

UNIVERSITY FOR DEVELOPMENT STUDIES
SCHOOL OF BUSINESS AND LAW
DEPARTMENT OF BANKING AND FINANCE

**THE EFFECTS OF EXCHANGE RATE VOLATILITY ON DOMESTIC
CONSUMPTION IN GHANA**

INUSAH ZUBERU

**Thesis submitted to the Department of Finance, School of Business and Law,
University for Development Studies, in partial fulfillment of the requirements for the
award of Master of Commerce degree in Banking and Finance**

2020



UNIVERSITY FOR DEVELOPMENT STUDIES

SCHOOL OF BUSINESS AND LAW

DEPARTMENT OF BANKING AND FINANCE

**THE EFFECTS OF EXCHANGE RATE VOLATILITY ON DOMESTIC
CONSUMPTION IN GHANA**

BY

INUSAH ZUBERU

(UDS/MCM/0152/17)

**Thesis submitted to the Department of Finance, School of Business and Law,
University for Development Studies, in partial fulfillment of the requirements for the
award of Master of Commerce degree in Banking and Finance**

June, 2020



DECLARATION

Student

This Research project is my original work and has not been submitted for another degree in this university or any other University

Signature of the candidate: Date:

Name: InusahZuberu

This thesis has been submitted for examination with my approval as University Supervisor in accordance with the rules of the University.

Signature of Supervisor:



Date:

Name: Dr. Muazu Ibrahim



ABSTRACT

The volatility of the exchange rate is an important phenomenon that requires a lot of attention, especially in nations whose development are based on the development of the global market. Globalization has led many countries, including Ghana, to open up to international trade; As a result, the exchange rate has become a major player affecting not only a country's trade flows, but also other macroeconomic variables. However, previous studies of exchange rate volatility have not considered Ghana, even though it is a small, open economy that has often experienced exchange rate volatility. Using the annual data covering the period 1980-2016 and the annualized variance of the real exchange rate as a measure of exchange rate volatility, as well as the Autoregressive Distributed Lag (ARDL) approach, the preliminary result obtained shows that all variables are integrated at order. This means that all variables display the unit root at all levels but remain motionless at the first difference. Finally, we find that the volatility of exchange rates has positive effects on domestic consumption in the short term. However, the exchange rate volatility negatively affects long-term domestic consumption. Therefore, we conclude that the exchange rate pass-through inflation to affect domestic consumption in Ghana. The results of the analysis, which covers the period 1980-2016, reveal that the pass-through effect of the exchange rate to domestic consumption in Ghana is substantial. Our results further suggest s that the effect of the volatility of the exchange rate on consumption is not dependent on financial sector development level. As a foreign exchange policy, authorities should avoid quoting the prices of local goods and services in foreign currency.



ACKNOWLEDGEMENT

First of all, I give my profound gratitude to the Almighty Allah for bringing me this far in my academic pursuit. I am very grateful to my selfless and hardworking supervisor Dr. Muazu Ibrahim for his time, patience, guidance and encouragement throughout my thesis. You have really contributed tremendously to the development of my research knowledge. Almighty Allah will richly bless you and your entire family. My endless appreciation goes to Mr. Abubakari Zakaria and Mr Imoro Abdul-Razak for your support and resourcefulness. Indeed you are good friends. I also appreciate the support of all my course mates. It would have been difficult for me to do it without your support and encouragement. My special thanks also go to my mother Ayishatu Amadu, my brothers Zuberu Mantashawu (late), Zuberu Hudu, and Zuberu Shirazu for paying special attention towards my academic progression. I also thank Dr. Ibrahim Osman Adam The Head of Accounting department University for Development Studies and Mr Ibrahim Sumaila The bursar for Dagbong State SHS Yendi for their caring and advice. To my dear wife Muastapha Hajar, I say God bless you for your advice and prayers in this academic journey. I further extend my appreciation to all the lecturers, staff and students of School of Business and Law (SBL) and to all my family and friends, I say big thanks to you all.



DEDICATION

This dedicated is dedicated to my mother Zubiru Ayisha, my dear wife Mustafa Hajero and my dear children, Inusah Ilham, Inusa Rabaab and Inusa Sajiid and to all those who were with me at the right and wrong times.



TABLE OF CONTENTS

DECLARATION ii

ABSTRACT iii

ACKNOWLEDGEMENT iv

DEDICATION v

TABLE OF CONTENTSvi

LIST OF TABLES **Error! Bookmark not defined.**

LIST OF FIGURES **Error! Bookmark not defined.**viii

LIST OF ACRONYMS ix

CHAPTER ONE **Error! Bookmark not defined.**

INTRODUCTION **Error! Bookmark not defined.**

1.1 Background **Error! Bookmark not defined.**

1.2 Research Problem **Error! Bookmark not defined.**

1.3 Research or Objectives **Error! Bookmark not defined.**

1.4 Research questions **Error! Bookmark not defined.**

1.5 The Justification of the Investigation..... **Error! Bookmark not defined.**

1.6 Scope of the Study **Error! Bookmark not defined.**

1.7 Organization of the Research..... **Error! Bookmark not defined.**

CHAPTER TWO **Error! Bookmark not defined.**

LITERATURE REVIEW **Error! Bookmark not defined.**

2.1 Introduction..... **Error! Bookmark not defined.**

2.2 Conceptual Framework **Error! Bookmark not defined.**

2.2.1 History of exchange rate in Ghana..... **Error! Bookmark not defined.**

2.2.2 Exchange regime in Ghana **Error! Bookmark not defined.**

2.2.2.1 System of fixed exchange rate **Error! Bookmark not defined.**

2.2.2.2 Floating Exchange Rate System **Error! Bookmark not defined.**

2.2.2 Exchange Rate Volatility **Error! Bookmark not defined.**

2.2.3.1 Exchange Rate Volatility in Ghana..... **Error! Bookmark not defined.**

2.2.3.2 Exchange Rate Volatility and Inflation..... **Error! Bookmark not defined.**

2.2.3.3 Exchange Rate Volatility and Interest Rates. **Error! Bookmark not defined.**





4.3.2.2 Relationship between Exchange Rates, Interest Rates and Inflation Rate.....	Error! Bookmark not defined.
2.2.3.5 Exchange Rates Volatility, Inflation and Domestic Consumption. .	Error! Bookmark not defined.
2.2.3.6 Interest rate and inflation	Error! Bookmark not defined.
2.2.4 Financial Sector Development in Ghana	Error! Bookmark not defined.
2.2.5 Introduction of the Ghanaian Cedi.....	Error! Bookmark not defined.
2.3 Theoretical Literature.....	Error! Bookmark not defined.
2.3.1 Theory of Purchasing Power Parity (PPP).....	Error! Bookmark not defined.
2.3.2 Uncovered Interest Rate Parity	Error! Bookmark not defined.
2.3.3 The Eclectic Paradigm	Error! Bookmark not defined.
2.3.4 Exchange rate theory on imperfect capital markets	Error! Bookmark not defined.
2.4 Review of Empirical literature.....	Error! Bookmark not defined.
2.5 Conclusion	Error! Bookmark not defined.
CHAPTER THREE	Error! Bookmark not defined.
METHODOLOGY	Error! Bookmark not defined.
3.1 Introduction.....	Error! Bookmark not defined.
3.2 Scope of the study.....	Error! Bookmark not defined.
3.3 Sources of Data	Error! Bookmark not defined.
3.4 Data Description and Definition of Variables	Error! Bookmark not defined.
3.4.1 Exchange rate.....	Error! Bookmark not defined.
3.4.2 Domestic consumption.....	Error! Bookmark not defined.
3.4.3 Financial sector development	Error! Bookmark not defined.
3.4.4 Real GDP per capita.....	Error! Bookmark not defined.
3.4.5 Interest rate.....	Error! Bookmark not defined.
3.4.6 Inflation.....	Error! Bookmark not defined.
3.5 Empirical strategy	Error! Bookmark not defined.
3.5.1 Modeling exchange rate volatility	Error! Bookmark not defined.
3.5.2 Estimating the Autoregressive Distributed Lag (ARDL)	Error! Bookmark not defined.
3.5.3 Testing for structural unit roots.....	Error! Bookmark not defined.
3.5.4 Examining the short and long run effects of exchange rate volatility	Error! Bookmark not defined.



3.5.5	Granger causality test.....	Error! Bookmark not defined.
3.6	Conclusion	Error! Bookmark not defined.
	CHAPTER FOUR.....	Error! Bookmark not defined.
	FINDINGS AND DISCUSSIONS	Error! Bookmark not defined.
4.0	Introduction.....	Error! Bookmark not defined.
4.1	Descriptive Statistics.....	Error! Bookmark not defined.
4.2	Adapter Coefficients	Error! Bookmark not defined.
4.5	Structural Break Unit Roots Results	Error! Bookmark not defined.
4.5.1	At Levels	Error! Bookmark not defined.
4.5.1.1	Household Consumption.....	Error! Bookmark not defined.
4.5.1.2	Exchange rate.....	Error! Bookmark not defined.
4.5.1.2	Interests	Error! Bookmark not defined.
4.5.1.2	Real GDP per capita.....	Error! Bookmark not defined.
4.5.1.2	Financial development	Error! Bookmark not defined.
4.5.1.2	Inflation.....	Error! Bookmark not defined.
4.5.2	At First Difference	Error! Bookmark not defined.
4.5.2.1	Household consumption.....	Error! Bookmark not defined.
4.5.2.1	Interests	Error! Bookmark not defined.
4.5.2.1	Real GDP per capita.....	Error! Bookmark not defined.
4.5.2.1	Financial development	Error! Bookmark not defined.
4.5.2.1	Inflation.....	Error! Bookmark not defined.
4.6	Bounds Testing Co-integration Results	Error! Bookmark not defined.
4.6.1	Bounds Co-integration tests without interactive term	Error! Bookmark not defined.
4.6.1	Tests to common boundaries with an interactive term	Error! Bookmark not defined.
4.7	Empirical Findings.....	Error! Bookmark not defined.
4.7.1	Effect of exchange rate volatility and its transmission effect on household consumption	Error! Bookmark not defined.
	Error! Bookmark not defined.	
4.7.2	Examine the Causal Link among Variables.....	Error! Bookmark not defined.
4.8	Conclusion and Policy Implications	Error! Bookmark not defined.
	CHAPTER FIVE	Error! Bookmark not defined.

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION **Error!
Bookmark not defined.**

5.1 Introduction.....**Error! Bookmark not defined.**

2.5 Summary of Key Findings and Conclusion**Error! Bookmark not defined.**

5.2.1 The effect of exchange rate volatility on domestic consumption in Ghana..... **Error!
Bookmark not defined.**

5.2.2 The transmissions channels of exchange rate volatility on domestic consumption..... **Error!
Bookmark not defined.**

5.2.3 The role of the financial sector development in the relationship between exchange rate
volatility and consumption.....**Error! Bookmark not defined.**

3.5 Policy Recommendations.....**Error! Bookmark not defined.**

5.3 Contribution of Research to Contemporary Literature**Error! Bookmark not defined.**

5.5 Other areas of research.....**Error! Bookmark not defined.**

REFERENCES**Error! Bookmark not defined.**



LIST OF TABLES

Table 4.1: Descriptive Statistics.....	57
Table 4.2: Correlation matrix.....	58
Table 4.3: Exchange rate volatility results.....	65
Table 4.4: Unit root test results for household consumption at levels.....	68
Table 4.5: Unit root test results for exchange rate at levels.....	69
Table 4.6: Unit root test results for interest rate at levels.....	70
Table 4.7: Unit root test results for real GDP per capita at levels.....	72
Table 4.8: Unit root test results for financial development at levels.....	73
Table 4.9: Unit root test results for inflation at levels.....	74
Table 4.10: Unit root test results for household consumption at first difference.....	77
Table 4.11: Unit root test results for exchange rate at first difference.....	78
Table 4.12: Unit root test results for interest rate at first difference.....	79
Table 4.13: Unit root test results for real GDP per capita at first difference.....	81
Table 4.14: Unit root test results for financial development at first difference.....	82
Table 4.15: Unit root test results for inflation at first difference.....	83
Table 4.16: ARDL cointegration test results without interactive term.....	86
Table 4.17: ARDL cointegration test results with interactive term.....	87



Table 4.18: Short and long run effects of exchange rate volatility on domestic consumption.....88

Table 4.19: Breusch-Godfrey Serial Correlation LM Test.....91

Table 4.21: Breusch-Godfrey Serial Correlation LM Test.....94

Table 4.22: Breusch-Pagan-Godfrey Heteroskedasticity Test.....94

Table 4.23: Granger Causality Test Results.....97

LIST OF FIGURES

Figure 2.1: The deterioration of Ghanaian Cedi against the US dollar from 1983 to 2017.....16

Figure 4.1: Exchange rate and consumption.....60

Figure 4.2: Financial development and consumption.....61

Figure 4.3: Real GDP per capita and consumption.....62

Figure 4.4: Inflation and consumption.....63

Figure 4.5: Interest rate and consumption.....64

Figure 4.6: Real Effective Exchange Rate Volatility Clustering.....65

Figure 4.7: Cumulative sum for model 1.....92

Figure 4.8: Cumulative sum of squares for model 1.....93

Figure 4.9: Cumulative sum for model 2.....95

Figure 4.10: Cumulative sum of squares for model 2.....96



LIST OF ACRONYMS

AIK	Akaike Information Criterion
ARDL	Auto-Regressive Distributed Lag
BoG	Bank of Ghana
BPG	Breusch Pagan Godfrey
CBK	Central Bank of Kenya
CONSU	Household Consumption Expenditure
CPI	Consumer Price Index
CUSUM	Cumulative Sum
CUSUM	Cumulative Sum Square
MPC	Marginal Propensity to Consume
ERP	Economic Reform Program
FCA	Foreign Currency Accounts

FEA	Foreign Exchange Accounts
FINDEX	Financial Sector Development Index
FINSAP	Financial Sector Adjustment Program
GARCH	General Auto-Regressive Conditional Heteroskedasticity
GDP	Gross Domestic Product
GDPPC	Gross Domestic Product Per Capita
IMF	International Monetary Fund
INTRATE	Interest rate
MoFEP	Ministry of Finance and Economic Planning
NCL	National Liberation Council
OLS	Ordinary Least Square
PPP	Purchasing Power Parity
REER	Real Exchange Rate
REERVOL	Real Exchange Rate Volatility
RESET	Ramsey's Regression Equation Specification Error Test
SSA	Sub – Saharan African
USA	United State of America

VAR	Vector Auto-Regressive
WACB	West African Currency Board
WDI	World Development Indicators
WP	Working Paper



CHAPTER ONE

INTRODUCTION

1.1 Background

The volatility of the exchange rate is an important element that requires critical analysis, in particular in countries in development that are highly dependent on international trade. With globalization and the tendency of all countries to open up to international trade and take advantage of international markets, the exchange rate is in the process of becoming an actor importantly, it affects not only trade in the country, but also of other variables of microeconomics such as consumption, which is a very important component of aggregate demand. Consumption is an important part of the accumulated demand that affects economic measures related to monetary policy (Lyke and Ho, 2017). Numerous authors have considered real income and interest rate as a factor influencing consumption in economy. Today, the exchange rate has become a major factor in most macroeconomic variables. Domestic consumption is one of the macroeconomic variables that affect the exchange rate. Bahmani-Oskooee, Katan and Xi (2015) Alexander, one of the first economists, recognized the impact of the exchange rate on consumption in 1952. He argued that consumption rates could be affected by the rate of exchange because of the pass-through effects on inflation. According to Upstfield and Rogoff (1998) and Lake (2017), made it clear that exchange rate volatility like any form of volatility is critical on the attitude of individuals, hence their savings decisions. Indeed, exchange rate volatility can affect the prices of goods and services because of its pass-through effects on inflation. This has led to price uncertainty, which has a decisive impact on domestic consumption.





Exchange rate management is one of the most traditional ways to reduce internal and external imbalances in the country's economy. Policymakers often face the challenge of choosing between a fixed and floating exchange rate regime. According to the theory, when the exchange rate is fixed, many fluctuations diminish and, if allowed to float freely on the market, they are not predictable. However, in order to reduce volatility you need to choose the right regime (Friedman 1953 Flud and Rose, 1995). The final argument is that no exchange rate regime is appropriate for all countries (Frankel, 1999), but the level of financial development of a country determines the appropriate exchange rate for each country. (Aghion et al, 2009). The choice of the exchange rate regime is perhaps one of the most controversial aspects of macroeconomic policy in developing countries, Humera (2014).

High development in the financial sector could reduce the real economic costs of exchange rate volatility. The advanced financial sector can mitigate the effects of exchange rate volatility in two ways. First, further development of the financial sector could be a more effective way of transferring exchange rate volatility risk. Merton & Bodie (1995) point out that one of the most important roles of the financial system is to facilitate trade, hedging, and diversification and risk sharing. As a result, a well-developed financial market can reduce the impact of exchange rate fluctuations on domestic consumption. Another mechanism by which the advanced financial sector can mitigate the impact of monetary uncertainty is that further development of the financial sector could provide better access to finance for exporting firms to offset the negative impact of volatility of exchange rate. Suppose the lending capacity of the firm matches the degree of development of the financial sector of the economy. Then the actors of industry's financial strength at large will be proportional to the increase in the capacity of the firm to increase its indebtedness and ability to absorb the shocks of the exchange rates and the negative impact

on producer prices and local consumption. Cheney (2005) and Ryoo and Dekle (2006) have recently shown that the liquidity constraints which is under normal circumstances determined by the level of development of the financial sector of exporting country play a key role in determining the level of its exchange rate regime, hence the level of its domestic consumption.

1.2 Research Problem

The importance of the relationship between exchange rate volatility and local consumption has received more attention in modern literature. Despite its apparent role, there is no much research work on the effect of exchange rate volatility on domestic consumption especially in Ghana. Surprisingly, the past studies on the relationship between exchange rate volatility and domestic consumption is limited (Bahmani Uskoy, Kutan and Shi, 2015). To take advantage of the benefits of the global market, the exchange rate has become a major player, affecting not only trade flows but also domestic spending. Since exchange rates changes can affect consumption, so changes in exchange rates that indicate volatility can also affect consumption. This is why it is important for an open economy like Ghana to seriously analyze the relationship between exchange rate volatility and domestic consumption. This study also estimates that inflation and interest rates as the variables in which the volatility of exchange rate can pass-through to affect local consumption. The study is mainly based on the fact that the impact of exchange rate changes on domestic consumption is positive and that the development of the Ghanaian financial sector has helped to reduce exchange rate fluctuations. Knowing the size and speed of the pass-through of the volatility of the exchange rate to the domestic consumption, can provide the understanding of the effectiveness of the monetary policy channel or otherwise, and this is the main objective of the study. The objective of this study is to examine the significant role that the development of the financial sector in



Ghana plays in relation between the volatility of the exchange rate and domestic consumption in Ghana.

Despite the obvious importance, few studies have tried to examine the effects of volatility of exchange rate on household consumption and also attempted to make substantiation of the relationship that exist between exchange rate volatility and domestic consumption in Ghana.

Bahmani-Oskooee and Hajilee (2010) findings indicated that exchange rate depreciation in 6 countries was correlated positively with the wages of low unskilled labour out of the 18 countries they examined, and negatively correlated with the wages of highly skilled labour in 7 countries out of the 18 countries. Bahmani-Oskooee and Hajilee (2012) again gathered evidence of short-run effect of currency depreciation on consumption in 37 countries out of 50 countries. They also found long-term effects in 24 of out of the 50 countries. Their conclusions confirm the claims of Alexander (1952).

In addition to these studies, Bahmani-Oskooee and Xi (2012) by using the GARCH base measure of exchange rate fluctuation examine the role of exchange rate volatility in local consumption, by including real income, interest rates, and exchange rates in the study. They found that in Canada, exchange rate volatility would be one of the reasons for reduction in consumption and increase in consumption in the United States and Japan. In the context of emerging markets, Bahmani-Oskooee, Xi and Kutan (2015) has also studied the effects of fluctuations in the rate of exchange on domestic consumption. In a sample of 12 countries, they found that while short-term exchange rate fluctuations affect domestic



consumption in all countries, it was only 6 countries that they observed that the short-run effects are passed on to the long-run effect.

It is only the emerging economies or the industrial nations that the recent studies in this area have so far covered. The only country of South Saharan Africa that has seen the recent time series study so far is South Africa. Oseni (2016) in a recent study, also looked at the issue, focusing on a panel of 19 countries in sub-Saharan Africa. The main limitation of these extant studies is that panel method was employed and as a result may not accurately reflect the country's specific experiences. In this paper, we add to this growing literature by examining the effects of exchange rate fluctuations on domestic consumption, focusing on Ghana. Ghana is a small and open economy that has experience a severe fluctuation of exchange rate, besides being a Sub-Saharan African (SSA) country. Since 1983, Ghana has implemented a series of economic reforms aimed at achieving and sustaining economic growth and reducing poverty. A major reform of the exchange rate system was implemented under the Financial Sector Adjustment Program (FINSAP), where the exchange rate regime of the 1980s was replaced by a floating system (Alagidede and Ibrahim, 2016). Once the floating system has replaced the system of fixed exchange rate, the currency, (Cedi) became volatile. Therefore, our objective is to evaluate how the volatility of the Ghanaian Cedi has affected the domestic consumption of the country.

1.5 Research or Objectives

1. The main objective of this study is to assess the impact of changes in exchange rates on the domestic consumption in Ghana. The following specific objectives answer the research questions:
2. To determine the effect of exchange rate volatility on domestic consumption in Ghana



3. Examine the role of financial sector development in exchange rate volatility and domestic consumption-nexus.
4. Examine the causal link between consumption, the exchange rate and the interest rate.

1.4 Research questions

1. What is the effect of exchange rate volatility on domestic consumption?
2. How does the financial sector mediate relationship between exchange rate volatility and domestic consumption?
3. What are the causality trends between consumption, exchange rate and interest rates?

6.1 The Justification of the Study

This study contribution to the current empirical literature is to provide new insights into the relationship between volatility of exchange rates and consumption in Ghana and how the development of the financial sector in Ghana has shaped the effect of the rate of exchange volatility pass-through effects on domestic consumption in Ghana. This study will benefit many people in the country, including the government and its agencies, such as the Ministry of Finance and Economic Planning (MOFEP) and the Bank of Ghana (BoG), by developing a policy framework aiming at reducing the uncertainty and volatility of the exchange rate in the economy. It will also help these agencies stimulate the economy during the recession and reduce it during periods of inflation. This will contribute to better transmission of monetary policy and price stabilization for Ghana's economic growth. The study will be an important tool for researchers and academics to raise awareness of how exchange rate volatility impacts on Ghana's domestic consumption and its policy implication for policy makers how exchange rate volatility could be curtail in the Ghanaian



economy. Therefore, this could be added to the existing literature on the relationship between exchange rate fluctuations and domestic consumption in Ghana.

1.7 Scope of the Study

The study is limited to Ghana based on annual time series data from 1980 to 2016. This period was chosen based on data availability.

1.8 Organization of the Research

The first chapter (introduction) describes the context of the study and also provides an introductory statement to the problems of this research. It defines the relevant areas in need of solutions immediate, improvements and how things should be done. It also provides the purpose of the survey and states the questions that require answers at the end of the study. In addition, the chapter lists the importance of the study for Ghana's economy and describes its limitations and challenges. In the second chapter, the researchers review some theoretical and empirical articles on the exchange rate, inflation and interest rates. In addition, conceptual work was used to support the study. Chapter three describes the research approach adopted for the study, the sample structure and how the sample size is determined. Sampling techniques, and tools used for data collection, data analysis, and data sources are described in this chapter. The fourth chapter presents the data collected as well as their analysis and interpretations or debates. It presents the factors identified by the analysis of the data as significant compared to the assumptions made in the hypothesis. The



chapter also discusses the empirical results of the research compared to the existing literature. Chapter five is the summary and conclusions on the relevance of the findings for Ghana's economy.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter examines recent studies on the objectives and conceptual framework of exchange rate volatility and consumer spending. The sections that are discussed in this section are: 2.2 consists of definitions and conceptual frameworks, chapter 2.3 Discusses theoretical works related to the survey, and section 2.4 deals with the empirical literature relevant to the survey.

2.2 Conceptual Framework

The exchange rate is an important variable that determines global competitiveness and serves as a parameter for measuring a country's currency relative to the currency of a different country and the relationship between currencies. In this case, any low-exchange rate country expects a more competitive currency (Danmola , 2013). Exchange rate regulation includes the laws (rule system), regulations, and institutional arrangements under which states pay for themselves (Danmola , 2013). A high development in the



financial sector could reduce the real economic costs of volatility in exchange rates. The development of Ghana's financial sector has shaped exchange rate fluctuations over the years.

2.2.1 History of exchange rate in Ghana

Prior to the advent of the Economic Recovery Program (ERP), Ghana's exchange rate policy was to maintain a stable exchange rate regime with occasional devaluations and financial stabilization. However, since 1988 the State has a flexible exchange rate system, after which the national currency, the cedi (¢) is facing significant instability. After independence in 1957, Ghana adopted an independent currency and monetary policy. After having worked for several years with a fixed exchange rate, Ghana introduced in 1983 a more flexible system that remained more flexible. Over the years, the currency which has been changed occasionally many times has seen a significant decline in relation to the other major currencies. This has led to inflation, erosion of national income and a loss of confidence in the economy.

According to the literature, the depreciation of the currency is due in part to the forces of supply and the seasonal demand shock. The long-run trend depreciation, however, reflects more fundamental elements: due to instability, Ghana adopted a fixed exchange rate system to manage its exchange rate between 1970 and 1985. During this period, Ghana Cedi was pegged with the major convertible currencies, including the British pound and the US dollar, respectively. Since 1986, the government has adopted a floating exchange rate, and in September of the same year, has adopted an auction market approach to accelerate the exchange rate adjustment and to reach the trade liberalization goal left to



the market forces (supply and demand) partly to set the Cedi/ US dollar rate. Following the introduction of the floating exchange rate in 1986, the value of the Cedi was depreciated by 95.6 % in 1995, but the depreciation rate of the Cedi eased off between 1988 and 1991. In 1988, the foreign exchange rate bureau was put in place in order to absorb the parallel exchange rate market into well established legal foreign exchange rate bureau system. These exchange offices were the entities that were fully authorized exchange bureau entities, managed by individuals, groups or institutions. In March 1990, the country established a wholesales auction to replace weekly retail auction, which led to the establishment of a composite regime called interbank and wholesale system. However, the wholesale auction system was abolished in April 1992 and replaced by the interbank market system. Since then, both the commercial banks and foreign and exchange bureau have operated in a competitive environment. Depreciation was 57.4 % in 1993 and fell to 2.3 % in 1998 before reaching its highest value of 99.4 % in 2000. Between 2001 and 2007, the cedi depreciation rate slowed down. However, the value of the cedi fell sharply between 2008 and 2009, partly because of the redenomination of the national currency.

2.2.2 Exchange regime in Ghana

Ghana introduced a new currency called Ghana pound (£ G) in November 1958, when it was linked to the British pound at par and was fixed at external value of US\$2.8 (Jebuni, Sowa and Tutu, 1991). The external value of the currency is the value of the currency relative to another currency. The exchange rate of Ghana's fixed system had been extended from 1958 to 1983 before the advent of the floating exchange rate regime. The foreign exchange market system of Ghana has experienced considerable and dramatic changes over the last three decades. Ghana was a member of the British West African Currency Board (WACB), created in 1912. In this system, the Board was responsible for the issuance of legal currency notes and coins in within the four colonies of the British - (Ghana, Nigeria, Sierra Leone and Gambia) However, prior to independence in 1957,

Ghana renounced her membership to the WACB and introduced the fixed exchange rate policy.

2.2.2.1 System of fixed exchange rate

A fixed exchange rate system is a system in which a currency is linked to a currency or another basket of currencies. Bhattarai and Amah (2005) linked the reason for the evolution of exchange to the result of different political regime and different policies since 1957. They further explained that Ghana's choice of a fixed exchange rate system over a floating exchange rate system corresponded to thought at that time, so that by 1946 the exchange rate policy was dominated by the 1944 Bretton Woods agreements. So even, the United States adhered to the floating exchange rate system in 1973, likewise other states. For these reasons, this notion may be due to the fact that most countries are engaged in economic expansion activities which could adversely affect their balance of payments if the exchange rate is not fixed. On the other hand, their conclusions are not sufficient to explain the sources of Ghana's exchange rate determination, since other factors such as interest rates and terms of trade may affect any single exchange rate policy decision, among others.

The results of Battatarai and Armah (2005) are similar to Kenen (2000). Both argue that fixed exchange rates may be achievable if you rely just on the appropriate monetary policy controls, but these monetary controls have not yet been determined. Based on the studies to date, it can be concluded that the time for the adoption of a fixed exchange rate was favorable for Ghana, but that it could have been more beneficial for the country even



after 1983 if Ghana's exchange rate system had been applied with effective checks of the balance of payments as a strategy to reduce the difference between the volume of imports and exports, to increase local production and to keep the money supply within acceptable limits.

The system of fixed exchange rates in Ghana began in November 1958, when the country introduced a new currency, the Ghana pound, was initially set at par with the British pound sterling and exchanged at US\$2.80. In 1965, a new currency, the cedi, was introduced to replace the Ghanaian pound. Then was set at 2.4 Cedis at £1 and 1 cedi US \$ 1.166. In February 1967, the Cedi was replaced by the new Cedi, worth 1.2 times the "old" Cedi. The external value of the Cedi is set to US\$ 1 = 0.714 new Cedi. In terms of the British pound, the new Cedi was initially set at 2 Cedi = 1 British Pound, but the currency was devalued by 2.45 Cedi = 1 British Pound, while maintaining the price of the new Cedi-dollar exchange rate (Kwakye , 2012) . They say the economy is in free fall. Companies were producing below capacity due to a shortage of raw materials. The exports stagnated and imports quickly became more expensive. The GDP per capita has greatly dropped and the government of the National Liberation Council has attempted to ensure the rescue of the economy by seeking for a bail out from the IMF and the World Bank. As a result, Ghana relied on a combination of economic measures and reform of international financial institutions. In July 1967 the rate was fixed at US\$1.00 per 1.02 cedi. In November 1967, the devaluation of the British pound was established at £1 = \$ 2.8 to £1 = US \$ 2.4. Although Ghana's currency remains at par to the British pound, Ghana did not devalue its currency. Due to the fact that its balance of payments is not sustainability and couple with the erosion of Ghana's foreign reserves, the Cedi was devalued in December 1971, at a constant rate of 1 US dollar= 1.82 cedis and later was revalued to US\$0.78 in 1972. However, the cedi regained





about 25 Percent of its value after the coup d'tat in January 13, 1972 which led to the expulsion of Busia's progress party government by the NLC military government of Col. Ignatius Kuntu Achiampong. After the coup d'tat, the currency of Ghana was devalued in early 1973 to \$ US 0.87. At this point, it was possible for the government to exit the fixed exchange rate system by devaluing the currency to reflect its market value because of the forces of supply and demand. The flexible exchange rate system was adopted in June 1978: the Cedi-USD exchange rate was adjusted according to current macroeconomic conditions. The floating exchange rate regime was one of many monetary interventions put in place by the Ghanaian government to devalue the currency after a first attempt.

2.2.2.2 Floating Exchange Rate System

The current exchange rate system, called the floating exchange rate, can be described as a managed exchange rate system (Kensen , 1994), adopted by most countries as a result of the unsuccessful attempt to restore the Bretton Wood system after it collapsed. Although the exchange rate floats, there have been no significant fluctuations. It was a stable system, due to the fact that the Central banks have tried to ensure that sometimes they intervene to avoid large fluctuations. The rate of exchange in most major countries was pegged against the US dollar. There was significant appreciation of the currencies of these leading countries against the dollar. However, in 1973, when the system became impracticable, the dollar and other major currencies were allowed to float. The implementation of the floating exchange rate regime, which freely determined the value of the Cedi through the interaction of market forces , resulted in a 96% fall in the Cedi in 1987 (Tarawalie et al., 2012).

Sowa and Acquaye (1999) found that the liberalization of financial and foreign exchange market of Ghana has exerted a weak impact on Ghana's exports and imports and continued without stop, even upon the currency devaluation. Although the liberalization efforts have been largely inflationary by the supply of money and output, it has generally improved upon the locative efficiency of the financial markets. The foreign exchange bureau system was created to integrate the parallel market into the legal forex market. The weekly auction was canceled in 1990 in favor of wholesale auctions, which institutionalized the composite exchange rate system put in place, in particular the interbank system and the wholesale auction system. However, the wholesale auction system was abolished in April 1992, opening up commercial banks and foreign exchange bureaus in a competitive financial environment. The exchange rate has continued to depreciate, even though there was some gains and the real effective exchange rate in 1993 was $1\text{USD} = 123.92$ Cedi and was increased to $1\text{USD} = 140.49$ cedis in 1999. As a result, the value of the Cedi was reduced by 99.4% in 2000, partly because of the general elections held in the country that year.



2.2.2 Exchange Rate Volatility

The exchange rate defined in N'gang'a's work (2015) as the price of the currency of a country relative to another currency. This is the rate at which one currency will be exchanged for another currency. It is also considered the value of a country's currency against another currency. Volatility represents the degree of modification of a variable over time. The larger the change in the variable, the more volatile it is. Volatility is a statistical measure of the dispersion of returns for a given value or a market index. Exchange rate volatility refers to the exchange rate fluctuations that occur between the currency of one

country in terms of the currency of another country and the negative or positive effects on the economy (Ng'ang 'a , 2015). .

2.2.3.1 Exchange Rate Volatility in Ghana

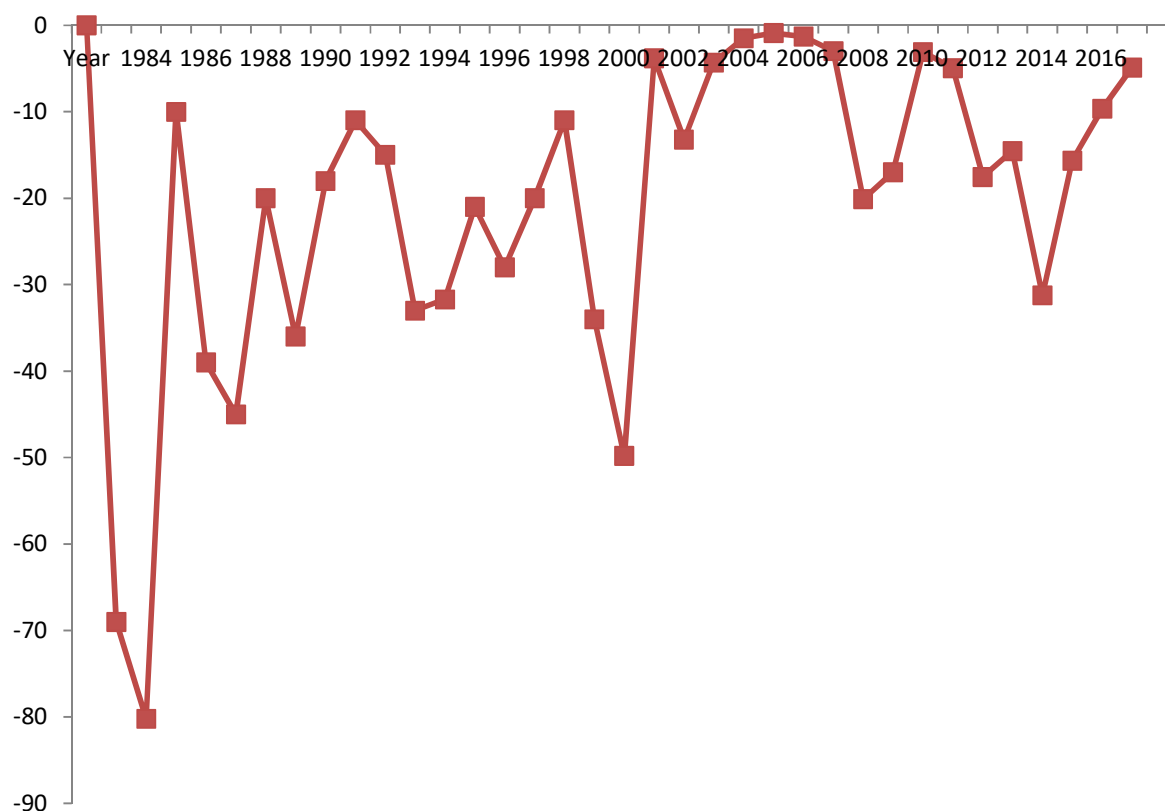
Small and open economies often view exchange rate policy as an integral part of their cumulative macro-prudential policies to ensure price stability and commitment to economic growth and financial stability. In these circumstances, the general objective of monetary policy is, first and foremost, to stabilize exchange restrictions in their basic form. Ghana is a small, open economy that poses a specific problem as exchange rate fluctuations do not reflect the fundamentals of the economy (WP/BOG, 2014). The economy of Ghana is small and open, with the uncertainty of exchange rate. Ghana is involved in many economic reforms aimed at reducing poverty and economic growth. In the framework of the of Financial Sector Adjustment Program (FINSAP), a fundamental reform of the exchange rate has been in space , in which the free floating regime replaced the regime of the fixed exchange rates in the 1980s. Since then, Ghana's currency (Cedi) became unstable (Olajidede and Ibrahim, 2016). The rapid depreciation of the Cedi against other major currencies destabilized Ghana's economy in the first eight months of 2014 and increased Ghana's economic awareness of the economic situation, regardless of people understands of economic issues.

According to the Governor of Bank of Ghana in 2014, he was surprised when his illiterate mother insisted on increasing monthly transfers in to account for the rapid depreciation of the Ghana Cedi. In fact, this is not the first time Ghana has experienced such turbulence on the currency market. On annual basis, there has never been a year when the cedi has not lost its value since the country is moved from the fixed exchange rate system to current floating exchange rate regime as part of the economic reform program started in April 1983. Over the past three decades, the cedi has lost about 99.9984% of its value



against the US dollar. The lowest annual depreciation rate (0.9 %) occurred in 2005, while the year 2000 had the highest depreciation in Cedi (49.8 % since 1984). On average, the cedi has depreciated annually at a rate of 20.3 % over three decades (see Figure 2.1). The longest period of deceleration in cedi, with a steady decline in the rate of the depreciation, when it moved from 13.2% in 2002 to 0.9% was in 2005, before reaching 20.1% in 2008.

Figure 2.1: Depreciation of Ghana Cedi against US Dollar from 1983 to 2017



Source: Author's calculation using data from the Bank of Ghana.

Quarterly, the cedi is not stable either. Between 2007 and 2014, the interbank exchange rate depreciated by 3.7% on average, against 3.9% for the Forex Office. The last quarter of



1999 was marked by the highest depreciation rate of the interbank market, while the second quarter of 2000 was marked by the worst depreciation of the foreign exchange market, at 27.3%. In fact, most quarters suffered currency depreciation and few of them reported an appreciation. The largest period of exchange rate appreciation occurred between the third quarter of 2009 and the first quarter of 2010 for the interbank market, the third quarter of 2009 and the second quarter of 2010. The highest quarterly increase in the Cedi compared with the US dollar 2.3% on the interbank market were recorded in the second quarter of 2003, while the foreign exchange market recorded the best appreciation of 1.5% in the third quarter of 2004. For example, between September 2011 and September 2014, Ghana's external debt increased from US\$ 7,103.41 million to US\$ 12,712.02 million, an increase of 79.0%, but in terms of Cedi, the increase reached 275.8% from GHC10 814.23 million to GHC40 644.15 millions.

2.2.3.2 Exchange Rate Volatility and Inflation

The inflationary effect of the depreciation of the exchange rate is indisputable, especially if, as in Ghana, the country's import expenditure is a sizeable proportion of total expenditure. The depreciation of the Cedi against major currencies not only increases the cedi prices of finished products by importing these products, but also by increasing the cost of cedi of imported inputs. As indicated in the government's 2015 Budget (see page 14), "while food inflation declined in late October 2014, non-food inflation increased sharply, mainly because of the indirect effects of the sharp depreciation of the exchange rate during the period considered." The speculative effect of exchange rate instability hampers business, government and household planning, while recognizing that speculation is not necessarily the main cause of the exchange rate market instability. It cannot be ruled out that any market instability fuel speculation, which in turn fuel more instability that

hinders the planning of economic agents. In fact, the Government, had to revise its target for 2014 in the 2014 mid-year review to Parliament after a first half agitation, the situation may not be different from the business world.

According to Ng'ang'a (2015), inflation is an increase in the general price level due to increased demand, higher import price, or increased costs. According to Mushtaq Ur and Shafiq Ur (2015), inflation is a very important macroeconomic variable and has a major contribution to the determination of the exchange rate. There is an inverse relationship between inflation and the exchange rate. An increase in inflation means an increase in the amount of money held by people or high prices of products. High product prices mean that buyers have to spend more than before. This will reduce the demand for local currency in the FOREX market as buyers seek the product in other markets, which may lead to the devaluation of the local currency against the major currencies, US\$ for instance. In fact, inflation is relevant in determining the transfer of the exchange rate to the consumer. The high inflation caused by exchange rate uncertainty changes the level of prices of goods both domestic and abroad (Ogundipe and Egbetokun, 2013). According to Ogundipe and Egbetokun (2013), high (low) level of inflation increases (decreases) a person's purchasing power. During a season of high exchange rates, the national currency depreciates, which means that the rise in the exchange rate has been dictated by consumer price inflation (Charles, Simon and Daniel, 2008). Bahmani-Oskooee, Kutan, and Xi (2012) argue that, since in the current float, the exchange rate volatility contributes to inflation volatility, it can directly affect the consumer spending. The disparity in inflation creates uncertainty about the purchasing power of consumers trying to adapt to protect themselves from the future by saving more and consuming less. On the other hand, consumers can consume more and save less if they want to overcome future inflation. The volatility of exchange rates contributing to inflation, it should have similar effects on



consumption.

2.2.3.3 Exchange Rate Volatility and Interest Rates.

The theory of IFE assumes that nominal interest rates and inflation will move together in the long-term. This means that real interest rates are stable over time. The IFE also assumes that the appreciation or depreciation of the currency is proportionally correlated with the nominal interest rate spreads. This theory attributes exchange rate fluctuations to interest rate differentials rather than inflation differentials.

4.3.2.2 Relationship between Exchange Rates, Interest Rates and Inflation Rate

Mumuni and Owusu-Afriyie (2004) conducted a study that investigates the determinant of the Cedi-dollars exchange rate. In their study, they found that the Cedi/USD movements were determined by the integration of macro-economic factors such as inflation, money supply and speculation on the basis of immediate pass history. In order to understanding the relationship between the exchange rate, the inflation, interest rates and the money supply, they realized that the highest levels of domestic inflation in relation to the foreign inflation led to depreciation of the cedi as against the US dollar. However, high interest rates in the domestic market have strengthened the Cedi against the dollar in the short term. The study of Laryea (2016) has revealed that the inflation reached a peak at





about 70 % in June 1996; there depreciation of the exchange rate was at 30 percent in the year, while interest rates rose to around 40 %. Consequently, inflation and interest rates show the divergent results on exchange rate when tested together as compared to result when tested individually on the exchange rate. Moreover, despite an increase in the money supply, the exchange rate declined marginally in succession. In 2001, the exchange rate dropped to about 62%, with a similar increase in inflation of about 45%, while interest rate rose to 38% and the growth rate of money rose to 45%. laryea (2016) has also noted that the exchange rate is closely linked to inflation, growth of the money supply and interest rates.

In a related literature by Sanusi (2010) also shows that the pass-through of the exchange rate, to the extent that exchange rate movements reflect consumer prices of goods in Ghana is important (Sanusi , 2010). The statement of Sanusi, however, was contrary to the findings of Frimpong and Adam (2010) who found a lower rate of pass-through for Ghana. As a result, the depreciation of the exchange rate is the result of high inflation and the appreciation of the exchange rate is the result of the fall in inflation. As a result, the rate of change in depreciation between 1983 and 2006 is the product of an increase in inflation and interest rates over this period. From these figures, it will be interesting to discover the impact of these economic factors on current exchange rates, as the government has taken steps to stabilize the exchange rate, but this is not sustainable in the long run. The relationship between exchange rates, interest rates and inflation is similar to the generally accepted theory that appreciation of exchange rates reduces inflation and raises interest rates, and depreciation of exchange rate increases inflation and reduces interest rate.

2.2.3.5 Exchange Rates Volatility, Inflation and Domestic Consumption.

Since the collapse of the Bretton-Woods system of fixed exchange rates, both real and nominal exchange rates among countries have continued to fluctuate widely. The liberalization of capital flows and the increasing movements of cross-border financial transactions have also tended to amplify the volatility of exchange rates among countries. The traditional belief is that the increased volatility of exchange rates has a negative impact on an economy. One key argument has been that exchange rate volatility could have indirect effects on domestic consumption as a result of pass-through effect on other economic variables (Côte, 1994). For many countries the desire to mitigate the effects of exchange rate uncertainty has been an underlying rationale for the adoption of managed or fixed exchange rate regimes. Given that the effect of exchange rate volatility on consumption has been such an important issue for the exchange rate policy of a country. The effects of exchange rate depreciation are well documented in the literature. The one that frequently comes to mind is the fact that depreciation of real exchange rate increases demand for domestically produced goods by reducing their relative prices and more importantly promotes exports which eventually exert expansionary effect on national output. This expenditure switching effects are associated with the Mundell-Fleming-Dornbusch framework. Thus, imports become more expensive relative to domestically produced goods particularly if domestic production does not depend largely on imported raw materials and capital inputs.



Bahmani-Oskooee, Kutan and Xi, (2012) stated that in every country, 60-70% of domestic production is purchased and consumed by domestic residents. Therefore, understanding the determinants of consumer spending or consumption is very important to policy makers so that they can stimulate it during recession time and curtail it during inflationary time.

Base on Alexander's inclusion of exchange rate in the consumption function in 1952, Bahmani- Oskooee, Kutan and Xi, (2012) in their study to assess the relationship between exchange rate volatility and domestic consumption in Japan took an additional step and argue that since under the current float, exchange rate volatility contributes to inflation volatility it may have direct effect on consumption. Inflation is quite relevant in determining exchange rate pass through to consumer. Rising level of inflation induced from exchange rate increases price level of foreign goods (Ogundipe and Agetokun, 2015, Paral, Ben and Alass, 1998). Domestic consumption is therefore affected by the rate of exchange rate volatility as a result of fluctuation in the value of raw materials bought from countries that experience a strengthening or weakening of the local currency as the case may be.

2.2.3.6 Interest rate and inflation

According to (Nchor and Darkwah, 2015) the level of interest rates in an economy plays a significant role in influencing the level of inflation. Rising nominal interest rates lead to rising inflation rate and vice versa all things being equal. The relationship is however,



opposite in the case of real interest rates. Rising real interest rates lead to declining inflation rates all things being equal. So far as interest rate affects the rate of inflation, the relationship between interest rate and consumption exist in the form of pass through effect of inflation.

2.2.4 Financial Sector Development in Ghana

Inelasticity of Ghana's export supply and our absolute requirements for goods imported for various reasons have not been able to increase exports and reduce domestic demand for foreign goods and services within a constant depreciation of the exchange rate over the years. Ghana's exports were dominated by primary products that did not respond easily to changes in the foreign exchange market. This is often what has motivated the need to diversify our exports in areas/products more sensitive to the dynamics of the foreign exchange market. Even if the country could benefit from the growth effect of the domestic output growth, it would be reversed because of the strong dollar-based government responsibility, which is a common feature of the country time. The depreciation of the Cedi increases the local currency value of the foreign currency debt and the burden of debt service due to the fact that the national income is in national currency. While it is recognized that the public debt denominated in the currency of Ghana has increased considerably in recent years, the number has reached the upper limit when specified in cedis.

The causes of exchange rate volatility are directly related to the demand and supply of exchange rates, and this is well explained in the literature. In Ghana, the continued reduction of the value of the Cedi with respect to the main trading currencies has often been linked to many factors, including the high dependence on imports and dependence





in respect of exports of raw materials. Solving this fundamental problem is a long-term problem, but it may not be the only reason for the problem of exchange rate instability. The high budget deficit, which accounted for about 12% of GDP in 2012, was mainly due to higher election-related spending and the apparent indecision of the central bank, or even the inability of the central bank to inflame its intervention measures when needed cannot escape responsibility for the rapid depreciation of the cedi in the first half of 2014. The "dollarization" of local transactions, including the government's decision to index import tariffs on the dollar, tends to put pressure on the dollar demand of economic agents to avoid potential losses, while maintaining the national currency to pay the rates of import at the port. The exchange rate control measures adopted by the central bank in February 2014 with the desperate aim of stopping the rapid depreciation of the Cedi compounded the problem, as many people decided to keep their currency or divert it. In addition, the mechanism for regulating and monitoring the foreign exchange market, in particular that of foreign exchange agencies, is relaxed and porous to the extent that an individual does not need to show its identity to facilitate the capture of individual records and office surveillance activities over a period of time. In such circumstances, how can the regulatory authority monitor and control the possible flow of currency into the parallel or black market or underground market?

As Ghana's international trade structure remains unchanged, with increased exports of primary products and large imports, resulting in a persistent trade deficit, the national currency will continue to decline relative to major trading currencies. The slowdown in the cedi's depreciation in the last quarter of 2014 sparked a debate over whether it's just a flash after the turbulence of the first nine months of the year. It is important to note that the US\$ 1 billion EURO bond and the US\$ 1.7 billion COCOBOD commercial financing facility for cocoa purchases in 2014/15 to reverse the speculative behavior of agents in the



exchange rate market and, coupled the deceleration of imports from August to September, largely explains the slowdown in the depreciation in value of the cedi. However, in the medium and long term, the redemption or repayment of these facilities could have a knock-on effect on the cedi against other foreign currencies if these facilities were not prudently invested in economic sectors which will likely to generate better returns in the future.

It is difficult to foresee a long period of stability of the Ghanaian exchange rate market in the current economic structure. We can only expect a possible slowdown in the exchange rates if concrete measures are taken in the financial and monetary sector of the macro-economy as well as the adaptation of better monetary controls and supervision in the economy and improve the foreign exchange market, instead of repeating the unpopular control of exchange rates that were introduced in February 2014 to cope with the rapid decline of Cedi. The Bank of Ghana may take any other action (or take existing measures) to ensure that foreign currency transactions, particularly in the foreign exchange bureaus, require proper identification to facilitate the movement of currency in the system and at least the possibilities of reducing exchange of currency in the parallel market. The banking supervision systems should be strengthened in order to be able to reduce the gaps that facilitate the operations of unconventional exchange rate market. To improve the regular supply of foreign currency in the banking sector, measures could be undertaken to encourage the Ghanaians in the diasporas to manage their foreign currency accounts at a marginal rate than they would have received in their home country. In the United States, Canada and Europe, interest rates on savings and other deposits are very low, as a rate that is 2% higher than the rates in these countries could attract Ghanaians in the overseas who have surplus income to invest elsewhere to invest in Ghana, which could be a better alternative than issuing the euro at 8%.

Moreover, it is more appropriate to use financial instrument and other monetary instruments to cope with the rapid depreciation of the cedi in place of resorting to measures of strict control that undermine the confidence of the general public in the financial and foreign exchange system of the country.

2.2.5 Introduction of the Ghanaian Cedi

After the election, in particular between 2001 and 2006, the declining cedi rate has stabilized and a new currency was introduced, the Ghana Cedi in July 2007, however, the external purchasing power of the currency was maintained. For example, the rate of exchange of the Ghana Cedi (GH¢) - US\$ was 9200 Cedi to US\$1 at the time, this reform became GH¢ 0.92 = US\$1. This means that the currency was not devalued or revalued but has been redenominated. However, since the redenomination, the value of the Ghana cedi has continued to depreciate in part due to rising inflation and monetary reforms in general. In August 2012, the Ghana Cedi depreciated by GH¢1.89 = 1 USD and less than GH¢2.21 in December 2013, although it is not monotonic. In effect, the companies importing incur higher production costs result in higher consumer price and in January 2014, one dollar was exchanged against GH¢2.39. To avoid any devaluation of the currency, the Bank of Ghana published on February 4, 2014 a directive on the operations of foreign exchange accounts (FEA) and foreign currency accounts (FCA). The new FEA guidelines include the prohibition of transfers from one foreign currency account to another and the revocation of all checks issued on FEA. In addition, it ordered banks to convert all unused foreign currency resources into Ghanaian cedi and to stop granting a foreign currency denominated loan to a non-exchange income earner. These draconian measures constituted an instinctive reaction of the Central Bank to restore stability by placing the cart in front of the horse. It was not surprising; therefore, that the directives did not produce the desired impact, but



limited access to foreign exchange, limited domestic trade, limited deposits and credits, and strengthened black market activities. This exacerbated the pressure on businesses, as the guidelines exacerbated the exchange rate deterioration of GH¢2.89 = 1USD in May 2014 and in August 2014, the Central Bank canceled its previous exchange measures.

In short, Ghana has reviewed several chapters and policies to stabilize the exchange rate, but the somewhat volatile nature of it has put the responsibility on policy makers to doubt as which of the factors that influential significantly the exchange rates volatility. The advent of global financial crises in 2008 has generated volatile capital flows and an increased risk propensity for international investors. This has led to significant fluctuations in the exchange rates beyond the basic equilibrium path in small open economies, including Ghana (Warjiyo, 2013). According to Warjiyo (2013), the Ghana cedi depreciated by 20.2 % and 14.8 % respectively in 2008 and 2009, against a depreciation of 5 % in 2007 and 3.1 % in 2010. This volatility was probably exacerbated by shallow and inefficient market. According to the Financial Stability Management of the Bank of Ghana (WP/BoG, 2014), the exchange rate is a known macroeconomic variable to support price behavior. Therefore, it is necessary to understand the effects of exchange rate fluctuations and how quickly these effects affect the prices of others in formulating a policy response to exchange rate fluctuations. The Bank's policy-making process in Ghana involves a comprehensive analysis of critical macroeconomic data in the areas of real sector



development, fiscal developments, monetary and financial developments, external sector developments and global economic outlook, development and outlook of inflation exchange rate developments (Bank of Ghana, 2014).

One of the main problems in Ghana since the introduction of the flexible exchange rate regime in 1986 was the continued depreciation of the cedi of Ghana compared to major international currencies. The cedi, which traded below the GH¢0.95 against 1.00 dollars in July 2007, has experienced steady decline to reach GH¢3.55/US\$1.00 in 2014 (Tweneboah, 2015). During the first nine months of 2014 on the interbank foreign exchange market recorded a 31.9 % depreciation against the US dollar, compared with a decrease of 4.12 % in the same period of 2013 (Tekper, 2014). According to Tekper (2014), the Ghana cedi also depreciated by 29.32 % and 23.63 % against the pound sterling and the euro, respectively, on the same period and in relation to a depreciation of 16.73 % and 20.05 %, respectively compared to those currencies in 2013, with a stronger depreciation on the black market.



2.3 Theoretical Literature

Most of the economic disparities that countries face are corrected by one of the most fundamental economic principles, fundamentally known as the exchange rate. The Structural Adjustment Program (SAP) is the result of the implementation work of the exchange rate. It has also been used as a strategic policy to guide the flow of economic resources (skilled labour, capital, technical knowhow and foreign exchange) into import and export sectors. However, according to Schaling (2008), the sustainability and economic



development depend on the stability of the exchange rate system. Several theories have been proposed to help determine the exchange rate. These theories include purchasing power parity, uncovered interest parity, the monetary model and the portfolio balance approach. This section of the chapter provides relevant theories to explain the relationship between exchange rate fluctuations and domestic consumption in Ghana. Three theories have been examined: the eclectic paradigm, the exchange rate theory on imperfect capital markets, uncovered interest rate parity and the purchasing power parity theory. In this study, however, purchasing power parity and uncovered interest rate parity, and the electric paradigm theory are examined in detail.

2.3.1 Theory of Purchasing Power Parity (PPP)

The theory of purchasing power parity was established by a Swedish economist, Cassel, in 1918. Cassel developed this theory by trying to explore the currencies and cohesion of different economies. The theory explains the prices of goods and services in different economies and how they are affected by exchange rates. Therefore, if a monetary unit in one economy has the same purchasing power as another currency, the conversion rates of these currencies should be similar to the proportion of price levels in the two economies. This theory makes it possible to calculate the value of the currencies of different economies and to make the necessary adjustments to the different conversion rates of the economies examined, so that the conversion rates are equal to the purchasing power of the economies (Mishkin and Eakins, 2009).



The theory is largely based on the one price law and will be maintained when there is international merchandise arbitrage. PPP can be absolute or relative. When the purchasing power of a local currency is identical to that of another economy at current market prices, the PPP is absolute. For relative purchasing power parity, changes in exchange rates are compared with changes in inflation. If the change in percentage of the conversion rate of the two currencies counterpoises with the change in the inflation rates of the two economies over a period of time, it is the relative parity purchasing power (Serrano and Taylor 2002). However, the purchasing power parity theory has inherent limitations because of the basic assumptions it has built around. The assumption is that shipping costs are minimal, taxes and tariffs are in abstraction, as well as identical consumer baskets, and there is no arbitrary gain. It is assumed that raw material costs remain the same from one country to another that all operators have the same information on prices and exchange rates in all countries and that companies would price their goods the same way across all the markets. There are rarely perfect markets in the real world, and these assumptions will be difficult to meet. However, the importance of this assumption is: they are not yet convincing enough to ignore the theory (Froot and Stein, 1991).

According to Kidwell et al. (2008) Currency conversion rates reach a level that indicates that prices of products and services are similar in different economies using the same currency. If this theory applies to exchange rates, all products in all countries cost them in the same currency. As a result, there is no net saving when buying goods in one place rather than in another. The ideal PPP situation is based on the idea that when rebates are maintained, the same basket of goods from two economies is identical to that of



currencies (Madura and Fox, 2011). Hypotheses of the PPP theory include: no price, no shipping costs, no trade barriers, no taxes, customers have a complete understanding of the markets and, therefore, buy from markets with the lowest prices these markets are pretty competitive. The cost of goods and services in an inherently undervalued economy is generally different from that of goods and services sold in another economy. Therefore, if the valuation currency is undervalued, prices will be lower compared to other economies, but if the currency is not overvalued, the products will be sold at higher prices. This will disrupt the level of exports and imports unless trade barriers, transportation costs or perishability allow people to buy the same products in several locations (Mishkin and Eakins 2009). Relative PPP is related to how the changes in currency of the economy can be compared to changes in level of inflation rates in that country (Sano and Taylor, 2002). This means that issues such as transportation costs, tariffs and quotas are already taken into account. Relative PPP is more common than absolute PPP. However, you can-not rely entirely on PPP to design or develop models to determine the levels of exchange rate. This is because there has been a record of much non-conformity from the theory since its inception (Shapiro, 1992).

According to the purchasing power parity theory, exchange rate fluctuations are designed to maintain the parity of purchasing power. Moreover, the movement in translation rates keeps the price indexes in the two economies at par. The unrealistic assumptions of this theory prevent it from explaining exchange rates movements. It would not be logical to assume that all goods are the same and that costs such as transportation and taxes do not exist. In addition, barriers to trade can-not be removed. However, theory of PPPs can-not



be completely excluded. In fact, the theory allows us to draw conclusions about very basic conditions before adding complexity to our exchange rate models. However, if the assumptions of PPP were to hold, the domestic consumption level will be determined by other factors rather than exchange rates. In fact, if the markets were competitive, the commercial revenues of the weak currency economies would not be important to convert these incomes into national currency and will cause a loss of value (Shapiro, 1992).

According to Kuttner and Posen (2006), the purchasing power theorem assumes that the normal equilibrium rate of exchange existing between two inconvertible currencies is determined by the ratios of their purchasing powers; hence the rate of exchange tends to be established at the point of equality between the purchasing powers of the two currencies. The theory of purchasing power considered (PPP) is traditionally the starting point of the exchange rate analysis. The PPP theory (in its absolute form) assumes that the equilibrium exchange rate is equal to the internal and external price ratios (Frenkel, 1976). This means, on the basis of purchasing power parity, that the monetary value in the different countries must be the same, expressed in the common currency.

The PPP principle is based on the Law of One Price (LOOP), which states that for each product, $P_t(i) = E_t P_t^*(i)$ where: $P_t(i)$ is the price in the national currency of the product i in period t , E_t is the nominal exchange rate for period t , defined as the local price of a unit of foreign currency, $P_t^*(i)$ is the foreign-currency price of good i in period t .

.3.2 Uncovered Interest Rate Parity

Uncovered Interest Rate Parity (UIRP) is one of the major links in the international financial markets and creates an essential basis for certain assumptions to determine the bases of exchange rate Hilde (2009). It argues that the nominal interest rate between the two countries should be a proportional or neutral indication of future developments in spot exchange rates. Hence, the investors' normal profit on the domestic and international assets expressed in the same currency ought to be equivalent irrespective of the national markets within which the foreign deposit is invested. The disappointment of the interest rate differential to be the unbiased indicator uncovered interest rate parity puzzle (Cook, 2009). The assumption of the UIRP remains that, investors would not be able to benefit from the arbitrage because the high base rate currency would have to be reduced by an amount equal to the difference in the degree of interest rate between the two country. The decrease in the shares of this relationship is that the financial markets are not efficient and there is a possibility of arbitrage (Cook, 2009). Likewise, any discoveries reflecting a reverse relationship is called forward premium puzzle (Cook, 2009)

The basic premise of the UIRP is the productive speculation of the industry, as the price must fully reflect all the information available to market participants and, therefore, a profitable open market can-not be offered. This means that exchange rates will change rapidly, based on new information, which should be immediately reflected in the exchange rate.



2.3.3 The Eclectic Paradigm

Dunning (1995) came up with this theory which is in itself a mix of three different but correlated theories. These theories are Ownership, Location and Internalization (OLI) which are used to describe how the factors therein contribute to changes in foreign direct investments. Ownership related advantages are those provided by intangible assets. These assets must however be considered as exclusive possessions held and owned by the company and are transferable to other firms at prices that would lead to reduction of costs to the company, or would lead to the company registering high rates of return. In his arguments, Dunning (2005) argues that when all other factors are held constant, a company with a higher level of competitive advantages, in comparison with its competitors, has a higher chance in increasing its overall production and hence increasing its global presence.

Location benefits, as explained by Denisia (2010) are used to compare the different economies, as per their strengths and opportunity. The end results of this analysis is that the most suitable country is selected to be a host country for the activities of multinational firms. The correlation existing between location and ownership advantages is that when a multinational corporation is able to host itself in the most suitable economy, it is now able to engage in the exploitation of its ownership related abilities, and thus leading to the firm engaging in foreign direct investment.

The third theory, internalization, establishes a need for the firm to be able to have an established business in each of the economies that the company sells its products or





services. The firm must derive ways through which it can benefit further through foreign production as compared to the meager fees that are earned in international trade activities such as exporting and franchising. Dunning (2005) states that a corporation is more likely to get higher returns if, it engages in foreign production as opposed to the extension of its production rights to other countries. The eclectic paradigm is therefore in support of the establishment of production markets by a corporation through exploitation of its competitive advantages and the selection of suitable locations.

2.3.4 Exchange rate theory on imperfect capital markets

Cushman (1985) and Itigaki (1981) are among researchers whose studies may be related to this theory. Itigaki (1981) noted in his model that the depreciation of the national currency led to a greater demand for a perfect and different model when coming up with the end products. Cushman (1985) found that the uncertainty of the exchange was a function of timing difference. As a result, companies participating in international activities need a greater incentive than expected to compensate for uncertainties related to exchange rate fluctuations. Transnational companies will only be encouraged to invest in a particular country if these investments are profitable. This means that your capital costs must be higher than the expected return. The macroeconomic variable uncertainty such as exchange rates, inflation and economic stability of countries will be very important in calculating the corporate n Cost of Capital. Capital costs must be low if these variables are not volatile enough to make them much more risky.

2.4 Review of Empirical literature.



Exchange rate pass-through is defined as the percentage change in the domestic currency import prices resulting from a percentage change in the exchange rate between exporting and importing countries Goldberg and Knetter (1997). Various empirical research on the impact of exchange rate pass-through to consumer price have been performed with very - significant results. Mc Carthe (2000) conducts extensive research on the exchange rate paas-through on the aggregate level of a member of the industrialized world. The VAR model for import, production and consumption prices is estimated between 1776 and 1998. In most of the countries analyzed, the exchange rate pass-through to consumer prices is found to be modestThe pass-through rate was positively associated with the openness of the country and negatively associated with exchange rates volatility.

Kim (1998) examined exchange rate pass-through in the United States using a multivariate framework. This study deals with changes in producer's prices to changes in the trade-weighted nominal effective exchange rate, money supply, aggregate income, and interest rates. It was noted that the exchange rate contributes significantly to producer prices.

In Colombia's pass-through exchange rate study, Ricon (2000) used the Johanshan framework to evaluate the effect of exchange rate pass-through. He used monthly data for 1980-1988 and found that the exchange rate pass-through was incomplete. The estimated long-term flexibility of import and export prices based on exchange rate movements is about 0.84 and about 0.61, respectively. The direct long-term effect of the exchange rate on consumer prices is 0.84.



Aliu et al. (2008) have examined the degree of effect of exchange rate pass-through to Nigeria's import and consumer price between the first quarter of 1986 and the fourth quarter of the Year 2007 according to the vector error correction methodology. They discovered that the evolution of the exchange rate in Nigeria during this period, despite a slight increase in import prices relative to consumer prices, is significant and continuous. For example, a shock of 1% of the exchange rate translates into a transfer of 14.3 % and 10.5 % respectively to import and consumer prices over the next four quarters. The result suggests, among other things, that the exchange rate pass-through in Nigeria's falls along the price series and partly overturns the conventional wisdom in the literature that ERPT is always considerably higher in developing economies than developed economies.

Adetiloye (2010) also analyzed the Nigerian exchange rate and the CPI. He adopted Granger causality and correlation techniques to determine the importance of the relationship between the consumer index and the exchange rate. A strong positive relationship was found between the import percentage and the index than between the parallel and official rates. The coefficient between the independent exchange rate and the CPI is smaller than the official exchange rate, while the import ratio in the economy was found to show a near two-way balance causality with consumer price Index. The most important is the causality, as the import ratio granger cause the consumer price index.

The theoretical perspective Hau (2002) puts strongly the emphasis on the fact that more opened economies, exhibit less volatile forms of real exchange rate. The claim is as follows. As an economy opens, the increase in the volume of imported products will prepare the path for rapid adjustment of the domestic aggregate price level. This



reduces the impact of short-term on financial or real shocks domestic cash balance and, therefore, reduces the scope of this shock to the development of the actual consumption of the household or the real exchange rate. As a result, the relatively closed economy lacks additional flexibility in the exchange rate because of its low share of imports. In response to the shocks, these economies release most pronounce effect on consumption and the real exchange rate, when the situation is stable. Trade restrictions affect the level of the real exchange rate because of its effects on domestic prices. The increase in trade restrictions can lead to increase in domestic prices and a currency appreciation. Devereux and Lane (2003) also found this result for developing and developed economies.

Obstfield and Rogoff (1998) argue that exchange rate fluctuation can have a negative impact on households and businesses through direct and indirect channels. Direct Channel assumes that households and businesses do not like fluctuations in exchange rates and that these fluctuations can negatively affect their consumption and leisure decisions. They argue that trade could fall due to exchange rate volatility, which could lead to lower domestic or foreign production or incomes and, ultimately, general consumption. According to the indirect channel, to protect the risk of future exchange rate fluctuations, the company can set higher prices or charge a premium and reduce prices beyond total consumption.

According to Inusah and Chiaraah (2013), the volatility of the global real exchange rate has a significant impact on financial risk. The study examined the sources of real exchange rate volatility in Ghana, using a dynamic econometric technique based on Autoregressive Distributed Lag (ADL) model to account for the psychological inertia among others. The paper uses the time series method with annual data over a 22-year period, from 1980 to

2012, to determine the determinants of exchange rate fluctuations in Ghana. The results of the study indicate that there is a positive relationship between public spending and real exchange rate volatility. This study concluded that public spending is the most important factor in the volatility of the real exchange rate.

The result of the research conducted by Tweneboah (2015) suggests that as the need for US Dollar increases, the Cedi/Dollar exchange rate becomes more volatile. The paper investigates the evidence on the effects of financial dollarization and exchange rate volatility in Ghana. The research covers 26 year period from January 1990 to March 2015. Using Exponential Generalized Autoregressive Conditional Heteroskedasticity (E-GARCH) model, the findings of the study give evidence of a positive impact of dollarization on the volatility of nominal bilateral Ghana Cedi/US Dollar exchange rate. The paper suggests that addressing the increasing dollarization of the Ghanaian economy would be an appropriate policy to stabilize the Cedi.

According to Ogundipe and Egbetokum (2013) the rise in overreliance of Nigerian economy on imports has made it necessary to constantly look at the effects of exchange rate volatility on consumer prices. Using a structural vector autoregressive to determine the pass-through impact of exchange rate dynamics to consumer prices by adopting the Variance Decomposition analysis, the result of the study indicates a considerable exchange rate pass-through to inflation in Nigeria. The results indicate that exchange rate has been



more significant in determining the increasing incident of inflation in Nigeria than the real money supply. The study however, recommended that Nigeria economy should concentrate on policies that will bring stability of the exchange rate sound monetary policy.

The result of research work done by Alagidede and Ibrahim (2017) indicates that while volatility on the exchange rates are mean reverting, misalignment tend to correct very sluggishly, with painful consequences in the short-run as agents recalibrate their consumption investment choices. The findings further states that about three-fourth of the volatility to the real exchange rate are self-driven, and the other one-fourth of the volatility to the real exchange rate is as a result of factors such as government expenditure and growth of money supply, terms of trade and output volatility. The paper suggest that too much shock is too bad to economic growth and recommended that innovation and more efficient allocation of resources can enhance economic growth.

Iyke and Ho (2017) concluded that consumption is an important part of aggregate demand therefore, its actions affect business cycle, long term growth, job creation, and decision on micro-economic policy. The paper added that the important determinant of consumption revealed in available literature are income and interest rate and recent literature has also included changes in the real exchange rate and its volatility as another significant variable affecting consumption decision as a result of the pass-through influence on inflation and inflation volatility. The paper seeks to study the effects of exchange rate volatility on consumption by concentrating on sub-Saharan African country Ghana which has gone through exchange volatility. The paper used data covering 35 years spanning from 1980 to





2015 and common Variance of the real exchange rate as measure of exchange rate volatility. The result of the study indicates that exchange rate volatility has a negative impact on domestic consumption in the short-run with negative pass-through effect on the long-run. The paper suggested that policy makers should find a way of decreasing or eradicate exchange rate volatility by embarking on policies that will limit foreign transactions in the country and encourage quality exports.

Nchor and Darkwa (2015): This paper examines the impact of nominal exchange rate and interest rate fluctuations on inflation in Ghana. It also analyzes the presence of Fisher's impact scenarios and Fisher's international impact. It uses an ADL and an unrestricted error correction model. The methods ordinary least square regression was also used to determine the presence of Fisher effect and international Fisher effect. The results showed that short – term, 1% increase in depreciation level of the Ghana Cedi results in the increase in the level of the rate of inflation of by 0.20%. A percentage point rise in the level of nominal however reduces inflation by 0.98%. Inflation increases by 1.33% for every percentage point increase in the nominal interest rate in the long run. An increase in inflation on the other hand increases the nominal interest rate by 0.51% which demonstrates the partial Fisher effect. A 1% increase in the interest rate differential leads to a depreciation of the Ghana cedi by approximately 1% which indicates the full international Fisher effect.

Danmola (2013) examines the effect of exchange rate volatility on macroeconomic variables and, using a correlation matrix, ordinary least squares (OLS) system and



Grangercausality test, the results of the study. Indicated that fluctuation in the rate of exchange have a positive impact on GDP, foreign direct investment and foreign trade, but have a negative impact on inflation in the country. The author suggested that the state improve its revenues by increasing the number of products exported, reducing dependence on the oil sector of the economy and minimize the importation of non-essential products in order to improve the terms of trade. In addition, the increase in domestic production will reduce the problem caused by exchange rate volatility.

Campa and Goldberg (2006) use time series and data from different countries to indicate that the sensitivity of retail prices to exchange rates could increase over the last decade. This conclusion applies to current and non-current products. We will highlight three reasons for changes in the pass-through to the price of retail products. First, it may be that the price to import in the area of transport has fallen, but nothing indicates that the types of goods in the country are involved. On the other hand, the use of imported inputs has increased significantly in all sectors, which means that the costs of tradable goods imported for the home have increased sensitivity to the exchange rate of prices. Finally, we consider whether there have been changing sectoral expenditures on distribution services, with the direction of change negatively correlated with pass-through into final consumption prices. We found that this channel, which isolated consumer prices from imports and exchange rates, has not changed steadily in recent years. These effects generally

encourage greater sensitivity of consumer prices to exchange rates, even if exchange rate pass-through into import prices has declined for some types of goods.

Loloh (2014) estimates the effect of exchange rate fluctuations on domestic prices between January 1994 and December 2012 using a recursive Vector Autoregressive (VAR). The model includes six variables, categorized as: oil price, output gap, exchange rate, non-food product prices, general consumer prices and money market prices, with the implicit assumption that the identified shocks contemporaneously impact variables ordered after the shock without a contemporaneous feedback. We conclude that the impact of the shock on the nominal exchange rate on domestic prices is incomplete, generally modest and decreases after 18 to 24 months, but this effect is felt mainly within 12 months. In general, the impact of the exchange rate shock on consumer price inflation is higher than non-food inflation. We find evidence that corroborates Taylor's assumption that exchange rates are positively correlated with inflation levels. In 1952, Alexander argued that since the inflationary effects of reduced consumption could shift workers' incomes to producers, this could lead to a decrease in household consumption. This assumption is based on the assumption that wages are not completely adapted to the inflation and labor has a high MPC relative to that of the producers.

Goldfajn and Werlang (2000) investigate a panel of 71 countries and find that exchange rate pass-through are correlated with the trade cycle, the size of the initial real exchange rate deviation, the initial inflation rate and the extent of the openness of the economy. They



also indicated that the exchange pass-through coefficient changes positively over time after depreciation and maximized after one year (12 months).

Bursten et al. (2002) studied the behavior of consumer prices after significant reduction in nine states and have noted a decrease in the exchange rate pass-through to consumer prices. After the floating of exchange rate in Brazil in 1999, Rabanel and Schwartz (2000) examined the inflationary behavior in the country and noted that the first shock occurred in the system 20 months later.

Zorzi et al. (2007) used Vector Autoregressive models to study the extent of exchange rate pass-through to price in 12 emerging markets in Asia, Latin America, and Europe, Central and Eastern Europe. Their results were opposite party to the traditional belief that the exchange rate pass-through to domestic prices in developing countries is greater than in developed countries. They found that for emerging markets with single-digit inflation, the variation in import and consumption prices is small and does not differ from that of the developed economy. The paper also found strong evidence of a positive relationship between the extent of the exchange rate pass-through and inflation, consistent with Taylor's hypothesis.





Leigh and Rossi (2002) use a recursive vector autoregressive model to study the effect of exchange rate fluctuations on prices in Turkey. They discovered that (1) the effect of the exchange rate on prices ended after about a year, but generally felt during the first four months, (2) the pass-through to wholesale prices is more pronounced and (3) the estimated pass-through takes place in a shorter period and is higher than that estimated in the other emerging countries.

Acheampong (2004) uses a recursive VAR to estimate cumulative pass-through in Ghana and concludes that the pass-through is incomplete, modest and slow. It also notes that the change in prices of non-food products is more pronounced than that of consumer prices and that the pass-through to consumer prices has not changed over time, but that the pass-through to non-food products price has gone up. Although this study has an approach similar to that of Acheampong (2004), this study fills two important gaps. Placing a money market or money market policy (general accumulation of money) before a variable exchange rate can reduce the impact of supply and demand shocks on the exchange rate. As a result, this study reorganizes the response of the money market and / or monetary policy to allow the money market, and in particular monetary policy, to react simultaneously to all shocks. Second, nearly ten years have passed since the study was conducted. It is important to examine the impact of the exchange rate caused by the macroeconomic and political changes since 2004 in order to study its effects.

2.5 Conclusion



This chapter analyzed the relevant literature on the channels through which exchange rate volatility affects theoretical and empirical domestic consumption, and finally brought to bear the various exchange rate policies of Ghana over the years, ranging from fixed exchange rate to flexible exchange rate and finally to the managed exchange rate regime. Nevertheless, the results of the relationship between exchange rate volatility and domestic consumption in the studies were mixed and inconclusive. This study therefore attempts to add and partially fill in the gaps to the current exchange rate volatility and domestic consumption literature by examining the effects of exchange rate volatility on domestic consumption in Ghana having included the role financial sector development in Ghana play to shape domestic consumption.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

Consumption is an essential component of aggregate demand. As a result, their behavior affects economic cycles, long-term growth, employment decisions and macroeconomic policy. Therefore, this study focuses on determining the effects of the exchange rate on consumption in Ghana. The study considers that inflation and interest rates are the main variables through which domestic consumption is influenced by exchange rates. In this paper, we use annual data covering the 37 year period from 1980 to 2016 and the annual



change in the real exchange rate as a measure of exchange rate volatility. This chapter describes the procedures and methodologies that will be used to draw conclusions about the relationship between exchange rate volatility and local consumption in Ghana. It essentially provides a detailed description of research design, data sources, data description, experimental strategies and conclusions.

3.2 Scope of the study

According to Kothari (2004), the scope of research (planning) provides a framework for methods and procedures for obtaining the required information. The general framework of the project determines the information that will be collected, from what source and what actions. This study used a descriptive research model to illustrate the relationship between exchange rate volatility and local consumption in Ghana. Descriptive research design is generally determined to provide a general picture of a particular situation when it is discovered naturally. Usually, it is used to justify current practice and objective judgment, as well as to help develop fundamental theories (Kothari, 2004).

In this study, only secondary data and time series are used for all variables from 1980 to 2016 that is 37 year period in the analysis. This period is of particular interest for the study as it incorporates Ghana's transition period from the fixed to float system to Allegida and Abraham (2017). The period also coincides with the launch of the ERP. Domestic consumption as measured by household final consumption expenditure will be used as a dependent variable. This study will examine other macroeconomic factors that focus on macroeconomic variables that may directly or indirectly affect domestic consumption. All other factors in the macroeconomic indices are not considered for this study. The macroeconomic variable that are consider as independent variables for this study

are inflation, interest rate, exchange rate, real GDP per capita, and financial sector development.

3.3 Sources of Data

The study focuses on secondary data from 1980 to 2016 to study the impact of exchange rate fluctuations on domestic consumption in Ghana. However, this study is based on annual time series data because our analysis are based on other macroeconomic variables available only every year and therefore limit the use of monthly or quarterly data when a larger sample is guaranteed. In fact, the choice of this period depends on the availability of data for a longer period. Annual data on macroeconomic variables that include the Cedi/dollar exchange rate, inflation, domestic consumption, financial development, interest rates and GDP per capita are obtained from World Development Indicators (WDI) of the World Bank

3.4 Data Description and Definition of Variables

3.4.1 Exchange rate

Modern-day businesses are to some extent influenced by international activities resulting from globalization. As a result, changes in the exchange rate can affect the competitive position of companies and industrial processes. The Cedi/dollar exchange rate is used as an alternative to the exchange rate variable because the dollar is the main currency used in Ghana to handle international business.





3.4.2 Domestic consumption

Domestic consumption serves as the dependent variable through the total household consumption expenditure which represents the market value of all goods and services, including durable goods such as automobiles, washing machines and personal computers. This also includes rents for owner's occupy or apartment as well as payments and fees charged to the government for permits and licenses.

3.4.3 Financial sector development

The financial development is proxy by using Svirydzenka's (2016) recently developed measure of financial development that encompasses an index summing up the stage of financial development based on their size and markets liquidity, easy accessibility of financial services by individuals and companies and efficiency.

3.4.4 Real GDP per capita

GDP per capita is the GDP divided by population in the middle of the year. GDP is the total value added of all producers remaining in the economy plus taxes on products minus subsidies not included in the value of products. It is calculated without deduction for depreciation of manufactured assets or for depletion of natural resources. Values are presented in current US dollars.

3.4.5 Interest rate

The real interest rate is the inflation-adjusted loan interest rate, as measured by the GDP deflator. The conditions associated with interest rates vary from country to country, which limits their comparison. We include the interest rate allowed by the money market as well as the impact of monetary policy on the transition. There is an inverse relationship with lower interest rates, which means that lower rates tend to lower exchange rates. In this way, we expect the high interest rate to be positively related to the exchange rate.

3.4.6 Inflation

Inflation measured by the consumer price index reflects the change Annual percentage of the cost of basket of goods and services purchased by the average consumer that may be fixed or changed at specified intervals such as every month/year. The inflation variable is the annual percentage change in the consumer price index and is used to represent macroeconomic stability or instability.

3.5 Empirical strategy

3.5.1 Modeling exchange rate volatility

The overall objective of this paper is to determine the effects of exchange rate volatility on domestic consumption. In this sense, our empirical strategy is based on the estimation of a simple reference equation that links domestic consumption and exchange rate volatility to a set of standard controls augmented by domestic consumption. The theoretical basis of the relationship between consumption and exchange rate volatility can be traced back to Alexander's (1952) fundamental work, who recognized that the exchange rate can determine the level of consumption through its pass-through effect on inflation. According to him, the volatility of the real exchange rate can lead to inflationary uncertainty, which





plays a fundamental role in household consumption decisions. From this point of view, a consumption function must contain a measure of real exchange rate volatility as a determinant Iyke and Ho (2017). To measure volatility, some authors used standard deviations where the volatility of the exchange rate is measured by the degree of fluctuation in the rate of exchange in relation to its mean overtime (Gadanecz and Mehrotra, 2013; Schnabl, 2007).

The use of this measure is not without challenges. First, it assumes that the empirical distribution of the exchange rate is normal. Secondly, it does not reflect the split between the unpredictable components of the exchange rate process and thus does not capture information on past exchange rates. The empirical flaw of this measure of the model limits its use; therefore, the use of the autoregressive conditional heteroskedasticity (ARCH), or generalized ARCH (GARCH). In this study, we rely on GARCH developed by Bollerslev (1986) not only because the exchange rate better follows the GARCH process (McKenzie, 1999), as reported in Alagidé and Ibrahim (2017), but also because it reflects the past values of the exchange rate as different from the ARCH. By allowing the recording of the real exchange rate to depend on its lag in the average equation, we derive our GARCH model as follows:

$$\ln \text{EXR}_t = \alpha_1 + \alpha_2 \ln \text{EXR}_{t-1} + \mu_t \quad (3.1)$$

$$\mu_t | \Omega_t \sim iid N(0, Q_t)$$

$$Q_t = \vartheta_0 + \delta \mu_{t-1}^2 + \sigma Q_{t-1} \quad (3.2)$$

Where $\vartheta_0 > 0$; $\delta \geq 0$; and $\sigma \geq 0$.

Where EXR_t the real effective exchange rate at time t is, EXR_{t-1} is the one-period lag of real effective exchange rate ε_t is the error term which is independently and identically distributed. Also, from equation (3.2), Q_t is our conditional variance which consist of the mean (ϑ_0), information about past volatility (μ_{t-1}^2) and the past forecast error variance (Q_{t-1}) which is taken to denote the GARCH term. Thus from equations (3.1) and (3.2), our GARCH model allows the error term to take a time-varying variance conditional on the past behaviour of the real effective exchange rate overtime hence capturing the volatility adequately. Indeed, this volatility figures are extracted and fitted into consumption equation which it is specified in the next section.

3.5.2 Estimating the Autoregressive Distributed Lag (ARDL)

Given the objectives of this study, we set a baseline model where domestic consumption is made to depend on exchange rate, exchange rate volatility, interest rate, real GDP per capita, inflation and the country's domestic financial sector development. In this endeavour, the following compact model is specified:

$$C_t = f(EXR_t, EXRVOL_t, INTR_t, GDPPC_t, INFL_t, FSD_t) \quad (3.3)$$

Where C_t domestic consumption at time t ; EXR_t is exchange rate at time t ; $EXRVOL_t$ is exchange rate volatility at time t ; $INTR_t$ is interest rate at time t ; $GDPPC_t$ is real GDP per capita at time t ; $INFL_t$ at time t ; while FSD_t is financial sector development at time t .

From the compact model in equation (3.3), we explicitly derive equation (3.4) below:

$$C_t = \beta_0 + \beta_1 EXR_t + \beta_2 EXRVOL_t + \beta_3 INTR_t + \beta_4 GDPPC_t + \beta_5 INFL_t + \beta_6 FSD_t + \varepsilon_t \quad (3.4)$$



Where the error is term ε_t at time t ; β_i denotes their respective coefficients while the other variables are as previously defined.

In line with the theory, increases in the real exchange rate (real appreciations) should stimulate local consumption and vice versa (see Bahmani-Oskooee, Kutan and Xi, 2015). Therefore, it is expected that β_1 is positive. Exchange rate volatility can improve or hinder domestic consumption, depending on the response of consumers to inflationary uncertainty induced by exchange rate volatility (see Obstfeld and Rogoff 1998, Bahmani-Oskooee, Kutan and Xi 2015). Therefore, β_2 can be positive or negative. Rising interest rates should create an inter-temporal substitution of the consumption and vice versa (see Hall 1988). Therefore, we expect β_3 to be negative. We expect β_5 to be negative, suggesting that an increase in inflation is associated with a decline in domestic consumption.

Beyond examining the impact of exchange rate volatility on domestic consumption, the study also aims at determining the moderating effect of financial sector development in exchange rate volatility–domestic consumption nexus. In other words, we examine whether development of the domestic financial sector dampen or magnify the impact of exchange rate volatility on domestic consumption in Ghana. In this endeavour, we include a multiplicative interactive term of financial sector development and exchange rate volatility into the domestic consumption equation in (3.4) above. We therefore specify the following equation:

$$C_t = \beta_0 + \beta_1 EXR_t + \beta_2 EXRVOL_t + \beta_3 INTR_t + \beta_4 GDPPC_t + \beta_5 INFL_t + \beta_6 FSD_t + \beta_7 (FSD_t \times EXRVOL_t) + \varepsilon_t \quad (3.5)$$





Where β_7 measures the indirect effect of exchange rate volatility on domestic consumption via financial sector development. With regard to the indirect effect, four possible conclusions can be reached: First, if both the coefficients of exchange rate volatility (β_2) and the interactive effect (β_7) are negative, it means that, exchange rate volatility decrease domestic consumption and development of the financial sector magnifies the negative effect of volatility on consumption. Second, if both the coefficients of exchange rate volatility (β_2) and the interactive effect (β_7) are positive, then it implies that exchange rate volatility increases domestic consumption and improved financial sector development magnifies the positive effect of exchange rate volatility on domestic consumption. Third, if the coefficient of exchange rate volatility (β_2) is negative and that of the interactive effect (β_7) is positive, then it implies that exchange rate volatility decreases domestic consumption and development of the financial dampen the negative effect of the exchange rate volatility on domestic consumption. Fourth, if the coefficient of exchange rate volatility (β_2) is positive and that of the interactive effect (β_7) is negative, then we conclude that exchange rate volatility spurs domestic consumption and increases in financial development lowers the positive effect of exchange rate volatility.

3.5.3 Testing for structural unit roots

Undoubtedly, time series data exhibit stochastic patterns hence the need to test for their stationarity properties. Thus, the study examines the unit root properties of all the variables using the Augmented Dickey-Fuller (ADF) test. Given the historical background of



Ghana's exchange rate system, it is possible that the data may contain structural breaks. However, the traditional ADF test of unit root does not control for structural breaks. Thus, in examining the unit root test, the study relies on the ADF approach that controls for structural breaks.

In all the series/variables, we examine the unit root property at both levels and at first difference with the null hypothesis that, the series contain unit root against the alternative hypothesis of no unit root. If the null hypothesis is rejected, the study concludes that the series is stationary and does not have unit root otherwise the series in question is non-stationary. Furthermore, if the null hypothesis is rejected at levels, we conclude that the series is stationary and integrated of order zero [$I(0)$]. If the null hypothesis is not rejected at levels, the unit root is further examined at first difference. Here, if the null hypothesis is rejected at first difference, we conclude that the series is stationary and integrated of order one [$I(1)$]. Indeed, for each stationary test, we include an intercept and a time trend. By finding evidence of stationarity, the implication is that, shocks to these variables tend to have a transitory effect and are likely to mean revert.

3.5.4 *Examining the short and long run effects of exchange rate volatility*

Indeed, equation (3.4) can be estimated using the Ordinary Least Squares (OLS). However, this approach does not reveal both the short and long run effects. Given this weakness, the study relies on the autoregressive distributed lag (ARDL) approach proposed by Pesaran et al., (2001) which is capable of revealing both the short and long run effects of exchange rate volatility on domestic consumption. A key advantage of this approach is that, it is

applicable irrespective of the order of integration of the series except the case of higher order integration such as order 2 [$I(2)$]. Furthermore, it does well in small samples. The long run relationship is examined using the bounds test cointegration within the ARDL framework below:

$$\begin{aligned} \Delta C_t = & \alpha_0 + \sum_{i=1}^m \alpha_1 \Delta C_{t-1} + \sum_{i=1}^m \alpha_2 \Delta EXR_{t-i} + \sum_{i=1}^m \alpha_3 \Delta EXRVOL_{t-i} + \sum_{i=1}^m \alpha_4 \Delta INTR_{t-i} \\ & + \sum_{i=1}^m \alpha_5 \Delta GDPPC_{t-i} + \sum_{i=1}^m \alpha_6 \Delta INFL_{t-i} + \sum_{i=1}^m \alpha_7 \Delta FSD_{t-i} \\ & + \sum_{i=1}^m \alpha_8 \Delta (FSD_{t-1} \times EXRVOL_{t-1}) + \omega_1 EXR_{t-1} + \omega_2 EXRVOL_{t-1} \\ & + \omega_3 INTR_{t-1} + \omega_4 GDPPC_{t-1} + \omega_5 INFL_{t-1} + \omega_6 FSD_{t-1} + \omega_7 (FSD_{t-1} \\ & \times EXRVOL_{t-1}) + \varphi ECT_{t-1} + \varepsilon_t \quad (3.6) \end{aligned}$$

where ECT is the error correction term which measures the speed of adjustment to long run equilibrium; α and ω respectively denote the short and long run effects; m is the maximum lag; Δ is the difference operator while the other variables remain as previously defined.

We estimate the long-run effects of these variables on domestic consumption by setting the non-first-differenced lagged component of Equation (3.6) to zero. The estimates of Equation (1) and (2) are only reliable if we can establish that the coefficients ω_1 to ω_7 are jointly significant. That is, the variables in Equation (3.6) should be cointegrated. This can be verified by testing the joint null hypothesis that, $\omega_1 = \omega_2 = \omega_3 = \omega_4 = \omega_5 = \omega_6 = \omega_7 = 0$ against the alternative hypothesis that, $\omega_1 \neq \omega_2 \neq \omega_3 \neq \omega_4 \neq \omega_5 \neq \omega_6 \neq \omega_7 \neq 0$. Testing these hypotheses produces the F-statistics which are compared to the two sets of critical values tabulated by Pesaran et al., (2001). The first set of critical values are



calculated by assuming that the variables in Equation (3.6) are integrated of order zero $I(0)$, while the second set are calculated by assuming that they are integrated of order one $I(1)$. We reject the presence of cointegration if the calculated F-statistic is greater than set of critical values otherwise we do not reject the hypothesis. By rejecting the null hypothesis, we conclude that our variables are cointegration hence move together towards a common long run path. However, the test is inconclusive if the calculated F-statistic lies in-between both sets of critical values.

3.5.5 Granger causality test

While first and second research objectives are achieved with the use of the ARDL, in the third research objective, the study seeks to examine the causal relationship among the variables. On this score, this research relied on the standard Granger causality test. Granger (1969) espoused this test of causality in such a way that Y_t Granger causes Z_t if the past values of the latter can be used to predict the values of Z_t all things being equation.

Following Ibrahim and Musah (2014), we specify the following VAR models:

$$CONS_t = \varphi_0 + \sum_{i=1}^s \varphi_1 VARI_{t-i} + \sum_{k=1}^q \varphi_2 CONS_{t-j} + \epsilon_{1t} \quad (3.7)$$

$$VARI_t = \gamma_0 + \sum_{i=1}^s \gamma_1 CONS_{t-i} + \sum_{k=1}^q \gamma_2 VARI_{t-j} + \epsilon_{2t} \quad (3.8)$$

Where $CONS_t$ and $VARI_t$ respectively represent household consumption and the vector of the other variables including exchange rate volatility.



From equations (3.7), the study tests the null hypothesis that: $H_0: \varphi_1 = 0$ against the alternative hypothesis that: $H_1: \varphi_1 \neq 0$. Similarly from equation (3.8), the study tests the null hypothesis that: $H_0: \gamma_1 = 0$ against the alternative hypothesis that: $H_1: \gamma_1 \neq 0$.

Based on this, four possible outcomes are notable. First, if the null hypothesis from equation (3.7) is not rejected and the null hypothesis from equation (3.8) is rejected, then it means there is a uni-directional causality from the other variables (including exchange rate volatility) to household consumption. Second, if the null hypothesis from equation (3.7) is rejected and the null hypothesis from equation (3.8) is not rejected, then it means there is a uni-directional causality from household consumption to the other variables (including exchange rate volatility). Third, if the null hypothesis from equation (3.7) is rejected and the null hypothesis from equation (3.8) is also rejected, then it means there is a bi-directional or feedback causality from the other variables (including exchange rate volatility) to household consumption and from household consumption to the other variables. Fourth, if the null hypothesis from equation (3.7) is not rejected and the null hypothesis from equation (3.8) is not also rejected, then it means there neutrality or no-causality from any direction between the other variables (including exchange rate volatility) and household consumption.

3.6 Conclusion

This chapter discussed the analytical framework of the study. The scope of the study (study design), data sources and collection has been highlighted in this chapter. The chapter also extensively describes the data collected and the empirical strategy to be adopted in the data



analyzes. Procedure and method of data analysis have also been discussed in this chapter. In the next chapter, the study presents and discusses the empirical findings on the impact of exchange rate volatility on household consumption.



CHAPTER FOUR

FINDINGS AND DISCUSSIONS

4.0 Introduction



This chapter presents the results of the study and the discussion of the results. It has four main parts. The first part is a descriptive statistic, the second part deals with the test results (correlation coefficients), the third part analyzes the empirical results on the short and long-term effects of exchange rate fluctuations and their passive effect on the Household consumption. It also presents results on the causality relationship between variables. The fourth section is the conclusion and the policy implications of the study.

4.1 Descriptive Statistics

Table 4.1 summarizes the descriptive statistics for the variables used in the model. The result shows that although some variables are normally distributed, others are not. For example, the exchange rate variable is generally distributed according to the Jerka-Bara test. The result also revealed that the real effective exchange rate and GDP per capita had the highest standard deviations, reinforcing the general intuition that the real effective exchange rate and GDP per capita in developing economies were very volatile. The values kurtosis which is 3 is less than the normal distribution of specific 3, indicating an near normality state. By comparing the standard deviation numbers with their corresponding mean values, they can be deduced as low, indicating that the values do not deviate significantly from their means.

Table 4.1: Descriptive statistics

	REER	GDPPC	INFL	FDINDEX	INTRATE	CONSU
Mean	335.5245	1044.6190	27.2722	0.119015	20.4322	82.8004
Median	114.8362	949.0133	18.6410	0.116959	20.9750	83.7149

Maximum	3522.154	1659.484	122.8745	0.146776	47.8800	94.2317
Minimum	64.6655	701.5355	7.1263	0.099611	0.0000	66.9921
Std. Dev.	693.1501	292.4894	25.5881	0.012448	14.0798	6.6012
Skewness	3.5203	1.001	2.7147	0.624148	0.1301	-0.6087
Kurtosis	14.9278	2.7667	10.2258	2.461589	2.3152	3.0321
Jarque-Bera	287.7691	6.0886	122.5383	2.772193	0.8051	2.2247
Probability	0.0000	0.0476	0.0000	0.250050	0.6686	0.3287
Observations	36	36	36	36	36	36

Notes: RRSP = effective exchange rate; GDP = GDP per capita; FDINDEX = Financial Development Index; Entry = CONSU interest rate = household consumption expenditure.

While the average value of the real exchange rate is GH 335.5245, the value of the standard deviation is 693.1501, which indicates a degree of variation. The skewness value indicates that the real exchange rate is too far to the right. The value of the kurtosis and skewness shows an abnormal distribution of the real exchange rate, which indicates that our exchange rate distribution is leptokurtic. A formal test of normality is the Jarque-Bera (J-B) test which is asymptotically chi-squared distributed with 2 degrees of freedom (Alagidede and Ibrahim 2016, Asteriou and Hall 2011). Table 4.1 shows in the JB test a high statistic of the real effective exchange rate, GDP per capita, FDI and inflation, thus rejecting the assumption of the normal situation in this series. The gaps in the effective exchange are close to the empirical data in the 2016 literature; (see Alagidede and Ibrahim, 2016, Kwek and Koay, 2006 for instance) Although the changes are not exactly the same because of the value of the bias, however, the value of household expenditure is negative, indicating that it is looking left. On the other hand, excluding household consumption expenditure, all the variables are positively skewed: the average consumption expenditure of households is 82.8002, which reaffirms the impact of exchange rate fluctuations on Ghana's consumption. Standard deviation measures the absolute variance correlation





between variables. The results indicate that the most volatile variable is the real effective exchange rate. Exogenous variables vary much less than real effective exchange rate volatility. Real variables show different levels of variation with the least showing by household consumption expenditure. The effective exchange rate showed greater volatility, followed by GDP per capita, inflation and the lowest financial development interest rate among the exogenous variables.

4.2 Correlation Coefficients

Correlation analysis is used to demonstrate a relationship between two variables. Six variables were presented: the effective exchange rate, GDP per capita, the financial development index, the interest rate, inflation and household consumption expenditure.

Table 4.2: Matrix Correlation

REER	GDPPC	INFL	FDINDEX	INTRATE	CONSU
------	-------	------	---------	---------	-------



REERVOL

REER	1.000					
GDPPC	-0.357	1.000				
INFL	0.745	-0.421	1.000			
FDINDEX	-0.004	0.458	-0.117	1.000		
INTRATE	-0.471	0.081	-0.178	-0.317	1.000	
CONSU	0.335	0.432	0.151	-0.387	-0.371	1.000

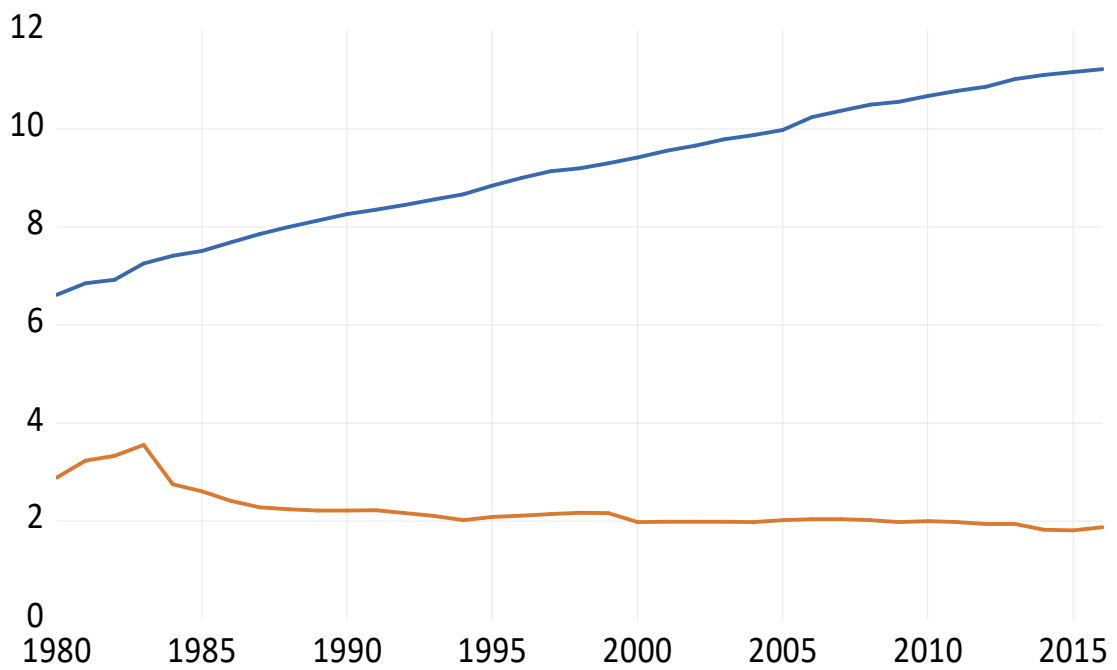
Notes: REER = Real effective exchange rate; GDPPC = GDP per capita; INFL = Inflation; FDINDEX = Financial development index; INTRATE = Interest rate; CONSU = Household consumption expenditure.

From the analysis of the correlation, it was found that there exist a weak positive correlation between Real exchange rate volatility and real effective exchange, inflation, financial development index and household consumption expenditure. This implies increase in real effective exchange rate, inflation, and financial development index increase real effective exchange rate volatility which negatively impact on Household consumption expenditure. The analysis further shows that real effective exchange rate has a strong positive relationship with real effective exchange rate volatility follow by inflation and financial development index has a very week positive relationship with Real effective exchange rate volatility. However, the relationship between real effective exchange rate volatility and interest rate and GDP per capita was found to have a degree of negativity.

This implies that movement in interest rate and GDP per capita has adverse consequences on the real effective exchange rate volatility.



Figure 4.1: Exchange rate and consumption

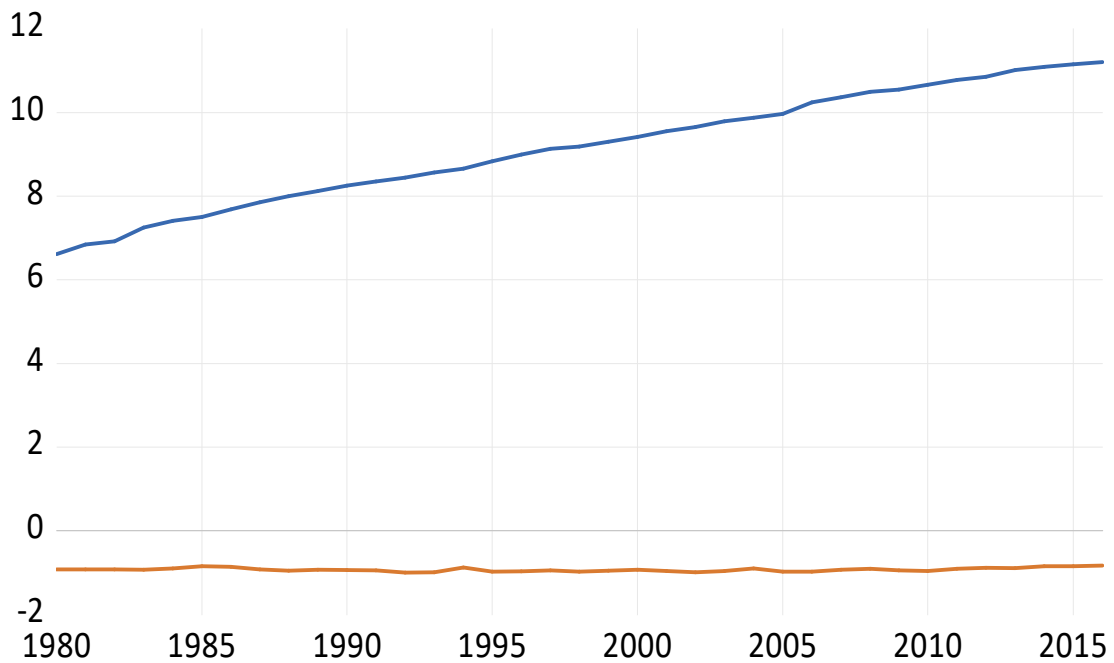


Source: Author's construct.



Figure 4.1 above presents the time trend between exchange rate and domestic consumption. From the Figure, we observe an upward trend of consumption over the sample period while exchange rate does not follow linear trend. For instance, while domestic consumption increased in 1984, exchange rate sharply dropped in this period and remained so over a longer period of time.

Figure 4.2: Financial development and consumption

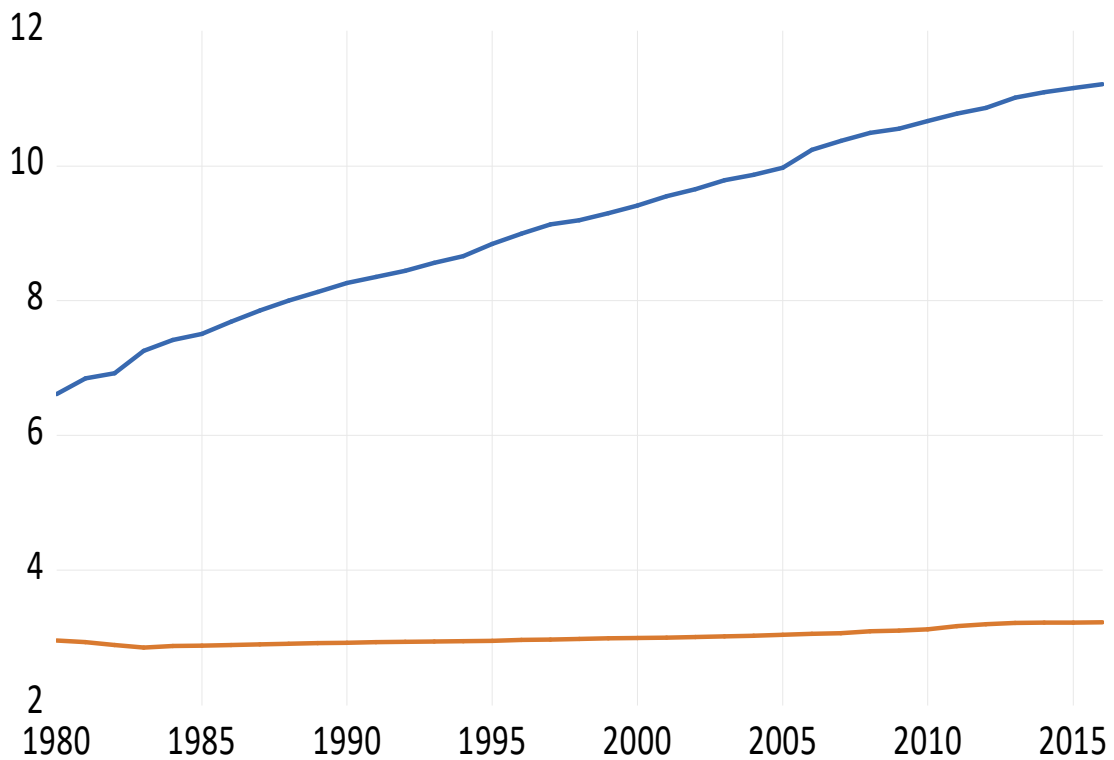


Source: Author's construct

Figure 4.2 above shows the time trend of financial development and domestic consumption over the period 1980 to 2016. While domestic consumption shows an increasing trend, financial development trend appears stable and relatively lower.



Figure 4.3: Real GDP per capita and consumption

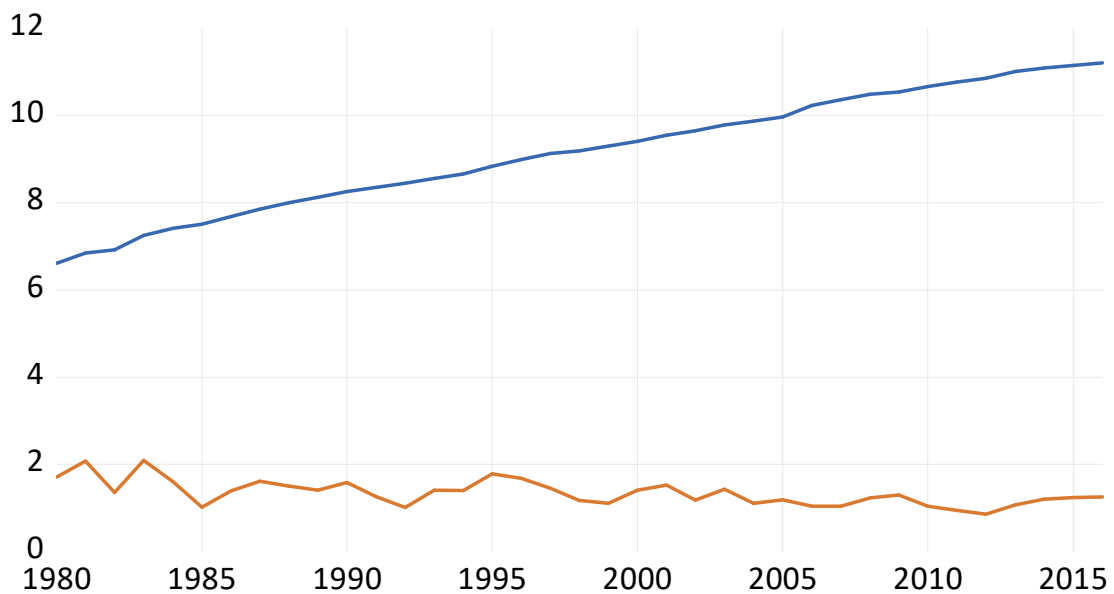


Source: Author's construct



From Figure 4.3 above where the time trend of real GDP per capita and consumption is shown. From the Figure, we observe that, both real GDP per capita and consumption increase overtime but the relative increase in consumption is higher than that of the real GDP per capita. This trend provides a cursory evidence that, increase real income might be associated with higher consumption.

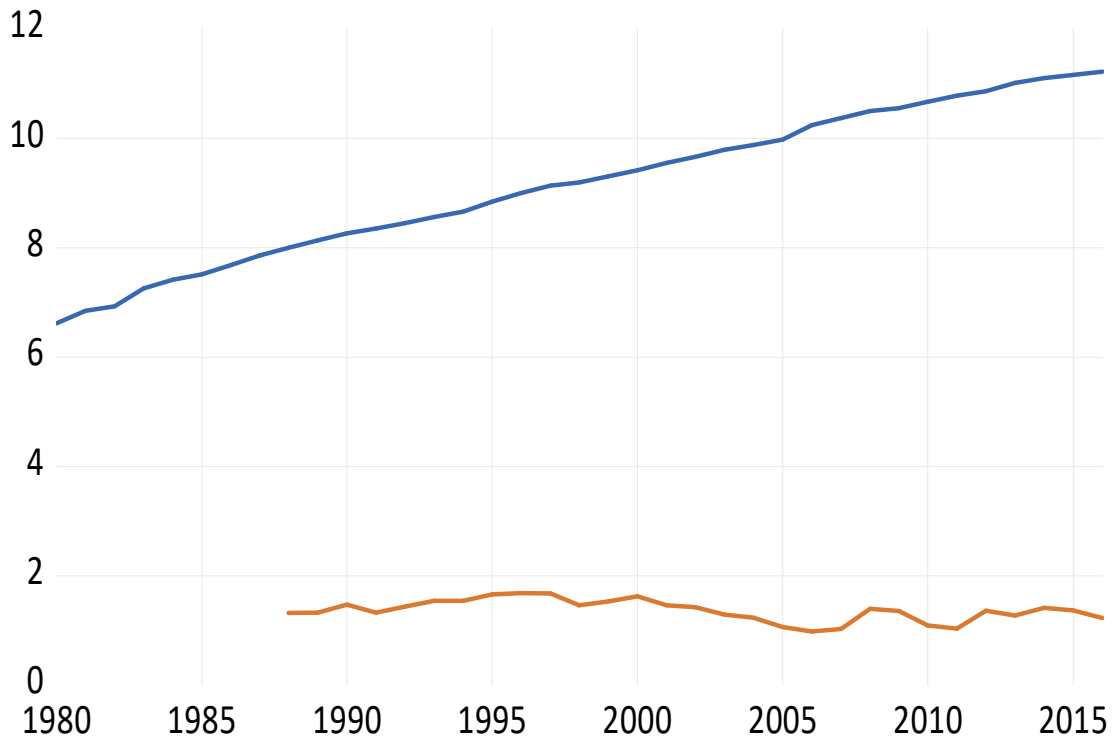
Figure 4.4: Inflation and consumption



Source: Author's construct

From Figure 4.4, it is clear that, while household consumption has a linear upward trend, inflation is largely non-linear and do not show sign of smoothing out.

Figure 4.5: Interest rate and consumption



Source: Author's construct

With regard to Figure 4.5 which shows the trend of interest rate and consumption, similar to inflation, interest rate does not follow a linear pattern relative to household consumption.

The overarching aim of this study is to examine the impact of exchange rate volatility on domestic consumption where volatility is modeled using the GARCH approach. Having estimated the GARCH model, we present the GARCH results in Table 4.3 below.

Table 4.3: Exchange rate volatility results

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0.574231	0.046311	12.39955	0.0000
LREER(-1)	0.709214***	0.024251	29.24515	0.0000
Variance Equation				
C	0.002431	0.000902	2.695637	0.0070
ARCH term	0.764096***	0.040665	18.79001	0.0000
GARCH term	-0.170481***	0.015855	-10.75250	0.0000
Diagnostics				
R-squared	0.797441	Mean dependent var		2.204062
Adj. R-squared	0.791483	S.D. dependent var		0.406551
S.E. of regression	0.185646	Akaike info criterion		-2.372181
Sum squared resid	1.171789	Schwarz criterion		-2.152247
Log likelihood	47.69925	Hannan-Quinn criter.		-2.295418
Durbin-Watson stat	1.073664			

Notes: *** denotes significance at 1%.

From Table 4.3, we find that, the coefficient of the lagged exchange rate is positive and significant suggesting that, current values of exchange rate are driven by its past values. For most part, about 79.7% of the variations in exchange rate are caused by variations in itself.

With regard to the variance equation, while the coefficient of the ARCH term is positive, the coefficient of the GARCH term is negative. Both terms are also significant at conventional levels. We examine the level of persistence or otherwise of the volatility by computing the sum of the ARCH and GARCH terms. If the sum of the ARCH and GARCH

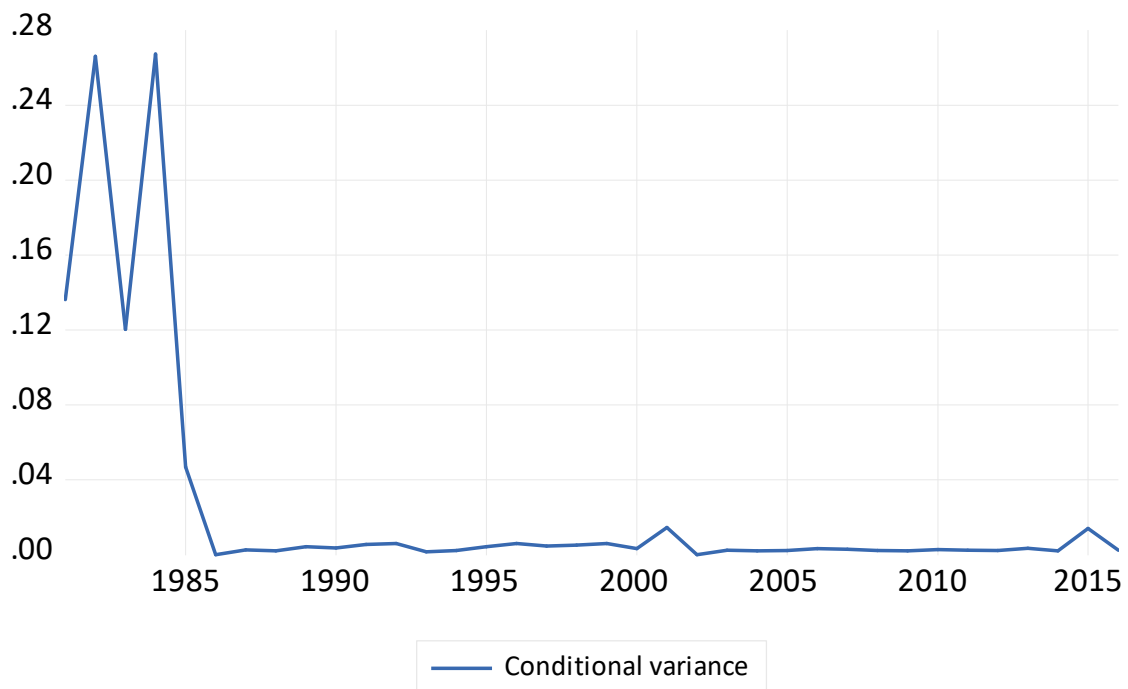




terms is closer to one, then it means the volatility is persistence and if the sum is far away from one, we conclude that the volatility is sluggish. With 0.764096 and -0.170481 as the ARCH and GARCH terms respectively produces a sum of 0.593615 ($0.764096 - 0.170481$). Given this, we can conclude that the exchange rate volatility is not persistent. This finding is inconsistent with Alagidede and Ibrahim (2017) who found that, real exchange rate volatility in Ghana is persistent. We attribute the differences in the finding to the proxy of exchange rate. While this study relied on real effective exchange rate to compute the volatility, Alagidede and Ibrahim's (2017) study used real exchange rate.

Based on Table 4.3 above, we plot the volatility clustering as shown in Figure 4.6 below.

Figure 4.6: Real Effective Exchange Rate Volatility Clustering



The real effective exchange rate volatility is presented above with the hope of providing some insights on the degree of real effective exchange rate volatility at least over the sample period. Overall, real effective exchange rate has not been highly volatile in some period consistent with the findings in the Table above. The change from fixed to “managed” floating regime in 1986 saw stability in the real effective exchange rate. The volatility trend shows a visible but marginal rise in 2000 and 2001 and slowly declined in 2002 perhaps due to the pre-election activities in 2000 and post-election in 2001. This period is followed by a modicum of stability until another marginal rise is observed in 2014 to 2015. This trend could be attributed to the election and post-electoral period where government incurred higher expenditure thus contributing to currency depreciation. The next section presents the results based on the structural unit root tests which is done at both levels and first difference.





4.5 Structural Break Unit Roots Results

In this section, we present findings on the unit root properties of the variables. In each test, we include an intercept and a trend while controlling for structural breaks in the data. The unit root tests are done at levels and first difference. We present the results of the unit root test at levels in the next section.

4.5.1 At Levels

4.5.1.1 Household Consumption

Table 4.4: Unit root test results for household consumption at levels

	t-Statistic	Prob.*
Break Date: 2014		
Break Selection: Minimize Dickey-Fuller t-statistic		
Lag Length: 0 (Automatic - based on Schwarz information criterion, maxlag=9)		
Augmented Dickey-Fuller test statistic	-3.518161	0.6820
Test critical values:		
1% level	-5.347598	
5% level	-4.859812	
10% level	-4.607324	

*Vogelsang (1993) asymptotic one-sided p-values.

Augmented Dickey-Fuller Test Equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LCONSUI(-1)	0.666888	0.094683	7.043349	0.0000
C	2.407594	0.637692	3.775478	0.0007
TREND	0.040868	0.012171	3.357747	0.0021
INCPTBREAK	-0.093197	0.040421	-2.305691	0.0280
BREAKDUM	0.044780	0.057705	0.776021	0.4436

R-squared	0.998878	Mean dependent var	9.2217
Ad. R-squared	0.998733	S.D. dependent var	1.3114
S.E. of regression	0.046685	Akaike info criterion	-3.1625
Sum squared resid	0.067564	Schwarz criterion	-2.9426
Log likelihood	61.92590	Hannan-Quinn criter.	-3.0857
F-statistic	6897.675	Durbin-Watson stat	2.2628
Prob(F-statistic)	0.000000		

4.5.1.2 Exchange rate

Table 4.5: Unit root test results for exchange rate at levels

Break Date: 1983		
Break Selection: Minimize Dickey-Fuller t-statistic		
Lag Length: 0 (Automatic - based on Schwarz information criterion, maxlag=9)		
	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-13.84395	< 0.01
Test critical values:	1% level	-5.347598
	5% level	-4.859812
	10% level	-4.607324

*Vogelsang (1993) asymptotic one-sided p-values.

Augmented Dickey-Fuller Test Equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LREER(-1)	0.419913	0.041902	10.02136	0.0000
C	2.008027	0.134949	14.87993	0.0000
TREND	-0.007506	0.001393	-5.386918	0.0000
INCPTBREAK	-0.662171	0.046659	-14.19178	0.0000
BREAKDUM	0.825379	0.064708	12.75549	0.0000
R-squared	0.985074	Mean dependent var	2.2040	
Adjusted R-squared	0.983149	S.D. dependent var	0.4065	
S.E. of regression	0.052776	Akaike info criterion	-2.9172	
Sum squared resid	0.086343	Schwarz criterion	-2.6973	
Log likelihood	57.51116	Hannan-Quinn criter.	-2.8405	



F-statistic	511.4916	Durbin-Watson stat	1.7561
Prob(F-statistic)	0.000000		

4.5.1.2 Interest rate

Table 4.6: Unit root test results for interest rate at levels

Break Date: 2002				
Break Selection: Minimize Dickey-Fuller t-statistic				
Lag Length: 1 (Automatic - based on Schwarz information criterion, maxlag=9)				
			t-Statistic	Prob. *
Augmented Dickey-Fuller test statistic			-4.164147	0.2786
Test critical values:	1% level		-5.347598	
	5% level		-4.859812	
	10% level		-4.607324	
*Vogelsang (1993) asymptotic one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LINTRATE(-1)	0.146082	0.205064	0.712369	0.4841
D(LINTRATE(-1))	0.253408	0.188756	1.342515	0.1938
C	1.243074	0.299850	4.145652	0.0005
TREND	0.009422	0.006894	1.366745	0.1862
INCPTBREAK	-0.394401	0.136513	-2.889117	0.0088
BREAKDUM	0.281186	0.158128	1.778212	0.0899
R-squared	0.7012	Mean dependent var		1.3669
Adjusted R-squared	0.6301	S.D. dependent var		0.2034
S.E. of regression	0.1237	Akaike info criterion		-1.1478
Sum squared resid	0.3216	Schwarz criterion		-0.8599
Log likelihood	21.496	Hannan-Quinn criter.		-1.0622
F-statistic	9.8596	Durbin-Watson stat		2.1089
Prob(F-statistic)	0.0000			



4.5.1.2 *Real GDP per capita*

Table 4.7: Unit root test results for real GDP per capita at levels

Break Date: 2010 Break Selection: Minimize Dickey-Fuller t-statistic Lag Length: 1 (Automatic - based on Schwarz information criterion, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic				
Test critical values:			-7.540149	< 0.01
	1% level		-5.347598	
	5% level		-4.859812	
	10% level		-4.607324	
*Vogelsang (1993) asymptotic one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGDPPC(-1)	0.482679	0.068609	7.035238	0.0000
D(LGDPPC(-1))	0.265823	0.096709	2.748692	0.0102
C	1.470113	0.194980	7.539825	0.0000
TREND	0.004337	0.000575	7.543480	0.0000
INCPTBREAK	0.049084	0.008001	6.134893	0.0000
BREAKDUM	-0.023718	0.009098	-2.606960	0.0143
R-squared	0.9965	Mean dependent var		3.0063
Adjusted R-squared	0.9959	S.D. dependent var		0.1129
S.E. of regression	0.0072	Akaike info criterion		-6.8742
Sum squared resid	0.0015	Schwarz criterion		-6.6076
Log likelihood	126.299	Hannan-Quinn criter.		-6.7822
F-statistic	1665.7	Durbin-Watson stat		1.8829
Prob(F-statistic)	0.0000			



4.5.1.2 *Financial development*

Table 4.8: Unit root test results for financial development at levels

Break Date: 2010 Break Selection: Minimize Dickey-Fuller t-statistic Lag Length: 0 (Automatic - based on Schwarz information criterion, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-4.310982	0.2037
Test critical values:	1% level		-5.347598	
	5% level		-4.859812	
	10% level		-4.607324	
*Vogelsang (1993) asymptotic one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFDINDEX(-1)	0.310236	0.160001	1.938960	0.0617
C	-0.633899	0.147403	-4.300444	0.0002
TREND	-0.000893	0.000769	-1.160554	0.2547
INCPTBREAK	0.072602	0.023534	3.084995	0.0043
BREAKDUM	-0.075877	0.037702	-2.012552	0.0529
R-squared	0.4949	Mean dependent var		-0.9266
Adjusted R-squared	0.4297	S.D. dependent var		0.0443
S.E. of regression	0.0335	Akaike info criterion		-3.8251
Sum squared resid	0.0348	Schwarz criterion		-3.6051
Log likelihood	73.851	Hannan-Quinn criter.		-3.7483
F-statistic	7.5945	Durbin-Watson stat		1.9444
Prob(F-statistic)	0.0002			



4.5.1.2 Inflation

Table 4.9: Unit root test results for inflation at levels

Break Date: 1994			
Break Selection: Minimize Dickey-Fuller t-statistic			
Lag Length: 3 (Automatic - based on Schwarz information criterion, maxlag=9)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.972782	< 0.01
Test critical values:	1% level	-5.347598	
	5% level	-4.859812	
	10% level	-4.607324	

*Vogelsang (1993) asymptotic one-sided p-values.

Augmented Dickey-Fuller Test Equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LINFL(-1)	-0.997758	0.286508	-3.482478	0.0018
D(LINFL(-1))	1.087216	0.229763	4.731907	0.0001
D(LINFL(-2))	0.556114	0.168444	3.301472	0.0029
D(LINFL(-3))	0.372473	0.119204	3.124680	0.0045
C	3.146950	0.473800	6.641934	0.0000
TREND	-0.045115	0.008517	-5.296928	0.0000
INCPTBREAK	0.339805	0.108807	3.123009	0.0045
BREAKDUM	-0.371513	0.179421	-2.070625	0.0489
R-squared	0.6803	Mean dependent var		1.2785
Adjusted R-squared	0.5908	S.D. dependent var		0.2302
S.E. of regression	0.1472	Akaike info criterion		-0.7856
Sum squared resid	0.5423	Schwarz criterion		-0.4228
Log likelihood	20.962	Hannan-Quinn criter.		-0.6635
F-statistic	7.6004	Durbin-Watson stat		2.2110
Prob(F-statistic)	0.0000			



From the unit root results Tables above, we find that, while domestic consumption, interest rate and financial development are not stationary at levels, exchange rate, real GDP per capita and inflation are stationary at levels. This is because, we fail to reject the null hypotheses of unit roots for domestic consumption, interest rate and financial development while rejecting that of the null hypotheses for exchange rate, real GDP per capita and inflation. Thus, exchange rate, real GDP per capita and inflation are integrated of order zero $I(0)$.

With regard to the structural break, the study find structural break in 2014, 1983, 2002 and 1994 for domestic consumption, exchange rate, interest rate and inflation. However, for both the financial development and real GDP per capita, the study observes a break period in 2010. Indeed, the exchange rate structural break period in 1983 coincided with the Economic Recovery Programme (ERP) period where the country liberalized its financial markets and exchange rates.

In the next section, we conduct the unit root tests at first difference in order to examine whether all non-stationarity will be cleared.



4.5.2 At First Difference

4.5.2.1 Household consumption

Table 4.10: Unit root test results for household consumption at first difference

Break Date: 2005				
Break Selection: Minimize Dickey-Fuller t-statistic				
Lag Length: 0 (Automatic - based on Schwarz information criterion, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-7.199571	< 0.01
Test critical values:	1% level		-5.347598	
	5% level		-4.859812	
	10% level		-4.607324	

*Vogelsang (1993) asymptotic one-sided p-values.

Augmented Dickey-Fuller Test Equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LCONSU1(-1))	-0.252277	0.173938	-1.450389	0.1573
C	0.224680	0.038785	5.792974	0.0000
TREND	-0.004853	0.001693	-2.866689	0.0075
INCPTBREAK	0.063241	0.034810	1.816767	0.0793
BREAKDUM	-0.049206	0.055903	-0.880206	0.3857
R-squared	0.240359	Mean dependent var		0.1248
Adjusted R-squared	0.139073	S.D. dependent var		0.0558
S.E. of regression	0.051818	Akaike info criterion		-2.9506
Sum squared resid	0.080553	Schwarz criterion		-2.7284
Log likelihood	56.63550	Hannan-Quinn criter.		-2.8899
F-statistic	2.373084	Durbin-Watson stat		1.7183
Prob(F-statistic)	0.074541			



4.5.2.1 Exchange rate

Table 4.11: Unit root test results for exchange rate at first difference

Break Date: 1984 Break Selection: Minimize Dickey-Fuller t-statistic Lag Length: 0 (Automatic - based on Schwarz information criterion, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-11.34586	< 0.01
Test critical values:	1% level		-5.347598	
	5% level		-4.859812	
	10% level		-4.607324	
*Vogelsang (1993) asymptotic one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LREER(-1))	0.114241	0.078069	1.463340	0.1538
C	0.128766	0.046571	2.764944	0.0096
TREND	0.001840	0.001277	1.440676	0.1600
INCPTBREAK	-0.185829	0.058215	-3.192086	0.0033
BREAKDUM	-0.773591	0.071685	-10.79159	0.0000
R-squared	0.858303	Mean dependent var		-0.0389
Adjusted R-squared	0.839410	S.D. dependent var		0.1534
S.E. of regression	0.061476	Akaike info criterion		-2.6087
Sum squared resid	0.113377	Schwarz criterion		-2.3866
Log likelihood	50.65386	Hannan-Quinn criter.		-2.5320
F-statistic	45.42992	Durbin-Watson stat		1.8448
Prob(F-statistic)	0.000000			



4.5.2.1 Interest rate

Table 4.12: Unit root test results for interest rate at first difference

Break Date: 2006 Break Selection: Minimize Dickey-Fuller t-statistic Lag Length: 1 (Automatic - based on Schwarz information criterion, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-5.552523	< 0.01
Test critical values:	1% level		-5.347598	
	5% level		-4.859812	
	10% level		-4.607324	
*Vogelsang (1993) asymptotic one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LINTRATE(-1))	-0.635118	0.294482	-2.156729	0.0434
D(LINTRATE(-1),2)	0.373012	0.189726	1.966055	0.0633
C	0.102244	0.071169	1.436644	0.1663
TREND	-0.016489	0.007686	-2.145467	0.0444
INCPTBREAK	0.291310	0.120961	2.408305	0.0258
BREAKDUM	-0.272619	0.163584	-1.666539	0.1112
R-squared	0.306983	Mean dependent var		-0.009411
Adjusted R-squared	0.133729	S.D. dependent var		0.151394
S.E. of regression	0.140908	Akaike info criterion		-0.882245
Sum squared resid	0.397101	Schwarz criterion		-0.591915
Log likelihood	17.46919	Hannan-Quinn criter.		-0.798641
F-statistic	1.771864	Durbin-Watson stat		2.298870
Prob(F-statistic)	0.164562			



4.5.2.1 Real GDP per capita

Table 4.13: Unit root test results for real GDP per capita at first difference

Break Date: 2011 Break Selection: Minimize Dickey-Fuller t-statistic Lag Length: 2 (Automatic - based on Schwarz information criterion, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-7.744503	< 0.01
Test critical values:	1% level		-5.347598	
	5% level		-4.859812	
	10% level		-4.607324	
*Vogelsang (1993) asymptotic one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGDPPC(-1))	-0.120869	0.144731	-0.835130	0.4113
D(LGDPPC(-1),2)	0.144805	0.116108	1.247155	0.2235
D(LGDPPC(-2),2)	0.224015	0.107805	2.077963	0.0477
C	0.005588	0.002870	1.947019	0.0624
TREND	0.000336	0.000199	1.688143	0.1033
INCPTBREAK	-0.001603	0.004394	-0.364807	0.7182
BREAKDUM	0.037737	0.007683	4.911804	0.0000
R-squared	0.565372	Mean dependent var		0.011331
Adjusted R-squared	0.465073	S.D. dependent var		0.009256
S.E. of regression	0.006770	Akaike info criterion		-6.966826
Sum squared resid	0.001192	Schwarz criterion		-6.649385
Log likelihood	121.9526	Hannan-Quinn criter.		-6.860017
F-statistic	5.636881	Durbin-Watson stat		1.790108
Prob(F-statistic)	0.000739			



4.5.2.1 *Financial development*

Table 4.14: Unit root test results for financial development at first difference

Break Date: 1987 Break Selection: Minimize Dickey-Fuller t-statistic Lag Length: 0 (Automatic - based on Schwarz information criterion, maxlag=9)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-7.415259	< 0.01
Test critical values:	1% level		-5.347598	
	5% level		-4.859812	
	10% level		-4.607324	
*Vogelsang (1993) asymptotic one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LFDINDEX(-1))	-0.276997	0.172212	-1.608464	0.1182
C	0.013349	0.018189	0.733900	0.4687
TREND	0.001135	0.000910	1.247484	0.2219
INCPTBREAK	-0.033946	0.025838	-1.313794	0.1989
BREAKDUM	-0.051383	0.042830	-1.199699	0.2396
R-squared	0.173833	Mean dependent var		0.002650
Adjusted R-squared	0.063677	S.D. dependent var		0.041360
S.E. of regression	0.040022	Akaike info criterion		-3.467223
Sum squared resid	0.048052	Schwarz criterion		-3.245030
Log likelihood	65.67640	Hannan-Quinn criter.		-3.390522
F-statistic	1.578066	Durbin-Watson stat		2.413463
Prob(F-statistic)	0.205695			



4.5.2.1 Inflation

Table 4.15: Unit root test results for inflation at first difference

Break Date: 1985		
Break Selection: Minimize Dickey-Fuller t-statistic		
Lag Length: 0 (Automatic - based on Schwarz information criterion, maxlag=9)		
		t-Statistic
		Prob.*
Augmented Dickey-Fuller test statistic		-10.07778
Test critical values:		< 0.01
	1% level	-5.347598
	5% level	-4.859812
	10% level	-4.607324

*Vogelsang (1993) asymptotic one-sided p-values.

Augmented Dickey-Fuller Test Equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LINFL(-1))	-0.499277	0.148771	-3.356020	0.0022
C	-0.089544	0.148529	-0.602870	0.5511
TREND	-0.000773	0.005118	-0.151005	0.8810
INCPTBREAK	0.106518	0.181225	0.587768	0.5611
BREAKDUM	-0.844398	0.279365	-3.022557	0.0051
R-squared	0.368635	Mean dependent var		-0.023555
Adjusted R-squared	0.284453	S.D. dependent var		0.300962
S.E. of regression	0.254584	Akaike info criterion		0.233193
Sum squared resid	1.944392	Schwarz criterion		0.455385
Log likelihood	0.919128	Hannan-Quinn criter.		0.309894
F-statistic	4.379026	Durbin-Watson stat		1.791187
Prob(F-statistic)	0.006593			





From the results above, we find that, domestic consumption, interest rate and financial development have turned stationary after first difference their respective null hypotheses of unit roots are rejected. Therefore, these variables are integrated of order one $[I(1)]$. The other variables, exchange rate, real GDP per capita and inflation maintain stationarity properties hence integrated of order zero $[I(0)]$. Thus, the overall conclusion is that, all the variables are stationary and do not exhibit unit roots. Thus, shocks to these variables have transitory impacts and are likely to mean revert.

At first difference, we observe a structural break period in 2005, 1984, 2006, 2011, 1987 and 1985 for domestic consumption, exchange rate, interest rate, real GDP per capita, financial development and inflation respectively.

Having determined the stationarity properties of the variables, we examine the level of co-integration using the bounds testing approach. The results are presented in section 4.6 below.

4.6 Bounds Testing Co-integration Results

This section presents the findings on the co-integration level which is examined without the interactive term and with the interactive term of exchange rate volatility and financial development.

4.6.1 Bounds Co-integration tests without interactive term

In examining the co-integration, the study first specified the model where domestic consumption is made to depend on exchange rate, exchange rate volatility, financial development, real GDP per capita, inflation and interest rate. The results from the co-integration level of these variables are presented in Table 4.16.

Table 4.16: ARDL cointegration test results without interactive term

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Significance	<i>I</i> (0)	<i>I</i> (1)
F-statistic	3.176993	10%	1.99	2.94
k	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99

Notes: * denotes significance at 1%. The order of the test is: Consumption (exchange rate, exchange rate volatility, financial development, real GDP per capita, inflation and interest rate). All variables are in logs.

From these results, we reject the null hypothesis of absence of co-integration because the calculated F-test is 3.176993 higher than the critical values at the 1% level of significance. By rejecting the null hypothesis, the study highlighted the fact that co-integration indicates that variables have a long-term relationship.





4.6.1 Tests to common boundaries with an interactive term

While the earlier section examined the co-integration without controlling for the interactive term, this section determines the level of co-integration among all the variables including the interactive term. Specifically, we estimate the model where domestic consumption is made to depend on exchange rate, exchange rate volatility, financial development, real GDP per capita, inflation and interest rate, interactive term. The results are presented in Table 4.17 below.

Table 4.17: ARDL cointegration test results with interactive term

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	2.72577	10%	1.92	2.89
k	7	5%	2.17	3.21
		2.5%	2.43	3.51
		1%	2.73	3.9

Notes: * denotes significance at 1%. The order of the test is: Consumption (exchange rate, exchange rate volatility, financial development, real GDP per capita, inflation and interest rate, interactive term). All variables are in logs.

Like previous results, we found evidence of co-integration even after controlling for the term interactive. In particular, the calculated F-statistics is greater than 2.72577 at critical values of 5% significance level. Therefore, the level of co-integration is strong,

whether we control the term of interactive or not. Categorically, our study reveals that the domestic consumption and all the variables have a long relationship term and tend to move in a common long term path. After finding evidence of co-integration, the study continues to assess the impact of exchange rate fluctuations on domestic consumption in the next section.

4.7 Empirical Findings

This chapter presents the results based on the ARDL model. Our dependent variable is the domestic consumption affected by independent variables. In addition, the study also presents the results of the Granger causality test.

4.7.1 Effect of exchange rate volatility and its transmission effect on household consumption

Two presumptive models, the first model is evaluated without the interactive term, while the second model includes the interactive term as a reference in the domestic consumption equation. Table 4.18 presents the results of the short- and long-run effects of exchange rate fluctuations on domestic consumption.



Table 4.18 : Short and Long Term Effects of Exchange Rate Fluctuations in Domestic Consumption

	Selected Model: ARDL (2, 0, 0, 2, 1, 2, 2)	Selected Model: ARDL (2, 2, 1, 1, 2, 2, 2, 1)
	1	2
Short run estimates:		
Consumption(-1)	0.8381*** [0.0050]	-0.7428*** [0.0014]
Consumption(-2)	0.2353 [0.2400]	-
Real effective exchange rate	0.1663* [0.0899]	0.0263* [0.0714]
Real effective exchange rate(-1)	-	0.2022** [0.0295]
Real effective exchange rate volatility	0.0115* [0.0676]	0.6557*** [0.0007]
Real effective exchange rate volatility(-1)	-	-
Interest rate	-0.0644* [0.0706]	-0.0278 [0.2354]
Interest rate(-1)	-0.1561*** [0.0029]	-
Interest rate(-2)	0.0369 [0.3647]	-
Inflation	0.3647 [0.9142]	0.0438* [0.0748]
Inflation(-1)	0.0929*** [0.0054]	-0.0194 [0.1861]
GDP per capita	-1.3572* [0.0506]	0.8265** [0.0439]
GDP per capita (-1)	0.4806 [0.6322]	1.2713*** [0.0081]
GDP per capita (-2)	1.5154** [0.0377]	-
Financial development index	-0.5632*** [0.0028]	1.0668*** [0.0055]
Financial development index(-1)	-0.2196 [0.1344]	0.6143*** [0.0007]
Financial development index(-2)	0.5275*** [0.0061]	-
Error correction term	-0.0735*** [0.0000]	-0.2844*** [0.0002]



Interactive term	–	0.6477*** [0.0008]
Long run estimates:		
Real effective exchange rate	–2.2631 [0.7349]	–0.3011 [0.8000]
Real effective exchange rate volatility	–0.1576** [0.0327]	–0.3165* [0.05363]
Interest rate	–0.7447* [0.0532]	–0.3600* [0.0667]
Inflation	1.3106 [–0.3566]	–0.4988 [0.5381]
GDP per capita	8.6895** [0.0316]	1.8188** [0.0110]
Financial development index	17.8252 [0.7407]	–5.9994 [0.5465]
Interactive term	–	4.2908 [0.5393]
Constant	49.3437 [0.7242]	1.7247 [0.8360]
Diagnostics		
R–square	0.9201	0.8683
Adjusted R–square	0.8112	0.7630
Serial Correlation LM test (F–statistic) [p–value]	0.4062 [0.6778]	0.2271 [0.8046]
Heteroskedasticity Test: Breusch–Pagan–Godfrey F–statistic) [p–value]	1.4799 [0.2588]	5.1215 [0.1590]
RESET	0.9567 [0.6358]	0.8445 [0.4308]
CUSUM	Stable	Stable
CUSUM square	Stable	Stable

Notes: *** and ** and * indicate a significance of 1%, 5% and 10% respectively.

The short- and long-term results are presented in Table 18.4. The optimal model selected is ARDL (2, 0, 0, 2, 1, 2, 2). To be reliable, they must undergo various diagnostic tests. These diagnostic tests are: LM, RESET, BPG, CUSUM and CUSUMSQ. From these diagnostic tests, given in Table 18.4 it is clear that using the CUSUM test, there is a structural stability such that the value of LM exceeds all levels of significance, indicating that this model has no serial correlation and our Breusch Breusch-Pagan-Godfrey test indicates the absence



heteroskedasticity and there is no error associated with the functional classification of the consumption model. Therefore, the results are reliable. In addition, the estimate of the estimated error correction is statistically negative and significant, while the value of p is less than the significant levels that indicate the existence of co-integration and convergence.

The value of P (0.01) obtained from the test is below any level of significant. As a result, the null assumption is rejected, which means that the real fluctuation of the real exchange rate, real effective exchange rate, inflation, per capita GDP, inflationary and FDI movement affect short-term house consumption expenditure. Given the coefficient, the fluctuations in the real exchange rate have mixed effects on domestic consumption in the short term. In other words, the current level of volatility negatively affects consumption, while the previous level of volatility has a positive impact on short-term consumption. In the long term, exchange rate volatility has a negative impact on consumption. For other variables, the effective exchange rate appears to affect consumption differently depending on short-term lag. In the zero lag, the effect is positive but not significant, while in the first and second lags, it is respectively negative, positive and statistically significant. In the long run, this has a positive effect on consumption. As a result, the real appreciation improves local consumption in the short and long term. Interest rates have a positive impact on short-term consumption in the second lag. This effect changes to negative in the long run.



Table 4.19: Breusch-Godfrey Serial Correlation LM Test

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.406271	Prob. F(2,9)	0.6778
Obs*R-squared	2.235774	Prob. Chi-Square(2)	0.3270

Table 4.20: Breusch-Pagan-Godfrey Heteroskedasticity Test

Null hypothesis: Homoskedasticity

	1.479		0.25
F-statistic	957	Prob. F(15,11)	88
	18.05	Prob. Chi-Square(15)	0.25
Obs*R-squared	404		98
Scaled explained SS	3.936	Prob. Chi-Square(15)	0.99
	465		79



Figure 4.7: Cumulative sum for model 1

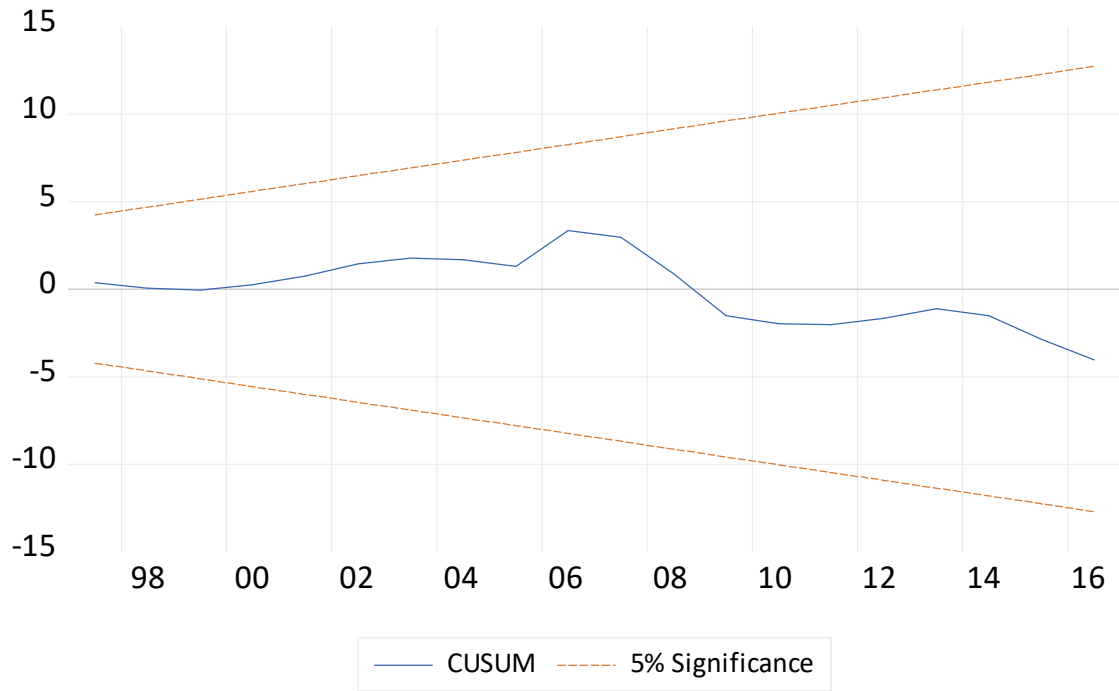


Figure 4.8: Cumulative sum of squares for model 1



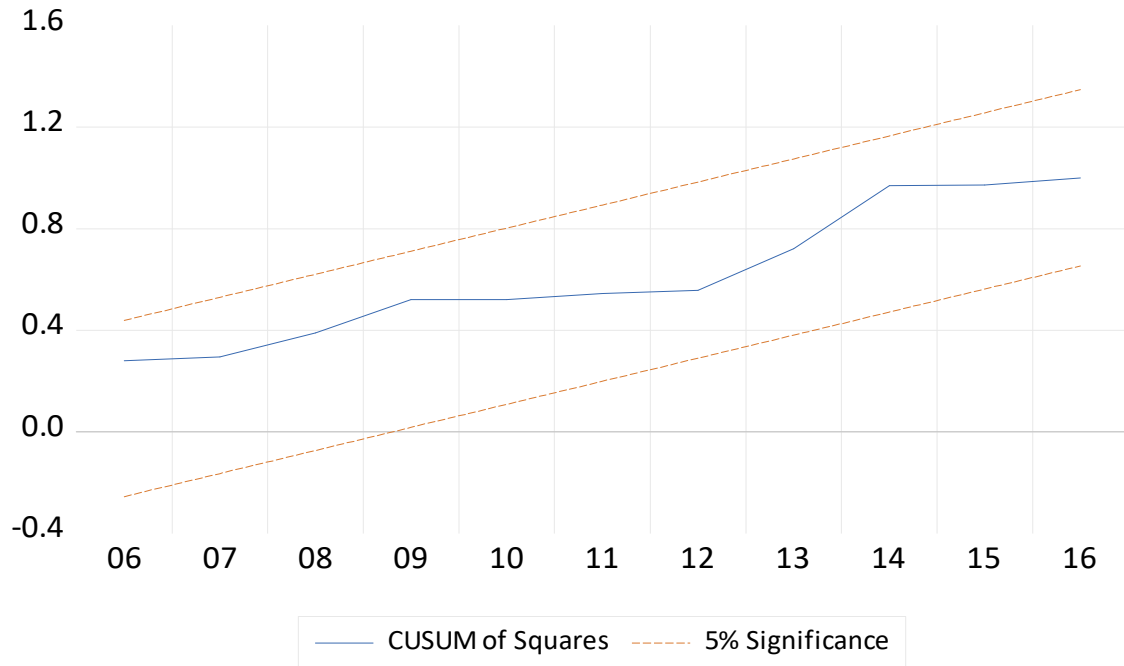


Table 4.21: Breusch-Godfrey Serial Correlation LM Test

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.227177	Prob. F(2,5)	0.8046
Obs*R-squared	2.332432	Prob. Chi-Square(2)	0.3115

Table 4.22: Breusch-Pagan-Godfrey Heteroskedasticity Test

Null hypothesis: Homoskedasticity

F-statistic	5.121538	Prob. F(20,7)	0.0170
Obs*R-squared	26.20891	Prob. Chi-Square(20)	0.1590
Scaled explained SS	1.284993	Prob. Chi-Square(20)	1.0000



Figure 4.9: Cumulative sum for model 2

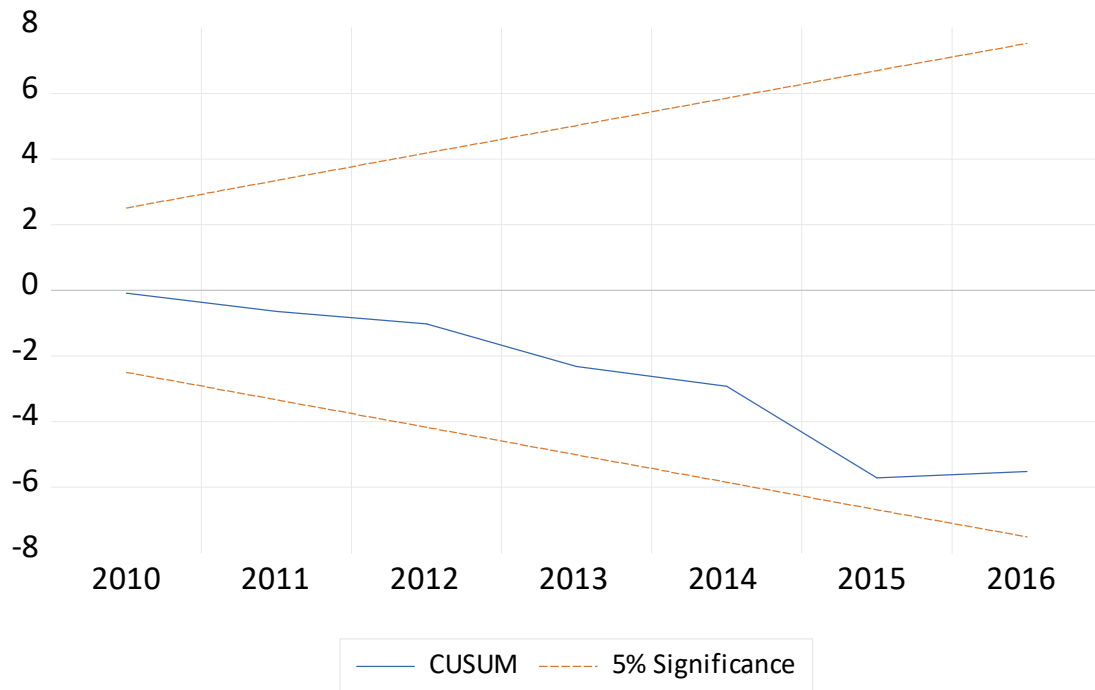
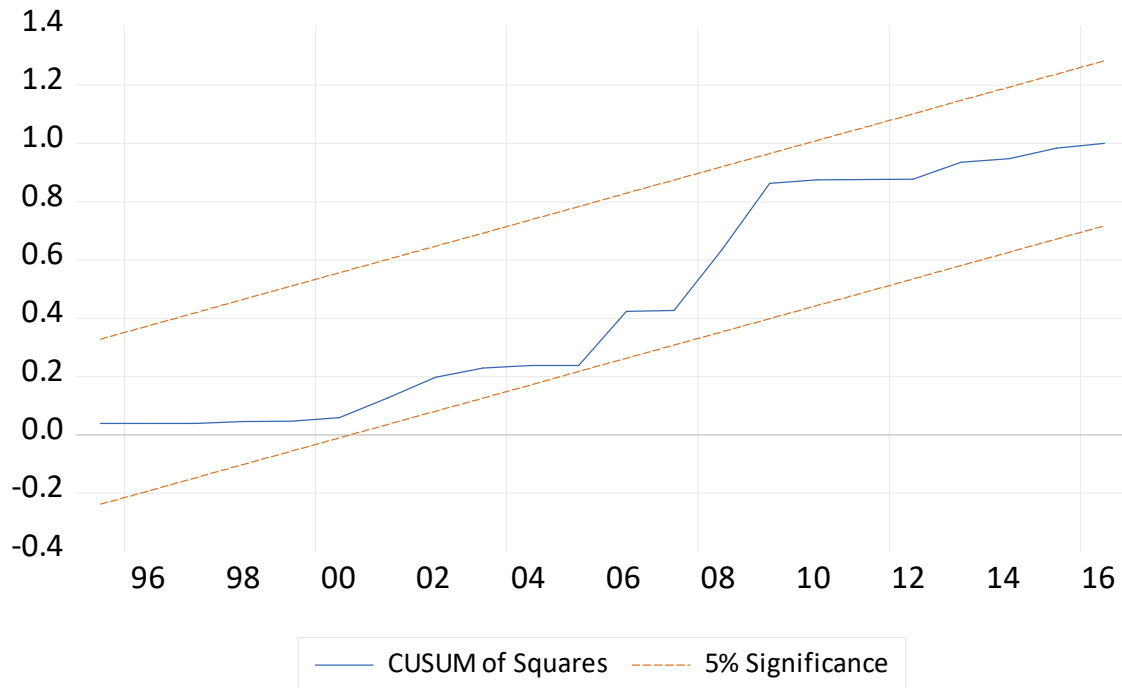


Figure 4.10: Cumulative sum of squares for model 2





4.7.2 Examine the Causal Link among Variables

Several arguments were presented regarding the effect of certain macroeconomic variables on the volatility of the real exchange rate. This part of the chapter sought to examine the causal link between empirically macro-economic variables such as real effective exchange rate (REER), inflation (INFL), GDP per capita (GDPPC), financial development index (FDINDEX), interest rate (INTRATE) and household consumption expenditure (CONSU) and their relationship with real effective exchange rate volatility. To achieve this goal, a Granger causality test was performed. The results are as follows in Table 4.23 below.

Table 4.23: Granger Causality Test Results

Null Hypothesis:	<i>F</i> -Statistic	<i>p</i> -value
LREER does not Granger Cause LREERVOL	3.46501	0.0447**



LREERVOL does not Granger Cause LREER	0.20144	0.8187
LCONSUS does not Granger Cause LREERVOL	0.15023	0.8612
LREERVOL does not Granger Cause LCONSUS	0.01069	0.9894
LGDPPC does not Granger Cause LREERVOL	1.51418	0.2369
LREERVOL does not Granger Cause LGDPPC	0.06111	0.9408
LFDINDEX does not Granger Cause LREERVOL	0.04029	0.9606
LREERVOL does not Granger Cause LFDINDEX	0.35761	0.7024
LINFL does not Granger Cause LREERVOL	0.94493	0.4003
LREERVOL does not Granger Cause LINFL	1.39136	0.2648
LINTRATE does not Granger Cause LREERVOL	0.67896	0.5175
LREERVOL does not Granger Cause LINTRATE	0.68787	0.5131
LCONSUS does not Granger Cause LREER	0.49979	0.6116
LREER does not Granger Cause LCONSUS	0.89672	0.4186
LGDPPC does not Granger Cause LREER	1.05569	0.3605
LREER does not Granger Cause LGDPPC	0.11594	0.8909
LFDINDEX does not Granger Cause LREER	0.01707	0.9831
LREER does not Granger Cause LFDINDEX	0.46020	0.6355
LINFL does not Granger Cause LREER	7.39750	0.0024***
LREER does not Granger Cause LINFL	1.17661	0.3221
LINTRATE does not Granger Cause LREER	0.64134	0.5362
LREER does not Granger Cause LINTRATE	1.98136	0.1617
LGDPPC does not Granger Cause LCONSUS	1.68320	0.2029
LCONSUS does not Granger Cause LGDPPC	1.56747	0.2252



LFDINDEX does not Granger Cause LCONSU	0.65485	0.5268
LCONSU does not Granger Cause LFDINDEX	0.63302	0.5379
LINFL does not Granger Cause LCONSU	1.45683	0.2490
LCONSU does not Granger Cause LINFL	0.35050	0.7072
LINTRATE does not Granger Cause LCONSU	2.32876	0.1210
LCONSU does not Granger Cause LINTRATE	0.11271	0.8939
LFDINDEX does not Granger Cause LGDPPC	0.36731	0.6957
LGDPPC does not Granger Cause LFDINDEX	1.49342	0.2408
LINFL does not Granger Cause LGDPPC	0.98003	0.3870
LGDPPC does not Granger Cause LINFL	11.0216	0.0003***
LINTRATE does not Granger Cause LGDPPC	2.11298	0.1447
LGDPPC does not Granger Cause LINTRATE	1.30482	0.2914
LINFL does not Granger Cause LFDINDEX	0.46138	0.6348
LFDINDEX does not Granger Cause LINFL	0.29278	0.7483
LINTRATE does not Granger Cause LFDINDEX	0.94384	0.4043
LFDINDEX does not Granger Cause LINTRATE	1.23653	0.3098
LINTRATE does not Granger Cause LINFL	4.42006	0.0243**
LINFL does not Granger Cause LINTRATE	0.02955	0.9709

Notes: *** and ** indicate a significance of 1% and 5% respectively.

In Table 4.23, the result of the causal relationship test between a real effective exchange rate volatility and a real effective exchange rate indicates that the null hypothesis that the real effective exchange rate does not Granger cause the fluctuation in the exchange rate volatility is rejected at 5 % significance level. Therefore, one can conclude that real



effective exchange rate Granger causes fluctuations in the real exchange rate. This means that the real effective exchange rate plays an important role in determining the volatility of the effective exchange rate in Ghana. However, the null hypothesis of the volatility of the real exchange rate does not Granger-cause the real effective exchange rate is true since the p-value is higher than all the levels of significance. The result of the causality between inflation and the exchange rate shows that the null hypothesis is rejected. That means inflation granger cause the real exchange rate. Indeed, the value of p is 0.0024 less than 0.01. On the other hand, we accept the null hypothesis that the real exchange effective does not granger cause inflation. We conclude that in Ghana inflation rather has a significant influence on the real effective exchange rate. We highlights the result of a causal link between GDP per capita and inflation to test the assumption that GDP per capita does not granger cause inflation factor. This was rejected at 1 % significant level. As a result, we can conclude that GDPper capita Granger cause of inflation. This means that GDP per capita has a significant impact on the level of inflation in the country, but the opposite is not true.

The test of causal link between the interest rate and inflation is evidenced by the fact that interest rate does not granger cause inflation is rejected at a significant level of 5%. This means that interest rates have a significant impact on inflation in Ghana. The reverse is invalid.

However, apart from the real effective exchange rate, inflation, GDP per capita and interest rate have a significant causal link with the volatility of the effective exchange rate, the real effective exchange rate and inflation. The other variables have no significant causal relationship with each other.

4.8 Conclusion and Policy Implications

Based on the results of our empirical analysis, we highlight the drivers of short-term real effective exchange rate volatility in Ghana. Examine the channels through which exchange rate fluctuations pass to influence consumption. We also assessed the role of financial development in exchange rate volatility in Ghana. Given the overall purpose of this study, we examine the implications of our policy objectives for guiding Ghana's economic policy on consumption. So far, the literature is not critical regarding the drivers of exchange rate volatility. With respect to the relationship between exchange rate fluctuations and consumption, our study found a negative and significant relationship between the two. We assume a series of possible channels through which this can occur in the field after a set of commands is applied to our regression. Interest rate and inflation are some of the channels and have been addressed in numerous studies (see Arize et al., 2000, Dell'Aricecia 1999, McKenzie 1999) and it is confirmed this study. Focusing on the volatility of the real exchange rate, our study indicates that the P value (0.01) obtained from the test is lower than all signal levels. Therefore, a null hypothesis has been rejected, which means that effective exchange rate volatility, real effective exchange rate, inflation, GDP per capita, interest rate fluctuations and financial sector development, all affect household consumption expenditure in the short term. Our results show that effective exchange rate volatility has mixed effects on domestic consumption in the short term. In other words, the current level of volatility negatively affects consumption, while the previous level of volatility has a positive impact on short-term consumption. In the long term, exchange rate volatility has a negative impact on consumption. Evidence of a short-term negative impact of real exchange rate volatility on consumption indicates that exchange rate volatility is a



significant source of changes in Ghana's domestic consumption level. Indeed, the volatility of the exchange rate negatively affects domestic consumption, which can slow overall spending. Therefore, in terms of policy, the stability of the exchange rate is important if policymakers increase want to boost domestic consumption in Ghana. In addition, as the volatility of the exchange rate has a negative impact on domestic consumption over the long term, decrease in long term consumption should be expected. More specifically, the evidence suggests that exchange rate volatility can pose many macroeconomic problems: high inflationary uncertainty, low domestic consumption, low economic growth, high unemployment, high poverty and income inequality. . State decision-makers can remedy this situation by implementing an exchange rate policy that prevents exchange rate fluctuations. As confirmed by Tweneboah and Alagidede (2015), the transition to a more stable international currency, such as the US dollar, may be the only way if volatility is excessive.

CHAPTER FIVE



SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

The previous section presented an analysis and discussion of secondary data including annual data on the World Development Indicators of the World Bank and data from the Bank of Ghana. This chapter summarizes the main findings regarding the relationship between effective exchange rate volatility and local consumption in Ghana, based on the results of the analysis. The chapter also provides a brief summary and recommends based on key findings.

2.5 Summary of Key Findings and Conclusion

The decision of consumption or savings is essential for both micro-analysis and the macroeconomic in the short-term and long-term in Ghana. Given the policy importance of consumer decisions, the ancient literature has focused much attention on the determinant of domestic consumption. For this purpose, income and interest rates have often being marked as the main determinants of consumption. Recent studies have identified the effects of changes in the exchange rate on consumption, suggesting that reductions may be detrimental to consumption because of their inflationary effects. Other studies have suggested that exchange rate fluctuations rather than its mean fluctuations can have a significant impact on consumption. According to this opinion, fluctuations in exchange rates lead to fluctuation in inflation, which could in turn affect consumption. Annual data for the period 1980-2016 were used to study the volatility factors of the real exchange rate on domestic consumption in Ghana. The ARDL model was used for the evaluation. The



main objective of this study was to study the impact of exchange rate fluctuations on local consumption in Ghana, to study the transfer path of the exchange rate fluctuations on domestic consumption in Ghana and to examine also the role of financial sector development in the face of exchange rate fluctuations and domestic consumption.

5.2.1 The effect of exchange rate volatility on domestic consumption in Ghana

We have followed recent studies examining the effects of exchange rate volatility on local consumption in Ghana. We focused on Ghana because previous studies did not look at Ghana, even though it is a small, open economy that has experienced frequent exchange rate fluctuations. According to annual data for the period 1980-2016, the evolution of the real annual exchange rate as a measure of exchange rate volatility as well as the ARDL approach, the preliminary result obtained shows that all variables are integrated in the system. This means that all the variables indicate the root of the unit at all levels, but have become constant in the first version. The lag selection criteria revealed that the optimal number of matrices for the ARDL model is 2. The lag model 2 was tested as stable using the Cusum test. A serial link in the model was tested using the Breusch-Godfrey Serial Correlation LM test and it was determined that no serial Correlation was available in the model. Pesaran linkage test revealed a co-integration and convergence system between the variables. This means that there is a long-term relationship between the variables or evolving in the long term. The result shows that the lag in the exchange rate causes the current exchange rate. In other words, the exchange rate of recent years has an impact on the current exchange rate in Ghana. This means that the Cedi/Dollar exchange rate differences are influenced not only by economic fundamentals, but also by speculation



based on the history of the exchange rate itself. This conclusion is not affected by alternative time restrictions and the choice to measure exchange rate fluctuations. This conclusion is also related to the existing theoretical predictions.

5.2.2 The transmissions channels of exchange rate volatility on domestic consumption

The results also revealed that the real effective exchange rate, Granger cause the real exchange rate to fluctuate. However, the opposite was not true. It was also revealed that per capita GDP and interest rates granger cause inflation, but the opposite is untrue. Finally, the result also shows that Inflation granger caused the real exchange rate, but the opposite has not been proven. The result also shows that short-term inflation is the root cause of Ghana's current exchange rate volatility. In other words, last year's inflation had a significant impact on the current exchange rate in Ghana. Finally, we found that the volatility of the exchange rate had positive effects on domestic consumption in the short term. However, this negatively affects long-term domestic consumption. We therefore conclude that the recent exchange rate due to inflation affects local consumption in Ghana. The proof of the analysis, for the period 1980-2016, reveals that the pass-through effect of the exchange rate in domestic consumption in Ghana is significant. It is compatible with most work done in this area in developing countries. For example, Sanusi (2010) found a good exchange in Ghana. The seemingly significant transition can be attributed to a continuous decrease in the value of the Cedi across the entire observed sample. As a result, companies and importers may see increased costs as a result of the exchange rate depreciation and thus continue to pass on the largest cost increases to consumers. The high exchange rate was also driven by strong and sustained inflation during the review period, as well as by high interest rates in Ghana's domestic consumption basket.



5.2.3 The role of the financial sector development in the relationship between exchange rate volatility and consumption.

The result indicates that policymakers and the government should focus on price stability because of the short-term relationship between the exchange rate and inflation. One of the objectives of this paper was to examine the role played by the financial sector in determining the impact of volatility on the real exchange rate on consumption in Ghana. Although our results show that the effect of exchange rate fluctuations on consumption does not depend on the level of development of the financial sector, we believe that the more financially developed the economy is, the lower its internal consumption will be negatively affected the fluctuations of the exchange rate.

3.5 Policy Recommendations

As a foreign exchange policy, the authorities should avoid the provision of domestic goods and services in foreign currency. Businesses, especially those focusing on real estate, hotel services and car retail, tend to report their prices and services in either dollars or pounds. These practices have negative effects on local currency and administration. In other words, the local currency may continue to decline or have no value, while monetary policy may become less effective in these practices. Therefore, to avoid uncertainty about future exchange rates, politicians try to limit these practices. Since the free exchange rate status regime, the volatility of the local currency is inevitable. What is avoidable is frequency and magnitude. One way to do this is to improve the quality and quantity of



exports. The country currently exports unprocessed products and services, but a large proportion of its imports are refined products and services. Promoting the export of goods and services in its finished form is therefore necessary to prevent the fluctuations in the exchange rate in the country. There are other policies to stabilize the country's exchange rate. Our proposed policy is therefore not exhaustive and, according to the results of the study, a series of recommendations were made for researchers, financial analysts and future decision-makers. First, future studies should include per capita GDP and inflation, as these variables influence exchange rate fluctuations in Ghana. Second, given the outcome, it is important that the government and policymakers pay particular attention to all macroeconomic elements because of their significant short- and long-term impact on the stability of the state's exchange rate. The study found that economic fundamentals influenced fluctuations in the dollar/dollar exchange rate.

5.3 Contribution of Research to Contemporary Literature

The importance of this study is based on the conclusion that research conducted on the effect of effective exchange rate volatility on local consumption in Ghana (Adu-Gyamfi, 2011) used monthly and quarterly data do not treat adequately the behavior of exchange rate volatility. This study seeks to add to the existing literature using annual data and the ARDL methodology. In addition, the study will expand the literary landscape to other studies of consumer behavior in Ghana. In addition, the results of the study will contribute to the body of current knowledge and, as a result, will expand the limits of knowledge about exchange rate volatility in Ghana. The results of the research will contribute to the knowledge and literature in the field in question and will serve as a basis for future research for students and other researchers involved in similar research in other relevant fields. This study will be an abundant source of literature for other researchers and its limitations can

be understood by others studying the same subject. The results of this study should confirm or exaggerate current knowledge about the impact of exchange rate fluctuations on local consumption in Ghana.

5.5 Other areas of research

The purpose of this study is to assess the impact of exchange rate volatility on local consumption in Ghana. Therefore, further research is needed to identify other explanatory variables that influence exchange rate fluctuations in Ghana. Further research is needed on the role of financial development in Ghana's exchange rate volatility. These results open the door to new studies on the role of speculation and noise in Ghana's exchange rate dynamics.

REFERENCES





- Abakar, E. (2009). The impact of monetary policy on stock prices in Ghana, *Unpublished MBA Thesis submitted to the Department of Economics, KNUST Space Ghana*
- Acheampong, Kwasi (2004), “The Pass-Through from Exchange Rate to Domestic Prices in Ghana”, *BOG working Paper No. 05/14, Accra, Bank of Ghana*
- Adetiloye Kehinde A., 2010. Exchange Rates and the consumer price Index in Nigeria: A causality Approach: *Journal of Emerging Trends in Economics and Management sciences, JETEMS 1 (2): 114 -120.*
- Adjasi, C., Harvey, S. K., and Agyapong, D. (2008). Effect of Exchange rate volatility on the Ghana stock exchange., *African Journal of Accounting, Economics, Finance and Banking Research*, 3(3), 28-47.
- Adu–Gyamfi, A. (2011). Assessing the impact of exchange rate volatility on economic growth in Ghana (Unpublished master’s thesis) *Kwame Nkrumah University of Science and Technology, Kumasi, Ghana*
- Aghion, P., Bacchetta, P., Ranciere, R., and Rogoff, K. (2009). Exchange rate volatility and productivity growth: The role of financial development. *Journal of Monetary Economics*, 56(4), 494-513.
- Aivazian, V.A., Jeffrey L.C., Itzhak, K. and Clarence, C.Y. (1986). International Exchange Risk and Asset Substitutability - *Journal of International Money and Finance*
- Akhtar, S. (2006). Pakistan—Economic Outlook and Prospects, *Speech Delivered at the Adam Smith Institute, Thun, Switzerland, (June 27).*



- Akpan, P. L. (2008). Foreign exchange market and economic growth in an emerging petroleum based economy: Evidence from Nigeria (1970-2003). *African Economic and Business Review*, 6(2).
- Alagidede, P., and Ibrahim, M. (2016). On the causes and effects of exchange rate volatility on economic growth: evidence from Ghana. *Journal of African Business*, 1-25.
- Alexander, S. S. (1952). Effects of a devaluation of trade balance. *International Monetary Fund Staff Papers*, 2(2), 263-278.
- Aliyu S.U.R Yakubu M.U, Sanni G.K and Duke O.O., 2008. Exchange rate pass-through in Nigeria Evidence from a vector Error correction model, *JEC classification: F3, F41*
- Allen, D. S., and Ndikumana, L. (2000). Financial intermediation and economic growth in Southern Africa, *Journal of African Economies*, 9(2), 132-160
- Al-Yousif, Y. K. (2002). Financial development and economic growth: Another look at the evidence from developing countries. *Review of Financial Economics*, 11(2), 131-150.
- Arratibel, O., Furceri, D., Martin, R., and Zdzienicka, A. (2011). The effect of nominal exchange rate volatility on real macroeconomic performance in the CEE countries, *Economic Systems*, 35(2), 261-277
- Asiedu, E. (2006). Foreign direct investment in Africa: The role of natural resources, market size, government policy, institutions and political instability. *The World Economy*, 29(1), 63-77. Digitized by UCC, Library 62

- Asiedu, E., and Lien, D. (2004). Capital controls and foreign direct investment. *World Development*, 32(3), 479-490.
- Asseery, A., and Peel, D. A. (1991). The effects of exchange rate volatility on exports: some new estimates. *Economics Letters*, 37(2), 173-177.
- Bahmani-Oskooee, M. and Kandil, M. (2007). Exchange Rate Fluctuations and Output in Oil Producing Countries: The Case of Iran. *International Monetary Fund, IMF Working Paper*, WP/07/113, 132
- Bahmani-Oskooee, M., and Hajilee, M. (2010), On the relation between currency depreciation and wages, *Applied Economics Letters*, 17(6), 525-530
- Bahmani-Oskooee, M., and Hajilee, M. (2012). On the Relation between Currency Depreciation and Domestic Consumption, *International Economics*, 65(4), 503-512
- Bahmani-Oskooee, M., and Nasir, A. B. M. (2004). ARDL approach to test the productivity bias hypothesis, *Review of Development Economics*, 8(3), 483-488
- Bahmani-Oskooee, M., and Xi, D. (2012), Exchange rate volatility and domestic consumption: Evidence from Japan. *Economic Systems*, 36(2), 326-335.
- Bahmani-Oskooee, M., Kutan, A. M., and Xi, D. (2015), Does exchange rate volatility hurt domestic consumption? Evidence from emerging economies, *International Economics*, 144(4), 53-65
- Bailliu, J., Lafrance, R., and Perrault, J. F. (2003). Does exchange rate policy matter for growth? *International Finance*, 6(3), 381-414.



Bank of Ghana (Various Issues), *Bank of Ghana Annual Reports*, Accra: Bank of Ghana
Monetary Fund, *IMF Working Paper*, WP/07/113, 132

Bank of Ghana (Various Issues). *Bank of Ghana Annual Reports*, Accra: Bank of Ghana.

Belke, A., and Kaas, L. (2004). Exchange rate movements and employment growth: An
OCA assessment of the CEE economies. *Empirical*, 31(2-3), 247-280.

Bernanke, B.S. (2005). Inflation in Latin America—A New Era, Remarks at the Stanford
Institute for Economic Policy Research Economic Summit.

Bernanke, B.S., Laubach, F.S., Mishkin A. and Posen A.S. (1999). Inflation Targeting:
Lessons from the International Experience, Princeton, NJ: *Princeton
Universality Press*.

Bleaney, M., and Greenaway, D. (2001). The Impact of terms of trade and real exchange
rate volatility on investment and growth in Sub-Saharan Africa, *Journal of
Development Economics*, 65(2): 491–500.

Bleaney, M., and Greenaway, D. (2001). The impact of terms of trade and real exchange
rate volatility on investment and growth in sub-Saharan Africa, *Journal of
development Economics*, 65(2), 491-500.

Bonnie, E.L., (1984). Relationships among Exchange Rates, Intervention, and Interest
Rates: An Empirical Investigation, *Journal of International Money and Finance*.

Bowa, C. (1994). The determinants of the inflationary process in Zambia (1973-1993)
(*Doctoral dissertation, University of Nairobi*)



- Brada, J. C., and Méndez, J. A. (1988). Exchange rate risk, exchange rate regime and the volume of international trade, *Kyklos*, 41(2), 263-280
- Broll, U., and Eckwert, B. (1999). Exchange rate volatility and international trade, *Southern Economic Journal*, 178-185
- Burstein, A., B. Eichenbaum, and S. Rebelo (2002), "Why Is Inflation So Low After Large Devaluations?" *NBER Working Paper No. 8748, Cambridge, Massachusetts, NBER*
- Calvo, G. and Carlos H.V. (1992). Currency Substitution in Developing Countries: An Introduction. *Revista de Análisis Central Bank of Kenya Papers and website 2015*
- Campa, J. M., and Goldberg, L. S. (1999). Investment, pass-through, and exchange rates: a cross-country comparison. *International Economic Review*, 40(2), 287-314.
- Campa, J. M., and Goldberg, L. S. (2002). Exchange rate pass-through into import prices: A macro or micro phenomenon? (No. w8934). *National Bureau of Economic Research*
- Campbell, J. Y., and Mankiw, N. G. (1991). The response of consumption to income: a cross country investigation. *European Economic Review*, 35(4), 723-756.
- Carroll, C. D. (2006). Consumption and saving: theory and evidence. *NBER Working Paper, National Bureau of Economic Research, Cambridge, MA.*
- Carroll, C.D., and Kimball, M. S. (1996). On the concavity of the consumption function, *Econometrica*, 64(4), 981-992



- Charles Adjasi, Simon Harvery and Daniel Agyapong, 2008. Effect of exchange rate volatility on the Ghana stock exchange: *African Journal of Accounting, Economies and Banking Research, Scheme 3*
- Cheruiyot, J.K. (2012). Effectiveness of Monetary Policy Tools in Countering Inflation in commercial banks in Kenya, *Unpublished MBA thesis, University of Nairobi*,
- Côté, A. (1994). Exchange rate volatility and trade, *Bank of Canada Working Paper*
- Danby, P. (2009). *Setting the right direction, business strategy review, London Business School*
- Danmola, R. A. (2013). The Impact of exchange Rate Volatility on the Macro Economic Variables in Nigeria, *European Scientific Journal*, 9(7)
- De Grauwe, P. (1988). Exchange rate variability and the slowdown in growth of international trade, *Staff Papers-International Monetary Fund*, 63-84
- De Grauwe, P. (1996). International money: post-war trends and theories. OUP Catalogue
- De Grauwe, P., and Verfaillie, G. (1988). Exchange rate variability, misalignment, and the European monetary system, In *Misalignment of Exchange Rates* (pp. 77-104), *University of Chicago Press*
- Dollar, D. (1992). Outward-oriented developing economies really do grow more rapidly: evidence from 95 LDCs, 1976-1985. *Economic development and cultural change*, 523-544



- Edwards S. and Levy Yeyati, E. (2005). Flexible exchange rates as shock absorbers
European Economic Review, 49(8), 2079-2105
- Eichengreen, B., and Leblang, D. (2003). Exchange Rates and Cohesion: Historical Perspectives and Political-Economy Considerations. *JCMS: Journal of Common Market Studies*, 41(5), 797-822.
- Engle, R., Granger, C. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica*, 55, 251-276.
- Fisher, I. (1933). The debt-deflation theory of great depressions, *Econometrica*
- Frankel, J. A., and Wei, S. J. (2007). Assessing China's exchange rate regime, *Economic Policy*, 22(51), 575-627
- Frankel, J. A., and Wei, S. J. (2008). Estimation of de facto exchange rate regimes: Synthesis of the techniques for inferring flexibility and basket weights (No. w14016). *National Bureau of Economic Research*
- Friedman, M. (2000). Canada and Flexible Exchange Rates (PDF). Speech delivered at revisiting the Case for Flexible Exchange Rates," a conference sponsored by the Bank of Canada, Ottawa, Ontario, November.
- Frimpong, S. and A. M. Adam (2010), "Exchange Rate Pass-Through in Ghana", *International Business Research*, 3(2), 186-192.
- Frimpong, S., and Adam, A. M. (2010). Exchange rate pass-through in Ghana, *International Business Research*, 3(2), P186



- Geert, A. and Edward, E. (1995). *Foreign Exchange Intervention: Theory and Evidence*
International Monetary Fund, Washington, D.C.
- Ghatak, S., and Siddiki, J. U. (2001). The use of the ARDL approach in estimating virtual
exchange rates in India, *Journal of Applied Statistics*, 28(4), 573-583
- Ghosh, A. R., Gulde, A. M., Ostry, J. D., and Wolf, H. C. (1997). Does the nominal
exchange rate regime matter? (No. w5874). *National Bureau of Economic
Research*
- Goldberg, P. K. and M. M. Knetter (1997), “Goods Prices and Exchange Rates: What Have
We Learned?” *Journal of Economic Literature*, 35(3): 1243
- Goldfajn, I., and Werlang (2000), “The Pass-Through from Depreciation to inflation: A
Panel Study”, *Working Paper No. 423, Rio de Janeiro, Department of
Economics, Pontificia Universidade Catolica.*
- Goodfriend, M. and Robert G. King (2004), “The Incredible Volcker Disinflation”
Prepared for the Carnegie-Rochester Conference on Public Policy
- Granger, C. W. J. (1969). Investigating Causal Relations by Econometric Models and
Cross-Spectral Methods. *Econometrica*, 37(3), 424–438.
- Guillaumont, P. Jeanney, S. G. and Brun, J. F. (1999). How Instability Lowers African
Growth. *Journal of African Economies*, 8(1), 87-107
- Gujarati, D. N. (2012). *Basic Econometrics*. Tata McGraw-Hill Education.



- Hahn, E. (2003), "Pass-Through of External Shocks to Euro Area Inflation", *European Central Bank Working Paper No. 243*.
- Hali, E. (1993). The Effectiveness of Central-Bank Intervention: A Survey of the Literature after 1982. *Princeton special Papers in International Economics*.
- Harchaoui, T. M., Tarkhani, F., and Yuen, T. (2005). The effects of the exchange rate on investment: Evidence from Canadian manufacturing industries. Bank of Canada
- Heidari, H. and HashemiPourvalad, M. (2011). Reinvestigating the relationship between exchange rate uncertainty and private investment in Iran: An application of bounds test approach to level relationship, *African Journal of Business Management* 5(15), 6186-6194
- Hooper, P., and Kohlhagen, S. W. (1978). The effect of exchange rate uncertainty on the prices and volume of international trade, *Journal of International Economics*, 8(4), 483-511
- Ibrahim, M., and Musah, A., (2014). An Econometric Analysis of the Impact of Macroeconomic Fundamentals on Stock Market Returns in Ghana, *Research in Applied Economics*, 6(2), 47-72.
- Insah, B. (2013). Modelling Real Exchange Rate Volatility in a Developing Country, *Journal of Economics and Sustainable Development*, 4(6), 61
- Jebuni, C. D., Sowa, N. K., and Tutu, K. A. (1991). Exchange rate policy and macroeconomic performance in Ghana (*AERC Research Paper 6*), Nairobi: Initiatives.



- Kenen, Peter B. (2000). Fixed versus floating exchange rates, *Cato Journal*, 20 (1)
- Kensen, P. B. (1994) The international economy (3rd ed). *Cambridge: Cambridge University Press.*
- Koray, F., and Lastrapes, W. D. (1989). Real exchange rate volatility and US bilateral trade: a VAR approach. *The Review of Economics and Statistics*, 708-712.
- Kroner, K. F., and Lastrapes, W. D. (1993), The impact of exchange rate volatility on international trade: reduced form estimates using the GARCH-in-mean model. *Journal of International Money and Finance*, 12(3), 298-318.
- Krugman, P. (1986), "Pricing to Market When Exchange Rate Changes", *NBER Working Paper No. 1926, Cambridge, Massachusetts, NBER.*
- Kumar, V., and Whitt Jr, J. A. (1992). Exchange rate variability and international trade, *Economic Review*, (May), 17-32
- Kwakye, J. K. (2012). Determination of real exchange rate misalignment for Ghana (Institute of Economic Affairs Monograph No. 31), Accra: *Institute of Economic Affairs.*
- Kyereboah-Coleman, A., and Agyire-Tettey, K. F. (2008). Impact of macroeconomic indicators on stock market performance: The case of the Ghana Stock Exchange. *Journal of Risk Finance*, 9(4), 365-378.
- Lastrapes, W. D., and Koray, F. (1990). Exchange rate volatility and US multilateral trade flows. *Journal of Macroeconomics*, 12(3), 341-362.



- Leigh, D., and M. Rossi (2002), "Exchange Rate Pass-Through in Turkey", *IMF Working Paper No. 02/204, IMF*.
- Levine, R., Loayza, N., and Beck, T. (2000). Financial intermediation and growth: Causality and causes. *Journal of monetary Economics*, 46(1), 31-77
- Mahmood, I., Ehsanullah, M., and Ahmed, H. (2011). Exchange rate volatility and macroeconomic variables in Pakistan, *Journal of Economic and Sustainable Development*, 1(2), 11-22
- McCarthy, J. (1999), "Pass-Through of Exchange Rates and Import Prices to Domestic Inflation in Some Industrialized Economies", *BIS Working Paper No. 79, Basel, BIS*.
- Melitz, J. (1988). Monetary Discipline and Cooperation in the European Monetary System, A Synthesis, *The European Monetary System*, 51- 84
- Mumuni, Z. and Owusu-Afriyie, E. (2004). Determinants of the cedi/dollar rate of exchange in Ghana: A monetary approach. *Bank of Ghana Working Paper, WP/BOG 2004/06*
- Ng'ang'a , J.N. (2015), the effects of exchange rate volatility on the inflation rate in Kenya. unpublished *Research project submitted in partial fulfillment of the requirements for the award of degree of master of Business Administration, School of Business, University of Nairobi*.
- Nucci, F., and Pozzolo, A. F. (2010). The exchange rate, employment and hours: What firm-level data say, *Journal of International Economics*, 82(2), 112-123.



- Obstfeld, M., and Rogoff, K. (1998). Risk and exchange rates, NBER Working Papers No. w6694, *National Bureau of Economic Research*
- Oseni, I. O. (2016). Exchange rate volatility and private consumption in Sub-Saharan African countries: A system-GMM dynamic panel analysis. *Future Business Journal*, 2(2), 103-115.
- Oshikoya, T. W. (1994). Macroeconomic determinants of domestic private investment in Africa: An empirical analysis. *Economic development and cultural change*, 573-596
- Paya, I., Venetis, I. A., and Peel, D. A. (2003). Further Evidence on PPP Adjustment Speeds: the Case of Effective Real Exchange Rates and the EMS*. *Oxford Bulletin of Economics and Statistics*, 65(4), 421-437.
- Perée, E., and Steinherr, A. (1989). Exchange rate uncertainty and foreign trade, *European Economic Review*, 33(6), 1241-1264
- Perron, P. (1997). Further evidence on breaking trend functions in macroeconomic variables. *Journal of Econometrics*, 80(2), 355-385.
- Pesaran, M. H., and Pesaran, B. (1997). Working with Microfit 4.0: An interactive approach, *Oxford, Oxford University Press*
- Pesaran, M. H., and Shin, Y. (1999). Long-run structural modelling. *Econometric Reviews*, 21, 49-87.
- Pesaran, M. H., Shin, Y., and Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships, *Journal of Applied Economics*, 16(3), 289-326.



- Phillips, P. C., and Perron, P. (1988). Testing for a unit root in time series regression, *Biometrika*, 75(2), 335-346
- Pokhariyal, G. P., Pundo, M., and Musyoki, D. (2012). The impact of real exchange rate volatility on economic growth: *Kenyan evidence. Business and Economic Horizons*, (07), 59-75.
- Prasad, E. S. (2007). Monetary policy independence, the currency regime, and the capital account in China. *Debating China's exchange rate policy*
- Rabanal, P., and G. Schwartz (2001), "Exchange Rate Changes and Consumer Price Inflation: 20 Months After the Floating of the Real in Brazil: Selected Issues and Statistical Appendix", *IMF Country Report No. 01/10, Washington, IMF*.
- Sanginabadi, B., and Heidari, H. (2012). The Effects of Exchange Rate Volatility on Economic Growth in Iran
- Sanusi, A. R., (2010). Exchange rate pass-through to consumer prices in Ghana: Evidence from structural vector auto-regression. *West African Journal of Monetary and Economic Integration*, 10(1)
- Savvides, A. (1992). Unanticipated exchange rate variability and the growth of international trade, *Weltwirtschaft liches Archive*, 128(3), 446-463
- Schnabl, G. (2008). Exchange rate volatility and growth in small open economies at the EMU periphery, *Economic Systems*, 32(1), 70-91
- Serven, L. (2002). Real exchange rate uncertainty and private investment in developing countries (Vol. 2823), *World Bank Publications*



- Tang, T. C. (2006). Are imports and exports of OIC member countries cointegrated? A reexamination, *Journal of Economics and Management* 14 (1), 49-79
- Tarawalie, A. B., Sissoho, M., Conte, M., and Ahoritor, C. R. (2012). Exchange rate, inflation and macroeconomic performance in the West African Monetary Zone, (WAMZ) (*WAMI Occasional Paper Series No. 2*)
- Taylor, J. (2000), “Low Inflation, Pass-Through and the Pricing Power of Firms”, *European Economic Review*, 44, 1389-1408.
- Tweneboah, G., and Alagidede, P. (2015). Dollarisation in Ghana: Measurements, determinants and policy implications (Working Paper No. 315). *African Finance and Economics Consult*
- Vieira, F. V., Holland, M., da Silva, C. G., and Bottecchia, L. C. (2013). Growth and exchange rate volatility: a panel data analysis. *Applied Economics*, 45(26), 3733-3741.
- Warjio, Perry (2013), “Indonesia: Stabilising the exchange rate along its fundamental”, In “market volatility and foreign exchange rate intervention in EMEs: what has changed?” *BIS Papers 73, Monetary and Economic Department*.
- Zorzi, M. C., E. Hahn, and M. Sanchez (2007), “Exchange Rate Pass-Through in Emerging Markets”, *ECB Working Papers Series No. 739, EU*



