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EXCHANGE RATE VOLATILITY AND EXPORT PERFORMANCE: EVIDENCE FROM THE GHANAIAN EXPORT SECTORS

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DECLARATION

I declare that the content of this thesis, with the exception of all duly cited works, is as a result of my own research and has not been presented by anyone for any academic award in this University or any other. I bear sole responsibility for any shortcomings.

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CERTIFICATION

We hereby certify that this thesis was supervised in accordance with procedures laid down by the University of Ghana.

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(SUPERVISOR)

DEDICATION

I dedicate this work first and foremost to the Almighty God for His grace has been sufficient and has carried me through this work successfully.

Secondly, I dedicate this work to my husband, Adams Webonga Medzida, my son, Malachi Yada Medzida and all who contributed one way or another towards the completion of this work.

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ABBREVIATIONS

ADF – Augmented Dickery Fuller

AGEX – Agricultural Export

AIC – Akaike Importation Criterion

ARCH – Autoregressive Conditional Heteroskedasticity

ARDL – Autoregressive Distributed Lag

ATM – Automated Teller Machine

B&FT – Business and Financial Times

BoG – Bank of Ghana

BoP – Balance of Payment

BW – Band Width

CA – Current Accounts

CPS – Credit to Private Sector

CUSUM – Cumulative Sum of Recursive Residuals

CUSUMSQ – Cumulative form of Squares of Recursive Residuals

Dd – Demand

DF – Dickery Fuller

ECM – Error Correction Model

ECT – Error Correction Term

ERP – Economic Recovery Programme

EU – European Union

EXP – Export

EXV – Exchange Rate Volatility

f – Function

FA – Financial Accounts

FAPDA – Food and Agriculture Policy Decision Analysis

FDI – Foreign Direct Investment

GARCH – Generalized Auto Regressive Conditional Heteroskedasticity

GDP – Gross Domestic Product

GDPG – Gross Domestic Product Growth

Gh – Ghana

GHATIG – Ghana Trade and Investment Gateway Programme

GNPC – Ghana National Petroleum Company

GOV – Government Expenditure on Infrastructure

IMF – International Monetary Fund

INDEX – Industrial Export

INF – Inflation

J. Bera – Jarque Bera

JCT – Johansen Co-Integration Test

KA – Capital Accounts

LCU – Local Currency Unit

LM – Lagrangean Multiplier

Obs – Observations

OLS – Ordinary Least Squares

P – Pesewas

PP – Philips Perron

Prob – Probability

R – Residual

R&D – Research and Development

RER – Real Effective Exchange Rate

SAD – Structural Adjustment Programme

SBC – Schawrtz Bayesian Criteria

SEREX – Services Export

SIC – Schwarz Information Criterion

Ss – Supply

SS Dev – Sum of Squared Deviations

Std Dev – Standard Deviation

TAR – Tariff Rate

TEN – Tweneboah, Enyenra, Ntomme

UAE – United Arab Emirates

UK – United Kingdom

US – United States

USD – United States Dollar

VAR – Vector Autoregression

WACB – West African Currency Board

WAMI – West African Monetary Institute

WDI – World Development Indicators

WTO – World Trade Organisation

ABSTRACT

This study seeks to examine the effect of exchange rate movements on export sector performance in Ghana. The focus is on the real sector of the economy thus, Agricultural, Industrial and Services Sectors. A quantitative research design is employed. It uses data from the World Development Indicators (WDI) and the sample period spans1984-2016. The Generalized Autoregressive Conditional Heteroskedastic (GARCH) model is employed in calculating exchange rate volatility. This was after an ARCH effect had been established among the exports. Specifically, the GARCH (1,1) model is employed in establishing and analyzing the dynamic interactions and long-run relationships between variables. Also, the autoregressive distributed lag co-integration technique is adopted. The study finds that, exchange rate volatility impacts negatively on export performance in all the three main sectors of the economy. Both the long-run and short-run results find statistically significant positive effects of GDP growth, foreign direct investment, credit to private sector and government expenditure on infrastructure on export performance. Inflation is negative and statistically cogent only in the case of the industrial sector export. However, the chief variable of interest, exchange rate volatility and trade openness (tariff rate) have negative effects on Ghana's export as well as the sectoral exports both in the long run and short run.

Keywords: Real sector, Exchange rate volatility, Generalized Autoregressive Conditional Heteroskedastic, Autoregressive distributed lag, Bank of Ghana, Forward contracts, Foreign exchange market, Export performance, Cedi.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Traditionally, Ghana is known to be endowed with many natural resources such as gold, diamond, cocoa, timber, among others. These commodities are mainly exported in their raw state. Along this trading history, Ghana has also exported some large quantities of manufactured products (in the 1960's). This makes the export sector an indispensable sector of the Ghanaian economy. The revenues that accrue to the country from these exports are major sources of foreign exchange and government revenue. The volumes and prices of the export commodities are also dependent on several factors such as the level of domestic production, demand for the exported products and the cost of production. In each case however, exchange rate is an important determinant for each of the factors (Smith 2004).

Exchange rate relates to the worth of a country's currency against other trading currencies such as the Pound Sterling and the Dollar. In most cases, currencies could depreciate (devaluation) or appreciate (revaluation) against other currencies depending on market forces. Exchange rate movements (depreciation or appreciation) is therefore, very important in determining the value of a country's exports since such exports are affected by the daily fluctuations in exchange rates. In this vein, Wondemu and Potts (2016) posit that, world trade has become the engine of growth and for most economies, the growth impact of exports is much stronger than that of imports. Gyimah-Brempong (1991) also added that, exchange rates determine the relative profitability of tradables and non-tradables, exports and imports, and the relative use of imported and domestic inputs. Similarly, Khalighi and Fadaei (2017) argue that, sustainable economic development can be achieved through prosperous exports and the application of policies in the foreign trade sector.

Even though global trade has seen a steady growth, concerns have also been raised in relation to the impact of exchange rate movements on trade in general and on import and export activities (Cheung and Sengupta 2013). The keen interest in exchange rate movements in many countries (Developed and Developing) came to light after the Bretton Woods System collapsed in the early parts of the 1970s. This system saw a fixed exchange rate regime which sought to establish gold parity with the reserve currency which was the dollar and all other currencies were pegged to it. This system according to Ghizoni (2013), sought to ensure exchange rate stability, prevent competitive devaluation and also promote economic growth. Its collapse led to the floating exchange rate system where IMF gave its members the chance to choose their own exchange rate arrangements. The fixed and floating exchange rate regimes have been the major exchange rate regimes that have characterized most exchange rate policies in many countries (MacDonald 1988; Flood, Bhandari and Horne 1989; MacDonald and Taylor 1992).

Typical of floating exchange rate regimes, currencies could depreciate or appreciate depending on how favorable or otherwise market forces turn out. Economists and policy makers alike have so much interest in exchange rate developments with the aim of analyzing their economic implications. Several researches have been done in this area and some have argued in favour of and others against the institution of floating exchange rates and their effects on exports. Shi, Xu, and Yin (2015), argue that allowing exchange rates to float possibly will not be appropriate, especially for small open economies since it does not ensure the stabilization of real variables but results further in the fluctuations of nominal variables particularly, inflation. Also, in a study by Caglayan and Demir (2014), it was found that, productive growth of export-oriented firms was more affected by exchange rate uncertainty than it significantly did in other sectors or areas of the economy.

Ghana's export sector is growing steadily and there is a need to pay more attention to it since a vibrant export sector can culminate into substantial spillovers to other sectors thus, resulting in

an overall economic growth.

1.2 Statement of Problem

Exchange rate stability has become an issue of concern to policy makers and other economic agents in the world and especially Ghana for quite some time now. Prior to Ghana's independence, it incorporated a fixed rate system under the British Colonial economic arrangement. The British West African Currency Board (WACB) which was the colonial monetary authority was responsible for regulating currency supply in the British West African Colonies after its establishment in 1912 (Bawumia 2014). During this period, West African Pound Sterling was fixed. When the participating countries comprising Ghana, Nigeria, Gambia and Sierra Leone gained independence, WACB collapsed. This happened even though trade was booming at the time (Anokye and Chaudhry 2013).

After the independence of Ghana from the British in 1957, the Nkrumah government embarked on a massive infrastructural development. These projects were possible because of the heavy dependence on the country's major foreign earner, cocoa, which was experiencing a boom at the time but started declining after some time. The massive infrastructural development made it impossible for Ghana to adhere to the strict requirement of fiscal discipline. The breakdown of monetary and fiscal discipline led to high inflation, shortage of foreign exchange, imposition of exchange controls and the emergence of black markets for foreign currency (Bawumia 2014). The Ghanaian Economy started experiencing a slowdown in the mid-1960s.

Since Ghana adopted an open market regime and a floating exchange rate system, the Cedi has experienced fluctuations. This has mostly been a depreciation of the cedi against other major trading currencies such as the dollar and the pound sterling. The years 1980s and early part of 1990s were exceptionally difficult periods for low-income developing countries (IMF 1999). Due to slow economic growth, diminishing investment inflows and rising debt, many developing counties subscribed to the IMF's Structural Adjustment Programme (SAP).

Exchange rate variability in relation to cedi has affected and continues to affect several sectors of the economy and it is posing serious macroeconomic management problems to the country. Ghana's foreign trade sector has not been spared and it is evident in a deficit in trade balance over the past decades due to an increase in the demand for imports which has not had a corresponding increase in the demand for exports. Ghana's current account deficit stood at 12% of GDP in 2013 as a result of weaker terms of trade for its main exports (cocoa and gold) and an increase in capita imports among other macroeconomic factors (Moser 2014). The export sector has a positive effect on trade balance and the need therefore to examine how the various export sectors respond to the exchange rate shocks in order to inform policy decisions. Against this background, a few studies have been conducted:

The West African Monetary Institute (WAMI) in a study found that exchange rate volatility has a negative effect on exports in Sierra Leone, Nigeria and Liberia. The case of Gambia showed a positive effect, while Ghana and Guinea showed that exchange rate has no significant relationship on export (Tarawalie, Sissoho, Conte and Ahortor 2013). This study also established terms of trade and exports were also positively related. Quaicoe, Aboagye and Bopkin (2017) also found that economic growth and trade openness were negatively related.

In a similar study by Cheung and Sengupta (2013), into the effects of real effective exchange rate on exports focusing on the non-financial sector in Indian, found that, averagely, appreciation in currency and currency volatility were strongly but negatively related.

Although the subject has become popular, research in this area has concentrated on estimating the relationship between aggregate export and economic growth. What is missing in the studies reviewed is the analysis of exchange rate volatility on the sectoral disentanglement of exports and establishing the long-run and short-run effects of exchange rate volatility on the individual export sectors so as to explore the differences in reaction to the shocks and to determine

whether Ghana could take advantage of the differences in reaction to leverage the impact of exchange rate volatility in the real sector and consequently, the economy. The research will also help policy makers in formulating sector specific policies that will enhance exports and consequently affect economic growth and wellbeing of economic agents.

1.3 Objectives of the Study

The objectives of this study are to contribute to existing literature on the impact of exchange rate movements on sectoral exports and also to serve as a guide for policy makers, individuals and businesses. The specific objectives of the study are as follows:

I. To re-examine the effect of exchange rate volatility on exports

II. To re-examine the effect of exchange rate volatility on Sectoral exports

1.4 Research Hypotheses

In order to achieve the set objectives, the study was guided by the following hypotheses:

I. H_0: Exchange rate volatility has no effect on exports

H_1: Exchange rate volatility affects exports

II. H_0: Exchange rate volatility has no effect on sectoral export performance

H_1: Exchange rate volatility affects sectoral export performance

1.5 Significance of the Study

Exports are known to be one of the main macroeconomic indicators that affects a country's GDP positively. A positive net export can largely help to improve a nation's economy since there is no doubt that the export sector has far reaching implications on other sectors of the economy.

In Ghana, over the years, exchange rates of the cedis and its counterparts (such as the dollar and pound sterling) have experienced high volatility. The Cedi has realized depreciation most of the times. The question now is, how does that impact on Exports, GDP and consequently, the Ghanaian economy at large? Some studies have examined exchange rate impacts on exports and growth but only a few have looked at how the individual export sectors respond to exchange rate movements in order to establish the long-run and short-run effects of exchange rate volatility and sectoral exports in Ghana. The results of this research will inform government, businesses and policy makers on issues concerning exchange rate fluctuations and its impact on the various export sectors in order to develop a benchmark for measuring their respective objectives and policy goals and also ensure their implementation. The study will also add to scholarly knowledge and contribute to the current discourse on the impact of floating exchange rates.

1.6 Scope of the Study

This study is limited to Ghana and intends to use data on annual averages of exchange rates between the Ghana Cedi and the US Dollar (expressed as Local Currency Unit per US Dollar) from the Bank of Ghana for the periods 1984 to 2016. Data relating to exports for the same period will be gathered. The following sectors will be used for the sectoral export analysis; Agricultural, Mineral, Oil, Manufacturing and Service sectors. The Mineral, Oil and Manufacturing Sectors will be merged to represent the Industrial Sector. This is because these are the main export sectors that generate revenue for the country.

The main challenge was access to data. This is because goods and people leave the shores of this country illegally and are therefore undocumented. This makes it difficult to obtain data that will cover the actual total exports hence, making data gathered not to represent actual total exports. This notwithstanding could serve as an avenue for future research. The study is also limited to Ghana and the Ghanaian Export sector, therefore, cannot be assumed to imply for other countries

or sectors respectively.

1.7 Organization of the Study

This study is organized into six chapters. Chapter one comprises; introduction to the study, identifying the need for this study and how this study can fill the gap the study intends to fill through the statement of the objectives and the research questions. It will also identify the methodology intended for this study and finally how the entire study will be organized.

Chapter two presents an overview of exchange rates and the Ghanaian export sector diving into exchange rate arrangements and exports performance. Chapter three presents literature; theoretical and empirical with focus on works pertaining to the subject area. In this regard, literature on exchange rates and exports will be reviewed.

Chapter four presents a detailed discussion on the methodology adopted; the type of regression analysis used, quantitative analysis of variables used, robustness checks and other relevant information aimed at enhancing this study.

Chapter five proceeds with analysis of findings from regression analysis and other quantitative analysis adopted and as well interpret results. A pictorial view of the results is also been presented.

Chapter six gives a summary and conclusion of the entire study stating the findings and giving necessary remarks on the findings. The study will also seek to make relevant recommendations to stakeholders and other economic agents.

CHAPTER TWO

OVERVIEW OF EXCHANGE RATES AND THE GHANAIAN EXPORT SECTOR

2.1 Introduction

Ghana is vested with a plethora of natural resources. These comprise cocoa, oil, timber, gold, diamond, gas and so on. Most of these resources are exported in their unprocessed state as it is being practiced by many African countries. The trading partners then further process these resources into their intermediate or finished state. The exportation of these resources fetches the country revenue which can consequently be used to develop the country. The earnings generated are greatly affected by the quantity or volumes of such exports. In this vein, the significance of exports to the economy of Ghana cannot be overemphasized.

Several factors determine the volumes of exports of a country of which exchange rate movements is cardinal (Smith 2004). Currencies could either appreciate or depreciate against each other depending on market forces. The Ghanaian currency (cedi) unfortunately, has experienced depreciation against the US dollar and other major currencies for quite some time. Hooper and Kohlhagen (1978) posit that when exchange rate risk increases, trade is affected negatively on the premise that economic agents are risk-averse. De Grauwe (1988), in his study stated that trade volatility is dependent on the risk aversion of economic agents hence, exchange rate volatility can affect export of goods and services positively. Dincer and Kandil (2011), established some theories on how exchange rate affects export using the goods and money markets. These they specified as follows;

I. Unexpected strengthening of the domestic currency against that of trading partners will result in exports becoming relatively expensive whereas import becomes cheaper relative to the goods and money market. This is not advantageous especially for countries that heavily rely on the foreign markets for their mined resources or

manufactured goods and services as it could result in lowering the productivity of indigenous firms.

II. A positive shock to the domestic currency which is as a result of an unexpected appreciation or overvaluation of the currency will result in lower interest rates as economic agents will choose to hold less local currency. Consequently, in the money market, a positive shock to the domestic currency can cause a reduction in the local production output.

When the Bretton Woods system collapsed in the 1970s, interest in exchange rate volatility and its link to exports increased significantly. This lead to more trading countries making flexible exchange rate arrangements to promote trade. A number of researchers have established a fairly systematic evidence on issues bothering on real exchange rate volatility in developed and developing economies. The exchange rate volatility effects on trade flows is mostly measured by the risk or uncertainty or even the level of currency exposure. Depending on the risk averse nature of economic agents, different reactions are expected in times of fluctuations in real exchange rates. Ultimately, the IMF (1984), Hooper and Kohlhagen (1978), and others have argued that a surge in exchange rate volatility will cause risk averse economic agents to trade less and eventually, move production to local markets.

De Grauwe (1988), also argues that increase in real exchange rate variations could affect trade volumes positively or negatively depending on the income and substitution effects. Economic agents that are risk averse will increase exports to prevent a fall in their levels of revenue in relation to the income effect. As expected utility of export revenue is increased due to the high exchange rate volatility, exporters are encouraged to increase the volume of exports in order to prevent their revenue levels from falling. With the substitution effect on the other hand, risk-averse economic agents decrease the level of exports to correspond with the fall in the expected export revenue marginal utility. Economic agents who are less risk averse are likely to attribute

more risk to exchange rate volatility. These category of economic agents are more likely to decrease exports and channel their resources to other sectors of the economy in times of more real exchange rate volatility. Exchange rates are expected to positively influence trade if the income effect is offset by the substitution effect.

Also, increased risk will negatively affect trade. Earlier, models that were founded on production decisions taken by exporters without considering exchange rate exposure were not able to hedge against the risk associated with currency exposure. The models predicted that risk averse exporters were negatively affected by increased volatility (Clark 1973). The above assumption presupposed that when exports rise, exchange rates tend to be volatile. The volatility is more pronounced when the income is higher and falls when the substitution effect is relatively higher. In the end, the real exchange rate effects on exports is inconclusive and ambiguous (Fountas and Aristotelous 1999; Cote 1994).

Franke (1991) and Sercu and Vanhulle (1992) also argue that the volume of trade can be affected positively by exchange rate movements. Higher risk tends to serve as an opportunity to earn higher profit hence, an increase in exchange rate movements will result in increased trade. As a result, exports are expected to perform better with increased exchange rate variability since most industries are likely to exercise the option to export, hence, trade volumes will increase. Pindyck (1982) has shown that, inconsistences in prices can also result in a rise in average investment and output all things being equal, as firms adjust respectively to enjoy both higher prices and lower prices when they occur. From a political viewpoint, Brada and Mendez (1988) argue that, exchange rate movements can be used as a tool for shielding the Balance of Payment from external shocks, hence, the adoption of trade restrictions to achieve equilibrium in trade and capital controls will be minimal. Reduced restrictions on international trade is able to stimulate trade for instance in increased exchange rate movements.

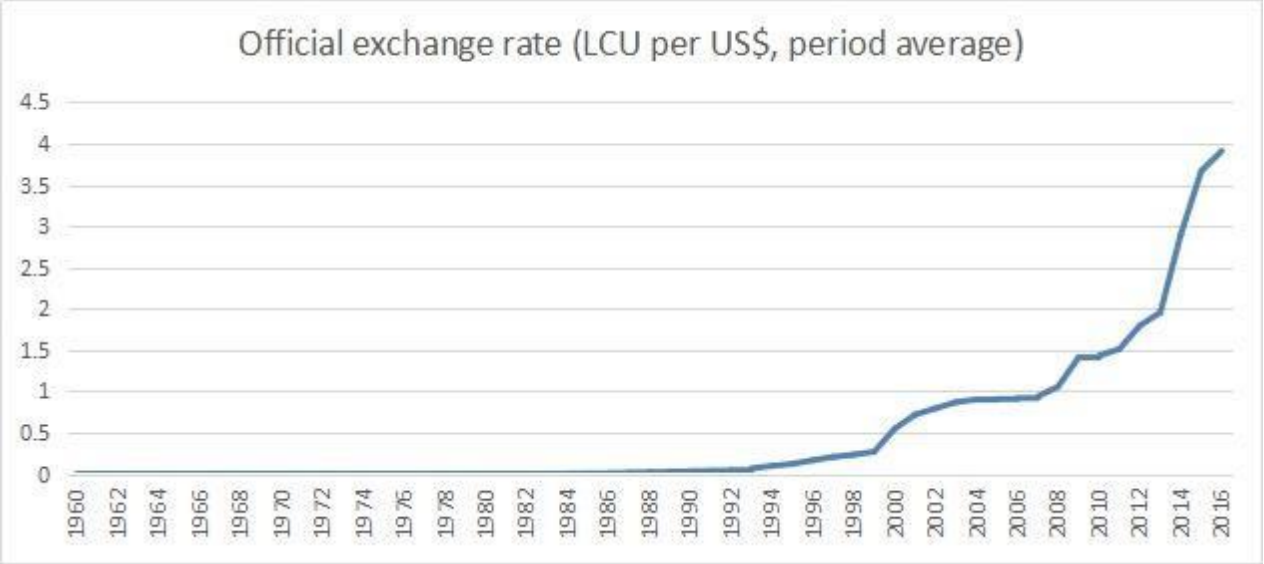
Alternatively, Cote (1994) argues that, exchange rate movements weaken international trade. The reason being that, markets, particularly in under developed economies may be imperfect. Also, hedging may be very expensive and imperfect hence cannot be used as a tool for preventing exchange rate risk. Consequently, exports may be correlated negatively with exchange rate movements as stated by the risk –aversion hypothesis. Ultimately, increased exchange rate movements will reduce the volume of trade through the rise in for example, irreversible investment cost due to higher risk and uncertainty as argued by Arize et al. (2000); Hooper and Kohlhagen (1978). Chit (2008) posits that in the absence of hedging opportunities, or even in the instance where it will be too expensive to hedge, risk-averse producers must consider the volumes of their exports first before resolving any exchange rate risk.

Researchers have not been able to reach a consensus from a theoretical view point on the subject matter and this has resulted in more scholars undertaking to do more current research in the field. Additionally, differences in country factors, time frames or periods, sample size, models and estimation techniques and the emergence and development in econometrics have made it very difficult to reach a consensus and to establish an agreeable link between exchange rate movements and exports performance.

During the years, 1970 through to 1982, Ghana was under a fixed exchange rate regime. The Ghana cedi was pegged to the most prominent and widely acceptable currencies, the American Dollar and the British Pound Sterling. In the country's bid to encourage exports through the exchange rate rationalisation and "getting the price right", an Economic Recovery Programme (ERP) was launched. Redirecting resources to productive sectors within the economy was the aim of the programme. Series of devaluations were made by the government in the quest to boost economic activities. By the year, 1986, a floating exchange rate system was adopted and an auction market approach was also rolled out in September the same year. This was to enhance trade liberalisation through the accelerated adjustment of exchange rate, which was left partially

to market forces (demand and supply) in the determination of the cedi-dollar rates. Figure 2.1 shows the exchange rate between the Ghana Cedi and the US Dollar expressed as Local Currency Unit per US Dollar from 1960 – 2016.

Figure 2.1: Trend of Exchange rates between the Ghana Cedi and the US Dollar



Source: WDI data

The figure shows that the cedi has not been performing too well against the dollar. The performance of the cedi was quite steady between 1960 to 1994. Thereafter, the cedi started experiencing a great depreciation against the dollar. In the year 2007, during the redenomination of the cedi, the exchange rate was ¢ 1=$1. This was not sustainable as the cedi began to depreciate against the dollar and the exchange rate grew to $1=₵ 3.9 as of2016.

2.2 Nominal and Real Exchange Rates

Real exchange rate is a measure of the ratio of the price level of currencies abroad, relative to the local price level. Ghana's real exchange rate was very volatile from 1990 through to 1992. This period witnessed a reduction in the export-GDP ratio caused by real depreciation in exchange rate and this resulted in the fall in the export performance. Also, the periods between 1993 and 1997 was represented with periods of appreciation in the real exchange. This was so

because real exchange rate volatility fell below the slope. In effect, export-GDP of the Ghanaian economy rose above its trend. In 2001 however, the real exchange rate experienced a downward slope. Export-GDP ratio rose from 2000 to 2005 and gradually fell thereafter. In conclusion, real exchange rate rose while export-GDP rose initially and thereafter declined within the period of study.

The nominal exchange rate also relates to the official exchange rate expressed by the amount of local currency units that can buy in a foreign currency one unit of a good or service. In any case, purchasing power of a currency is not truly reflected in nominal rate (Colander 2010). On the other hand, real exchange rate represents purchasing power of a currency, as it accounts for differences in the level of prices and inflation (Colander 2010). Real exchange rate is then not affected when nominal exchange rate depreciation is balanced by a corresponding increase in domestic price inflation (Bird 1983). Consequently, household price inflation counter balances export price competitive advantage of currency depreciation (Bird 1983). Also as postulated by Burstein, Eichenbaum, and Rebelo (2007) and Owen (2005), an accurate measure of effective exchange rate is the real exchange rate as it factors in the purchasing power.

2.3 Exchange Rate Arrangements

An exchange rate arrangement is defined by the International Monetary Fund (IMF), as the way the currency of a nation operates (IMF 2008). The level of control a nation has over its currency determines to a large extent its exchange rate (Calvo and Reinhart 2002). Exchange rate arrangements can be classified under two main types; the fixed exchange rate and the floating exchange rate (IMF 2008). In the instance of floating exchange rate, Owen (2005), argues that currencies are allowed to fluctuate against each other depending on market forces (free flow of demand and supply). Fixed or pegged exchange rate is a rate predetermined by a sitting government of a local state (Bautista 1982).

A fixed exchange rate may be fixed on a set amount of currencies or a fixed currency. For instance, the US Dollar can be pegged to a specific price range by the central government in respect of one currency or a basket of currencies (Owen 2005). The Bretton Woods collapse which happened in the 1970s, led to the IMF giving its members the opportunity to choose their own exchange rate arrangements. Most developing countries were encouraged to formulate frameworks to manage the floating exchange rates that would ensure prices self- correct and promote more exports (Musila and Newark 2003). But even after the breakdown of the Bretton Woods fixed rate regime, a number of policy makers still refuse the floating rate system by showing unwillingness to abandon exchange rate controls (Dooley et al. 2004),. This 'fear of floating" is likely to stem from uncontrollable variability of exchange rate due to market forces a country is exposed to because of floating exchange rates (Reinhart 2000; Millman 1990).

Also, Reinhart (2000), again stated that, the "official labels" of a nation's exchange rate arrangements do not generally give sufficient portrayal of the actual practice in a country. Subsequently, by authority, even though a country may adopt exchange rate arrangement, it does not affect other commitments that the country has already engaged in. It does not really matter whether a country has committed to an exchange rate path or not, the de facto exchange rate arrangement gives a more practical portrayal. Similarly, several researchers as cited by Edwards (2011) argue that the de facto exchange rate arrangement is able to indicate mechanisms through which a country's currency may weaken, specifically depreciate or devalue.

2.3.1 Depreciation versus Devaluation

The value of a country's currency could experience a fall in value through depreciation or even devaluation (Owen 2005). Krugman and Obstveld (1997) argue that currencies depreciate in value usually after the interplay of demand and supply on the currency market and this stems from the concept of floating exchange rate. Devaluation of a currency is a more conscious effort by policy makers to decrease the official exchange rate of a country in respect of other currencies

(Todaro and Smith 2009).

Similarly, Junz and Rhomberg (1973), are of the view that decreases in exchange rate, without price inflation, diminishes export prices estimated in local currency in respect of other currencies. The reduction in export prices renders products less expensive and relatively affordable ostensibly, from a price viewpoint (Junz and Rhomberg 1973). This is seen by some scholars as a positive effect of a weakening currency since prices have become more competitive (Owen 2005). Additionally, Todaro and Smith (2009) argue that a debilitating or weakening exchange rate may result in other unforeseen outcomes, for example, price inflation resulting from an increase in the demand for exports and additionally higher import costs. For instance, if an economy attains full employment, prices move up as rational economic agents buy less imports and consumers in other countries increase their interest for the nation of origin's less expensive exports (Mussa and Rosen 1978; Bautista 1982; Todaro and Smith 2009).

Hence, Kamin and Rogers (2000) contend that continuous price inflation is a major risk that can affect real exchange rates. More so, Reinhart (2000) also contends that such negative impacts are more profound in developing economies who tend to depend a lot on foreign currency like the dollar for both public and private sector debt financing.

A local currency that has depreciated with respect to a foreign currency in which a debt is designated makes it much costlier to service. Furthermore, Boltho (1996) argue that policy makers may not be able to perfectly predict the effect of a currency depreciation on the real exchange rate and on price elasticity. Furthermore, wage inflation may likewise be transported in with a depreciated local currency since the workforce may strive for wage increments in order to secure the real purchasing power of their earnings notwithstanding price inflation (Owen 2005).

Liaquat (2011) states that in a situation where currency depreciation is simultaneous, any competitive advantage enjoyed from such deprecation is quickly eroded. Liaquat (2011), further examines proof where numerous nations sought after export-led growth through competition in prices by depreciating their currencies. It was found that such depreciations (devaluations) generated a havoc in the foreign exchange market and this rendered the whole exercise 'self-defeating'. Boltho (1996), conversely, suggests that under a floating exchange rate regime, currency weakening may cause only a transitory increment in sales, consequently, presenting a temporary competitive advantage. The increase in sales, all other things equal, will raise the level of experience and increase the learning curve, leading to efficiency in firms in the long run (Arrow 1963; Keesing 1967). Consequently, depreciation in the currency would lead to competitive advantage becoming more sustained (Boltho 1996; Clark 1996).

Berman and Berthou (2009) then argued that though exchange rate deprecation would increase the volume of exports, the degree and length cannot be stipulated. The effects of depreciation caused by price competition, could take as long as a year or a year and a half to notice (Junz and Rhomberg 1973). This is as a result of a number of lag effects. These include recognition lags, where buyers take quite some time to recognise price competitiveness; decision lags, whereby it takes time for new requests to be put in; delivery lags, as trade flows are sometimes delayed due to credit terms of trade, recording of receipt of payment can be affected; replacement lags, as buyers may have to use up existing inventories before ordering for new stock to replace the used up stock; and production lags, as it takes time for export manufacturers to increase production in order to meet rising demand (Junz and Rhomberg 1973).

2.4 Export Performance

Export performance could be studied from a demand-side or supply-side perspective. And these could be as a result of currency depreciation (Owen 2005). From a demand viewpoint, competition in most cases is dependent on price such that, a higher price, lowers demand and a

lower price on the other hand, increases demand (Razmi 2007). Currency depreciation has an inherent 'positive competitive effect' as it may encourage the buying of domestic goods, because domestic prices will fall (Berman and Berthou 2009). Razmi (2007), however argue that, where it becomes the objective of a developing country to trade in high- income markets due to its relative advantage of price competition resulting from a depreciated currency, high-income markets may adopt protectionism mechanisms to protect or correct the rates.

The US Dollar is generally accepted as an international currency for transacting (Goldberg and Tille 2010). Therefore, export growth ultimately, is affected by how much a local currency is to a dollar. A depreciation in currency may have detrimental supply-side effects on an economy's productivity as argued by Owen (2005). These may include know-how, labour infrastructure, and business funding. Currency weakness at the firm level may also induce balance-sheet effect as it reduces the firm's production ability and capability to compete inexport markets. Berman and Berthou (2009), then, argue that, because the strength of the local currency is low, firms will find it expensive to buy inputs for production.

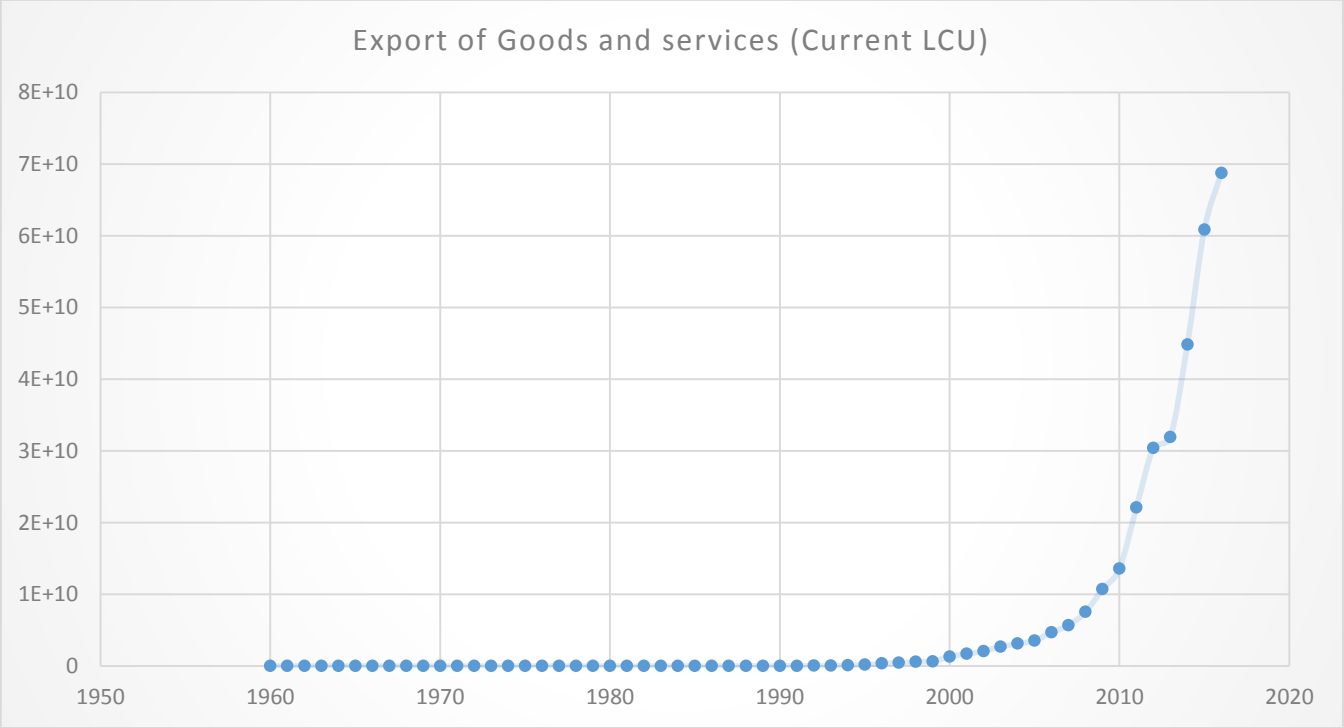
The growth of export as demonstrated by Kamin and Rogers (2000), is affected by real exchange rate depreciation which encourages export growth over an economy through fare development and a substitution from imports to household products. Bird (1983), contends further that the depreciation of currency causes relative price changes at an aggregate level and is deficiently specific in its effects as it fails to segregate between individual sectors or industries. Some researchers have suggested outward-looking methodologies that can help economic growth, principally in developing countries as championed by Prebisch (1964).

However, Lages (2011) posits that export performance is a complex variable, as it has both financial and non-financial measures and may be operationalized and conceptualized differently. There also exist, internal and external factors that may influence export performance (Lages 2011). Firm characteristics and competencies, product characteristics and management

characteristics make up some of the internal factors (Donthu and Kim 1993). An increase in the market share of exports, export growth or an improved balance of trade could be traced to enhanced export performance which has a direct effect on net exports (Durand and Giorno 1987; Sousa 2004; Santos-Paulino 2002; Musila and Newark 2003).

Sousa (2004) found that growth of export is a main indicator of export performance. He based his assertion from his study done on the review of forty-three strategic empirical studies published between the period 1998 and 2004 on export performance. He used market- clearing quantity exported as a proxy for measuring export growth. He concluded from the study that export growth does indicate an increase in market share which also reflects export performance. Figure 2.2 shows export growth in Ghana from 1960-2016 and it can be observed that export has been growing steadily over the period.

Figure 2.2: Export Growth in Ghana



Source: Author's Computation (From WDI)

2.5 The Ghanaian Export Sector

Ghana has always undertaken trade since time immemorial. Dating back to the thirteenth century, Ghana has been involved in international trade, trading in large quantities of its gold reserves. A typical example was the trans-Saharan trade. It was one of the most advanced trading networks at the time and linked Europe with North Africa and the Sahara. European products were traded for slaves and gold. The Gold coast, now called Ghana, was a key point of trade contact at the time.

Some researchers have contended that trading in slaves increased the fortunes of African economic resources and in this manner never hindered development. But Walter Rodney, has concluded that by extracting the most valuable resource of Africa, thus its people, Africa was deprived of self-improvement and innovation and other self-development needs. Rodney goes further to state that slave trade lead to Africa's underdevelopment which continued up till today. The Ghanaian export sector has grown steadily in recent times. Exports have been diversified into several areas namely; agricultural, manufacturing, mineral, oil (fuel products) and services sectors.

The agricultural sector is one of the oldest and yet successful sectors that Ghana can boast of. It consists of a variety of agricultural products which provide employment for the formal and informal sectors of the Ghanaian economy. The main commodities that drive the agricultural sector are cocoa, oil palms, yams, kola nuts, grains and timber. The Ghanaian economy has benefitted immensely from the export of cocoa since it was introduced in the year 1878 and quickly became the country's major export. The agricultural sector has served as a tool in reducing unemployment and in 2013, the sector employed 53.6% of the total labor force in Ghana (FAPDA 2016).

The manufacturing sector of Ghana has not really been given enough attention. Although the sector is under-developed, it is a major feature to the country's GDP. Ghana's topmost manufacturing industries include chemicals and pharmaceuticals, cement, oil refining and aluminium smelting. Some other minor industries include the production of agro-food processing, textiles, glass, beverages, paints, plastics, and metals and wood products processing. The manufacturing sector is relatively important as it contributes about 9% of the country's GDP. The Ministry of Trade is working at designing proactive policies to rejuvenate the Ghanaian industry and trade through the Ghana Trade and Investment Gateway Programme (GHATIG), whose establishment is to seek the promotion of FDI and to promote Ghana's manufacturing industry, creating value in West Africa.

The mineral sector on one hand can also be identified as one of Ghana's oldest export sectors. The sector has significantly contributed in the country's socioeconomic development from the pre independence period.

This sector produces mostly; gold bauxite, manganese and diamonds. The Mining sector interestingly contributes about 5% to Ghana's GDP whilst exports of minerals contribute about 37% of the export basket. With the mineral exports, gold is the most exported, accounting for about 90% (GMMSIBG 2013). This sector has been experiencing discoveries, day in, day out.

The Oil sector is also another important sector in the development of the Ghanaian economy. Ghana's offshore mining dates back as a far as 25 years when the Ghana National Petroleum Company (GNPC) was established. The 25-years period has been a somewhat difficult but progressive period for the development of Ghana's oil sector. After many years of failed attempts to take over the gulf oil fields, GNPC, through foreign partnerships discovered the jubilee fields, which was a huge oil and gas reserve 60km offshore. By 2010, commercial extraction had begun, managed by Tullow and other partners.

GNPC has in addition to the Jubilee field, made allocation rights for the development of 16 additional fields to the partnership. In August 2016, GNPC had started Hydrocarbon production in the Tweneboa, Enyenra, Ntomme (TEN) oil field. It is expected to extract 300 million barrels of oil and gas for up to 20 years.

Lastly, the service sector in Ghana over the years has seen a tremendous growth, displacing both the agricultural and industrial sectors. The sector comprises hospitality, trade, repair of vehicles and household goods; public administration; education; health; transport and warehousing; information and communication; financial and insurance activities; real estate among others. In recent times, the service sector seems to be the key driver of several economies, even more so with technological growth and globalization. In Europe, Asia, Africa and the other continents, the service sector has proven to be a key contributor to GDP (Angus 2003) but researchers presage that if the trend continues without a commensurate growth in the industrial sector, the unemployment gap will continue to widen.

2.6 Efficiency-Driven Economies

By the definition of Schwab (2010), efficiency-driven economies refer to developing economies which experience trade or industrial growth, driven by exports. These economies mostly have a higher GDP limit of $9 000 per capita (Schwab 2010), hence, their broad classification as developing economies (Clark 1996). Nonetheless, some other characteristics make efficiency-driven economies quite different from developing economies. Efficiency- driven economies strive to overcome the constraint of a limited domestic market. This they do by supporting an open market economy, hence, participating in international trade (Baldauf, Cravens, and Wagner 2000). Tan and Phang (2005), also argue that efficiency- driven economies are supported by efficient infrastructure that help in ensuring the efficient operation of an economy, more so, they have resources that enhance the economy's export orientation.

It is worthy to note that, large firms and multinational companies are the principal drivers of these exports and are mainly manufacturing industries (Porter 1998). Developing countries have rarely invested in large manufacturing export industries and the interest in this area in most developing economies is quite recent. Recently, trade patterns in the export of industrial goods have shown tremendous improvement, especially, from developing economies and this has been attributed to efficient-driven economies which help in enhancing terms of trade and price competitiveness (Bloch and Sapsford 2000).

Moreover, an export-oriented growth is desirable for developing economies in terms of industrialization, since it helps in focusing on efficient allocation of resources, greater capacity utilization, improved employment and enhancement in technology Balassa (1978). These developments and improvements are as a result of efficiency enhancers, Efficiency enhancers are goods and labour improvement market efficiency; improvements in market size; financial market development; higher education and training and technological readiness.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

This chapter provides a background on currency evolution; from the era of fixed exchange rate regimes to that of flexible exchange rate regimes with emphases on economic reforms particularly in Ghana. The chapter also reviews existing literature, delving into the theoretical and empirical literature underpinning exchange rate movements. Efforts are made to explore the relationship between exchange rate movements and export performance. Theoretical models pertaining to exchange rate fluctuations are brought to bear.

3.2 Theoretical Literature

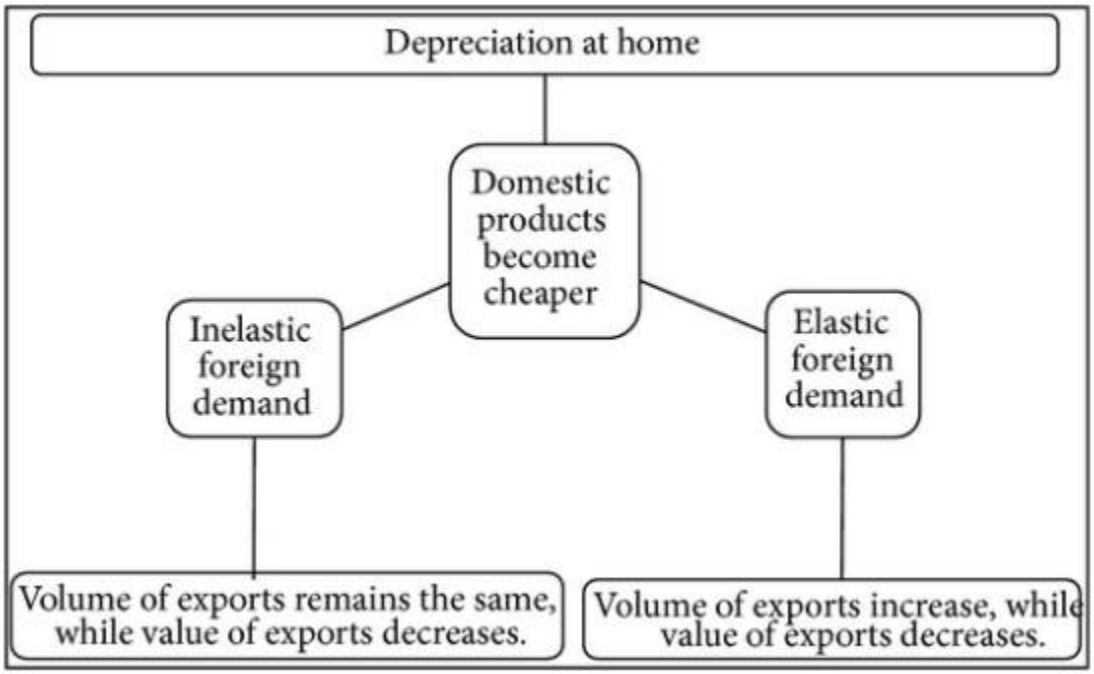
In order for countries to benefit from exports there is the need to understand the foreign exchange market through the application of knowledge on exchange rate movements. Businesses and individuals can leverage the effect of exchange rate movements by applying the knowledge in the theories that underpin exchange rate movements. Since exchange rate is very important in international trade, understanding its movements will help improve decisions on international trade.

Theories on exchange rate movements have evolved over the years. During the sixteenth century, mercantilism was the dominant economic system of most industrial nations. The Mercantilist Approach to international trade was the theory in practice which assumed that a nation's wealth depends primarily on its ability to possess precious metals such as gold and silver (Ali, Johari and Alias 2014). Possession of the metals took place through exportation and encouraging metal discovery while suppressing imports through the imposition of excessive tariffs.

The Mercantilist Approach was vehemently criticized by some theorists who propounded the Standard Trade Theory and based their argument on Adam Smith's Wealth of nations and David Ricardo's principles of Political Economy and taxation and heralded the formulation of free trade (Smith 1776; Ricardo 1817). The Standard Trade Theory assumes that, fluctuations in exchange rate affect both the volume and value of trade, all other variables fixed. This supposes in home country that, real depreciation causes a decrease in the imported goods of households per domestic goods and services. Therefore, a unit of imported goods would give higher number of units of domestic goods. Sooner or later, domestic households will buy less import whereas foreign households are likely to purchase more of domestic goods. Eventually, as the home country real exchange goes higher, more trade surpluses could also be obtained by the country.

The Standard Trade Theory was extended by accounting for demand price elasticity of imports and exports by Lerner (1944), who was of the view that trade balance was concerned about the actual values of imports and exports rather than the volume of the physical goods. Elasticity of demand measures how responsive the demand for goods and services is to changes in price (Howitt, Watson and Adams 1980). The foundation of the elasticity theory was originally laid by Bickerdike-Robinson-Metzler who argued that import and export supply and demand elasticities and the initial volume of trade determine the change in the value of foreign currency of trade balance. This argument on supply and demand elasticities is presented in the figure below.

Figure 3.1: Supply and Demand Elasticities of Exports



Source: Bickerdike-Robinson-Metzler Elasticity Theory

As can be seen in the above figure, a depreciation of the home currency will cause domestic products to be relatively cheaper than foreign products, all things being equal. This will result in an increase in the volume of exports while the value of exports decreases for elastic foreign demand. On the other hand, a depreciated home currency will result in the volume of exports remaining the same while the value of exports decreases for an inelastic foreign demand.

Dincer and Kandil (2011), argued that stochastic uncertainty may arise on the demand and supply sides of an economy in the real world. They are of the view that real output is dependent on unexpected movements in exchange rate which is greatly affected by the forces of demand and supply, government spending and money supply in the short term. Also, supply-side channels establish that output fluctuates with expected changes in exchange rate.

Hence, the following;

I. Considering the goods market, when the exchange rate of the local currency receives a positive shock (an unanticipated random rise in the value of the domestic currency), exports becoming more expensive while rendering imports less expensive. Consequently, demand for domestic products in the international market will decrease due to keen competition, resulting in a decrease in the price and output domestic goods.

II. Also, a rise in the value of the local currency in the money market, compared to the equilibrium point, causes less currency to be held by economic units leading to a fall in interest rates. This controls fall in demand, hence, the decrease in domestic goods and its prices in times when exchange rates rise.

III. In the supply side, when exchange rate rises, it increases production of domestic goods and reduces production cost while reducing the cost of imported intermediate goods.

IV. Again on the supply side, an exchange rate increase causes a fall in competition which also affects production for the external markets hence, supply of output reduces.

In conclusion, currency appreciation affects price and output depending on demand or supply channels. Correspondingly, the growth of export will also be affected by how economic agents react to demand and supply.

3.3 Bretton Woods Era

Prior to the Bretton Woods system, the Gold Standard was the exchange rate arrangement adopted by most countries where the value of currencies was tied to that of gold to ensure stability in the value of currencies. This system was in session for quite a long time until it was

replaced at a conference in Bretton Woods based on a number of challenges the system had, one of which was the heavy dependence of global trade on the discovery of gold.

The Bretton Woods System, established in 1944 was a system of monetary and exchange rate management. Delegates were picked from Forty-four (44) countries to participate in a Bretton Woods conference in New Hampshire. The conference recommended international economic cooperation. The system according to Ghizoni (2013), was to ensure exchange rate stability, prevent competitive devaluation and promote economic growth.

The system also aimed at establishing a fixed exchange rate regime that would enhance international trade while protecting the policy goals of individual nations. The participating countries agreed to peg currencies to the price of gold. The price of gold was eventually linked to the US dollar which was used as the reserve currency. This was because the United States held about ¾ of the world's monetary stock of gold. This arrangement was not to be altered in any case except to correct a fundamental disequilibrium. Pegging the various currencies to gold meant that individual countries fixed their price levels to that of the world and also agreed to an open market system. Currencies were pegged to the US Dollar based on gold and valued at $35 per ounce of gold (Meltzer 1991). Countries were also expected to keep fixed exchange rates with one another within the range of ± 1 percent and capital flows were severely restricted.

In most exchange rate regimes, countries are faced with the principal tradeoff between domestic monetary sovereignty and exchange rate stability and the extent to which they cooperate with other nations in international trade (Knight 2013). This implies that governments of the various countries will have to prioritize and in most instances, the decision bothers on either economics or politics. According to Mandilaras (2015), even though each aspect of the dilemma is attractive, policy makers cannot achieve all three simultaneously; for example, achieving exchange rate stability and operating an open market will imply a loss of monetary sovereignty. For countries to change the monetary base will mean they have to offset one or the other in order to achieve

the desired level of exchange rate.

One disadvantage of the Bretton Woods system as cited in Bordo and Eichengreen (1991), was that it exposed its member countries to monetary shocks that were affecting other parts of the world. Voutsa and Borovas (2015), also mentioned that the system drifted away from its core mandate of ensuring global financial stability to serving the financial interest of powerful states.

During the 1960s the dollar began to struggle because it was overvalued and around the early part of the 1970s, U.S. president Richard Nixon suspended the system. Attempts made to revive the system proved futile and the system finally closed in March 1973 and currencies began to float against each other. IMF then gave its members the chance to choose their own exchange rate arrangements.

In the Post-Bretton Woods era, currencies are allowed to float against each other for which some researchers have argued that it is not desirable for most countries especially developing economies such as Ghana. According to Edwards and Santaella (1993), exchange rate adjustment for developing countries and for that matter Ghana, has not been desirable since it has led to enthusiasm for devaluation of the local currency and consequently enhanced inflation. This has been supported by a number of researches and can be seen in the works of Agenor and Montiel 1991; Aghevli, Khan and Montiel 1991; Burton and Gilma 1991. This therefore means that it is more desirable for exchange rates in developing countries to move towards rigidity.

3.4 Empirical Studies on Currency Weakness and Export Performance

Examining literature on the relationship between currency weakness and export performance gives mixed proof as researchers have not been able to establish a unanimous conclusion. In the 1960s, currency weakness served as a tool for boosting export performance through price competitiveness (Prebsich 1964). Todaro and Smith (2009) likewise found that a country can enhance the competitive position of its exports by decreasing the price of its local currency. Be

that as it may, the impacts of currency weakness on export performance are not generally observed to be positive.

Musila (2002), for example found that currency weakness worsened export performance particularly for small open economies in the short run and just imperceptibly enhanced performance in the long run. Even though this study looked at the short-run and long-run dynamics of currency weakness and export performance, the study did not explore the effects of exchange rate weakness on disintegrated export. Calvo and Reinhart (2002) additionally discovered confirming evidence that, exports do not at first increase after the devaluation of a country's currency. Instead, they discovered exports at first deteriorating for the initial eight months after a local currency is devalued. High cost of inputs, corporate financial stress and trade credit, are some of the factors that lead to this decrease (Calvo and Reinhart 2002).

Frankel (2005), Berman and Berthou (2009) and Lizondo and Montiel (1989), concur with the finding that exports rebound back just tolerably and tend just to recover beginning levels over the long term as opposed to achieving higher market share. Additionally, Berman and Berthou (2009) found a negative relationship between currency depreciation or devaluation and exports using data from 27 developed and developing nations between 1990 and 2005. This negative relationship was especially predominant when the size of the currency depreciation or devaluation was expansive; and monetary market flaws, for example, outside money designated borrowings and credit imperatives, were available (Berman and Berthou 2009). Frankel (2005), Berman and Berthou (2009) and Lizondo and Montiel (1989), do find that fares bounce back just modestly and tend just to recover starting levels over the long haul as opposed to accomplish higher piece of the overall industry. In this vein, Berman and Berthou (2009) found the effect of cash devaluation on fares to be negative in 27 created and creating nations over the period 1990 to 2005. This negative relationship was especially predominant when the size of the money debasement or deterioration was large; and flaws in the financial markets (Berman and Berthou

2009).

In a study by Bautista (1982) of 23 developing economies from 1973 to 1979, it was found that currency weakness did not result in a lasting improvement in export competiveness, notwithstanding the magnitude for most of the sample under review. In spite of prior discoveries, a simulation analysis carried out by Musila and Newark (2003) found that devaluation may enhance export performance and shorten the development of imports over the long term with regard to small open economies. In this vein, Auer and Chaney (2009) also showed the real exchange rate depreciation positively relates to export volumes.

Edwards (2011), also contends that when the real exchange rate is stable, that is not moved toward becoming overstated, then it is an important part of an export oriented development strategy. As indicated by Edwards (2011), with regard to China, which he contends has adequately stimulated exports keeping up an exchange rate that is undervalued. Despite whether there is improvement in export performance because of the devalued currency or certain unintended consequences may happen.

Peree and Steinherr (1989) also in their study, found that an increase in exchange rate volatility results in adverse effects on the volume of exports. This has been widely agreed by researchers as shown in empirical studies reviewed and it goes to conclude that exchange rate volatility impacts negatively on export performance. This notwithstanding, McKenzie (1998) and Bahmani et al. (1993) among others, finds no statistically significant relationship between exchange rate movements and international trade. Franke (1991) and Sercu and Vanhulle (1992) among others however, in their studies, have found exchange rate volatility to have a positive effect on international trade.

3.5 Trade Openness, Exchange Rate Regimes and Balance of Payment

Persistent and high balance of payment deficit has become an issue of concern for most countries

especially, developing countries. The high rate of public debt is crippling most developing economies. The question is, whether this is caused by trade openness or the choice of exchange rate regime or a combination of both. The concern on balance of payment is due to its impact on other sectors of the economy.

According to Jebuni, Oduro, and Tutu (1994), countries in Africa were adopting Structural Adjustment Programs to save them from economic downturns and trade deficits aggravated by high exchange rates, high inflation and other macro variables. Trade and payment liberalization are the major components for such interventions. An open trade can be decided by countries unilaterally or bilaterally by agreeing to be part of a free-trade area of a group of countries without any restrictions but control trade against nonmember countries:

3.5.1 Trade Openness

Kruger (1986), defines liberalization of trade as a move from the use of quantitative restrictions to the use of price or tariff instruments. This implies that with liberalization, certain incentives and barriers to trade are removed to enhance the supply of imports so as to generate the required export sector response. When this is accompanied by vigorous export promoting strategies, will improve balance of payments, all things being equal. The question at the heart of international economics and macro- development is whether trade openness has a positive effect or otherwise on economic growth and for that matter, balance of payment. The classical and neo-classical economists hold a positive view on international trade and economic growth and they are of the view that foreign trade is an engine of growth. Structuralist on the other hand, hold the view that international trade has been detrimental to poor countries causing an enormous deterioration in their terms of trade thereby negatively affecting their balance of payment.

The United Arab Emirates (UAE) for instance has an impressive economy due to trade liberalization and openness to the international market among other diversification policies

such as good economic and political policies. The UAE is considered as one of the most open economies in the world characterized by small tariffs and very few obstacles to trade (World Trade Organisation 2012).

The above assertion has been agreed by some researchers who argue that the UAE adopts an open approach to international trade through the reduction in barriers to trade thereby, enhancing international competition through its 'Free Trade Zones' which has helped to diversify its exports (Al-Shayeb and Hatemi-J 2016; Moore 2010). Dowrick and Golley (2004), also posit that trade openness increases access to trade inputs which are necessary for technological progress resulting in growth in productivity through the expansion markets for inputs or outputs. Output markets enable local producers to utilize economies of scale and specialisation which intends lead to growth in productivity. Input market expansion helps countries to take advantage of product variety, product model and technological transfer with reliance on trading with research intensive economies. The arguments for the impact of trade openness on economic growth has also been supported in the works of Chang, Kaltani, and Loayza (2009); Dollar and Kraay (2004); Freund and Bolaky (2008).

The above notwithstanding, several other researchers have downplayed the contribution of trade openness in some countries, especially developing economies. This mostly is centred on two most common criticisms against trade openness and liberalization; the infant industry argument and strategic protection of essential commodities. Literature has it that the infant industry argument became prevalent after the World War II to justify protectionist policies of developing countries in the post colonialism era. Developing countries were to ensure extensive protection of their local industries to enhance industrialization thereby fostering economic growth. Some studies have demonstrated how protectionism has enhanced long-run economic growth in developing countries which has also been supported in empirical studies in the works of Young (1991); Kaneda (2003); Das & Srinivasan (1997).

Strategic protection of essential commodities on the other hand argues that protecting local industries through subsidies, tariffs and other favourable trade agreements can improve the welfare of local industries to enhance their productivity and consequently enhance economic growth. This would help to reduce foreign defection incentives and also limit dumping of goods. The works of Lee and Swagel (1997); Trefler (1993) have shown that protection tends to favour comparatively weak and disadvantaged sectors thereby reducing the vulnerability to foreign defection. Local Industries that have their inputs subsidised are able to produce at a lower unit cost, all things being equal, making their exports more attractive and this could send a positive signal to enhancing a countries Balance of Payment.

Other researchers have also argued that trade openness poses a threat to countries (especially developing countries) because these countries are not able to effectively compete against the well-established nations and are crippled eventually and this may reduce long term growth rate in the developing countries (Young 1991; Stokey 1991).

Researchers have not been able to unanimously agree on trade openness as a tool for enhancing economic growth since it could serve as an advantage to enhance productivity or serve as a disadvantage to cripple indigenous industries. A country (especially developing country) that intends to open its market to international trade would have to critically examine its negative and positive impact since it could result in enhancing economic growth or otherwise of the country.

3.5.2 The Phase of Ghana's Balance of Payment

Prior to the nineteenth century, gold was the major currency for international transactions and this provided little flexibility for countries to experience balance of payment deficit. After the Bretton Wood system which marked the end of the dollar convertibility to gold which ensured a fixed exchange rate system where currencies were pegged to gold, currencies were made to float

freely against each other and this has been the practice up until now.

Balance of payment indicates a country's transactions with the outside world (IMF 1993). It then serves as the international balance sheet which keeps records of all international transactions in goods, services, and assets over a year. International trade in goods and services enables countries to specialize in areas of comparative advantage in production which helps enhance living standards of citizens.

Availability of international markets enable countries to export goods and services that they are relatively efficient in producing and import those that they are less efficient in producing. This has led to exchange rate issues since different countries have different currencies. The foreign exchange market then serves as a conduit for a successful international trade and helps provide detailed information regarding the demand and supply of a country's currency. A country is able to assess its position in international trade of its goods and services, income and capital flows and also, its exchange rate policies.

Balance of Payment is made up of three components; Financial Account(FA) which measures the changes in international ownership of assets; Capital Account(KA) which also deals with the transfer of financial assets such as tax payments and transfer of title to assets and these do not affect a countries income, production or savings. Lastly, the Current Account (CA) which measures a country's trade balance plus the effect of net income and direct payments. This is represented as: $BoP = CA + KA + FA$.

The BoP in Ghana has mostly been characterized by a deficit. This is evidenced in the statement made by the Finance Minister in the presentation of the 2017 Budget to Parliament. He stated that for the first time since 2011, Ghana had recorded a trade surplus of $247 in 2016 compared to a deficit of $129 million in 2015. This, he said was as a result of a reduction in the current account deficit which was driven mainly by the improvement in the balance of trade.

3.5.3 Exchange Rate Regimes and Economic Recovery Programs

Before the Economic Recovery Programs (ERP), Ghana maintained a fixed exchange rate policy until 1988 when the country switched to a flexible exchange rate system. Most African countries including Ghana experienced severe deterioration in international trade relations, domestic policy management and national calamities during the 1970s and the early part of the 1980s. This resulted in a continuous decline in Ghana's GDP (gross domestic product) growth. Averagely, real per capita income fell by 27 percent. In 1982, Inflation also stood at 22 percent but by 1983, inflation had risen significantly to a staggering 123 percent (Maehle, Teferra, and Khachatryan 2013).

The Government of Ghana launched the ERP in 1983 under the guidance of the IMF and World Bank to help reverse the protracted period of serious economic decline (Amenumey 2008). The main reason for the ERP was to improve the economy and slash Ghana's external debts.

The ERP used a market-based strategy to reduce volatility in the macroeconomic variables. It also played significant roles in liberating the private and external sectors of the economy. Inflation reduced significantly to 10% in 1991, from 142% in 1983. GDP grew averagely by 5% leading to an increase in per capita income of the citizenry.

With its objective of restoring and promoting production, especially in the export sector, government began to rebuild infrastructure through a USD 4.2 billion program. This interest of the program directed towards the export sector received serious criticisms by a sector of Ghanaians who were not involved in the export sector. This resulted in a cut in budget devoted for agriculture from 10 percent to 3.5 percent by 1988. The private sector and investment were also hampered by the slow implementation of critical structural reforms.

3.6 Evolution of the Cedi

Prior to the introduction of money as a medium of exchange, trade was effected by the exchange of items between two or more people. This system known as the barter trade was the medium through which people traded goods and services. With this system, anyone who needed an item had to find another who also needed the item of the former to effect the exchange. This was quite challenging because it was difficult to find someone who had what the other person needed, in the right quantity and was also interested in what the former had.

Cowries were eventually introduced as a medium of exchange. Anin (2000) in his book, Banking in Ghana" traces banking as far back as the earliest forms of banking where cowries were accepted for transactions. He stated that until 1880, currencies used in trade in the Gold Coast had continuously evolved, from barter trade to cowries, to other forms of paper money. The Ghanaian currency derives its name from the cowries traded at that time, which was locally referred to as 'Sedie'. Then there was a shift from the use of cowries to the use of gold as a unit of measure in the 19th century.

To enhance trade, an attempt was made to set up a common currency in West Africa and this resulted in the establishment of the West African Currency Board WACB). West Africa Currency Board (WACB) was vested with the responsible of issuing currency for most West African countries especially the British Colonised countries which included Ghana. The West African Pound Sterling, shillings and coins were the currencies in circulation. WACB collapsed following the independence of Ghana from colonial rule and this was similar for other West African countries who also depended on WACB for their currencies and gave way to new economic arrangements (Anokye and Chaudhry 2013).

On July 14, 1958, the new monetary authority in Ghana, the Bank of Ghana, issued its own currency, moving away from the West African Pound. The new currency was Ghana Pound, the

Ghana shillings and the Ghana Pence. The Ghana pound was equal to the UK pound. Later, an Exchange Control Act was passed in 1960 to regulate all trades or fund transfers outside Ghana. At the time, the act made it mandatory for all fund flows outside Ghana to be declared to the Bank of Ghana (Anin 2000).

The second issue of currency was in 1965 when Ghana decided to leave the British Colonial monetary system and this led to the second issue of currency on 19th July, 1965 which resulted in the introduction of the Cedi notes and Pesewa coins to replace the Ghana Pound, Shillings and Pence. The Cedi was equivalent to eight shillings and four pence (8s 4p) and bore the portrait of the then President, Dr. Kwame Nkrumah.

After the overthrow of Dr. Kwame Nkrumah, the military government replaced the currency which bore Dr. Nkrumah's portrait with one without his portrait and this led to the introduction of the new Cedi (N¢) which was issued at the rate of $¢1.20 = N¢1.00$. The new currency remained in circulation until it became known as the cedi in March, 1973. The cedi was revalued at the rate of $¢1.00 = US\$\ 0.78$. The notes and coins in circulation were ¢1, ¢5, ¢10, ¢50, ¢100, ¢1,000, 5P, 10P, and 20P until 1994 when additional seven different note and eight coin denominations were introduced. In the year 2000, ¢ 10000 and ¢ 20000 notes were added.

The Cedi experienced a number of devaluations against the US Dollar over the years. By 1983, the cedi had devalued at the rate of $US\$\ 1.00 = ¢30.00$ The devaluation created quite a number of challenges for Ghana which emanated from inadequate publicity, problem of exchanging the cedi for other foreign currencies such as the Dollar and Pound and managing inflation just to mention a few. The cedi has since then been struggling to find its level against other major trading currencies.

In November, 2006, the Bank of Ghana initiated a move towards the redenomination of the cedi (revaluation of the Cedi). The Governor of the Bank of Ghana presented the proposal to parliament and the bill was passed by parliament on the 1st of July, 2007. Four zeros of the cedi were knocked off which resulted in the introduction of the Ghana cedi. That is, ¢ 10,000 became One Ghana Cedi: ¢10,000 = GH¢1.00. The old and new cedi traded side by side until December 2007 when the new cedi completely replaced the old cedi. After December, 2007, the new cedi now served as legal tender for payment of goods and services and the old cedi lost its power as legal tender. The new cedi was able to resolve difficulties the people of Ghana encountered with the old cedi which included carrying loads of currencies for transaction purposes, strain on payment systems, particularly the Automated Teller Machine (ATM) and increasing difficulties in maintaining account books and statistical records just to mention a few. As a result, researchers argue that currency redenomination is part of reforms.

Most developing countries have also experienced some redenomination and Mosley (2005), has it that developing economies have redenominated their currencies by about 70 times, By and large, studies have shown that redenomination does not work if the economy is not productive itself. Empirical studies by Caballero (2002) and Calomiris (2006) are consistent with the argument that currency redenomination cannot in itself transform an economy when there is unemployment, local industries are collapsing, currency depreciates in value, imports exceed exports and cost of production is excessive. It is however imperative to state that other studies in the area have been inconclusive.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

This chapter of the study discusses the various methods used in the study. It presented a detailed description of the research design, the variable description and model specifications used for the study.

4.2 Research Design

In conformity with what the study sought to do, quantitative research design was adopted to explore the association between exchange rate volatility and Ghana's export performance. As compared to qualitative design, the key strength of the quantitative research design is how it takes full advantage of replicability, objectivity and generalisability of findings. Therefore, this design ensures that the researcher sets aside his experiences, discretions or perceptions and biases to ensure objectivity in the conduct of the study and deductions that would be drawn. Interestingly, quantitative research designs sometimes entail description, where variables are typically measured once or investigational, where variables are measured before and after a treatment.

4.3 Data Source and Data Analysis

The study used secondary data sourced from the 2017 edition of the World Development Indicators (WDI) for the period 1984-2016. WDI contains Annual Time Series data on selected macroeconomic variables such as Government Expenditure on Infrastructure (GOV), Exchange Rate Volatility (EXV), Real Gross Domestic Product Growth (GDPG), Credit to Private Sector (CPS), Foreign Direct Investment (FDI), Tariff Rate (TAR) and Inflation (INF), etc. In order to achieve the objectives of the study, descriptive statistics, graphs and tables were employed. Unit

root test was also employed to check for stationarity among variables as well as the bounds test which was employed to check for cointegration among variables.

4.4 Theoretical Model Specification

Settling on a suitable model for the export performance stems from theoretical considerations. In light of the survey of literature, this study adopts a framework elaborated by Obeng (2017). Obeng (2017) explored how exchange rate volatility affects diversification of export in Ghana. The functional form f, expresses Ghana's export performance as a vector of tariff rate proxying trade openness, exchange rate volatility, government expenditure on infrastructure, credit to private sector, and GDP growth and is given by;

$$EXP = f\ (TAR, GDPG, EXV, GOV, CPS) \quad (1)$$

where TAR represents Tariff Rate; GDPG represents Gross Domestic Product Growth; EXV represents Exchange Rate Volatility; GOV represents Government Expenditure and CPS represents Credit to Private Sector.

4.5 Empirical Model Specification

By augmenting the models used by Dhliwayo (1996) and Ali (2010), the study presented a model whereby export performance was intuitively related to the level of economic growth and several macroeconomic variables. The specification of econometric models for this study considers the variables of interest discussed and offers a slight deviation from the literature.

To explore the dynamic association among export performance and some macroeconomic variables; GDP Growth (GDPG), Tariff rate (TAR), Inflation rate (INF), Credit to Private Sector (CPS) and Government Expenditure on Infrastructure (GOV) were controlled for. In addition, since exchange rate volatility (EXV) is not an economic variable, it was calculated (generated) and incorporated into the model. The specification of the functional model is shown in equation 2 below:

EXP=*f* (GOV, CPS, GDPG, TAR, EXV) (2)

In all, four (4) models were estimated. Model 1 had overall export performance as the dependent variable while Models 2, 3 and 4 had the export performance of the agricultural, services, and industrial sectors as dependent variables respectively.

Transforming the variables in equation (2) into logs, the empirical specification of model 1 expressing the relationship between export performance, exchange rate volatility and other control variables is shown in equation (3)

$$\ln EXP_t = \beta_0 + \beta_1 lnGOV_t + \beta_2 lnCPS + \beta_3 lnTAR_t + \beta_4 lnGDPG_t + \beta_5 lnEXV_t + \varepsilon_t \quad (3)$$

In a similar vein, the empirical equations for models 2, 3 and 4 estimating the effect of exchange rate volatility on the main sectors of the Ghanaian economy (agricultural, industrial, and service sectors) are presented as follows:

$$\ln AGEX_t = \beta_0 + \beta_1 lnGOV_t + \beta_2 lnCPS + \beta_3 lnTAR_t + \beta_4 lnGDPG_t + \beta_5 lnEXV_t \quad (4)$$

$$\ln SEREX_t = \beta_0 + \beta_1 lnGOV_t + +\beta_2 lnTAR_t + \beta_3 lnGDPG_t + \beta_4 lnEXV_t + \beta_5 lnFDI_t + \varepsilon_t \quad (5)$$

$$\ln INDEX_t = \beta_0 + \beta_1 lnGOV_t + \beta_2 lnCPS + \beta_3 lnTAR_t + \beta_4 lnGDPG_t + \beta_5 lnEXV_t + \beta_6 lnINF_t + \varepsilon_t \quad (6)$$

where EXP = Export Performance, β_0 = Export Performance intercept, GDPG= Gross Domestic Product Growth, TAR = Tariff rate, CPS = Credit to Private Sector, INF = Inflation rate, EXV = Exchange Rate Volatility, GOV = Government Expenditure on Infrastructure, FDI = Foreign Direct Investment, AGEX = Agricultural Sector Export, INDEX = Industrial Sector Export, SEREX = Service Sector Export while ε is the error term and subscript t representing time.

4.5.1 Modelling Exchange Rate Volatility

The chief explanatory variable of interest, exchange rate volatility is not observed over time. It was thus calculated. Since real exchange rate is sometimes characterized by volatility, the assumption of uniform

variance is inappropriate hence undeviating models are unable to explain a number of important features of exchange rate related impacts. It is therefore appropriate to use models that permit the variance to be influenced by its history to examine the real exchange rate volatility.

Various methodologies have been used to calculate exchange rate volatility in literature. These approaches encompass the standard deviation method, the moving average method as well as the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) which was developed by Bollerslev (Brooks, Smith, Hill & O'Dowd, 2002). There are several versions of the GARCH model but this study settled on the GARCH (1,1) model as defined in equation (7) below. This is because it is parsimonious and it is able to capture volatility in most time series (Tarawalie, Sissoho, Conte & Ahortor 2013).

The study considered Generalised Autoregressive Conditional Heteroskedastic (GARCH) models which allow variances of errors to be time dependent. Nevertheless, it was imperative to test for the existence of time varying effect (ARCH Effect). The GARCH models are suitable for the estimation of the series if there is evidence of heteroscedasticity. If the results prove otherwise, i.e. no ARCH Effect, the GARCH models will not be appropriate to use.

The GARCH (1,1) modeling process commences with mean equation (7) which expresses changes in the real effective exchange rate, RER, as a function of its lagged value. The error term, e_t is normally distributed with zero mean and a variance, h_t. The variance, h_t is then used to specify the GARCH (1,1) model of interest as in equation (8).

$$\Delta(lnRER)_t = c_1 + \beta\Delta(lnRER)_{t-1} + e_t \quad (7)$$

$$e_t \approx N(0, h^2{}_t)$$

$$h^2{}_t = c_2 + \alpha e_{t-1}^2 + \beta h^2{}_{t-1} \quad (8)$$

where: $\Delta(lnRER)$= difference log of the real effective exchange rate from period t to $t-1$

h_t = variance of the error term e_t

e_{t-1}^2= the ARCH term

h_{t-1}= the GARCH term (9)

In equation (9) above, the variance equation has one ARCH term (i.e.e_{t-1}^2) and one GARCH term (h_{t-1}). The conditional variance is represented by the dependent variable (h_t), the lag of the squared error term (ARCH effect) and conditional volatility (GARCH effect) are represented by α and β respectively. α and β both measure the overall volatility. If the error coefficient is high, α denotes that volatility reacts strongly to internal movements, while a large GARCH coefficient, β denotes that shocks to conditional variance take a long time to die out, which implies that volatility is persistent (Brooks et al. 2002). If ($\alpha + \beta$) in the variance equation is very close to one, it means high persistence in volatility and implies inefficiency in the market. It is expected to be detrimental to Ghana's EXP position.

4.6 Justification of the Inclusion of the Variables

4.6.1 Export Performance (EXP)

Exports (EXP) represent the volume of exports and it was measured as the ratio of total exports of goods and services to GDP. Likewise, the sectoral exports (agricultural sector, industrial sector and service) which are also measured as a ratio of GDP. This is because the volume of exports is affected by several factors of which exchange rate is cardinal (Smith 2004). It is obtained from the WDI data of the World Bank from 1984-2016 (33years). It is expected to have a negative relationship with exchange rates such that, if the value of the local currency depreciates (weakens against major trading currencies), exports become more attractive resulting in an increase in the volume of exports. Likewise, an appreciation (strengthens against major trading currencies) of the local currency leads to exports being more expensive and unattractive, hence, a reduction in the volume of exports (Obeng 2017).

4.6.2 Government Expenditure (GOV)

Government Expenditure on infrastructure was measured as a ratio of government expenditure on infrastructure to GDP. It is used usually as an indicator of physical investment. According to the Keynesian proposition, government expenditure has the potential of increasing economic growth through exports. It may however, have an adverse effect on economic growth because of the crowding out effect on private investment and the inflationary pressures it could result in (Allen and Ndikumana 2000). The data was obtained from the 2017 edition of the World Development Indicators (WDI). It is expected that government expenditure has a positive effect on export performance (Asiedu 2006).

4.6.3 Credit to Private Sector (CPS)

Closely related to the efficiency and increased productive capacity of the main sectors of the economy is the supply of credit. Theoretically, credit to private sector is expected to increase export performance through chain reaction generated through interest rate, FDI and exchange rate. The data for credit to private sector was taken from the 2017 edition of the WDI. It is expected to have a favourable influence on export performance.

4.6.4 Foreign Direct Investment (FDI)

The fast pace at which the world is developing has enabled many countries to develop due to transfer of technology, imitation and technical know-how. It is argued that developing nations benefit through the replication of designs and technology from advanced nations or counterparts since it is relatively cheaper to imitate than to innovate. As argued by Grossman and Helpman (1991), FDI serves as a conduit for technological transfer to less advanced nations and has a visible impact on R&D which is evident in innovations by the developing nations thus, enhancing increased efficiency in the real sector. FDI was measured as a ratio of local currency depreciates (weakens against major trading currencies), exports become more attractive resulting in an increase in the volume of exports. Likewise, an appreciation (strengthens against major trading

currencies) of the local currency leads to exports being more expensive and unattractive, hence, a reduction in the volume of exports (Obeng 2017).

4.6.5 Inflation (INF)

Fundamentally, inflation measures the changes in the cost to the average consumer on goods and services over a specified period of time. It is used to capture macroeconomic instability in Ghana (Asiedu and Lien, 2004). Generally, higher levels of inflation are unattractive to foreign investors. This is because it increases the cost of borrowing and therefore, lowers the rate of capital investment. It is expected that lower levels of inflation which indicates stable macroeconomic environment stimulates growth and consequently, the volume of exports.

4.6.6 Tariff Rate (TAR)

This variable captures the degree to which the economy is open to the external world. Openness reflects how easy the country is able to import or export to other parts of the world. In this study, trade openness was proxied by the average annual tariff rate on exports. Trade openness used as a control variable in the study is supported by other studies (Adams 2009; Agbloyor et al. 2016). There is no obvious expectation of the sign of the coefficient for this variable; it could be positive or negative.

4.6.7 GDP Growth (GDPG)

GDP growth was measured by the average growth in real GDP representing the level of development of the country. It is expected to have a positive relationship with the volume of exports such that an increase in GDP will cause the volume of exports to increase. Also, exports are expected to decrease when GDP decreases.

4.6.8 Government Expenditure (GOV)

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4.7 Stationarity Tests

Time series analyses, requires that variables used be tested for their statistical properties. Regression encompassing non-stationary time series usually result in the problem of spurious regression. This is evident in the regression results revealing a high and significant association between variables. Besides, Stock and Watson (1988) have additionally demonstrated that the test statistics (t, F, DW, and R^2) are likely not to have standard distributions if there exist unit roots among variables in the model. If the means, variances and auto-covariances of a time series are not time dependent, they are considered stationary.

The study employed several stationarity tests. This was because of the inherent weaknesses exhibited by various techniques in checking or testing for stationarity. It became imperative to use different techniques in order to ensure that results were reliable. Philips-Perron (PP) test as well as Augmented Dickey Fuller (ADF) tests were employed. Both tests are similar, they just contrast in how autocorrelation is being corrected in the residuals. The PP nonparametric test simplifies the ADF technique, permitting for less restrictive expectations for the time series under study. The null hypothesis tested was that the variable under study had a unit root and the alternative was that the variable had no unit root. For each of the tests, the lag-length was selected using the Schwarz Information Criterion (SIC) and Akaike Information Criteria (AIC) for both techniques. The responses of ADF tests to lag selection renders the PP test an essential extra technique for making inductions about unit roots. The ADF is basically formulated as follows:

$$X_t = \mu + \alpha X_{t-1} + \gamma t + \varepsilon_t \quad (10)$$

Deducting X_{t-1} from each of the sides gives:

$$\Delta X_t = \mu + (1 - \alpha) X_{t-1} + \gamma t + \varepsilon_t \quad (11)$$

The t-test on the assessed coefficient of X_{t-1} offers the Dickey Fuller test for the existence of a unit-root. Adjusting the Dickey Fuller test gives the ADF test and this involves supplementing the equation

above with the dependent variables' lagged values. This is proposed to ensure that the error procedure in the estimating equation is residually uncorrelated, and further captures the probability that X_t is characterized by a higher order autoregressive process. Though the DF procedure is usually used in testing for unit roots, it relaxes the assumption that the errors are independent and identically distributed making it less desirable. Consequently, in adjusting for serial correlation, where $(1-\alpha)$ is represented byρ, the lagged first difference is added to equation (11) and this transforms the ADF test into the form below:

$$\Delta X_t = \mu + \rho X_{t-1} + \gamma\tau + \sum_{i=1}^{\rho} \emptyset_i \Delta X_{t-i} + \varepsilon_t \qquad (12)$$

Where Δ represents the first difference operator, X_t signifies the series at time t, μ, γ, $\emptyset$ represent the parameters being estimated and ε_t denotes the error term.

In the ADF and PP test the null hypothesis of the existence of unit root in the series is tested against the alternative hypothesis that the series is stationary.

Thus:

$H_0: \rho = 0$ (X_t is non-stationary) $\qquad$ $H_1: \rho \neq 0$ (X_t is stationary)

4.8 Estimation Technique

Autoregressive Distributed Lag (ARDL) Model

To investigate the long-run and also the dynamic relationships among the variables of interest empirically, the autoregressive distributed lag method by Pesaran, Shin, and Smith (2001) was employed.

The ARDL was employed in estimating the model because: First, the ARDL procedure is relatively the most appropriate and works effectively even in few sample data studies. Looking at the study period 1984–2016 (33years), it is relatively small therefore, ARDL is the best technique for such smaller samples. Second, the ARDL enables the estimation of the long-run relationships using the Ordinary Least Square method when the lag of the model is known. This nevertheless, cannot be said about other

multivariate cointegration processes such as the Johansen Cointegration Test (JCT) advanced by Johansen (Johansen 1991). The ARDL procedure is comparatively simple. In conclusion, the ARDL method does not require for the variables to be pretested in the model for the existence of unit root as it is being required by other methods such as the Johansen approach. It can be used irrespective of whether the regressors in the model are purely I(0), purely I(1) or mutually cointegrated.

Following Pesaran et al. (2001) as summarized in Choong, Yusop, and Liew (2005), the relationship between the variables of interest in the study can be expressed by using the ARDL approach for export performance and the real sector are as follows:

$$\Delta lnEXP = \delta_0 + \emptyset lnEXP_{t-1} + \alpha_1 lnGOV_{t-1} + \alpha_2 lnTAR_{t-1} + \alpha_3 lnCPS_{t-1} + \alpha_4 lnGDPG_{t-1} + \alpha_5 lnEXV_{t-1} + \sum_{i=1}^{\rho} \beta_1 \Delta lnEXP_{t-i} + \sum_{i=1}^{\rho} \beta_2 \Delta lnGOV_{t-i} + \sum_{i=1}^{\rho} \beta_3 \Delta lnTAR_{t-i} + \sum_{i=1}^{\rho} \beta_4 \Delta lnCPS_{t-i} + \sum_{i=1}^{\rho} \beta_5 \Delta lnGDPG_{t-i} + \sum_{i=1}^{\rho} \beta_6 \Delta lnEXV_{t-i} + \varepsilon_t \quad (13)$$

$$\Delta lnAGEX = \delta_0 + \emptyset lnAGEX_{t-1} + \gamma_1 lnGOV_{t-1} + \gamma_2 lnTAR_{t-1} + \gamma_3 lnCPS_{t-1} + \gamma_4 lnGDPG_{t-1} + \gamma_5 lnEXV_{t-1} + \sum_{i=1}^{\rho} \beta_1 \Delta lnAGEX_{t-i} + \sum_{i=1}^{\rho} \beta_2 \Delta lnGOV_{t-i} + \sum_{i=1}^{\rho} \beta_3 \Delta lnTAR_{t-i} + \sum_{i=1}^{\rho} \beta_4 \Delta lnCPS_{t-i} + \sum_{i=1}^{\rho} \beta_5 \Delta lnGDPG_{t-i} + \sum_{i=1}^{\rho} \beta_6 \Delta lnEXV_{t-i} + \varepsilon_t \quad (14)$$

$$\Delta lnINDEX = \delta_0 + \emptyset lnINDEX_{t-1} + \varphi_1 lnINF_{t-1} + \varphi_2 lnTAR_{t-1} + \varphi_3 lnCPS_{t-1} + \varphi_4 lnGDPG_{t-1} + \varphi_5 lnEXV_{t-1} + \varphi_6 lnGOV_{t-1} + \sum_{i=1}^{\rho} \beta_1 \Delta lnINDEX_{t-i} + \sum_{i=1}^{\rho} \beta_2 \Delta lnINF_{t-i} + \sum_{i=1}^{\rho} \beta_3 \Delta lnTAR_{t-i} + \sum_{i=1}^{\rho} \beta_4 \Delta lnCPS_{t-i} + \sum_{i=1}^{\rho} \beta_5 \Delta lnGDPG_{t-i} + \sum_{i=1}^{\rho} \beta_6 \Delta lnEXV_{t-i} + \sum_{i=1}^{\rho} \beta_7 \Delta lnGOV_{t-i} + \varepsilon_t + \varepsilon_t \quad (15)$$

$$\Delta lnSEREX = \delta_0 + \emptyset lnSEREX_{t-1} + {}^{\theta}{}_1 lnGOV_{t-1} + {}^{\theta}{}_2 lnTAR_{t-1} + {}^{\theta}{}_3 lnFDI_{t-1} + {}^{\theta}{}_4 lnGDPG_{t-1} + {}^{\theta}{}_5 lnEXV_{t-1} + \sum_{i=1}^{\rho} \beta_1 \Delta lnSEREX_{t-i} + \sum_{i=1}^{\rho} \beta_2 \Delta lnGOV_{t-i} + \sum_{i=1}^{\rho} \beta_3 \Delta lnTAR_{t-i} + \sum_{i=1}^{\rho} \beta_4 \Delta lnGOV_{t-i} + \sum_{i=1}^{\rho} \beta_5 \Delta lnGDPG_{t-i} + \sum_{i=1}^{\rho} \beta_6 \Delta lnEXV_{t-i} + + \varepsilon_t \quad (16)$$

Where, $\emptyset \; and \; \alpha_i$ denote the short run elasticities while β_i are the short run effects. Also, AGEX= Agricultural sector export to GDP, INDEX= Industrial sector export to GDP, SEREX = service sector export to GDP, and EXP = export to GDP.

4.9 Test for Cointegration

The ARDL long-run cointegration test, which is also referred to as the Bounds Test and developed by Pesaran, et al. (2001) was employed to test for the cointegration relationships between the series in the model. Cointegration is said to exit between at least two series if every one of the series considered independently is non-stationary with I(1), while their linear combination are stationary with I(0). When considering a multiple non-stationary time-series, there is a likelihood of more than one linear association to form a cointegration.

Having fulfilled the conditions that the variables were a mixture of I(0) or I(1), the ARDL bounds test was carried out. The bounds testing method fundamentally consists three steps. The first step was to estimate equation (10) by OLS so as to test for the presence or otherwise of a long-run relationship among the variables. The F-test for the joint significance of the coefficients of lagged levels of the variables was conducted.

The hypothesis would then be:

$H_0: \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = 0$

$H_1: \theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq \theta_5 \neq \theta_6 \neq 0$

The test which normalizes export performance (EXP) was denoted by

F_{EXP} $(EXP, GDPG, GOV, TAR, EXV, CPS)$ for model 1. By symmetry, the tests wg=hich normalizes models 2, 3 and 4 are as follows

F_{AGEX} $(EXP, GDPG, GOV, TAR, EXV, CPS)$ ……. ……...Model 2

F_{SEREX} $(SEREX, FDI\ GDPG, TAR, EXV, GOV)$…….Model 3

F_{INDEX} $(INDEX, INF, GDPG, GOV, TAR, EXV, CPS)$ ……..Model 4

Two asymptotic critical bounds values gives a test for long-run relationship when the independent variables are I(d) (where $0 \leq d \leq 1$): a lower value assuming the regressors are I(0) and an upper value assuming purely I(1) regressors.

Therefore, the null hypothesis which states that there is no long-run relationship among the series is rejected if the F-statistic is above the upper critical value, irrespective of the orders of integration. Alternatively, we fail to reject the null hypothesis if the F-statistic falls below the lower critical values. The results become inconclusive however, if the F-statistic is found between the lower and the upper critical values.

If cointegration is established in the second stage of the ARDL bounds approach, the short-run model for EXP_t (model 1) was estimated as follows:

$$\Delta lnEXP_t = \gamma + \sum_{i=l}^{\rho} \beta_{li}\, \Delta lnEXP_{t-i} + \sum_{f-1}^{n} \beta_{2f} \Delta lnGOV_{t-f} + \sum_{g-1}^{n} \beta_{3g} \Delta lnCPS_{t-g} +$$

$$\sum_{k-1}^{n} \beta_{4k} \Delta lnTAR + \sum_{j-1}^{n} \beta_{5j} \Delta lnGDPG_{t-1} + \sum_{t-r}^{n} \beta_{6r} \Delta lnEXV + \mu_t \qquad (17)$$

This involved the selection of orders of ARDL (p, q_1, q_2, q_3, q_4, q_5) model in the variables using AIC (Akaike, 1973). By symmetry, the long-run ARDL formulations for models 2, 3 and 4 follow the same process.

Finally, the Error Correction Model (ECM) is estimated to capture the short-run dynamics of the series given a shock or disequilibrium.

4.10 Error-Correction Model (ECM)

In times series analysis, Error Correction Models as well as cointegration concepts are jointly and frequently used to demonstrate the relationship between the series understudied. It is realised in essence that, with re-parameterization, the ECM is a standard VAR in first differences augmented by error-correction terms. An ECM helps in merging the long run, cointegrating relationship between the variables and the short-run association among the first differences of the variables. The notion regarding the error-correction model is that often, there exists cointegration between two economic variables. There may be imbalances in the short-run, though. The ECM is able to adjust for some proportion or percentage of the disequilibrium or shock in the next period.

Kremers, Ericsson, and Dolado (1992) and Bahmani-Oskooee (2001) argue that comparatively, the ECM is a more effective way to begin cointegration. Therefore, the study recognizes that the variables under study show evidence of modest response to equilibrium when shocked in the short-run. The error-correction procedure is therefore a way of reconciling the short-run and long-run behaviour of the variables.

The ECM was estimated as follows:

$$\Delta lnEXP_t = \gamma + \sum_{i=l}^{\rho} \beta_{li}\, \Delta lnEXP_{t-i} + \sum_{f-1}^{n} \beta_{2f} \Delta lnTAR_{t-f} + \sum_{g-1}^{n} \beta_{3g} \Delta lnGOV_{t-g} + \sum_{k-1}^{n} \beta_{4k} \Delta lnCPS_{t-k} + \sum_{j-1}^{n} \beta_{5j} \Delta lnGDPG_{t-1} + \sum_{t-r}^{n} \beta_{6r} \Delta lnEXV + \rho ECM_{t-1} + \mu_t \quad (18)$$

$$\Delta lnAGEX_t = \gamma + \sum_{i=l}^{\rho} \beta_{li}\, \Delta lnAGEX_{t-i} + \sum_{f-1}^{n} \beta_{2f} \Delta lnTAR_{t-f} + \sum_{g-1}^{n} \beta_{3g} \Delta lnGOV_{t-g} + \sum_{k-1}^{n} \beta_{4k} \Delta lnCPS_{t-k} + \sum_{j-1}^{n} \beta_{5j} \Delta lnGDPG_{t-1} + \sum_{t-r}^{n} \beta_{6r} \Delta lnEXV + \rho ECM_{t-1} + \mu_t \quad (19)$$

$$\Delta lnINDEX_t = \gamma + \sum_{i=l}^{\rho} \beta_{li}\, \Delta lnINDEX_{t-i} + \sum_{f-1}^{n} \beta_{2q} \Delta lnINF_{t-q} + \sum_{f-1}^{n} \beta_{3f} \Delta lnTAR_{t-f} + \sum_{g-1}^{n} \beta_{4g} \Delta lnGOV_{t-g} + \sum_{k-1}^{n} \beta_{5k} \Delta lnCPS_{t-k} + \sum_{j-1}^{n} \beta_{6j} \Delta lnGDPG_{t-1} + \sum_{t-r}^{n} \beta_{7r} \Delta lnEXV + \rho ECM_{t-1} + \mu_t \quad (20)$$

$$\Delta lnSEREX_t = \gamma + \sum_{i=l}^{\rho} \beta_{li}\, \Delta lnSEREX_{t-i} + \sum_{f-1}^{n} \beta_{2f} \Delta lnTAR_{t-f} + \sum_{g-1}^{n} \beta_{3g} \Delta lnGOV_{t-g} +$$

$$\sum_{k-1}^{n} \beta_{4k} \Delta lnFDI + \sum_{j-1}^{n} \beta_{5j} \Delta lnGDPG_{t-1} + \sum_{t-r}^{n} \beta_{6r} \Delta lnEXV + \rho ECM_{t-1} + \mu_t \quad (21)$$

From equation (18), $\boldsymbol{\rho}$ represents how the model converges to equilibrium through the short-run dynamic coefficients. ECT_{t-1} represents the Error Correction term. The coefficient of the ECT, ρ, captures the speed with which adjustments could occur to reach equilibrium in the event of shocks to the system. The absolute magnitude of the error term, ECT_{t-1}, depicts how quickly the model can adjust in the long-run equilibrium when it experiences disequilibrium or shock.

4.11 Data Analysis

The study employed descriptive and quantitative analysis. Graphs and tables were also used to assist in the descriptive analysis. Stationarity test procedures were specified. Moreover, the study adapted the bounds testing approach of cointegration to attain both the short-term and long-term effects of the variables under study. All estimations were done utilizing Eviews.

4.12 Chapter Summary

This chapter exhibited the procedural structure used in the study. The model was produced using theoretical formulations of the neo-classical theory. Annual time-series data on GDP Growth, Government Expenditure on Infrastructure, Foreign Direct Investment, Inflation, Tariff Rate and Credit to Private Sector from 1984 to 2016 were used for the study. The study also carried out the stationarity test using ADF and PP tests. The bounds test approach to cointegration was further employed to determine the presence or otherwise of long run relationship between exchange rate movements and exports performance.

CHAPTER FIVE

ANALYSIS AND DISCUSSION OF RESULTS

5.1 Introduction

The chapter presents and discusses the findings from the study. The purpose was to understand how exchange rate volatility relates with export performance in Ghana. The study first tested for the stationarity status of the variables using the ADF and PP tests and further tested for cointegration using the ARDL bounds testing approach.

5.2 Descriptive Statistics

Table 5.1: Descriptive Statistics

	EXP	EXV	GDPG	GOV	TAR	CPS
Mean	29.12322	0.003086	5.583323	112.6060	10.28970	10.46138
Median	29.47672	-0.120950	4.985866	112.4222	10.00000	11.88439
Maximum	48.80226	2.091533	14.04600	125.2731	16.20000	20.44463
Minimum	8.044027	-0.622950	3.300000	102.7266	5.000000	2.209409
Std. Dev.	10.73655	0.522941	2.175458	5.530051	2.991934	5.694196
Skewness	-0.105384	2.180826	2.133785	0.138949	0.012554	0.073960
Kurtosis	1.968991	9.156771	8.215934	2.492816	2.306164	1.659959
J. Bera	1.522679	78.27853	62.44992	0.459887	0.662804	2.499185
Pro	0.467040	0.000000	0.000000	0.794578	0.717917	0.286622
Sum	961.0662	0.101854	184.2496	3715.999	339.5600	345.2256
SS Dev.	3688.754	8.750955	151.4438	978.6067	286.4535	1037.564
Obs	33	33	33	33	33	33

Note: SS Dev. represents Sum of Squared Deviation, Std Dev. represents Standard Deviation, J. Bera represents Jarque Bera, Prob represents Probability, while Obs stands for Observation. EXP represents Exports, EXV represents Exchange rate volatility, GDPG represents GDP Growth, GOV represents Government Expenditure on Infrastructure, TAR represents Tariff rate and CPS represents Credit to Private Sector. Source: Author's Computation.

The descriptive statistics of the variables involved in the estimation of the four models are presented here. The descriptive statistics is based on the true values (level) of the variables. Included in the descriptive statistics are the mean, median, standard deviation among others as shown above.

It could be seen from Table 5.1 that every one of the variables have positive means and medians except for exchange rate volatility. This is normal considering the series involved. For instance, the mean of export performance (EXP) is approximately 29 percent while tariff rate (TAR) averaged 10 percent over the study period. The average GDPG of Ghana over the study period was also approximately 6 percent. Also, the negligible deviance of the variables from their means represented by the standard deviation denotes the slow variations of the variables over the study period. Based on the Jarque-Bera statistic, we fail to reject the null hypothesis that all the series emanate from a normally distributed random process. In a similar vein, the descriptive statistics for models 2, 3 and 4 are presented in Appendix A, B and C respectively.

Moreover, in terms of skewness, the descriptive statistics show that all the variables are positive suggesting that most of the values are more than their means. Furthermore, the standard deviation of the variables from their means are quite low when compared with their respective means, with the exception of exchange rate volatility. This is normal considering the fact that the variables change easily depending on the nature and extent of instability in the goods market at any point in time.

5.3 Evidence of Real Exchange Rate Volatility in Ghana

As shown in the ARCH test results, there is evidence of ARCH effect in the exchange rate series used for the study (Appendix D). The coefficient of the squared residuals for the series is significant at 1 percent. The intuition of this result is that the real exchange rate covers time varying effect, hence, linear models cannot credibly clarify its behavioural pattern. Hence, there is a justification for using GARCH models for estimating the volatility in the exchange rate.

The ARCH test (Appendix D) provides proof of high and persistent volatility in the exchange rate. The coefficient, β, which denotes the effect of new shocks on volatility, and parameter, α, which captures the tenacity of volatility shocks, are both significant at 1 percent. The addition of the coefficients of α and β are approximately one indicating that the volatility is highly persistent. This signifies the existence of volatility clustering. The evidence fits that of models 2, 3 and 4. Moreover, the ARCH [1] which is the serial LM test shows that serial correlation does not exist in the residuals.

5.4 Stationarity Test Results

Even though the cointegration technique used for this study does not necessitate pre-testing for the existence of unit root in the variables, it is necessary though, to have the test conducted in order to confirm that the variables are not unified of an order higher than one. This will help in avoiding spurious regression and confirm that there is no integration among a number of the variables at a higher order.

The unit root tests were conducted using the ADF and the PP tests to examine the statistical properties of the variables. This was to establish whether the variables were integrated at any order. The test included an intercept and time trend in the model to ensure the order of integration. The Schawrtz-Bayesian Criteria (SBC) was employed to ascertain the optimal number of lags included in the test. The unit root decision was made using the P-values. This was to either reject the null hypothesis which stated that the series had unit root or fail to reject the null hypothesis if otherwise.

Tables 5.2 and 5.3 represent respectively, the results of the ADF and PP tests. Based on the results, the null hypothesis is rejected and this is based on MacKinnon, Lockwood and Williams (2004) critical values and also the probability values.

Table 5.2: Stationarity Test Results

Variables	Statistics		First Difference			
	ADF-Statistics	PPF-Statistics	ADF-Statistics	I(0)	PPF-Statistics	
LEXP	-2.4886	-3.1706	-7.3034***	I(0)	-7.4866***	I(1)
LTAR	-2.0136	-1.3894	-5.0645***	I(0)	-3.5787**	I(1)
LINF	-3.4767**	-4.0251**	-4.5805***	I(0)	-15.7639***	I(0)
LCPS	-3.0981**	-1.7776	-6.3926***	I(0)	-6.2502***	I(1)
LGOV	-1.08972	-2.8745	-5.3079***	I(1)	-6.1668***	I(1)
LGDPG	3.5970	0.4542	-3.0170**	I(1)	-3.7210**	I(1)
LEXV	-4.3886***	-4.1935**	-7.3652***	I(0)	-19.858***	I(0)
LFDI	-4.4767**	-3.1727**	-3.1815	I(0)	-4.8105***	I(0)
LAGEX	-3.1511**	-2.0181	-3.2136***	I(0)	-2.9136	I(0)
LINDEX	-4.1306	-5.7106***	-5.6135***	I(0)	-4.7165***	I(1)

*Note: ***, **, * shows the rejection of the null hypothesis of unit root at 1%, 5%, 10% significant levels respectively, Δ signifies the first difference, BW is the Band Width and I(0) is the lag order of integration. The values in parenthesis are the P-values, LEXP represents log of Exports, LTAR represents log of Tariff rate, LINF represents log of Inflation, LCPS represents log of Credit to Private Sector, LGOV represents log of Government expenditure on Infrastructure, LGDPG represents log of GDP Growth, LEXV represents log of Exchange rate volatility, LFDI represents log of Foreign Direct Investment, LAGEX represents log of Agricultural Export, LINDEX represents log of Industrial Export. Source: Author's Computation*

Based on the stationarity test results in Table 5.2, the p-values of the ADF were statistically not significant at any of the levels of significance, the null hypothesis of the existence of unit root cannot be rejected, except for the log of technology (LTECH), exchange rate volatility (EXV) and inflation (LINF) which were significant at 5 percent or 10 percent levels of significance. Nonetheless, all the variables turn out to be stationary at first difference. Hence, the null hypothesis that there exist unit root is rejected at 1 percent level of significance for all the estimates except for tariff rate which was stationary at 5 percent.

Table 5.2 presents the test for the existence of unit root with trend and intercept using the PP test. Based on the results for the p-values for most of the variables, the null hypothesis of the existence of unit root cannot be rejected since the PP statistics were statistically not significant except for exchange rate volatility (EXV) and inflation (INF) which were stationary at 5 percent levels of significance. The variables however, became stationary at first difference and became statistically significant at 1 percent and 5 percent levels of significance. The ADF test and the PP test in Table 5.2 are in agreement and show that a number of the variables are integrated of order one, I(1), with intercept and time trend in the model. Hence, the evidence that the variables were integrated of order zero, I(0), or order one, I(1).

5.4 Cointegration Analysis

This section presents how export relates with exchange rate volatility and the other control variables in the long-run.

Table 5.3: Cointegration results using Bounds Test

Critical Value Bound of the F-statistic: intercept and no trend

K	90% Level		95% Level		99% Level	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
6	1.99	2.94	2.27	3.28	2.88	3.99

F-Statistics: F_{EXP}(LEXP|LCPS, LGDPG, LGOV, LTAR, LEXV)= 5.5561***

Source: Author's Computation

Since the study had the objective of establishing how exchange rate movements relate with exports performance, it was necessary that the presence of long-run equilibrium association among these variables be tested for using the bounds testing approach to cointegration. As argued by Pesaran et al. (2001), a lag length of 2 for annual data was used in the bounds test. After conducting the bounds test,

the F-test for the joint significance of the variables was conducted as well as individually and a regression was run.

Also, it was necessary to test for the joint null hypothesis that the coefficients of the lagged levels are zero using the F-statistics, indicating that no long run relationship exists between them. The results of the F-statistics using ARDL-OLS regression are shown in Table 5.3.

In Table 5.3, based on the decision rule of the F-statistics, the joint null hypothesis was rejected at 5 percent level of significance. Also, since the computed F-statistics for F_{LEXP} (.) = 5.5561 exceeded the upper bound's critical value of (3.99) at 1 percent level of significance, the null hypothesis of no cointegration (i.e. long run relationship) between export performance and its regressors was rejected. F_{LEXP}(LEXP|LEXV, LTAR, LCPS, LGDPG, LGOV) = 5.5561. The cointegration tests for the other models (2, 3 and 4) were reported in Appendices E, F and G.

This result indicates that there is a unique cointegration association among the variables in Ghana's export performance and that all the factors of export performance can be treated as the 'long-run forcing' variables for the description of export performance in Ghana. Hence, cointegration can be said to exist between the variables in the export performance equation.

5.5 Long-run and Short-run Estimates of the relationship between export performance, exchange rate volatility and other control variables (Model 1)

Table 5.4 shows the long run relationship based on the Schwartz Bayesian Criteria (SBC). The ARDL passes the standard diagnostic test (serial correlation, functional form, normality and heteroscedasticity) as it is presented in Table 5.4.

Table 5.4: Long Run and Short-Run effects of exchange rate volatility on exports (Model 1)

	ARDL	
Variable	Short Run	Long-run
LEXV	-0.1019***	-0.1944*
	(0.0498)	(0.1117)
LTAR	-0.2734**	-0.1628*
	(0.1266)	(0.2252)
LGOV	0.2066***	0.2923
	(0.0758)	(0.2408)
LGOV(-1)	0.1416*	-
	(0.0744)	-
LGDPG	0.7240	0.1037**
	(0.9559)	(0.0521)
LGDPG(-1)	0.6258	
	(0.9994)	
LCPS	0.5111*	1.1462
	(0.2988)	(0.9357)
CONS	-	1.2809
		(6.9715)
ECT(-1)	-0.5399***	-
	(0.1084)	-
R^2	0.9118	-
Adjusted R^2	0.8580	-
DW Statistic	1.9605	-

*Note ***, ** and * denotes 1%, 5% and 10% level of significance respectively.*
Standard errors are in parenthesis, LEXP represents log of Exports, LTAR represents log of Tariff rate LCPS represents log of Credit to Private Sector, LGOV represents log of Government expenditure on Infrastructure, LGDPG represents log of GDP Growth, LEXV represents log of Exchange rate volatility, ECT represents Error correction term.
Source: Authors' Computation from WDI data

5.5.1 Long Run Results (with the Log of Exports (LEXP) as the Dependent Variable)

The long-run findings show that exchange rate volatility is disadvantageous to export performance in Ghana. The coefficient of exchange rate volatility is negative and statistically significant at 10 percent. With a coefficient of -0.1944, it illustrates that an increase in the volatility of real effective exchange rate of Ghana by 1 percent leads to approximately 0.19 percent reduction in export performance. Exchange rate volatility is considered in this perspective as a risk to trade. Ideally, exchange rate volatility affects export performance through trade. The result has theoretical underpinning in that the more the real exchange rate of a country becomes volatile, the more trade becomes risky and for a small open economy like Ghana, its consequence is felt on export performance, foreign exchange and real output.

The result concurs that of Eichengreen (2008); Adamu (2005); Mordi (2006) and Ahortor, Conte, Sissoho, and Tarawalie (2013) as cited in Obeng (2017). Adamu (2005) for instance, examines the effect of exchange rate volatility on private investment which is a component of EXP and confirms an adverse effect. Mordi (2006) employs GARCH model and argues that the inability of a country to manage exchange rates appropriately can result in distortions in consumption and production patterns and also, excessive currency fluctuations can create risks which can destabilize the economy. This implies that the effect of exchange rate movements on export performance cannot be undermined therefore, cannot be overlooked. It also shows that in investigating the effect of international trade, it is imperative to consider the impact of exchange rate movements. The result however, contradicts the findings of Pindyck (1982) who asserts that volatility could be profitable to firms and the entire economy.

From the result in Table 5.4, the coefficient of trade openness of -0.1628 demonstrates that a 1 percent rise in openness to trade results in a decline in export performance by approximately 0.16 percent in the long run, ceteris paribus. The finding is also statistically significant at 10 percent. Tariff rate is ambiguous in terms of its relationship with export performance depending on the level of economic development among others. Openness to trade is often expected to increase export performance through conduits such as access to innovative technology from abroad, more access to a variety of factors of production, access to broader markets and increased local production through enhanced specialization. Conversely, the results show that tariff rate has a harmful effect on export performance revealing the import depending nature of the Ghanaian economy.

The result is not a surprise to the Ghanaian economy since most businesses are often affected by trade liberalisation because of the importation of relatively cheaper commodities. As a result, most indigenous industries end up being crippled by imported commodities. The Komenda sugar factory, Kumasi jute factory, Zuarungu meat processing factory, Bolgatanga rice mills, Pwalugu tomato canning factory and Wenchi tomato factory are a few examples of local factories that have folded up due to a number of factors including keen competition from imported products. This means that increased trade openness

has been impacting adversely on export performance over the study period. Rodrik (2008) suggests that trade liberalization must be complemented by complementary adjustment policies, principally, macroeconomic reforms and must be strict enough to be effective. There also has to be the adoption of conditions that will ensure no adverse effect on fiscal balances, if not, alternative and expedient ways of resolving the imbalances should be put in place.

Also, in relation to GDP growth which has a coefficient of 0.1037, it indicates that as GDP growth improves by 1 percentage point, export performance increases by approximately 0.10 percent. Statistically significant at 5 percent, the coefficient of GDP growth carried the expected positive sign. This means that exports improve as real GDP increases. A plausible reason is the increased capacity of the country to produce more for domestic and international consumers. This result is not startling giving that real output in the Ghanaian economy has improved especially due to crude oil exploration. Accordingly, the trade balance has improved leading to improved performance on the Exports. A review of studies on export performance in developing countries reveals a positive association between growth in income and export.

However, Bird and Vaillancourt (2008) have also argued that export performance decline in low income countries even though nominal value of GDP growth improves because it does not realistically depict the improvement in the productive capacity of most imported goods. The finding supports that of Joseph et al (2011) who found that GDP growth exerts a significant influence on export and foreign exchange reserves.

In addition, the results show that the coefficient of credit to private sector is positive signaling a favourable influence on Export performance. Unfortunately, Credit to private sector is not statistically significant and has a coefficient of 1.1462. The result concurs with the findings of Umer et al. (2010) who found that, credit to private sector does not play an overwhelming role in determining Pakistan's export and concluded that the export is not a purely monetary phenomenon. Same can be said about Fleermuys (2005) who concluded that money supply has insignificant effect on Namibia's balance of

trade. The result also concurs with that of Tijani (2014) and Danjuma (2013) who determined whether excess money supply played a significant role in the disequilibrium of export performance in Nigeria during the period 1986-2010. They found that money supply has an insignificant impact on Nigeria's balance of trade.

Also, the coefficient of technology proxied by government expenditure on infrastructure had the expected positive sign but is statistically not significant. Although an increase in technology is expected to improve the export position, the result is not surprising, considering the nature and trail of production in Ghana, which is dominated by primary commodities of cocoa, gold, diamond and recently crude oil, largely dictated by external forces. Government expenditure on infrastructure has been on the increase in Ghana over time and propels production in the real sector especially the agricultural sector which is mostly practiced in remote areas.

5.5.2 Short Run Results (with the Log of Exports (LEXP) as the Dependent Variable)

Some model descriptive statistics can be found in Table 5.4. It can be observed that the adjusted R^2 is about 0.86 which means that nearly 86 percent of the variations in export performance is accounted for by the regressors. Moreover, a DW-statistics of roughly 1.96 shows that there is no autocorrelation in the residuals.

The negative coefficient of the ECT is a sign that any disturbance that occurs in the short-run will be corrected in the long-run. The rule of thumb has it that as the error correction coefficient (in absolute terms), becomes bigger, the variables equilibrate faster in the long-run when shocked (Acheampong, 2007). The finding indicated that the coefficient of the lagged error correction term, ECT (-1), shows the expected negative sign (-0.5399) and is statistically significant at 1 percent. This means that approximately 54 percent of the shocks caused by previous year converges back to the long run equilibrium in the current year.

The short run dynamics reveal that exchange rate movements are harmful to export performance in Ghana. The results in response to the first hypothesis in the short-run dynamics show that the coefficient of exchange rate volatility is negative and statistically significant at 1 percent. With a coefficient of -0.1019, it means that an increase in the volatility of real effective exchange rate of Ghana by 1 percent leads to approximately 0.1 percent drop in export performance.

In this study, exchange rate volatility affects export through merchandized trade and investment. Theoretically, the result indicates that the more the real exchange rate become volatile, the more trade becomes risky affecting exports performance, foreign exchange and real output. By employing the GARCH model, Mordi, (2006) argues that when exchange rates are not properly managed, it can result in macroeconomic instability. It also shows that in investigating the effect of international trade, it is necessary to consider the impact of exchange rate volatility since it has implications on trade.

The coefficient of previous year's GDP growth had the expected positive sign and is statistically significant at 5 percent. With a coefficient of 0.6258, it follows that as GDP growth rises by 1 percent, the export performance rises by approximately 0.6 percent, everything else held constant. This reaffirms the quest for developing countries like Ghana to improve its GDP growth by ensuring a sustained economic growth while controlling population growth. The result backs the assertion that as countries develop, export performance improves more than proportionately to the growth in income.

Furthermore, the contemporaneous results show that tariff rate has a suppressing impact on export in Ghana. The coefficient of tariff rate of -0.2734 means that a 1 percent increase in openness to trade results in a drop in export performance by nearly 0.27 percent. The effect is statistically significant at 5 percent. Tariff rate proxying for trade openness is expected to raise export performance because of factors such as access to broader markets and enhanced efficiency in production. The results in this study are however, contrary and as such point to the ambiguous nature of trade openness in terms of its effect. Openness to trade rather has a harmful effect on export performance. This is not surprising because most businesses in Ghana are unable to expand because of keen competition from foreign

counterparts as trade liberalisation encourages the importation of relatively inexpensive goods as compared to domestically manufactured ones.

As a result, several industries are out of business and are dormant to say the least. The findings of this study concurs that of Pupongsak, (2010) and Nwosa, Saibu, and Fakunle, (2012) who concluded that trade liberalization when accompanied by the appropriate macroeconomic policies enhances the overall export performance in the short run.

In addition, the coefficient of credit to private sector is positive and statistically significant indicating a favourable effect on Ghana's export. Credit to private sector is statistically significant at 10 percent with a coefficient of 0.5111 indicating an increase in export performance of approximately 0.51 percent if there is a 1 percent increase in money supply. The result concurs that of Danjuma (2013) who determined whether credit to private sector played a significant role in the disequilibrium of export performance in Nigeria during the period 1986-2010. He concluded that credit to private sector had a significant effect on Nigeria's Export performances. Imoisi, Olatunji and Ekpenyong (2013) also found a positive and significant effect of credit to private sector on Nigeria's Export. On the flip side, Umer, et al. (2010) found that credit to private sector did not play an overwhelming role in determining Pakistan's export. Same can be said about Fleermuys (2005) who concluded that credit to private sector has insignificant effect on Namibia's balance of trade.

The coefficient of government expenditure on infrastructure had the predicted positive sign and is statistically significant at 1 percent. With a coefficient of 0.2066, the result shows that as technology increases by 1 percent, the export performance increases by approximately 0.21 percent. Intuitively, the coefficient means that an increase in technology would yield an improved export due to improved productive capacity. The finding is in line with that of Imoisi, Olatunji and Ekpenyong (2013) who found a positive and significant effect of technology on Nigeria's balance of trade.

5.5.3 Results of the relationship between Agricultural exports, exchange rate volatility and other control variables (Model 2)

Long-run and short-run estimates of Model 2 (with the Log of Agricultural Export (LAGEX) as the Dependent Variable).

The presence of cointegration among the variables led to estimation of the long-run relationships among the variables. The results for model 2 which was set out to estimate the effect of exchange rate volatility on agricultural sector's export is presented in Table 5.6.

Table 5.6: Long Run and Short-Run effects of exchange rate volatility on agricultural exports (Model 2)

	ARDL	
Variable	Short Run	Long-run
LAGEX(-1)	0.2405	
	(0.1548)	-
LEXV	-0.2395**	-0.3419***
	(0.1142)	(0.1159)
LEXV(-1)	-0.2975**	-
	(0.1212)	-
LTAR	-0.1716	-0.3813***
	(0.1996)	(0.1170)
LGOV	0.6252***	1.2006
	(0.0758)	(1.1492)
LGOV(-1)	0.1416*	-
	(0.0744) -	
LGDPG	-0.3850***	0.0175
	(0.1489)	(0.2232)
LCPS	0.1783	0.6882***
	(0.2258)	(0.2403)
CONS	-	22.6433
		(15.876)
ECT(-1)	-0.2464***	-
	(0.0381)	-
R^2	0.8124	-
Adjusted R^2	0.7313	-
DW Statistic	1.9312	-

*Note ***, ** and * denotes 1%, 5% and 10% level of significance respectively. LAGEX is log of agricultural export, LEXP represents log of Exports, LTAR represents log of Tariff rate, LCPS represents log of Credit to Private Sector, LGOV represents log of Government expenditure on Infrastructure, LGDPG represents log of GDP Growth, LEXV represents log of Exchange rate volatility, ECT represents Error Correction Term. Standard errors are in parenthesis, Source: Authors' Computation.*

The results indicate that real effective exchange rate volatility (EXV) is significant at 5 percent and it has the expected sign. Specifically, in the short-run, a 1 percent increase in real effective exchange rate

volatility will cause a fall in agricultural sector exports by approximately 0.24 percent while long run volatility causes a reduction in agricultural export by approximately 0.30 percent. The finding concurs that of Kamuganga (2012) and Goya (2014) who found that real effective exchange rate volatility had a negative effect on export. The finding is however inconsistent with that of Agosin, Alvarez and Bravo-Ortega (2009) who argued that exchange rate volatility has insignificant effect on export performance.

The coefficient of GDP growth (GDPG) which is a proxy for the level of development had a positive and statistically significant effect on agricultural sector export only in the long-run. From intuition, increases in income should lead to increased production for exports. The study confirms the findings of Elhiraika and Mbate (2014). Also, government expenditure on infrastructure (LGOV), a proxy for investment, was significant at 1 percent level of significance only in the short run. The coefficient of credit to private sector (LCPS) was also significant only in the long-run at 1 percent level of significance and it carries the expected positive sign. Moreover, we find that tariff rate (LTAR), a proxy for trade openness had a negative effect on the agricultural export sector in Ghana only in the long-run and at 1 percent level of significance.

5.5.4 Results of the relationship between Services export, exchange rate volatility and other control variables (Model 3)

Long-run and Short-run Estimates of Model 3 (with the Log of Services Export (LSEREX) as the Dependent Variable)

The results for model 3 which was set out to estimate the effect of exchange rate volatility on service sector exports is presented in Table 5.7.

Table 5.7: Long-Run and Short-Run effects of exchange rate volatility on services export (Model 3)

	ARDL	
Variable	Short Run	Long-run
LSEREX(-1)	0.8776***	
	(0.1480)	-
LEXV	0.1368***	-0.3622***
	(0.0460)	(0.1212)
LEXV(-1)	-0.1787**	-
	(0.0815)	-
LTAR	-0.9038***	-0.7168***
	(0.2261)	(0.2187)
LGOV	-0.1045	0.2708
	(0.1134)	(0.2364)
LGDPG	0.1365	0.2997**
	(0.1489)	(0.1533)
LFDI	0.3066***	0.0693
	(0.0704)	(0.0754)
LFDI(-1)	0.3048***	-
	(0.0804)	-
CONS	-	1.1729**
	-	(0.5784)
ECT(-1)	-0.4139***	-
	(0.0601)	-
R^2	0.7215	-
Adjusted R^2	0.6351	-
DW Statistic	1.8901	-

*Note ***, ** and * denotes 1%, 5% and 10% level of significance respectively. LSEREX is log of services export, LEXP represents log of Exports, LTAR represents log of Tariff rate, LCPS represents log of Credit to Private Sector, LGOV represents log of Government expenditure on Infrastructure, LGDPG represents log of GDP Growth, LEXV represents log of Exchange rate volatility, LFDI represents log of Foreign Direct Investment, ECT represents Error Correction term. Source: Authors' Computation.*

We found that but for the short-run, real effective exchange rate volatility (EXV) had the expected negative effect on the service sector export in all the periods at 1percent level of significance. Specifically, in the short-run, a 1 percent increase in real effective exchange rate volatility causes an increase in the service sector's export by approximately 0.14 percent while previous year's volatility causes a reduction in service sector export by approximately 0.18 percent and 0.36 percent in the long-run. The finding supports that of Kamuganga (2012) and Goya (2014) who found a negative relationship between real effective exchange rate volatility and export. The finding is however inconsistent with that of Agosin, Alvarez and Bravo-Ortega (2009).

Furthermore, GDP growth (GDPG) had a positive and statistically significant influence on the service sector's export only in the long-run. Also, government expenditure on infrastructure (LGOV) carried the appropriate sign in the long-run. Moreover, foreign direct investment (LFDI) was also significant in both periods at various levels of significance and they carried the expected positive signs. In addition, the result shows that tariff rate (LTAR) capturing trade openness has a deleterious effect the service sector exports in Ghana in both the long-run and short-run at 5 percent level of significance. Lastly, the result shows that previous year's level of service sector export propels the sector to achieve better export of approximately 0.88 percent at a significant level of 1 percent.

5.5.5 Result of the relationship between Industrial export, exchange rate volatility and other control variables (Model 4).

Long-run and Short-run Estimates of Model 4 (with the Log of Industrial Export (LINDEX) as the Dependent Variable). The results for model 4 which was set out to estimate the effect of exchange rate volatility on industrial sector's export is presented in Table 5.8.

Table 5.8: Long-Run and Short-Run effects of exchange rate volatility on Industrial export (Model 4)

	ARDL	
Variable	Short Run	Long-run
LINDEX(-1)	0.0478*	-
	(0.0250)	-
LINF	-0.2145	-0.6383
	(0.3321)	(0.9704)
LEXV	-0.4956***	-0.8480***
	(0.0946)	(0.1559)
LEXV(-1)	-0.2430***	-
	(0.0491)	-
LGDPG	0.6837**	0.6227***
	(0.3582)	(0.1458)
LTAR	-0.3734**	-0.3078***
	(0.1575)	(0.1104)
LCPS	0.5433***	0.8546***
	(0.1206)	(0.2649)
LGOV	0.0077***	0.0132***
	(0.0014)	(0.0033)
CONS	-	-4.0153***
		(1.1242)
ECT(-1)	-0.3717***	-
	(0.1170)	-
R^2	0.6118	-
Adjusted R^2	0.5580	-
DW Statistic	1.9905	-

*Note ***, ** and * denotes 1%, 5% and 10% level of significance respectively. LINDEX is log of industrial sector export, LEXP represents log of Exports, LTAR represents log of Tariff rate, LINF represents log of Inflation, LCPS represents log of Credit to Private Sector, LGOV represents log of Government expenditure on Infrastructure, LGDPG represents log of GDP Growth, LEXV represents log of Exchange rate volatility, ECT represents error correction term. Source: Authors' Computation.*

It was found that effective exchange rate volatility (EXV) had the expected effect on industrial sector exports in both the long-run and short-run as well as the previous year at various levels of significance and it had the expected sign. Specifically, in the short-run, a 1 percent increase in real effective exchange rate volatility will cause a fall in industrial sector's export by approximately 0.5 percent while previous year's volatility causes a reduction in industrial export by approximately 0.24 percent in the short-run. The finding agrees with that of Kamuganga (2012) and Goya (2014) who found a negative relationship between real effective rate volatility and export. The finding is however inconsistent with that of Agosin, Alvarez, and Bravo-Ortega (2009).

Also, GDP growth (GDPG) had a positive and statistically significant influence on industrial sector's export only in the long-run. Also, government expenditure on infrastructure (LGOV) carried the

appropriate sign and were significant at 1 percent level of significance in both the short-run and long-run. Moreover, credit to private sector (LCPS) was also significant in both periods at 1 percent levels of significance and it carries the expected positive sign. In addition, the result shows that tariff rate (LTAR), capturing trade openness has a deleterious effect on industrial sector's export in both the long-run and short-run at 1 and 5 percent significant levels respectively. Lastly, the result shows that previous year's level of industrial sector export propels the sector to achieve better export approximately 0.05 percent at a significant level of 10 percent.

5.6 Post Estimation (Model Diagnostic) Tests

Diagnostic tests were conducted for the model. Table 5.9 below presents the summary of the results of the various tests.

Table 5.9: Diagnostic Tests

Test	Chi/F Version
Serial Correlation	F (2, 16) = 0.6610[0.5484]
Functional Form	F (1, 17) = 0.0225 [0.8821]
Normality	CHSQ(2) = 0.6320[0.7290]
Heteroscedasticity	F (11, 18) = 0.3705[0.9359]

Source: Author's Computation

The tests show that the models passed the Lagrangean Multiplier test of residual serial correlation among variables. The models also passed the tests for misspecification using square of the fitted values as well as the normality test. Again, the ARDL model passed the test for heteroscedasticity.

Table 5.9 also specifically presents the Breusch-Goddfrey Serial Correlation LM test for the existence of autocorrelation. The p-value of the results show 0.5284, approximately 53 percent is greater than the critical value of 0.05 (5%). This means non-existence of autocorrelation. The results of the white heteroscedasticity test above show the p-value of about 0.9359, approximately 94 percent which is greater than the critical value of 0.05 or 5 percent. This means non-existence of heteroscedasticity. The Ramey RESET test is also presented in Table 5.7 and shows a p-value of approximately 88 percent

(0.8821) and is greater than the critical value of 0.05 or 5 percent which means the linear model is suitable. The diagnostic tests for the other models (2, 3 and 4) are reported in Appendix H.

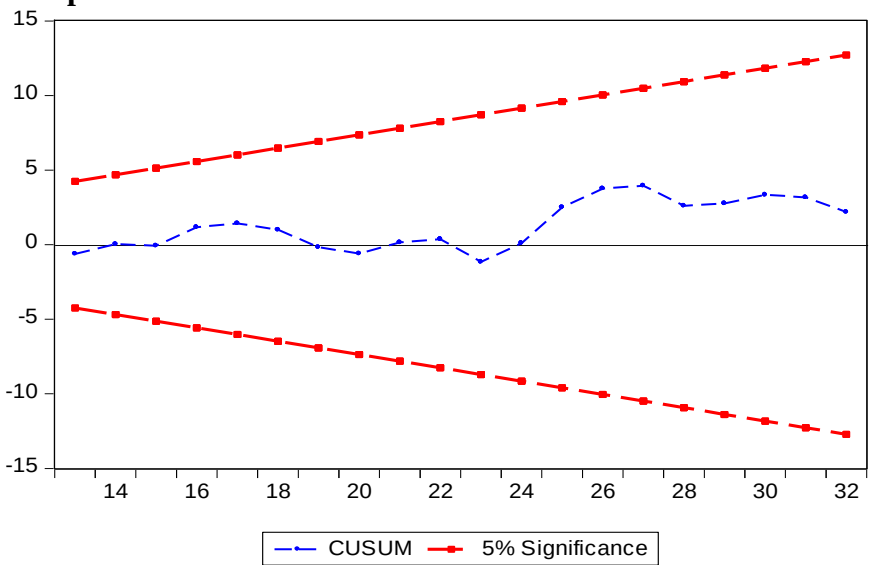
5.7 Stability Tests

Pesaran, Smith and Yeo (1985) propose that stability test for parameters be done using cumulative sum of recursive residuals (CUSUM) as well as cumulative sum of squares of recursive residuals (CUSUMSQ) and adds that plots be performed after the estimations. To eradicate any bias that may be found in the results of the model due to unstable parameters, it is important to perform the stability test.

Figures 5.1 and 5.2 respectively show results of CUSUM and CUSUMSQ. According to Bahmani-Oskooee and Nasir (2004) the null hypothesis states that, the coefficient vector is the same in every period while the alternative is that it is not. The CUSUM and CUSUMSQ statistics are plotted against the critical bound of 5 percent significant level. If the plot of the statistics falls within the critical bound of 5 percent significant level, the null hypothesis that, all coefficients are stable cannot be rejected.

The plot of CUSUM for the estimated ARDL model is shown in Figure 3. Since the plots of all coefficients fall within the critical bounds at 5 percent level of significance, it depicts the absence of instability of the coefficients and this clearly shows convergence. In the same way, the stability tests for models 2, 3 and 4 are reported in Appendix I, J and K respectively.

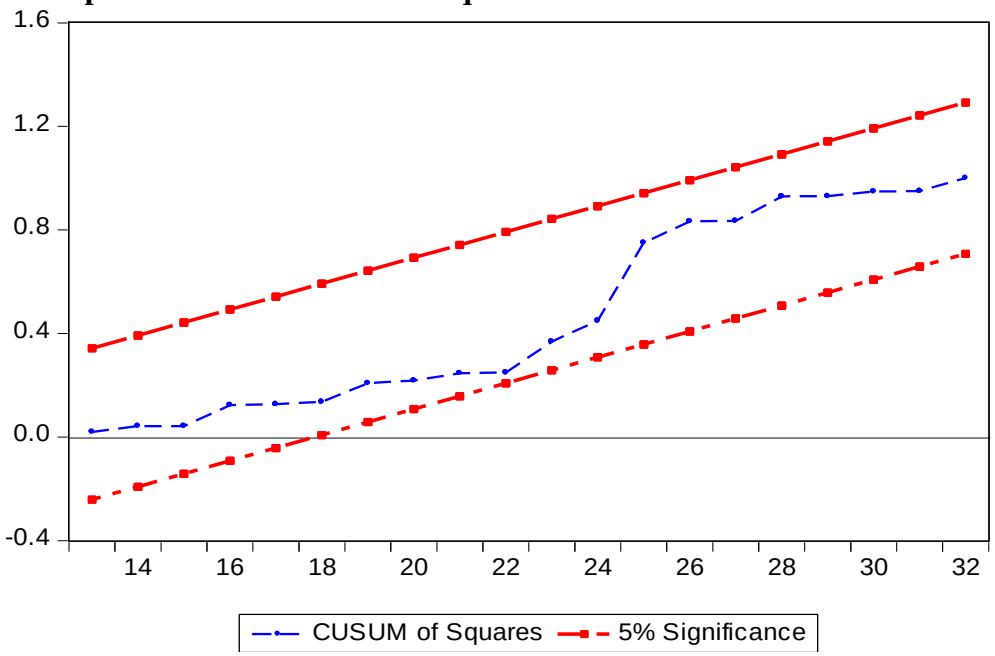
Figure 5.1 Graph of Cumulative Sum of Recursive Residuals



Source: Author's Computation using Eviews.

The CUSUMSQ for the estimated ARDL model is also shown in Figure 5.1. There is also a depiction of no instability of the coefficients because the plots of all coefficients fall within the critical bounds at 5 percent significant level. It can be said that variables are not varying erratically. In the same way, the stability tests for the other models (2, 3 and 4) were reported in Appendices I, J and K.

Figure 5.2: Graph of Cumulative Sum of Square Recursive Residuals



Source: Author's Computation using Eviews.

5.8 Chapter Summary

This chapter looked at the time series properties of the data used for estimation. Stationarity test was conducted by employing both the ADF and the PP techniques which indicated that some of the series had to be differenced once to achieve stationarity. The occurrence of non-stationary variables implies the presence of a long-run relationship, which the study verified using bounds testing approach to cointegration. Given the findings, the implication is that volatility-export nexus should be estimated in a single equation framework.

The results indicated the presence of cointegrating relationship between export performance and exchange rate volatility. Whereas GDP growth and CPS exerted positive and statistically significant impact on Ghana's export, a negative effect was realized from exchange rate volatility to export. The finding for the ECM revealed that the ECT for export did carry the anticipated negative sign.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The chapter recapped, concluded and gave an action guideline stemming from the study for economic managers and planners to consider. The purpose was to display the utmost results of the study and also put forward guidelines for progress in ensuring a stable and continuous export administration. The goal of the research was to empirically explore the association amidst exchange rate volatility and performance of exports in Ghana.

6.2 Summary

The motivation of this study was to explore the effect of real effective exchange rate volatility on export performance, and also, its effect on the real sector of Ghana using data from the World Development Indicators (WDI) from 1984 to 2016 employing an Auto Regressive Distributed Lag Model developed by Pesaran, Shin and Smith (2001). The Study also employed GARCH (1,1) in measuring real effective exchange rate volatility. The bounds test to cointegration was also employed to establish the presence of long-run equilibrium association between variables. The result indicated the presence of a unique cointegration among variables in Ghana's export performance, hence, cointegration can be said to have existed between variables.

The empirical findings showed that in the long-term, only exchange rate volatility and trade openness (tariff rate) exerted a statistically significant negative effect on export performance in the agricultural sector, the industrial sector and the services sector but only in the previous year. This demonstrated that per the results, exchange rate volatility and tariff are unfavorable to export performance in Ghana. Nonetheless, but for foreign direct investment which was only in the case of the services sector, GDP growth, credit to private sector and government expenditure on

infrastructure proved export performance inducing in all the four models.

Specifically, the results indicated that a 1 percent increase in real effective exchange rate will cause agricultural export to fall by approximately 0.24 percent in the short-run and 0.3 percent in the long-run at 5 percent and I percent significant levels respectively.

In the case of the services sector, but for the short-run, real effective exchange rate volatility had the expected negative effect on the services sector export in all the periods at 1percent level of significance. In the short-run specifically, the results showed that, a 1 percent increase in real effective exchange rate volatility causes an increase in the services sector export by approximately 0.14 percent while previous year's volatility causes a reduction in the services sector export by approximately 0.18 percent and 0.36 percent in the long-run.

It was found also that, effective exchange rate volatility had the expected effect on industrial sector exports in both the long-run and short-run as well as the previous year at various levels of significance. Specifically, in the short-run, a 1 percent increase in real effective exchange rate volatility will cause a fall in industrial sector export by approximately 0.5 percent while previous year's volatility causes a reduction in industrial export by approximately 0.24 percent in the short-run.

The transient developments, in compliance to what was established in the end, affirmed that GDP growth, credit to private sector and government expenditure on infrastructure had a positive and significant influence on export performance as well as the sectoral export performance. However, the short run dynamics also revealed that trade openness, inflation (only in the case of the industrial sector) and exchange rate volatility, had petrifying effects on Ghana's export.

The perseverance of a long-run dependency between exchange rate volatility and Ghana's export performance as well as disaggregated real sector exports was confirmed further by a negative and demographically cogent coefficient of the lagged error correction term in all the four models

and the size of this coefficient suggests that, any disequilibrium caused by previous year's shocks converges back to the long-run equilibrium in the current year by the magnitude of the coefficients.

6.3 Conclusion

The study's focus was to empirically explore, the relationship between exchange rate volatility and export performance in Ghana utilizing data acquired for the duration, 1984 to 2016. Generally, the relationship amidst exchange rate volatility, trade openness and export performance in Ghana was examined, taking into consideration, the sectoral disentanglement of exports. The issue of exchange rate volatility and export performance has become very crucial for most developing countries and more so, not much empirical work has been done in Ghana.

In the scheme for the long-term association and short-term compelling limitations of the model estimated, the ARDL technique was applied. The ADF and the PP test statistics were used in testing for the statistical properties of the variables. It was revealed that the variables were stationary after taking first difference with a constant and trend under the ADF test and Philip Peron test statistics. The study followed up with the examination of the long- run and short-run connections amidst exchange rate volatility and export performance and also the disaggregated export performance of the real sector.

Both the long-run and short-run results found statistically significant positive effects of GDP growth, foreign direct investment, credit to private sector and government expenditure on infrastructure on export performance. Inflation was negative and statistically cogent only in the case of the industrial sector export. However, the chief variable of interest, exchange rate volatility and trade openness (tariff rate) had a negative effect on Ghana's export as well as the sectoral exports both in the long run and short run.

6.4 Recommendations

Based on the findings from the study, a number of recommendations are offered to policy makers,

businesses, investors, regulators of the finance industry and researchers of future studies. The study encourages policy makers to invent sufficient decisive policies that will sustain the foreign exchange rate as well as other major macro-economic variables so as to actualize a sustained export performance. In specifics, the recommendations are that:

On macroeconomic stability and particularly on exchange rate, one policy implication of our results is that, domestically, the Bank of Ghana needs to step-up its exchange rate stabilization drives to minimize the exchange rate risk imposed on trade players. In addition, the Bank of Ghana should sensitize trade players on the need to patronise forward contracts. This will ensure steady flow of trade and improved export performance. There should also be in place strict foreign exchange control policies to help in the appropriate determination of the value of the exchange rate. This has the potential of helping strengthen the value of the Cedi and ensure a stable export.

Though credit to private sector had positive impact on Ghana's export performance position, it is economically imperative for monetary authorities to ensure sound monetary policy management practices. Closely related to money supply is high inflation and as such care must be taken in using unexpected expansionary fiscal policies to increase interest rate due to the potency of such policies to stifle or crowd-out investment, growth and hence export as found in the case of the industrial sector.

Realistically, the high dependence on imported goods cannot be discouraged by the impositions of stern tariffs. Thus, the government needs to formulate policies that would create an enabling environment to boost investment in the productive sectors. In addition, the government should improve upon Exports of goods and services among the major trading partners and other countries by substituting for imports. This would help reduce the usual trade deficits the country records.

There is the need for active participation of the government in the Ghanaian economy. Productive involvement of the government in manufacturing, construction and infrastructural development needs to be stepped-up to attract both indigenous and foreign investors (FDI) thereby spurring growth. This will in turn lead to job creation, employment opportunities and at the long run improve exports and economic growth at large.

6.5 Limitations

The major drawback to this study was the unavailability of data which is common to Sub-Saharan African countries. We could not use large sample size because of missing values for some of the variables in the 1970s in addition to the pegged exchange rate in late 1970s. Moreover, this study used the ARDL approach to cointegration and one vital limitation associated with this method is that it is susceptible to both model specification and lag length selection. The selected lag length has implications for the outcome of the cointegration. In all, notwithstanding these limitations, the findings of this study retain a considerable degree of reliability and exactness that render this thesis suitable for academic references and formulations of policies.

6.6 Future Direction of Research

Finally, instead of considering the impact of exchange rate volatility on export performance as a whole, one could study the impact of exchange rate volatility on bilateral trade between Ghana and its major trading partners in the EU and America.

REFERENCES

A., B., M., E., & S., R. (2007). Modelling Exchange rate pass-through after large devaluations. *Journal of Monetary Economics*, 346-368.

A., D., & R., P. (1994). Investments Under Uncertainty, Princeton University Press, Princeton N.J.

Abdullah, P., Rumondor, B. Y., Kusuma, A. C., & Sya'banni, E. R. (2017). Analysis of the Effects of Foreign Currency Supply and Demand on Rupiah Exchange Rate. *2nd ISI Regional Statistics Conference* (p. Session CPS13). Indonesia: Bank Indonesia.

Acheampong, I. K. (2007). Testing Mckinnon-Shaw thesis in the context of Ghana's financial sector liberalisation episode. *International Journal of Management Research and Technology, 1*(2), 156–183.

Adamu, P. A. (2005). The impact of exchange rate volatility on private investment in Nigeria: an error correction representation. *The Nigerian Journal of Economic and Social Studies*, *47*(2), 301–317.

Agenor, P., & Montiel, P. (1991). Exchange Rate Management and Credibility Isuues in Developing Countries. *Washington, D.C. IMF Mimeo*.

Aghevli, B., Khan, M., & Montiel , P. (1991). Exchange Rate Policy in Developing Countries: Some Analytic Issues. *IMF Occasional Papers no. 78. Washington, D.C.* .

Akaike, H. (1973). Maximum likelihood identification of Gaussian autoregressive moving average models. *Biometrika*, 255–265.

Alam, S., & Ahmed , Q. (2012). Exchange Rate Volatility and Aggregate Exports Demand Through ARDL Framework: An Experience from Pakistan Economy. *Review of Applied Economics* , 79-94.

Ali, D. A., Johari, F., & Alias, M. H. (2014). The Effects of Exchange Rate Movements on Trade Balance: A Chronological Theoretical Review. *Economics Research International*, 1-7.

Al-Shayeb, A., & Hatemi-J, A. (2016). Trade Openness and Economic Development in the UAE: An Asymetric Approach. *Journal of Economic Studies*, 587-597.

Amenumey, D. E. (2008). *Ghana: A Concise History from Pre-Colonial Times to the 20th Century.* Accra: Woeli Publishing Services.

Angus, M. (2003). *The World Economy: Historical Statistics.* Paris: OECD.

Anin, T. E. (2000). *Banking in Ghana.* Accra: Woeli Publishing Services.

Anokye, A. M., & Chaudhry, I. S. (2013). The Currency Union Effect on Intra-Regional Trade In Economic Community of West African States(ECOWAS). *Journal of International Trade Law and Policy*, 102-122.

Anokye, A. M., & Chaudhry, I. S. (2013). The Currency Union Effect on Intra-Regional Trade In Economic Community of West African States(ECOWAS). *Journal of International Trade Law and Policy*, 102-122.

Arize, A., Osang, T., & Slottje, D. J. (2000). Exchange Rate Volatility and Foreign Trade: Evidence from Thirteen LDC's. *Journal of Business and Economic Statistics, American Statistical Association*, 10-17.

Auer, R., & Chaney, T. (2009). Exchange Rate Pass-Through in a Competitive Model Pricing-to-Market. *A journal of Money, Credit and Banking*, 151 - 175.

Bahmani-Oskooee, M. (2001). Nominal and real effective exchange rates of Middle Eastern countries and their trade performance. *Applied Economics*, *33*(1), 103–111.

Bahmani-Oskooee, M., & Nasir, A. B. M. (2004). ARDL approach to test the productivity bias hypothesis. *Review of Development Economics*, *8*(3), 483–488.

Balassa, B. (1978). The Purchasing Power Parity Doctrine; A reappraisal. *A Journal of Political Economy*, 584-59.

Baldauf, A., Cravens , D. W., & Wagner, U. (2000). Examining Determinants of Export Performance in Small Open Economies. *Journal of World Business*, 65 - 79.

Bawumia, M. (2014). Restoring The Value Of The Cedi. *Central University College, Ghana*.

Bird, G. (1983). Should Developing Countries Use Currency Depreciation as a tool of Balance of Payment Adjustments; A review of the Theory and Evidence; A Guide for the Policy Makers. *The J. Development Studies*, 461 - 483.

Bird, R. M., & Vaillancourt, F. (2008). *Fiscal decentralization in developing countries*. Cambridge University Press.

Block, H., & Sapsford, D. (2000). Whither the Terms of Trade: An Elaboration of the Prebisch-Singer Hypothesis. *Cambridge Journal Of Economics*, 461 - 481.

Boateng, E. A. (1996). *A Geography of Ghana.* Cambridge: Cambridge University Press.

Boltho, A. (1996). The Assessment: International Competitiveness . *Oxord Review of Economic Policy*, 1 - 15.

Boorman, J. (9-11). Trade policy Issues. *IMF Institute and Policy Development and Review Department*, 1995.

Bordo, M. D., & Eichengreen, B. (1991). A Retrospective on the Bretton Woods System: Lessons for International Monetary Reforms. *National Bureau of Economic Research*, vol: 0-226-06587-1.

Brooks, B. J., Smith, M. H., Hill, M. K., & O'Dowd, C. D. (2002). Size-differentiated volatility analysis of internally mixed laboratory-generated aerosol. *Journal of Aerosol Science*, *33*(4), 555–579.

Burton, D., & Gilman, M. (1991). Exchange Rate Policy and the IMF. . *Finance and Development*, 28(3): 18-21.

Caballero, R. (2002). Macroeconomic Volatility in Latin America: A View and Three Case Studies. *National Bureau of Economic Research*, No. 7782.

Caglayan, M., & Demir, F. (2014). Firm Productivity, Exchange Rate Movements, Sources of Finance, and Export Orientation. *World Development*, pp. 204-219.

Caglayan, M., & Demir, F. (2014). Firm Productivity, Exchange Rate Movements, Sources of Finance, and Export Orientation. *World Development*, pp. 204-219.

Calomiris, C. (2006). Devaluation with Contract Redenomination in Argentina. *National Bureau of Economic Research*, No. 12644.

Cassey, A. J., & Dhanireddy, P. (2011). A Primer on Exchange Rates and Exporting. *Washinton State University Extension*, EM041E.

Chang, R., Kaltani, L., & Loayza, N. V. (2009). Openness Can Be Good For Growth: The Role of Policy Complementarities. *Journal of Development Economics*, 33-49.

Cheung, Y.-W., & Sengupta, R. (2013). Impact of Excgahnge Rate Movements on Exports: An Analysis of Indian Non-Financial Sector Firms. *Journal of International Money and Finance*, 231-245.

Cheung, Y.-W., & Sengupta, R. (2013). Impact of Excgahnge Rate Movements on Exports: An Analysis of Indian Non-Financial Sector Firms. *Journal of International Money and Finance*, 231-245.

Chit, M. M., Rizov, M., & Willenbockel, D. (2008). Exchange Rate Volatility and Exports; New Empirical Evidence from the Emerging East Assian Economies. *Discussion paper, Middlesex University Economics*.

Choong, C. K., Yusop, Z., & Liew, V. K. S. (2005). Export-led growth hypothesis in Malaysia: An investigation using bounds test. *Sunway Academic Journal*, *2*, 13–22.

Clark, P. B. (1973). Uncertainty, Exchange Rate Risk on International Trade. *Western Economic Journal, Vol 11*, 302-313.

Clark, P. B. (1973). Uncertainty, Exchange Rate Risk on International Trade. *Western Economic Journal, Vol 11*, 302-313.

Cote, A. (1994). Exchange Rate Volatility and Trade. *Bank of Canada Working Papaer*.

Das, S., & Srinivasan, K. (1997). Duration of Firms in an Infant Industry: A case of Indian Computer Hardware. *Journal of Development Economics*.

David, C. (2010). The Economics Profession, the Financial Crisis and methods . *Journal of Economic Methodology*, 419-427.

DeGrauwe, P. (1988). Exchange Rate Variability and The Slowdown in Growth of International Trade. *IMF Papers*, 63-84.

Diamontopoulus, A., & Inglis, K. (1988). Identifying Differences Between High and Low Involvement Exporters. *International Marketing Review*, 52 - 60.

Dincer, N., & Kandil, M. (2011). The Effects of Exchange Rate Fluctuations on Exports: A sectoral Analysis for Turkey. *The Journal of International Trade & Economic Development*, 809-837.

Dincer, N., & Magda, K. (2011). The effects of Exchange Rate flactuations on Exports: A sectoral Analysis for Turkey. *The Journal of International Trade and Economic Development*, 809-837.

Dollar, D., & Kraay, A. (2004). Trade, Growth and Poverty. *Economic Journal*, 22-49.

Donthu, N., & Kim, S. H. (1993). Implications of Firm Controllable Factors on Export Growth. *Journal of Global Marketing*, 47 - 64.

Dowrick, S. G. (2004). Trade Openness and Growth: Who Benefits? *Oxford Review of Economic Policy*, 38-56.

Durand, M., & Giornu, C. (1987). Indicators of International Competitiveness: Conceptual Aspects and Evaluation. *OECD Economic Studies*, 147 - 197.

Edwards, S., & Santaella, J. (1993). Devaluation Controversies in the Developing Countries: Lesson from the Bretton Woods Era. In M. D. Bordo, & B. Eichengreen, *A Retrospective on the Bretton Woods System: Lessons for the International Monetary Reform* (pp. 405-460). Chicago: University of Chicago Press.

Eichengreen, B. (2008). *The European economy since 1945: coordinated capitalism and beyond*. Princeton University Press.

Flood, R. P., Bhandari, J. S., & Horne, J. P. (1989). Evolution of Exchange Rate Regimes. *IMF Staff Papers*, 810-835, Vol. 63 No. 4.

Fountas, S., & Aristotelous, K. (1999). The Impact of The Exchange Rate Regime on Exports: Evidence from the European Monetary System. *Journal of Economic Integration*, 567-589.

Frank, G. (1991). Exchange Rate Volatility and International Trading Strategy. *Journal of International Money and Finance, Vol 10*, 292-307.

Freund, C., & Bolaky, B. (2008). Trade, Regulation and Income. *Journal of Development Economics*, 309-321.

Fund, I. M. (1993). Balance of Payment Manual. Washington D.C.: IMF.

Ghizoni, S. K. (2013). Creation of the Bretton Woods System. *Federal Reserve History*.

Goldberg, L. S., & Tille, C. (2010). *International Comparisons of Production, Income and Prices.* Pennsylvania: Penn World trade Version.

Guillermo, C., & Reinhart, C. (2002). Fear of Floating. *Quarterly Journal of Economics*, 379 - 408.

Gyimah-Brempong, K. (1991). ' The Effects of Exchange Rate Controls On The Black Market Exchange Rate In A Less Developed Country'. *International Economic Journal*, 63-78 Vol.5 No.1.

Hessel, L. K. (2008). Re-Thinking New Knowledge Productions. *A literature Review and Research Agenda*, 740 - 760.

Howitt, R. E., Watson, W. D., & Adams, R. M. (1980). A Reevaluation of Price Elasticities for Irrigation Water. *Water Resource Research*, 623-628.

IMF. (1999). *The IMF's Enhanced Structural Adjustment Facility (ESAF): Is It Working?* Washington DC: IMF.

IMF. (2008). Exchange Rate Regimes (Fix or Float). *Quarterly Magazine of the International Monetary Fund*.

IMF. (2009). World Economic Outlook. *Annual Report of The IMF*.

Imoisi, A. I., Olatunji, L. M., & Ekpenyong, B. I. (2013). Monetary policy and its implications for balance of payments stability in Nigeria: 1980-2010. *International Journal of Economics and Finance, 5*(3), 196.

J., A. Z., Desai, S., & Hessel, J. (2008). Entrenuership, Economic Development and Institutions. *Small Business Economics*, 219 - 234.

Jebuni, C., Oduro, A. D., & TuTu, K. A. (1994). Trade and Payments Regime and the Balance of Payments in Ghana. *World Development*, 1161-1173.

Jereissati, H. J. (1999, Spring). The IMF Role in Financial Crises. *Institute of Brazilian Issues.* Washington, DC: The George Washington University.

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica: Journal of the Econometric Society*, 1551–1580.

Josef, C. B., & Jose, M. A. (n.d.). Exchange Rate Risk, Exchange Rate Regime and Volume of International Trade. 263-280.

Junz, H. B., & Rhomberg, R. R. (1973). Price Competitiveness in Export Trade Among Industrial Countries. *The American Economic Review*, 412 - 418.

K., S. (2010). The Global Competitiveness Report 2010 - 2011. *World Economic Forum, Geneva Switzerland*.

Kamin, S. B., & Roger, J. H. (2000). Output and the Real Exchange Rate in Developing countries: An Application to Mexico. *Journal of Development Economics*, 85 - 109.

Kandil, M., & Mirzaie, A. (2002). Exchange Rate Fluctuations and Disaggregated Economic Activity in the US: Theory and Evidence. *Journal of International Money and Finance*, 1-31.

Kaneda, M. (2003). Policy Design in a Dynamic Model of Infant Industry Protection. *Journal of Development Economics*.

Keesing, D. B. (1967). Outward Policies and Economic Development. *The Economic Journal*, 303 - 320.

Kemal, M. A., & Qadir, U. (2005). Real Exchange Rate, Exports, and Imports Movements: A Trivariate Analysis. *The Pakistan Development Review*, pp. 177-195.

Kemal, M. A., & Qadir, U. (2005). Real Exchange Rate, Exports, and Imports Movements: A Trivariate Analysis. *The Pakistan Development Review*, pp. 177-195.

Khalighi, L., & Fadaei, M. S. (2017). A Study on the Effects of Exchange Rates and Foreign Policies on Iranians Dates Export. *Journal of The Saudi Society of Agricultural Sciences*, 112-118.

Knight, S. C. (2013). *Handbook of Key Global Financial Markets, Institutions, and Infrastructure.* Washinhton DC: American University, Washington DC, USA.

Kohlhagen, P. H. (1978). The effects of Exchange Rate Uncertainty on the Prices and Volumes of International Trade. *Journal of International Economics 8 (4)*, 483-511.

Kremers, J. J., Ericsson, N. R., & Dolado, J. J. (1992). The power of cointegration tests. *Oxford Bulletin of Economics and Statistics*, *54*(3), 325–348.

Krueger, A. (1986). Problems of Liberalisation. In A. C. Papageorgiou, *Economic Liberalisation in Developing Countries.* Oxford: Blackwell.

Krugman, P. R., & Obstveld, M. (1997). International Economics: Theory and Policy, Reading MA: Addison-Wesley.

Lages, L. F. (2011). A Conceptual Framework of the Determinants of Export Performance. *Journal of Global Marketing*, 29 - 51.

Lee, J. W., & Swagel P. (1997). Trade Barriers and Trade Flows Across Countries and Industries. . *Review of Economics and Statistics*, 372-382.

Lerner, A. (1944). *Economics of Control: Principle of Welfare Economics.* New York: Macmillan, NY, USA.

Liquart, A. (2011). Currency Wars, Then and Now. *Foerign Affairs*, 92 - 103.

Lizondo, J. S., & Montiel, P. J. (1989). Contractionary Devaluation in Developing Countries: An Analytical Overview. *Staff Paper - International Monetary Fund*, 182 - 227.

MacDonald, R. (1988). Floating Exchange Rate Theories and Evidence. *Biddles Ltd., Guildford and King's Lynn*.

MacDonald, R., & Taylor, M. P. (1992). Exchange Rate Economics: A Survey. *IMF Staff Papers*, 1-57 Vol. 39, No. 1.

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research*, *39*(1), 99–128.

Maehle, N., Teferra , H., & Khachatryan, A. (2013). *Exchange Rate Liberalization in selected Sub-Saharan African Countries: Success, Failures and Lessons.* Washington D. C: International Monetary Fund.

Magee, S. P. (1976). The empirical evidence on the monetary approach to the balance of payments and exchange rates. *The American Economic Review*, *66*(2), 163–170.

Mandilaras, A. S. (2015). The International Policy Trilemma in the Post-Bretton Woods Era. *Journal of Macroeconomics*, 18-32.

Meltzer, A. H. (1991). *U.S. Policy in the Bretton Woods Era.* St. Louis: Federal Reserve Bank of St. Louis Review.

Moore, M. (2010). *"The US- UAE Trade and Investment Relationship Executive Report" Prepared for US-UAE Business Council.*

Mordi, C. N. (2006). Challenges of exchange rate volatility in economic management in Nigeria. *The Dynamics of Exchange Rate in Nigeria*, 17–25.

Moser, S. (2014). *Country Report Ghana.* Rabobank, Nederland: Country Risk Research Team.

Mosley, L. (2005). *Global Capital and National Governments.* Cambridge: Cambridge University Press.

Musila, J. W., & Newark, J. (2003). Does Currency Devaluations improve Trade Balance in the Long Run? Evidence from Malawi. *African Development Review*, 339 - 352.

Mussa, M., & Rosen, S. (1978). Monopoly and Product Quantity. *Journal of Economic Theory*, 301 - 317.

N., B., & A., B. (2009). Financial Market Imperfections and the Impact of Exchange Rate Movements on Exports. *international Review of Economics*, 103-120.

Nwosa, P. I., Saibu, M. O., & Fakunle, O. O. (2012). The effect of trade liberalization on trade tax revenue in Nigeria. *African Economic and Business Review*, *10*(2), 28–43.

Obeng, C. K. (2017). Effects of Exchange Rate Volatility on Non-Traditional Exports in Ghana.

Organisation, W. T. (2012). *Trade Policy Review of the UAE.* World Trade Organisation.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, *16*(3), 289–326.

Pesaran, M. H., Smith, R. P., & Yeo, J. S. (1985). Testing for structural stability and predictive failure: a review. *The Manchester School*, *53*(3), 280–295.

Pindyck, R. S. (1982). Adjustment costs, uncertainty, and the behavior of the firm. *The American Economic Review*, *72*(3), 415–427.

Porter, M. C. (1998). The Competitive Advantage of Nations, New York. The Free Press.

Pupongsak, S. (2010). *The effect of trade liberalization on taxation and government revenue* (PhD Thesis). University of Birmingham.

Quaicoe, A., Aboagye, A. Q., & Bopkin, G. A. (2017). Assessing The Impact of Export Processing zones on Economic Growth in Ghana. *Research In International Business and Finance*, 1150-1163.

R., O. J. (1994). Effects of World Demand and Competitiveness on Export and Economic growth . *Growth and Changes*, 3 - 24.

R.M., B. (1982). Exchange Rate Variances and Export Competitiveness in Less Developed Countries Under Generalised Floating. *The Journal of Development Studies*, 354-378.

Razmi, A. (2007). Pursuing Manuacturing Based Export Led Growth: Are Developing Countries Increasingly Crowding each other? *Structural Change and Economic Dynamics*, 460 - 482.

Reinhart, C. M. (2000). The Mirage of Floating Exchange Rates. . *The American Economic Review*, 65 - 70.

Ricardo, D. (1817). *Principles of Political Economy and Taxation.* G. Bells and Sons.

Rodrik, D. (2008). *One economics, many recipes: globalization, institutions, and economic growth*. Princeton University Press.

S., R. P. (1982). The Value of Waiting to Invest. *National Bereau of Economics Research*, 707-727.

Salifu, Z., Osei, K. A., & Adjasi, C. K. (2007). Foreign Exchange Risk Exposure of Listed Companies in Ghana. *Journalof Risk Finance*, 380-393.

Salifu, Z., Osei, K. A., & Adjasi, C. K. (2007). Foreign Exchange Risk Exposure of Listed Companies in Ghana. *Journal of Risk Finance*, 380-393.

Santos-Paulino, A. (2002). Trade Liberalization and Export Performance in Selected Developing Countries. *Journal of Development Studies*, 140 - 158.

Sausa, C. M. (2004). Export Performance Measurement: An Evaluation of The Empirical Research in the Literature. *Academy of Marketing Science Review*, 1 - 23.

Sercu, P., & Vanhulle, C. (1992). Exchange Rate Volatility, Exposure and the Value of Exporting firms. *Journal of Banking and Finance*, 155-182.

Shi, K., Xu, J., & Yin, X. (2015). Imput Sustitution, Export Pricing and Exchange Rate Policy. *Journal of International Money and Finance*, 26-46.

Smith, A. (1776). *Wealth of Nations.* Chicago: University of Chicago Bookstore.

Stock, J. H., & Watson, M. W. (1988). Testing for common trends. *Journal of the American Statistical Association*, *83*(404), 1097–1107

Stokey, N. L. (1991). The Volume and Composition of Trade Between Rich and Poor Countries. *Review of Economic Studies*, 63-80.

Tan, K., & Phang , S. (2005). From Efficiency -Driven to Innovation-Driven Economic Growth; Perspectives from Singapore. *World Bank Publication, 3569*.

Tarawalie, A. B., Sissoho, M., Conte, M., & Ahortor, C. R. (2013). Export Performance and Exchange Rate Volatility: Evidence From The WAMZ. *West African Monetary Institute*, p. Vol. No. 5.

Todaro, M., & Smith , S. (2009). Economic Development 6th Edition. London, Addison - Wesley.

Trefler, D. (1993). Trade Liberalisation and the Theory of Endogenous Protection: An Economic Study of US Import Policy. *Journal of Political Economy*, 138-160.

Voutsa, M. E., & Borovas, G. (2015). The Operation of the Bretton Woods Institutions in the Modern Globalized Environment: Problems and Challenges . *Procedia Economics and Finance*, 168-180.

W., M. J. (2002). Exchange Rate Changes and Trade Balance Adjustments in Malawi. *Canadian Journal of Development Studies*, 9-85.

Wondemu, K., & Potts, D. (2016). The Impact of Real Exchange Changes on Export Performance in Tanzania and Ethiopia. *African Dvelopment Bank Group*, p. N0. 240.

Wong, C. H., & Kirmani , N. (1995). Trade Policy Issues. *IMF Institute and Review Department*, 6-10.

World, B. (1981). *Trade Among Developing Countries: Theory, Policy Issues, and Principal Trends.* Washington D.C. : The World Bank.

Young, A. (1991). Learning by doing and the Dynamic Effects of International Trade . *Quarterly Journal of Economics*, 369-405

APPENDICES

APPENDIX A

Descriptive Statistics of Model 2

	AGEX	EXV	GOV	GDPG	TAR	CPS
Mean	8.463348	0.003086	112.6060	5.583323	10.28970	10.46138
Median	7.661377	-0.120950	112.4222	4.985866	10.00000	11.88439
Maximum	17.69756	2.091533	125.2731	14.04600	16.20000	20.44463
Minimum	2.878077	-0.622950	102.7266	3.300000	5.000000	2.209409
Std. Dev.	3.953478	0.522941	5.530051	2.175458	2.991934	5.694196
Skewness	0.775087	2.180826	0.138949	2.133785	0.012554	0.073960
Kurtosis	2.839757	9.156771	2.492816	8.215934	2.306164	1.659959
Jarque-Bera	3.339490	78.27853	0.459887	62.44992	0.662804	2.499185
Probability	0.188295	0.000000	0.794578	0.000000	0.717917	0.286622
Sum	279.2905	0.101854	3715.999	184.2496	339.5600	345.2256
Sum Sq. Dev.	500.1597	8.750955	978.6067	151.4438	286.4535	1037.564
Observations	33	33	33	33	33	33

APPENDIX B

Descriptive Statistics of Model 3

	INDEX	TAR	INF	GOV	EXV	CPS	GDPG
Mean	12.87746	10.28970	21.86327	112.6060	0.003086	10.46138	5.583323
Median	11.32672	10.00000	17.49317	112.4222	-0.120950	11.88439	4.985866
Maximum	32.52972	16.20000	59.46155	125.2731	2.091533	20.44463	14.04600
Minimum	0.608450	5.000000	8.726837	102.7266	-0.622950	2.209409	3.300000
Std. Dev.	7.969673	2.991934	12.19731	5.530051	0.522941	5.694196	2.175458
Skewness	0.598284	0.012554	1.222721	0.138949	2.180826	0.073960	2.133785
Kurtosis	2.918937	2.306164	4.123441	2.492816	9.156771	1.659959	8.215934
Jarque-Bera	1.977728	0.662804	9.958165	0.459887	78.27853	2.499185	62.44992
Probability	0.371999	0.717917	0.006880	0.794578	0.000000	0.286622	0.000000
Sum	424.9561	339.5600	721.4879	3715.999	0.101854	345.2256	184.2496
Sum Sq. Dev.	2032.502	286.4535	4760.781	978.6067	8.750955	1037.564	151.4438
Observations	33	33	33	33	33	33	33

APPENDIX C

Descriptive Statistics of Model 4

	SEREX	GDPG	GOV	EXV	TAR	FDI
Mean	3.044299	5.583323	112.6060	0.003086	10.28970	-0.094104
Median	1.021977	4.985866	112.4222	-0.120950	10.00000	0.000000
Maximum	6.189944	14.04600	125.2731	2.091533	16.20000	2.115462
Minimum	2.903380	3.300000	102.7266	-0.622950	5.000000	-4.279500
Std. Dev.	0.055737	2.175458	5.530051	0.522941	2.991934	1.016528
Skewness	2.200404	2.133785	0.138949	2.180826	0.012554	-1.803171
Kurtosis	6.041646	8.215934	2.492816	9.156771	2.306164	11.11207
Jarque-Bera	39.35076	62.44992	0.459887	78.27853	0.662804	108.3657
Probability	0.000000	0.000000	0.794578	0.000000	0.717917	0.000000
Sum	1.461872	184.2496	3715.999	0.101854	339.5600	-3.105421
Sum Sq. Dev.	0.099412	151.4438	978.6067	8.750955	286.4535	33.06654
Observations	33	33	33	33	33	33

APPENDIX D

ARCH Test Result on Real Effective Exchange Rate

SERIES	ARCH RESID^2	F-Statistics	R-Squared	P-Values
RER (-1)	0. 8712***	5872.17	579.51	0.0003
ARCH [1]		0.0461	0.0578	0.7967

*Note: *** implies 1% level of significance while ARCH [1] is the ARCH LM test.*

GARCH (1, 1) Results for Volatility in the Exchange Rate

Variable	Coefficient	Std. Error	Z-Statistic	Prob
CONS	0.0003	2.13E-05	5.1166	0.0000
ARCH (α)	0.5417***	0.0671	6.1273	0.0000
GARCH (β)	0.5713***	0.0417	13.997	0.0000
(α + β)	1.0038			

*Note: *** implies 1% level of significance.*

APPENDIX (E – G)

E. Cointegration Test for Model 2

Critical Value Bound of the F-statistic: intercept and no trend						
K	90% Level		95% Level		99% Level	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
6	1.89	2.81	2.19	3.19	2.73	3.93

F-Statistics: F_{AGEX}(LAGEX|LCPS, LGDPG, LGOV, LTAR, LEXV)= 3.6191***

F. Cointegration Test for Model 3

Critical Value Bound of the F-statistic: intercept and no trend						
K	90% Level		95% Level		99% Level	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
6	1.91	2.54	2.37	3.38	2.91	4.12

F-Statistics: F_{INDEX}(LINDEX|LCPS, LGDPG, LINF, LGOV, LTAR, LEXV)= 3.4127**

G. Cointegration Test for Model 4

Critical Value Bound of the F-statistic: intercept and no trend

K	90% Level		95% Level		99% Level	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
6	1.97	2.97	2.31	3.39	2.94	4.05

F-Statistics: F_{SEREX}(LSEREX|LGDPG, LFDI, LGOV, LTAR, LEXV)= 4.7513***

APPENDIX H

Diagnostic Tests for Model 2

Test	Chi/F Version
Serial Correlation	F (2, 12) = 0.3210 [0.2414]
Functional Form	F (1, 15) = 0.03112[0.5311]
Normality	CHSQ(2) = 0.4130 [0.1137]
Heteroscedasticity	F (12, 17) = 0.5105 [0.7124]

Source: Author's Computation

Diagnostic Tests for Model 3

Test	Chi/F Version
Serial Correlation	F (2, 17) = 0.3718[0.1517]
Functional Form	F (1, 13) = 0.5173 [0.9124]
Normality	CHSQ(2) = 0.2189[0.6745]
Heteroscedasticity	F (12, 17) = 0.5161[0.8137]

Source: Author's Computation

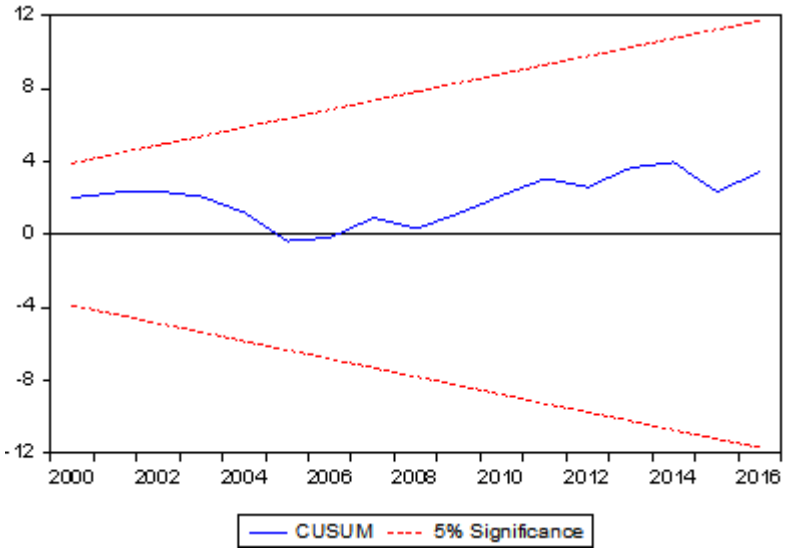
Diagnostic Tests for Model 4

Test	Chi/F Version
Serial Correlation	F (2, 16) = 0.7179[0.8713]
Functional Form	F (1, 17) = 0.0225 [0.6718]
Normality	CHSQ(2) = 0.6320[0.3871]
Heteroscedasticity	F (10, 17) = 0.3705[0.7461]

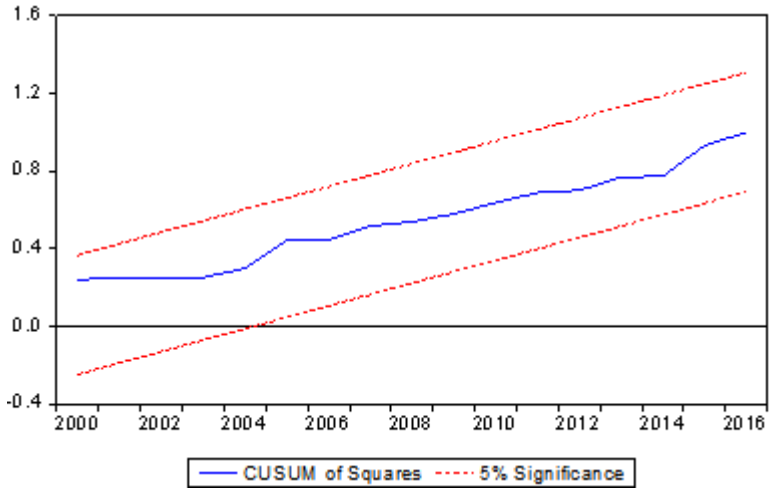
Source: Author's Computation

APPENDIX I

PLOT OF CUSUM (Model 2)

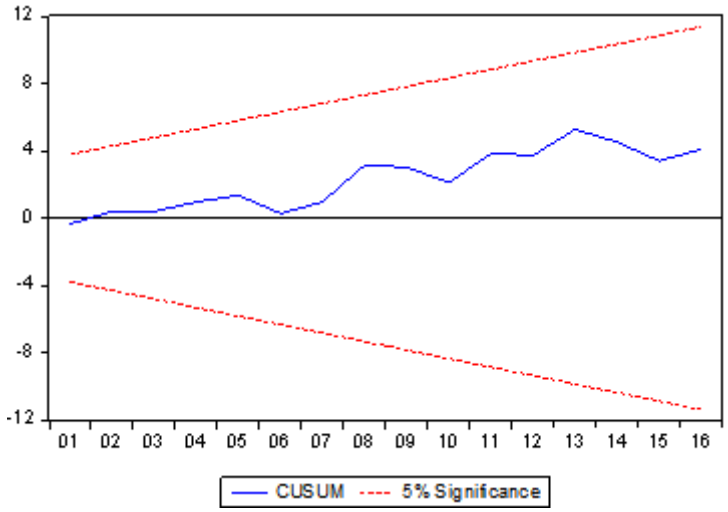


PLOT OF CUSUMSQ (Model 2)

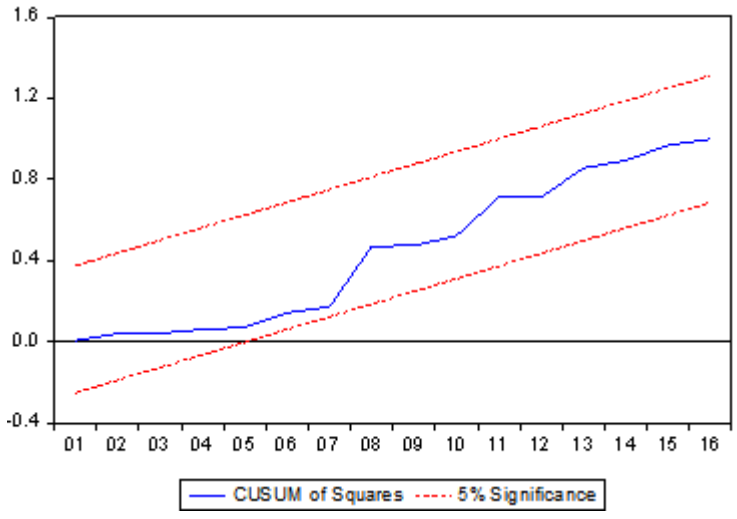


APPENDIX J

PLOT OF CUSUM (Model 3)

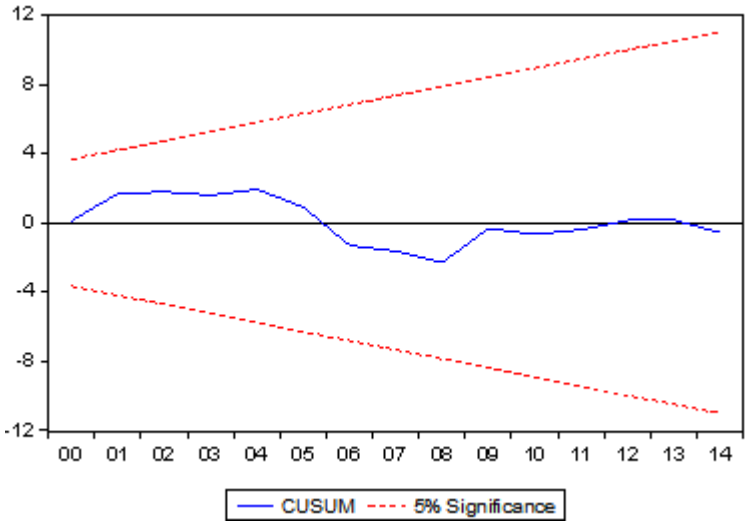


PLOT OF CUSUMSQ (Model 3)



APPENDIX K

PLOT OF CUSUM (Model 4)



PLOT OF CUSUMSQ (Model 4)