

**EXAMINING THE EFFECTS OF FISCAL DEFICITS ON INFLATION IN
GHANA**

BY

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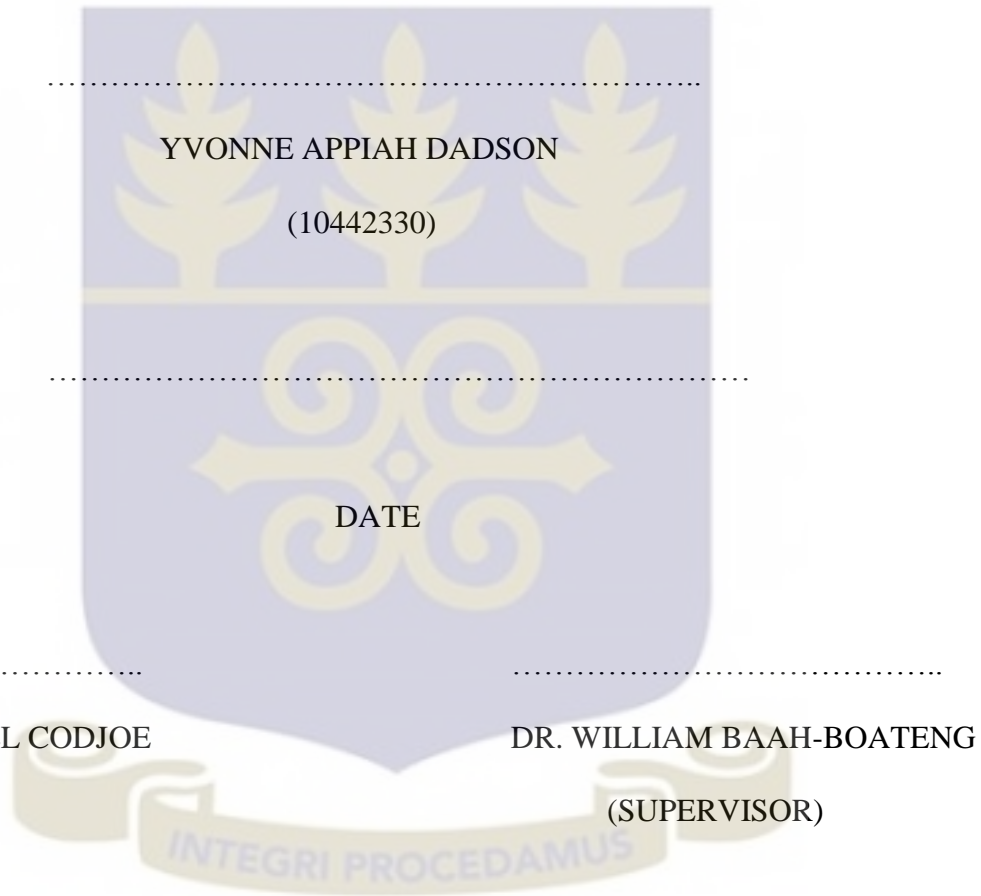
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DECLARATION

I, YVONNE APPIAH DADSON, hereby declare that this thesis is the original research undertaken by me under the guidance of my supervisors. Neither the whole nor a part of this thesis has been presented for another degree elsewhere.



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ABSTRACT

Inflation is a major macroeconomic issue in Ghana, although there have been times when it seemed to have been managed. This is evident in the periods such as June 2010, when Ghana attained a single-digit of 9.5%. However, there appears to be a fundamental problem in the management of inflation, in other words, inflation seem not to be tractable. The evidence from many studies conducted on inflation indicated that the causes of inflation are many and varied. However, the main thrust of this study is to examine the impact of fiscal deficit on the inflationary trends in Ghana. Nevertheless, other explanatory variables, such as the Treasury bill rate, real exchange rate and real GDP were included. The study period spans from the period 1983 to 2013. The time series properties of the underlying series were examined using the Augmented Dickey Fuller and the Philip-Perron unit root tests. Using the Autoregressive Distributive Lag (ARDL) model, the long and short-run models were estimated, and the Granger Causality test was employed to test for causality between the variables. The results suggested a positive relationship between fiscal deficits and inflation in the long-run. The Granger causality test supported a unidirectional causality from fiscal deficits to inflation. In conclusion, this study revealed that inflationary pressures for the period 1983 to 2013 were predominantly a monetary phenomenon. The fiscal deficit component with its corresponding financing was observed to be a major determinant of inflation in Ghana hence emphasizing the prominence of the fiscal theory of the price level in the explanation of inflation in Ghana. A major recommendation from the conclusions is that fiscal and monetary policies must be properly formulated and implemented to address the problem of inflation in Ghana.

DEDICATION

To God Almighty and the Appiah Dadson family for their love and immense support.



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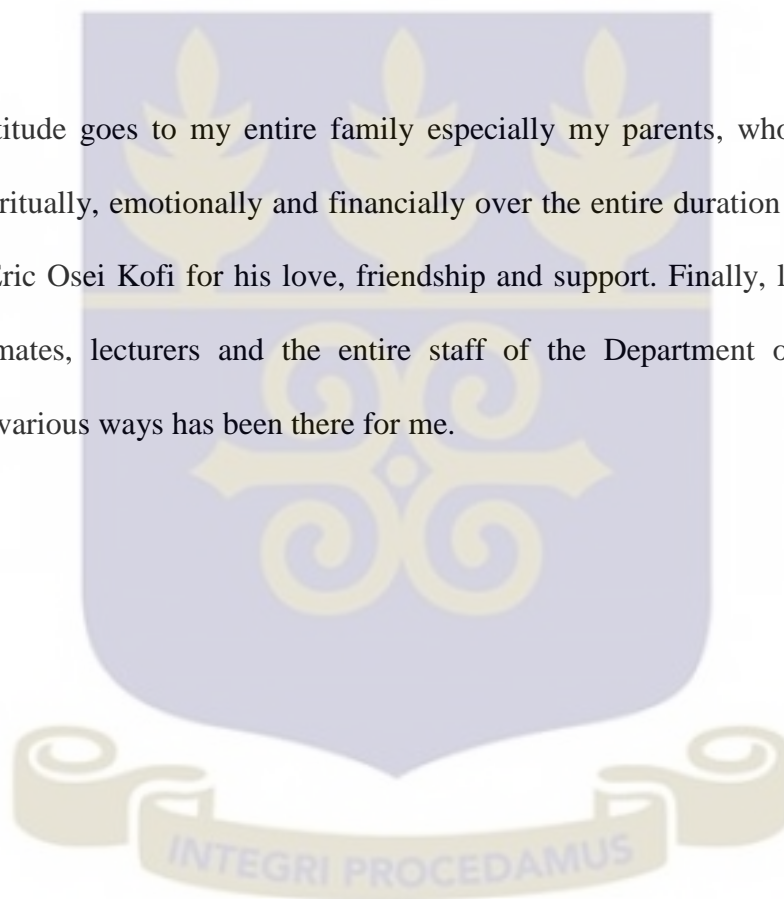


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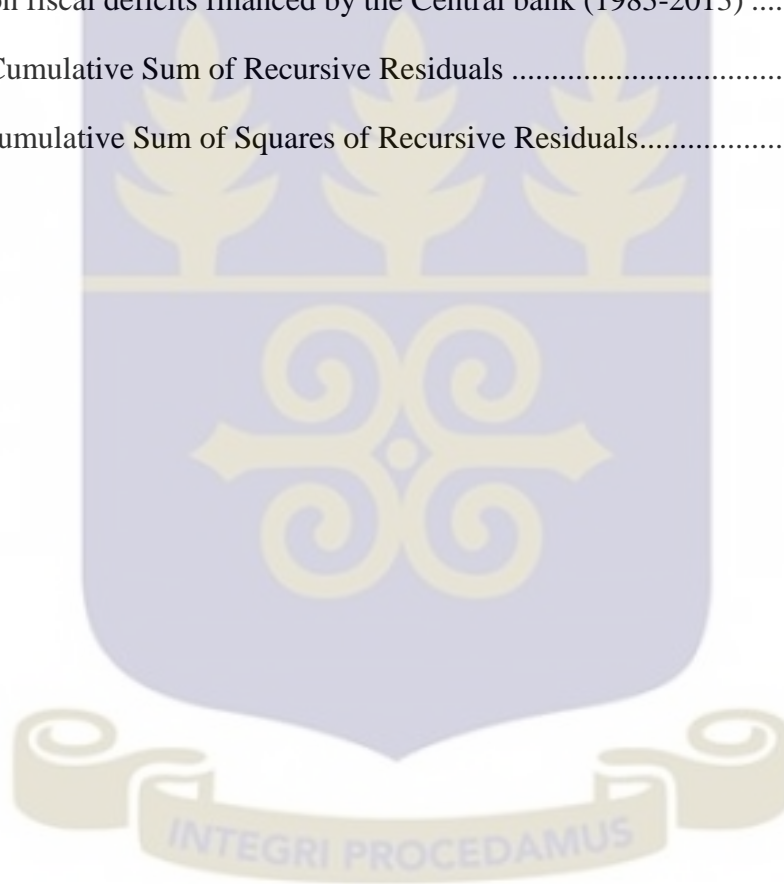
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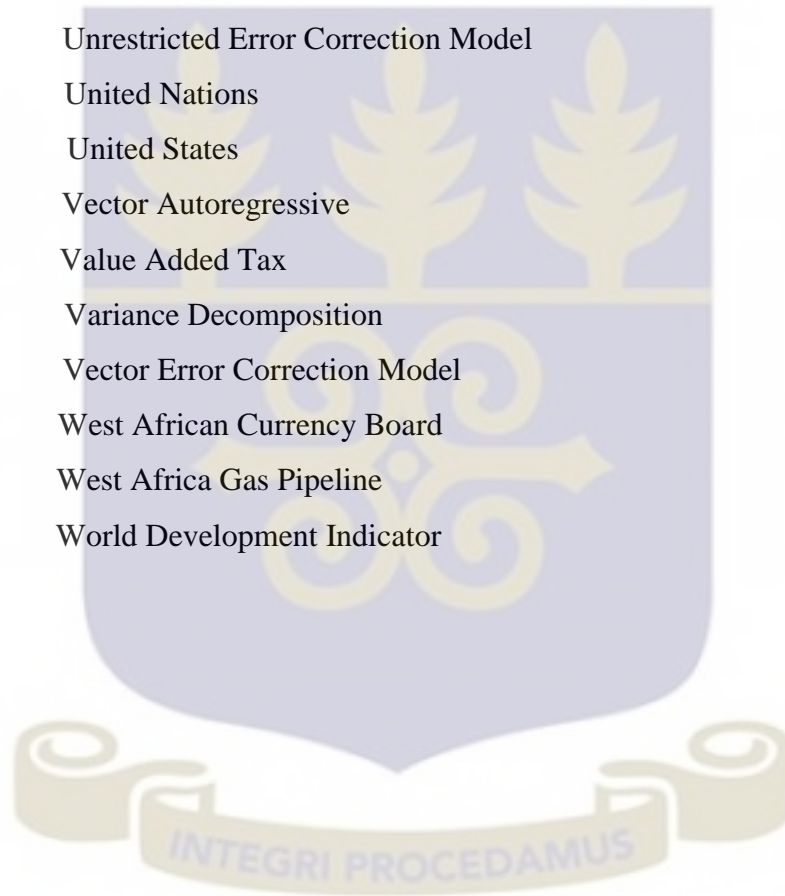
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ACRONYMS

ADF	–	Augmented Dickey- Fuller test
ARDL	–	Autoregressive Distributed Lag
CEPA	–	Centre for Policy Analysis
CPI	–	Consumer Price Index
CUSUM	–	Cumulative Sum
CUSUMQ	–	Cumulative Sum of Squares
DPQR	–	Dynamic Panel Quartile Regression
DOLS	–	Dynamic Ordinary Least Squares
ECM	–	Error Correction Model
ERP	–	Economic Recovery Programme
FMOLS	–	Fully Modified Ordinary Least Squares
FTPL	–	Fiscal Theory of the Price Level
GBC	–	Government Budget Constraint
GDP	–	Gross Domestic Product
GNPC	–	Ghana National Petroleum
GoG	–	Government of Ghana
GRA	–	Ghana Revenue Authority
HIPC	–	Heavily Indebted Poor Countries
IEA	–	Institute of Economic Affairs
IMF	–	International Monetary Fund
IRF	–	Impulse Response Function
IT	–	Inflation Targetting
LAC	–	Latin American & Caribbean countries
LCU	–	Local Currency Unit
MDG	–	Millennium Development Goals
MPC	–	Monetary Policy Committee
NLC	–	National Liberation Council
NRC	–	National Redemption Council
OECD	–	Organization for Economic Cooperation and Development
OLS	–	Ordinary Least Squares

OMO	–	Open Market Operations
PNDC	–	Provisional National Defense Council
PP	–	Progress Party
SAP	–	Structural Adjustment Programme
SSSS	–	Single Spine Salary Structure
SW-H	–	Sargent & Wallace Hypothesis
SVAR	–	Structural Vector Autoregression
TOR	–	Tema Oil Refinery
UECM	–	Unrestricted Error Correction Model
U.N.	–	United Nations
U. S.	–	United States
VAR	–	Vector Autoregressive
VAT	–	Value Added Tax
VD	–	Variance Decomposition
VECM	–	Vector Error Correction Model
WACB	–	West African Currency Board
WAGP	–	West Africa Gas Pipeline
WDI	–	World Development Indicator



CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Macroeconomic stability is one of the major goals of macroeconomic policy in most countries; either industrialized or emerging. The attainment of macroeconomic stability does not guarantee high rates of economic growth. In most instances, high and sustainable growth is dependent on key structural measures such as good governance and banking sector reforms (Ames et al, 2001).

A major challenge confronting price stability and economic growth globally and in particular developing economies, is the issue of controlling high inflationary pressures (Okereafor, 2015). Inflation has been defined severally in literature. For instance, inflation is defined as a situation of constantly rising prices, or equally, of continually deteriorating value of money (Laidler & Parkin, 1975). Again, Mishkin (2007), referred to inflation as the situation of a continually rising price level. Inflation does not refer to increases in the prices of specific commodities. Generally, inflation occurs when prices of most commodities rise and such an upsurge is not temporary. However, not every hike in the price level is termed inflation.

Inflation continues to be a recurrent topic in academic literature especially since its disturbing experience in many industrialized economies during the mid and late 1970s, brought about by oil shocks which were accompanied by an overall commodity price boom (Vansteenkiste, 2009). For instance, inflation in the U.S. rose to 6% between 1968

-1971 and then fell to 4% in 1972. In the early parts of 1974, inflation rapidly rose to reach a peak of 10%, this surge was due to hikes in the oil price of 1973 (Branson, 1989).

Central banks accommodated the rise in prices during this period through monetary policies which resulted in most of the industrialized countries such as the U.S, incurring double-digit inflation rate (Kiguel, 2011). This action by the central banks ushered many economies into a recession in the mid-1970s. A phenomenon known as stagflation was experienced for the first time during the 1970s by most economies in the world. As with most of the industrialized countries, inflation has always been very chronic and problematic in many developing economies. Inflationary pressures of the industrialized countries trickled down to the emerging economies. Hence, the inflationary pressures of the developing countries are usually explained in terms of world inflation (Hossain 1986).

The twentieth century was characterized by more inflation than any other century. It produced the worst form of inflation in history; every country experienced some of the worst form of inflation of this century (Taylor, 2006). The hardest-hit countries during this century, endured one or more episodes of hyperinflation and also decades of high inflation rates or both. For instance, in the 1950s countries such as Chile, Bolivia, Argentina, Uruguay and Turkey had already been experiencing double-digit inflation rates of above 10 percent. Although, Brazil never experienced hyperinflation, it had inflation rates of over 10 percent every year from 1951 to 1995 which peaked at 1000% in some years. The worst hit economy which was Yugoslavia, for most parts of the 1960s, 1970s and 1980s, experienced a double-digit inflation and finally experienced

hyperinflation in the early parts of the 1990s (Taylor, 2006). Again, China was the only Asian country that experienced the hyperinflationary periods of this century although Indonesia suffered high rates of inflation at different time periods in the same century.

Furthermore, the Latin American and Caribbean (LAC) countries encountered periodic episodes of high inflation during this period. These high episodes experienced were attributed to factors such as policy mistakes and commodity shocks, oil and food price changes, political and fiscal factors as well as international transmission of inflation. However, most African countries during this period had currency boards until the 1960s. These currency boards helped limit the impact of inflation by aligning their currencies to European currencies. Comparatively, the French West-African countries whose currencies are tied to the French franc have suffered less inflation than other countries especially English-speaking countries that had independent monetary policies (Taylor, 2006). For instance, Ghana, an English-speaking country, experienced a double-digit inflation of 14.2% as early as in 1964. However, Congo's inflation occurred under the reign of Mobutu (1965-1997) whilst Angola experienced inflation exclusively in the 1990s. Inflation rates in the Sub-Saharan region are among the highest in the contemporary world.

The persistence of inflation in several developing economies over decades has sparked concern among policy-makers and economists about the exposure of these countries to the adverse effects of inflation. During periods of high inflationary pressures, economies of the developing world encounter problems such as democratic instability, fiscal austerity and structural reform (Dornbusch, 1992). According to De Long (1997),

although the U.S. inflation of the 1970s was primarily sparked by oil shocks, they were not the principal cause of the inflation episodes within the developing countries. This may be due to the fact that these episodes occurred during the period when inflation was already high and still rising. The determinants of inflation in developing countries may differ from those identified for developed countries.

The two competing theoretical contentions explaining the main causes of inflation are the Monetarists and Structuralist schools of thought. However, other schools of thought that provide pertinent support to the inflationary theory are the Marxists, post-Keynesians and the Neo-structuralists. However, there is no consensus both in theoretical and empirical literature regarding the factors that drive the inflationary process of many economies, especially the emerging economies. While from the monetarist perspective, inflation is fundamentally a monetary phenomenon as proposed by Friedman (1968) that “inflation is always and everywhere a monetary phenomenon and occurs only by a rapid increase in the quantity of money over output.” Structuralists on the other hand, emphasized that inflationary pressures are brought about by supply rigidities and devoid of monetary influences. Hence, money supply is an outcome of the occurrence of inflation rather than its cause (Pennant-Rea & Emmont, 1990).

Hossain (1986), suggested that the major determinants of inflation in developing countries have largely been monetary factors. The inflationary pressures experienced by most of the developing countries were assumed as basically a monetary phenomenon. This was due to the inability or unwillingness of governments to finance its expenditures by raising taxes. Instead most of these countries preferred to print money, excessive

issues of currency or open market operations, hence increasing money supply and thereby fueling inflationary pressures (Taylor, 2006). On the hand, Griffin (1961) suggested that inflation in developing countries was not fundamentally a monetarist phenomenon. He rather emphasized that inflationary pressures of developing economies were as a result of structural disequilibrium. He further suggested that inflation in these economies can only be curbed by ensuring compatibility among the various structural elements of the national expenditure of an economy.

Loungani and Swagel (2001), after reviewing some studies¹, proposed four main sources of inflation in developing countries: The first source of inflation in developing countries was linked to fiscal imbalances which may lead to a rise in inflationary pressures either through an increase in monetary growth or through exchange rate depreciation brought about by balance of payments crisis. Regardless of the exchange regime implemented by an economy, exchange rate is a main source of inflation especially in developing countries.

The second category is attributed to the overheating of an economy. If monetary growth exceeds that which is needed to support growth, whatever its cause, excess demand arises. Hence, inflation occurs until real demand falls to the level consistent with likely output. As a result, most of the policy-driven fluctuations in inflation could be explained by variations in the output gap.

¹ Chopra (1985), Montiel (1989), Ball and Mankiw (1995), Coe and McDermott (1997),

The third source was linked to relative price changes, although classical models of inflation indicated that relative price changes do not affect aggregate inflation. According to them, different firms react differently to huge price shocks as compared to small price shocks. This is because most firms adjust or reviews its prices during such huge price shocks but tend to ignore small price shocks. In a situation where the price shock is only temporary, the extent of the overall price impact depends on the importance of the sector to the overall consumer inflation. The last source was ascribed to the inflation inertia component arising from the presence of staggered wage contracts or slow adjustment of inflationary expectations.

1.2 Statement of the Problem

Ghana's economy has been characterized by macroeconomic instability in most parts of its history. This is reflected in prolonged inflation that had confronted and inhibited the growth and development of the Ghanaian economy ever since its independence in 1957. With each phase of macroeconomic instability, there has been a major unpredictable change in prices of goods and services as well as factors of production that distorts the planning horizon (Gockel & Abbey, 2014).

Although, inflation continues to plague the Ghanaian economy and therefore occupies the centre stage of economic policy, however no single consensus theory of inflation has emerged². Moreover, many empirical studies has attributed inflation to varied causes. In

². Economists contend that there is no single theory capable of explaining every inflationary situation in an economy this is because sources of inflation will depend on a number of factors including the extent of the development of the country, the nature of its labour unions, market structure among others (Gyebi & Bofo, 2013).

most cases, the forces that drive inflationary pressures are country-specific (Adu & Marbuah, 2011). In an attempt to identify the main causes or drivers of inflationary pressures in Ghana, inflation has been researched into from the demand or monetary side as well as the real factors side. Notable studies including Chibber and Shaffik (1990) among others³ affirmed the monetarist hypothesis.⁴ On the contrary, studies by Sowa and Kwakye (1993) among others⁵ were aligned to the structuralists' views. However, studies by Ocran (2007) as well as others⁶ revealed a mixture of both the monetarists and structuralists views of inflation. Among the factors identified as major causes of inflation in Ghana are: fiscal deficits and its financing, real GDP, money supply, exchange rate, inflation inertia, food production among others.

In simple terms, fiscal deficits occur when government expenditure exceeds government revenue. The subject of fiscal deficits has attracted a great deal of attention over the past three decades as evident in the extensive debate in both academic and policy arenas. Fiscal deficits and its financing had always posed a serious challenge especially to developing countries, Ghana inclusive. It was prominent in the macroeconomic adjustment of the 1980s in both industrialized and emerging countries (Easterly, Rodriguez & Schmidt-Hebbel, 1994). The over-indebtedness that led to the debt crisis which began in 1982 comprising: high inflation, low investment as well as low growth performance that afflicted developing countries during this period, were linked to fiscal deficits (Easterly & Schmidt-Hebbel, 1993).

³ Lawson (1966), Ahmad (1970), Dordunoo (1994), Bawumia and Abradu-Otoo (2003), Bawumia and Atta-Mensah (2003).

⁴ The monetarists hold the view that sustained money growth in excess of output produces inflation (Meltzer, 2002).

⁵ Sowa (1994; 1996), Sowa and Acquaye (1999).

⁶ Appiah and Boahene (2007), Adu and Marbuah (2011), Gyebi and Bofo (2013), Ahiakpor (2014)

Substantial evidence indicates that, in many cases, fiscal mismanagement resulting in huge and prolonged fiscal deficits, has been the fundamental cause of macroeconomic instability which in turn, has caused problems such as high inflation rates, large external current account deficits, slow-moving and inhibited growth (Ashong, 2004). Ghana since independence has been unable to marshal enough revenue to accommodate its ever-increasing expenditures hence creating deficits on its accounts. In practice, a government which incurs fiscal deficits can finance by: borrowing either from domestic or external sources, issuing bonds on the domestic financial markets and finally by resorting to the “printing of money” (Alagidede et al, 2013).

The size of fiscal deficits and sources of financing determines the fiscal constraints that a country will be subjected to in the long run (Kustepeli & Onel, 2004). Each of these sources of financing triggers its own macroeconomic costs and effects. With the exception of money printing, there are limitations on the extent to which a government can pursue these financing options. According to section 30(2) of Bank of Ghana Act, 2002 (Act 612), “the total of the loans, advances, purchases of treasury bills and securities together with money borrowed by the Government from other banking institutions and the public at the close of a financial year under subsection (1) shall not exceed 10 percent of the total revenue of the fiscal year in which the advances were made” (Fitch report, 2014).

Ghana registered high inflationary episodes in the 1970s and early 1980s. The yearly inflation rates recorded exceeded 100% on four occasions between July 1977 and March 1983. Inflation averaged about 50%, with 1977 and 1981 recording 116.5% respectively.

Inflation continued to surge upwards, reaching approximately 123% in 1983. Coincidentally, government budget was also in deficits between 1972 and 1983. For instance, the fiscal deficit as percentage of GDP was 6% and 11% in 1972 and 1976 respectively. This “sky-rocketing” inflation rates of the period was attributed to the monetization of the fiscal deficits which caused an excess growth in money supply. Government was however compelled to monetize existing deficits due to the financial environment of that time (Sowa & Kwakye, 1993).

Ghana has up until this time been battling with the issue of high inflation rates over the past three decades until June 2010, when it recorded a single-digit inflation rate of 9.5%. Inflation rates declined further to 6.3% by October 2011 and finally reached 8.8% by January 2012 (Ghana Statistical Service, 2014). However, the recurrence of inflation brings to the fore the need for a study into the underlying factor explaining Ghana’s inflation problem which hit 13.5% by December 2013 and has exhibited an increasing trend afterwards registering 17% of GDP by December 2014 (Ghana Statistical Service, 2014). In the same vein, Ghana’s fiscal deficits have also assumed an upward trend and remained high in recent times. The deficits stood at 11.6% in 2012, dropped to 10.1% of GDP in 2013 as against the target of 9.0% of GDP and finally reached 9.4% of GDP by 2013. Large fiscal deficits and its financing mainly through the central bank was identified as one of the key contributory factors that sparked off the high inflationary pressures experienced by the economy after January 2013⁷.

⁷ Bank of Ghana Annual Report, 2013.

Furthermore, although ardent monetary policy operations by the central bank has slowed money supply growth in recent years (i.e. dropping from 33.3% in 2010 to 20.4% in 2013), the country continues to experience high fiscal deficits and current account deficits (reaching 10.8% of GDP and 12.3% of GDP in 2013 respectively). These occurrences have detrimental effects on price stability, economic activities and economic growth in general. In the light of all these occurrences, the question still remains; what are the effects of fiscal deficits on inflation? Can the government rely on fiscal prudence alone to curtail the inflationary pressures in the economy? Again, is there a unidirectional or two-way causal link between fiscal deficits and inflation in Ghana? This thesis sets out to achieve empirical answers to these questions.

1.3 Objectives of the Study

The main objective of this research is to examine empirically the effects of fiscal deficits on inflation in Ghana. The study seeks to determine whether persistent inflation in Ghana tends to have some considerable fiscal roots. Specifically, it seeks:

1. To examine the impact of fiscal deficits on the inflationary trends in Ghana.
2. To determine the type of relationship existing between these two variables.

1.4 Hypotheses

The following hypotheses will be tested using appropriate quantitative and statistical techniques. To achieve the objectives of this study, two hypotheses are set:

1. **H₀**: Fiscal deficits have no effect on inflation in both short and long run.
H₁: Fiscal deficits have an effect on inflation in both short and long run.
2. **H₀**: There is no uni-directional causality from fiscal deficits to inflation.

H₁: There is a uni-directional causality from fiscal deficits to inflation.

1.5 Methodology and Data

To carry out the study, an Autoregressive Distributed Lag (ARDL) is adopted and estimated to capture the effects of fiscal deficits on inflation in the short and long run time periods. An inflation model is specified which comprises real GDP and real exchange rate as some of the explanatory variables. Diagnostic tests including test for serial correlation, heteroscedasticity, functional form specification and normality test of residual terms are carried out to test the robustness of the results from the ARDL model. The study makes use of annual time-series data, drawn from secondary sources which covers a sample period between 1983 and 2013 yielding 31 observations. The data is compiled from different sources including: World Development Indicators (WDI, 2014), Monetary Time Series data, Bank of Ghana as well as requested data from the Bank of Ghana.

1.6 Significance of the Study

Monetary policy in Ghana has had as its main objective the attainment of price stability (i.e. controlling inflation). Attaining low levels of inflation is crucial in order for the government to achieve higher rates of employment and economic growth. However, robust and sustainable economic growth must be backed by sound macroeconomic policies which includes sustainable fiscal deficits (Fischer, 1986).

One question frequently asked regarding the macroeconomic impact of fiscal deficits is: if higher fiscal deficits are always associated with higher inflation? Sargent and Wallace

(1985), confirmed the assertion that higher public sector deficits are inflationary. This relationship is however inconclusive since government can finance these deficits through several sources. Ghana had found itself in fiscal crisis prior to the period of economic reforms in 1983 (Alagidede et al, 2013). For most parts of history, the country recorded deficits on its fiscal balance with the exception of 1986-1991 and 1994 -1995 where surpluses were obtained on the government's accounts.

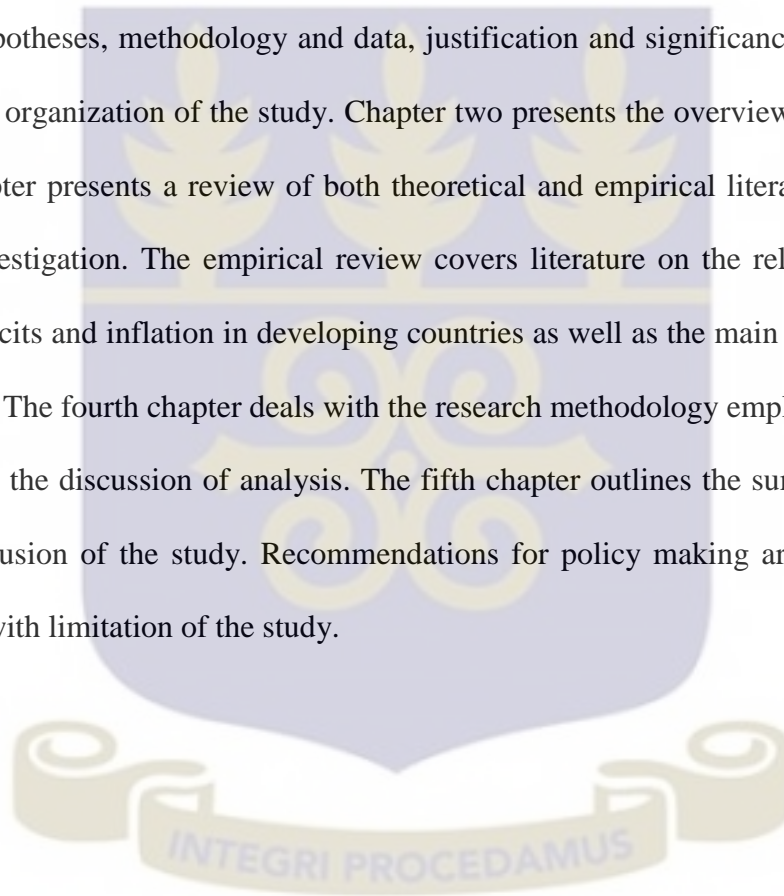
Macroeconomic situation in Ghana could have been better if the levels and frequency of fiscal deterioration had been lower. Although, Ghana has made significant advances in terms of economic growth, which has contributed to enhancing key social outcomes, including those of the Millennium Development Goals (MDGs). However, the country still has large economic and infrastructural deficits (Osei, 2013). Large fiscal deficits are known to limit economic activity in several ways: mainly, by accelerating the growth of credit and debt, increasing Ghana's inflationary pressures, causing uncertainty, raising costs of production within the private sector and finally hindering the rate of growth.

For most governments, the foremost objective is the attainment of macroeconomic stability to meet the medium and long term goals of sustainable growth along with poverty reduction. An appropriate guide towards achieving this would be, the existence of relevant and adequate statistical information and analyses available to policy makers in their decision and policy-making processes. Though there is substantial amount of research on inflation in Ghana, less attention has been given to the impact of fiscal deficits on inflation in Ghana and hence, the inability of policymakers to make right policies consistent with curbing inflation. It is hoped that the study will establish the

effects of fiscal deficits on inflation. This will reveal the actual policies needed by policymakers in curbing fiscal deficits and in so doing fight inflation in Ghana.

1.7 Organization of the Study

The study is divided into five chapters. Chapter one covers general introduction which is sub-divided into the background of the study, statement of the problem, objectives of the study, hypotheses, methodology and data, justification and significance of the study and lastly, the organization of the study. Chapter two presents the overview of the study. The third chapter presents a review of both theoretical and empirical literature on the issues under investigation. The empirical review covers literature on the relationship between fiscal deficits and inflation in developing countries as well as the main causes of inflation in Ghana. The fourth chapter deals with the research methodology employed for the study as well as the discussion of analysis. The fifth chapter outlines the summary of findings and conclusion of the study. Recommendations for policy making are also highlighted together with limitation of the study.



CHAPTER TWO

INFLATION AND FISCAL DEFICIT IN GHANA

2.1. Inflationary Trends

Ghana recorded low rates of inflation shortly after independence until 1964, when the economy experienced its first double-digit inflation rate of 14.2%. Between 1964 and 1966, inflationary pressures began to mount up registering 26.4% by 1965. This occurrence was attributed to the government's policy of budgetary deficits and its related financing through the central bank as well as borrowing from the commercial banks to finance deficits in the early in the 1960s. However, a single-digit inflation rate average of 9% was achieved between 1967 and 1969. From the period 1967 to 1970, inflation assumed a decreasing trend registering as low as 3.0% by 1970. Inflation was controlled during this period due to the marked domestic output growth and improved import supplies brought about by the cocoa boom of 1970 (Dordunoo, 2000). However, this low inflation rate could not be sustained as inflation shot up to 9.6% by 1971.

Inflationary pressures assumed an upward trend between 1972 and 1981, it averaged 50% during this period, with 1977 and 1981 hitting 116.5% respectively. A fundamental reason identified by the Central Bureau of Statistics, for the "galloping" inflation rate of this period was the huge borrowings from the central bank by successive governments which increased yearly. A "sky-rocketing" inflation rate of 122.9% was recorded, this is the highest the economy has recorded since independence. The severe drought and its accompanying bushfires of 1983 as well as the influx of Ghanaians from Nigeria during the same period were identified as the major causes of the 1983 inflation rate (Aryeetey

& Harrigan, 2000). By 1984, inflation had declined from 122.9% recorded in 1983 to 40% and further to 10.3% by 1985. This decreasing trend in the inflation rate was linked to the Economic Recovery Programme (ERP) of 1983 and the bumper harvest in 1984 (Kwakye & Sowa, 1993).

The period between 1986 and 2000, experienced comparatively low rates of inflation although it remained above the set targets of the government. For instance, the rate of inflation registered in 1988 was 31.4%, which dropped further to 25.2% by 1989. The declining rates of inflation during this period was mainly as a result of growth in specifically food supplies, which brought about effective contractionary monetary hence, the low inflation rates. Furthermore, the bumper harvest of 1991 coupled with conscious effort at monetary policy by the government brought a decline in the inflation rate to 10.1% in 1992 (CEPA, 1996). The highest inflation rate of 59.5% since the inception of the ERP was experienced in 1995. This was attributed to the introduction of the Value Added Tax (VAT), which was higher than the existing sales tax rate (CEPA, 1996).

By the end of 2000, inflation had assumed an upward trend hitting 40.5% after a decline between 1996 and 1999. Some of the causes of this upsurge in inflation was the depreciation of the domestic currency and most especially fiscal mismanagement due to extensive borrowing from the central bank possibly to finance the 2000 elections (Bermanke et al, 2005). By the end of December 2001, inflation rate stood at 21.3% which was below the set target of 25%. This decline was brought about by prudent fiscal

management, tight monetary policies and a relatively stable cedi⁸. In 2003, although the set inflation target was 9%, inflation stood at 23.6% by the end of the year. This was due to adjustments and the corrective measures instituted in the petroleum sector of the economy. Headline inflation declined from 23.6% in December 2003 to 11.8% by December 2004 which was above government's commitment to bring the 12-month CPI inflation down to below 10% in 2004⁹. During the 2008 election year, inflation rate increased from 12.8% in January to 18.4% in July and finally ended at 18.1% by December.

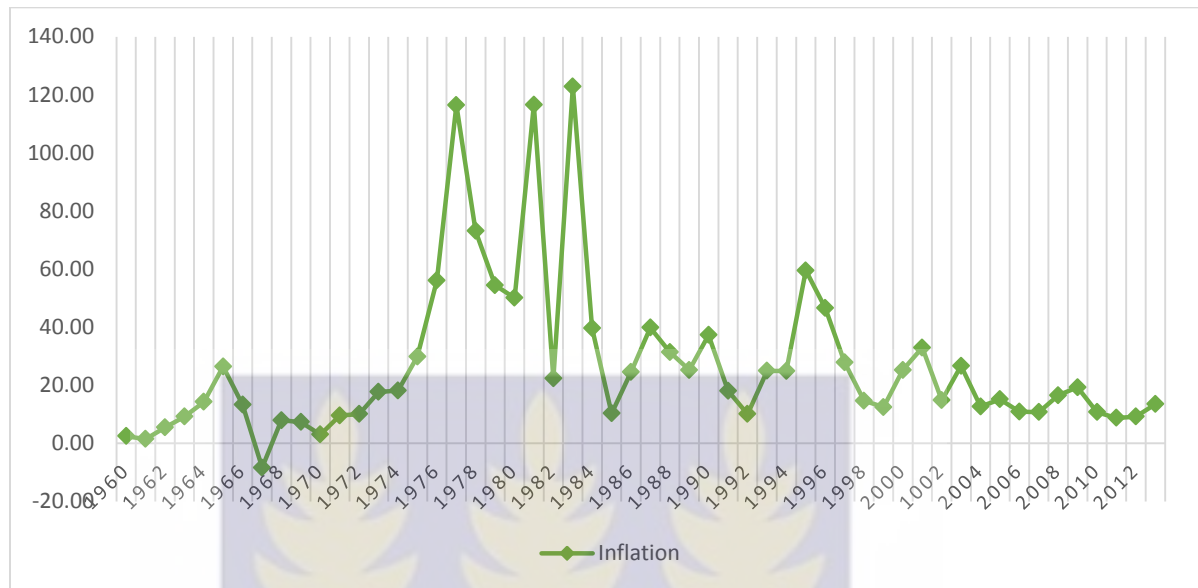
Inflation was still unstable and had assumed a downward trend from 14.8% in January to 14.2% in February; it further declined to 13.3% in March, 2010. The economy achieved its single-digit inflation figure of 9.5% for the month of June, after several years of incurring severe double-digit inflation rate. This disinflation process continued steadily in the third and fourth quarters of 2010 backed by good food harvests. It further declined to 8.6% by the end of 2010, lower than the end year target of 9.5%. The sharp decline in inflation in this period emanated from both food and non-food categories of the consumer price index¹⁰. By the close of 2012, a single-digit inflation rate of 8.8%¹¹ was recorded. Inflation surged in 2013 mainly on account of the elimination of subsidies on petroleum prices and utility tariffs as well as pass-through effects of exchange rate depreciation, the latter reflected a general weakness of the external sector developments in 2013. The year ended with inflation rate at 13.5% (GoG policy statement, 2014).

⁸ Quarterly Bulletin of the Bank of Ghana, 2001-2003

⁹ Bank of Ghana Annual report, 2004

¹⁰ Bank of Ghana Annual report, 2008.

¹¹ Ghana Statistical Service

Fig. 2.1: Trends of inflation (1960 – 2013)

Source: Author's computation based on data from Ghana Statistical service, Annual Reports of the Bank of Ghana and WDI, 2014.

Fig 2.1 represents the inflationary trend in Ghana from 1960 to 2013. From the diagram, inflationary pressures have been averagely high especially between the 1970 era i.e. before 1983. However, after 1983, there has been periods of high inflation rate, such as 1996 which was an election year. It is also observed that, inflationary pressures assume an increasing trend especially during election periods with the exception of 2004. High inflation rates undermine confidence in the economy and subsequently investment.

2.2. Fiscal deficits

In simple terms, fiscal deficits occur when government expenditure exceeds government revenue. A significant feature of Ghana's history has been the dominance of fiscal deficits. The economy consistently incurred fiscal deficits although there were years of surpluses. By the 1960s, import substitution and over-indulgence in modernization resulted in excessive government spending hence, government budget (narrowly defined)

registered deficits (Sowa & Kwakye, 1993). Many of the state-owned enterprises as well as large investments in social and infrastructural facilities operated at a loss and adversely impacted on public finances. The fiscal position of the government deteriorated as expenditure increased from C156.4million in 1960 to C371million by 1965. By 1965, government budget balance deteriorated to 6.4% of GDP (Bawumia, 2013).

Between 1966 and 1971, a conscious effort at reducing the high level fiscal deficits was made by both the NLC (1966-69) and the Progress Party (1969-72). The NLC initiated Ghana's first experiment at economic stabilization with a Standby Arrangement with the IMF. This programme entailed deflationary fiscal and monetary policies. Budgetary expenditure and fiscal deficits were reduced, interest rates were raised, price controls and subsidies were progressively removed (Hutchful, 2002). The objective of the IMF supported stabilization program embarked upon by the NLC was largely achieved. For instance, low fiscal deficits of C50million (2.2% of GDP) was recorded in 1970. By 1971, the economic situation had become aggravated by a dramatic drop in cocoa prices resulting in a balance of trade deficit. This situation caused fiscal deficits to hit 3.5% of GDP in 1971¹².

The period between 1972 and 1982 under successive governments was characterized by dramatic economic decline underpinned by indiscipline in economic management. This period represented the worst economic performance in Ghana's history (Bawumia, 2013). Throughout this period, the government ran a deficit fiscal policy, with the growth rate of

¹² Data obtained from IMF, Yearbook

revenue lagging behind the growth rate of expenditure¹³. Fiscal deficits as a percentage of GDP increased from 3.5% in 1971 to 7.5% in 1975. It peaked at 11.2% of GDP in 1976 then steadily declined to 6.3% of GDP in 1979 and further to 5.6% by 1982¹⁴. By 1983, fiscal development had reached a crisis point and therefore needed a fiscal policy reform.

The inception of the ERP had as a main fiscal objective, the reduction of fiscal deficits in order to help control inflation and prevent crowding-out of the private sector (Aryeetey & Harrigan, 2000). To achieve this, the government-revenue system was restored to enable the mobilization of revenues needed through taxation to reduce the deficits and reignite the economy. In addition, the expenditure policy was directed at achieving levels of expenditure that were consistent with macroeconomic stability and at the same time, addressing the most critical requirements of accelerated growth (Chand, 1996). Between 1986 and 1991, the government experienced consistent surpluses on its accounts. Large foreign inflows coupled with a more efficient public spending, accounted for these surpluses achieved throughout the period (Amoah & Loloh, 2008). For instance, fiscal balance was in surplus of ₵4.1 billion in 1987 (0.005% of GDP), followed by an improved performance in 1991 with a modest surplus of about ₵39 billion.

Fiscal indiscipline emerged in the election year of 1992, large deficits of 4.3% of GDP was recorded in 1992 (CEPA, 1996). Since 1992, the country has recorded fiscal deficits with the exception of 1994 and 1995 fiscal years, where surpluses of 2.3% and 0.9% of

¹⁴ International Financial Statistics Yearbook 1989, IMF

GDP respectively were registered (Amoah & Loloh, 2008). The budget surplus of 1994 was due to a major fiscal turnaround¹⁵ engineered by the government. The period leading to the 1996 elections was accompanied by fiscal pressures (CEPA, 1996). The fiscal position in 1996 resulted in a fiscal deficit of 7.7% of GDP. The IMF and the World Bank suspended their support to Ghana as they had done in 1992 due to the fiscal slippages of that period (Bawumia, 2013). Between 1999 and 2000, the Ghanaian economy was hit by falling prices of its two main exports, cocoa and gold and also rising prices of oil. The Ghanaian economy faced persistently high fiscal deficits and declining foreign exchange reserves.

The excessive fiscal expansion in the run-up to the 2000 Presidential and Parliamentary elections worsened the fiscal position of the economy, fiscal deficits as a percentage of GDP peaked at 8.5%. However, Ghana's sign-up for the Heavily Indebted Poor Countries (HIPC) initiative brought some assistance in the second half of 2000, this resulted in an improved government finances especially between 2001 and 2005 resulting in fiscal deficits assuming a decreasing trend. Economic discipline and stability was maintained during the election year of 2004, fiscal deficits as a percentage of GDP hit 3.2% and declined further recording as low as 2.0% of GDP in 2005. However, after Ghana reached the HIPC completion in 2005, fiscal deficits began to exhibit an increasing movement registering 4.7% and 4.8% of GDP in 2006 and 2007 respectively (Osei, 2012).

¹⁵ Towards the end of 1994, further divestiture of the holdings in Ashanti Goldfields Company were undertaken to raise \$200million to finance the deficit (Aryeetey & Harrigan, 2000).

During the 2008 election year, fiscal indiscipline took a centre stage as fiscal deficits rose to 6.5% of the rebased GDP in 2008. Government subsidies of utilities and wage increases during the election year were identified as the main causes of the fiscal slippages of this period (Bawumia, 2013). Furthermore, the periods between 2009 and 2011, experienced low levels of fiscal deficits although they were above the budget targets for the periods. The fiscal deficits of 11.8% of GDP recorded in 2012 remains the highest in the history of Ghana. Some of the exceptional factors outlined were: implementation challenges associated with the single-spine wage policy initiated in 2007; significant shortfall in grants from development partners; non-realization of projected revenue from the oil companies due mainly to shortfall in projected output in 2011 and 2012; larger-than expected petroleum and utility subsidies; higher interest costs arising from the steep rise in short term domestic interest rates and the continued disruption in gas supply to the country from the West African Gas Pipeline (WAGP) that led to a substantial increase in subsidies. Government budgetary operations in 2013 resulted in an overall deficit of GH¢9,454.6 million, equivalent to 10.1% of GDP, against the target of 9.0% of GDP.¹⁶

2.2.1 Trends and Structure of Government Revenue and Expenditure

Expansionary fiscal policies were reflected in an increasing public expenditure with revenues lagging behind between the period 1960 and 1982. These high expenditures were caused by high recurrent outlays, made up of wages and salaries which constituted the greatest share. This was because the government was the largest formal sector employer during the period (ISSER, 1992).

¹⁶ Bank of Ghana Annual Reports, 2009, 2010 and 2012.

For the periods 1970 to 1982, government expenditure in general exceeded revenue, even though its overall trend in real terms declined by over 10% per annum (Dordunoo, 2000). For instance, in absolute terms (1975 constant prices), total expenditure as a whole was ₵1,163.25million in 1970. It fell to as low as ₵934.43million by 1979 and further to ₵547.33million by 1982, the same trend was exhibited in recurrent expenditure. Owing to the general decline in economic activity and the corresponding reduction in government outlays, expenditure reducing policies aimed at solving the deficit problem were directed at cutting down development expenditures (Tsikata & Amuzu, 1993). In this same period, tax and non-tax revenues (including grants) showed a downward trend both in real terms and as a percentage of real GDP. Total real revenue was ₵1,184.52million in 1970 which in terms of revenue-GDP ratio was over 22.1%. This declined steadily to ₵605.31million in 1979 and further to ₵325.03million by 1982. A major contributory factor was the drastic decline in tax revenue from 19.8% to 4.9% in 1982 (Dordunoo, 2000).

Revenue rose from 6% of GDP in 1983 to 15% in the second half of the decade. In 1984, foreign grants to a large extent became an essential component of the overall budgetary account. Hence from 1984, the role of external grants was entirely included in government finance (Dordunoo, 2000). Revenues derived from taxes constitute a major component of the total revenue derived by the government of Ghana. The period 1984-95 witnessed a rapid growth in government revenue from as low as ₵431.63million in 1984 to ₵2,321.22 million in 1995 in real terms. In percentage terms, revenue increased from 8.34% of GDP in 1984 to over 27% in 1995. Also, Government recurrent expenditure in absolute terms exhibited a steady increasing trend from ₵523.98million in 1984 to

¢1,607.87million by 1995. As a proportion of the real GDP, the increase was from 8.4% in 1984 to 18.7% in 1995.

During the election year of 1992, civil service wages were increased by 80%, expanding the government wage bill by 38.7%; tax revenues partly due to the poor cocoa harvest between 1991 and 1992, pressures mounted up to the 1992 election period, pushed up rural development expenditures (Dordunoo, 2000). Total revenue and expenditure increased at an average yearly rate of 40.5% and 43.2% respectively, during the first half of the 1990's (CEPA, 1996). The economy experienced little success in containing its fiscal deficits during that period, due to the difficulty in matching up the increases in total expenditures with increases in total revenues (Wetzel, 2000).

The Value Added Tax (VAT) was introduced on 1st March 1995, with the aim of boosting domestic current tax revenues. However, due to serious political and implementation bottlenecks the VAT was withdrawn. The government incurred losses in revenue, which amounted to about ¢36billion for the withdrawal of the VAT (CEPA, 1996). Fiscal indiscipline was prevalent in the run-up to the 1996 elections. As in 1992, there was considerable attrition in the government's revenue base as well as a shortfall in petroleum revenue. The deficit in petroleum tax, was as a result of the suspension of the automatic price adjustment formula as the election period drew closer. However, expenditure remained at the same levels as a proportion of GDP (30%) since 1993.

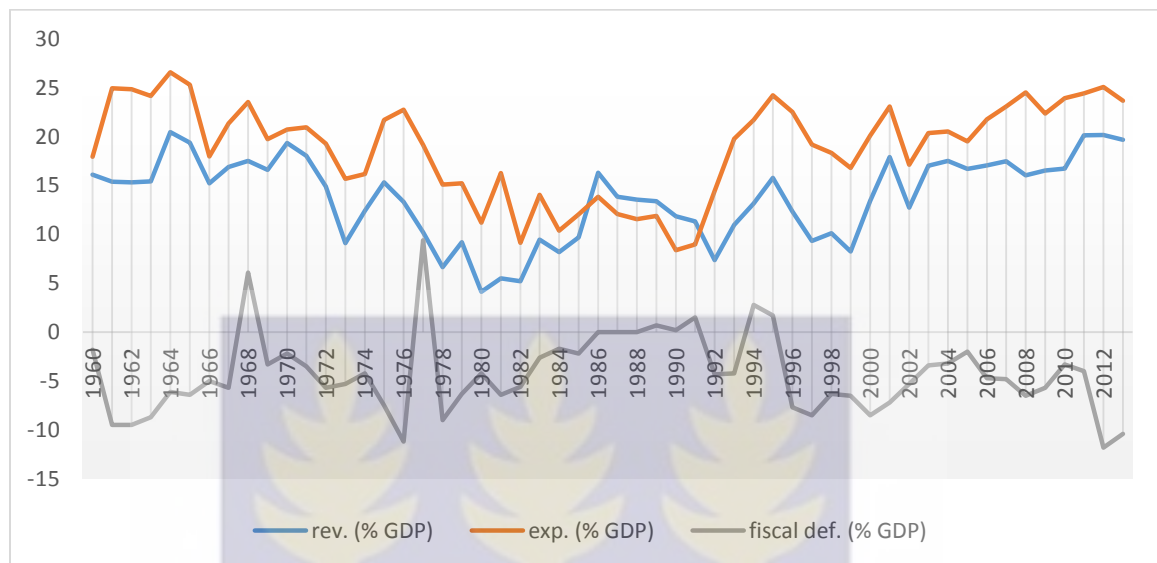
Total government revenue including tax and non-tax as well as grants amounted to ¢5.7trillion (21% of GDP) in 2000. On the other hand, total expenditure for the period

amounted to 33.4% of GDP. During 2004, overall tax revenue contributed 72.7% of total government revenue as compared to 73.84% in 2003. This decline was mainly due to the tax concessions granted by the government in 2004. These concessions included; the reduction of the threshold of income tax and the cut in corporate tax from 32.5% in 2003 to 30% in 2004 (ISSER, 2006). On the other hand, government expenditure comprising net lending, hit ₵26,229.5 billion which was 38.2 % above the 2003 figure of ₵18,981.3 billion. This rise in government expenditure was due to the inability of Tema Oil Refinery's (TOR) to recover fully its refinery cost in the face of rising oil prices (Bank of Ghana, 2004). The government's revenue as a percentage of GDP rose from 15.5% in 2009 to 16.8% in 2010, it increased further to 20% by 2011. In general, government revenues assumed an increasing trend over the period 2006 to 2011 although revenues reduced from 15.9% in 2008 to 15.5% by 2009.

Tax revenue, a main component of total revenue increased over the period 2008 to 2011. Tax revenue amounted to GH₵9,614 in 2011 as compared to GH₵4,299 million in 2008. The actual tax revenue for 2011 also exceeded the budgeted target of GH₵8,527 by about 12.75%.¹⁷ Major fiscal slippages that characterized 2012 due to the implementation of the Single Spine Salary Structure (SSSS) and related arrears, election-related outlays, decline in revenues and grants resulted in major fiscal slippages. The 2013 budget sought to restore fiscal discipline and keep the national debt at sustainable levels. However, large shortfalls in expected revenues as well as huge overruns in compensation to public sector workers and higher than the anticipated interest payments, had an adverse effect on the fiscal position of the economy.

¹⁷ Bank of Ghana Annual Reports 2008-2011

Fig 2.2 Trends in Government revenue, expenditure and fiscal deficits as percentages of GDP (1960-2013)



Source: Author's computation based on International Financial Statistics Yearbook, 1989, World Economic Outlook data (IMF) and Annual Reports

2.2.2 Policy Measures

Successive governments after independence embarked on several programmes to reduce fiscal deficits in order to curtail the high inflationary pressures.

2.2.2.1 Pre-ERP period (1960-1982)

The National Liberation Council (NLC) carried out an IMF sponsored stabilization programme to bring down inflation rates when they came into power between the periods 1966 to 1969. Some of the measures implemented included: the cutting down on public expenditure and bank financing, secondly, tight monetary policy through interest rate increases and credit restrictions and lastly, a 30% devaluation of the domestic currency in

1967. However, these measures reduced inflation rates at the expense of economic decline (Sowa & Kwakye, 1993).

The Busia era (1969-1972), managed to revive economic activity after the period of stabilization. This resulted in an upsurge in government recurrent spending and investment. In addition, private sector participation in the economy also shot up during this period. Financial stability was achieved through tight monetary policy measures comprising credit restrictions and increasing review of interest rates. Inflationary pressures were therefore, reduced between 1969 and 1971 as a result of domestic output growth coupled with the cocoa boom of 1970 (Sowa & Kwakye, 1993).

The decade 1972-1981 was referred to as the “Printing Press” era, this was due to the high expansionary policies supported by expansionary monetary policies pursued by successive governments which comprised mainly of military regimes. This era experienced very huge inflation rates due to the operations of Bank of Ghana in financing fiscal deficits. The National Redemption Council (NRC) of 1972, revalued the cedi and imposed rigorous price controls. However, fiscal deficits as well as inflationary pressures could not be brought down. Another military intervention during 1979 resulted in the failure of another IMF sponsored stabilization effort in June of the same year (Sowa & Kwakye, 1993). Extensive price controls, fixed exchange rate regimes and interest rate controls were resorted to in order to curb these high inflation rates.

2.2.2.2 *Post –ERP*

In the mid-1983, the Economic Recovery Programme (ERP) backed by the IMF and the World Bank was launched with the main fiscal objective to reduce fiscal deficits in order to help control inflation and prevent the crowding-out of the private sector (Aryeetey & Harrigan, 2000). Subsequently, the Structural Adjustment Programme (SAP) was implemented from 1986.

Government programmes emphasized demand reduction through decline in fiscal deficits and the “rationalization” of the public sector. The consequence of these policies was that fiscal balance turned positive between 1986 and 1991. Again, there was an increase in the influx of foreign inflows, during this period (Amoah & Loloh, 2008). The budget surplus of 1994 was due to a major fiscal improvement¹⁸ engineered by the government.

Up until 2006, monetary-targeting was the main approach operated by the Bank of Ghana in order to attain price stability. This approach had two main options: the first been the credit- approach, which was in place up until 1991. This approach was targeted at domestic credit with the main aim of achieving money supply objectives in order to finally achieve inflation targets (Kwakye, 2012). However, the credit targets were mostly disturbed fundamentally from higher budget financing, resulting in gaps in the money supply as well as inflation targets.

¹⁸ Towards the end of 1994, further divestiture of the holdings in Ashanti Goldfields Company were undertaken to raise \$200million to finance the deficit (Aryeetey & Harrigan, 2000).

The second alternative of the monetary targeting which was open market operations, was in existence between 1992 and 2006. This approach involved the sale and purchase of financial instruments by the Bank of Ghana. OMO was consistently uni-directional due to the persistence of excess money in the economy. One major limitation of this approach was the inability to distinguish between the sale of instruments to mop-up and the sale in order to raise money to finance government budget. Over the period, monetary growth rates rather became much higher than inflation rates. This situation was prevalent in periods of financial and other structural changes in the economy (Kwakye, 2012).

2.3 Deficit Financing

The 1960s marked the beginning of continual succession of sizeable fiscal deficits as well as the use of money creation as an instrument of financing these deficits (Ahmad, 1970). The deficits on government accounts were rising and unlike the earlier years, foreign reserves to finance the deficit were limited. The government also depleted its bank balances and started borrowing from the banking system. It began issuing Treasury Bills in 1960 (Bawumia, 2013).

The average annual rate of deficit financing between the period 1960 and 1965 was about £G13million¹⁹, of which half was funded by the Bank of Ghana and the other half by the commercial banks. In 1960, the commercial banks were the sole source of deficit financing²⁰. In 1961, of the total deficit financing of £G8.5million, the central bank

¹⁹ Ghana pounds

²⁰ Before 1960, the commercial banks were a small net debtor to the government whereas borrowing from the Bank of Ghana was negligible. Hence, deficit financing by the Government was for the first time resorted to in 1960, when the commercial banks' vis-à-vis the Government changed from a small net debtor to a net creditor (Ahmad, 1970)

contributed £G5.5million or 65% of the total amount. The commercial banks' contribution rose to 58% in 1962 but fell again to less than one-third by 1963 (Ahmad, 1970). In 1965, the government increasingly turned to the banking system for financing its budgetary deficit. During this period, the burden of additional borrowing shifted from the commercial banks to Bank of Ghana, which contributed about two-thirds of the total deficit financing which amounted to £G 33million (Ahmad, 1970).

During the governments of the National Liberation Council (1966-1969) and the Progress Party (1969-1972), an IMF-sponsored adjustment program opened the door to external borrowing for financing the deficit. From 1968 to 1970, there was an increase in the external financing of the budgetary gap as net external loans accounted for an average of 2.2% of GDP, which was mainly directed towards government recurrent and investment expenditures (Sowa & Kwakye, 1993). In 1970, the total deficit of C\$50million²¹ was almost fully financed from external borrowing. The decline in external borrowing to finance deficits happened in 1972, when the National Redemption Council (NRC) refused to honor some of Ghana's external debts leading to Ghana been blacklisted from the international financial community (Sowa, 1996).

The large deficits obtained between 1972 and 1982 were mainly financed through domestic sources. Deficit financing became the primary source of the budgetary support, causing the share of government borrowing from the domestic banking system, mainly from Bank of Ghana, to increase from 49% in 1970 to 86% in 1982 (Kusi, 1991). The domestic financing of the deficit (as a percentage of GDP) increased from 2% in 1972 to

²¹ Data from International Financial Statistics (IMF), Yearbook 1989

7% and 11% in 1975 and 1976 respectively averaging 6% between 1977 and 1982. During these periods, a large proportion of the internal loans obtained by the government were provided by the Bank of Ghana. Monetization by the Bank of Ghana resulted in very high inflationary pressures during this period. For instance, inflation averaged 50% over the period with 1977 and 1981 recording 116.5% respectively.

Foreign inflows, in the form of loans and grants in support of various projects and programmes became a key component in the budgets of the government under the ERP era. Ghana obtained international credibility and this resulted in an economic turn-around which translated into external capital inflows (Sowa & Kwakye, 1993). These capital inflows supported government budget and balance of payments. External support since 1986, has helped the government of Ghana to pay off some of its internal public debt (Sowa, 1996). In the adjustment phase of the ERP programme, net external financing increased significantly from \$176million a year between the 1983-86 periods to \$472million between 1987- and 1991 (Nowak et al, 1996). This increment resulted in significant net payments to the domestic banking sector between 1987 and 1991.

The Government of Ghana depleted its cash reserves and therefore could not use it as a major source of finance. Until 1991 and 1992, proceeds of divestiture (of state enterprises) was not a source of finance. However, they became an important but irregular source of finance averaging about 2.22% of GDP (or 5.2% of total expenditure) for the period 1992-95 (Dordunoo, 2000). The year 1997, registered an overall broad deficit of about ₵1,675billion. This deficit incurred was financed through several sources such as capital receipts of ₵361billion, domestic borrowings from formal and informal

markets of ₵867 billion where formal borrowing from the banking sector and the non-bank sector totaled ₵741 billion whilst informal borrowing amounted to ₵126 billion of the total domestic borrowings. The last source was through external borrowing of ₵446 billion (CEPA, 1998).

By the end of the last quarter of 1999, overall fiscal deficit of ₵320.1 billion together with a net foreign repayment of ₵11.7 billion resulted in a resource gap of ₵331.8 billion for the quarter. This was financed through domestic borrowing of ₵134.0 billion from the banking sector and ₵197.8 billion from the non-banking sector²². The net domestic financing of the budget amounted to ₵392.7 billion in 2004 as against the net repayment of ₵54.9 billion in 2003. While there was a net borrowing of ₵1,639.9 billion from the banking sector, the government made a net repayment of ₵1,247.3 billion to the non-bank public by way of programme and project loans as well as exceptional financing. Foreign resources made significant contribution to the financing of the existing deficits.²³

In 2008, the deficit was primarily financed through domestic borrowing which amounted to GHS1, 152.7 million, which amounted to 58.3% of the total deficit, the remainder of 41.7% was externally financed. The overall fiscal deficit of GHS2, 999.87 incurred in 2010, was financed through net domestic borrowing which amounted to GH₵2,142.6 million (4.8% of GDP) and net foreign inflow of GH₵1,302.3 million (2.9% of GDP)²⁴. The deficits incurred in 2012 which tend to be the highest recorded since independence, was financed from domestic sources to the tune of GH₵6,831.0 million (9.3% of GDP) while GH₵1,817.7 million (2.5% of GDP) was financed from external sources. Financing

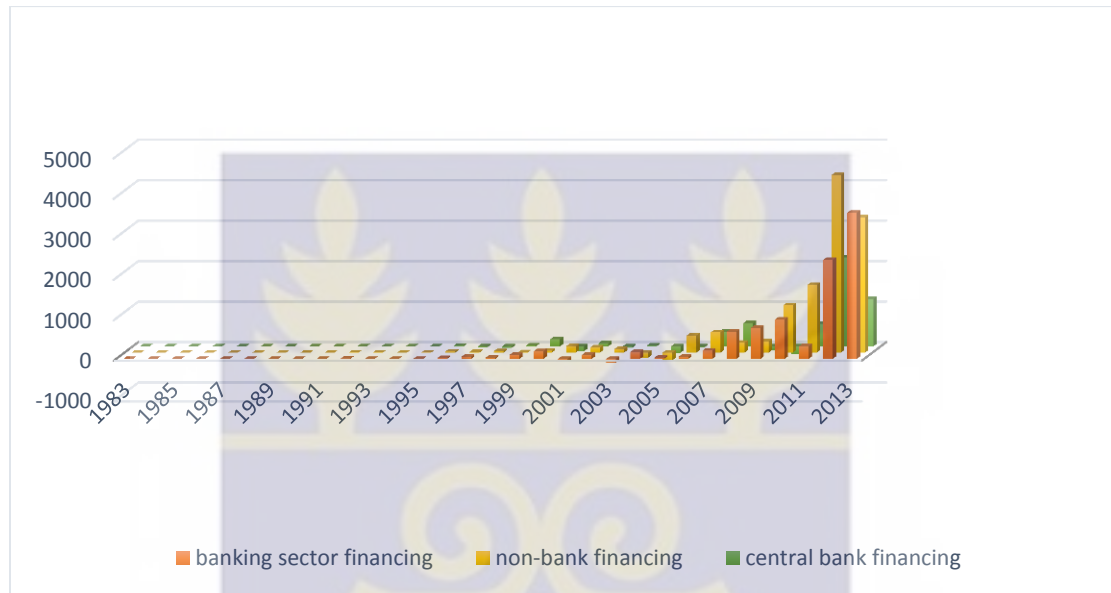
²² Quarterly Reports of Bank of Ghana, 1999.

²³ Bank of Ghana Annual Reports, 2004

²⁴ Bank of Ghana Annual Reports, 2008-2010

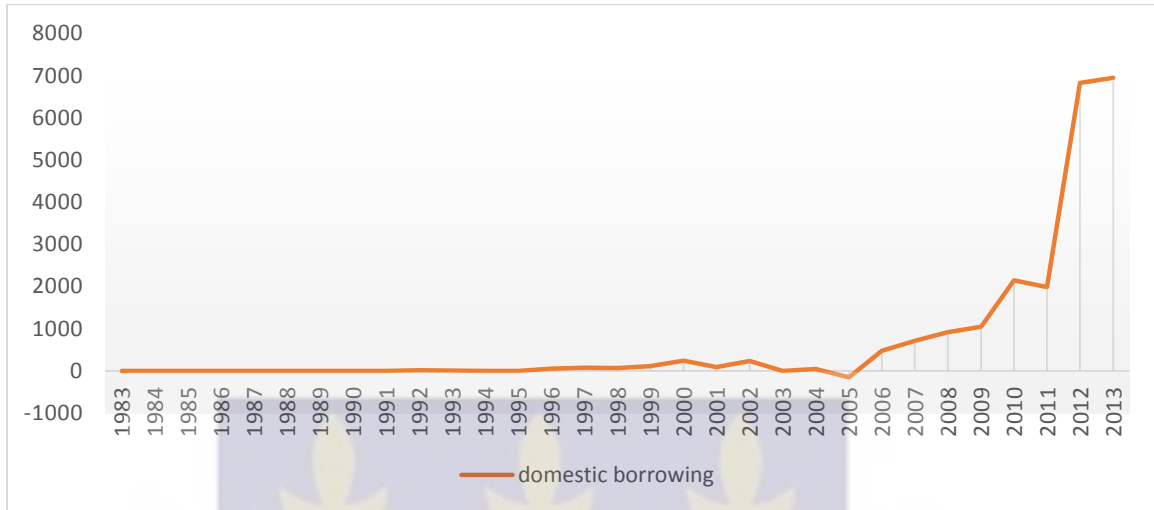
of fiscal deficit from the external sources results in the mounting up of the external debt stock.

Fig. 2.3 Sources of financing fiscal deficits from 1983 to 2013



Source: Author's computation based on requested data from the Bank of Ghana

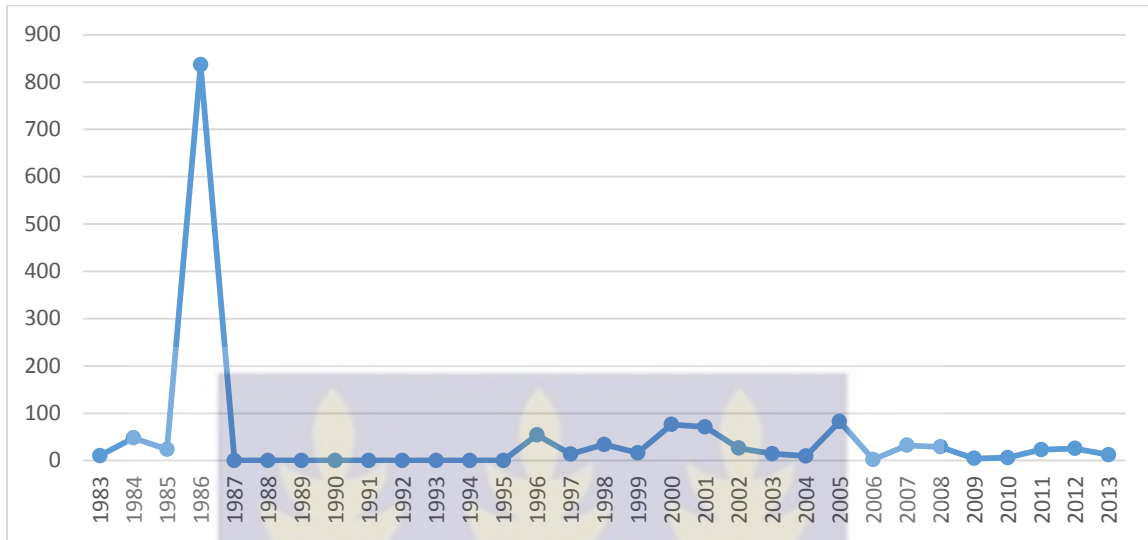
From fig 2.3, it is observed that on the average, the government resorted more to non-bank financing of fiscal deficits than the other sources. Domestic source of financing comprises banking sector and the non-banking sector financing.

Fig. 2.4 Trend in domestic borrowing (1983-2013)

Source: Author's computation based on requested data from Bank of Ghana

From fig 2.4, it can be observed that domestic borrowing through the use of the Treasury bills has assumed an increasing trend since 2005, when there was a decline in the use of domestic borrowing as a source of financing fiscal deficits. Higher Treasury bill rates serves as a disincentive to holding money. Investors, rather prefer to hold government securities than to save. From the graph, government has increased the use of domestic borrowings to finance existing deficits. This crowds-out the private sector thereby reducing its productive capacity due to increasing cost of production. The private sector channels this increasing cost to consumers in the form of higher price. This situation in the long-run causes high inflationary pressures.

Fig. 2.5 Proportion fiscal deficits financed by the Central bank (1983-2013)



Source: Author's computation based on data required from the Bank of Ghana

From the graph above, although government accounts was not in deficits, central bank continued to finance existing deficits in 1986. From 1987 to 1995, Bank of Ghana did not carry out any monetization of deficits due to surpluses on government accounts. However, during this same period government continued to borrow from the domestic markets.

2.4. Conclusion

This chapter presents an overview of inflation and fiscal deficits in Ghana. The chapter is subdivided into three sections; inflationary trends, fiscal deficits and deficit financing in Ghana. It is observed that inflationary pressures had been generally high in Ghana and the economy has registered fiscal deficits for most years after independence with the exception of 1986-1991 and 1994-1995 where surpluses were achieved

CHAPTER THREE

LITERATURE REVIEW

3.1. Conceptual Issues

One of the major responsibilities of policy-makers in every country is to develop a public consensus on fiscal policy. As pertaining in many developed and developing countries, failure to do so usually leads to extreme fiscal deficits and other fiscal problems.²⁵ A primary goal of fiscal policy is to equate the public sector's financing requirement with the private sector's demand for investment and a sustainable balance of payment (Blejer & Cheasty, 1993). In practice, fiscal policies may be applied erroneously due to the fact that conventional measures of the fiscal deficits misconstrue the true budget constraint and gives an unclear picture of the economy's fiscal stance (Blejer & Cheasty, 1991). According to Blejer and Cheasty (1991), in order to understand the fiscal position of a country, it may be essential to view the budget from several angles and from one country to the other. Hence, the search for a single accurate measure of fiscal deficits may be difficult.

Recent analyses of fiscal deficits have highlighted a number of conceptual and practical issues which are compounded by lack of uniformity among countries (Agenor & Montiel, 2008). According to Blejer and Chu (1988), some of these practical issues include: how “the government” should be defined, should it include local governments and extra budgetary units? How should revenue and expenditure be defined and what specific items should be included? Should their definition be based on cash flows, commitment or

²⁵Developing a public consensus is not easy especially given the distributional struggles in decision on fiscal expenditure and revenue (Blejer & Cheasty, 1993)

national accounts concepts? These questions will provide further in-depth understanding of the macro impacts of these deficits.

3.1.1. Measurement of Fiscal Deficits

There are several unconventional measures of fiscal deficits; the most appropriate measure of fiscal deficits depends on the purpose of the analysis. The concept of budgetary balance widely accepted is the conventional deficit, which is defined in terms of the resource use of the public sector that is left to be financed in each fiscal year after the government offsets its income against its expenditure (Blejer & Cheasty, 1993). The conventional deficit remains the main fiscal indicator employed in the design and monitoring of most IMF programmes.

According to economic literature and practices of institutions such as the World Bank and the International Monetary Fund (IMF), different ways of measuring the conventional budget balance exists. However, the World Bank defines the conventional budget balance as the difference between expenditure items such as salaries and wages, expenditure on goods and services including capital expenditure, interest on public debt, transfers and subsidies, revenue items including taxes, user charges, grants received and profits of non-financial public enterprises and sale of assets (Blejer & Cheasty 1990). Similarly, the IMF gives a functional definition of fiscal deficits as the sum of expenditure on goods and services, transfers and repayments excluding revenues, grants and lending.

Furthermore, Heller et al (1986), described the conventional balance measurement as a reflection of the current cash flow position of government calculated by only using the cash receipts and cash expenditure in a given time period. Expenditure comprises interest payments and excludes repayments of public debt. According to Tanzi (1993), the conventional balance can be defined as the difference between current revenues and current expenditure of government. Thus, it reflects the financing gap that needs to be closed by way of net lending, including borrowing from the central bank.

The conventional budget balance can be measured in two ways: on a cash basis or an accrual (or payment order) basis. According to Tanzi *et al.* (1988), fiscal deficits conventionally defined on cash basis, measures the difference between total government cash expenditure (including interest payments on public debt but excluding any amortization payments) and total cash receipts (including taxes and non-tax revenues plus grants, exceeding borrowing proceeds). However, it does not make available a direct measure of monetary expansion as a result of increased demand for financial instruments in the short-term markets (Jacobs *et al.*, 2002). On the accrual basis, the balance reflects accumulated income and expenditure flows, regardless of whether they involve cash payments or not. The accumulation of arrears of payments or revenue is reflected by higher balances when measured on an accrual basis as compared with a cash-based measure (Agénor & Montiel, 1999).

However, the conventional budget balance exhibited some limitations which made it inappropriate as a world-wide measure. Tanzi (1993), argued that the conventional deficit fails to take into account the diverse impact of all its components on aggregate demand.

These are the feedback elements in tax revenues as regards economic activity as well as the impact that different sources of finance have on the aggregate demand. He contends that, attention should rather be channeled from just a measure of the deficits towards other various measures such as the structural aspects of fiscal policy which would assist in providing a much broader view of the fiscal stance.

In addition, Buiter (1983), also criticized the conventional measure of the deficit and the fiscal stance indicator constructed by the IMF and the OECD, among others. He proposed the use of comprehensive accounting for the public sector, which measures changes in the net worth of the public sector from different sources. Furthermore, Rutayisire (1987), also disapproved of the use of the conventional deficit as a measure of a country's fiscal position and as a basis for a country's fiscal planning on the grounds that it fail to isolate cyclical influences of the economy on the budget and fails to merge a country's fiscal policy with medium or long term objectives of economic policy. Furthermore, the study emphasized that conventional deficit will erroneously report the monetary and inflationary implications of the budget.

To overcome the limitations of the conventional deficit measure, alternative measures of fiscal deficit that complement the information provided by the conventional deficits are necessary. This is due to the difficulties created by changes in inflation in the interpretation of conventional deficits, hence making an evaluation of fiscal performance

over time difficult. These measures are discussed by several authors, including Buiter (1983) among others²⁶.

3.1.2. Alternative Measures of Fiscal Deficits

Table 3.1 Definitions of Various Budget Balance

Fiscal Indicator	Definition
1. Conventional budget balance	= Expenditure – Income
2. Total budget balance without grants	= Conventional balance (1) – grants
3. External budget balance	= Gov't exp. – receipts (externally financed)
4. Domestic budget balance	= Total balance – external balance
5. Primary budget balance	= Total balance – interest payments
6. Operational budget balance	= Primary balance + real interest payments
7. Current budget balance	= Current revenue – current expenditure
8. Consolidated budget balance	= Central + decentralized government balances
9. Cyclically neutral budget balance	= Expenditures – cyclically adjusted revenues
10. Cyclically adj. Budget balance	= Total balance – cyclically neutral balance
11. Benchmark budget balance	= Normative year balance (as pre-determined)
12. Structural budget balance	= Cyclical effect of budget + benchmark balance
13. Full employment budget balance	= full empl. exp. – full empl. Revenue
14. Liquidity budget balance	= Total balance – net loans
15. Weighted budget balance	= weights allocated according to the importance of operational variables

Source: Jacobs *et al.*, 2002

The different measures above highlight a particular aspect of fiscal structure that can be of relevance to investors and policy analysts in order to obtain a clear picture of the fiscal stance of the economy. Thus, the choice of a budget balance is mainly focused on the interpretation and management of fiscal policy (Jacobs *et al.*, 2002). The domestic fiscal

²⁶ Blejer and Cheasty (1991), Easterly and Schmidt-Hebbel (1994).

balance comprises only those components of the conventional deficit that arises from transactions within the domestic economy and omits those transactions directly affecting the balance of payments. With sizeable trade or capital flows to and from the rest of the world, the conventional measure would be predominantly misleading. This measure is used to identify the direct expansionary impact of the government on the domestic economy.

In order to remove the effects of previous deficits on a budget, Blejer and Cheasty (1991), suggested the use of the primary (non-interest) deficit. The primary balance attempts to measure the discretionary budget stance by excluding interest payments from the budget. It can be said to provide an indicator of current fiscal effort, since interest payments are predetermined by the size of previous deficits. A deficit in the primary balance signals a rising public sector net indebtedness, as maturing loans and interest payments would have to be paid with further loans.

The operational or inflation-adjusted budget deficit is employed in order to remove the effects of inflation from the interest payments, (Tanzi et al, 1988). This is defined as the conventional deficit less part of the debt service that compensates debt holders for actual inflation. Alternatively, it can be defined as primary deficit plus real interest payments. If the effects of inflation are not removed, the deficit will be observed by the size of the amortization element included as interest payments above the line rather than below, Blejer and Cheasty (1991). The use of the operational deficit concept facilitates an

analysis of the underlying stance of fiscal policy by adjusting for this inflation-interest rate nexus²⁷.

The current fiscal balance represents the difference between current revenue and current expenditure. It invariably measures the difference between public investments and savings. It provides a measure of the government's contribution to national savings. When positive, it suggests that the government can at least finance consumption from its own revenue. A fundamental concern with this measure is the implicit assumption that all current expenditures are of consumption nature that does not contribute to growth. By implication, the measure also assumes that all expenditures categorized as investment do not have the attribute of being consumed. Tanzi (1993), argued that in the real world, there tend to be a thin line between what can be termed as current and what can be termed as capital expenditures.

Cyclically adjusted or structural balances seek to provide a measure of the fiscal position that is net of the impact of macroeconomic developments in the budget. This approach takes account of the fact that, over the course of the business cycle, for instance, revenues tend to be lower and expenditures higher during a recession. Thus, higher fiscal deficits cannot always be attributed to a loosening of the fiscal position but may simply indicate that the economy is moving into a recession.

²⁷The operational deficit measure has been criticized for imparting an inflationary bias to fiscal policy, since unexpected inflation may reduce the inflation-adjusted deficit substantially. Moreover, it assumes that bondholders will save 100 percent of the inflationary component of their nominal interest earnings. While flawed, the operational deficit concept is a useful complementary indicator of fiscal policy in a high inflation rate environment (IMF).

3.1.3. The Government Budget Constraint

A household's budget constraint indicates that the present value of its consumption must be less than or equal to its initial wealth plus the present value of its labour income. A government is confronted with a similar constraint: the current value of its purchases of goods and services must be less than or equal to its initial wealth plus the current value of its tax revenues (net of transfer payments) (Romer, 2001).

A theoretical framework in which the relationship between fiscal deficits and inflation can be examined is through the Government Budget Constraint (GBC). The government budget constraint provides a linkage between taxes, expenditure and alternative sources of financing public imbalances. When government revenues fall short of current and capital expenditures (including interest payment on public debt), the government incurs a deficit that may be financed in a variety of ways such as through monetization, domestic or external borrowing and others. GBC is an important tool for understanding the relationship between monetary and fiscal policies, more especially the macroeconomic effects of fiscal deficits (Agenor & Montiel, 2008).

3.2. Theoretical Literature Review

Different theories have been proposed by different economists in explaining the occurrence of inflationary pressures in an economy. This section reviews literature of four (4) major theories of inflation. These are the two competing theoretical arguments explaining the main causes of inflation identified in literature: the monetarists arguments, the structuralists' argument, the fiscal theory of the price level and the Keynesian approach to inflation are discussed in this section.

3.2.1 Monetarist Argument

In the monetary theories of Keynes (1936) and Patinkin (1965) and in Meltzer's classic article (1951), "the quantity theory" is a proposition about the effects of changes in money in a fully employed economy where capital stock, real output, and employment remain unchanged. Two versions of the quantity theory can be identified in the literature: the first version associated with Alfred Marshall and A.C. Pigou is known as the Cambridge cash-balance approach and the second version is associated with Irving Fisher's Equation of Exchange. The origin of the monetarist assertion is found in the Quantity Theory of Money which evolved from the Irving Fisher's Equation of Exchange.

The quantity theory of money proposes that a change in the growth rate of money induces an equal change in the rate of price inflation (Lucas, 1980). For instance, a rising level of money in circulation causes price acceleration. Naturally, when the money supply increases, it creates more demand for goods, however, the supply cannot be increased due to the assumption of full employment of resources hence leading to an increase in general price levels. The quantity theory of money has been related with the development of monetarism, although the term "monetarism" did not emerge until 1968 (Brunner, 1968). Monetarism suggests that the factors causing inflation in an economy, like Ghana are similar to those causing inflation elsewhere in the world and are primarily a matter of excessive aggregate demand.

Modern quantity theorists led by Friedman (1968) hold that "inflation is always and everywhere a monetary phenomenon that arises from a more rapid expansion in the

quantity of money than in total output”²⁸. He argued that changes in the quantity of money will work to cause changes in nominal income. Inflation everywhere is based on an increased demand for goods and services as individuals decide to spend their cash balances, since the demand for money is fairly stable, the excess demand is the outcome of a rise in the nominal quantity of money supplied to the economy. Monetarists believe that though in the short-run price shocks or shortages may cause prices to rise temporarily, inflation over time is caused by excess liquidity in the system, especially an excess in fiscal deficits intensifies inflationary pressures (Aretis & Sawyer, 2006). Hence, monetarists are of the view that controlling inflation comes mainly under the purview of the monetary authority.

However, a reconsideration of the foundations of the monetarists’ doctrine has given rise to an unconventional view that a strong, independent central bank is not a sufficient condition for price stability. According to Kocherlakota and Phelan (1999), the amount of money a household desires to hold today depends essentially on that household’s beliefs about future inflation. Hence, the dependence of present monies held by households based on their own beliefs about future inflation creates possibilities of a large number of equilibrium paths of inflation rates. Thus, control of the money supply alone is not sufficient to reduce inflationary pressures in an economy.

²⁸ As cited in Ahking and Miller (1985)

3.2.2 The Fiscal Theory of the Price Level (FTPL)

Monetarists are of the view that: ‘inflation is always and everywhere a monetary phenomenon’. (Friedman, 1968). This concept of the monetarists was confronted by the proponents of theories that explain fiscal policy responses to inflation²⁹. The first version of the fiscal theories of inflation is based on a seminal paper by Sargent and Wallace (1981). According to them, a monetarist economy has two characteristics: firstly, the price level closely related to the monetary base and secondly, the monetary authority raises seignorage³⁰. Sargent and Wallace (1981), proposed that under certain circumstances, the control of the monetary authority over inflation in a monetarist economy is very limited even though the monetary base and the price level are closely connected. According to them, two coordination strategies reveal this proposition: firstly, when monetary authority is dominant and secondly, when the fiscal authority is dominant.

The second version known as the Fiscal Theory of the Price Level (FTPL) is also called the strong-form of fiscal theory. The central theme from the studies of Leeper (1991) and others³¹, revealed that the price level is determined merely by fiscal variables. This implies that government debt, present and future revenue, spending plans and monetary factors play no role in price determination, at best monetary policy plays an indirect role. According to Bassetto (2001), the role of money in the determination of price level is so negligible that sometimes, it is ignored. Price levels adjust to ensure that, the

²⁹ See Canzoneri et al (2001), Marimon (2001) and Ekanayake (2012) uses the terminology ‘fiscal theories of inflation’ as an umbrella term for all theories that explains fiscal policy responses on inflation.

³⁰ revenue from money creation

³¹ Sims (1994), Woodford (1994;1995) Carlstrom and Fuerst (2000)

government's inter-temporal budget constraint and its adjustment is driven by the individuals' wealth effect.

The FTPL relates fiscal and monetary policies through the Government's inter-temporal Budget Constraint (GBC). The GBC can be defined as a long-term solvency condition of public sector finances (Lozano, 2008). It is assumed to be an equilibrium condition and the future channel of revenues and expenditures is determined exogenously by the fiscal authority. Primarily, the FTPL argues for non-Ricardian equivalence, in which individuals are assumed to be increasing their wealth during periods of fiscal deficit. This occurrence raises aggregate demand thereby creating inflation and leaving no role for the monetary authority (Ekanayake, 2012).

3.2.3 Structuralists Arguments

The Structuralists argument of inflation is as a result of the stabilization policies pursued by the Latin American governments on the proposition of the International Monetary Fund (Sunkel, 1969). Structuralists contend that, inflation is basically the outcome of inconsistencies over the distribution of income within a cost-push framework (i.e. inelastic supply). According to them, inflation originates from the supply side therefore excess demand caused by increases in money supply is irrelevant. Olivera (1964) argued that countries which are undergoing the intermediate stage of economic evolution are countries that are neither pre-industrial nor fully developed. Such countries are the most susceptible to structural inflation.

According to the structuralists, developing countries in their pursuit to grow face structural bottlenecks. These bottlenecks includes: first and foremost, agricultural bottlenecks which make the supply of agricultural products inelastic. For instance, the inelasticity of food supply that results from the concentrated structure of land ownership is seen as a major source of inflation (Cardoso, 1981). This same opinion was shared by Boianovsky (2010). According to him, the main reason behind prolonged inflation in an emerging country such as Brazil was the speed in variation in aggregate demand, which was faster than corresponding changes in the composition of aggregate supply (i.e. particularly inelastic supply function). Secondly, resource constraint or government budget constraint and thirdly, foreign exchange bottlenecks which are critical for developing countries.

3.2.4. Keynesian Approach to Inflation

Keynes definition of inflation was simply an extension of the classical views. The Keynesian theory is based on a short-run analysis in which prices are assumed to be fixed. According to them, prices are determined by non-monetary forces. The basis of Keynesian inflationary theory was on income and expenditure flows rather than concentrating on monetary stocks. According to the Keynesian model, inflation occurs when aggregate demand for final goods and services exceeds the aggregate supply at full (or nearly full) employment level.

Keynesians argued that, money supply is only one of the components of aggregate demand and therefore cannot solely be responsible for increases in the general price level, instead it is aggregate demand that entirely influences inflationary situations in a country.

They believed that factors that influence aggregate demand in the economy (money supply inclusive) are responsible for the persistent rise in price levels in an economy. Although fiscal deficits were common before the emergence of the Keynesian theories, the pre-Keynesian assumption was that in peace time the budget should generally be balanced or even in surplus to pay off the government debt generated by war time deficits (Fisher & Easterly, 1990).

Keynes provided a framework on how fiscal deficit behaviour should be analyzed. His earlier emphasis was on fiscal policy and deficits as components of aggregate demand. From this perspective, Keynes argued that during a recession, a government should increase its expenditure, reduce taxes and shift its budget toward a deficit rather than balancing its budget. On the contrary, if the economy was experiencing a problem with inflation during an economic boom, Keynesian analysis called for contractionary fiscal policy to temper excessive demand.

3.3 Empirical Review

There are numerous empirical studies that attempt to explain the effects of fiscal deficit on inflation as well as the determinants of inflation in general. Some of these studies try to establish the long term relationship between the two variables while the others focus on the short-run effect of fiscal deficits on inflation in developing countries. However, irrespective of the approach used, most of these studies end up with inconclusive findings, in contrast to the theoretical expectations. The literature review below mainly comprises studies that focuses on the long-run effects of fiscal deficits on inflation. In general, most empirical studies suggest that: (i) fiscal deficits are not inflationary, (ii)

there is only a weak correlation between the two, and (iii) there is a strong link between fiscal deficits and inflation only during high inflationary episodes.

De Haan & Zelhorst (1990) employed data from 17 developing countries over the period of 1961– 1985, and used the VAR estimation method to show the correlation between budget deficits and inflation. The overall conclusion of this study did not provide adequate support for the hypothesis that government budget deficit causes monetary expansion and therefore, led to inflation. Although most researchers have emphasized that the budget deficits inflation causality is mostly valid in high inflation periods. Later on, this benchmark findings were supported by several studies such as Fischer et al. (2002), Catao and Terrones (2003, 2005) and Lin and Chu (2013).

Egwaikhide et al (1994), established the direct linkage between exchange rate depreciation, budget deficits and inflation in Nigeria. Their study was centred on these key areas; trends in inflation, budget deficits, monetary growth, growth in real gross domestic product (real GDP) and the exchange rate during the period 1970-1989. They established that growth in the central government expenditure eventually led to persistent budget deficits and these deficits were however financed through money creation. Again they identified in their study that, increases in domestic credit to the government had two direct effects; firstly, it expanded aggregate demand and secondly, it accelerated the growth of domestic money supply. The study, however, concluded that inflation in Nigeria is caused by both monetary and structural factors.

N'dungu (1995), employed the use of multivariate Granger Non-Causality Test to find out whether in the case of the Kenyan economy, budget deficits affect monetary base growth. The effect was not observed with the use of M3 growth. Furthermore, there was both direct and indirect links between money printing and the rate of inflation. In the estimated inflation equation, excess money printing was statistically significant, but its effect on the rate of inflation was weak. The results of this paper led to the view that budget deficits affect the monetary base and excess money printing affects the rate of interest hence the rate of inflation. However the study failed to distinguish between short-run and long-run time periods. Earlier studies by N'dungu (1993), established that monetary base growth and the rate of inflation drives each other with the rate of inflation further driving the broad money without any feedback effects.

In the study of Odedokun (1995), a single equation was employed to examine the causes of inflation in 35 Sub-Saharan Africa countries between 1971 and 1990 using an annual panel data. The study revealed that monetary growth, the rate of domestic currency depreciation and inflation expectations tends to have positive effects on inflation (as measured by the GDP deflator and the consumer price index). Furthermore, the study revealed a positive yet, statistically insignificant effect of fiscal deficit (as a percentage of GDP) on inflation whilst a negative and slightly significant value was obtained for the GDP deflator equation.

A study by Chaudhary and Ahmad (1995), employed a simultaneous equation model similar to that of De Silva (1977) to analyze the relationship between money supply, budget deficits, and inflation in Pakistan. In the model of the study; money supply,

money demand, prices, output and exports were determined endogenously. The findings of the study suggested that the domestic financing of budget deficits, particularly from the banking system was inflationary in the long-run. Again, the results provided support for a positive relationship between budget deficit and inflation during the acute inflation periods, i.e., in the 1970s. They identified that money supply was not exogenous instead it depended on the position of international reserves and fiscal deficit. The study concluded that the execution of monetary policy may be determined by the central bank, but the overall formulation of policy is heavily dependent on the fiscal decisions made by the government. In order to control inflationary pressure, the study recommended that government needed to cut the size of budget deficits. This view was supported by Agha and Khan (2006).

In order to explore the relationship between fiscal operations, money supply and inflation in Tanzania between 1970 and 1991, Kilindo (1997) employed the structural model borrowed from Aghevli and Khan (1978). The estimations were carried out in two distinct periods: 1970-84 (pre-reforms) and 1985-91 (post-reforms). The results of this study revealed that, the role of the budget in the inflationary process was very crucial as credit flows toward non-performing parastatals accounted for large deficits that were monetized through bank borrowing. The study, therefore, established a strong relationship between fiscal operations, money supply and inflation in Tanzania. Nevertheless, several weaknesses arose because of the model adopted; structural equations were estimated without sufficient economic theory linking the macroeconomic variables. Furthermore, unit root tests and cointegration analysis were not conducted to determine the order of integration of the variables, and their long-run relationships.

A study on inflation by Laryea and Sumaila (2001), also confirmed that inflation in Tanzania both in the short-run and long-run basically arises from monetary factors. Again, Solomon & De Wet (2004) examined the deficit-inflation relationship in Tanzania and by the use of cointegration analysis over the period 1967-2001, established that an increase in the budget deficits induced higher inflation due to higher aggregate demand resulting from an increase in expenditure as well as money supply, to monetize the increase in the budget deficits.

A study was conducted by Durevall and N'dungu (2001), to analyze inflation dynamics in Kenya from 1974 to 1996, with the use the help of an Error Correction Model (ECM). The Johansen maximum likelihood procedure was used to test two single equations: a monetary sector equation and a price level equation separately for cointegrating vectors. The logarithm of the price of maize was added as an explanatory variable due to its significance in Kenya. The results of the study indicated that excess money supply did not directly affect inflation in the long run. Nevertheless, in the long-run inflation in Kenya was significantly driven by supply factors.

Catao and Terrones (2003; 2005), reexamined the issue of fiscal deficits and inflation in a context of broader dataset spanning over 107 countries over the period 1960-2001. In their analysis, the fiscal deficits were scaled by narrow money, introducing a non-linearity in the model. The results of the study showed that with or without oil price, fiscal deficits continued to have a dominant effect on inflation in developing countries, emerging markets and high-inflation economies and much smaller effect on moderate-inflation economies. A major weakness of this study was that the link between fiscal

deficits and inflation was estimated directly in a nonlinear relationship, since there is insufficient theory to model this relationship directly.

A long-run, indirect relationship (through the money supply) between fiscal deficits and inflation was investigated into by Nachege (2005), for the Democratic Republic of the Congo (DRC) during the period 1981 to 2003. The study employed multivariate cointegration analysis and Vector Error Correction Model (VECM). Empirical results revealed that, there was a strong and statistically significant long-run relationship between budget deficits and seignorage, and between money creation and inflation. Policy recommendations suggested by the study included curtailing fiscal deficits in order to achieve and maintain long-term price stability in the DRC. The study failed to make mention of the short run.

Agha and Khan (2006), examined the long run relationship between budget deficits and inflation in Pakistan by employing Vector Autoregression (VAR) and Vector Error-Correction Model (VECM) models. The results of the study showed that budget deficits had a positive relationship with inflation and further confirmed that market borrowings were the most inflationary financing source in Pakistan. They used deficit financing as their main economic framework.

The study of Wolde-Rufael (2008), investigated the causal link between inflation, money and budget deficits in Ethiopia for the period 1964 to 2003 using the Bounds Test Approach to cointegration as well as Toda and Yamamoto's Augmented Ganger causality. To check the robustness of the Bounds test, they also used two additional long

run tests: the Dynamic Ordinary Least Squares (DOLS) and the Fully Modified Ordinary Least Squares (FMOLS). The empirical evidence revealed that there was a long run cointegration relationship between the variables with a unidirectional Granger Causality running from budget deficits to inflation. In contrast, fiscal policy did not have any impact on the growth of money supply. The study concluded that the fiscal balance and the control of the money supply are essential policy tools for the long-run macroeconomic stability of Ethiopia.

In investigating the causal long-term relationship between budget deficits, money growth and inflation in Colombia, Lozano (2008) employed a Vector Error Correction Model (VECM) which estimated two samples according to data availability; annual data from 1955 to 2007 and quarterly data from 1982 to 2007. The study found a close long-run relationship between inflation and money growth on the one hand and between money growth and fiscal deficit, on the other hand. With regards to the role of the fiscal deficit, the VECM estimates showed that a 1% increase in fiscal deficit (as a share of GDP) led to an increase of almost 0.46 percentage points in the M1 growth rate. The conclusion, supported by several statistical tests, was that, the Sargent and Wallace hypothesis (SW-H) would be the most appropriate approach to understanding the dynamics of these variables of Colombia as at 1980. The study, however, failed to show causality between the variables, inflation and budget deficit.

Oladipo and Akinbobola (2011), examined the causal relationship between budget deficits and inflation as well as the economic implication of deficit financing in Nigeria from 1970 to 2005. In this study, a four variable single equation model was employed in

which the budget deficits, GDP and the exchange rate were treated as exogenous variables. The results of the Granger Causality Pairwise test indicated that fiscal deficits, GDP and the exchange rate have a causal effect with inflation; therefore, a strong unidirectional causality was found between fiscal deficits and inflation with the causality running from fiscal deficits to inflation at 5% level of significance.

Habibullah et al (2011), investigated the long-run relationship between budget deficits and inflation in thirteen Asian developing countries from 1950-1999 with the use of cointegration and the Error Correction Model (ECM) approaches. The findings from the ECM estimated, indicated the existence of a long-run relationship between inflation and budget deficits (with the presence of money supply as a third variable). The significance of the EC term suggested that both money and budget deficits Granger cause inflation in the long-run. Out of the 13 countries estimated, only in Bangladesh, South Korea and Sri Lanka did they find that budget deficit Granger causes inflation in the short-run. For all other selected Asian countries, the null hypothesis that budgets deficit Granger cause inflation was rejected at the 5% level. Finally, based on the empirical evidence, they concluded that budget deficits are inflationary in the selected Asian developing countries covered in the study.

Makochekanwa (2011), examined the deficits-inflation relationship in the Zimbabwean context and established the causal link that runs from the budget deficit to the inflation rate using cointegration analysis over the period 1980-2005. A four-variable single equation model that comprised the budget deficits, GDP and exchange rate as exogenous variables and inflation as an endogenous variable was employed to examine the deficits-

inflation relationship. The results of the Johansen test revealed that the coefficient of budget deficits as positive and significant at the one percent level of significance. Thus, in the case of Zimbabwe, budget deficits impact positively and significantly on the country's rate of inflation.

Devapriya and Ichihashi (2012), examined the relationship and causality between government budget deficits, deficit financing sources, and inflation in Sri Lanka, using time series data from 1950 to 2010. By employing the Vector Autoregressive (VAR) model, they established that budget deficits cause inflation, and that there existed a positive relationship between budget deficits and inflation. The causality test also indicated that, there was bi-directional causality between budget -deficits and inflation. In other words, budget deficits Granger causes inflation and inflation also Granger causes budget deficits. Also, this study suggested that the main determinants of inflation in Sri Lanka were budget deficits, growth of money supply, interest rates and the real exchange rate of the country.

By employing a modeling approach that incorporated the theory of cointegration and its implied Vector Error Correction Model (VECM), Dockery et al. (2012), examined the long-term relationship between fiscal deficits and inflation for Nigeria from 1973 to 2006. The study discovered the following: firstly, an insignificant relationship existed between inflation and fiscal deficits. Secondly, past levels of fiscal deficits do not tend to have a positive and/or significant effect on price movement. Thirdly, there existed a positive long-run relationship between money supply and inflation in the economy over the study period. Fourthly, the Variance Decomposition and Impulse Response analysis

confirmed the influence of monetary forces on the movement of prices. According to this study, the relationship between fiscal deficits and inflation is usually examined from a long-term perspective, hence the study failed to account for the short-run interdependence among these variables. The findings of this study confirmed some previous findings in studies of (Landon & Reid 1990; Karras, 1994). These studies claimed that fiscal deficits were not on the whole inflationary.

Ekanayake (2012), investigated the validity of the hypothesis that there is a link between fiscal deficits and inflation in Sri Lanka using annual data from 1959 to 2008. He employed an Autoregressive Distributed Lag (ARDL) model as the main methodological framework. The results indicated that there existed a positive and significant relationship of about 11% between fiscal deficits and inflation in Sri Lanka. According to the study, in the absence of the public sector wage effect, the deficit-inflation link becomes insignificant. On the contrary, Buffie (1999), suggested that the inclusion of the public sector wages in the analysis may weaken the deficit-inflation link.

Lin and Chu (2013) applied the Dynamic Panel Quartile Regression (DPQR) model under the Autoregressive Distributed Lag (ARDL) specification, and examined the deficits-inflation relationship in 91 countries from 1960 to 2006. The DPQR model estimated the impact of fiscal deficits on inflation at various inflation levels and allowed for a dynamic adjustment with the ARDL specification. The empirical results noted that the fiscal deficits had a strong impact on inflation in high-inflation episodes, and a weak impact in low-inflation episodes.

Erkam and Çetinkaya (2014), re-examined a well-known causal relationship between budget deficits and inflation for Turkey in two different sub-periods, namely; 1987-2003 and 2005-2013 with the use of Vector Autoregression (VAR) and Granger non-causality procedures. The Granger non-causality tests confirmed a positive and significant causality running from budget deficits to inflation for the first sub-period in which the average inflation was relatively high. This causal link disappeared when the second sub-period with low average inflation was analyzed. According to the study, these results could be attributed to the strong fiscal stabilization policies pursued in the Turkish economy in the aftermath of the 2001 crisis. Studies by Metin (1998) and Ozatay (2000), also affirmed this assertion, although the same variables were not applied in all the three studies. Metin (1998), evaluated annual fiscal and monetary data for Turkey (1950-1987) and found that budget deficits and government debt monetization affected the price level significantly. For the same country, Ozatay (2000) found that, the price level was adjusted to the monetary imbalances caused by the Turkish government's fiscal imbalances.

Investigations into the dynamic link between budget deficits and inflation in the Lao PDR, were conducted by Saysombath and Kyophilavong (2014), using annual data for the period 1980-2010. They employed the ARDL cointegration method in conjunction with the structural VAR (SVAR) method to analyze the relationship for both the long and short run dynamics between the two variables. The results indicated that there is no long-run relation between budget deficit and the inflation in Laos. The Impulse Response results in the SVAR model indicated that there was a unidirectional causality found between the two variables with the causality running from inflation to budget deficits.

3.3.1. Empirical Literature on Ghana's Inflationary Experience

Several studies on inflation carried out in Ghana highlights the two main schools of thought that supports inflation: the monetarists and structuralists contentions, although some studies show a mixture of both schools of thought. According to these studies, both structural and monetary factors are identified as causes of inflation in Ghana.

According to the study of Chibber and Shafik (1990), inflation inertia, fluctuations in exchange rate and cereal production influenced inflation stronger than money supply in the short-run. However, effects of money supply were dominant in the long-run. They concluded that inflation in Ghana is primarily a monetary phenomenon in that devaluation in the country's currency led to a reduction in the rate of monetization and inflation, although inflation in the past had been accounted for by structural factors.

The study of the sources of inflation between 1962 and 1989 in Ghana by Sowa and Kwakye (1993), highlighted that although monetary factors featured prominently in the pre-ERP period, supply factors, especially food production, which had also contributed immensely to inflation over the pre-ERP period became the main driving force during the ERP period. The findings in this study confirm the Structuralists contentions on inflation.

Sowa (1994; 1996), employed an Error Correction Model (ECM) and data over the period 1963 to 1990 to estimate an inflation equation for Ghana. The results from the ECM revealed that inflation in Ghana, both in the long-run and short-run was influenced more by output volatility than by monetary factors. Although real output and money were significant variables, parallel exchange rate did not have any significant effect on

inflation, thus confirming earlier findings by Sowa and Kwakye (1991). The results from this study was further supported by Sowa and Acquaye (1999), in the dynamic ECM specified by them, they observed that changes in output in the short-run had a more profound effect on inflation than any other variable.

A study by Bawumia and Abradu-Otoo (2003), on inflation in Ghana using monthly data spanning the period 1983-1999, within an Error Correcting framework, found that inflation in Ghana was positively related to money supply and the exchange rate while negatively related to real income in the long-run. In the short-run, the impact of the exchange rate on inflation occurred after a month, whereas the impact of real income on inflation after two months. However, the effects of money supply on inflation took a longer lag (a period of four months).

A similar work by Bawumia and Atta-Mensah (2003), employing a Vector Error-Correction Forecasting Model (VECM), concluded that inflation in Ghana was purely a monetary phenomenon. This study failed to account for structural factors because it did not attempt to explore the influence of real factors on the price level.

A study by Ocran (2007), examined the causes of inflation in Ghana between the period 1960 and 2003 using the Johansen Cointegration test and an Error Correction Model (ECM). The paper identified inflation inertia, changes in money supply, changes in the Government of Ghana Treasury bill rates as well as changes in the exchange rate as determinants of inflation in the short-run. However, inflation inertia was found to be the dominant determinant of inflation in Ghana. Again, the scarcity of data on domestic ex-

pump price of petroleum products covering the study period prevented the inclusion of this variable in the study.

By employing the Autoregressive Distributed Lag (ARDL) and using an annual time series data covering the period 1960 to 2009, Adu and Marbuah (2011), provided an empirical analysis of the factors that accounted for inflation dynamics in Ghana. The paper identified real output as the most significant determinant of inflation in the long-run whilst monetary expansion was the most important driver of inflation in the short-run followed by nominal interest rate and fiscal deficits. Finally the study concluded that inflation dynamics in Ghana are explained by both structural and monetary factors similar to findings obtained from prior studies.

In a study of Gyebi and Boafo (2013), on inflation in Ghana for the period 1990 to 2009 using the OLS estimator, concluded that real exchange rate and money supply were the main determinants responsible for inflation in Ghana. They further revealed that exchange rate depreciation helped reduce the level of inflation, growth in real output or expenditure and money supply caused price levels to rise.

Ahiakpor (2014), examined the factors that influence inflation in Ghana over the sample period of 1965-2012. The results of the study indicated that real output, population growth rate, broad money, exchange rate, lending rate and budget deficits are the key factors in explaining inflation in Ghana. From the study, output levels had an inverse relationship with inflation whilst population growth, broad money, exchange rate, lending rate and budget deficits had a positive relationship with inflation.

Furthermore, a study by Enu and Havi (2014), examined the macroeconomic determinants of inflation in Ghana from 1964 to 2008. The results of the Johansen cointegration test indicated that there existed a long and short-run relationships between inflation, population growth, foreign direct investment, foreign aid, agricultural output and service output in Ghana. The study specified that in the long-run, population growth and service output affects inflation positively, whereas foreign direct investment, foreign aid and agricultural output had a negative relationship with inflation.

A study into the inflation dynamics in Ghana by Osei (2015), with the help of a Vector Autoregression (VAR) model, suggested that inflation in Ghana is influenced largely by inflation persistence reflecting price expectations, domestic food prices, petroleum prices and exchange rate. Money supply and world food prices were also highlighted as other determinants of inflation however, they weakly affected domestic inflation.

3.4. Conclusion

This chapter highlighted the conceptual issues with the measurement of fiscal deficits and outlined the alternative measurements of fiscal deficits. The theoretical literature review was organized along four themes: the monetarists and structuralists schools of thought, Keynesian approach to inflation as well as the fiscal theory of the price level to support the relationship that exists between fiscal deficits and inflation.

From the empirical section of this chapter, it is evident that the relationship between fiscal deficits and inflation remains a crucial issue in almost all developing countries, Ghana inclusive. The literature reviewed had conflicting results of the effects of fiscal

deficits on inflation. Some studies Sowa (1994) among others³² found a strong and positive relationship between these two macroeconomic variables. Secondly, De Haan and Zelhorst, (1990) and others³³ indicated that fiscal deficits have a strong effect on inflation in high-inflation episodes and a weak effect in low-inflation episodes based on their estimation methodology and country category. Finally, the outcome of other studies Landon and Reid (1990) among others³⁴, showed no significant relationship between fiscal deficits and inflation.

According to the World Bank (2014), fiscal deficits remain the biggest source of vulnerability in the Ghanaian economy. Preliminary figures indicated that, the fiscal deficits which was 9.2% of GDP in the first half of 2014, ended at 9.4% of GDP from 10.4% in 2013. Moreover, the year-on-year inflation rate closed at 2014 at 17% in December, unchanged from the same level recorded in November. Although many studies on inflation have been carried out on Ghana, a handful of these studies such as Adu and Marbuah (2011), Ahiakpor (2014) identified fiscal deficits as a major source of inflation in Ghana. However, these studies failed to indicate the sources through which financing fiscal deficit results in inflationary pressures. This study therefore seeks to fill this gap by investigating the channels through which fiscal deficit causes inflationary pressures.

³² Nachega (2005), Agha and Khan (2006), Oladipo and Akinbobola (2011)

³³ Catao and Terrones (2003; 2005), Lin and Chu (2013).

³⁴ Karras (1994), Dockery et al (2012), Saysombath and Kyophilavong (2014)

CHAPTER FOUR

METHODOLOGY AND DISCUSSION OF RESULTS

4.1. Model Specification

It can be observed in literature that fiscal deficits are financed in several ways. In practice, a government incurring fiscal deficits, can finance such deficits through borrowing either from domestic or external sources, through the sale of bonds on the domestic financial markets and lastly resorting to the central bank to monetize the deficits (Alagidede *et al.*, 2013). Each of these sources of financing triggers its own macroeconomic effects and costs. Domestic borrowing results in credit squeeze-through higher interest rates and further to the crowding out of private investment and consumption. External borrowing leads to a current account deficit and an appreciation of the real exchange rate and sometimes results in balance of payments crisis (if foreign reserves decreases) or an external debt crisis (if debt is too large). Finally, money printing by the central bank leads to inflation (Easterly & Schmidt-Hebbel, 1993).

In order to estimate the effects of fiscal deficits on inflation, the following functional model is specified:

$$\blacksquare P_t = f(Y_t, CBF_t, RER_t, TB_t, P_{t-1}) \dots \dots \dots (1)$$

Where: P is the price level calculated based on domestic consumer price index of Ghana (2010=100), P_{t-1} is the proxy of price expectation (previous year's domestic consumer price index), Y is real output proxied by real Gross Domestic Product, CBF is the proportion of fiscal deficits financed by the Central bank, RER is real exchange rate, TB is the Treasury bill rate and (t) is the time period.

According to World Bank (2014), changes in cost incurred by an average consumer for acquiring a basket of goods and services, that may be fixed or changed at specified intervals, such as yearly is referred to as consumer price index. The Laspeyres formula is generally used and it is known as a “base-weighted” or “fixed-weighted” index because the price increases are weighted by the quantities in the base period. The Consumer Price Index (CPI) is an example of a Laspeyres Index.

Fiscal deficit is the key variable of interest. According to literature, there are various sources through which fiscal deficits are financed; however, governments of most developing countries often resort to the central bank’s resources in order to finance deficits on government accounts this may be due to insufficiently developed financial and tax-collection mechanisms and institutions to provide the needed resources of the government (Boariu & Bilan, 2007). How fiscal deficits are financed helps to explain why they might be strongly or weakly linked with inflation. In instances where they are strongly linked, the linkage might not be at the same time. Central bank financing of fiscal deficits according to literature tends to be highly inflationary. Studies by Lawson (1966) among others³⁵ have traced the main source of demand pressure to fiscal deficit financing. The proportion of fiscal deficits financed by the Bank of Ghana is obtained based on the data on central bank financing and fiscal deficits obtained from Bank of Ghana. It is expressed in percentages. The sign of the coefficient is therefore expected be positive.

³⁵ Ewusi (1977), Sowa and Kwakye (1993), Adu and Marbuah (2011)

When aggregate supply exceeds aggregate demand, prices tend to fall. Supply factors especially food production has been a major determining factor of inflationary pressures in Ghana according to studies such as Sowa and Kwakye (1993)³⁶, It can be observed that during periods of bumper harvest, demand pressure eases and causes prices to fall. On the other hand, slumps in production particularly food shortage often precede inflationary pressures in Ghana. The sign of real output parameter is expected to be negative; this is because inflation is assumed to be a decreasing function of output.

As indicated by Krugman (1983), exchange rate plays an important role in monetary policy on the international economy. Real exchange rate depreciation theoretically, tends to improve the external trade competitiveness of a country. Depreciation of a domestic currency in terms of other currencies provides an incentive for domestic producers to increase production hence, increasing their volume of exports. On the other hand, it serves as a disincentive, as prices of imports of producer and consumer goods rises thereby contributing to high domestic inflation. The exchange rate used in this study is based on price quotation. Therefore, the real exchange rate is defined as $R = e P^*/P$ where e is the nominal exchange rate, P^* is the foreign price level (U.S. consumer price level) and P is the domestic price level. The expected sign of the parameter is therefore positive.

The government issues Treasury bills in order to borrow from the domestic market; this is a source by which the government finances fiscal deficits. Purchasing a treasury bill is lending money to the Government. High Treasury bill rates encourage investors to purchase more government instruments thus, government bonds become more

³⁶ Sowa (1996), Adu & Marbuah (2011)

substitutable for money. This situation tends to crowd-out private investment and consumption³⁷. This occurrence leads to high cost of borrowing which causes a reduction in the rate of real output growth and finally to an increase in the general price level (Dockery et al, 2012). The theoretical sign is expected to be positive.

The model also presupposes that price expectation or inflation inertia is adaptively formed. During periods of persistent price hikes, individuals and firms unceasingly readjust their real incomes and expenditures to reflect their expectations about future price changes. They undertake this action in order to maintain their share in income. Again, firms especially producers, use the expectations about a previous year's inflation rate to build into their mark-ups. The coefficient of the lagged price is expected to be positive.

Hence, a semi-log linear inflation-fiscal deficit econometric model is specified from the equation (1) as follows:

$$\ln P_t = \beta_0 + \beta_1 CBF_t + \beta_2 \ln Y_t + \beta_3 \ln RER_t + \beta_4 TB_t + \beta_5 \ln P_{t-1} + \varepsilon_t \dots \dots \dots (2)$$

Where β_0 is the intercept / constant term, $\beta_1 \dots \beta_5$ represents the parameter coefficients of CBF, Y, RER, TB and P respectively, ε_t represents the white noise error term, (which is identically and independently distributed with zero mean and a homoscedastic variance and not correlated with any of the explanatory variables).

³⁷ Crowding out refers to excessive government spending which reduces private sector investment.

4.2. Data Source

The data used in this study is obtained from the World Development Indicators (WDI), 2014, monetary time series data from the Bank of Ghana and requested data on some variables from the Bank of Ghana. The data which is an annual data covers the period between 1983 and 2013 yielding 31 observations. Data on the proportion of fiscal deficits financed by the central bank is computed by dividing data on central bank financing by the overall fiscal deficits and converting them into percentages. Data for real exchange rate is computed by multiplying the nominal exchange rate by the ratio of United States CPI to Ghana CPI. The base year of Ghana and US CPIs is 2010. The exchange rate is based on price quotation. Treasury bill rate is based on the 91-day maturity rate. GDP is in measured in local currency unit (LCU).

Table 4.1. Details of Regression Variables

Variable	Description	Unit of measurement	Expected Signs	Data source
P	Consumer Price index (2010=100)	Index		WDI, 2014.
CBF	Proportion of fiscal deficits finance by the central bank	Percentage	Positive	Bank of Ghana.
Y	Real Gross Domestic Product (constant LCU)	GHS millions	Negative	WDI, 2014.
RER	Real exchange rate	GHS	Positive	Computed based on WDI, 2014 data.
TB	Treasury bill rate	Percentage (%)	Positive	Monetary Time Series data, Bank of Ghana

4.3. Estimation Technique

To examine the effects of fiscal deficits on inflation in Ghana, we adopt the Auto Regressive Distributed Lag (ARDL) Bounds Testing approach developed by Pesaran and Shin (1999) and further extended by Pesaran et al (2001) is employed. The ARDL Bounds Testing approach is a technique for testing the existence of long run relationship between variables in a multivariate time series model irrespective of whether the underlying explanatory variables are purely stationary at levels i.e. $I(0)$, stationary at first difference i.e. $I(1)$ or mixture of both. This procedure is adopted because it simple as opposed to other multivariate cointegration techniques such as the Engle and Granger (1987) and Johansen and Juselius (1990). These two main cointegration techniques have one severe limitation, which is that, the underlying time series variables must be integrated of order one (i.e., $I(1)$) or stationary at first difference. In most instances, this requirement is difficult to obtain.

The following are some of the advantages of the ARDL Bounds Testing procedure: it is the most appropriate approach since this study uses data that spans from 1983-2013, which is quite a small sample size. Again, it is applicable to time series variables with a mixture of purely $I(0)$, $I(1)$ or a combination of $I(0)$ and $I(1)$, it also involves just a single-equation set-up, making it simple to implement and interpret. Furthermore, the ARDL can estimate long-run and short-run components of a model simultaneously and also deal with the problems of serial correlation and endogeneity by producing unbiased and efficient estimates.

4.3.2. Test for Stationarity

The variables in the model are tested for unit roots using the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) to investigate the time series properties of the variables. The ADF is a test against the null hypothesis that there is a unit root of I (1). The equation used in the ADF test is as follows:

(i) ADF with both the intercept and trend

$$\Delta y_t = \alpha + \beta t + \delta y_{t-1} + \sum_{i=1}^k \gamma_i \Delta y_{t-i} + \varepsilon_t \dots \dots \dots (a)$$

Where: t is the time index, Δ is the first difference operator, α is an intercept constant called the drift, β is the coefficient on a time trend, δ is the coefficient presenting process root, k is the lag order of the first-differences autoregressive process and ε_t is a pure white noise. The ADF test is applied to ascertain whether the error term (ε_t) is serially correlated or white noise based on the introduction of lagged difference term. The test employs the t-statistic on the coefficient of the lagged independent variable (δ). The null hypothesis of unit root or non-stationarity is rejected if the t-value is significantly different from the critical value of 10%, 5% and 1% levels of significance. Hence, the alternative hypothesis of no unit root or stationarity is accepted. The Phillip-Perron test is applied as an alternative to confirm the results of the ADF test.

4.3.3. Test for Cointegration

Based on the results of the unit root test, tests for cointegration to determine the existence of a long run relation between fiscal deficits and inflation are performed. The ADRL Bounds Testing approach basically comprises three stages: Firstly, the dynamic analysis in which the presence of long run relationships between the variables in the model is tested. Secondly, the long-run relationship between the variables in the model is

estimated as well as estimating the long-run coefficients of the variables in the model. The last stage comprises the Error Correction Model (ECM) which estimates the short-run relationship between the variables in the model as well as its coefficients.

According to Pesaran et al., (1999), the Bounds test can be computed based on the estimation of an Error Correction version of the ARDL model, the Ordinary Least squares (OLS) estimator or by an Unrestricted Error Correction Model (UECM). Based on the conventional ECM or Unrestricted Error Correction Model (UECM) by Pesaran et al., (1999), the first step of the inflation model (P_t) specified in (1) is estimated by the Ordinary Least Squares (OLS). Hence the model is expressed as;

$$\Delta P_t = \beta + \sum_{j=0}^q \alpha_j \Delta CBF_{t-j} + \sum_{j=0}^r \gamma_j \Delta Y_{t-j} + \sum_{j=0}^s \phi_j \Delta RER_{t-j} + \sum_{j=0}^t \omega_j \Delta TB_{t-j} + \sum_{j=0}^u \lambda_j \Delta P_{t-1} + \delta_1 CBF_{t-1} + \delta_2 Y_{t-1} + \delta_3 RER_{t-1} + \delta_4 TB_{t-1} + \delta_5 P_{t-1} + \varepsilon_t \dots \dots \dots (3)$$

Where: P_t is the inflation rate, Δ is the first difference operator, β is the intercept / constant term CBF is the first difference of the proportion of fiscal deficits financed by the central bank, Y is the first difference of the log of gross domestic product, RER is the first difference of the log of real exchange rate, TB is the first difference of the log of interest rate, (q, r, s, t, u) represents the parameters lag length on the regression variable, ($\alpha, \phi, \lambda, \gamma, \omega$) are short-run dynamics of the inflation model, $\delta_1 \dots \delta_5$ are the long-run multipliers or parameter, ε_t is the white noise term.

The selection of an appropriate lag length is as important as determining the variables to be included in any structure of equations (Enders, 1995). The ARDL Bounds Test approach has a required maximum lag length of one (1). The Akaike Information Criteria (AIC) and Schwarz (Bayesian) Information Criteria (SIC) are the two common types of

lag structures that can be employed. However this study employs the Schwarz Bayesian Information Criterion (SIC) over the AIC because it is a consistent estimator.

4.3.3.1. The Unrestricted Error Correction Model

The F-test is used to test the joint significance of the coefficients of the lagged level variables. The long run relationship is established by restricting the coefficients of the lagged level coefficients to zero. Hence, we test the null hypothesis of no-cointegrating equation by performing a joint significance test on the lagged level variables. The hypothesis testing is as follows:

- H_0 : the coefficients on the lagged level variables are not jointly significant
i.e.: $H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = 0$
- H_1 : the coefficients on the lagged level variables are jointly significant
i.e.: $H_0: \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq 0$

The null hypothesis representing no cointegration is tested against the alternative hypothesis of cointegration among the variables by means of an F-test. The asymptotic distribution of the F-static is non-standard under the null hypothesis irrespective of whether the explanatory variables are purely I (0) or I (1). When the F-statistic for the cointegration test is normalized on P_t , we obtain: $F_p = [P_t \mid \text{CBF, TB, RER, Y}]$

The decision rule for F-test is dependent on the values with which it is compared to. The critical values however, depend on the following factors: the number of regressors in the model, the order of integration of the variables whether I (0) or I (1) and lastly, whether the model has an intercept and/or a trend or neither of the two. The upper and lower

critical values are chosen based on the order of integration of the regressors (Pesaran et al., 1999). The upper critical values are based on the assumption that the regressors are integrated of order one or I (1) whereas the lower critical values are based on the assumption that the regressors are integrated of order zero or I (0). Based on the conventionally used level of significance of 1%, 5% and 10%: we may reject (or fail to reject) the null hypothesis of no cointegration if the computed F-statistic lies above (below) the value of the upper critical bound.

4.3.4. Long-Run Model

After establishing the existence of cointegration, the conditional ARDL specification of the long-run P_t model is estimated as:

$$P_t = \beta_0 + \sum_{j=0}^q \beta_{1j} CBF_{t-j} + \sum_{j=0}^r \beta_{2j} Y_{t-j} + \sum_{j=0}^s \beta_{3j} RER_{t-j} + \sum_{j=0}^t \beta_{4j} TB_{t-j} + \sum_{j=0}^v \beta_{6j} P_{t-1} \dots \dots \dots (4)$$

4.3.5. Error-Correction Model

The short-run dynamics associated with the long-run estimates are established by constructing an Error Correction Model (ECM). This is specified as follows

$$\Delta P_t = \lambda_0 + \sum_{j=0}^a \lambda_{1j} \Delta CBF_{t-j} + \sum_{j=0}^b \lambda_{2j} \Delta Y_{t-j} + \sum_{j=0}^c \lambda_{3j} \Delta RER_{t-j} + \sum_{j=0}^d \lambda_{4j} \Delta TB_{t-j} + \sum_{j=0}^e \lambda_{5j} \Delta P_{t-1} + \varphi ecm_{t-1} \dots \dots \dots (5)$$

Where: Δ is the first difference operator, λ_0 represents the intercept / constant term, (a, b, c, d, e) represents the lag length on the regression variables, $\lambda_1, \dots, \lambda_5$ are the coefficients of the short-run equation, φ is the speed of adjustment to obtain the long-run equilibrium in the event of shock and ecm_{t-1} is the error correction term.

4.4. Pairwise Granger Causality

To achieve the second objective of the studies, a Granger Causality test will be carried out to determine the kind of causal relationship between the inflation and fiscal deficits. The main reason why the Granger Causality test is preferred among other test procedures is based on its robust response to both small and large samples. To investigate the causality relationship between inflation and fiscal deficits, a two-way causality is developed where the coefficients of P and FD are statistically significant from zero in the two regressions.

$$\bullet P_t = \gamma_{11} + \sum_{i=1}^p \gamma_{12}^i P_{t-i} + \gamma_{13}^i CBF_{t-i} + \sum_{i=1}^p \gamma_{13}^i CBF_{t-i} + \varepsilon_t \dots \dots \dots (6)$$

$$\bullet CBF_t = \gamma_{21} + \sum_{i=1}^p \gamma_{22}^i FD_{t-i} + \gamma_{23}^i P_t + \sum_{i=1}^p \gamma_{23}^i P_{t-i} + \mu_t \dots \dots \dots (7)$$

From the equations above, non-causality from fiscal deficits to inflation involves $\gamma^1_{11} = \gamma^2_{12} = \dots = \gamma^p_{13} = 0$ whilst non-causality from inflation to fiscal deficits implies $\gamma^1_{11} = \gamma^2_{12} = \dots = \gamma^p_{13} = 0$.

Where: ε_t and μ_t are the white noise disturbance terms

p is the number of lags necessary to induce white noise in the residuals

4.5 Diagnostic Tests

A number of diagnostic tests will be carried out to test the robustness of the results from the ARDL model. Diagnostic tests such as tests for autocorrelation, heteroscedasticity, normality test of the error term and model stability will be carried out in this study. A key assumption in the ARDL Bounds Testing methodology of Pesaran et al., (1999) is that the error terms in the Unrestricted Error Correction Model (UECM) must be serially independent.

4.6 Discussion of Empirical Results

4.6.1 Descriptive Statistics of Variables

The descriptive statistics include summary statistics such as mean, median, maximum, minimum among others. Results of the descriptive statistics represented below indicates that, over the period of study, P averaged 34%, implying that price levels in Ghana generally have been high over the period of study. Real Exchange Rate (RER) has the lowest mean of 1.24 whilst real output (Y) has the highest mean of 14,623.82. The variables have relatively high variability. However, the variability of the variables are low compared with the mean of the variables, except the variability in the price level (P) and proportion of fiscal deficits financed by the central bank (CBF) which are higher compared with their means. Again, real output (Y) had a maximum value of 32,644.14 which was the highest among the variables whilst RER obtained the maximum value of 2.072300 which was the lowest among the variables. Most of the variables are positively skewed with the exception of RER which exhibits negative skewness implying that it has a long left tail. As indicated by the p-values of the Jacque Bera statistic, P, Y and CBF are normally distributed at 5%, 10% and 1% levels of significance respectively whilst TB and RER are not normally distributed based on their p-values. The total number of observations for each variable is 31.

Table 4.2. Summary Statistics of Variables from 1983- 2013

	P	CBF	TB	RER	Y
Mean	34.00916	46.74096	24.33258	1.244296	14623.82
Median	15.00693	13.83921	21.71000	1.225083	12700.30
Maximum	132.4647	833.3333	47.88000	2.072300	32644.14
Minimum	0.356742	0.000000	9.600000	0.112996	6250.730
Std. Dev.	40.37911	147.8999	10.96432	0.474086	7088.589
Skewness	1.086311	5.083163	0.704026	-0.343660	1.007608
Kurtosis	2.907628	27.56263	2.660341	2.897888	3.164300
Jarque-Bera	6.108055	912.7912	2.709891	0.623662	5.280451
Probability	0.047169	0.000000	0.257961	0.732105	0.071345
Sum	1054.284	1448.970	754.3100	38.57318	453338.3
Sum Sq. Dev.	48914.17	656231.1	3606.491	6.742738	1.51E+09
Observations	31	31	31	31	31

Source: Author's compilation using E-views 7

4.6.2 Results of Unit Root Test

Two conditions must be satisfied before using the ARDL Bound Test approach. It requires that the dependent variable must be integrated of order one, i.e. $I(1)$. In other words, the dependent variable must be stationary at first difference. Secondly, none of the explanatory variables should either be $I(2)$ or higher. The Augmented Dickey Fuller (ADF) test is employed as the main unit root test tool and the results of the ADF test are confirmed by the Phillip-Perron (PP) unit root test.

Table 4.3. Results of the ADF and PP Unit Root Tests at Levels (1983-2013)

Variables	ADF		PP	
	t-statistic	p-value	Adj.t-statistic	p-value
LnP	0.137163	0.9962	0.505893	0.9988
CBF	-5.811737***	0.0002	-5.871933***	0.0002
TB	-1.995	0.2889	-1.995	0.2889
LnRER	-7.147993***	0.0000	-7.147993***	0.0000
LnY	1.787069	1.0000	1.823380	1.0000

Source: Author's estimation using E-views 7. Mackinnon (1996) one-sided p-values *** implies rejection of the null hypothesis at 1% level of significance.

From the Mackinnon (1996) critical values, the null hypothesis is rejected when the calculated t-statistic (absolute terms) is greater than the critical t-value. On the other hand, we fail to reject the null hypothesis when the calculated t-statistic (absolute terms) is less than the critical t-value. The results from table 4.3 indicates that, with the exception of LnRER and CBF which were stationary at levels, the rest of the variables were not stationary at 1%, 5%, 10% levels of significance. As a result, the ADF and PP unit root tests were carried out at first difference and the results shown in Table 4.4.

Table 4.4. Results of the ADF and PP unit root at first difference (1983-2013)

Variables	ADF		PP	
	t-static	p-value	Adj. t-statistic	p-value
LnP	-4.026785**	0.0190	-3.866126**	0.0270
TB	-5.724***	0.0000	-5.734***	0.0000
LnY	-4.413886***	0.0079	-4.410510***	0.0079

Source: Author's estimation using E-views 7. The p-values, the t-statistic and the adjusted t-statistic are recorded respectively. ***, ** implies rejection of the null hypothesis at 1% and 5% respectively.

Results from Table 4.4 indicate that, all the variables that were not stationary at levels are now stationary at first difference at 1% and 5% levels of significance. The dependent variable, inflation is stationary at first difference i.e. I(1) and all the regressors are either stationary at levels i.e. I(0) or first difference i.e. I(1) and none is integrated of order two or higher i.e. I(2).

Table 4.5. Order of Integration of the Regression Variables (1983-2013)

Variables	ADF unit root test	Phillips-Perron unit root test
LnP	I(1)	I(1)
CBF	I(0)	I(0)
TB	I(1)	I(1)
LnRER	I(0)	I(0)
LnY	I(1)	I(1)

Source: Author's estimation using E-views 7

From Table 4.5, it can be concluded that the precondition for the application of the ARDL Bounds Testing Approach to cointegration has been satisfied.

4.6.3 Tests for Cointegration

The long-run relationship among the variables is tested using the Wald test. Thereafter, we compare the computed F-statistic with the lower and upper critical bound values. The F-statistic tests the joint significance of the coefficients of the lagged level variables. The null hypothesis of non-cointegration is tested against the alternative hypothesis that there is cointegration among the variables.

Table 4.6: Results of Long-Run Relationship among the variables (1983 – 2013)

Test for the existence of a level relationship among the variables in the ARDL model				
K	95% Lower Bound	95% Upper Bound	90% Lower Bound	90% Upper Bound
4	2.6651	3.9880	2.1328	3.3187
Computed ARDL F-statistic: 5.0326				

Source: Author's estimation using Microfit 5.0.

Table 4.6 shows that the null hypothesis of no level effect is rejected since the computed ARDL F-statistic (5.0326) is greater than the upper bound (i.e. $I(1)$) critical values at 5% and 10% levels of significance. Hence, we can conclude that there exists cointegration (level effects) among the variables at 5% and 10% levels of significance.

4.6.4 Estimation of Long-run Coefficients and Discussions

After estimating the conditional ARDL specification for the inflation model, results from the estimation of the long run coefficients are represented in Table 4.7.

**Table 4.7: Estimated Long Run Coefficients using the ARDL Approach
ARDL (1, 1, 0, 0, 0) selected based on Schwarz Bayesian Criterion**

Dependent Variable =LnP				
30 observations used for the estimation from 1984 to 2013				
Regressors	Coefficient	Standard Error	T-Ratio	P-values
CBF	0.0031183	0.0017306	1.8019	0.084*
TB	0.043232	0.012516	3.4541	0.002***
LnRER	-0.065410	0.45582	-0.19850	0.007**
LnY	0.17987	0.044601	4.0329	0.000***

Source: Author's estimation using Micro-fit 5.0 ***, **, *denote levels of significance at 1%, 5% and 10% respectively.

The results of the estimated long-run coefficients of the variables of the model are displayed in Table 4.7. It can be observed that, all the long-run coefficients of the variables are significant at 1%, 5% and 10% respectively. However, the signs of the coefficients of LnRER and LnY do not conform to their expected theoretical signs.

From Table 4.7, there exists positive effect of the proportion of fiscal deficits financed through the central bank (CBF) on inflation. Therefore, a percentage point increase (decrease) in CBF, keeping all other variables unchanged leads to a corresponding increase (decrease) in the inflation rate by 0.0031183. This finding confirms the assertion by Sargent and Wallace (1981), that public sector deficits are inflationary. This implies that high and prolonged public sector deficit statistically explains the upsurge in inflation in the long-run though its coefficient is comparatively small. The modest impact of CBF on inflation during the period of study may be due to the fact that, government resorted

more to the other sources of financing especially domestic borrowing than to the printing of money by the central bank.

For instance, from the period 1987 to 1995, there was no monetization of fiscal deficits by the central bank though the government continued to finance existing deficits through the banking and non-bank sectors as well as through external sources. This occurrence has therefore smoothens-out the effect of central bank financing on inflation over this period. This result affirms the positive relationship that exists between fiscal deficits and inflation. Findings by Makochekeka (2011) in the Zimbabwean context, affirms this positive relationship that exists between budget deficits and inflation. On the contrary, findings by Saysombath and Kyophilavong (2014), revealed no long run relationship between budget deficit and inflation in Laos.

The Treasury bill rate is found to have positive effect on inflationary pressures in Ghana at 1% level of significance. This implies that a percentage point increase (decrease) in Treasury bill rate causes inflation rate to rise (fall) by 0.043232. Comparatively, financing of fiscal deficits through domestic borrowing by the government has a larger impact on the inflationary pressures in Ghana than the monetization of fiscal deficits by the central bank. Over the period of study, it was observed that government resorts more to domestic financing (banking sector and non-bank sectors) of fiscal deficits than to the printing of money by the central bank to finance deficits.

A Treasury bill is a short-term investment product offered by the Bank of Ghana on behalf of the Government. It is a measure of government borrowing and backed by the

credit of the Government. Therefore, purchasing a treasury bill is lending money to the Government. The Government issues bonds to obtain money from the economy through the financial sector in order to finance its deficits. High Treasury bill rates encourage investors to purchase more government instruments thus, government bonds become more substitutable for money. This situation tends to crowd-out the private sector or private investment. When the private sector is crowded-out, firms incur higher production cost due to the increased cost of borrowing. This higher cost of borrowing is transferred into increased production cost hence, limiting the production capacity of the private sector as a whole. This occurrence has an adverse impact on expansion, thereby causing aggregate supply to fall short of overall demand in the economy, hence, fueling inflationary pressures in the long run. Similar result obtained by Agha and Khan (2006), revealed that market borrowings were the most inflationary financing source in Pakistan. Again, this finding of is affirmed by the study of Adu and Marbuah (2011), which indicates a positive relationship between inflation and interest rate (proxy by the Treasury bill rate) in both the long and short-run periods.

Theoretically, the depreciation of the Ghana cedi favours the export sector in that, Ghanaian exports becomes comparatively cheaper and more competitive on the foreign markets. On the other hand, imports to the domestic markets become fairly expensive. This results in both cost-push (imported) and demand-pull inflation in the long-run. Contrary to theoretical assertion, real exchange rate impacts negatively on inflationary pressures in Ghana at 1% level of significance. Interestingly, a study carried out by Ndung'u (1997) found similar results for Kenya. Again, findings by Adu and Marbuah

(2011), also confirmed the inverse relationship that exists between real exchange rate and inflation.

There exists a positive and significant long run relationship between real GDP growth and inflation. This relationship is inconsistent with the supply-side theoretical expectations. This implies that, a percentage point increase (decrease) in real GDP growth brings about approximately 18% rise (fall) in the inflationary pressures (inflation) in the long-run. When real incomes increases, demand for goods and services rises, thereby increasing aggregate demand with aggregate supply remaining constant, all things being equal, prices of goods and services will rise. A prolonged rise in prices will bring about inflation. Findings by Enu and Havi (2014), supports the positive relationship between real GDP growth and inflation whilst studies by Bawumia and Abradu-Otoo (2003) and Ahiakpor (2014) contradicts with this finding.

Inflation inertia or price expectations is a key determinant of inflation since it shows considerable persistence as indicated by its positive and significant lagged coefficient in the ARDL approach. This is represented in the appendix.

4.6.5. Error Correction Model Results and Discussions

In order to capture the short-run dynamics of inflation and the independent variables, the inflation model is estimated at the first difference of the variables with the residuals of the cointegration regression added as the error correction factor. The estimation of the Error Correction Model (ECM) helps to establish the short-run relationship. Table 4.8 presents the results of the ECM representation of the ARDL Bounds Testing Approach.

Table 4.8 Results of the Error Correction Model for the Selected ARDL Model

ARDL (1, 1, 0, 0, 0) selected based on Schwarz Bayesian Criterion

Dependent Variable =dLnP				
30 observations used for estimation from 1984 to 2013				
Regressor	Coefficient	Standard Error	T-Ratio	p-values
dCBF	0.0009430	0.0005614	1.6797	0.091*
dTB	0.025842	0.0075362	3.4290	0.002***
dLnRER	-0.039098	0.27965	-0.13981	0.890
dLnY	0.10752	0.050095	2.1462	0.042**
ecm(-1)	-0.59773	0.15686	-3.8107	0.001***
List of additional temporary variables created: $dLnP = LnP - LnP(-1)$ $dLnRER = LnRER - LnRER(-1)$ $dLnY = LnY - LnY(-1)$ $dLnTB = LnTB - LnTB(-1)$ $dCBF = CBF - CBF(-1)$ $ecm = LnP - 0.0031183*CBF - 0.043232*TB + 0.065410*LnRER - 0.17987*LnY.$				
R-Squared	0.62008	R-Bar-Squared	0.54093	
S.E. of Regression	0.40573	F-Stat. F(4,25)	9.7927[.000]	
Mean of Dependent Variable	-0.073616	S.D. of Dependent Variable	0.59882	
Residual Sum of Squares	3.9508	Equation Log-likelihood	-12.1589	
Akaike Info. Criterion	-18.1589	Schwarz Bayesian Criterion	-22.3625	
DW-statistic	2.1042			

Source: Author's estimation using Microfit 5.0

From Table 4.8, the coefficients of all the variables with the exception of real exchange rate are statistically significant in the short-run. The coefficients of CBF, TB and Y maintained their positive signs which are statistically significant at 10%, 1% and 5% respectively. However, compared to the long-run, the magnitude of their effects on inflation are slightly lower. For instance, a percentage point increase (decrease) in the treasury bill rate will cause a rise (fall) in inflation rate by 0.025842. This indicates that even in the short-run Treasury bill rate still affects investment decision (reduction in productivity levels) hence, the inflationary process in the Ghanaian economy. The impact

of CBF on the inflationary pressures especially in the short-run is negligible. This implies that, central bank financing of fiscal deficit does not spur strong inflationary pressures in the short-run. However, from the table, real GDP growth had the strongest impact on inflation in both the long and short-run time periods.

Furthermore, the short-run model shows convergence to equilibrium in the long-run, after a temporary shock in the economy. In theory, the dynamic stability of the path of inflation requires that the coefficient of the error correction term be negative and statistically significant. This is established in our short-run model where the coefficient of lagged *ecm* is both negative and highly significant at 1% level of significance. The estimated coefficient of the *ecm* is -0.59773 suggesting that approximately 60% of the disequilibrium in the previous year's shocks to the system converge back to the long run equilibrium in the current year. By this finding, it is concluded that any disequilibrium within the inflationary pressures of Ghana in the short-run is quickly adjusted and converged back to equilibrium in the long-run.

In order to ensure the reliability of the estimated parameters in the error correction model, series of diagnostic tests were applied. An F-statistic of approximately 10 suggests the joint significance of the determinants in the *ecm*. It shows a good fit of the model, confirming its predictive ability. The adjusted- R^2 value implies that approximately 54% of the variations in inflation are explained by changes in the estimated determinants. A Durbin-Watson statistic value of approximately 2.1 indicates that there is no strong serial correlation in the residuals.

4.6.6 Diagnostic Tests

Diagnostic tests such as the test for serial correlation, heteroscedasticity, functional form specification and normality test of residual terms are carried out and represented in Table 5.8 to determine the time series properties of the data.

Table 4.9 Results of the ARDL Diagnostic tests

Test Statistic	LM Version	F Version
A: Serial Correlation	CHSQ (1) = 0.24696(0.619)	F(1, 23) = 0.19091(0.666)
B: Functional Form	CHSQ(1) = 1.4745(0.225)	F(1,23) = 1.1888(0.287)
C: Normality	CHSQ(2) = 1.1357(0.567)	Not applicable
D: Heteroscedasticity	CHSQ(1) = .65752(0.417)	F(1,28) = 0.62743(0.435)

Note:

A: *Lagrange multiplier test of residual serial correlation*

B: *Ramsey's RESET test using the square of the fitted values*

C: *Based on a test of skewness and kurtosis of residuals*

D: *Based on the regression of squared residuals on squared fitted*

Given the p-values of serial correlation, functional form, normality and heteroscedasticity as 0.666, 0.287, 0.567 and 0.435 respectively from Table 4.9, the result shows the absence of serial correlation, heteroskedastic errors, model misspecification and non-normality of residuals. Hence, we fail to reject the null hypothesis of no serial correlation, correct functional form, normally distributed residuals and homoscedasticity at 5% level of significance. Stability tests using the CUSUM and CUSUMQ tests of Brown et al. (1975) for the model generally suggested an absence of structural breaks. Again, the Cumulative Sum (CUSUM) and the Cumulative Sum of Squares (CUSUMQ) techniques are employed to determine the stability of the short-run and long-run coefficients.

Fig. 4.1: Plot of Cumulative Sum of Recursive Residuals

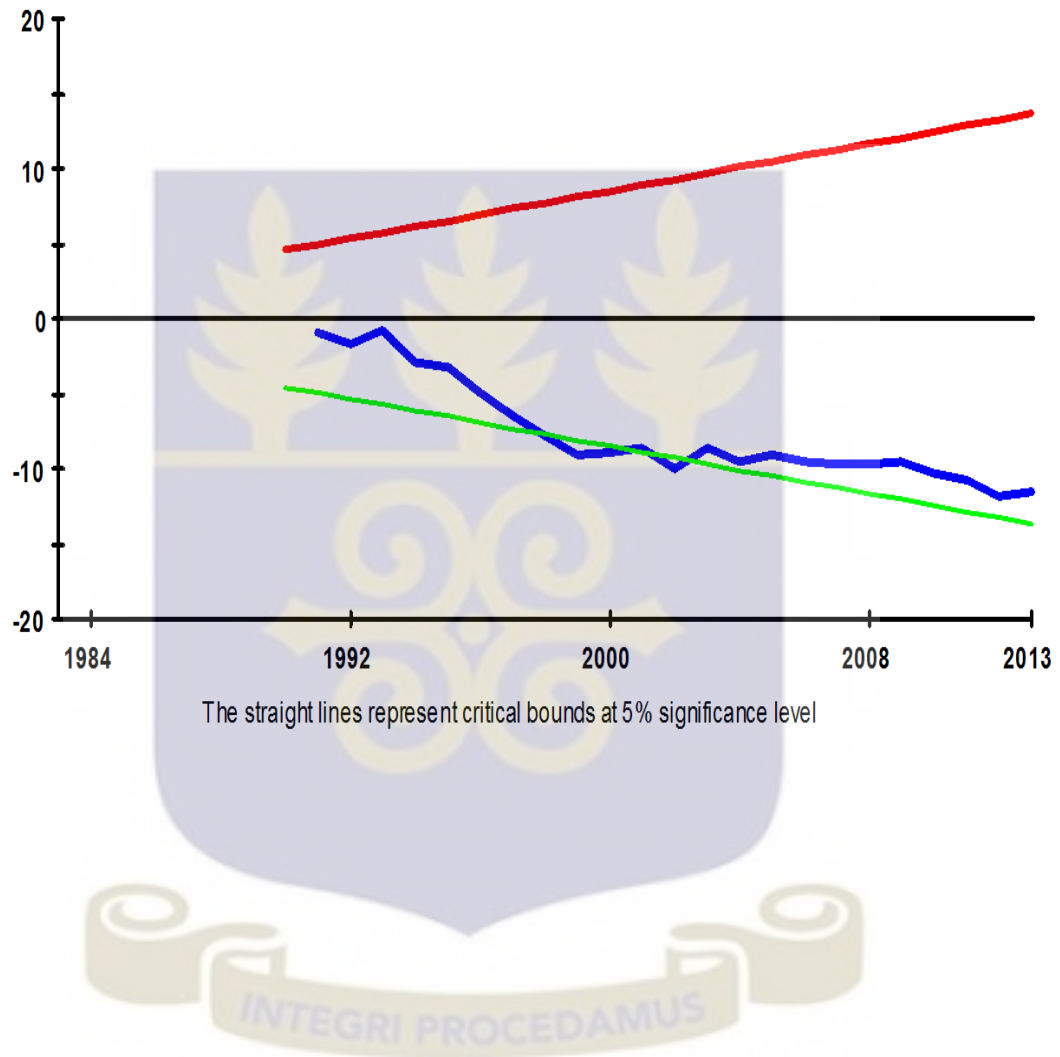
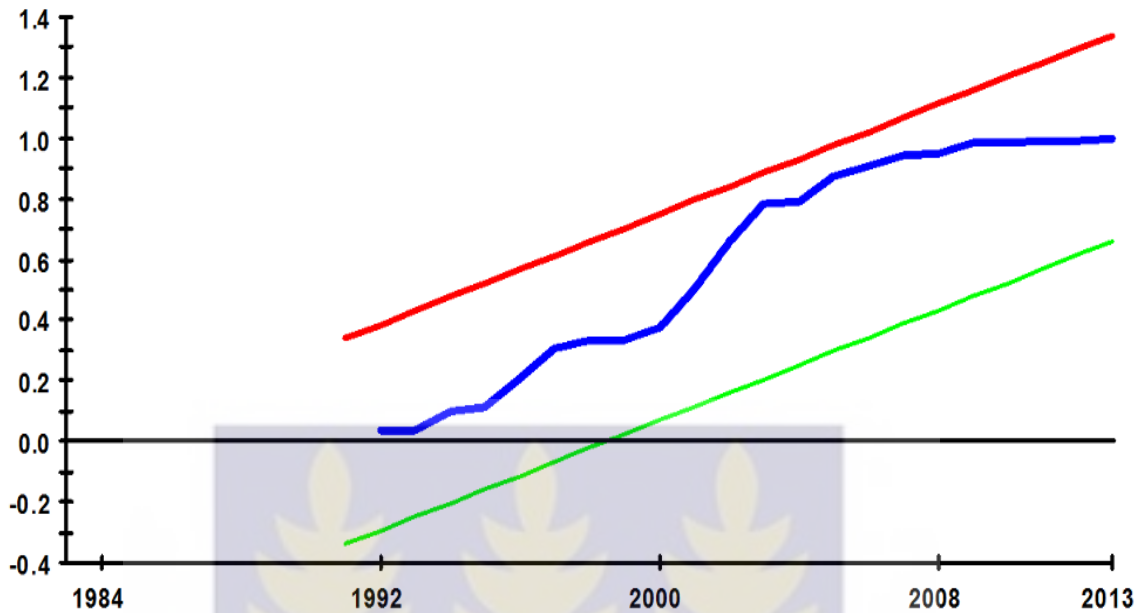


Figure 4.2 Plot of Cumulative Sum of Squares of Recursive Residuals



The straight lines represent critical bounds at 5% significance level

Figs 4.1 and 4.2 represent the graphs of the CUSUM and CUSUMQ respectively. The null hypothesis of stable parameters is tested against the alternative hypothesis that both the long and short run parameters are not stable. It can be observed that, the plots of CUSUM and CUSUMQ are within the critical bounds. This implies that the estimated model and its coefficients are stable at 5% level of significance.

4.6.7 Results of the Granger Causality Test

To achieve the second objective of this study, a Granger-causality test is conducted to investigate the causal relationship between inflation and the variable of interest, which is fiscal deficit. However, the existence of Granger-causality does not literally imply that the occurrence of one variable is as a result of the other. It suggests that while the past can predict the future, the future cannot predict the past. The first differenced variables are used in this analysis. The results of the Granger Causality test are presented in Table 4.10 below.

Table 4.10: Results of the Granger Causality Test

Null Hypothesis:	F-Statistic	Prob.
FD does not Granger Cause LnP	3.69721	0.0222**
LnP does not Granger Cause FD	1.27163	0.3265

Source: Author's estimation using E-views 7

From Table 4.10, the null hypothesis that fiscal deficits (FD) do not Granger-cause inflation (P) is rejected at 5% level of significance. On the other hand, we fail to reject the null hypothesis that inflation does not Granger-cause fiscal deficits at 5% level of significance. This implies that, there is uni-directional causality running from fiscal deficits to the inflation with no feedback effect. This result is supported by the findings of Ahking and Miller (1985) among others³⁸. In conclusion, this result implies that the past and present values of fiscal deficits provide important information to forecast the future values of inflation in Ghana.

4.6.8 Conclusion

In this chapter, the ARDL Bounds Testing Approach and the Pairwise Granger-causality test were adopted to address the objectives of the study. Several estimations were carried out by the use of Eviews7 statistical package and Microfit 5.0. Due to the limitation in to data, the estimation was carried out from 1983 to 2013. The study revealed cointegration among the variables. The long-run estimation revealed that all variables are significant at 10% 5% and 1% levels of significance. On the other hand, only RER was found to be statistically insignificant in the short-run. This study concluded the analysis by conducting some diagnostic tests.

³⁸ Solomon and Wet (2004), Lozano (2008)

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of the Study

The study attempted to highlight and examine the effect of fiscal deficits on inflation in Ghana. Additionally, the study sought to determine the type of relationship that existed between fiscal deficits and inflation in Ghana. An overview of the inflationary and fiscal trends as well as deficit financing in Ghana was presented. It was observed that fiscal deficits to a large extent were financed domestically through government borrowings from the banking sector, the non-banking sector as well as through money printing by the central bank.

The literature review was organized along four themes: the monetarists and structuralists schools of thought, Keynesian approach to inflation as well as the fiscal theory of the price level to support the relationship that exists between fiscal deficits and inflation. The study also undertook an empirical survey of the literature on the relationship between fiscal deficits and inflation in developing countries as well as the causes of inflation in Ghana. Some of these studies such as Nachega (2005) among others³⁹ established a long-run relationship between the two variables while the others focused on the short-run effects of fiscal policy shocks on inflation in developing countries. However, irrespective of the approach used, these studies ended up with inconclusive findings in contrast to theoretical expectations. In general, some of the empirical studies suggested that: (i) fiscal deficits are not inflationary, (ii) there is only a weak correlation between the two,

³⁹ Agha and Khan (2006), Oladipo and Akinbobola (2011)

and (iii) there is a strong link between fiscal deficits and inflation only during high inflationary episodes.

The Autoregressive Distributed Lag (ARDL) Bounds Testing Approach to cointegration was adopted to model the short and long run models of inflation for Ghana. Cointegration was established between inflation and the explanatory variables in Ghana. The results of the estimation revealed that, the coefficients of proportion of fiscal deficits financed through the central bank (CBF), treasury bill rate (TB), real exchange rate (RER) and real GDP were all significant variables in the long-run. In addition, with the exception of real exchange rate (RER), all the other variables were significant in the short-run.

From the study, it is observed that the proportion of fiscal deficits financed through the central bank (CBF), treasury bill rate (TB) and real GDP growth (Y) have positive effects on inflation in the long and short-run time periods in Ghana. This implies that a percentage point increase (decrease) in CBF, TB and Y results in a rise (fall) in inflationary pressures in Ghana. On the other hand, the study revealed an inverse relationship between real exchange rate (RER) and inflation in the long-run but was insignificant in the short-run time period.

The Granger Causality test indicated a unidirectional causality running from fiscal deficits to inflation. This implies that, whereas the past values of fiscal deficits can predict the present values of inflation, past values of inflation cannot predict the present values of fiscal deficits.

In conclusion, though inflationary pressures in Ghana are normally structured along the lines of structural and monetary aggregates, the study revealed that inflationary pressures under the period of study (1983- 2013) was influenced by a mixture of both structuralist monetary factors. The fiscal deficit component with its corresponding financing is observed to be a major determinant of inflation in Ghana. Therefore, the fiscal theory of price level is also prominent in any attempt to explain inflation in Ghana. This is because fiscal deficits tend to have a monetary effect, although it is not necessarily money supply in and of itself, there is a fiscal accommodation which tends to create the inflationary pressures.

5.2 Policy Implications and Recommendations

The economic consequences of inflation implies that, there is a constant effort by government to control this phenomenon. Economic theory suggests several factors as determinants. However, our emphasis in this study has been to examine the impact of fiscal deficits on inflation. The study revealed a positive relationship between fiscal deficit and the price level in the long-run. Its impact (in terms of the size of its coefficient) was however, comparatively small. The findings provide important information for policy formulation and implementation.

First and foremost, since the mission of the Bank of Ghana is to pursue monetary and financial policies which aims at price stability, further strengthening of its independence, would enable the central bank achieve its mission. In addition, it increases its capacity to manage the fiscal effects on the economy. In consolidating its independence, Bank of Ghana must continue to strengthen its interbank foreign exchange market as well as use

market transactions for the determination of its daily official exchange rate. Again, the practice of the Bank in acquiring foreign currency funding for priority sector imports must also be eliminated. These measures can help to achieve and maintain low inflation rates.

Furthermore, since the monetization of fiscal deficits is likely to result in higher inflationary pressures, therefore, the Bank of Ghana must limit the proportion of fiscal deficits monetized. The Government must resort to alternative domestic borrowing sources especially through marketable financial instruments such as: Bank of Ghana Bills of 1 week, 2-week, 28-day (1 month) and 56 –day (2 months) maturities. Again, the domestic financing of deficits can be carried out through the issuance of Treasury bills and bonds from deposit money banks and non-banks. High Treasury bill rate has the tendency of reducing money supply in the economy hence, this causes aggregate demand to fall and its effect is a reduction in the inflationary pressure in the long-run.

Furthermore, weak public financial management has been the basis of fiscal indiscipline as well as fiscal slippages experienced in Ghana over the years. Hence, to support and preserve fiscal adjustment, measures to restructure and strengthen public financial management in terms of establishing integrity, predictability and control over budget implementation are of key importance. Such measures includes: intensifying control over budget implementation by the Ministry of Finance & Economic Planning (MOFEP), cleaning up the government payroll in order to clear the system off ghost names, which increases the public wage bill and streamlining the size of the civil service in order to boost productivity.

Moreover, there is a strong need for expenditure control in order to achieve fiscal consolidation. Government must be made to cut down on profligate expenditures which normally exceed government revenues. This situation leads to the creation of deficits on government accounts. For instance, in Ghana there is the issue of ghost names on the payroll of many public institutions and since the wage bill has been a major cause of government expenditure overruns, a comprehensive cleaning of the payroll of government must be instituted.

In addition, increased domestic revenue mobilization is very essential for a successful fiscal consolidation and serves a basis for sustainable development. Hence, the government needs to strengthen revenue management by setting out realistic plans that would further support the Ghana Revenue Authority (GRA) to fortify measures to combat tax evasion, tax avoidance and corruption at all levels of governance. For instance, international tax cooperation must be increased in order to reduce to large extent unlawful financial inflows. Tax laws and regulations must be simplified and existing opportunities for tax avoidance can be reduced through increased fairness and transparency of the tax system. Again these tax laws and regulations should be basic and made stronger to combat tax evasion. Lastly, the tax base also has to be widened to incorporate the large informal sector into the formal economy.

Finally, the expansion of the manufacturing capacity of the economy would result in increased output, thereby boosting the exports of the economy which would result in an increased forex thereby strengthening the value of the cedi.

5.3. Limitations of the Study

The principal setback of this study is the limitation of obtaining all data for the intended study period. The study initially intended to run a regression to examine the effects of fiscal deficits on inflation from 1960 to 2014. However due to the unavailability of data for some of the variables such as treasury bill rates and central bank financing, the study had to run its model based on data from 1983 to 2013. Although efforts were made to extrapolate the missing data by graphical method, it resulted in huge values which were unrealistic.



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APPENDIX

Autoregressive Distributed Lag Estimates

ARDL(1,1,0,0,0) selected based on Schwarz Bayesian Criterion

Dependent variable is LINF

30 observations used for estimation from 1983 to 2013

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNP(-1)	.40227	.15686	2.5645[.017]
CBF	.9430E-3	.5614E-3	1.6797[.106]
CBF(-1)	.9209E-3	.5061E-3	1.8195[.081]
LNRER	-.039098	.27965	-.13981[.890]
LN Y	.10752	.050095	2.1462[.042]
TB	.025842	.0075362	3.4290[.002]

R-Squared	.52769	R-Bar-Squared	.42929
S.E. of Regression	.40573	F-Stat. F(5,24)	5.3628[.002]
Mean of Dependent Variable	2.9703	S.D. of Dependent Variable	.53707
Residual Sum of Squares	3.9508	Equation Log-likelihood	-12.1589
Akaike Info. Criterion	-18.1589	Schwarz Bayesian Criterion	-22.3625
DW-statistic	2.1042	Durbin's h-statistic	-.55787[.577]

Testing for existence of a level relationship among the variables in the ARDL model

F-statistic	95% Lower Bound	95% Upper Bound	90% Lower Bound	90% Upper Bound
5.0326	2.6651	3.9880	2.1328	3.3187

W-statistic 95% Lower Bound 95% Upper Bound 90% Lower Bound 90% Upper Bound

25.1631 13.3254 19.9399 10.6642 16.5936

If the statistic lies between the bounds, the test is inconclusive. If it is above the upper bound, the null hypothesis of no level effect is rejected. If it is below the lower bound, the null hypothesis of no level effect can't be rejected. The critical value bounds are computed by stochastic simulations using 20000 replications.

Diagnostic Tests

* Test Statistics *	LM Version	* F Version *

* A:Serial Correlation*	CHSQ(1) = .24696[.619]*	F(1,23) = .19091[.666]*
* B:Functional Form	*CHSQ(1) = 1.4745[.225]*	*F(1,23) = 1.1888[.287]*
* C:Normality	*CHSQ(2) = 1.1357[.567]*	Not applicable *
* D:Heteroscedasticity*	CHSQ(1) = .65752[.417]*	F(1,28) = .62743[.435]*

- A:Lagrange multiplier test of residual serial correlation
- B:Ramsey's RESET test using the square of the fitted values
- C:Based on a test of skewness and kurtosis of residuals
- D:Based on the regression of squared residuals on squared fitted values

Estimated Long Run Coefficients using the ARDL Approach

ARDL(1,1,0,0) selected based on Schwarz Bayesian Criterion

Dependent variable is LNP

30 observations used for estimation from 1983 to 2013

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
CBF	.0031183	.0017306	1.8019[.084]
LNRER	-.065410	.45582	-.19850[.007]
LNy	.17987	.044601	4.0329[.000]
TB	.043232	.012516	3.4541[.002]

Testing for existence of a level relationship among the variables in the ARDL model

F-statistic 95% Lower Bound 95% Upper Bound 90% Lower Bound 90% Upper Bound

5.0326 2.6651 3.9880 2.1328 3.3187

W-statistic 95% Lower Bound 95% Upper Bound 90% Lower Bound 90% Upper Bound

25.1631 13.3254 19.9399 10.6642 16.5936

If the statistic lies between the bounds, the test is inconclusive. If it is above the upper bound, the null hypothesis of no level effect is rejected. If it is below the lower bound, the null hypothesis of no level effect can't be rejected. The critical value bounds are computed by stochastic simulations using 20000 replications.

Error Correction Representation for the Selected ARDL Model

ARDL(1,1,0,0) selected based on Schwarz Bayesian Criterion

Dependent variable is dLNP

30 observations used for estimation from 1983 to 2013

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
dCBF	.9430E-3	.5614E-3	1.6797[.091]
dLNRER	-.039098	.27965	-.13981[.890]
dLNY	.10752	.050095	2.1462[.042]
dTB	.025842	.0075362	3.4290[.002]
ecm(-1)	-.59773	.15686	-3.8107[.001]

List of additional temporary variables created:

dLNP = LNP-LNP(-1)

dCBF = CBF-CBF(-1)

dLNRER = LNRER-LNRER(-1)

dLNY = LNY-LNY(-1)

dTB = TB-TB(-1)

ecm = LNP -.0031183*CBF + .065410*LNRER -.17987*LNY -.043232*TB

R-Squared	.62008	R-Bar-Squared	.54093
S.E. of Regression	.40573	F -Stat. F(4,25)	9.7927[.000]
Mean of Dependent Variable	-.073616	S.D. of Dependent Variable	.59882
Residual Sum of Squares	3.9508	Equation Log-likelihood	-12.1589
Akaike Info. Criterion	-18.1589	Schwarz Bayesian Criterion	-22.3625
DW-statistic	2.1042		

R-Squared and R-Bar-Squared measures refer to the dependent variable dLNP and in cases where the error correction model is highly restricted, these measures could become negative.

Testing for existence of a level relationship among the variables in the ARDL model

F-statistic	95% Lower Bound	95% Upper Bound	90% Lower Bound	90% Upper Bound
5.0326	2.6651	3.9880	2.1328	3.3187

W-statistic	95% Lower Bound	95% Upper Bound	90% Lower Bound	90% Upper Bound
25.1631	13.3254	19.9399	10.6642	16.5936

If the statistic lies between the bounds, the test is inconclusive. If it is above the upper bound, the null hypothesis of no level effect is rejected. If it is below the lower bound, the null hypothesis of no level effect can't be rejected. The critical value bounds are computed by stochastic simulations using 20000 replications.

