ASHESI UNIVERISTY COLLEGE

EXCHANGE RATES AND THE ECONOMIC RECOVERY PROGRAMME (ERP)

A Monetary Approach to Ghana's Exchange Rate 1972-2013

By

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DECLARATION

I hereby declare that this thesis is the result of my own original work and that no part of it has

been presented for another degree in this university or elsewhere.

Candidate's Signature:………………………………………………………..

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I hereby declare that the preparation and presentation of the thesis were supervised in accordance

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ABSTRACT

Before 1983 Government of Ghana operated a fixed exchange rate system that was subject to occasional devaluations. However, events such as a high inflation of 123 percent and an exchange rate depreciation to ¢3654.25 in 1983 among others led Ghana into a reform period known as the Economic Recovery Programme (ERP) between 1983 and 1991. It had a goal of correcting the differences in the balance of trade, liberalizing the economy and restoring the market value of the exchange rate.

This research seeks to ascertain the determinants of Ghana's exchange rate and the impact of the ERP on Ghana's exchange rate Post-1983. Sample data from 1972 to 2013 is analysed using the monetary approach, regression and time series analysis. The research stems from an enquiry to ascertain the determinants of Ghana's exchange rate in order to inform policy makers on the specific policy areas to tackle in exchange rate controls.

The research shows that there is a high correlation between exchange rate, and the ERP, inflation and interest rates. That is, a high inflation rate leads to a depreciation in Ghana's exchange rate relative to the US and a low inflation rate leads to an appreciation in the cedi-dollar exchange rate. The ERP reform has the greatest impact on the exchange rate of Ghana. GDP per capita growth and money growth have low impacts on the exchange rate. However, the low effect subsides with the inclusion of the interest rate variable. This result is further explained below.

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CHAPTER 1

INTRODUCTION

1.1 Background

The West African Currency Board (WACB) was established in 1912 to control the supply of currency to the British West African Colonies. These colonies consisted of The Gambia, Sierra Leone, Ghana and Nigeria who collectively used the West African Pound – a fixed exchange rate system (Bawumia, 2014). Ghana withdrew from the West African Currency Board and formed its own central Bank, the Bank of Ghana, after gaining independence from the British in 1957. After independence, the Bank of Ghana being the new monetary authority issued its currency as Ghana pounds, shillings and pence on July 14, 1958. Afterwards, the currency went through eight devaluations between 1967 and 1991 and four new currency issues. One of the causes of the devaluations was due to balance of payment deficits and government debt arising from government expansionary plans during the period of the reconstruction of the nation's infrastructure between 1958 and 1970 (Harrigan & Oduro, 2000). The Inflation rate, after the expansionary period, stood at 116.5 percent in 1981 and 123 percent in 1983 together with negative Gross Domestic Product growth values.

In the year 1983, Ghana adopted the Economic Recovery Program (ERP) to revive the economy which had large trade deficits and an overvalued currency. Its goal was to solve the economic problems that the country was facing. The reform involved two dimensions: trade liberalization and monetary and fiscal measures. The program was financed by aid and structural and sectoral loans from the Word Bank and the International Monetary Fund (IMF) between 1983 and 1991 (Amenumey, 2008).

The period between 1972 and 1983 was characterized by political instability, inconsistent economic policies, huge trade deficits and large government public sector expenditure. These

issues result from: government policies generally favouring the public sector over the private sector, especially in the allocation of scarce resources such as finance and foreign exchange (Brownbridge, Gockel, & Harrington, 2000).

1.1.1 The period 1970-1983

Between 1972 and 1983, a quantity control regime was operated. The regime comprised of a fixed exchange rate subject to occasional devaluation, exchange rate rationing and currency (cedi) inconvertibility (Harrigan & Oduro, 2000). With time, Ghana faced a number of problems due to the policies that it implemented such as price controls, a fixed exchange rate system and government expansions. Some of these problems are that it Ghana had an overvalued exchange rate and the emergence of a parallel market where the exchange rate was higher than the official rate. During this period, the exchange rate was used as a policy instrument (Bhattarai & Armah, 2005). However, a policy of fixed exchange rate will be successful in preventing real exchange rate misalignment if it is accompanied by restrained fiscal and monetary policies and thus, will not promote excess demand and introduce inflation. Problems with the incompatibility of the fixed exchange rate and macroeconomic policy stance emerged in the mid-1970s when the domestic inflation rate rose above the rate of Ghana's major trading partners and real exchange rate began to appreciate. Restrictions placed on the volume of traded foreign exchange resulted in the creation of a parallel market – an unofficial market for foreign exchange trading – and a black market premium emerged in 1975 (Harrigan & Oduro, 2000).

1.1.2 The reform period 1983-1993

The government would have been justified to adjust the exchange rate if inflation is to be avoided. However, the government had a number of options to consider; devalue the currency to bring the official rate to the market value, restrict international transactions, or buy its own currency with

foreign currency to make its value equal to the official rate. It was within this time period that the incumbent government received aid and loans from the IMF and the World Bank to mitigate the effects of currency depreciation on inflation and trade (Amenumey, 2008). The underlying objective of the donor-supported ERP was to dismantle price controls, and liberalise the economy. Other objectives of the reform include the following: (1) realigning the official rate with the black market rate, (2) formalizing the black market operations by licensing the agents as forex bureaus, and (3) allowing market forces to determine the exchange rate (Aryeetey, Harrigan, & Nissanke, 2000).

1.2 Problem Statement

Prior to the ERP, Ghana maintained a fixed exchange rate system. The system functioned properly until a period where huge government expansionary projects and an influx of large imports resulted in trade deficits and a cedi overvaluation, such that, the cedi depreciated from 0.29 percent in 1972 to 307 percent in 1983. As a corrective measure, the Government of Ghana adopted the Economic Recovery Programme (ERP) to resolve the country's economic situation. The post-ERP period was characterized by sparsely depreciating exchange rates, balance of payment deficits and fluctuating inflation rates hence, defeating the purpose of the reform. In this vein, much of literature have focused on assessing the post-independence period (1957) to the year 2000 in light of the economic reforms that the Government has adopted and their impact on Ghana's economic development as a whole. While others have focused on exchange rate policy alone or exchange rate policy and the impact of the ERP before the year 2000.

However, a few studies have focused on long-run exchange rate determination using the monetary approach as well as determination of the impact of the ERP on the exchange rate, using the ERP as a dummy variable. The study period between 1972 and 2013 is one which is seen in a few

studies, if any at all, and this covers much of the data because it takes into consideration an eleven-year pre-ERP period a ten-year Post ERP period and the modern era which is after the year 1993. In fact, there have been a number of studies on the exchange rate policy in Ghana, for instance, Sowa and Kwakye (1993), Jebuni, Sowa and Tutu (1991), and Chhibber and Shafik (1991). These studies focused on the period prior to the year 1995 – which I term as a short-run period for the ERP. A few studies however, have since then extended their analysis to as recent as 2010. One of such study is that of Maehle, Teferra and Khachatryan (2013) who compared the performance of Ghana against several other African countries from 1970 to 2010. Another study is that of Sanusi (2010) whose study focused on exchange rate pass-through in Ghana up until 2010. This study therefore seeks to bridge this gap by using more recent data and an extended time period to assess the determinants of the exchange rate in Ghana in the long-run.

1.3 Significance

This study seeks to contribute to the body of knowledge on the topic under study and inform the general public on the determinants of the cedi-dollar rate as well as the impact of the ERP on exchange rates. The issue of exchange rates has been central to Ghana's economic stability such that various measures have been put in place by the government to keep the exchange rate stable. These efforts though sometimes prove to be effective in the short-run tend to fail in the long-run. Hence, the best approach, therefore, might be to identify the determinants of the exchange rate movements in order to identify the right combination of policy measures to adopt by way of tackling the recent exchange rate fluctuation that Ghana faces.

By using the monetary approach to exchange rate determination, the study will inform policy makers' decisions on the determinants of Ghana's exchange rate as well as the combination of macroeconomic variables to use in exchange rate regulation. This area has become relevant

particularly in a period where a country's exchange rate is not only influenced by a single variable like only inflation or interest rates, but also a chain of variables. Now, these variables can be both numerical and categorical such as inflation, money growth, interest rates, balance of payments and political stability hence, making monetary models more complex but more predictive. In this paper, I also consider the impact of the ERP as a determinant of the exchange rate of Ghana.

1.4 Objective

The objective of this study, therefore, is to find out the relationship between exchange rates and economic factors such as the terms of trade, Gross Domestic Product (GDP), interest rates, prices of goods and money supply and assess the impact of the exchange rate policy reform after the reform period. This is done by introducing a monetary model to determine the macroeconomic factors that influence exchange rate movements in Ghana, and the sensitivity of the variables under the general monetary approach to exchange rate determination.

1.4.1 Research Questions

The main research question is that, "what are the main determinants of the cedi-dollar rate in Ghana?"

Related to the main question is:

What has been the impact of the ERP on the cedi-dollar rate?

The main research question enables the researcher to test whether the monetary model of exchange rate determination holds for Ghana. The subsequent question also provides a guide to test the impact of the ERP on the cedi-dollar exchange rate by introducing the ERP dummy variable.

1.5 Methodology

A regression analysis is used in estimating the determinants of the cedi-dollar exchange rate in Ghana. Chapter 3 provides further details about the regression model. The general monetary model is used as the backbone of the study and from which other models will be generated. These models are derived by dropping some of the variables in the general model. For instance, the interest rates is dropped in the general monetary model to form the fundamental monetary model and the inflation interaction model is also developed by dropping certain variables in the fundamental model.

The model is estimated by the Ordinary Least Squares (OLS) regression approach. The regression is estimated for the 1972 – 2013 period with a total of 42 observations within the period stated. Data used in the regression are obtained from the World Bank's World Development Indicators (WDI), the Bank of Ghana and the International Monetary Fund's (IMF) International Financial Statistics (IFS) databases. After estimating the regression equations, the findings are interpreted on the basis of their underlying macroeconomic underpinnings.

1.5.1 Hypothesis

Null hypothesis: Inflation rate, money growth, GDP growth and interest rates lead to no impact on exchange rates. That is, the monetary approach does not hold for exchange rate determination in Ghana

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

Alternative Hypothesis: Inflation rate, money growth, GDP growth and interest rates lead to an impact on exchange rates. That is, the monetary approach holds for exchange rate determination in Ghana.

$H_1 = \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$

1.6 Outline of the Research

The outline of the research is as follows. The initial chapter, chapter 1, introduces the research and discusses key thematic areas around which the topic revolves. It also discusses the significance of the research, the problem statement, objectives, hypothesis and the research questions which the study seeks to answer. The chapter then finally describes what theory and models the methodology seeks to use in answering the research questions outlined.

Chapter 2 then analyses relevant literature and compares and contrasts the results of the authors of the literature being evaluated. This is done with the goal of finding out the nuances as well as the correlations in the studies being analyzed and how their ideas contribute to the topic of discussion in this research. The chapter also studies the various models of exchange rate determination and compares them to the monetary model – which is the model being used in this research. Chapter 3, also lays out the research methodology that has been derived in answering the research questions and explains the variables and theory used to arrive at the goal of the research. These research methods were selected with goal of answering the research questions in chapter 1 of this research.

Furthermore, Chapter 4 presents the empirical results of the research which were obtained by regression analysis of secondary statistical data collected from 1972 to 2013. The regression model is run based on the general monetary approach and other equations which were adapted from the general monetary model for further investigation, especially for the inflation interaction equation in Chapter 4. The results that were obtained, were then interpreted on the basis of their macroeconomic underpinnings.

The final chapter, Chapter 5, then concludes the research by summarizing the results of the research and makes recommendations based on the empirical results presented in the previous

chapter. These recommendation are made with the idea of the exchange rate decisions which policy makers may take moving forward. It also proposes approaches to further research in the area in which the topic of this research studies.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The literature review to reviews prior research made with respect to Ghana's exchange rate performance historically. This is done by assessing relevant literature and other resources which cover the topic of discussion. The chapter begins with a background on exchange rates and how Ghana's exchange rate has performed from 1957 to 2014 and delves into comparing and contrasting relevant research material on the topic of study.

2.2 Background and Evolution of Exchange rates

Hopper (1997) states that, "whatever the explanations, the underlying belief is that exchange rates are affected by fundamental economic forces, such as money supplies, interest rate, real output level, or the trade balance…". This then presupposes that, generally, by focusing on these economic forces exchange rate stability could be achieved in the long-run. For the purpose of this research, an exchange rate will be defined as the value of one currency in terms of another currency (Aryeetey, Harrigan, & Nissanke, 2000). Exchange rates enable a country to trade with other countries by exporting goods to receive their domestic currency and importing the goods of other countries with a common currency. Hence, excess exports over imports causes an appreciation in the domestic currency due to the recording of a trade surplus and excess imports over exports, in the long-run, causes the value of the domestic currency to fall due to a trade deficit, all other things being equal. The table below shows the evolution of Ghana's exchange rate from 1958 to 1971.

Table 1

Year	Economic policy	Comment
Pre-November 1958	Fixed exchange rate system	Overvaluation of the cedi
November 1958	New currency called the Ghana Pound	Set at par with the pound sterling
July 19, 1965	Pound was replaced by the cedi	External value of cedi was at ¢1 = US$ 1.166. Decimalization was not accompanied by a change in the external value of the Ghana currency.
December 17, 1966	Ghana pound was formally demonetized	
After February 24 1966	Basis of currency unit was changed from 8shillings 4pence to 10shillings	The smallest currency unit "pesewa" was valued greater than the British penny
February 23, 1967	New currency known as the new cedi (NC)	Exchange rate was N¢1 = US$ 1.166. With old currency, N¢1.00 = 1.2. External value was fixed at US$1.00 = N¢ 0.714
July 8, 1967	First official devaluation of the cedi	US$ 1.00 = ¢1.02 A devaluation of about 30 percent
December 1971	Devaluation of currency which was later revalued at ¢1.28 = US$ 1.00	¢1.82 = US$ 1.00

Source: Jebuni, Sowa & Tutu (1991) and Aryeetey, Harrigan, & Nissanke, (2000)

2.3 Exchange rate in Retrospect

Ghana introduced a new currency in November 1958 named the Ghana pound (£G) which was fixed at par with the British pound sterling and at an external value of US$ 2.8 (Jebuni, Sowa & Tutu, 1991). The external value of a currency is the value of the currency in terms of another currency. Ghana's fixed exchange rate system spanned from 1958 to 1983 before introducing the floating exchange rate system. From 1957, Ghana's exchange rate dropped from ¢0.73 = $1 to ¢26,326 = $1 in March 2014, using 1957 currency rates (Bawumia, 2014). Also, the period 1967-1988 was characterized by eight devaluations of the cedi from a value of ¢1.02 = $1 to ¢202.35 in

1988. This has been as a result of occasional reforms during this period. The performance of the cedi/dollar exchange rate is shown in the graph below:

Figure 1, Cedi-Dollar Exchange Rate from 1957 to 2014
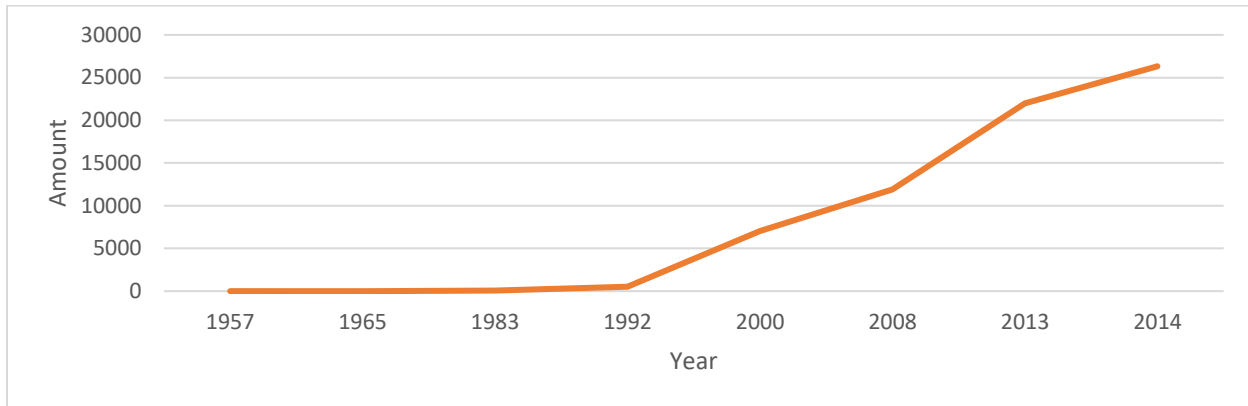
Source: Bawumia (2014)

Figure 1 shows Ghana's exchange rate values from 1957 to 2014 in the year 2000 Local Currency Unit per dollar (LCU/$). The Ghana cedi, from the graph, depreciated from an amount of ¢0.73 in 1957 to ¢26,326 – an amount of GHS 2.63 in today's money – per dollar. Its value began to achieve record highs after 1992 after being stable for 35years in the history of Ghana. Notwithstanding, the stable nature of the cedi from 1957 to 1992 can be attributed to the periodic devaluations of the cedi by the government at that time and the use of a fixed exchange rate system during that period.

2.4 Fixed versus Floating Exchange Rates

A fixed exchange rate system is where a currency is pegged to another currency or basket of currencies while a floating exchange rate system is where a currency is allowed to be set by demand and supply conditions (Kenen, 2000). Bhattarai and Armah (2005) explained the reason for the changes in exchange rate policies to be as a result of contrasting political regimes since 1957. They further elaborate that Ghana's choice of a fixed exchange system over a floating

exchange rate system was consistent with the thinking at that time such that, from 1946 to 1973, exchange rate policy was dominated by the Bretton Woods Agreement of 1944. Even so that the United States converted to a floating exchange only in 1973 together with other countries. This thinking they say, may probably be because most countries were involved in economic expansionary activities which could have had severe implications on the balance of payment of those countries should the exchange not be fixed. However, on the contrary, their findings are not entirely enough to explain the sources of exchange rate determination in Ghana since other factors such as interest rates and terms of trade could affect any one exchange rate policy decision among others.

Bhattarai and Armah's (2005) conclusions are similar to that of Kenen (2000). They both state that fixed exchange rates could be viable if only they are backed by sound monetary policy controls but these monetary controls had not been determined yet. Analysing the studies this far, it can be inferred that the time period for adopting a fixed exchange rate was favourable for Ghana but it could have been beneficial to the country even beyond 1983 if Ghana's exchange rate system had been coupled with efficient balance of payment controls such as a strategy to bridge the gap between the volume of imports and exports by boosting local production and keeping monetary supply within acceptable ranges. Hence, these studies point to the control of balance of payments as a variable in exchange rate determination.

Conversely, Dordunoo (2000) looks at the possible causes of exchange rate fluctuations under the floating exchange rate system in 1983 through the interaction between GDP growth and inflation rate. Thus, stating that GDP growth rate decreased at -4.34 percent in 1971, stagnated GDP growth at -13 percent between 1976 and 1977 while the inflation rate rose to as high as 123 percent in 1982. At this point, the possible way out of the fixed exchange rate system for the government was

to devalue the currency to reflect its market value per the forces of demand and supply. The floating exchange rate system was one of many appeals that the government of Ghana had made to devalue the currency after an initial attempt in 1961.

The Trilemma

In economic theory, a choice of a fixed or a floating exchange rate has implications for whether a country has control over monetary policy or capital flows. This phenomenon is explained in the "Trilemma".
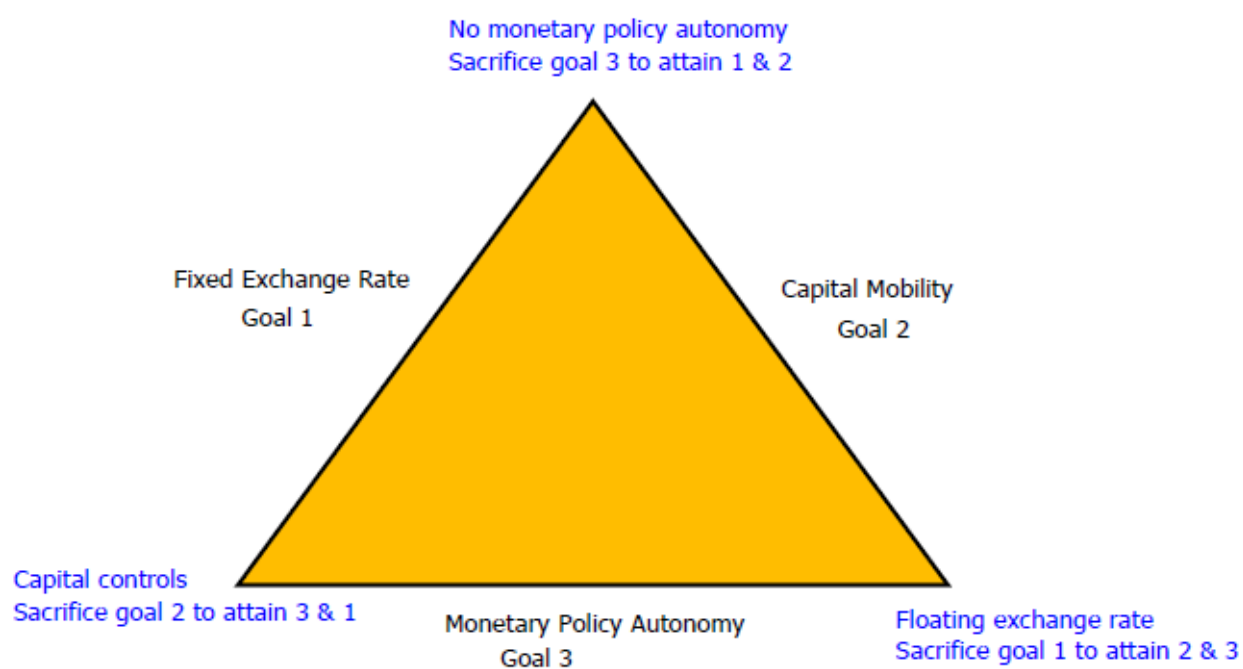
Source: Feenstra & Taylor (2014)

The trilemma, depicted in the diagram above, stems from the fact that most nations and economic policy makers would like to make decisions such as have monetary policy autonomy to help stabilize the economy, capital mobility, and adopt a fixed exchange rate for exchange rate stability (Mankiw, 2010). However, it is not possible to achieve all three. Aizenman and Ito (2011) explain

that each of the three sides of the triangle depicts a potentially desirable goal, which is not possible to be simultaneously achieved on all three sides. For instance, if a nation desires to adopt no monetary policy autonomy, it will have to sacrifice monetary policy autonomy to attain a fixed exchange rate and capital mobility whereas if it desires to adopt a floating exchange rate, it will have to forgo a fixed exchange rate to attain monetary policy autonomy and capital mobility. Thus, a nation can pick any two sides of the triangle and forgo the other depending on its long-term goals.

2.5 The Economic Recovery Programme (ERP)

Before the adoption of the ERP, real per capita income had declined by an average of 27 percent since 1970 and fiscal revenue had declined to 4-6 percent of GDP. The period also witnessed a rate of inflation of 22 percent in 1982 and 123 percent in 1983 (Maehle, Teferra & Khachatryan, 2013). The initial condition for the ERP was to have an initial multiple exchange rate system in 1983. This was to test the performance of the cedi-dollar exchange rate in the short term. During the transitional multiple exchange rate system, the cedi was devalued in April 1983, from 2.75 per US dollar to a weighted average of 24.7 cedis per US dollar. After the 1983 period, a floating exchange rate was adopted and was characterized by a release of the peg from Ghana's currency to the free movement of the cedi-dollar rate as set by the forces of demand and supply.

The reform period which spanned from 1983 to 1991 was marked by a move from economic controls and centralized regulation towards a liberal, market-oriented approach. According to Kapur, Hadjimichael, Hilbers, Schiff and Szymczak (1991), the elements of the reform strategy were:

1. A realignment of relative prices to encourage more productive activity, promote exports and strengthen economic incentives

2. A progressive shift from direct controls and intervention and toward greater reliance on market mechanisms

3. Restoration of fiscal discipline, an increase in public saving, and reduced recourse to government bank financing

4. Rehabilitation of the economic and social infrastructure of Ghana

5. Structural and institutional reforms towards enhancing efficiency and encourage private saving and investment

2.6 Conceptual Framework

Over the years, there has been a number of theories on exchange rate determination with each theory being founded on either economic forces, speculation or political factors. Also, several views have been expressed on these theories of exchange rate determination in order to predict the determinants of exchange rates in one country or another. The common ones of these approaches are the monetary approach and the portfolio balance approach. Any other approach may fall under either of these approaches.

2.6.1 The Monetary Approach

The monetary approach in this paper, is used to assess the impact of inflation, money growth, interest rates and Gross Domestic Product (GDP) growth on Ghana's exchange rates. There are two models equations under the monetary model namely: the fundamental monetary model and the general monetary model (Feenstra & Taylor, 2014). The monetary approach assumes, according to Hopper (1997), that the current exchange rate is determined by current fundamental economic variables such as inflation, money supply and GDP growth.

Sticky Price Monetary Approach

The monetary approach states that though PPP may, in fact, be of little empirical use in the short-run because price is sticky, it is a useful tool for exchange rate forecasts in the long-run. The ideas of Sticky Price Monetary Approach is attributed to Dornbusch (1976) and Frankel (1979). Both authors argue that short-run prices are likely to be sticky, due to short-run menu costs and imperfect information hence, PPP does not hold instantaneously. Frankel (1979) asserts that the adjustment of the exchange rate to equilibrium depends on the real interest rate differential. This is similar to the Uncovered Interest rate Parity – a theory that links exchange rates to interest rates – in Feenstra and Taylor (2014).

$$\frac{\Delta E_{\text{¢}/\$}}{E_{\text{¢}/\$}} = i_{GH,t} - i_{US,t} \qquad\qquad (2.1)$$

Where $\Delta E_{\text{¢}/\$}/E_{\text{¢}/\$}$ the percentage change in the cedi-dollar rate, $i_{GH,t}$ is the Ghanaian interest rate, and $i_{US,t}$ is the US interest rate. The subscript t stands for the time period.

A researcher like Hopper (1997) in attempting to determine if any aspect of the Deutsche Mark-US dollar rate is predictable states that, though PPP may fail to predict exchange rate movements in the short-run, volatilities and correlations of currencies tend to be much more predictable. Thus, the daily volatility of a currency measures the extent to which the currency's value in terms of another fluctuates every day in a somewhat predictive way. Hence, even if models fails, researchers could capitalize on the trends in exchange rates and other variables to determine if they impact exchange rates or not.

Flexible Price Monetary Approach

While the Sticky Price Monetary Approach conformed to findings under the monetary approach in the short run, it yielded divergent results in the long-run. Hence the Flexible Price Monetary Approach (FPMA) was proposed by Frankel (1976), Mussa (1976) and Bilson (1978). This model assumes that in the long-run, prices are flexible and that PPP holds instantaneously. It assumes the existence of a stable monetary equilibrium between real money demand and real money supply. The model's equation is displayed below:

$$E\cent/_{\$} = \frac{P_{GH}}{P_{US}} = \frac{\frac{M_{GH}}{L_{GH}Y_{GH}}}{\frac{M_{US}}{L_{US}Y_{US}}} = \frac{(M_{GH}/M_{US})}{(L_{GH}Y_{GH}/L_{US}Y_{US})} \qquad (2.2)$$

In the equation above, the left-hand side $E\cent/_{\$}$ refers to cedi-dollar exchange rate. P_{GH} represents the inflation Ghana and P_{us} represents prices of goods in the United States. At the relative nominal money supply divided by relative real money demands side of the equation, M_{GH} represents supply of money in Ghana, M_{US} represents the supply of money in US and the variable M, is assumed to be under the control of the central bank. L is a constant term which measures how much liquidity is generated for each dollar of nominal income, whereas Y_{GH} represents real income in Ghana and Y_{US} represents real income in the United States.

A more general approach to equation *2.2* in this research paper is stated equation *3.4* of the methodology section of this paper and serves as the general equation on which the findings draw from.

2.6.2 Portfolio Balance Approach

In addition to the monetary approach, the portfolio balance approach is an alternative model to exchange rate determination. In the portfolio balance model, the supply and demand for foreign

and domestic bonds, along with the supply of and demand for foreign and domestic money, determine the exchange rate. All other models of exchange rate determination are derived from either of these models.

2.7 Relationship between Exchange Rate, Interest Rate and Inflation Rate

Mumuni and Owusu-Afriyie (2004) conducted a study on the determinants of the cedi-dollar rate of exchange. In their study, they found out that cedi/dollar rate movements were determined by a combination of economic fundamentals such as inflation, money supply and speculation based on the immediate past history. By establishing the relationship between exchange rate and inflation, interest rate and money supply, they realized that higher levels of domestic inflation rate relative to foreign inflation result in a depreciation of the cedi against the dollar. Higher levels of domestic interest on the other hand result in expected strengthening of the cedi against the dollar in the short run. In their paper, when inflation rate peaked in June 1996 at about 70 percent, the exchange rate depreciated by approximately 30 percent while interest rates increased to about 40 percent. Thus, inflation and interest rates yield divergent results on exchange rates when tested together as compared to when tested individually against exchange rates.

Also, while money supply increased, the exchange rate depreciated by a marginal rate successively. Unlike their research, this research goes further to introduce the ERP as a dummy variable in order to determine the impact that the ERP had on exchange rate performance in Ghana. This paper also extends the study period to 2013 compared to their focus on 2003 to determine the long-run effect of the variables that are introduced in the monetary approach.

In 2001, exchange rates depreciated to about 62 percent with a corresponding rise in inflation rate of about 45 percent while interest rates rose to 38 percent and money growth rose at 45 percent. It can be inferred from the data that exchange rate values are highly correlated with inflation, money

supply growth and interest rates. A related literature by Sanusi (2010) also demonstrates that the exchange rate pass-through – the extent to which changes in exchange rates reflect consumer prices of goods – to consumer prices of goods in Ghana is substantial (Sanusi, 2010). Sanusi's assertion was, however, contrary to the findings of Frimpong and Adam (2010) who found a low pass-through for Ghana. Thus, an exchange rate depreciation results from an increase in inflation rate and an exchange rate appreciation results from a decrease in the inflation rate. Therefore, the exchange rate depreciation between 1983 and 2006 is reflected in high inflation and interest rates in the same period.

From this evidence, it will be interesting to find out the influence that these economic factors have on exchange rates in present times as various policy measures have been undertaken by the government to stabilize the exchange rate but they have all not been sustainable in the long-run. The correlation, between exchange rate, and interest rates and inflation rate is parallel to what is generally known in economic theory that an exchange rate appreciation lowers inflation values and raises interest rate and an exchange rate depreciation raises inflation rate and lowers interest rates. However, a question which might result from this theory could be, what is the reaction of these variables in the presence of other macroeconomic factors such as money supply and GDP growth?

Figure 2, Relationship between Exchange Rate, Inflation and Interest Rate
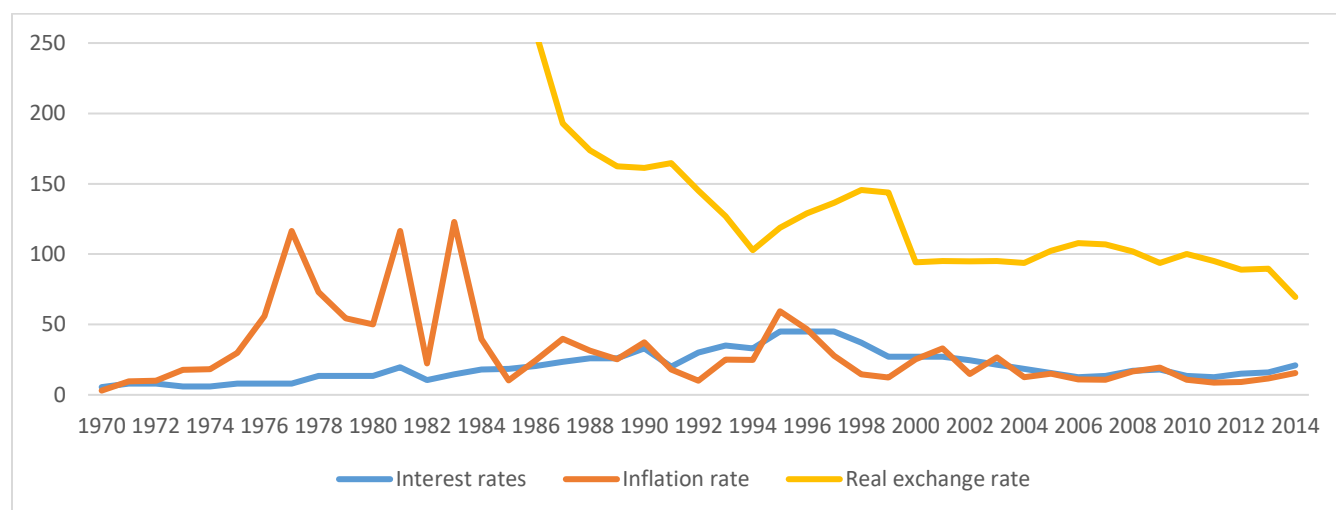
Source: World Bank, World Development Indicators (2015), www.data.worldbank.org/

The graph above shows the relationship between real exchange, inflation rate and interest rates according to data from the World Development Indicators (WDI) from 1970 to 2014. It can be seen from the graph that a progressive rise in interest rates from 1975 to 1997 resulted in an exchange rate appreciation from a record high in 1985. Inflation rate changes seem to have more prolonged effects on the exchange rate immediately after high inflation rates are recoded. For instance, the exchange rate peaked to record highs in 1985 but the increase was only after three previous unexpected high inflation rate records. The post-effect of inflation rate on the exchange rate is seen between 1994 and 1996 on the graph.

2.8 Relationship between Exchange rate and the GDP growth

Historically, between 1960 and 1982, the Gross Domestic Product declined at an average rate of 1.3 percent while the rate of inflation peaked to as high as 123 percent in 1983. Again, the findings of Jebuni, Sowa and Tutu (1991) reveals that real devaluation had an expansionary effect on GDP. Thus, an accompanying capital inflow as a result of the devaluation during the reform period led to a boost in imports which explains the positive influence that growth in GDP has on imports.

This is evident in the increase in gross capital formation from 4.0 percent of GDP in 1983 to 10.8 percent in 1987. Comparatively, Maehle, Teferra and Khachatryan (2013) also found out, the GDP per capita grew by almost 3 percent in 1984 after contracting by an average of 8 percent in 1982 and 1983. The results of Maehle, Teferra and Khachatryan (2013) agree with the results of Jebuni, Sowa and Tutu (1991). Figure 3 shows the trends of GDP growth, imports, and gross capital formation. From the graph, it can be realized that after the initial reform year, GDP growth rose from -4.56 percent in 1983, to positive values thereafter while imports reduced from 24 percent in 1970 to 3 percent in 1983 but rose thereafter. This could have been triggered by a rise in imports and stringent measures which were put in place to reduce negative balance of payment. It therefore follows that, predominantly, the introduction of the reform programme led to rise in capital inflows and increased imports. It could be that considering the protectionist nature of the government, much could not have been done through an increase in exports to reduce the deficits which might have accrued in the current account in the short-term.

Figure 3, Trends in GDP Growth, Imports, GCF and Rate of Depreciation (1972 – 2014)
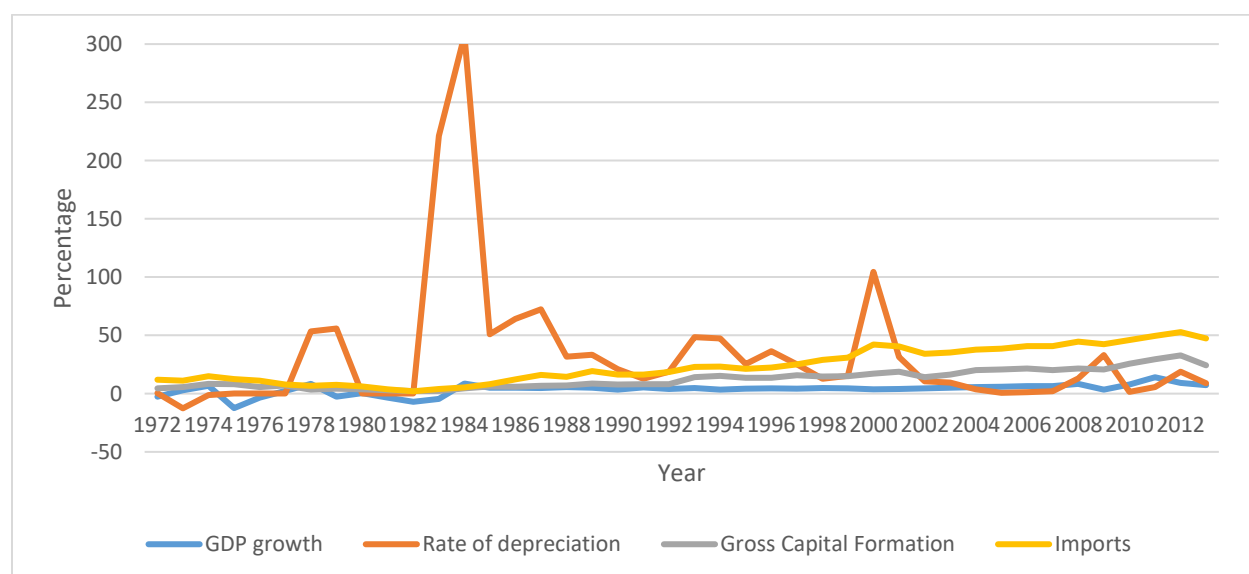
Source: United Nations Statistics Division, 2015, www.unstats.un.org

Figure 4, Graph of Exports and Imports (1980 – 2014)
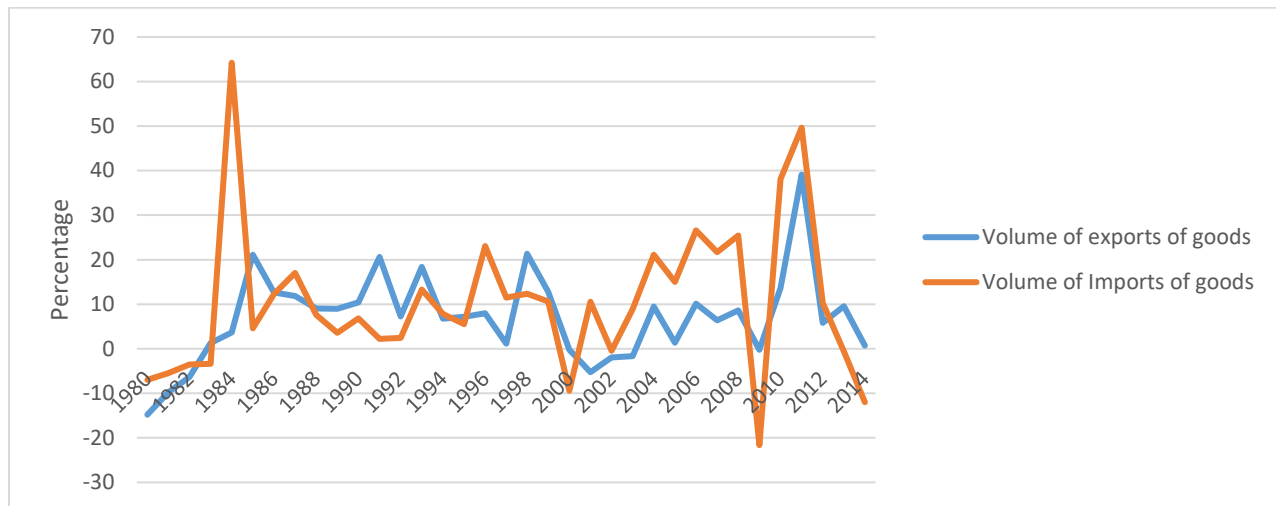
Source: IMF, World Economic Outlook Database (2014), www.data.imf.org

The graph in figure 4 shows exports and import values from 1980 to 2014. In the graph of GDP growth, imports, capital formation and rate of depreciation in figure 3, imports were shown to have been rising after 1983. However, exports, according to the graph are still in their low levels hence, indicating a terms of trade deficit in the current account. Hence, the purpose of figure 4 is to determine how imports rose against exports. The graph shows that imports have predominantly been higher than exports from 1983 to 1986 signifying a trade deficit as well as a deficit from 1996 to 1998 and then from 2001 to 2009. Deficits were recorded at other periods as well but those were for shorter periods of time.

2.9 Current Trends in GDP growth

The literature review has established that the economic factors which influence exchange rate movements are interest rates, inflation rate, and money supply as well as the gross domestic product and that a real devaluation of the currency has an expansionary effect on GDP. Also, literature reveals that financial expansion is a major factor in a government's choice in selecting on exchange rate regime over the other hence, an exchange rate choice is always subject to change

depending on state priorities (Bhattarai & Armah, 2005). Also, the type of exchange rate choice determines the set of economic factors which determine the exchange rate as informed by the trilemma and Hopper (1997)

It can inferred that the government achieved its goal of reducing the depreciation rate of the exchange during the period of the ERP reform. However, the same cannot not be noted about the period after the year 1996 where imports begun to exceed exports for prolonged periods, and exchange rate continued to depreciate due to rising inflation (Frimpong & Adam, 2010). Hence, it will be interesting to deduce the factors that account for changes in the exchange rate values after the 1983 period. Perhaps, the findings could be the key to tackling exchange rate fluctuations in Ghana.

CHAPTER 3

METHODOLOGY

3.1 Introduction

The chapter explains the research method which was adopted for the study and the reason behind the choice of the research method. It further describes the theoretical perspective of the research and the stepwise analytical procedures involved, as well as the secondary data collection sources from which data for the study was used. Finally, it explores the tools used in explaining the relationships among the variables under study.

3.2 The Research Method

The nature of the study is quantitative because numerical data has been used to general results to answer the research questions. In this study, statistical data is analysed using Ordinary Least Squares regression analysis to find out the main determinants of exchange rate fluctuations and the impact of the ERP exchange rate performance in Ghana. The monetary model is an approach which was used to determine the impact that each variable introduced in the monetary approach has on the exchange rate with the introduction of a dummy variable to represent the period before 1983 and the period after 1983.

The research estimates the determinants of the cedi-dollar exchange rate for Ghana. It further demonstrates through scatterplots, the correlation between exchange rates and the macroeconomic factors that impact Ghana's exchange rate. These macroeconomic factors include the exchange rate, inflation rate, output and money supply with exchange rate being the dependent variable. The use of these variables in a regression model constitute the simple monetary model to exchange rate determination. Introducing interest rates to augment the simple monetary model results in the creation of the general monetary model – which is the main model to be used. The monetary

approach assumes that the current exchange rate is determined by current fundamental economic variables (Hopper, 1997). These variables are money supply, prices of goods and output levels.

3.2.1 Variables Explained

Growth of money supply is the rate at which the total amount of money assets available in an economy grows over time. Output is the total amount of goods and services produced in an economy, the prices of goods refers to the general prices of goods set by demand and supply and interest rate is a rate set by the central bank to control the flow of money. Knowing the factors which influence exchange rate fluctuations, a multiple regression model can be derived:

$$E = f_1 (M, P, Y, I) \tag{3.1}$$

Equation 3 specifies that exchange rate *(E)* is a function of growth in money supply *(M)*, prices of goods *(P)*, level of output *(Y)* and interest rates *(I)*. Thus, it is proposed that a change in any of the independent variables will have a resultant marginal change in the exchange rate *(E)*. Practically, with the introduction of the ERP, money supply regulations caused resultant changes in exchange rate values. In estimating equation 3, we take the logs of all the variables. A relevant equation for the model therefore is:

$$E_1 = \beta_1 + \beta_2 M + \beta_3 P + \beta_4 Y + \beta_5 d_1 + \varepsilon \tag{3.2}$$

Therefore, equation 4 then is transformed into the regression equation that is estimated via the Original Least Squares method. The variable, d_1 is a dummy variable taking a value of 1 in the 1983 to 2013 period and zero before the year 1983. The error term, ε, is assumed to be normally and independently distributed. All other things being equal, an increase in money supply in Ghana relative to US money supply is expected to result in a depreciation in the exchange rate while a decrease in money supply in Ghana relative to US money supply is expected to lead to an exchange

rate appreciation; an increase in the prices of goods in Ghana relative to prices in the US is expected to lead to a depreciation in the exchange rate while a decrease in the prices of goods in Ghana relative to US money supply is expected to lead to an appreciation in exchange rate values. Finally, a rise in the level of output in Ghana relative to the US is expected lead to an appreciation in the exchange rate while a decrease in the level of output in Ghana relative to the US is expected lead to a depreciation in exchange rate.

3.2.2 Monetary Approach Regressors

After running an initial regression of equation 3.2, equation 3.3 is generated to further investigate the period within which inflation was highest the most, that is whether before the ERP or after the ERP:

$$E_2 = \beta 1 + \beta 2P + \beta 3d1 + \beta 4 \ (P*d1) + \varepsilon \tag{3.3}$$

$$E\cent/_\$ = \frac{P_{GH}}{P_{US}} = \frac{\frac{M_{GH}}{L_{GH(i\cent)}Y_{GH}}}{\frac{M_{US}}{L_{US(i\$)}Y_{US}}} = \frac{(M_{GH}/M_{US})}{(L_{GH(i\cent)}Y_{GH}/L_{US(i\$)}Y_{US})} \tag{3.4}$$

In the equation above, the left-hand side $E\cent/_\$$ refers to cedi-dollar exchange rate. P_{GH} represents the inflation Ghana and P_{us} represents prices of goods in the United States. At the relative nominal money supply divided by relative real money demands side of the equation, M_{GH} represents supply of money in Ghana, M_{US} represents the supply of money in US and the variable M, is assumed to be under the control of the central bank. L is a constant term which measures how much liquidity is generated for each dollar of nominal income whereas Y_{GH} represents real income in Ghana and Y_{US} represents real income in the United States.

The equation then goes further to introduce nominal interest rate in the long-run by allowing the constant term, L, to vary as a function of the nominal interest rate, *I,* hence, becoming *L (i).* This model is necessary because it makes the monetary model complete. According to monetary theory, the simple monetary equation, *Equation 2*, does not include nominal interest rate hence, makes the equation a long-run theory that links exchange rates to the price levels in each country – Purchasing Power Parity (PPP). It also provides a way of linking price levels in Ghana and the US to money supply and demand – the quantity theory. However, the quantity theory works with an assumption that the demand for money is stable – which is implausible. Therefore, the general monetary model solves this flaw by introducing nominal interest rate in the long-run and the results of this general model is compared with the simple model in the results section of this research.

$$E_3 = \beta_1 + \beta_2 M + \beta_3 P + \beta_4 Y + \beta_4 I + \beta_5 d_1 + \varepsilon \tag{3.5}$$

The variable *I* stands for relative interest rate. All the other variables in the equation are defined above.

3.3 Data Sources and Type

The type of data collected for the study is secondary data that has been consolidated from multiple sources. The secondary data was obtained from the official websites of the World Bank, International Monetary Fund (IMF), Ghana Statistical Service (GSS) and other authoritative publications.

3.4 Methods and Tools for Data Analysis

By employing regression analysis, the study determines the correlation between exchange rates, money supply, interest rate, output and the inflation rate using exchange rate as the dependent variable. The nature of the correlation between interest rates, inflation and exchange rates also

enables the researcher to find out whether exchange rate movement in the study period corresponds

to the changes in interest rates and inflation as established in economic theory.

CHAPTER 4

FINDINGS AND DISCUSSION

4.1 Introduction

This chapter introduces the findings of the research and a discussion of the results that were obtained from statistical analysis of the sample data collected. It also provides answers to the research questions posed at the introductory section of this research paper. The objective of the research was to evaluate the impact of the Economic Recovery Programme (ERP) on exchange rates in Ghana as well as identify the macroeconomic factors which determine the exchange rate.

4.2 Summary Statistics

Figure 5, Correlation between the Exchange Rate and Relative Inflation
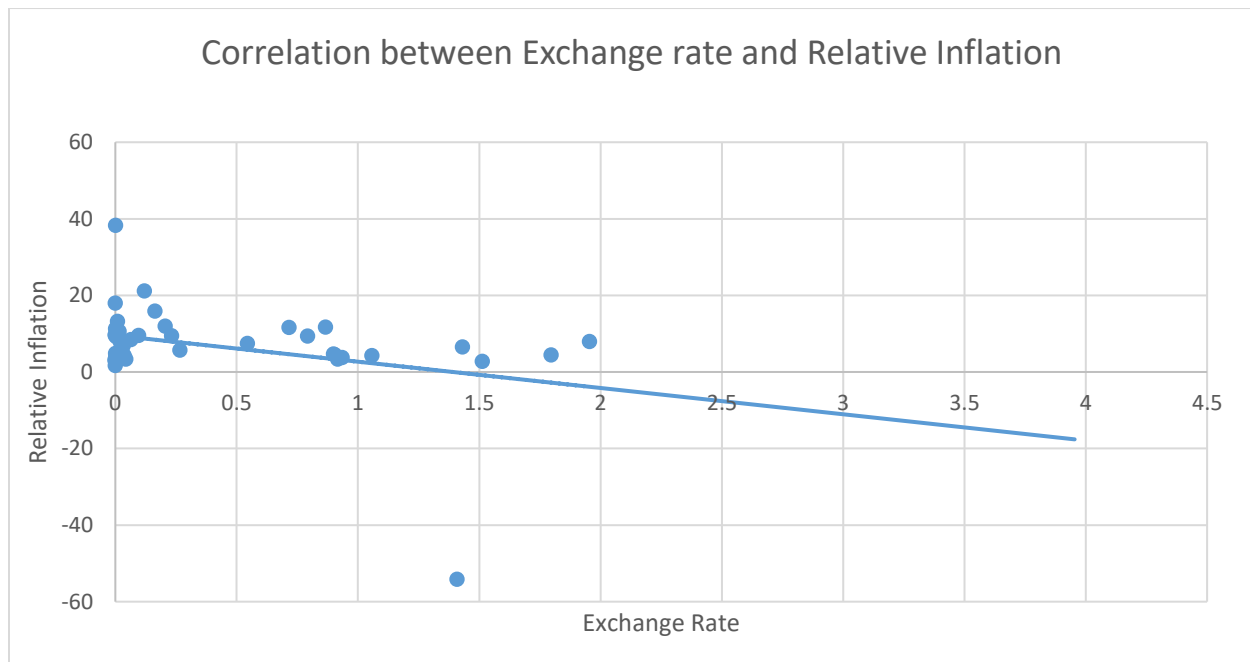
The scatterplot, figure 5, shows a negative correlation between exchange rate and the inflation rate of Ghana relative to that of the United States. Thus, as the rate of inflation rises, the exchange rate depreciates and as the inflation rate falls, the exchange rate appreciates. The scatterplot also

suggests a lower standard error for the sample as the values on the graph are clustered close to the regression line. The dispersion can therefore be said to have a lower standard error which implies that the regression output has the capability to predict or explain the relationship between the exchange rate and the relative inflation rate of the two countries. From historical analysis, this relationship can be said to have resulted from the goal of the government of Ghana to control the exchange rate predominantly through a regulation of inflationary values in Ghana, which is otherwise known as Inflation Rate Targeting.
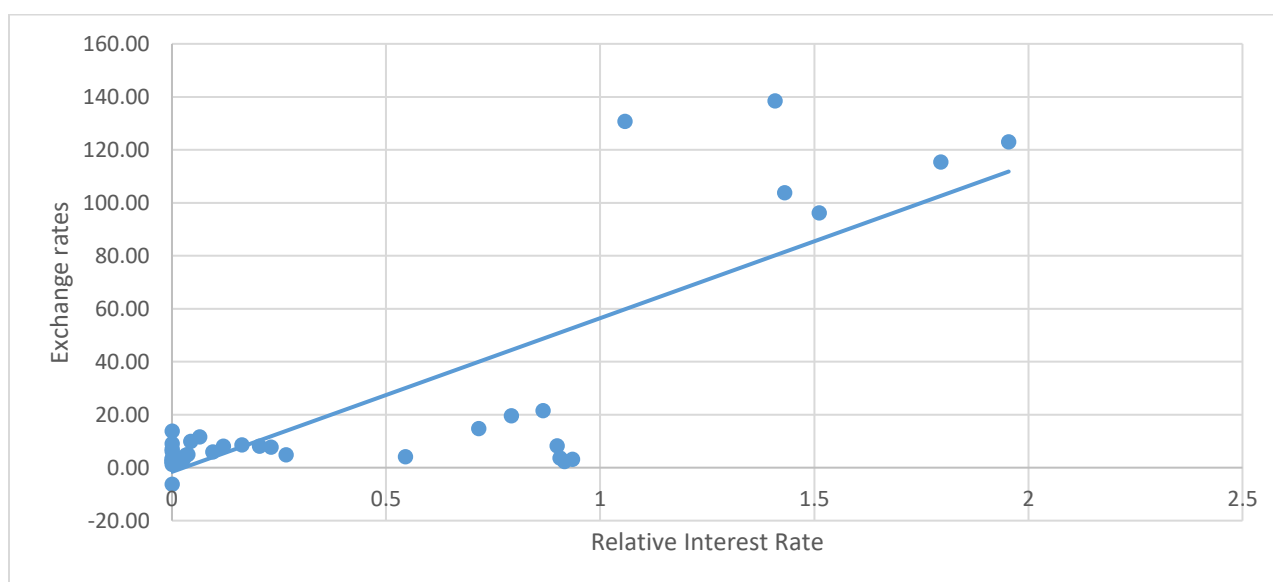
Figure 6, Correlation between the Exchange Rate and the Interest Rate

Compared to the graph of the relationship between exchange rate and relative inflation, the scatterplot, figure 6, shows a positive correlation between exchange rate and the interest rate of Ghana relative to that of the United States. Thus, as the interest rate rises, the exchange rate appreciates and as the interest rate falls, the exchange rate appreciates. In practical terms, higher interest rates tend to be more attractive to foreign investors than low interest rates. Consequently, this high interest rate increases savings and investment which in turn lowers the cedi-dollar exchange rate hence strengthening the cedi, all other things being equal. While a lower interest

rate decreases tends to be unattractive to foreign investors by decreases savings and investment and value of a country's currency relative to another, all other things being equal. The scatterplot also suggests a lower standard error for the sample as the values on the graph are clustered close to the origin of the regression line. The dispersion can therefore be said to have a lower standard error which might imply that the regression output has the capability to predict or explain the relationship between the exchange rate and the relative interest rate of the two countries. From historical analysis, this relationship can be said to have resulted from situation where the government raises interest rates in order to regulate the rate of depreciation of the exchange rate. This has been one of the monetary control policies which the government of Ghana in order to facilitate economic stability.

Figure 7, Trends in the Monetary Approach Determinants of Ghana
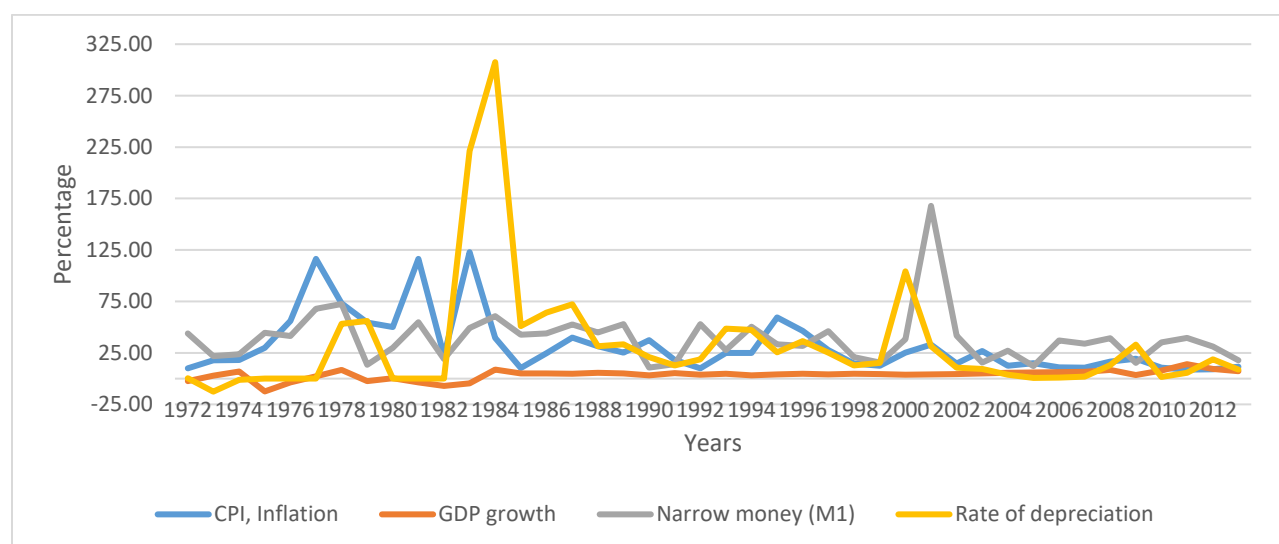

Figure 6 displays the line graphs of Ghana's inflation rate, GDP growth rate, money supply growth and the rate of depreciation of the exchange rate from 1972 to 2013. Its primary role is to show the relationship between the main determinants of the exchange rate under the monetary approach. From the graph, the exchange rate moves in tandem with narrow money supply such that an

increase in money supply results in an exchange rate depreciation. Thus, a rise in the rate of inflation, as observed in 1983, 1987, 2001 and in other years, resulted in an exchange rate depreciation. This occurred as narrow money rose from 25 percent in 1982 to about 70 percent in 1984 and in sundry years as well, whereas GDP growth was down from 1981 to 1983 and then rose from 1983 to 1984. This relationship shows that predominantly, when money supply increases more than real income, then the level of prices increase thereby raising the inflation rate. The change then causes the terms of trade to be negative since imports exceed exports as local products become expensive, thereby lowering GDP growth.

The cumulative effects of these three factors according to the monetary approach is that the exchange rate depreciates. Conversely, a greater reduction in money supply in Ghana than real income growth lowers the price levels of goods in Ghana but increases GDP growth since more citizens can undertake local production due to real income exceeding money supply. The effect is an appreciation in the exchange rate. This effect can be observed in the relationship between the exchange rate, inflation, money growth, and GDP growth of Ghana from 1972 to 2013. To support the values obtained, it can realized from the graph of exchange rates, inflation, GDP growth and money supply, that inflationary movements are caused by the combined movements of GDP growth and narrow money supply especially after the ERP period.

4.3 Empirical Results

Compiling data from IMF International Financial Statistics, the World Bank World Development Indicators, and the Bank of Ghana, the Ordinary Least Squares method was used to estimate Equations 3.2, 3.3 and 3.4. Where the dependent variable was observed to have been dependent on not only the independent variables but also on the interaction between variables, an interaction term was introduced to identify the sources of the cluster of the coefficients. In the case of

Equations 3.2 and 3.3, as the exchange rate values within the time period was observed to have depended largely on inflation, an interaction term was introduced to find out the aspect of the time periods that recorded a higher impact of inflation on exchange rates.

Table 2: Determinants of the Cedi-Dollar rate (1972 – 2013)

Regressor	OLS Estimates of the Monetary Approach Equations: Log of Ghana's Exchange Rate 1972 - 2013		
	(1)	(2)	(3)
Intercept	9.333	0.475*	0.016
	(15.480)	(0.102)	(25.239)
Relative Inflation	-1.65*	-0.016*	0.000
	(0.664)	(0.007)	(0.403)
Relative GDP Per Capita Growth	1.096	0.013	
	(1.050)	(0.012)	
Relative Money Growth	0.094	0.001	
	(0.076)	(0.001)	
Relative Interest Rate			
ERP dummy	53.289*		85.72*
	(17.374)		(28.577)
Inflation Interaction			-1.195*
			(0.567)
R Square	33.000	15.981	34.000
Standard Error	49.062	54.219	48.045
Observations	42	42	42

[1] The dependent variable is the log of the changes in the exchange rates. "*" means that the variables are statistically significant at 10% significance, that is, *10%. Standard errors are in parentheses.

Table, *2*, captures three monetary models whose equations are stated in the methodology section of this paper. The models that are estimated are the simple monetary model, the simple monetary model without the ERP dummy variable and then an inflation interaction equation between relative

inflation and the ERP dummy variable. Raw secondary data are collected from the World Bank, the IMF, and United Nations Statistics Division and calculated to suit the models stated in this research paper. The evaluation period for the study is from 1972 to 2013.

4.3.1 Results on the Simple Monetary Model

Columns 1 and 2 represent the Simple Monetary Model and the simple monetary model without the ERP dummy. The general model is statistically significant. Considering the variables individually, relative inflation and the ERP dummy variable recorded values which fell below the 10% significant interval while the constant term, GDP per capita and the money supply variables are not statistically significant. The R square is also called the Coefficient of Determination. In the simple monetary model, the R square value is below 50%. This suggests that much of the variation is not explained in the regression equation. The regressors of interest, which in this model are relative inflation rate, relative GDP per capita, relative money supply and the ERP dummy variable, are poorly correlated with the error term of the exchange rate equation. This implies then that the variables, on the whole, fairly impact the exchange rate under the study period selected.

The standard error represents the standard deviation of the observation from the regression line. Generally, a lower standard error indicates a close fit of the observations to the regression line in percentage points. As the standard error in the empirical results assumed low values, the results suggest that the spread of the data collected tend to be closer to the regression line. The overall standard error recorded for the simple monetary model was 49.06 percent which implies that, the sample is representative of the relationship between the dependent variable and the independent variables.

Table 2 suggests that all the models which are estimated are statistically significant overall. The three models were presented in order to determine how the dependent variable (exchange rates)

reacts to the various regressors. It then follows that the withdrawal of the ERP dummy variable raises the predictive effect of the error term and makes the error term more correlated with relative inflation and exchange rates. However, the introduction of the inflation interaction term yield divergent results. Thus, the relative inflation rate loses its predictive effect but assumes predictability together with ERP dummy variable, suggesting that the relative inflation rate had a more substantial impact on the exchange rate during the ERP period than in any other period. This links to the findings of Sanusi (2010), who found out that exchange rate pass through was substantial during the period of the ERP. The three equations also recorded more closely related R squares except the model without an ERP dummy, column 2, which has a standard error of 15%.

The ERP Dummy

The variable with the highest coefficient is the ERP dummy variable. The dummy variable is a categorical variable which was selected to represent the time period after the ERP and before the ERP period, with the ERP period assuming a variable of 1 and the Pre-ERP period assuming a variable of 0. The ERP dummy variable as observed in the table, is significant in column 1 and 3. This result is quite expected because most of the reforms during that period as stated in the introductory section of this research paper were targeted at strengthening the value of Ghana's exchange rate value against the dollar.

4.3.2 Analysis of Regressor Coefficients

The general monetary equation assumes that exchange rate values are influenced by money supply growth, prices of goods and GDP growth. Hence, the three determinants of exchange rate formed the basis of the simple monetary model by calculating the determinants as their values in Ghana relative to US values. On one hand, the regression results in Table 2 indicate that relative inflation rate is the strongest force in exchange rate determination in Ghana. Thus, a 1% fall in the inflation

rate leads to a 1.65% appreciation in the exchange rate in any particular year. The reduction in the rate of inflation over the period under the study can be attributed to a reduction in money supply and a reduction in local production during the ERP reform period. It can also be observed that the ERP, which was introduced as a numerical variable had a 53.9% impact on the exchange rate. However, when the ERP dummy variable was dropped in column 2, the error term recorded a lesser coefficient than in the model with the dummy variable but boosts the predictive effect of the error term. This result is consistent with the hypothesis in OLS estimations that certain variables may have predictive effect in the absence of other variables.

The inflation interaction model, column 3, was introduced to determine the period within which inflation has the most impact. The approach was necessary because the relative inflation rate, according to the regression, turns out to be the only variable which was statistically significant. Consequently, its result proves that inflation rate had the most impact on the exchange rate during the ERP period. The result, however, is expected because the ERP dummy variable, d_1, in the model has an 85.72% effect on the exchange rate of Ghana relative to the US. Currently, the inflation rate is one of the main target variables of the central bank in ensuring exchange rate stability. The period within which inflation had the highest can therefore be estimated to be from 1983 to 2013.

4.3.3 Impact of GDP per Capita Growth and Money Growth

Relative GDP growth and relative money growth variables in column 1 and 2 are not statistically significant. Thus, they do not fall within the 10% significance range. For GDP per capita growth, a 1% rise in relative GDP growth results in a 1.1% appreciation in exchange rates in Ghana relative to the US, while a 1% fall in relative GDP per capita growth leads to a 1.1% depreciation in the exchange rate of Ghana relative to the US. Also, a 1% increase in money growth of Ghana relative

to the US leads to a 0.094% depreciation in Ghana's exchange rate relative to the US, while a decline in money growth rate leads to a 0.094% appreciation in the exchange rate. This is against the background that 1% increase in Ghana's money growth rate relative to the US, all other things being equal, causes a proportional increase in transactions and hence, in aggregate demand. Their impact on the exchange rate, in terms of coefficients, are quite small compared to the other variables in the model. The introduction of the inflation interaction model and the simple monetary model without the ERP also reports similar results for the variables. Per the underlying principles of OLS, probably their impact could be substantial when one or more other variables are introduced. The general monetary model in Table 3 provides more insight into how valid this hypothesis is.

Table 3: Determinants of Cedi-Dollar Exchange Rate

Regressor	Estimates of the Monetary Approach Equation: Log of Ghana's Exchange Rate 1972 - 2013
	General Regression Equation
Intercept	-0.066
	(0.095)
Relative Inflation	0.001
	(0.005)
Relative GDP Per Capita Growth	0.012
	(0.006)
Relative Money Growth	0.001*
	(0.000)
Relative Interest Rate	0.011*
	(0.001)
ERP dummy	0.251*
	(0.110)
R Square	76.265
Standard Error	29.607
Observations	42

[1] The dependent variable is the log of the changes in the exchange rates. "*" means that the variables are statistically significant at 10% significance, that is, *10%. Standard errors are in parentheses.

4.4 Discussion of Sources of Exchange Rate Movements

For a detailed discussion of the sources of exchange rate movements, the general monetary approach is introduced to identify the possibility of other determinants of the exchange rate in Ghana. The purpose of the regression is to introduce the variable which affects the exchange rate but is subtly captured in the monetary approach as one of the primary factors which influence the exchange rate of Ghana. This idea is based on the idea of uncovered interest parity (UIP) – an idea which links exchange rates to interest rates completes the monetary model.

4.4.1 Empirical Results

The general monetary model, requires the inclusion of relative interest rate in the monetary model. Without it, the model is not complete. Interest rate is included to test the abilities of all the other variables to predict the exchange rate in the model introduced. Conventionally, the interest rate is a variable that does not count as one of the main determinants of the exchange rate in the monetary approach. But when it was included the regression output showed quite striking results. Not only does the R square yield a percentage above 50%, suggesting that much of the variation in the dependent variable is predicted by the independent variables, but also relative money growth and GDP per capita growth also turn out to be statistically significant compared to the results in the simple monetary model. The R square suggested a value of 76.27%. The general model is also within the 10% significance range and the standard error for the general regression was 29.60%

which shows that the data appear to be more closely related and clustered around the regression line.

In analyzing the regressors, it can be seen that with the introduction of interest rates, relative money growth, relative GDP per capita growth and the ERP dummy variable are significant with the exception of relative inflation. The change in the predictive effect of inflation rate makes it safe to suggest that there is no correlation between relative inflation rate and relative interest rates. When relative GDP per capita growth is replaced with relative GDP growth rate in the general monetary model the results which are obtained differ. It is also crucial to note that the inclusion of the interest rate shrinks the extent of the impact that each variable in the model has on the exchange rate. The possible reasons for these remarkable changes will be found out in the discussion section below.

4.6.2 The Impact of Inflation Rate

Inflationary pressures have had significant impacts on the exchange rate in Ghana since 1957 – the period which characterized Ghana's withdrawal from the West African Currency Board (WACB). The impact of inflation rate is so significant that the goal of the Bank of Ghana under the new Bank of Ghana Act of 612 (2002) had the explicit primary objective of price stability while maintaining a secondary goal of promoting economic growth. This reinforces the notion that inflationary control from the view of the Government of Ghana is invariably linked to economic growth and the exchange rate.

From the results above, there is a negative correlation between the inflation rate and the exchange rate such that, a high inflation rate results in an exchange rate depreciation while a low inflation leads to an exchange rate appreciation. It is therefore not surprising that when Ghana's inflation rate rose to a high of 123 percent in 1983, the exchange rate depreciated to ¢0.00883/$ in the same year, before appreciating in the subsequent years due to the ERP reforms. This result is consistent

with that of Mumuni and Owusu-Afriyie (2004) who realised that the period after the ERP was characterized by evidence of the directs impacts that Ghana's inflation rate had on the exchange rate. The inflation rate is also a relevant variable to study because the Post-2000 period was marked by the government decision to do inflation targeting – which is where the government sets a goal to control the expected inflation rate and results, by the market to establish credibility (Opoku-Afari, 2005). It therefore follows that the trends in inflationary values during the Post-2000 period to 2013 have been marked by relatively low inflationary values at the very least.

4.4.3 Money Growth

The regression results shows that the exchange rate has a negative correlation with money supply – which is narrow money or M1. M1 consists generally of notes, coins, and certain balances held by banks. The relationship between money supply and the exchange rate draws from the idea that the exchange rate under the monetary approach is a monetary phenomenon. Hence, a growth in relative money supply relative to US money supply results in an exchange rate depreciation since 'more money will be chasing fewer goods' and then spurring the prices of local goods and services. The macroeconomic idea behind this assumption is that a rise in Ghana's national income relative to the US will cause a proportional increase in transactions hence an increase in aggregate demand, all other things being equal. The increase in aggregate demand in Ghana without a corresponding increase in real income will cause excess supply hence high inflation. Chhibber and Shafik (1990) in their research hinted on a similar situation in relations to the Pre-ERP period. They state that between 1972 and 1983, Ghana's economy was characterized by the situation where a growth in money supply without a corresponding growth in real income brings about demand-pull and sometimes wage pull inflation and the emergence of black markets.

Again, one paradigm in the monetary approach that describes Ghana's relative money growth and exchange rate relationship is that, if Ghana runs a more lose monetary policy in the long run that is measured by a faster money growth rate, the cedi will depreciate more rapidly, all other things being equal. However, if Ghana's economic growth is faster in the long run by running a tighter monetary policy, the cedi will appreciate more rapidly, all other things being equal. Consequently, though the simple monetary model shows that there is no direct relationship between the exchange rate and money growth, the introduction of interest rate suggested a possible direct relationship between the exchange rates and narrow money growth through general monetary model to exchange rate determination.

4.4.4 GDP Growth and GDP per capita

While different results were obtained for relative GDP per capita growth in the general model, the simple monetary approach models suggest no direct relationship between exchange rates in Ghana and relative GDP growth. This could be because the interventions adopted by the government before and after the ERP were geared more towards regulating monetary policy and the market structure. This caused the main factors under monetary policy regulation such as inflation and interest rates to pull all other variables towards such exchange rate regulations, thereby creating an indirect relationship with all other variables but a direct relationship between exchange rate and inflation rate or the exchange rate and interest rates. Thus, in the general monetary equation, relative GDP growth and relative GDP per capita both report relatively low significance in the presence of all the other variables in the regression equation. Suggesting that they both do not have any direct effect on the equation. However, in the general monetary model, the introduction of interest rates brought a significant impact on relative GDP per capita. The reason for this will be explained in the section under interest rates. Linking the results to the graph, the output from the

models suggest that the relationship between relative GDP growth and the exchange rate cannot be determined directly by observation or inspection.

4.4.5 Interest Rates

Ghana's central bank controls consist of inflation targeting and the interest rate regulation. Though this came to be from the Bank of Ghana Act of 612 in 2002, the idea was being practiced from the ERP periods. By so doing, every other economic intervention in terms of money supply and/or GDP per capita growth regulation tend to be pulled towards either or both of these regulatory policies. The results of the general monetary model, which factors in interest rates, then agrees with the idea that when either of these variables are placed in a regression, either variable might have either a low predictive effect or no impact. For example, when interest rate is introduced, as in equation 3.4, the inflation rate become insignificant in the presence of the other variables but, money growth and GDP per capita fall within the 10% significance level range. However, a regression between inflation rate and the interest rate shows no relationship or correlation between them.

Conversely, with the decline of interest rate, GDP per capita, money growth and the constant term report insignificant predictive effects. This suggest that there is no direct relationship between the Ghana's exchange rate and money growth, GDP per capita and the constant term. Hence, the regressor GDP per capita and money growth are not correlated with the error term of the exchange rate equation. Thus, each regulatory policy by the government has a target but, in the long run, has an indirect impact on variables such as balance of payments, GDP growth, and money growth.

4.5 Other Variables that Impact the Exchange Rate

Other unobservable and numerical variables such as terms of trade regulations, Speculation, and Ghana's balance of payments may, as a matter of fact, may impact the exchange rate. For instance,

in the regression models generated, the ERP dummy variable had much impact on the exchange rate during the period. And this impact could be attributed to the major economic reforms such as the realignment of relative prices and a shift from direct controls toward a reliance on market mechanisms. Others include a rehabilitation of the economic and social infrastructure of Ghana, and reforms which will encourage private saving and investment. These reforms in the long-run have had huge impacts on economic growth in Ghana. Up to 2013, Ghana's exchange rate had been affected by mainly inflationary and other monetary factors such as interest rates and money supply, despite occasional devaluations and redenomination by the central bank (Bawumia, 2014). These ideas and analysis present the results of the study.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The conclusions and recommendations chapter provides a summary of the findings of the research and certain inferences which can be drawn from the research in response to the research questions in the introductory chapter of this paper. Included in the chapter are recommendations and information which could be considered for further study into the exchange rate performance of Ghana.

5.2 Research Summary

The goal of the ERP was to restore the exchange rate to its original value and boost economic activity in Ghana. In the short run, it might be inferred that the interventions achieved their goal, at least from 1983 to 1991. This is because when the nation plunged into a period of hunger and experienced the rise of the informal sector – especially the market for exchange rates – whose activities hurt that of the formal sector, the introduction of the dual exchange rate system and the Dutch auction system helped bring stability into the economy. Additionally, the introduction of the interbank market where the Bank of Ghana's (BoG) selling and buying rates were determined by the average daily rates of commercial banks helped formalize the system of exchanging currencies for international trade. However in the long run, it can be realized that the ripple effects of the Pre-1983 economic activities which was marked by huge government expansionary projects that plunged the nation into government deficits still affect the economy.

The monetary approach reveals that certain variables have much predictive effects on the exchange rate of Ghana. The relative rate of inflation combined with the determinants of the exchange rate under the monetary approach assumed significant appreciative effects on the exchange rate,

especially during the Economic Recovery Programme (ERP). Relative money growth and relative GDP per capita growth had predictive effects on the exchange rates when regressed together with interest rates in the general monetary equation. Proving that a single approach or a combination of approaches could help tackle the exchange rate problems. Thus, when the government regulates interest rate as a monetary policy, money supply and GDP per capita growth affects the exchange rate greatly. This therefore points to the fact that it is essential to understand the determinants of the exchange rate in order to control rapid exchange rate depreciations or appreciations.

Furthermore, the monetary approach from the results section of this paper provides evidence on the determinants of Ghana's exchange rate performance. This approach is consistent with the monetary approach theory which came about by a combination of the Sticky Price Monetary Approach (SPMA) and the Flexible Price Monetary Approach (FPMA), as introduced in chapter 2 of this research. The findings also show that there is no correlation between relative inflation rate and the relative interest rate hence, understanding the combination of approaches to use with either variable is necessary for accurate results. Thus, the use of inflationary controls to a great extent do not depend on the use of interest rate controls or measures.

From the results of the study, the ERP had the greatest impact on Ghana's exchange rate in Ghana and this shows that the reforms still have substantial effects on the performance of exchange rates in Ghana. Hence, we reject the null hypothesis because the findings section proves that the general monetary model holds for exchange rate determination in Ghana. This highlights clearly the benefits of the switch from a fixed exchange rate to a floating exchange rate and the degree of monetary and fiscal discipline which it affords the government of a particular country.

5.3 Recommendation

Based on the findings, the researcher recommends the following suggestions:

More focus should be directed at controlling inflation and interest rates in order to regulate the exchange rate. Knowing that both cannot be pursued jointly, according to the results of this study, the researcher advises that the government focuses on either variable. This approach is proposed with the assumption interest rates have no correlation with inflation rates, according to the findings of this research. In economic theory, marginally high interest rate will draw investors into the country and promote more economic activity – which was one of the major ambitions of the Economic Recovery Programme, all other things being equal. A stable inflation as well gives investors and importers the assurance that the cedi will fulfill its role as the country's medium of exchange and a store of value such that, its value will not be eroded within short periods of time as was the case before 1983. Inflation rate fluctuations, as have been the case from trends in the data collected, brings uncertainty in the market and could make the exchange rate markets ineffective since the operations of these markets hinge on exchange rate stability. Chhibber and Shafik (1991), who used macroeconomic models to determine the black market premium and inflation in Ghana from 1965 to 1988, expand on this topic in their research

A boost in local production could also tilt the scales and lead the economy towards more favourable terms of trade. This is because terms of trade values have significant impacts on GDP growth, according to chapter 2 of this research. This could be done by ensuring an effective balance of monetary controls such as long-run inflation controls and short-run interest rate controls and a revenue enhancing scheme. Fiscal discipline will seek to reduce government expenditure compared to the huge spending of the Pre-1983 period and channel the excess budget into government investments which could yield more revenue for the country.

5.4 Further Study

The purpose of the study is to assess the impact of the ERP on Ghana's exchange rate and the determinants of the cedi-dollar exchange rate. Therefore, further study should be done to determine the other explanatory variables that influence the cedi-dollar exchange rate. The study then, will inform policy makers on the combinations of interventions they could adopt in exchange rate regulation.

Further study is also needed on the impact of exchange rate reforms and devaluations on purchasing parity. Also to investigate whether such reforms or devaluations result in a greater value for citizens of the country or introduce other effects problems which may leave them worse off. For instance, the cedi redenomination of 2007 could be assessed to find out whether or not it resulted in an improved purchasing power – amount of goods the new currency can buy – in the livelihood of the citizens.

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