

UNIVERSITY OF CAPE COAST

EFFECT OF EXCHANGE RATE VOLATILITY ON ECONOMIC GROWTH
IN GHANA

BY
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fulfillment of the requirements for the award of Master of Business

Administration degree in Finance.

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DECLARATION

Candidate's Declaration

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

Candidate's Signature ----- Date -----

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Supervisor's Declaration

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

Supervisor's Signature ----- Date -----

Name: Dr. Carl Hope Korkpoe

ABSTRACT

Volatility is an innate feature of the exchange rate and economic theory suggests that exchange fluctuations have implication for the rate of growth of the economy. This study there examined the long run and the short run effect of exchange rate movement on the economic growth of Ghana by employing data from 1980 to 2018 and using the vector autoregressive model and the ordinary least square regression to investigate the relationship. The trend analysis from the exchange rate and economic growth data revealed a linear trend between exchange rate movement and economic growth in Ghana. The study found that exchange rate movement in Ghana is mainly a negative shock and during periods of significant depreciations, the economic growth experienced a sharp fall. The study further revealed that exchange rate volatility and economic growth are negatively related in both the short run and the long run. The study drew the conclusion that currency depreciation is characteristic of the Ghanaian cedi and the cedi depreciation slows down the growth of the economy in both the short run and the long run. The study recommended that the Government of Ghana and the Bank of Ghana employ short term to long term strategies such as restriction of import, increase in production, denominating and undertaking transaction in the local currency, and improving macroeconomic variables such as inflation and money supply to stabilize the cedi. This result of this study therefore has relevance for the Bank of Ghana, Government of Ghana, and the research community at large.

KEY WORDS

Depreciation

Economic growth

Exchange rate

Inflation

Money Supply

Volatility



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DEDICATION

To the Tankia family of Navrongo



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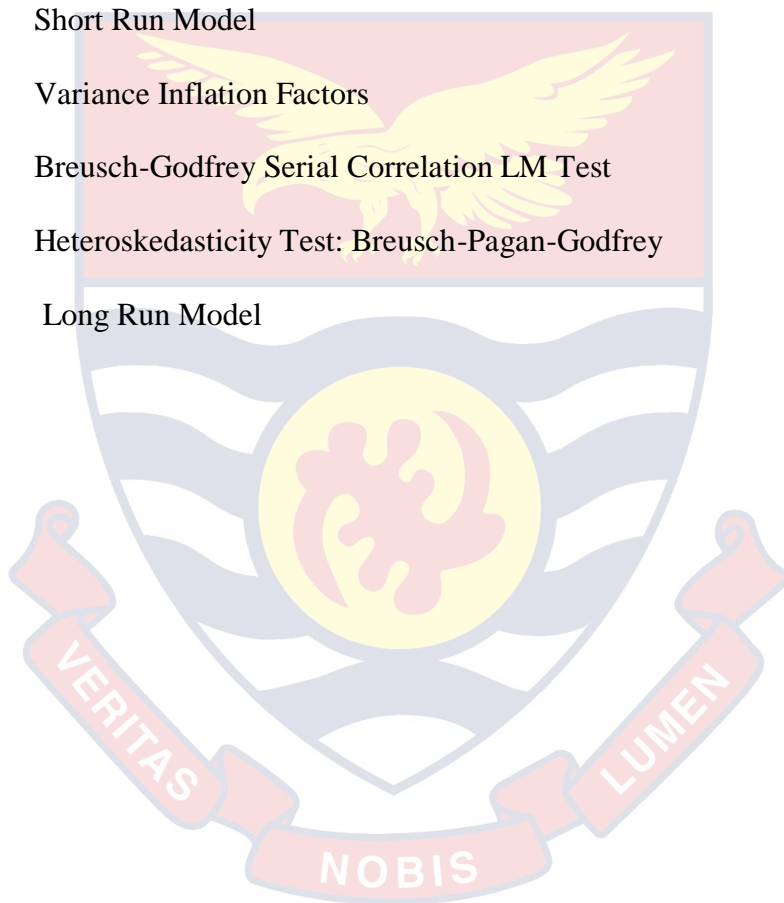
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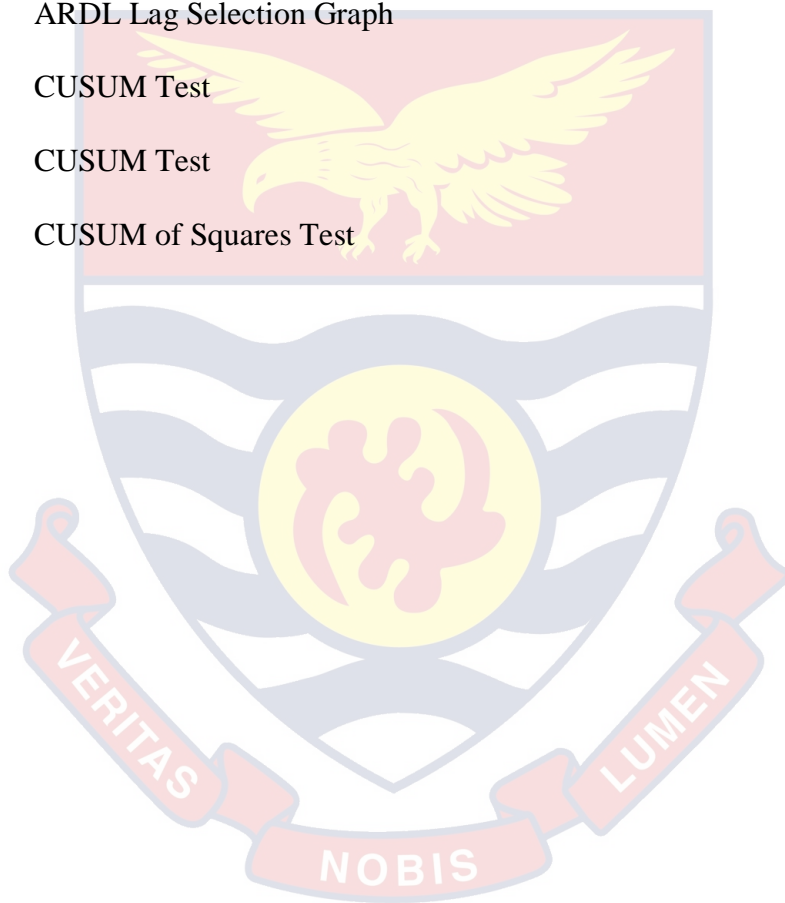
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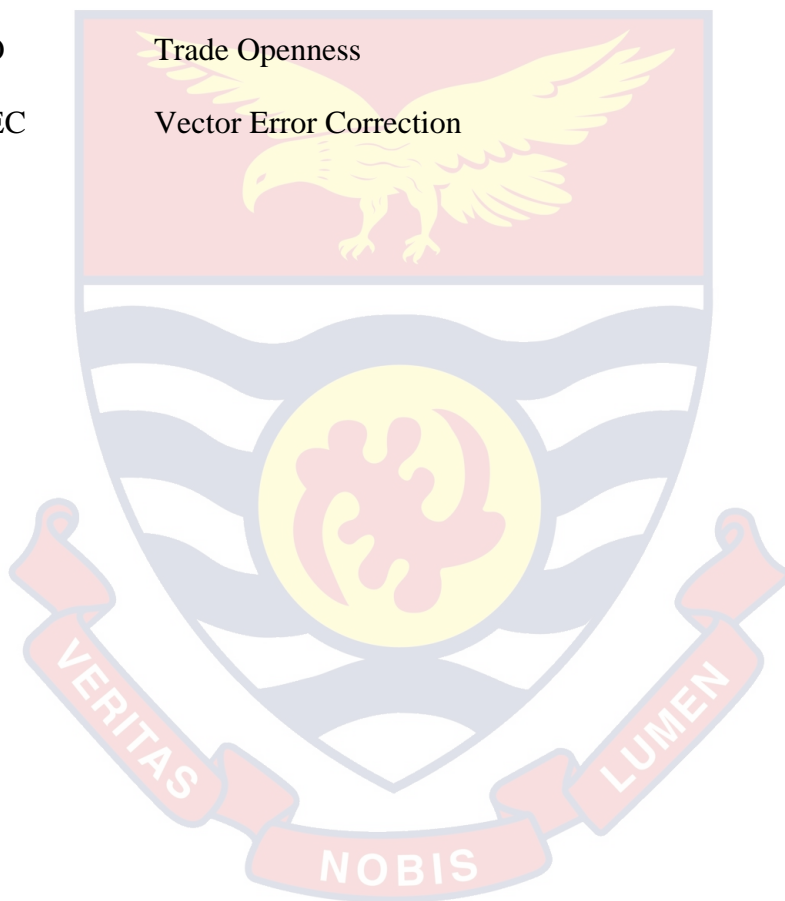
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LIST OF ACRONYMS/ABBREVIATIONS

ARDL	Autoregressive Distributed Lag Model
EG	Economic Growth
ERV	Exchange Rate Volatility
INF	Inflation
RGDPG	Real Gross Domestic Product Growth
TO	Trade Openness
VEC	Vector Error Correction



CHAPTER ONE

INTRODUCTION

Economic growth as measured by the rate of growth in a nation's Gross Domestic Product (GDP) is an important indicator that is used as gauge for assessing the economic prosperity of a country and its citizens. The rate of growth in the GDP of a country indicates the power of the country harness wealth for its citizens and how it can combat poverty and rapidly increase development and infrastructure. Trade and international relations between and among economies requires the demand and supply of foreign currencies to facilitate business deals and international trade transactions. Often, the excessive changes in the currency of an economy affect the volumes of trade which in turns affect the growth patterns. This study examined the volatility in the exchange rate of Ghana and the impact it has on the economic growth of Ghana.

Background to the Study

The non-stable behaviour of exchange rates across the world has been investigated and according to Mwinlaaru and Ofiori (2017), exchange rate volatility has influence on export, trade, inflation, employment growth and economic activity. The World Economic Outlook of the International Monetary Fund (2019) has submitted that a highly volatile currency creates economic uncertainties and instability, and in the short and long run it affects the rate of capital flow and international trade transactions. In a study by Iyke and Ho (2017), exchange rate dynamics have little impact of the economic structures of economies that depends heavily on domestic trade. For such economies, exchange

rate affects the economic stands through mediums such as overseas remittances and foreign travels.

An important debate regarding the sustainability of the world economy is the debate between countries having weak or strong currency (Lioudis, 2019). At the global level, weak currency is seen as beneficial to countries that are bent on having the capacity to export goods and services. Generally, a weak currency or depreciating currency makes import of goods and services expensive and stimulates export and this results in minimizing the trade deficit of economies (Achouak, Ousama & Mourad, 2018). On the contrary, strong currency makes imported goods and services cheaper but reduces the competitiveness of a country's export which in effect expands the trade deficit of a country.

The debate as to whether or not weak or strong currency is desirable has been settled by economies promoting stable exchange rate (Okorontah & Odoemena, 2016). The position of achieving stable exchange rate by the world economies is justified by theories of economies and finance in terms of harnessing capital flows into an economy. The growth of economies largely depends on capital flows and foreign investors prefer to invest capital in countries whose currencies are stable such that they are able to mitigate the risk of exchange rate losses. In assessing the effect of exchange rate fluctuations on economic growth, notable examples can be looked in terms of the Asian crises, the Euro fears, the Yen's gyration, and the undervaluation of the Chinese Yuan (Lioudis, 2019).

During 1997 and 1998, the growth of the economies of the Asian world suffered following the devaluation of the Thai baht which in effect collapsed the

financial market and the economic structures of the Asian countries (Anning, Sunday & Pacific, 2015). Similarly, between 1994 and 2004 China was accused of deliberately devaluing its currency to boost its export receipts (Lioudis, 2019). Furthermore, between 2008 and 2013 the Japanese Yen was the most volatile currency in the world and this provided economic benefit for the Japanese economy in terms of carry trade. Between 2010 and 2012, the Euro fluctuated by approximately 19% and this inflicted varied effects on the economic fiber of the European countries (Ahiabor & Amoah, 2019). The above mentioned developments affected the trade balance and the economic growth patterns of the respective economies.

In Ghana, the Central Bank of Ghana in July 2007 embarked on a redenomination of the Ghanaian currency and pegged 93 pesewas of the cedi to a unit of the United States dollar (International Growth Center, 2016). Since the introduction of the new Ghana cedi, there has been a free fall of the cedi against the major trading currency, the US dollar. For example, between July 2007 and December 2007, the cedi depreciated against the US dollar by 5.1%; the depreciation of the cedi in 2008 was 25.3%; in 2009 the cedi depreciated by 17.68% (Bank of Ghana, 2012). Technically, data check reveals that the cedi has depreciated against the dollar on year on year basis for three straight decades since 1990 to 2020.

While the cedi continues to depreciate in value against other major trading currencies, economic growth cannot maintain a stable growth path. The growth rate in the gross domestic product has followed a mixture of high and low bounds.

For example, data from the World Bank (2019) indicates that the economic growth rate for Ghana for a span of three decades occurred in 2011 where the economy grew by 14.047% but the lowest growth rate occurred in 2015 with a growth rate of 2.178%. With periods spanning 1981 to 1983, the economic growth rates were negative with the growth rates for 1981, 1982 and 1983 being -3.503%, -6.924% and -4.564% respectively. During these periods, the Ghanaian economy was in a severe state of collapse and a transition from a fixed exchange rate to free floating exchange rate was required to bring the economy to recovery (Mwinlaaru & Ofiori, 2017). Even though the floating exchange rate regime has contributed in moving the growth rate from the negative zones, the consistent depreciation of the cedi against then major trading currencies such as the dollar, pounds sterling, and the euro has been variables that pointers to the rate of growth to the economy of Ghana. The short term and long term impact of the volatilities in the dollar-cedi exchange rate on the growth of the economy of Ghana is assessed in this study.

Statement of the Problem

The behaviour of exchange rate in Ghana has become the center of all arguments and discussions regarding the health of the economy. The exchange rate is a pointer that directs the path of inflation, monetary policy rate, and the fiscal development of the country (African Economic Outlook, 2020). The debate between the connection between exchange rate and the growth of the economy is required for businessmen in the private sector to make informed decision. Government alike considers the direction of the exchange rate to make informed

decisions regarding borrowings, setting revenue targets, setting inflation benchmarks and spending patterns (African Economic Outlook, 2018).

The Annual Report of the Bank of Ghana (2018) reported that the growth of the economy is often impacted by the pressure exerted on the domestic currency. For instance, it was reported that even though effort was made to improve the external trade balance and thereby reducing the trade balance deficit, the increased demand for foreign currencies to settle foreign obligations often throws the income account off board and that leads to balance of payment problems (Bank of Ghana's Annual Report, 2018). Similarly, other macroeconomic variables such as inflation target and the monetary policy rate are set in accordance with the volatilities in the exchange rate. Thus, exchange rate fluctuations are important in making policy direction regarding fundamental variables in the economy.

The growth of Ghana's economy is largely dependent on the import and export of merchandise and services and the volatilities in the exchange rate have implications for receipts and payments which in turns affect the growth potential of the economy. Major commodities that are exported to other economies from Ghana include gold, crude oil, cocoa beans, timber, electricity, aluminum alloys, bauxite, diamond and manganese (Anna, 2014). With these commodities, the total export value for 2018 for instance was US\$14.87 billion representing a 7.5% increase over that of 2017. Against this figure, the total import for 2018 was US\$13.09 billion which also represents a 3.5% increase against the value for 2017 (Bank of Ghana's Annual Report, 2018). With a positive trade balance, a

reduction in the value of the exchange rate would be of benefit to Ghana in terms of higher receipts but at the same time payment for imported goods and services will also plummet. Changes in the exchange rate are therefore relevant for the generating revenues and settlement of foreign obligation. Shocks in the exchange rate can affect the growth patterns of the economy and must be managed for its short term and long term impacts.

Regarding the debate on exchange rate behaviour and economic growth, several studies abound but each of these studies focuses on a unique attribute and aspect of exchange rate. For example, Mpofu (2016) assessed the determinants of exchange rate volatility by using the GARCH model and thereby ignoring the short term and the long term impact of exchange rate volatility of fundamental variables such as economic growth. Furthermore, Korkmaz (2013) examined the effect of exchange rate on economic growth and established a causal relationship between the two variables in nine European countries. The study of Korkmaz (2013) did not offer insight regarding the direction of the causality in the short term and the long term. The gaps identified in literature us that the nature of short term and long term relationship between exchange rate fluctuation and economic growth has not received attention in the context of Ghana. This study bridged this gap in literature by employing the autoregressive distributed lag (ARDL) model to investigate the short term and the long term impact of exchange rate volatility on economic growth in Ghana.

Purpose of the Study

The purpose of this study was to assess the relationship between the volatility of exchange rate and the growth rate of gross domestic product in Ghana.

Research Objectives

The objectives of this study were to:

1. Assess the trend analysis between exchange rate volatility and economic growth in Ghana
2. Examine the short run relationship between exchange rate volatility and economic growth in Ghana
3. Investigate the long run relationship between exchange rate volatility and economic growth in Ghana

Research Questions

1. What is the trend analysis between exchange rate volatility and economic growth in Ghana?
2. What is the short run relationship between exchange rate volatility and economic growth in Ghana?
3. What is the long run relationship between exchange rate volatility and economic growth in Ghana?

Significance of the Study

The study is relevant for the government of Ghana and the Central Bank of Ghana, the business community and the research community at large. In the first place, the study will enhance the government of Ghana as well as the Central Bank of Ghana in terms of equipping them with the evidence regarding the impact trends in exchange rate dynamic and the trends in economic growth. The study will enable them to picture how the volatilities affect the growth of the economy in the short and the long run. To the Central Bank of Ghana, the study will serve as a guide in designing short term and long term policies to deal with the exchange rate movements in the country.

Secondly, the result of this study will serve as a guide to the business community in terms of helping them to understand the extent to which the Ghana cedi is volatile to that of other trading currencies, notably the United States Dollars. This will help them to measure the exact level of risk when they are speculating on the exchange rate in their international transactions. Thirdly, the study will contribute to addressing the gap identified in literature and thereby contributing to knowledge in the field of finance.

Delimitation

The scope of the study was limited to the Ghanaian economy and all the variables selected for this study is related to Ghana. The study is contextual and much relates to the monetary and the fiscal aspects of the economy. The main variables for this study are exchange rate and economic growth which is represented by the growth rate in the gross domestic product. Other control

variables including inflation, trade openness and money supply were also used in the study. Data for the study covered a 38-year period from 1980 to 2018.

Limitation of the Study

The present study examined the effect of exchange rate volatility on economic growth by focusing on the movement of the Ghana cedi with respect to the dollar of the United States of America. The study did not use other major trading currencies such as the Euro, Pounds, and the CFA even though they serve as currency units by which international trade transactions are undertaken in Ghana. The use of the volatility of the cedi with respect to the USA dollar while ignoring the volatility of the cedi with respect to other major trading currencies limits the study to some extent.

Definition of Terms

The following operational definitions of the key terms used in this study are defined as follows:

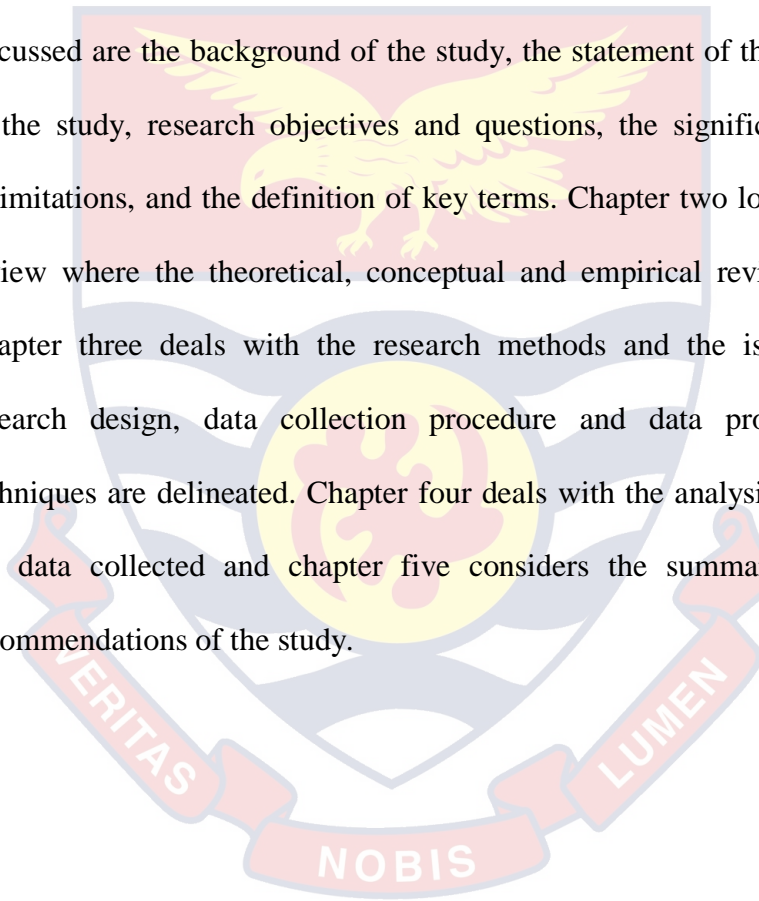
Exchange rate: Exchange rate is the price at which one country's currency is traded for the currency of another country. Thus, it is the rate of exchange between the currencies of two countries.

Exchange rate volatility: Exchange rate volatility is operationally defined as the changes or the fluctuations which represent the movements in the rate cedi and dollar rates over time.

Economic growth: Economic growth is the rate of change in the gross domestic product of a country measured per annum.

Organization of the Study

The study is organized into five chapters from chapter one to chapter five. Chapter one deals with the introduction to the study and the specific issues discussed are the background of the study, the statement of the problem, purpose of the study, research objectives and questions, the significance of the study, delimitations, and the definition of key terms. Chapter two looks at the literature review where the theoretical, conceptual and empirical reviews are discussed. Chapter three deals with the research methods and the issues regarding the research design, data collection procedure and data process and analysis techniques are delineated. Chapter four deals with the analysis and discussion of the data collected and chapter five considers the summary, conclusion and recommendations of the study.



CHAPTER TWO

LITERATURE REVIEW

Introduction

Chapter two of this study deals with the review of literature in an attempt to investigate the relationship between exchange rate volatilities and economic growth in Ghana. In this chapter, the theoretical, conceptual and empirical reviews are discussed.

Theoretical Review

This study is underpinned by the Endogenous Growth Theory (EGT), specifically the Solow Growth theory, which offers explanation to the forces that determine the long run growth of a country. This theory was propounded by Romer (1987) and advanced by Aghion and Howitt (1992) and Grossman and Helpman (1991). According to the endogenous growth theory, the economic growth of a country in the long run is determined by factors that are internal to the economic system. The theory further proposes that the long run economic growth of economies can be determined by economic forces including exchange rate. The theory begins from the premises that technological advancement occurs through investment in new markets, ideas, processes and products which come about as a result of economic activities (Aghion & Howitt, 1992). For firms to produce efficiently there is the need for the exchange rate to be stabilized so that losses arising from exchange rate risk in respect of international transactions will not occur. A stable exchange rate can improve the efficiency of the productive sector which in turn speeds up the pace of economic activity.

Furthermore, the endogenous growth theory lays much emphasis on innovations, research and development. It observes long run economic growth as a function of rapid innovation that is backed by rigorous research and development. But it must be noted that research and development expenditures are enormous and the extent to which firms can embark on research and development for innovations depends on the economic indicators of the country. This is the point where exchange rate plays important role in affecting the long run growth prospects of the economy.

For importing firms, deterioration of the exchange rate increases their cost of doing business and that negatively impacts on their ability to deploy research and development to discover new products and new markets. The inability to catch up with the technological trend, innovation and new products generally affects the growth path of the economy. On the contrary, for exporting firms firm, the deterioration of the exchange rate represents extra cash flows and that enables them to invest in research and development to discover new products and markets; and the growth path of the economy is positively affected.

On the contrary, the strengthening of the exchange rate serves as good news for importing firms through cost savings which enables them to invest extra cash in research and development for the purposes of innovation and new discoveries in the market economy. Exporting firms on the other hand suffer from appreciation of the domestic currency through reduced cash flows and the overall impact of this on the endogenous growth theory is that the pace of innovations of such firms will slow down. In summary, the endogenous growth theory suggests

that the long run growth of the economy is a function of the rate of innovation of the market which is also determined by the economic conditions in the country. Hence, the movements in the exchange rate affect the innovation process of the economy and the economic growth of the economy responds accordingly to these movements. The theory of endogenous growth therefore serves as the basis for analyzing the short run and the long run relationship between exchange rate volatilities and economic growth in Ghana.

The Concept of Exchange Rate

Exchange rate is the price at which the currency of one country is used to exchange for the currency of another country. The issue is exchange rate and the risk of it in the form of its volatilities is one of the most important variables considered by international trade parties and governments (Iyke & Ho, 2017). According to Korkmaz (2013), exchange rate is influenced by several factors including the balance of payment, money supply, inflation rate, unemployment rate and economic growth among others. This implies that exchange rate is a strong economic fundamental that is been affected by other economic variables.

In reflecting on the issue of exchange rate, it is important to assess the various regimes of exchange rate so as to understand the impact it has on the growth of market economies. The two major regimes of exchange rate are the fixed, also called the pegged exchange rate regime and the floating or the flexible exchange rate regime (Nandi, 2017). With the fixed or pegged exchange rate regime, the exchange rate of a country was benchmarked against the currency of

another country or a measure of value such as gold and the rate was allowed to move within a set range. With the fixed exchange rate, devaluation and revaluation of a country's currency was permissible only within the range specified (Feenstra & Taylor, 2014).

The floating or flexible exchange rate regime is the regime whereby the monetary authorities of countries allow the exchange rate to fluctuate freely in accordance with the forces of demand and supply on the currency market (Kiguel & Levy, 2007). With this regime, no effort is made by monetary authorities to benchmark the currency of one country against a base currency or against a particular measure of good. In modern market economy, the floating exchange rate is generally accepted as being efficient but a highly volatile currency pose high risk to trading parties who trade by using highly volatile currency Okorontoh (2016). Ghana therefore uses the floating exchange rate system and the shift in demand and supply makes the cedi relatively unstable and thereby posing risk for international trade parties, the government and the economy alike.

Exchange rate volatility in Ghana

Exchange rate in Ghana is at the heart of the management of the Ghanaian economy. The reason for the overarching relevance of exchange rate in Ghana is as a result of the volumes of importation of goods and services that come into the country on yearly basis (Antwi, Boadi & Koranteng, 2013). For instance, in 2017 the total import of goods into the country was US\$12.65 billion but there was an increase of import of goods in 2018 by 3.5% to US\$13.09 billion (Bank of Ghana

Annual report, 2018). The consistent import volumes in Ghana exert pressure of the domestic currency, and the result has been the balance of payment deficit problems. The compounded problems in respect of the pressures on the domestic currency have triggered some economic actions in the past. For example, the cedi was devalued in 1971 and shortly after revalued by 29% (Antwi, Boadi & Koranteng, 2013). Figure 1 depicts the exchange rate movement (depreciation) over the period of 1980 to 2018.

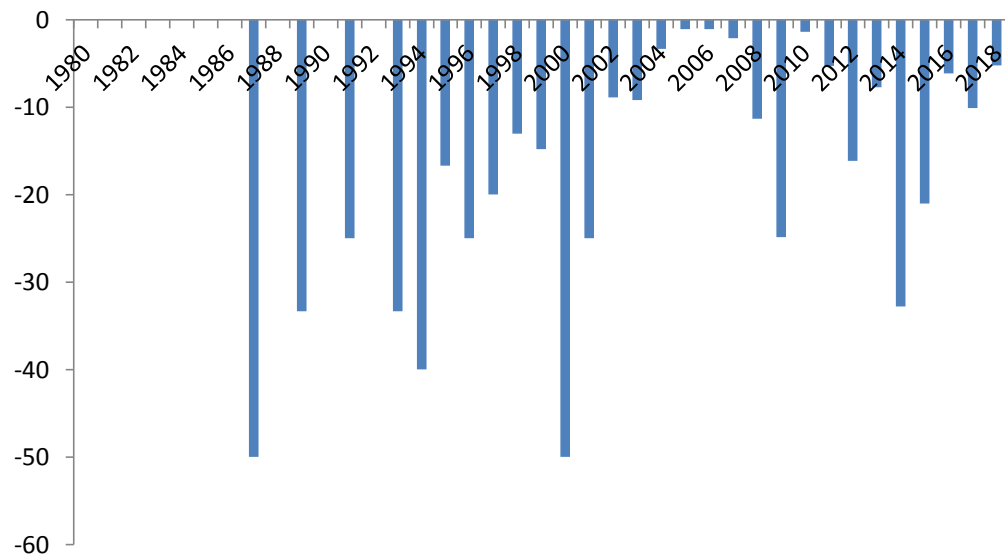


Figure 1: Exchange rate movement from 1980 to 2018

Source: Tankia-Allou (2020)

Figure 1 provides the pictorial view of the exchange rate movements in the Ghana cedi and the United States dollar from 1980 to 2018. Effective from 1987 the cedi depreciated by 50% against the US dollar and again by the same margin in the year 2000. Figure 1 further reveals that the depreciation of the cedi against the US dollar is feature of the exchange rate system in Ghana. For over three decades the Ghana cedi has constantly depreciated against the US dollar and this

consistent depreciation have implications for the productive sector for the economy, especially those who purchase raw materials from the overseas market for production. As Figure 1 shows, the depreciation rate of the cedi against the dollar for the 1980s and the 1990s are more severe than the trends in the 2000s. The dynamics in the exchange rate is therefore worthy of comparison to the growth rate of the economy so that the impact is assessed accordingly.

Economic growth trends in Ghana

Economic growth is the ultimate measure of how the gross domestic products of a country change from time to time. Like every economy, Ghana's fundamental economic variables notably the exchange rate, fiscal and monetary policy tools as well as other directives and policy frameworks affect the growth stand in one way or the other. Following the periods of the economic difficulties in Ghana in the 1960s to the 1980s, precisely 1982, the growth of the economy declined consistently and by an average of 1.3% (Antwi, Boadi & Koranteng, 2013). The growth rate for the early part of the 1980s was negative with the growth rate for 1981 being -3.503%, -6.924% for 1982 and -4.564% for 1983. The sluggish growth of the economy propelled the radical recovery of the economy and in view of the circumstance at the time the World Bank and the International Monetary Fund supported Economic Recovery Program was set in motion in 1983. The success of the program brought the economy back on track and the economy recovered to a growth rate of 8.648% in 1984 but declined to 5.092 in 1985 (Ahiabor & Amoah, 2019). The somehow good news is that the

growth of the Ghanaian economy since 1983 has not recorded a negative growth rate in fact the International Monetary Fund (2019) elated Ghana as the fastest growing economy in the world in 2017 with the growth rate of 8.143 and 6.263% in 2018 and projected growth for 2019 to be 8.8%. Figure 2 depicts the trend in the economic growth rate for Ghana from 1980 to 2018.

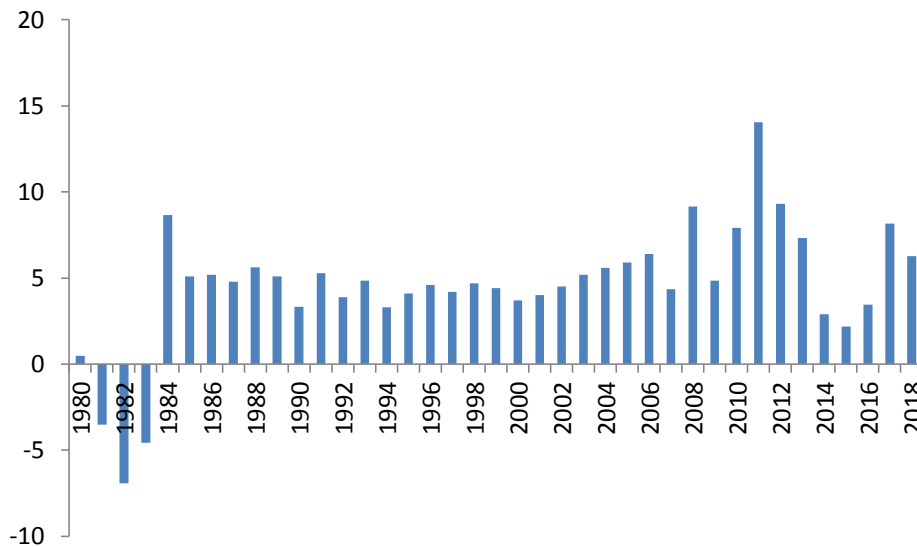


Figure 2: Economic growth trend from 1980 to 2018

Source: Tankia-Allou (2020)

From the 1980s to the year 2018, the highest economic growth for Ghana occurred in the year 2011 with growth rate of 14.047%; the second highest growth rate occurred in 2009 with growth rate of 9.293% and the third highest occurred in 2008 with the growth rate of 9.15%. From 2013 to 2016 the unfavourable economic conditions coupled with the erratic power supply slowed down the growth rate to the average of 3.9% (Bank of Ghana Annual Report, 2018). At the background of ensuring economic growth from the short run into the long run, sound economic policies targeting at controlling exchange rate and inflation

within limits are pursued by the government of Ghana and the Central Bank of Ghana (Bank of Ghana, 2018).

Empirical Review

Several studies have been presented on the relationship between exchange rate behaviour and economic growth around the world. Those studies that point to the short run and the long run effects are assessed in the following reviews.

Short Run Relationship Between Exchange Rate Volatilities and Economic Growth

In assessing the evidence for the short run relationship between exchange rate volatilities and economic growth, Mpofu (2016) examined the determinants of exchange rate volatilities in the South African economy by using data from 1986 to 2013 by employing the GARCH model. The study results of Mpofu (2016) revealed that the behaviour of exchange rate volatilities in the South Africa is largely caused by commodity prices, money supply, and foreign reserve. In helping to explain the exchange rate movement, the finding of Mpofu (2016) provides a lead in understanding the pass through of exchange rate movements to economic growth.

Mwinlaaru and Ofiori (2017) examined the effect of real exchange rate on economic growth in Ghana by using bounds tests and ordinary least square and employing data from 1984 to 2014. The results showed that real exchange rate and economic growth are related in the short run. Other studies such as Apkan (2008) and Asher (2012) also offered empirical support for the short run relationship between exchange rate and economic growth. The evidence found in

literature regarding the short term relationship can be justified from the point that the depreciation of the domestic currency against the major trading currencies limits the purchase of raw materials for production by manufacturing firms. Similarly, investment into the country will reduce since the exchange rate risk becomes hazardous to foreigners in terms of the returns they generate.

On the effect of the short run effect of exchange rate volatility on economic growth, Barguelli, Ben-Salha and Zmami (2018) investigated on exchange rate volatility on economic growth by having obtained sample data on forty five developing economies from the period of 1985 to 2015. Their study was based on the general method of moment estimators and at the end the study found that exchange rate volatility has negative effect of economic growth in the short run and that the extent of the openness is deepened by the level of trade openness. The result of this study reflects that high volatility means higher risk and it slows down the dividends of economic growth. Based on the empirical evidence from the above studies, it is clear that exchange rate volatilities pose risk which affect merchandise trade, services and investment. Instability in exchange rate increases the risk of cross-border business and investment; hence this study hypothesizes that a negative relationship exist between exchange rate volatilities and economic growth in Ghana.

Long run Relationship between Exchange Rate Volatilities and Economic Growth

In the long run, evidence around the world offers insight into whether or not a relationship exists between exchange rate volatility and economic growth. The study of Mwinlaaru and Ofiori (2017) which examined the effect of exchange

rate on economic growth reported that a significant long run relationship exist between exchange rate and economic growth. That is to say that the appreciation of the local currency against foreign trading currencies promotes the growth of the economy. For instance, the expectation that the local currency will appreciate or remain stable against the foreign currency in the future will promote investment and the import of raw materials into the domestic country for production purposes. This though may be done in the short run; the effect in the long run may be the increased in capital investment and the increase in the gross domestic product which does elevate the growth of the economy.

In the study of Iyke and Ho (2017), an investigation regarding the link between exchange rate volatility and domestic consumption was undertaken in Ghana. Data was employed from 1980 to 2015 and the result of their study suggested that exchange rate volatility negatively affects domestic consumption which invariably affects the growth of the economy. In this study it was found that high volatility increases the cost of importing domestic consumption goods and it also encourages the export of goods that otherwise could have been consumed domestically. High volatility also reduces the import of industrial raw materials which stifles production and negatively affects wages of employees. Furthermore, high volatility affect the prices of finished goods produced in the country higher prices means lower demand and lower consumption. As consumption slows down the future production of firms are reduced as well and the long run growth of the economy which largely depends on the production sector reduces.

In the study of Rozilee, Jaratin, Dullah and Nanthakumar (2012) in Malaysia, an investigation into the effect of real and nominal exchange rate on economic growth was carried out by employing data spanning between 1971 and 2009 and by using the bound testing. The study revealed that long run relationship exists between nominal and real exchange rate and economic growth. The empirical studies reviewed above shows that high volatilities in exchange rates are not helpful to the growth of economies. High movements in exchange rates reflect the degree of economic instability and that makes the economic environment volatile for foreign direct investment and production to take place. High volatilities in exchange rate further signify lack of confidence in the domestic economy and foreign trade partners become skeptical in terms of trading and investing in the respective sectors of the economy. Reviews in literature have therefore suggested that high volatilities negatively impact on the growth of economies. This study therefore put forward the hypothesis that a negative relationship exist between exchange rate volatilities and economic growth.

Chapter Summary

Chapter two of this study examined the review of literature regarding the relationship between exchange rate volatilities and economic growth. The study is founded on the endogenous growth theory and concepts of exchange rate and economic growth were discussed. Finally, the empirical evidence regarding the short run and the long run relationship between exchange rate volatility and economic growth were also examined.

CHAPTER THREE

RESEARCH METHODS

Introduction

This chapter discusses the research methods employed in this study. The study examines the short run and long run relationship between exchange rate volatility and economic growth in Ghana. Therefore, this chapter discusses the research design, research approach, definition and measurement of variables, data analysis and presentation in light of the objectives of the study.

Research Design

The study employs the explanatory design in analysing the relationship between exchange rate volatility and economic growth in Ghana. Research design is the overall blueprint that the study follows in achieving the objectives of the study. The explanatory research design is also referred to as the causal research and it provides the extent to which one or more variables influence another variable (Zikmund, Babin, Carr, & Griffin, 2012). Explanatory design focuses on an analysis of a situation or a specific problem to explain the patterns of relationships between variables.

There are some advantages related to the employment of explanatory design. Firstly, it plays important role in terms of identifying reasons behind a wide range of processes, as well as, assessing the impacts of changes on existing norms, processes on another variable. Explanatory design also offers the advantages of replication if necessity arises. Moreso, the explanatory design is associated with greater levels of internal validity due to systematic selection of

subjects in the study (Zikmund, Babin, Carr, & Griffin, 2012). The main disadvantages associated with explanatory study are that coincidences in events may be perceived as cause-and-effect relationships. It can also be difficult to reach appropriate conclusions on the basis of causal research findings. This is due to the impact of a wide range of factors and variables in social and economic environment. In other words, while casualty can be inferred, it cannot be proven with a high level of certainty. In certain cases, while correlation between two variables can be effectively established; identifying which variable is a cause and which one is the impact can be a difficult task to accomplish. Despite these limitations with the explanatory study, it is considered as ideal for the objective of this study since it allows for the assessment regarding the influence of exchange rate volatilities on economic growth in Ghana.

Research Approach

The quantitative research approach is adopted by this study in achieving its objectives. Quantitative research focuses on gathering numerical data and generalizing it across groups of people or to explain a particular phenomenon (Babbie, 2010). The main objective of quantitative research is to assess the relationship between variables; and also to examine the cause and effect relationship between variables. It also underscores how a manipulated variable influences another variable under a defined condition and setting (Muji, 2010). Quantitative research deals with numbers, logic, and an objective stance and also focuses on numeric and unchanging data and detailed, convergent reasoning

rather than divergent reasoning (Babbie, 2010). The main advantage with the employment of quantitative approach is that it allows for replication of the same phenomenon and therefore has high reliability level. Given the study purpose of assessing the effect of exchange rate volatility on economic growth in Ghana, the quantitative method is considered as ideal for this study.

Source of Data Collection

The main variables used in this study include economic growth, exchange rate and other control variables including trade openness, interest rate, money supply and inflation. Data on economic growth and trade openness are obtained from the World Development Indicators of the World Bank. Data on exchange rate and the other control variables were obtained from the website of the Bank of Ghana. Data was collected for a 38 year period from 1980 to 2018 on annual basis.

Definition and Measurement of Variables

The variables used in this study are defined to include the dependent variable, independent variable, and control variables. The dependent variable for the study is economic growth, the main independent variable is the exchange rate volatility and the control variables are trade openness, money supply and inflation.

Economic growth

Economic growth is generally defined as the increase or decrease in the production of goods and services by an economy for a given period of time. In other words, it is the change in the gross domestic product (GDP) of a country over a period of time. For the purpose of this study, economic growth is defined as the real GDP growth measured in percentage terms. Real GDP growth rate is defined by the World Bank (2019) as inflation-adjusted of the value of the nominal growth of the gross domestic product per year. It is also defined as the rate of change in the gross domestic product measured at constant prices. Thus, real GDP growth rate is not accounted for the effect of inflation.

Exchange rate volatility

Exchange rate volatility is defined as the annual variance of the amount of a foreign currency measured in terms of a unit of domestic currency. Exchange rate volatility affects the competitive position of firms in an economy and for that matter the growth of an economy (Kuwornu & Victor, 2011). For the purposes of this study, the annual variance of the cedi to the United States Dollar end of month exchange rate was used as the proxy to measure exchange rate. The cedi-dollar exchange rates was used as the proxy for exchange rate since most of the country's trade volumes are denominated in the United States Dollars (Bank of Ghana Annual Report, 2018).

Exchange rate is yet another important variable that determines the competitiveness of an economy in the international market. Finance and economic theories are of the idea that depreciation of a nation's currency (weak currency)

becomes good news for exporter and bad news for importers and the contrary is true. In a similar reasoning, in the event of a country having weak currency system (consistent depreciation of a country's currency), foreign investors become skeptical about investing in such a country since the remittances of cash to foreign investors will decrease. It is clear that depreciation of a country's currency discourages foreign investment in a country and the ripple effect is that economic growth is affected negatively. This study therefore hypothesizes a negative relationship between exchange rate and economic growth.

Trade openness

According to the World Bank (2019), trade openness is defined as the total amount of trade expressed as a percentage of GDP. Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product. Trade liberalization (openness to trade) is often hypothesized to raise economic growth through several channels, such as access to advanced technology from abroad, possibilities of catch-up, greater access to a variety of inputs for production, foreign direct investment, and access to broader markets that raise the efficiency of domestic production through increased specialization (Nketsia & Quaidoo, 2017). Hence, theoretically, the effect of trade openness on the growth of the economy is positive

Inflation

Inflation as measured by the gross domestic product deflator (GDP Deflator) which is the rate of change in the expenditure of all goods and services produced in the country per annum. Inflation is expected to proxy the general macroeconomic instability, therefore is expected to be negatively related to economic growth. This is because inflation reduces some of the gains or returns on investment and as a result, foreign investors seeking to directly invest capital in the country become skeptical about their investment when they realise that inflation is going to be high. In other words, inflation can serve as a real problem for the growth of economies. It is believed that inflation can virtually affect all the macroeconomic indicators in an economy (Nkoro & Uko, 2013). Thus, economic growth responds negatively when inflation rises.

Money supply

Money supply is the currency and liquid instrument available in an economy at a point in time (Chapellow, 2020). It includes all paper and coins currency, foreign currency, all deposits and government securities. Increase in money supply lowers the rate of interest which promotes investment and expands the growth of the economy. In this study the broad money supply (M3) is used as proxy for money supply. The study expects a positive relationship between money supply and economic growth.

Times series properties of the variables

As a pretest, all the variables are tested for their time series properties by using the unit root test. The tests for unit root in the variables are investigated by using the Augmented Dickey Fuller (ADF) test and Phillips-Perron (PP) test. The ADF and PP were tested on the null hypothesis that the variable has a unit root (non-stationarity). The ADF and PP tests are defined by equations (1) and (2) respectively.

$$\Delta y_t = B_1 + B_2 t + B_3 y_{t-1} + \sum_{i=1}^m a_i \Delta y_{t-i} + e_t \quad (1)$$

$$\Delta y_t = B_1 + B_2 t + B_3 y_{t-1} + \pi y_{t-1} + \epsilon_t, \epsilon_t \sim I(0) \quad (2)$$

The result of the study showed that all the variables were stationary at the first difference.

Model used for the study

This study uses the autoregressive distributed lag (ARDL) model to assess the short run and long run relationship between exchange rate volatility and economic growth. Discussed below is the detail of the vector autoregressive model.

The Autoregressive Distributed Lag Model

To model the data for this study appropriately and extract long run and short run relationships, the ARDL model is a good choice (Owusu & Anokye, 2016) since the variables for this study have the combination of I(0) and I(1). The ARDL model combines the features of both autoregressive (AR) and the

distributed lag (DL) models to manage a more general dynamic regression model. Lagged values of explanatory variables or of the dependent variable (or both) may capture important dynamic structure in the dependent variable that might be caused by a number of factors.

Pesaran & Shin (1998) and Pesaran, Shin & Smith (2001) itemised some features of the ARDL or bounds testing methodology of cointegration to include the following. They presented that the data being modeled must be stationary at level $I(0)$ or at first difference $I(1)$ but not at the second difference $I(2)$. They also captured that the model involves just a single-equation set-up, making it simple to implement and interpret. Also, different values can be assigned different lag-lengths as they enter the model.

To use the ARDL model, the researcher ensured that none of the variables are integrated at the second difference $I(2)$ and the unrestricted error correction model is formulated. The appropriate lag structure is determined for the ARDL model by using the Akaike Information Criterion. Serial correlation test is checked to ensure that the errors of the model are serially independent. Also, parameter stability test is conducted by using the CUSUM test to ensure that the model is dynamically stable. Bound testing is performed to see if there is evidence of a long run relationship between the variables in question. When the evidence of long run relationship is found between the variables, the long run level models are estimated as well as a separate restricted Error Correction Model (ECM). Finally, the results of the long run levels model as well as the restricted ECM are used to

measure short run dynamic effects, and the long run equilibrating relationship between the variables.

Model specification

The ARDL model of cointegration is used to ascertain relationship between exchange rate volatility and economic growth. The ARDL model is estimated using economic growth as the dependent variable, exchange rate volatility as the independent variable, and money supply, inflation and trade openness as control variables. The compact form of the ARDL model for analysing objectives is estimated as indicated in equation 3.

$$\begin{aligned} \Delta EG_t = & \beta_1 + \sum_{i=1}^a \beta_2 \Delta EG_{t-i} + \sum_{i=0}^b \beta_3 \Delta ERV_{t-i} + \sum_{i=0}^c \beta_4 \Delta INF_{t-i} \\ & + \sum_{i=0}^d \beta_5 \Delta MS_{t-i} + \sum_{i=0}^e \beta_6 \Delta TO_{t-i} + \phi_1 EG_{t-1} + \phi_2 ERV_{t-1} \\ & + \phi_3 INF_{t-1} + \phi_4 MS_{t-1} + \phi_5 TO_{t-1} \\ & + \mu_t \end{aligned} \quad (3)$$

Where EG = Economic Growth

ERV = Exchange Rate Volatility

MS = Money Supply

INF = Inflation rate

TO = Trade Openness

t = Time series

β_1 to β_6 and ϕ_1 to ϕ_5 = Coefficient of dependent and independent variables

a to e represents the highest lag length for the variables

μ = Error term

Model diagnostics

The study uses unit root test to ensure that at least all the variables are either stationary at level or after first differencing, and that none is stationary after second differencing. The study also checks for the goodness of fit of the ARDL model by checking the size of the R^2 and the adjusted R^2 and the probability value of the F-statistic. The study also checks the status of serial correlation in the residual of the model by checking the size of the Durbin-Watson statistic. If the Durbin-Watson statistic is approximately 2 then the model has no serial correlation. Other diagnostics such as multicollinearity and dynamic stability of the model will be tested. The study will use bounds testing to confirm the presence of long run relationship between FDI and economic growth.

Chapter Summary

This chapter discussed explanatory research and quantitative research as the research design and research approach applicable to this study respectively. The chapter indicated that the ARDL model was used in ascertaining the relationship between exchange rate volatility and economic growth in Ghana. The chapter also discussed the variables used in the study as well as the time series properties of the variables.

CHAPTER FOUR

RESULT AND DISCUSSIONS

Introduction

This chapter discussed the results obtained for the three objectives of the study. The purpose of the study was to assess the relationship between the volatility of exchange rate and the growth rate of gross domestic product in Ghana. The first objective of the study was to examine the trend between exchange rate volatility and economic growth in Ghana while the second and third objectives respectively assessed the short run and the long run relationships between economic growth and exchange rate volatility.

Trend Analysis between Exchange Rate and Economic Growth in Ghana

The study in the first place assessed the trend between exchange rate and economic growth in order to deepen understanding on the volatility of exchange rate. Figure 3 portrays the movement of economic growth (measured by the rate of change in real gross domestic product) and exchange rate (measured by the GHS/USD) from 1980 to 2018. The pictorial view of Figure 3 reflects that economic growth for Ghana was negative during the prior periods of 1984 but assumed positive growth since 1984 to 2018. In 1984 the growth rate of Ghana reached its peak with other major peaks reached in 2008, 2011 and 2017. There were also trends of troughs observed for periods such as 1982, 1989, 2000, 2007, 2009, and 2015. There were also periods of downturns and recoveries between the peaks and through with the long term sustained recovery observed between the years 2000 and 2005. Similarly, there was observed to be persistence in declining

economic growth from the year 2011 to 2015. There was also a linear trend observed in the exchange rate variable but prior to the period 1998 the exchange rate was consistently stable between GHS0.1 and GHS1 to a dollar of the United States of America. The movements in exchange rate took sharp upward movement in the post 2000s and between 2013 and 2014 and as well as around 2016 there was equilibrium reached between the exchange rate and economic growth.

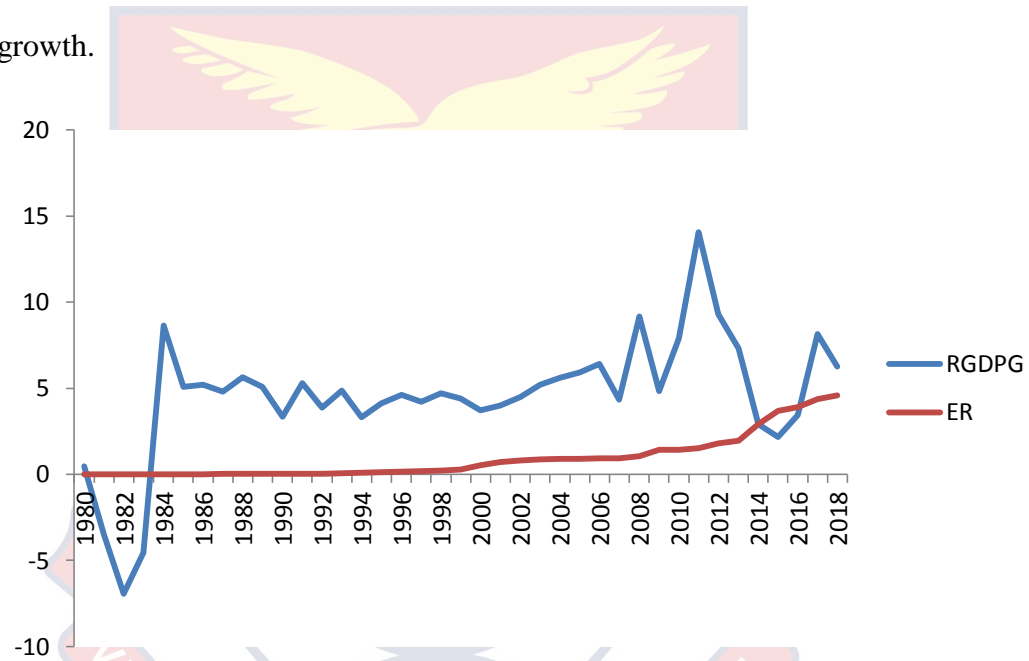


Figure 3: Trend between Exchange Rate and Economic Growth

Source: Tankia-Allou (2020)

Figure 4 on the other hand reveals the trend between exchange rate movement volatility and economic growth in Ghana from 1980 to 2018. Based on the presentation in Figure 4, it can be observed that the movement in the exchange rate was less volatile between 1980 and 1998 and between 2002 and 2007. However, there was mild shock observed in the periods between 1999 and 2001; 2008 and 2009; 2011 and 2013; with the most volatile trend observed between

2013 and 2015. The common feature among these volatilities is that they all represent negative shocks or depreciation of the cedi against the dollar. Generally, the main observation between the two variables was that both economic growth (Real GDP growth – RGDPG) and exchange rate volatility (ERV) produce upward trend occasioned by periodic shocks. Based on the pictorial assessment of the trend, the study concluded that there is an upward trend between exchange rate volatility and economic growth in Ghana.

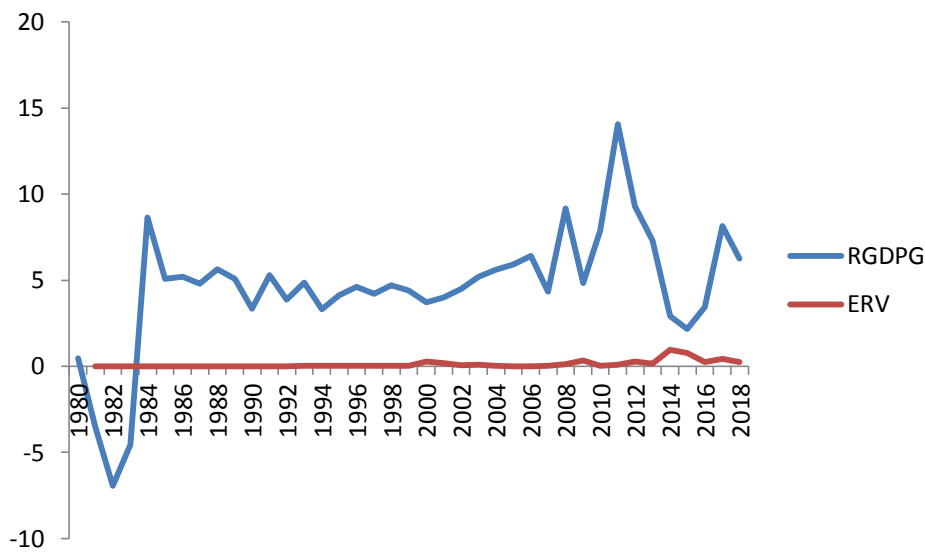


Figure 4: Trend between Exchange Rate Volatility and Economic Growth

Source: Tankia-Allou (2020)

One important observation in Figure 4 with regards to the two indicators was that economic growth somehow reaches its lower points at the same period where the shock in exchange rate is the highest. This fact was observed in periods such as 2014 and 2015, 2009 and 2000. For all these periods, the depreciation of the cedi pulls down the economic growth to lower levels. This study therefore drew the inference that negative shocks in exchange rate negatively affect the

economic growth of Ghana. Thus, exchange rate volatility was mainly a negative shock (depreciation) and this trend was found to adversely impact economic growth. The second and third objectives of this study however investigated the significance of this effect in both the short term and the long term.

Short Run Relationship between Exchange Rate Volatility and Economic

Growth

The relationship between exchange rate volatility and economic growth in Ghana was investigated using the autoregressive distributed lag model which assumes that the current value of the dependent variable (economic growth) and influenced by the past values of the same variable and other independent variables. The optimal ARDL model is shown in Table 1.

Table 1: Optimal ARDL(4, 4, 3, 4, 2)

Variable	Coefficient	Standard Error	T-Statistic	Probability
RGDPG(-1)	0.254980	0.137292	1.857200	0.0962
RGDPG(-2)	0.370728	0.117813	3.146751	0.0118
RGDPG(-3)	0.101487	0.115618	0.877777	0.4029
RGDPG(-4)	0.103295	0.091854	1.124548	0.2899
ERV	-9.908265	1.941412	-5.103639	0.0006
ERV(-1)	-4.253542	2.262161	-1.880300	0.0928
ERV(-2)	20.45563	3.809760	5.369269	0.0005
ERV(-3)	6.896949	3.979605	1.733074	0.1171
ERV(-4)	-4.490904	4.050380	-1.108761	0.2963
INF	0.025292	0.025728	0.983057	0.3513
INF(-1)	-0.044705	0.021711	-2.059112	0.0696
INF(-2)	0.031440	0.021853	1.438714	0.1841
INF(-3)	-0.026899	0.020749	-1.296416	0.2271
MS	0.138592	0.160941	0.861135	0.4115
MS(-1)	-0.407549	0.190485	-2.139539	0.0611
MS(-2)	0.209834	0.177885	1.179604	0.2684
MS(-3)	-0.161164	0.182459	-0.883293	0.4001
MS(-4)	0.383446	0.142609	2.688783	0.0248
TO	0.038096	0.026784	1.422315	0.1887

Table 1 continued

TO(-1)	0.015200	0.034407	0.441769	0.6691
TO(-2)	-0.090292	0.029127	-3.099904	0.0127
C	0.372587	3.262009	0.114220	0.9116
R-squared	0.951248	Mean dependent var	5.345774	
Adjusted R-squared	0.837494	S.D. dependent var	2.280916	
S.E. of regression	0.919482	Akaike info criterion	2.852581	
Sum squared resid	7.609031	Schwarz criterion	3.870249	
Log likelihood	-22.21500	Hannan-Quinn criter.	3.184315	
F-statistic	8.362336	Durbin-Watson stat	2.205587	
Prob(F-statistic)	0.001248			

Source: Tankia-Allou (2020)

Based on the result in Table 1, the optimal ARDL model is the ARDL (4, 4, 3, 4, 2) as it has the lowest information criterion as indicated by Figure 5. The optimal ARDL model had information criterion of 2.85 (see Figure 5).

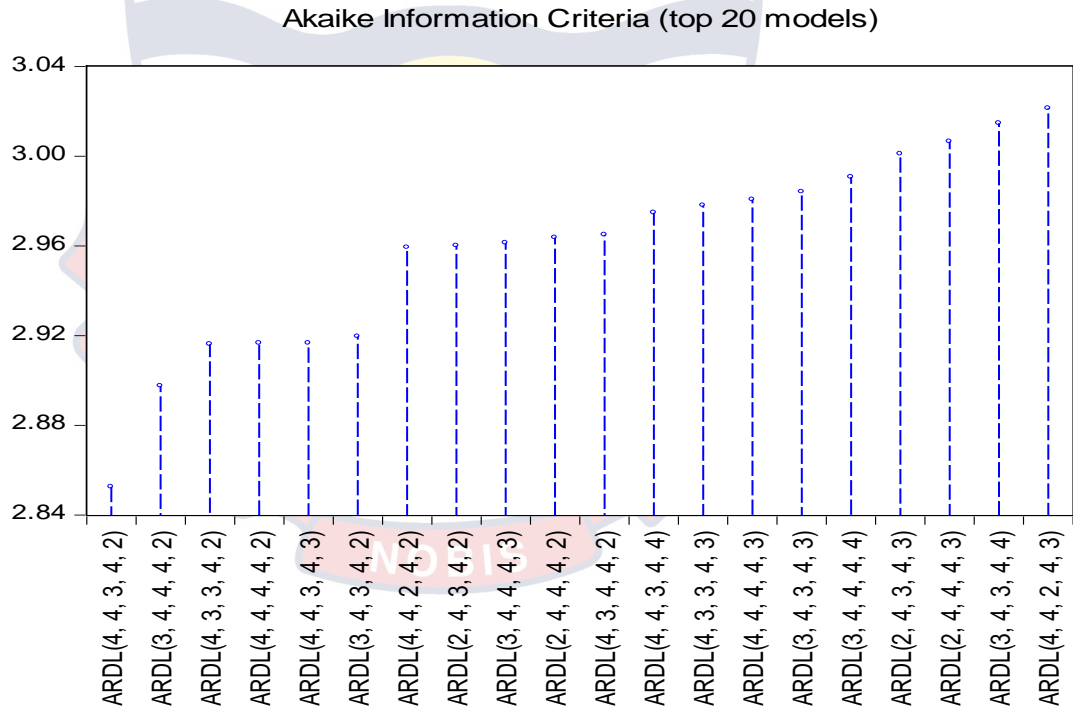


Figure 5: ARDL Lag Selection Graph

Source: Tankia-Allou (2020)

Based on Figure 5, the optimal ARDL model is ARDL (4, 4, 3, 4, 2). This means that the current level of economic growth is influenced by the first four lags of economic growth (EG), the first four lags of exchange rate volatility (ERV), the first three lags of inflation (INF), the first four lags of money supply (MS), and the first two lags of trade openness (TO). All the independent variables of the regression model were insignificant except five: the second lag of economic growth [EG(-2)], the current value of exchange rate volatility (ERV), the second lag of exchange rate volatility [MS(-2)], the fourth lag of money supply [MS(-4)], and the second lag of trade openness [TO(-2)].

The result in Table 1 further revealed that the coefficient of RGDPG (-2) = 0.370728, standard error = 0.117813, 3.146751, 0.0118, with the implication that that a unit increase in the second lag of economic growth will increase current value of economic growth by 0.370728 units. Exchange rate volatility produced coefficient = -9.908265, standard error = 1.941412, t-statistic = -5.103639, and probability value = 0.0006. Thus, a unit increase in exchange rate volatility decreases economic growth by 9.908265. The second lag of exchange rate volatility rather influence economic growth positively, the fourth lag of money supply positively influence economic growth while the second lag of economic growth influence economic growth negatively.

From the model in Table 1, the R^2 of 0.951248 is significant with the implication that the independent variables explain the variation in the economic growth by 95.12%. With adjustment in the independent variables, they explain the variation in the economic growth by 83.7494%. The F-statistic value of 8.362336

with a probability value of $0.001248 < 5\%$ indicates that the R^2 is significant. Also, the Durbin-Watson coefficient of 2.205587 indicates that the presence of serial correlation is weak in the optimal ADRL model. From Table 2, which is the heteroscedasticity test, the null hypothesis was that the error terms in the optimal ADRL model are constant. The probability value of the F-statistic of $0.8753 < 5\%$ indicates that the null hypothesis is not to be rejected. Thus, the optimal ARDL model had constant error terms.

Table 2: Heteroskedasticity Test - Breusch-Pagan-Godfrey

F-statistic	0.550472	Prob. F(21,9)	0.8753
Obs*R-squared	17.42991	Prob. Chi-Square(21)	0.6847
Scaled explained SS	2.751593	Prob. Chi-Square(21)	1.0000

Source: Tankia-Allou (2020)

Table 3 also provides a test for serial correlation in error terms of the optimal ARDL model in Table 1. The serial correlation test was performed under the null hypothesis that the error terms are not serially correlated. The probability value of the F-statistic was 0.6251 and this is more than 5% alpha level. Hence, the study concluded that no serial correlation exists in the optimal ARDL model.

Table 3: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.502799	Prob. F(2,7)	0.6251
Obs*R-squared	3.893971	Prob. Chi-Square(2)	0.1427

Source: Tankia-Allou (2020)

Furthermore, Figure 6 which is the CUSUM test indicated the dynamic stability of the optimal ARDL model. It can be observed that the blue contour line lies between the red diagonal dotted lines. Thus, the study revealed that the

optimal ARDL model is stable over the time. All the diagnostics performed on the optimal ARDL model indicated that the various assumptions of the model were satisfied.

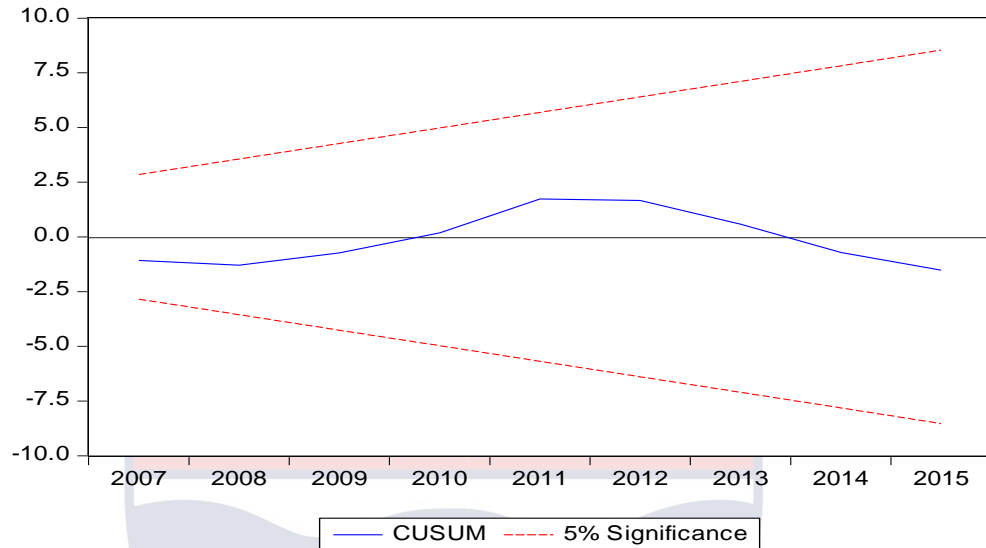


Figure 6: CUSUM Test

Source: Tankia-Allou (2020)

ARDL Bounds Test

The study performed the ARDL bounds test to ascertain whether there is evidence of long run relationship between economic growth and exchange rate volatility. The bounds test was performed under the null hypothesis that no long run relationship exists between the variables. The result of the bounds test as shown in Table 4 revealed that the F-statistics produced value of 3.584010 and this value is greater than lower and upper bounds critical values at both 10% and 5% significant levels. This result indicated that there is evidence of long run relationship between economic growth and exchange rate volatility.

Table 4: ARDL Bounds Test

Test Statistic	Value	K
F-statistic	3.584010	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.2	3.09
5%	2.56	3.49
2.5%	2.88	3.87
1%	3.29	4.37

Source: Tankia-Allou (2020)

Short Run Model

Having established that long run relationship exists between exchange rate volatility and economic growth, the study proceeded to assess the relationship between the two variables in the short run before that of the long run. The result of the short run relationship between exchange rate volatility and economic growth is shown in Table 5.

Table 5: Short Run Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ERV	-1.433509	0.40944	-3.50114	0.0099
INF	-0.021214	0.02735	-0.77566	0.4513
MS	1.596602	0.700612	2.278869	0.0305
TO	-0.507697	0.159752	-3.17802	0.0036
EC(-1)	-0.090292	0.029127	-3.099904	0.0127
R-squared	0.845051	Mean dependent var		4.790559
Adjusted R-squared	0.785815	S.D. dependent var		3.504335
S.E. of regression	3.162038	Akaike info criterion		5.275363
Sum squared resid	289.9560	Schwarz criterion		5.499828
Log likelihood	-84.68118	Hannan-Quinn criter.		5.351912
Durbin-Watson stat	2.019660			

Source: Tankia-Allou (2020)

The result in Table 5 showed that exchange rate volatility, money supply and trade openness influence economic growth negatively in the short run but inflation does not influence economic growth in the short run. Exchange rate volatility produced coefficient = -1.433509, standard error = 0.40944, test statistic = -3.50114, and probability value = 0.0099. Thus, a unit increase in the volatility in the exchange rate reduces economic growth by 1.433509 units. Money supply produced coefficient = 1.596602, standard error = 0.700612, t-statistic = 2.278869, and probability value = 0.0305 < 5%. This result showed that a unit increase in money supply in the short run by 1 unit will decrease economic growth by 1.596602 units. Trade openness also produced coefficient = -0.507697, standard error = 0.159752, test-statistic = -3.17802, and probability value = 0.0036 < 5%. The implication is that a unit increase in the level of trade openness by 1 unit will decrease the level of economic growth by 0.507697 units.

Furthermore, the first lag of the error correction (EC) terms indicated in Table was negative and significant. Thus, the EC(-1) had coefficient = -0.090292, standard error = 0.029127, t-statistic = -3.099904, and p-value = 0.0127 < 5%. The error correction term represents the speed of adjustment towards long run equilibrium. Thus, 0.090292 or 9.0292% of the deviation in the short run will be corrected every month in the long run after the market deviate from the long run growth part.

The R^2 of 0.845051 also indicated that the independent variables in the short model together explains up to 84.5051% of the behaviour of economic growth in the short run. The Durbin-Watson value of 2.0 also indicates that no

serial correlation exists in the short run model. The variance inflation factors produced in Table 6 were all less than 5 and the implication is that there is no multicollinearity in the independent variables of the short run model.

Table 6: Variance Inflation Factors

Variable	Coefficient Variance	Uncentered VIF
ERV	9.761492	1.827921
INF	0.000538	2.469484
MS	0.016495	3.92912
TO	0.001550	2.05194
EC(-1)	0.029079	1.088630

Source: Tankia-Allou (2020)

Also, the result in Table 7 which is the Breusch-Godfrey serial correlation LM test was performed under the null hypothesis that no serial correlation exists in the residual of the short run model. The null hypothesis was not rejected since the probability value of the F-statistic was more than 5% alpha level. Thus, the study revealed that no serial or autocorrelation exists in the residual of the short run model. This test confirms the value of the Durbin-Watson statistic which was approximately 2.0.

Table 7: Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.292959	Prob. F(2,27)	0.2909
Obs*R-squared	2.933102	Prob. Chi-Square(2)	0.2307

Source: Tankia-Allou (2020)

The test in Table 8 (the heteroskedasticity test) was performed to assess whether the error term of the residuals in the short run model were constant over

the sampled period. The null hypothesis for the test is that the error terms have constant variance. The probability value of the F-statistic was more than 5% alpha level; therefore, the study concluded that the error terms were constant.

Table 8: Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.700514	Prob. F(5,28)	0.0510
Obs*R-squared	11.06166	Prob. Chi-Square(5)	0.0502
Scaled explained SS	10.41406	Prob. Chi-Square(5)	0.0643

Source: Tankia-Allou (2020)

To ascertain the stability of the short run model, the CUSUM test was used. As shown by Figure 7, blue contour line lies between the red diagonal dotted lines. Thus, the study revealed that the short run model is stable over the time.

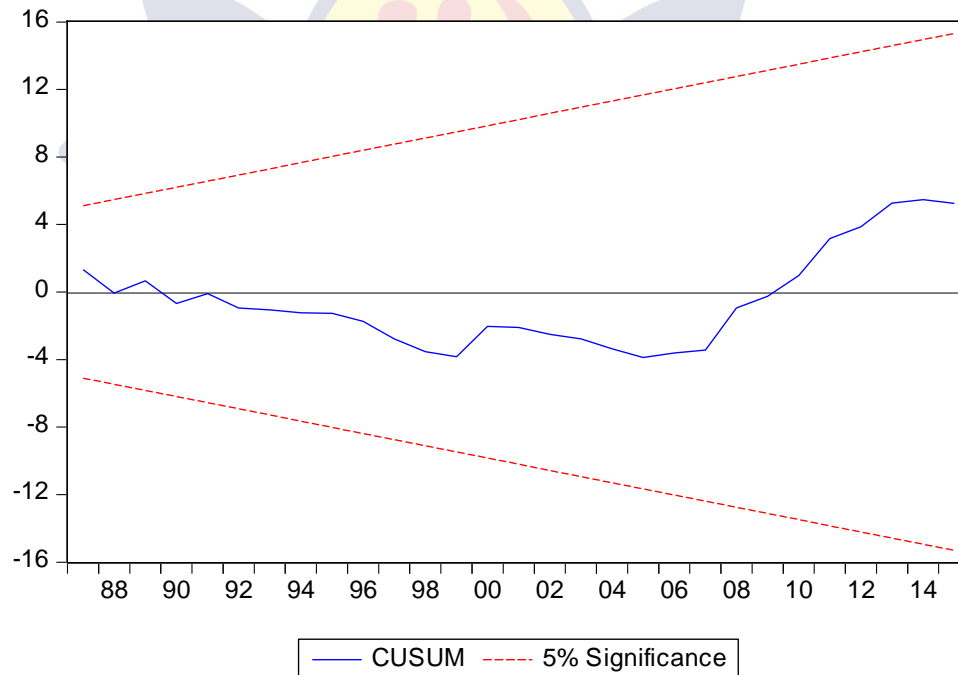


Figure 7: CUSUM Test

Source: Tankia-Allou (2020)

Furthermore, the CUSUM of squares test which is also a test for dynamic stability of the short run model revealed that the short run model is stable over the sample period. This is because the blue contour line lies between the two red diagonal dotted lines.

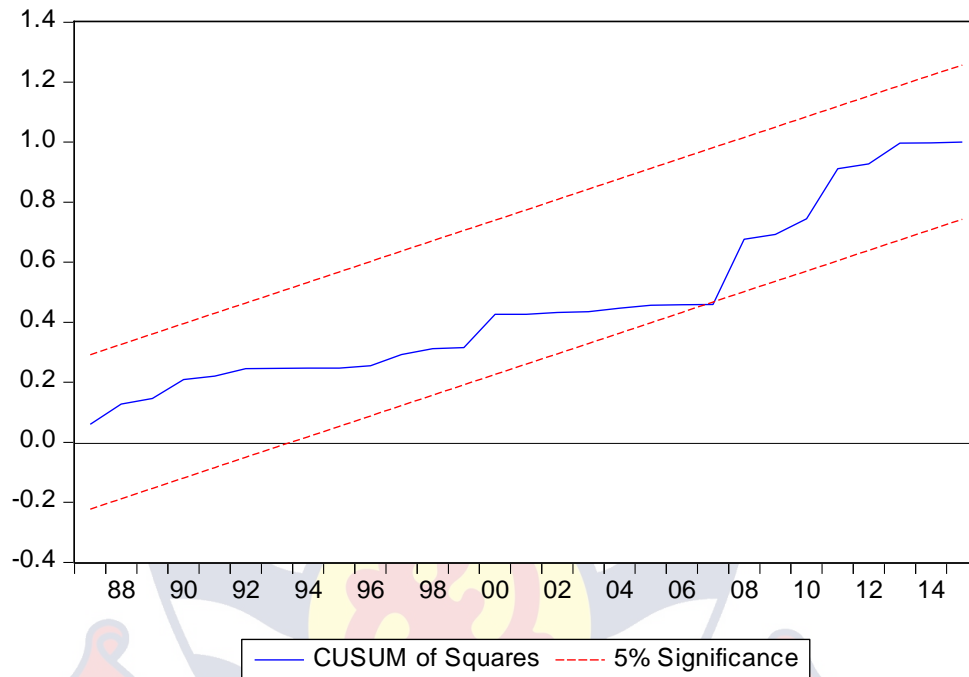


Figure 8: CUSUM of Squares Test

Source: Tankia-Allou (2020)

Thus, all the diagnostics performed on the short run model showed that, the short run model was correctly specified.

Discussions of Short Run Results

In this study, the result showed that exchange rate volatility has significant negative effect on economic growth. The trend analysis revealed that exchange rate volatility in Ghana is mainly depreciation or negative shocks. This means that increment in the depreciation of the cedi lowers the level of economic growth. The study further revealed that exchange rate volatilities in the short run are

mainly caused by economic growth, money supply and trade openness. This result obtained agrees with the study of Mpofu (2016) who examined the determinants of exchange rate volatilities revealed that the behaviour of exchange rate volatilities is largely caused by variables including money supply and trade openness. Mpofu (2016) found that exchange rate movements produce negative effect on economic in the short run and this present study found the same evidence.

Furthermore, the evidence found in this study is in line with the finding in the study of Mwinlaaru and Ofiori (2017) who examined the effect of real exchange rate on economic growth in Ghana by using bounds tests and ordinary least square and whose study presented the results that real exchange rate and economic growth are related in the short run. Other studies such as Apkan (2008) and Asher (2012) also offered empirical support for the short run relationship between exchange rate and economic growth. The evidence found in literature regarding the short term relationship can be justified from the point that the depreciation of the domestic currency against the major trading currencies limits the purchase of raw materials for production by manufacturing firms. Similarly, investment into the country will reduce since the exchange rate risk becomes hazardous to foreigners in terms of the returns they generate.

In addition to the above evidence on the effect of the short run effect of exchange rate volatility on economic growth, the evidence found in this present study is not different from the one found by Barguelli, Ben-Salha and Zmami (2018) whose investigation on exchange rate volatility on economic growth

within forty five developing economies found that exchange rate volatility has negative effect of economic growth in the short run and that the extent of the volatility is deepened by the level of trade openness. The result of this study reflects that high volatility meant higher risk and it slows down the dividends of economic growth. Based on the empirical evidence from the above studies and this present study, it is clear that exchange rate volatilities, particularly in Ghana poses risk to the growth. Therefore, the first hypothesis of this study which suggested that there is no significant short run relationship between exchange rate volatility and economic is thus rejected.

Long Run Relationship between Exchange Rate Volatility and Economic Growth

This present study used ordinary least square regression to examine the long run relationship between exchange rate volatility and economic growth in Ghana. The null hypothesis which underlined this investigation was that there is no significant relationship between exchange rate volatility and economic growth in Ghana against the alternative hypothesis that there is significant relationship between exchange rate volatilities and economic growth in Ghana. The null hypothesis was tested at 5% alpha level. The result for the long run analysis is indicated in Table 9.

Table 9: Long Run Model

Dependent Variable: RGDPG

Variable	Coefficient	Standard Error	t-Statistic	Probability
ERV	-0.553366	0.180105	-3.072463	0.0160
MS	-0.073039	0.022453	-3.252973	0.0008
INF	-0.053270	0.017936	-2.970004	0.0022
TO	0.062605	0.028867	2.168739	0.0122
C	4.233796	2.725692	1.553292	0.1308
R-square	0.933389	Adjusted R ²	0.824508	
F-statistic	3.759561	Prob(F-stat)	0.0000	
Durbin-Watson	1.616149			

Source: Tankia-Allou (2020)

The result indicated in Table 9 reflected the long run model analysed from the ordinary least square regression. From the result, it was found that exchange rate volatilities significantly affect economic growth in the long run but negatively. The study found the coefficient of exchange rate volatilities to be -0.553366 with standard error = 0.180105, t-statistics = -3.072463, and p – value = 0.0160. Based on this result, a unit change in the value of the currency decreases economic growth by 0.553366 units. In other words, exchange rate movement, through the depreciation of the Ghana cedi lowers economic growth in Ghana in

the long run. The coefficient of money supply was = -0.073039 with standard error = 0.022453, t-statistics = -3.252973, and p – value of 0.0008. This implies that money increased money supply negatively affect economic growth in the long run in Ghana. The coefficient of inflation was = -0.053270 with standard error = 0.017936, t-statistics = -2.970004, and p – value of 0.0022. In the long run, the rise in inflation negatively affects the level of economic growth in Ghana. The coefficient of trade openness was = 0.062605 with standard error = 0.028867, t-statistics = 2.168739, and p – value of 0.0122. This also implies that the rise in the level of trade openness positively affect economic growth in the long run. Based on the result in Table 9, the long run model was presented as indicated in equation 13. The result in equation sums up to the fact that exchange rate volatility, money supply and inflation do affect economic growth (RGDPG) negatively while trade openness affects economic growth positively in the long run.

$$\text{RGDPG} = -0.553366(\text{ERV}) - 0.073039(\text{MS}) - 0.053270(\text{INF}) + 0.062605 + e$$

From Table 9, the R-square of 0.933 means that the independent variables put together explains up to 93.3% of the behaviour of the dependent variable which is economic growth. The significance of the R-square is observed by the probability value of the F-statistic (F-stat = 3.759561) of 0.000. Furthermore, the Durbin-Watson value of 1.616149 is also a good indication that there is no serial correlation in the error term of the long run model. That is, for there to be serial correlation, the Durbin-Watson value must be closer to 0 or 4. A Durbin-Watson

value closer to 2 (as it is found in this study) is an indication of no serial correlation.

Discussions on the Long run Model

In the long run, this present study had found a significant negative relationship between exchange rate volatility and economic growth. The result of this study agrees with evidence found in other studies in economies. For example, the study of Mwinlaaru and Ofori (2017) examined the effect of exchange rate on economic growth reported that a significant long run relationship exist between exchange rate and economic growth. That is to say that the appreciation of the local currency against foreign trading currencies promotes the growth of the economy. A direct contrast can be made between evidence found this this present study and that of Mwinlaary and Ofori (2017); that is, Mwinlaary and Ofori (2017) reported that currency appreciation (positive volatility) positively affect the growth of the economy. This means that a negative shock or movement (that, negative volatility or currency depreciation) negatively affect the growth of the economy and this is the evidence found in this present study. Furthermore, the expectation that the local currency will depreciate or remain unstable against the foreign currency in the future will negatively affect investment and the import of raw materials into the domestic country for production purposes. This though may be done in the short run; the effect in the long run may be the decreased in capital

investment and the decrease in the gross domestic product which does decelerate the growth of the economy.

The establishment of the evidence of negative long run relationship between exchange rate volatility and economic growth in Ghana in this present study confirms and adds to the study conducted by Iyke and Ho (2017) whose investigation regarding the link between exchange rate volatility and domestic consumption was undertaken in Ghana with the result that exchange rate volatility negatively affects domestic consumption which invariably affects the growth of the economy. The pass through effect is that high volatility (in the case of depreciation of the local currency) increases the cost of importing domestic consumption goods and it also encourages the export of goods that otherwise could have been consumed domestically. High volatility also reduces the import of industrial raw materials which stifles production and negatively affects wages of employees. Furthermore, high volatility affect the prices of finished goods produced in the country higher prices means lower demand and lower consumption. As consumption slows down the future production of firms are reduced as well and the long run growth of the economy which largely depends on the production sector reduces.

This study has shown that the situation in Ghana and the context of Malaysia are similar upon comparing the results obtained from this present study with that of Rozilee, Jaratin, Dullah and Nanthakumar (2012) which was conducted in Malaysia on the effect of real and nominal exchange rate on economic growth and by using the bound testing. The study revealed that long run

relationship exists between nominal and real exchange rate and economic growth. The long run result of this study and that revealed by literature suggest that high volatilities in exchange rates are not helpful to the growth of economies. High movements in exchange rates reflect the degree of economic instability and that makes the economic environment volatile for foreign direct investment and production to take place. High volatilities in exchange rate further signify lack of confidence in the domestic economy and foreign trade partners become skeptical in terms of trading and investing in the respective sectors of the economy. Based on the results of the long run model, this study rejected that null hypothesis that no significant long run relationship exist between exchange rate volatility and economic growth.

Chapter Summary

Chapter four of this study presented the evidence on the short and long run relationships between exchange rate volatility and economic growth in Ghana. The study found a significant negative relationship between exchange rate volatility and economic in both the short run and the long run. The study also found that volatility in exchange rate in Ghana is mainly a negative shock or depreciation and that there is also a trend between exchange rate movement and economic growth. In the end the study rejected the first and second null hypotheses of this study which suggested that no short run and long run relationship exist between exchange rate volatility and economic growth.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter dealt with the summary, conclusions and recommendations of the study. The main purpose of the study was to analyse the effect of exchange rate volatility on economic growth of Ghana. This chapter further provided an overview of the entire study, touching on the purpose, research objectives and hypothesis, overall conclusions, recommendations based on the study, and suggestions for further studies.

Summary of the Study

This study investigated the movement of exchange rate behaviour in Ghana in terms of its volatility and the effect it has on economic growth in both the short term and the long term. Exchange rate volatility was defined as the rate of fluctuation in the annual values of the cedi to the United States of America dollar. Economic growth was also measured and defined in terms of the percentage change in the values of the real gross domestic product. In addition to the examination of the relationship between exchange rate volatilities and

economic growth in the short run and the in the long run, the study also investigated assessed the trend analysis between the two variables after having employed data on annual frequency from 1980 to 2018. This study was conducted with theoretical reference to the endogenous growth theory.

The study was based on the explanatory research design and the quantitative research approach which allows for the parametric statistical measure of the relationship between variables. The dependent variable of the study was economic growth while the main independent variable was exchange rate volatility and the study controlled for three other variables including inflation, money supply, and trade openness.

Economic growth was measured by the annual percentage growth rate of real GDP at constant prices based on constant local currency. Inflation was measured by the gross domestic product deflator (GDP Deflator) which is the rate of change in the expenditure of all goods and services produced in the country per annum. The broad money supply (M3) was used as proxy for money supply. Trade openness was defined and measured as the total amount of trade expressed as a percentage of GDP. Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product. Data on economic growth and trade openness were obtained from the World Development Indicators of the World Bank while data on exchange rate and the other control variables were obtained from the website of the Bank of Ghana.

The study was organised into three objectives and their corresponding hypothesis. The first objective examined the trend analysis between exchange rate

volatility and economic growth. The second objective sought to test the short run relationship between exchange rate volatility and economic growth with the null hypothesis that there is no short run relationship between exchange rate volatility and economic growth. The third objective of the study examined the long run relationship between exchange rate volatility and economic growth under the null hypothesis that there is no long run relationship between exchange rate volatility and economic growth. The short run relationship between exchange rate volatility and economic growth analysed using the vector autoregressive model and the long run relationship between exchange rate volatility and economic growth was examined using the ordinary least square regression.

Based on the first objective, the study found that there was a linear trend with respect to the plot of exchange rate volatilities and economic growth. The main characteristic of the exchange movement over the sample period was depreciation which represented a negative movement. Regarding the second objective and hypothesis, the study found a significant negative short run relationship between exchange rate volatility and economic growth. Finally, with respect to the third objective, the study found a significant negative relationship between exchange rate volatility and economic growth.

Conclusions

Based on the findings of the study, the conclusions drawn were summarized as follows:

1. Based on the first objective of this study which dealt with the trend analysis of exchange rate volatility and economic growth, the study concluded that exchange rate movement in Ghana behaves in a linear fashion with economic growth. Furthermore, this study concludes that exchange rate movement in Ghana is mainly depreciation with high drop downs having the capacity to draw down economic growth.
2. Based on the second objective which found a significant negative short run relationship between exchange rate volatility and economic growth, the study concluded that exchange rate depreciation (cedi depreciation) against major trading currencies such as the USA dollar reduces the growth potentials of the Ghana in the short term. Thus, a persistence decline in the value of the Ghana cedi slows down the growth of the economy.
3. With respect to the evidence of the long run relationship between exchange rate volatility and economic growth, the study concluded that the negative exchange rate movement in Ghana stifles the growth of the economy in the long run. Thus, the long term the growth of Ghanaian economy is a function of the movement of the exchange rate. Positive movement in terms of cedi appreciation increases economic growth while negative movement in terms of cedi depreciation reduces economic growth of the country.

The overall conclusion drawn from the study is that exchange rate volatility has significant effect on the growth of Ghana. Exchange rate in Ghana is downwardly unstable and the instability, largely in terms of depreciation slows down the growth of the economy. The conclusion drawn from this study has

contributed towards bridging the gap in literature where evidence on the exchange rate volatility and economic growth had been provided in terms of their trend. Furthermore, the study has contributed to revealing that there is the existence of both short run and long run relationship between exchange rate movement and economic growth in Ghana.

Recommendations

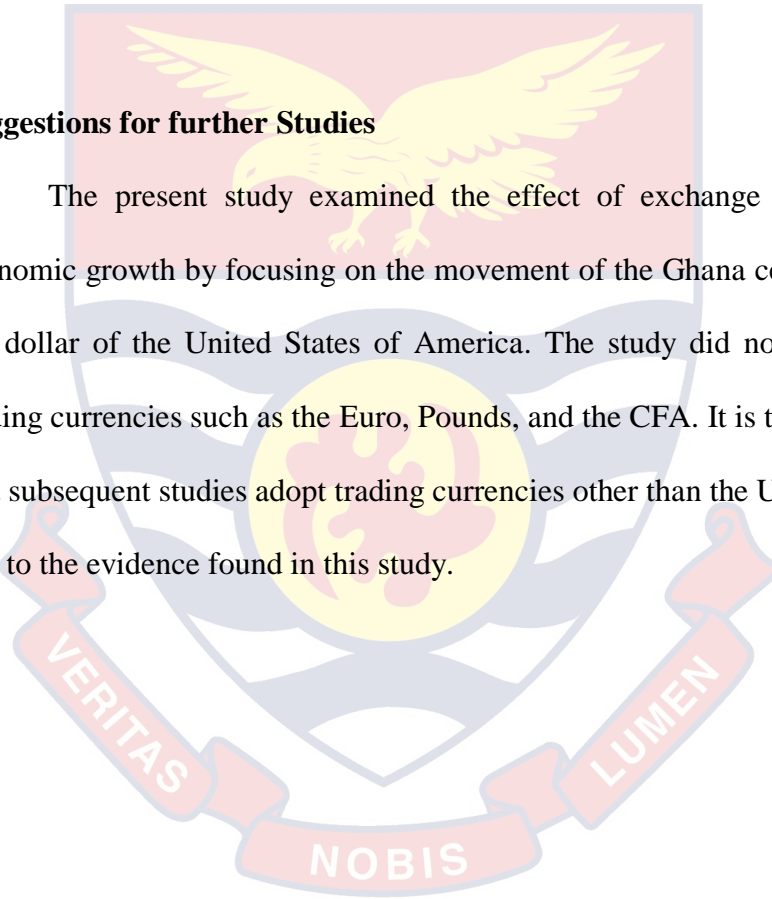
Based on the findings and the conclusions drawn from the study, the following recommendations were provided:

1. The government of Ghana and the Bank of Ghana are encouraged to adopt short term policies and strategies that will minimise or ensure the stability of the exchange rate. Examples of these policies include raising tariffs on import to limit the volumes of import which put pressure on the cedi to fall against other trading currencies while encouraging export of goods and services in the question to obtain inflows of foreign currencies. This recommendation is based on the fact that trade openness affects exchange rate volatilities negatively in the short run. The Bank of Ghana should also work to check the level of money supply. This is because the short run result found a positive relationship between money supply and exchange rate volatility reflecting that increase in money supply increases the volatility of exchange rate. The government is also encouraged to improve the macroeconomic variables such as the general price level (inflation) and money supply.

2. In reference to the results and conclusion drawn from the long run relationship between exchange rate volatility and economic growth, the study recommends that the Government of Ghana increases encourages the productive sectors of the country to produce more goods and services to serve home and foreign markets. This will limit the tendency of high imports and take a shift to exports. This move will eliminate the pressure on the local currency and enhance its stability.

Suggestions for further Studies

The present study examined the effect of exchange rate volatility on economic growth by focusing on the movement of the Ghana cedi with respect to the dollar of the United States of America. The study did not use other major trading currencies such as the Euro, Pounds, and the CFA. It is thus recommended that subsequent studies adopt trading currencies other than the USA dollar so as to add to the evidence found in this study.





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