saying main cause of external debt is as a result growing budget deficit. So considerable we can also conclude from the opposite end that the surplus in the fiscal balance of a country can reduce its external debt. The counterintuitive result could be as a result of the debt servicing. If the government does not service its debt and its deficits keep increasing, it can sometimes make the country unworthy of credit.

Also, the coefficient of the trade openness indicated a positive relationship with the external debt in both long and short-run periods. So, a unit increase in the trade openness causes a rise in external debt by 0.1 percent in the long run but 0.9 percent in the short-run. The sign of the coefficient confirms the a-priori expected sign, the result is statistically significant at a 1% and 5% alpha level for the long and short-run periods respectively. It confirms the empirical works of Awan et al (2015), they studied the determinants of external debt in Pakistan using the ARDL. In this work, it was found that trade openness is a determinant of external debt and has a positive relationship as it increases the debt stock. Al-Fawwaz (2016) also

after has investigated the determinants of external debt in Jordan also added his voice by concluding that trade openness is positively related to the external debt. Similarly, Kizilgol et al (201) studied the relationship between trade openness and external debt also confirmed that trade openness affects external debt positively both in the long run and the short run.

Moreover, the study Bolukbas (2016), Zefar and Butt (2008), Osuji and Olowolayemo (1998), Zefar and Butt (2008) and Zakaria (2012) all also studied how the external debt is influenced by the trade openness and concluded that the trade openness leads to an increase in the external public debt. Thus, a positive relationship between the trade openness and the external debt.

The long and short-run results indicate that the coefficient of interest payment shows a positive and significant relationship with external debt. The results indicate that a one percent increase in interest payment causes approximately 0.5 percent increase in the external debt in the long and short-run, ceteris paribus, on average at the highest level of significance in both periods. These results confirm the a-priori expectations of interest payment. We move further to reject the null hypothesis and conclude that there is a statistical significant relationship between interest payment and external debt in the long run.

The results depicted above again shows that population growth rate in the long and short-run is statistically insignificant but has negative impact on the external debt of the country. Specifically, it indicates that a percentage increase in population growth rate results to a 50 percent reduction in external debt in the long run but a 4 percent falling in the short-run, ceteris paribus. This is consistent with

the a-priori expected sign and thus confirms the findings of Bittencourt (2014), who investigated the main determinants of government and external debt in the young democracies of South America, with the use of the dynamic panel time-series analysis It was found that population is negatively related to debt.

The coefficient of current account balance is negative and depicts a statistically insignificant relationship with the external debt in the long run and short-run. Apparently, a unit increase in current account balance (deficit) causes external debt to rise by 4.2 percent in the long run and a 0.2 percentage point fall during the short-run, ceteris paribus. This result does not conform to the a-priori expected sign. It is therefore in confirmation to the findings of Ibhagui (2017) on "External debt and current account adjustments: The role of trade openness". Analyzed empirically using large panel data samples of Sub-Saharan African countries. He found that external debt mostly sets the tone for the subsequent adjustment of current account deficits in SSA. However, the current account deficits of countries with high openness expand significantly from increases in external debt. Also, Mehta and Kayumi (2013) studied the effect of current account deficit on external debt and foreign exchange rates. The study was for the period 1990 to 2012. The Study also covers analysis of the components of India's Total External Debt that includes long term debt and short-term debt. Also, the correlation between the current account balance and external debt had been studied and it was found that current account balance has a negative relationship with that external public debt and that shows a deficit.

The results again depict that, in the both time periods long run there exist a negative relationship between GDP growth and the external debt. This does satisfy the a-priori expectation change of the coefficient of the GDP growth variable. It shows that a percent increase in GDP growth declines the external debt in the long and short-run. Specifically, a unit increase in the GDPG will deteriorate the external debt by approximately 3 percent in the long run and short-run, when all other variables are held constant. Though the result obtained shows a negative relationship between GDP growth and external debt, it is insignificant. The empirical literature of Al-Fawwaz (2016) on the determinants of external debt in Jordan using confirmed this finding by concluding that the external debt is negatively related to GDP per capita. Additionally, Harmon (2012) studies the impact of public debt on three major economic indicators (inflation, GDP growth and interest rates) in Kenya on the period 1996 to 2011. Adopting a descriptive research design and simple linear regression models, it was found that the GDP growth rate is negatively related to the public debt.

Finally, in the both time periods, the coefficient of democracy indicates a negative relationship with the external debt. This is not consistent with the a-priori expected sign. The report shows that on average, ceteris paribus a unit increase in democracy index in the long run is associated with a 0.4 percentage point fall in external debt and a 0.01percent fall in the short-run but all insignificant. This contrasts the finding of Brafu-Insaidoo (2016) on the topic, “Fiscal Performance, Liberalization and External Debt in Ghana” tested three main working hypotheses including “fiscal deterioration causes an increase in a country’s external debt

stock." He concluded that the analysis rejects the null hypothesis that institutionalized democracy accumulates external debt.

Diagnostic Test

To ensure that the model and estimates are devoid of any econometric problems, various diagnostic tests are conducted and the results are presented in table 18.

Table 18: Diagnostics Test for External Debt

Test	Statistic	P-value
Serial Correlation	0. 3580	0.7035
Heteroscedasticity	1.3876	0.2492
Normality	12.5530	0.1019
Functional form	0.7659	0.3914

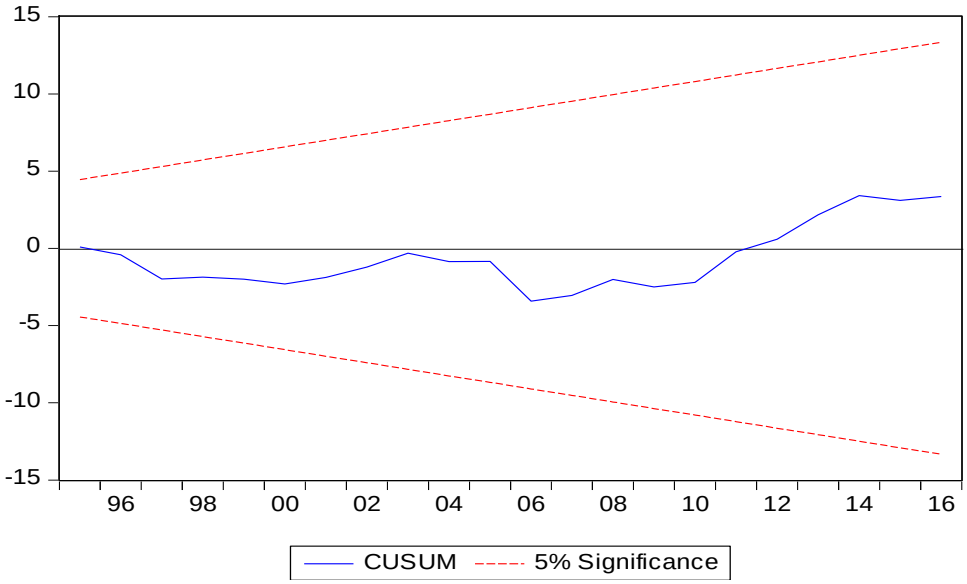
Source: Authors' own construct using E-views 10 Package

From the test taken above, we are to determine if there exist any sort of nonlinearity and misspecifications in the specified model estimated. However, from the probability of the F- statistics (0.39), the test therefore suggested is insignificant. So we fail to reject the null hypothesis and conclude that there does not exist any sort of nonlinearity and misspecification in the model.

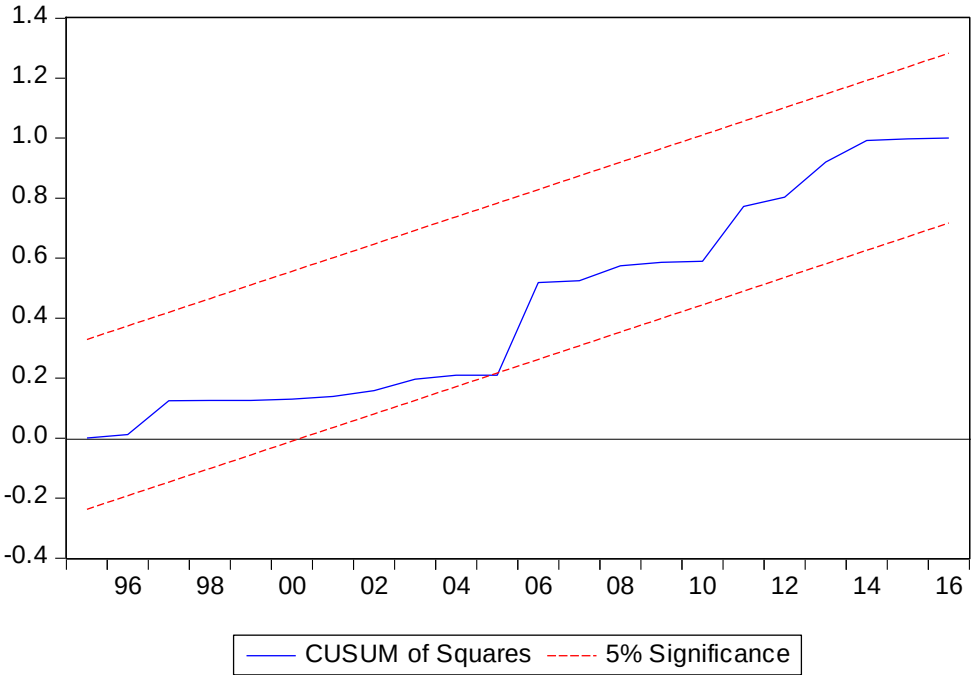
This displayed histogram however shows a negative skewness as its kurtosis value of 5.1 is less than the jarque- bera value of 12.6. This means the variables are much flatter and as such there exist no normality in the variables.

The above illustrations are diagnostic tests for identifying the presence of serial auto-correlation and Heteroskedasticity in the model, it can therefore be noticed the probability value of 0.7 and 0.25 indicates the acceptance of the null hypothesis. Therefore, there exist no Heteroskedasticity and no serial auto-correlation among the variables in the model.

Stability



Source: Authors' own construct using E-views 10 Package



Source: Authors' own construct using E-views 10 Package

In order to determine if the estimated regression equations are stable throughout the sample period, plots of the CUSUM and CUSUMQ tests as proposed by Brown et al (1975) and suggested by Pesaran et al (2001) within the ARDL framework are performed. The CUSUM and CUSUMQ residuals line within the 5% critical value bounds implying stability in the model. Hence it can be concluded that the regression equation is stable throughout the sample period considered. The reason the CUSUMQ slightly touches the bound line is as a result of the debt forgiveness granted in 2006-2007.

Conclusion

The chapter sets to examine the relationship between fiscal balance and public debt in Ghana. To achieve that, ADF and KPSS unit root procedures were undertaken to establish the stationary properties of these variables. Both the ADF

and the KPSS tests established that the variables used in the model were found to be either I(0) or I(1). The study further conducted the Bound test to see whether the variables were cointegrated in the long run. The study found that the all the variables were cointegrated. The study established a long run relationship between the variables and public debt by the use of the ARDL method. The results reveal that, fiscal deficit increases both the total public debt and the domestic debt. External debt stock is however reduced through fiscal deficits.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter summarizes and concludes the entire study. It also includes policy recommendations, limitations and suggestions for further research.

Summary of study

Fiscal balance and public debt have been one of the main concerns of stakeholders in the country. There are different perspectives and views on this subject in relation to the different theoretical and empirical literature in developing countries. This is because the debt keeps increasing at an increasing rate over the years and countries seek to know the factors that result to the increasing debt. It is necessary to divide the public debt into domestic public debt and external public debt in order to find the individual influences on both debt types.

The main objective of this study was to determine the influence of fiscal balance on the public debt by the use of the time series data from the years 1983 to 2016 in Ghana. There was an adequate review of theoretical and empirical literature in order to help understand the topic better. There were gaps identified from the literature that was reviewed and this work therefore seeks to address such gaps. In Ghana however, limited research has been conducted on this subject. The gaps include the use of the ARDL model and the disaggregation of the total debt into the external and domestic debt.

The following variables have been used in the analysis: Total debt (DEBT), Domestic Debt (D_DEBT) and External Debt (E_DEBT), Fiscal Balance (FB), Foreign Direct Investment (FDI), GDP Growth Rate (GDPG), Gross Fixed Capital Formation (GFCF), Inflation at Consumer price index (INFCPI), Trade Openness (OPEN), Current Account Balance (CAB), Executive constraint (XCONST), Interest Payment (INT), Democracy (DEMOC), Population Growth Rate (PGR). The unit root test was conducted on the variables and the results for both the ADF and the KPSS tests show that the variables are cointegrated of I(0) or I(1). It was ensured that none of the variables was of I(2) in order to avoid the problem of spurious results. The cointegration is also conducted which is the bound test that suggested the ARDL model. The coefficients for long -run and short-run were then estimated. The findings show that fiscal deterioration increases the total debt and domestic debt. However, the fiscal surplus increases the external debt in both time periods. The diagnostic test was also conducted on heteroscedasticity, serial correlation normality, CUSUM and CUSUMSQ as suggested by the ARDL model for both the linear model specification and the quadratic form model specification and the results reveal that all the diagnostic tests were passed and all the coefficients of the estimated models are stable over the study period.

Summary of Findings

Based on the findings of this study in relation to the main working hypothesis, it can be concluded that:

1. From the analysis, it was found in both the short- run and the long run that the fiscal deficit is positively related to the total debt. An increase in the fiscal deficit increases the total debt of Ghana significantly. Fiscal deficit is detrimental to the total debt both in the short run and long run in Ghana.
2. Fiscal deficit increases the country's domestic debt in Ghana. From the results, it was found that the fiscal deficit is responsible for increasing the domestic debt in Ghana. This relationship was established for both the short-run and the long run.
3. Fiscal deficit reduces Ghana's access to external loans hence a fall in the external debt. In the third output, it was deduced that the fiscal surpluses increase the external debt. and the possible reason could be the country's debt service.

Recommendations

Based on these findings, the following are put forward:

Since fiscal deficit is detrimental to both the total debt and domestic debt, the Government must work towards reducing its fiscal deficit by cutting down its expenditures. Government expenditure goes into unproductive projects, which do not yield any dividend to reservice the debt. The cut down in government expenditure would help reduce the debt which would thereby reduce the fiscal deficits. A low fiscal deficit would therefore not put pressure on the government to borrow in servicing the debt. The debt should not be used to take care of

expenditures, which do not yield interest but must rather be diverted into profitable investments that yield interests.

The Government agencies that are in charge of the revenue must consider the broadening of their tax base in order to reduce the deficits. Various strategies must be devised in order to capture the non-taxpayers in the informal sectors into the tax nets. The revenue leakages must also be checked in order to increase the domestic revenue. If the domestic revenue increases, the deficit would reduce as well and thereby reducing the public debt.

Future Direction of Research

In the future, the exchange rate would be included in the model of external debt because of how unstable the cedi is against the dollar. That also means the public debt would also be converted in Ghana cedes instead of measuring in dollars. Also, in the future it would be best to look at the threshold of debt that would not be harmful to the Ghanaian economy. This is because debt itself is not bad but becomes harmful when it reaches a particular threshold.

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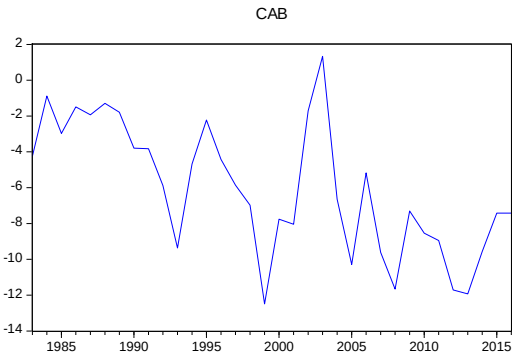
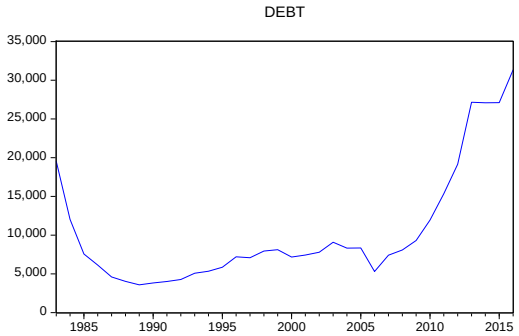
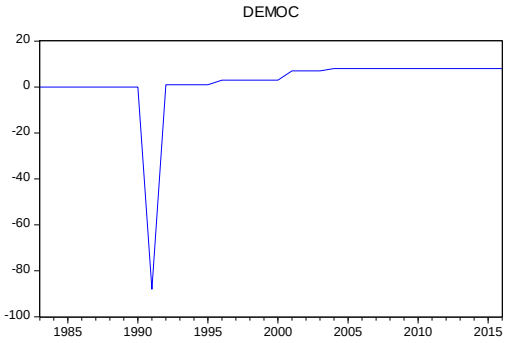
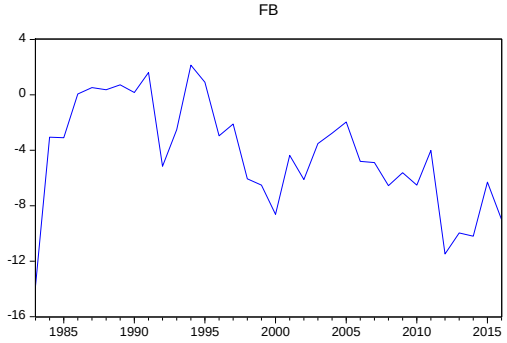
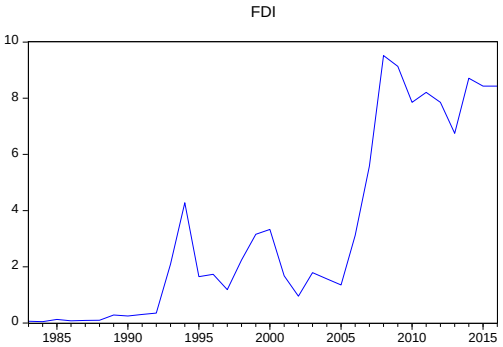
APPENDICES A-1

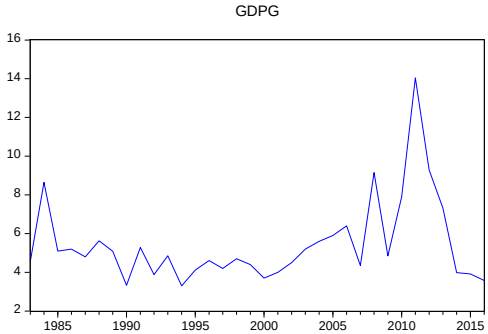


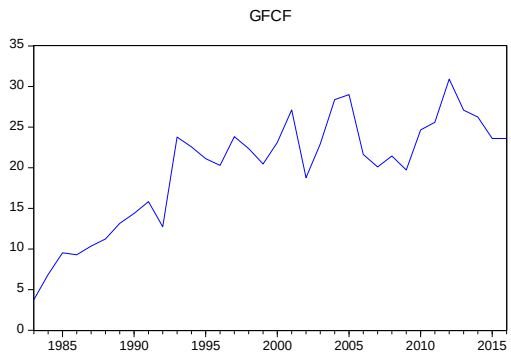


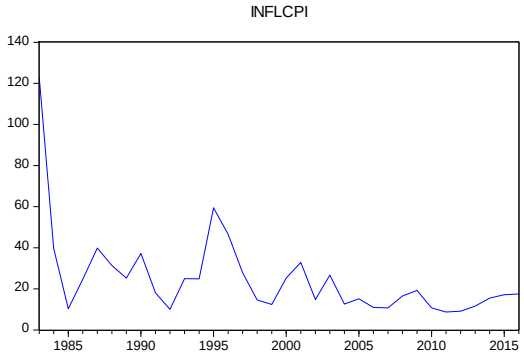


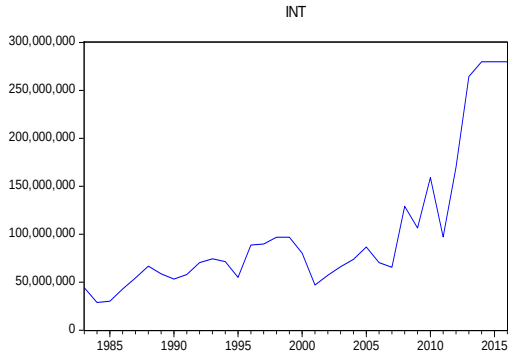


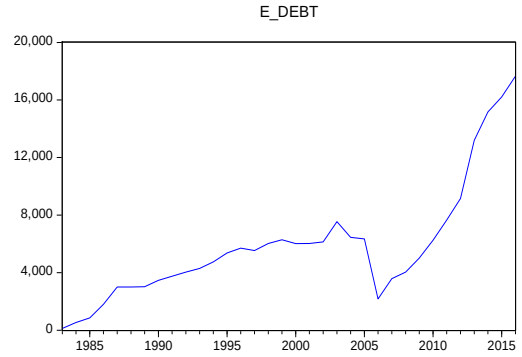


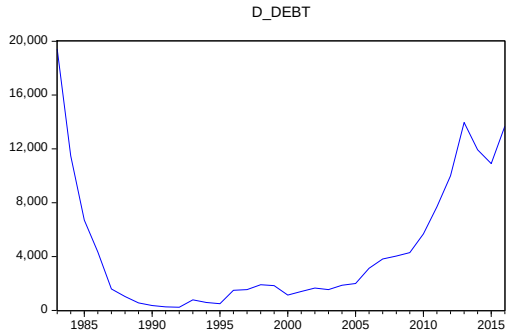


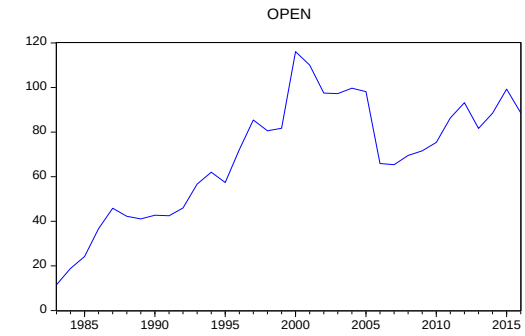


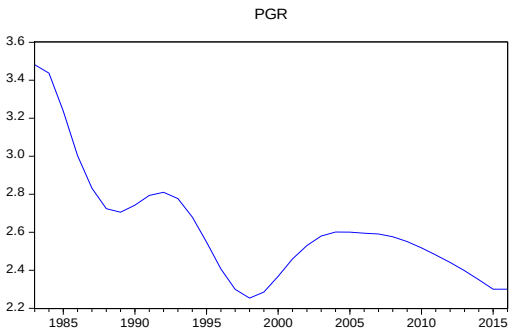


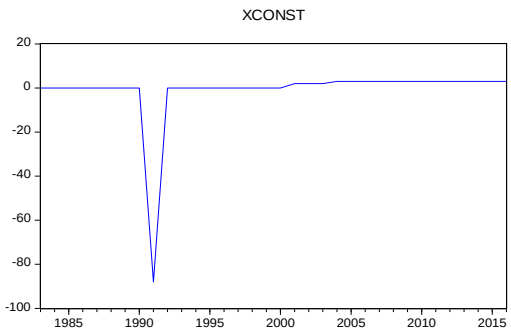












APPENDIX A-2