THE EFFECT OF FOREIGN EXCHANGE AND REAL EXCHANGE RATE ON FOREIGN TRADE IN LIBERIA

Master's Degree

Emmanuel Dweh TOGBA

Eskisehir, 2017

THE EFFECT OF FOREIGN EXCHANGE AND REAL EXCHANGE RATE ON FOREIGN TRADE IN LIBERIA

Emmanuel Dweh TOGBA

MASTER'S THESIS

Department of Economics
Supervisor: Assist. Prof. Dr. Bilgin BARİ

Eskisehir
Anadolu University
Graduate School of Social Science
May, 2017

This thesis work was supported under the project number 1702E045 which was accepted by the BAP Commission

FINAL APPROVAL FOR THESIS

This thesis titled "**The Effect of Foreign Exchange and Real Exchange Rate on Foreign Trade in Liberia**" has been prepared and submitted by **Emmanuel Dweh TOGBA** in partial fullfillment of the requirements in "**Anadolu University Directive on Graduate Education and Examination**" for the Master of Arts in **Department of Economics** has been examined and approved on **12/05/2017.**

Committee Members		**Signature**
Member (Supervisor)	: Assist.Prof.Dr.Bilgin BARİ	
Member	: Assoc.Prof.Dr.Reşat CEYLAN	
Member	: Assist.Prof.Dr.Sevilay KÜÇÜKSAKARYA	

12/05/2017
Date

Prof.Dr.Kemal YILDIRIM
Director
Graduate School of Social Sciences

ÖZET

LİBERYA'DA NOMİNAL VE REEL DÖVİZ KURU DIŞ TİCARETE ETKİSİ

Emmanuel Dweh TOGBA

İktisat Anabilim Dalı
Anadolu Üniversitesi, Sosyal Bilimler Enstitüsü, Mayıs, 2017

Danışman: Yrd. Doç. Dr. Bilgin BARI

Bu çalışma, 1980-2015'teki yıllık veriler kullanıla döviz müdahalesinin ve döviz kurlarının dış ticarete olan etkisini üç ayrı model, yani ihracat, ithalat ve ticaret dengesi olarak tahmin etmede bir ARDL model çerçevesi benimsemiştir. Sonuçlar, nominal döviz kurunun ihracat üzerindeki istatistiksel olarak önemli bir pozitif etkiye işaret ettiğini, ancak mutlak reel döviz kuru için geçerli olmadığını göstermektedir. Nominal döviz kurunun ithalatla ters ilişkili olduğu teyit edilirken, reel döviz kuru ithalatla pozitif ilişkiliydi. Ticaret dengesi modeli sonuçları, nominal döviz kurunun ticaret dengesi üzerinde istatistiksel olarak önemli derecede olumsuz bir etkiye sahip olduğunu göstermekle birlikte, reel döviz kuru ticaret dengesi ile pozitif yönde ilişkili görülmüştür. Merkez bankası tarafından kur rejimi değişikliği ve parasal müdahale nedeniyle çift para birimi ve yüksek dolarizasyon özellikle etkisiz görünmektedir. Aynı zamanda, Liberya doların değer kaybetmesi ticaret dengesini daha da kütüye eğilimindedir.

Anahtar Sözcükler: Nominal Döviz Kuru, Reel Döviz Kuru, Dış Ticaret, ARDL modeli, Çift para birimi

ABSTRACT

THE EFFECT OF FOREIGN EXCHANGE AND REAL EXCHANGE RATE ON FOREIGN TRADE IN LIBERIA

Emmanuel Dweh TOGBA

Department of Economics

Anadolu University, Graduate School of Social Sciences, May, 2017

Supervisor: Assistant Professor Dr. Bilgin BARI

This study adopted an ARDL model framework in estimating the effect of foreign exchange intervention and exchange rates on foreign trade in Liberia in three separate models namely export, import and trade balance using yearly data from 1980-2015. The results indicate a statistically significant positive effect of nominal exchange rate on export, but not necessarily for real exchange rate. Nominal exchange rate was confirmed to be inversely related to import while real exchange rate was positively related to import. The trade balance model results show a statistically significant negative effect of nominal exchange rate on trade balance while real exchange rate was seen to be positively related to trade balance. The exchange rate regime change and monetary intervention by the central bank seems ineffective particularly due to the dual currency and high dollarization. At the same time, the depreciation in the Liberian dollar tend to worsen the trade balance.

Keywords: Nominal Exchange Rate, Real Exchange Rate, Foreign Trade, ARDL model, Dual currency

12/05/2017

STATEMENT OF COMPLIANCE WITH ETHICAL PRINCIPLES AND RULES

I hereby truthfully declare that this thesis is an original work prepared by me; that I have behaved in accordance with the scientific ethical principles and rules throughout the stages of preparation, data collection, analysis and presentation of my work; that I have cited the sources of all the data and information that could be obtained within the scope of this study, and included these sources in the references section; and that this study has been scanned for plagiarism with "scientific plagiarism detection program" used by Anadolu University, and that "it does not have any plagiarism" whatsoever. I also declare that, if a case contrary to my declaration is detected in my work at any time, I hereby express my consent to all the ethical and legal consequences that are involved.

Emmanuel Dweh TOGBA

TABLE OF CONTENTS

TABLES

Page

FIGURES

Page

SYMBOLS AND ABBREVIATIONS

α	: Alfa
β	: Beta
γ	: Gamma
δ	: Delta
ε	: Epsilon
η	: Eta
ϕ	: Phi
Σ	: Sigma
AMSs	: ASEAN Member States
ASEAN	: Assiciation of Southeastern Asian Nations
CBL	: Central Bank of Liberia
IM	: Import
IMF	: International Monetary Fund
L.$	: Liberian Dollar
NER	: Nominal Exchange Rate
RER	: Real Exchange Rate
SSA	: Sub-Saharan Africa
TB	: Trade Balance
ToT	: Terms of Trade
U.S.$	: United States Dollar
WAMZ	: West African Monetary Zone
X	: Export

CHAPTER ONE

1. INTRODUCTION

Chapter one comprises the introduction of the study and other basic tenets of this study. These include research problem, the purpose of the study, assumptions, limitations and definition of key terms.

1.1. Introduction of the Study

The spread of globalization, so far, has been successful in connecting economies in the world. Today, the world economies are more linked than decades past through a global market where foreign trade is helping many economies to expand and develop. As these trade transactions tend to increase, technology, labor, capital, good and services are rapidly moving from one economy to another. One major player in this phenomenon is exchange rate—the price of a country's currency in another. Exchange rate serves as a key determinant of export and import while facilitating trade transactions across borders which can also have triggering effect on inflation and overall macroeconomic stability in an economy. Exchange rate (real) could affect an economy via many channels and consequently, has diverse macroeconomic and developmental impact on any society. In the last three decades, many studies in the fields of international economics, monetary economics and macroeconomics have focused mainly on the effect of either nominal or real exchange rates on international trade. However, it has been found in most studies that foreign trade movements have been severely affected by exchange rate changes especially in transition and developing economies, Liberia being no exception[1].

After its independence in 1847, the Government of Liberia issued its own currency – the Liberian dollars. The new currency soon started to depreciate after repeated fiscal crises that led to the government adopting sterling as a de facto currency. Later, the U.S. dollar replaced the Sterling in 1943, due to the devaluation of sterling relative to the U.S dollar increased the cost of repaying the country's debts. This change reflected the increasing spread of the dollar and the enlargement of U.S. government interests in Africa (Gardner, 2013). In the 1940s, Liberia's economy was booming and economic activities were at its highest peak. A period that was characterized by the exportation focusing mainly on primary products (rubber, iron ore, timber, gold etc.) which lasted briefly and then came the period of war. Right after the 14 years of civil war, the government

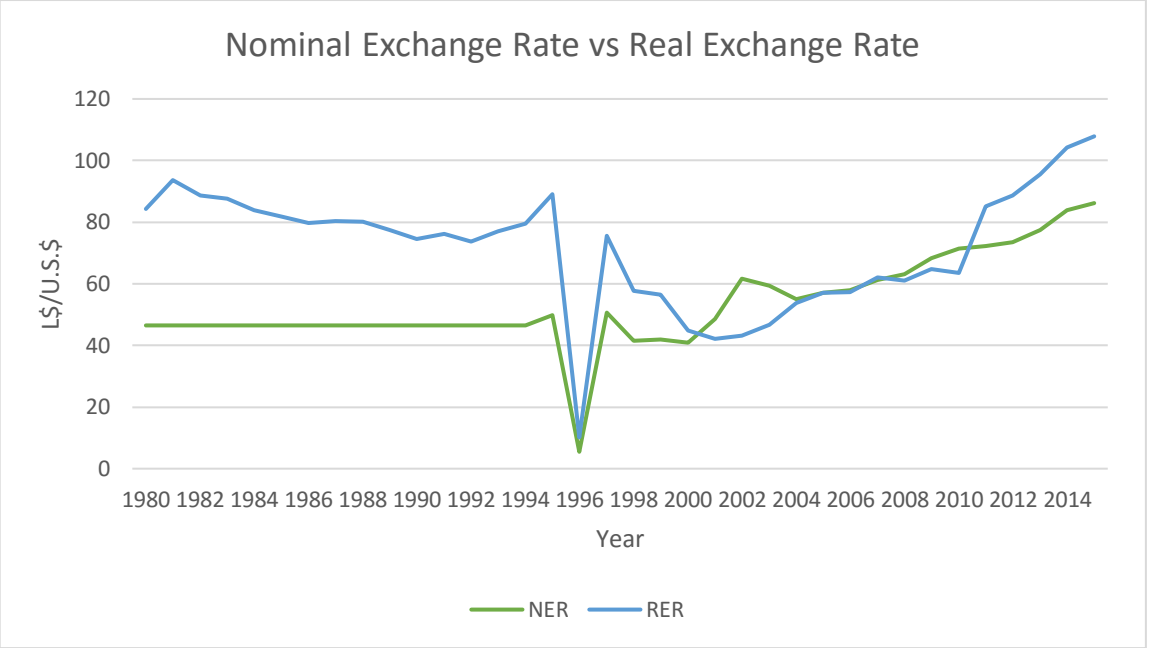
[1] Foreign trade and international trade are used interchangeably throughout this study.

continued with the full adoption of a floating/market-based exchange rate amidst limited monetary policy tools. The average year-end rate recorded between 1980 and 1994 was L$46.43 to U.S dollar, reflecting a stability in the exchange rate. While implementing a floating/market-based exchange rate regime in Liberia, there was, however, an 89% appreciation in the year-end average rate in 1996. Since then the exchange rate has shown gradual increase with the year-end average of 86.18 in 2015 reflecting a 2.72% percent depreciation in the value of the domestic currency from the previous year. This continuous growth in the exchange rate poses a severe problem on the economy.

Liberia, a small West African country with a population of approximately 4.6 million people as of 2016, is Africa's oldest independent nation. Its economy can be characterized as an export-based economy with export earnings making up huge portion of the government's revenue. Economic activities are more active and concentrated in the extractive industries—comprising of both agricultural and mining activities mainly operated by multinational firms and foreign concessionaires. The country's manufacturing sector is poor and households and firms mainly depend on imports from other countries for consumption. This high dependence on foreign trade seems to weaken Liberia's competitiveness on the world market concerning the trade of its major exporting products. The recent depreciation of the Liberian dollar against the United States dollar has received mixed reactions among many economists and policymakers. Some argued that the depreciation of the Liberian dollar is a good stimulus for export growth while others contested that the net benefits of depreciation cannot overshadow the cost on the economy.

This study uses nominal exchange rate, real exchange rate, export, import, trade balance, real gross domestic product (RGDP), foreign direct investment (FDI) and terms of trade (ToT) to capture the relationship and establish the short-run and long-run effect of nominal exchange rate and real exchange rate on foreign trade in Liberia using data from 1980 to 2015. The study employs an econometric model to establish the effect of foreign exchange and real exchange rate on foreign trade in Liberia and provides policy options for policymaker to implement.

Figure 1.1. *Nominal and Real Exchange Rates of Liberia (Yearly Average),1980-2015*



Source: *World Bank Development Indicators, World Bank Database, 2015 and Author's computation*[2]

In Figure 1.1, the nominal exchange rate and real exchange rate from 1980 to 2015 were presented. Here it can be seen that for all the periods up to 1999, real exchange rates were higher than nominal exchange rate. This shows that the relative price difference—the price level in foreign country—was lower than the domestic price level during these periods. In 2000, nominal exchange rate was equivalent to real exchange rate and for periods after 2000, real exchange rates were lower than nominal exchange rates up to 2010. This reflects that the price levels in Liberia were relatively low as compare to the foreign price level. Lastly, for the last 14 years before 2016, the real exchange rate seems to be greater than the nominal exchange rate indicating a relative increase in the domestic price level when compare to foreign price level.

1.2. Research Problem

The Liberian economy has a dual currency system with high dollarization. At the same time, the local currency, the Liberian dollar, continue to depreciate against the United States dollar. As noticed in other economies, such phenomenon can have damaging effect on economic activity and could affect inflation, export, import, terms of trade, economic growth, trade balance, etc. The continous increase in the exchange rate

[2] Note: Real Exchange Rates (rer) were computed by the author.

of Liberia's local currency relative to the U.S dollar have occurred side-by-side with fluctuations in foreign trade (exports and imports) over the past thirty-five years. This volatility in key macroeconomic variables is not unique to Liberia. However, fluctuations in the Liberian economy seems to have effect not only on foreign trade, but also on inflation as prices tend to increase. This could have a triggering effect on consumer spending, firms cost, wages and many other macroeconomic variables in the economy.

1.3. Purpose of the Study

Exchange rate regime and exchange rate fluctuations have serious macroeconomic implications in an economy. Theoretically, exchange rate affects inflation, foreign trade, capital account and other key macroeconomic variables. Since the last two decades, many least-developed countries in sub-Saharan Africa continue to experience fluctuations in the exchange rate of their local currencies and in their trade receipts. Foreign exchange rate does influence international trade as examined by many studies. As a least-developed country, Liberia's economy continues to experience depreciation of its currency—the Liberian dollar. This alarming situation makes foreign commodities more expensive and can also affect capital account and result to deteriorating terms of trade (ToT). This study attempts to examine the effect of the foreign exchange and real exchange rate on foreign trade volume in Liberia to support policy options towards achieving a better monetary policy stance and also contribute towards the existing literature in this field.

1.4. Significance of the Study

Since the start of the generalized floating exchange rate regime around the world, there has been considerable empirical and theoretical investigation regarding the effects of exchange rate changes on foreign trade. Most of these studies have been concerned with developed economics, with little consideration on least-developed and transition economies, probably, due to inavailability of quality data. This issue has also been prominent in policy debate. Yet, neither theoretical nor empirical work has converged towards consensus (Coric and Pugh, 2006). Liberia macroeconomic policies have eversince been towards improving export, strengthening industralization for the enhancement of the manufacturing sector and promoting the increment of import on equipments and michaneries for domestic production especially in agricultural and industrial sectors. Thus, it is important to know how nominal exchange rate and real exchange rate movements render trade policies ineffective. This study is important

because it has the propensity to determine the link between exchange rate and foreign trade and to also show whether exchange rate influence foreign trade of Liberia. This study will provide useful insight to policymakers with regards to implementing exchange rate regime at central banks and can also contribute to available literature in this field.

1.5. Assumptions

The basic assumption surrounding this research is that both nominal exchange rate and real exchange rate affect foreign trade in Liberia considering the period 1980 to 2015. The researcher expect both nominal and real exchange rates to have either positive or negative effect on foreign trade in Liberia.

1.6. Limitations

The researcher acknowledges that there are other exogenous variables that could influence foreign trade, but due to time constraint and other factors beyond control, only nominal exchange rate and real exchange rate will be considered as the main independent variables during this research.

1.7. Definitions of Key Terms

Exports: Exports are goods and services sent from a country to another country for sale.

Foreign Trade: Foreign trade/International trade is the exchange of goods, services, and capital across international borders or territories. In most countries, it comprises a huge share of total income of a country.

Imports: Imports are goods and services that are brought in a country from other country for sale purpose.

Dual Currency Regime: Dual Currency Regime is a monetary regime in which the country uses two separate currencies and legal tender within the economy.

Real Exchange Rate: Real Exchange Rate is termed as the ratio of the price level in foreign country and the home-counrty price level, such as the foreign-country price level is converted into the home-country currency units through the nominal exchange rate.

Nominal Exchange Rate: Nominal Exchange Rate is termed as the price of the number of units of the home-country currency that can buy a unit of a given foreign-country currency. Reduction in the numinal exchange rate is termed as an appreciation of the currency and *vice versa*.

Terms of Trade: Terms of Trade can be considered as the relative price of exports in terms of imports and at the same time it is considered as the ratio of export prices to import prices. It can be simply viewed as the amount of imported goods an economy can buy per unit of exported goods.

Trade Balance: Trade Balance is also known as Balance of Trade (BOT). It can be defined to as the difference between exports and imports of a country. When a country's import is higher than its export, the resulting negative number is considered as a trade deficit. And when the opposite holds true, a country has a trade surplus.

CHAPTER TWO

2. THEORETICAL AND RELATED LITERATURE REVIEW

This chapter contains both theoretical and related literature on the relationship between nominal exchange rate, real exchange rate, export and import as components of foreign trade.

2.1. Theoretical Relationship Between Exchange Rate and Foreign Trade

The theoretical relationship between exchange rate volatility and foreign trade balance has sparked serious debate in international economics for the past decades. Studies on this topic show that exchange rate volatility can have both positive and negative effect on the volume of trade. However, recent studies have emphasized more on the reverse causality between exchange rate and foreign trade and on the "pass-through" effect exchange rate has on inflation. Countries of the world make available goods and services for sale to each other based on the mutual benefits that are associated with trade. These gains from trade allow each country to specialize in the production of certain goods and services which they have competitive advantage and depend on other countries for other goods and services which they need. By doing this, all the participants benefit from foreign trade and thus, the importance of trade is realized. Foreign trade adversely affects the owners of resources that are "specific" to industries that compete with import, that is, they cannot find alternative employment in other industries. Trade has the propensity to alter the distribution of income between broad groups, such as workers and owners of capital. For one country to trade with another, exchange rate serves as a useful tool that allow people to compare the prices of goods and services produced in different countries and subsequently make purchase (Krugman, Obstfeld and Melitz, 2015 p. 234).

The trend in the exchange rate for many countries around the world in decades past has been increasingly disturbing. Foreign exchange rates for many developing and transition economies have been extremely volatile since the end of fixed exchange rates system in 1973. One crucial and critical question that is yet to be answered by many economists is the effect of such high exchange rate changes on foreign trade growth (Arize *et al*., 2012). This has been and may continue to be the subject of major concern for the next decade to come. Exchange rate volitality can have both negative and positive effect on foreign trade growth. Exchange rate volatility in this sense may be defined as

the risk connected with unanticipated movements in exchange rate[3]. As one of the most volatile macroeconomic variables, changes in real exchange rate have pervasive effects, with huge consequences for prices, wages, interest rate, productivity level and employment opportunities. Accordingly, large and unpredictable changes in exchange rates present a major concern for macroeconomic stabilization policy within an economy.

The liberalization of capital flows in the past years and the massive increase in the level of cross-country financial activities have enlarged exchange rate movements in emerging market economies. Currency crises are key examples of high exchange rate changes. Additionally, the move to a market-based exchange rate regime in some regions particularly Central and Eastern Europen and in other parts of Asia usually involves considerable degree of improvement of the international value of these countries' currencies. Volatility in exchange rate makes foreign trade more difficult because volatility increases exchange rate risk. For example see Donladi *et al.* (2015); Clark *et al.* (2004) and Arize, (1996). These studies show that exchange rate has an inverse effect on trade volume particularly export and that there also exist short-run and long-run relationship between exchange rate and trade volume.

In a separate work done by Doganlar (2002) where he investigates the impact of exchange rate volatility on export of five Asian countries including Turkey, South Korea, Malaysia, Indonesia and Pakistan, after performing an Engle-Granger residual-based cointegration, he came up with the result that exchange rate changes decreased real export values for these countries. This means that manufacturers in these countries are, to a larger extend, risk-averse and that they will choose to sell in home-country markets instead of foreign-country markets when exchange rate risk increases. Additionally, if manufacturers are not so risk-averse, a higher exchange rate could reduce the expected marginal utility of export revenues and hence leads them to produce smaller amount of export. Individuals that are very risk-averse usually worry about the worst possible consequence. Thus, when exchange rate risk increases, they will prefer to export more in order to avoid the possibility of a severe decline in their sales revenues. On another hand, individuals tha are less risk-averse are not so concerned with outmost outcomes. They view the benefit on export activity now as inattractive given the increase in risk and may choose to export (De Granuwe, 1988).

[3] See McKenzie (1999)

It has also been argued in other empirical studies that exchange rate volatility has an negative effect on the level of exports. However, while some researchers have been able to argue for the negative effects of exchange rate volatility on exports, others have also been able to argue for positive or no effects at all. In a recent study by Serenis and Serenis (2008), it was pointed out that exchange rate volatility may have no impact on trade and may as well have an effect in some other tendency such as on prices or foreign direct investment. This agrument was also supported by Aristotelous (2001), after studying the biletaral trade issue between the Bristish economy and U.S economy, he concluded that, among other things, exchnage rate volatility does not have any effect on export volume. To this end, the debate among economists as it relates to the effect of exchange rate on macroeconomic variables is yet to reach a conclusion.

2.2. Real Exchange Rate Changes and Trade Flows

Over the years, volatility in real exchange rate (RER) seems to have huge effect on export and import of goods and services especially in emerging and developing economies. While distance-related costs play an important part in the decision making of firms that are engaged in foreign trade and subsequently on the trade volume, fiscal policy tools such as tariffs and import quota could also have significant impact on trade as well. However, as evidenced by Odili (2015), tariffs may sometimes be ineffective especially in countries with poor export sector and overdependence on imported goods. This argument was further proven by Hayakawa and Kimura (2008), that in intra-East Asian where there exist the absent of tariff, trade is being discouraged by exchange rate volatility more seriously than the other regions. Secondly, one vital reason for this discouragement is that intermediate goods that are traded in foreign production networks, that is very vulnerable to exchange rate volatility compared with other types of trade, occupy a huge portion of East Asian trade.

Basically, in simplest form, the real exchange rate is termed as the nominal exchange rate that incorporates the price differences among the various countries. Its importance originates from the fact that it can be used as a key measure of trade competitiveness of a country (Akan and Arslan, 2008). As studied by Yuen-Ling *et al.* (2009), depreciation of a country's currency has tremendous impact on its trade balance, but the impact may vary, especially due to different level and stage of economic development. One major impacts is the Marshall-Lerner condition which denotes that in

the long-run, real depreciation may increase the trade balance given that the total value of import and export demand elasticity exceeds one. Real depreciation in exchange rate strengthens the trade balance via two important channels. The first is by increasing the quantity of export. Depreciation of a country's currency means that the home-country products will be less expensive as compared to the foreign-country products, thereby creating a more competitive export. Secondly, quantity of imports will ultimately decrease, as import is relatively more expensive. On the other hand, import and export values might not be responsive initially at the start of depreciation. Thus, the trade balance could deteriorate at the outset due to decreasing export value and increasing import value, but may improve after with time.

Real exchange rate volatility may have influence on both export and import in the short-run and long-run. The real exchange rate is one vital economic indicators of international competitiveness, and therefore, has a robust influence on a country's foreign trade developments. In particular, the effect of real exchange rate developments on foreign trade has eversince been an issue of discussions in developed, developing and transition economies. The link between exchange rate movements and foreign trade has been studied in a large number of both theoretical and empirical papers in recent years. Most studies Olimov and Sirajiddinov (2008), Arize *et al.* (2000) and Vergil (2002), show that real exchange rate, approximating for exchange rate uncertainty, exerts a huge negative effect on trade volume particularly export demand in both the short-run and the long-run.

However, some recent regional studies have been directed towards evaluating the reverse relationship between real exchange rate and trade volume among countries. While controlling for reverse causality, Broda and Romalis (2003) realized that deeper bilateral trading relations tend to dampen real exchange rate volatility and are much likely to lead to currency union. Rahutami (2013) provided evidence in a study on the ASEAN Economic Community that exchange rate volatility has no statistically significant effect on the export and import of ASEAN member states (AMSs)[4]. The estimation results also revealed that the increasing trend of terms of trade will induce the export value. The home country's income shows a positively significant effect on import value, but the real

[4]ASEAN is the Association of Southeast Asian Nations comprising of ten (10) Southeast Asian states which promotes intergovernmental cooperation and economic integration amongst members states.

exchange rate has a negative significant effect. However, based on the literature reviewed, the researcher cannot, *a priori*, the direction of the effect of nominal and real exchange rates on foreign trade in Liberia.

2.3. Foreign Exchange Market and Exchange Rate Regimes

In an economy, prices are determined by the interaction of buyers and sellers. Similar phenomenon holds true for exchange rates—that is, exchange rates are determined by the interaction of businesses, consumers and financial institutions that purchase and sell foreign currencies for the purpose of making international payments as a mean of facilitating foreign trade and international transactions (Krugman and Obstfeld, 2006: p. 310). These financial transactions usually take place in a foreign exchange market. But the extent to which the exchange rate movements can reach could spark a triggering effect on other macroeconomic variables in an economy, since both households and firms are always concern about the effect exchange rate policy and exchange rate uncertainty may have on future prices and eventually on demand.

The main purpose of exchange rate policy must be to attain a viable balance of payment (BoP) position, subject to maximizing resource utilization, holding price inflation within limits acceptable to society, and minimizing protection. Foreign exchange rate policies that are usually implemented are important means of determining the economic policies which are pursued by the central government; because of the liberalization of trade and very rapid and free movement of capital. Even though the exchange rate regime in developing market economies basically do not occur as normal policy introduction but as the changes in regime which are forced by crisis, the selection of an optimum exchange rate regime is key in reducing the fragileness of countries against crisis (Akan and Arslan, 2008).

However, the selection and implementation of an exchange rate regime should carefully take into consideration major macroeconomic issues especially a country's productivity strength. In an economy where export is relatively low as compare to import, there can always be huge pressure on the local currency in the foreign exchange market usually resulting to depreciation of home country's currency. Even if export is high, the lack of competitiveness at home and abroad can also lead to depreciation of the local currency since local firms are easily affected by external shocks from foreign markets.

Central Banks all around the world always change and adopt to new exchange rate regime that is deemed necessary and better for the economy at a point in time. In recent years, many countries including Liberia decided to adopt to a managed/float exchange rate regime. The International Monetary Fund (IMF) have a de facto classification of exchange rate that categorized all the countries of the world in various classes as per the exchange rate system being employed. These classifications can be considered as:

- Exchange Rate Regime with no Separate Legal Tender: In such case, currency of a particular country circulates as the only legal currency (formal dollarization) in a home-country economy. And if a country is a member of a monetary or currency union in which the same legal tender is being used by other member states of the union, adopting such regimes means a full surrender of the monetary authorities' control over home-country monetary policy.
- Currency Board Arrangements: A monetary regime based on a specific legislative commitment to exchange home currency for a foreign currency at a fixed exchange rate, coupled with limitations on the issuing authority to ensure the fulfillment of its legal obligation.
- Conventional Fixed/Peg Arrangements: In this sort of arrangement, a country fixes its currency within margins of ±1 percent or less *vis-à-vis* another country's currency. Monetary arrangement such as the ERM II[5] or a basket of currencies, where the basket is developed from the currencies of key trading or financial partners and weights reflecting the regional distribution of trade, services, and capital flows.
- Pegged Exchange Rates within Horizontal Band: This is an exchange rate regime where the value of a country's currency is maintained within certain margins of fluctuation of more than ±1 percent around a pegged main rate or the margin between the maximum and minimum value of the exchange rate exceeds 2 percent.
- Crawling Pegs Exchange Rate: In such a regime, the currency is adjusted occasionally in insignificant amounts at a fixed rate. Implementing a crawling peg exchange rate regime could inflict limitations on the overall implementation of monetary policy in a way just like a fixed peg system.

5 Exchange rate mechanism **II** (**ERM II**) is a form of exchange rate regime that requires all EU countries wishing to adopt the euro as their currency to fix their exchange rates to the Euro. Currencies that are participating may only fluctuate by a maximum of ± 15% around the central euro rate.

- Exchange Rates within Crawling Bands: This is a regime where the currency is maintained within certain fluctuation margins of at least ±1 percent around a central rate—or the margin between the maximum and minimum value of the exchange rate exceeds 2 percent—and the central rates or margins are adjusted occasionally at a fixed rate or in response to changes in selective quantitative indicators. The degree of exchange rate flexibility is a function of the band width
- Managed Floating with no Predetermined Path Exchange Rate Regime: In this exchange rate regime, the monetary authority attempts to influence the exchange rate without having a specific exchange rate path or target. Indicators for managing the rate are broadly judgmental, and adjustments may not be automatic. Intervention may be direct or indirect.
- Independently Floating Exchange Rate: This is an exchange rate regime where the exchange rate is market-determined, with any official foreign exchange market intervention aimed at stabilizing the rate of change and preventing undue fluctuations in the exchange rate (IMF, 2006).

2.4. Exchange Rate Risk and Foreign Trade

In an economy, both households and firms are always concerned about the risk related to exchange rate volatility. Multinational firms are usually unease about exchange rate risk management in a way that allow them to have competitiveness when making decision about participating in foreign market. Exchange rate changes present serious risk to firms in many ways. These risks can be classified as below:

- Transaction risk, this may arise as the result of the effect exchange rate fluctuations on a firm's obligations. Additionally, it is simply cash flow risk and deals with the effect of exchange rate movements on transactional account exposure related to receivables (export contracts), payables (import contracts) or repatriation of dividends. An exchange rate movement in the currency of denomination of any contract will result to a direct transaction exchange rate risk to the firm;
- Translation risk, this risk allows fluctuations in the exchange rate of a currency to affect the balance sheet of a firm. Translation risk for an international company is always measured by the vulnerability of its assets to possible exchange rate movements. As a means of merging together financial statements of a company, conversion may be carried out while considering the end-of-the-period exchange rate

depending on the firm's accounting guidelines. Therefore, while income statements are generally converted at the average exchange rate over the period, and

- Economic risk, which reflects basically the risk to the company's present value expected cash flows from exchange rate movements. Economic risk concerns the effect of exchange rate changes on revenues and operating expenses. Economic risk is usually realized from the present value of expected cash movement of the operations within a company and it branches. Identifiying many currency risk, and designing measures to avoid them is important to develop a strategy for managing currency risk (Papaioannou, 2006).

2.5. Monetary Policy and Exchange Rate Regime of Liberia (1980-2015)

Liberia has a dual currency regime where both Liberian dollar and United States dollar are legal tenders. It operates a managed-float exchange rate regime with no predetermined path and carried out regular foreign exchange interventions to even out major fluctuations in the exchange rate. The Central Bank of Liberia (hereafter, the CBL) employed a monetary policy focused mainly on maintaining price stability as the primary monetary policy objective. As the only policy tool to help contain inflation at a moderate level, the exchange rate sale auction is reviewed regularly with the aim of enhancing its use in the management of Liberian dollar liquidity. As a mean of implementing prudent monetary policy that is geared toward maintaining low and stable inflation while ensuring availability of sufficient credit to the private sector by commercial banks, the CBL made huge credit available to commercial banks and to credit unions by reducing the interest rate and extending the repayment date. This has only help a little in increasing the liquidity of the Liberian dollar in the economy as there has been increasing volatility in the exchange rate of the Liberian dollar *vis-à-vis* United States dollar in recent years.

Against the backdrop of increased pressure on the foreign exchange market, which started in mid-2004, prudent management of Liberian-dollar liquidity was thought to be important in helping to maintain price stability. The CBL also started accelerating work towards deepening the money market, by encouraging an active interbank market, which was unable to take-off due to the Ebola crisis, and widening participation at the CBL's bills auction to include private firms and, subsequently individuals. Moreover, the CBL, working with the Government, intends to make available more short-term, convertible financial instruments as additional tool for liquidity management by allowing for the

conversion of a portion of the Government of Liberia's long-term non-convertible debt with the CBL.

In the context of developing the framework for the establishment of a capital market, the bank has started making effort in establishing a capital and financial market in the economy. The CBL continues to intervene in the foreign exchange market to help smooth movements in the exchange rate, but will consider the priority the Government has placed on the accumulation of reserves which is expressed in terms of specific targets for the level of reserves at given dates under the program with the International Monetary Fund (IMF). It is important to note that the stability or value of the Liberian dollar largely depends on the ability of the economy to produce for both local consumption and export.

2.5.1. Dollarization and dual currency in Liberia

A simple and fundamental definition of dollarization can be considered as the holding by residents of a significant share of their assets in the form of foreign currency-denominated assets, particularly the U.S dollar. Often, there seems to be a huge disparity between official (or *de jure*), and unofficial (or *de facto*) dollarization. Where the former can be viewed as a situation in which foreign currency is given exclusive legal tender status in a country. This implicitly states that the foreign currency is used for purposes a currency may have, including as a unit of account for public contracts. On the other hand, *De facto* dollarization involves a situation where a foreign currency is being used alongwith the home currency as means of exchange, mainly for transaction purposes, that is, as currency substitution or as means of saving in hard currency in the form of asset.

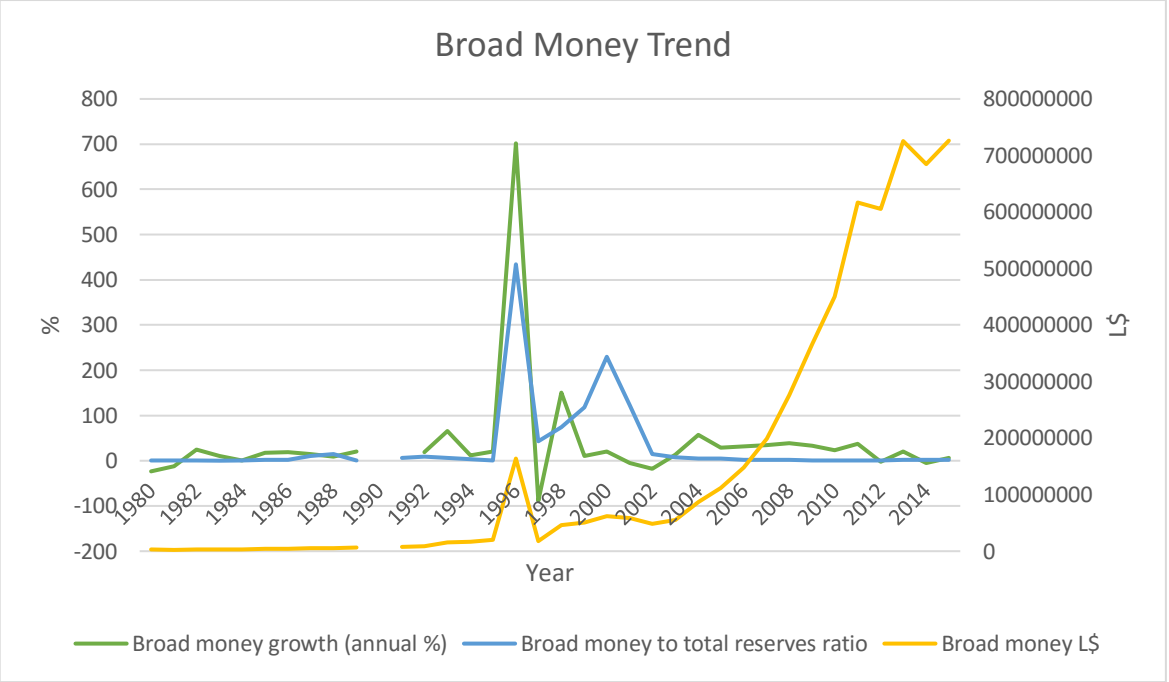
As the case is in Liberia, the United States dollar has been used as a medium of exchange along with the local currency (the Liberian dollar) for many years now. Most of the huge financial transactions in the country are usually carried out in U.S dollar. The literature on dollarization and its impact on the economy is not clear as to how and to what extend dollarization may affect monetary policy. But one thing that is certain is that the parallel circulation of a domestic currency and foreign currency either as means of payment or as store of value will definitely affect the conduct of monetary policy in some way or the other and, ultimately, the inflation outcome. As evidenced in Liberia, the high degree of dollarization which has existed for many decades now seems to affect the monetary policy being implementing by the central bank. This high dollarization is increasing the demand for the U.S dollar and at the same time reducing the demand for

the local currency (the Liberian dollar), hence causing depreciation in the Liberia dollar *vis-à-vis* the U.S dollar (Lorena, *et al*, 2016 and Alvarez-Plata P. and Garcia-Herrero A, 2008).

The adoption of the U.S currency as legal tender in Liberia is dated back to the country's independence. Even today, the Liberian dollar continue to be used for small-scale transactions and, to a limited extent, as the currency for bank deposits while U.S dollar is widely used for trade and financial transactions and for larger cash payments. Since 1847, Liberia economy has been either fully or mostly dollarized**.** Foreign currencies have always been important to the Liberian economy, both as a store of value and as a medium of exchange. The choice of currencies was dictated by the country's close economic ties with British, West African colonies and the United States. Since independence, Liberian dollar coins have circulated, but banknotes have been used more sparingly. While Liberian currency was issued at par with the U.S. dollar up to 1973, substantial fluctuations in exchange rates in the parallel market started to occur during the mid of 1974 (Erasmus, Leichter and Menkulasi, 2009).

Being cognizant of the fact that high dollarization in the Liberian economy is contributing towards the depreciation of the Liberian dollar against the US dollar, the CBL ignited the move from dollarization to de-dollarization with an attempt to slowly de-dollarize the economy. This process, which started in 2016, initially requires all commercial banks to pay personal remittances, which is usually paid in US dollar, partly in Liberian dollar. The notion is this unconventional policy instrument might, to some extend, reduce the demand for U.S dollar while at the same time increase the demand for Liberian dollar thus reducing the depreciation of the local currency vis-à-vis the US dollar. Figure 2.1 presents broad money (M2), broad money as a ratio to total reserve and broad money growth rate for the periods 1988 to 2015. During the year 1996, there was a 701.79 % growth in broad money (M2). In the year after, there was -88.78% growth in broad money (M2) due to civil unrest. And since than, there has been steady growth in broad money in the Liberia economy.

Figure 2.1. *M2 growth, broad money to reerve ratio and broad money (M2)*



Source: *World Development Indicators (WDI), World Bank Database, 2016*

2.5.2. Financial inclusion and access to credit

Financial inclusion means that individuals and businesses have access to beneficial and inexpensive financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way. Access to a bank account is a first major step toward broader financial inclusion since it allows people to store money, and send and receive payments. A bank account can also serve as a gateway to other financial services, which is why ensuring that people worldwide can have access to a bank account is the one main focus of the World Bank Group's Universal Financial Access 2020 initiative. Financial access facilitates day-to-day activities, and helps families and businesses plan for everything from long-term goals to unexpected emergencies. As account holders, people are more likely to use other financial services, such as credit and insurance, to start and expand businesses, invest in education or health, manage risk, and invest in financial shocks, which can improve the overall quality of their lives (WorldBank, 2016).

Despite some efforts made, there are still many challenges in ensuring financial inclusion in Liberia. As of 2015, there were nine licensed commercial banks operating in the Liberian banking sector. These banks are making efforts in establiahing branches in various counties in Liberia. There has also been progress in the presence and operations

of non-bank financial institution as the number of registered microfinance institutions now amounts to eighteen [6]. These microfinance institutions are key in providing micro loans to rural dwellers. Other financial coorperatives such as credit union, rural community finance institute and village saving and loan association are also playing a pivotal role in achieving financial inclusion and access to credit in Liberia, but there seems to be huge challenges ahead in creating a financial inclusive environment. Table 2.1 provides Liberia's Financial Indicators for the past 12 years.

Table 2.1. *Financial Indicators for Liberia 2004-2015*

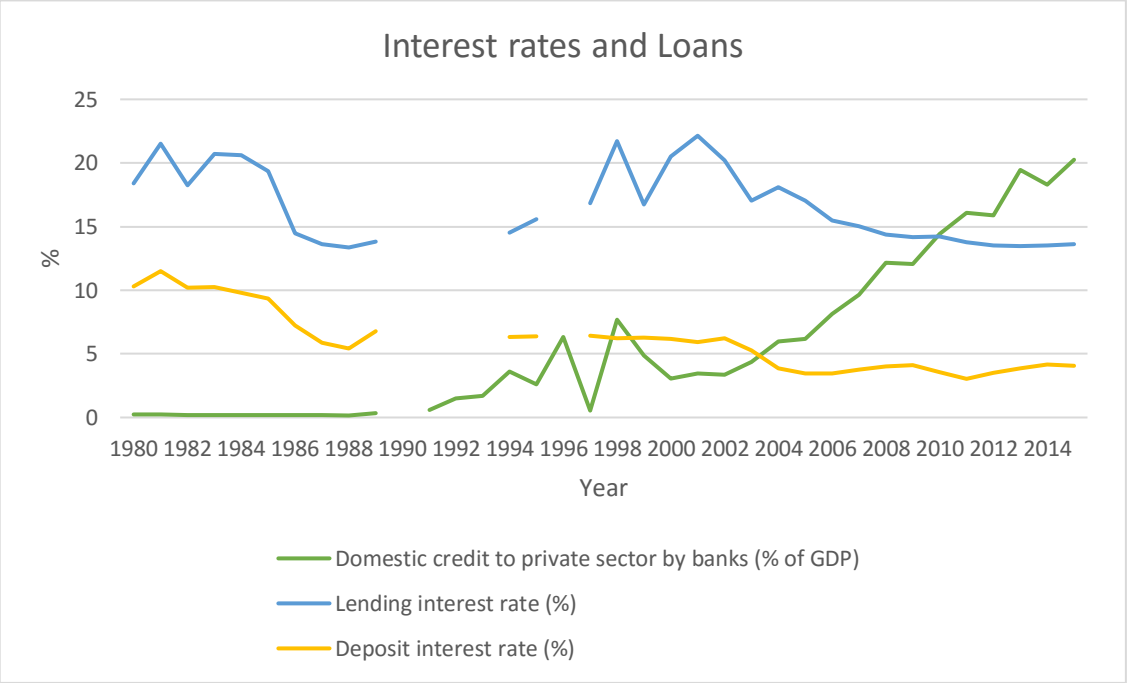
Year	M2/GDP	Current account balance (current US$)	Net financial account (current US$)
2004	18,25496082	-159726914,2	-217279140,3
2005	20,31156163	-183546381,8	-222797379,4
2006	24,4929631	-172814378,9	-271221180,3
2007	26,98185294	-223159911,4	-299117215,3
2008	32,43475903	-354304953,9	800002816,3
2009	31,69075447	-277191423,3	960317701,4
2010	34,8145751	-415239156,6	1072925558
2011	39,92267727	-755654779,2	-782472713,9
2012	34,90576735	-479940678,1	-783185764
2013	37,26126763	-535768739,1	-799127264
2014	33,99734622	-1611433992	-912855845,8
2015	35,37621493	-859626470,9	-1036276236

Source: *World Development Indicators, World Bank Database, 2017*

[6] See Central Bank of Liberia's website

One of the major problems is the high risk associated with providing credit to businesses. This and other risks are embedded in the high interest rate couple with the short payment periods. In some instances, financial institution that are more risk-averse usually request for collateral when providing credits to businesses. All of this aid in discouraging businesses especially small and medium-sized businesses from accessing credit from financial institutions.

Figure 2.1: *Interest Rates and Loans, 1980-1989, 1991-2015*



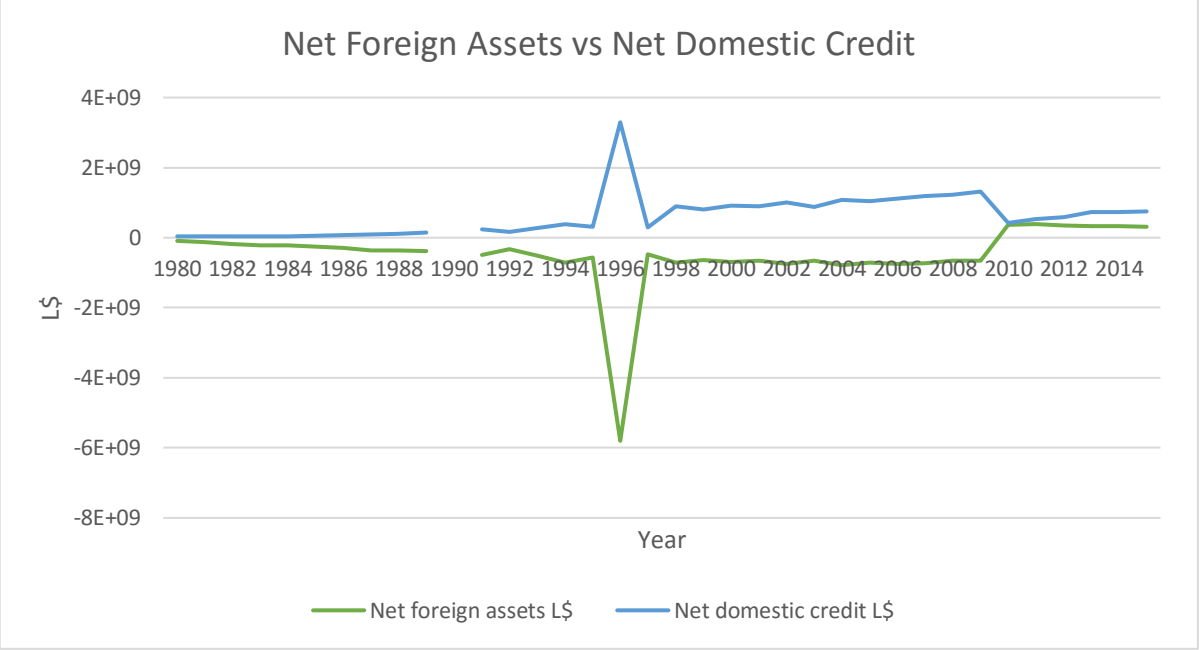
Source: *World Development Indicators (WDI), World Bank Database, 2016*

Domestic credit to private sector can be considered as the financial resources provided to the private sector by financial corporations and institutions, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. Figure 2.1 presents the lending rates, deposit rate and of domestic credit to private by commercial banks as percentage of gross domestic product. The lending interest rates for all periods far exceed the deposit interest rates and in some periods, double the deposit interest rates. Both lending interest rates and deposit interest rates seem to fluctuate over time. On the other hand, domestic credit as a percentage of gross domestic product fluctuated between the years 1994 and 2000. It

started increasing in 2001 and reached its maximum at 20.25% during the periods under consideration in 2015.

At the same time, net domestic credit being hold by the central bank and commercial banks in Liberia was recorded to be at its peak during the start of 1996 and became volatile up till 2015 as indicated by figure 2.2. In contrast, net foreign asset reached its lowest in 1996 due to the start of the civil war. This shows the immediate impact of the war on foreign investors decision to withdraw their investments from the country.

Figure 2.2: *Net Foreign Assets and Net Domestic Credit of Liberia, 1980- 2015*



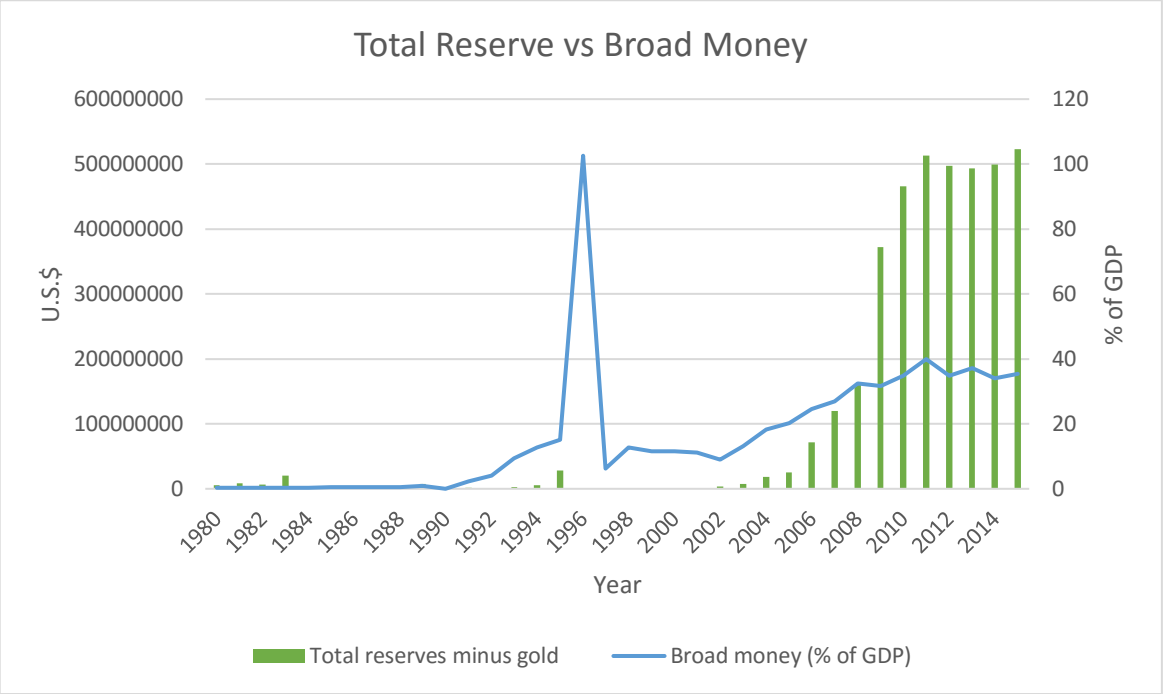
Source: *World Bank Development Indicators (WDI), World Bank Database, 2016*

2.5.3. Foreign exchange auction

The effectiveness of official intervention in foreign exchange market by central banks is a pivotal policy stance for governments in transition and developing countries to carefully consider. Many developing and transition economies have adopted foreign exchange auction as part of their monetary policy tools to serve as an intervention instrument enabling central banks to smooth the fluctuations in the exchange rate. Regarding the means through by which official foreign exchange interventions can be done., the literature is not clear, particularly, as the foreign exchange market is far from homogeneous. However, the widely used channel as indicated in most literature are the portfolio balance effect and the signaling or expectation effect. Intervention changes the

balance between home and foreign-currency-denominated assets in the market when considering the protfolio balance effect, which encourages investors to adjust their portfolio, thereby changing the market exchange rate. In contrast, during the signaling effect, information spread in the interventions increases investors expectations regarding the future spot exchange rate, leading to an immediate change in the current market exchange rate (Kubo, 2015). As one of the main policy tools available, exchange rate auction is done regularly by the Central Bank of Liberia (CBL) as a means of stabilizing fluctuation in the market exchange rate. Figure 2.3 shows the foreign exchange reserve and broad money as a percentage of gross domestic product of Liberia from 1980 to 2015. Here, it can be easily noticed that the country's total reserve seems to increase overtime while there has been fluatuations in broad money as a percentage of GDP.

Figure 2.3: *Foreign exchange reserve and Broad Money of Liberia, 1980-2015*



Source: *World Development Indicators, World Bank Database, 2015*

2.5.5. Remittances, exchange rate volatility and GDP growth in Liberia

2.5.5.1. *Inward remittance to Liberia*

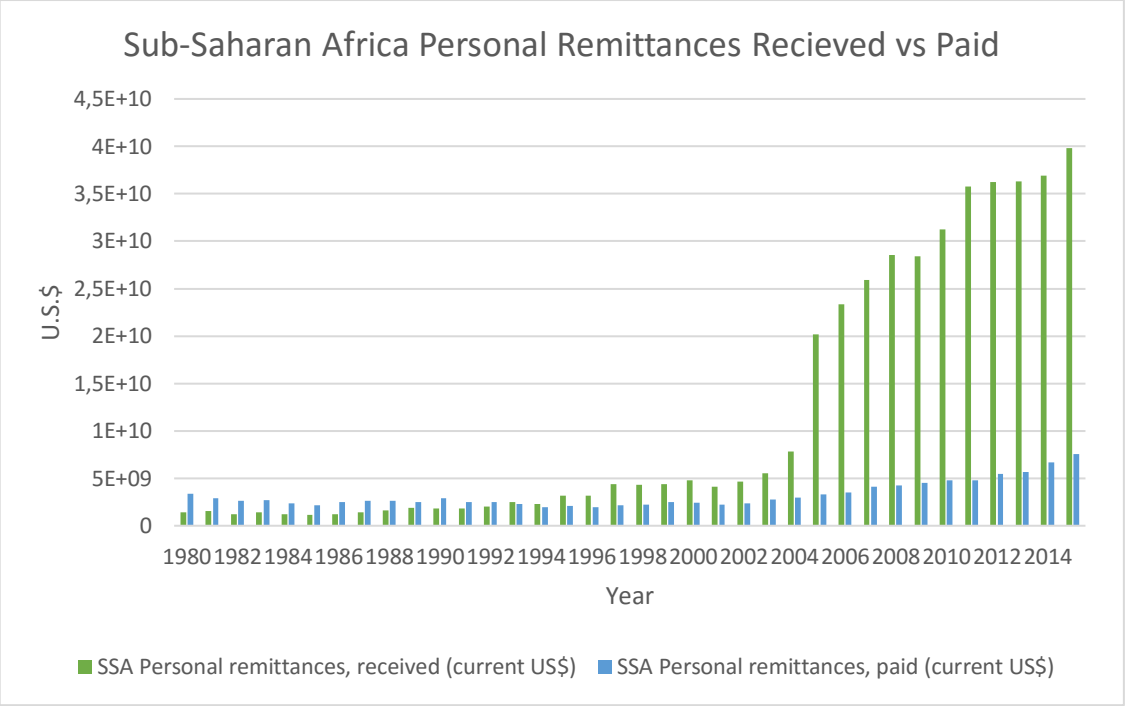
Workers remittances—transfers from international migrants to family members in their country of origin—is playing a pivotal role in the economic growth and poverty reduction of many developing countries especially Sub-Saharan African countries[7].

[7] Sub-Saharan countries are 44 African countries that are situated beneath the Sahara Desert.

Increases in remittance flows have greatly assisted these countries to minimize the problem arising from shortages of foreign exchange reserve which is badly needed to pay the import bills. It is undeniable that during their earlier stage of development, developing and transitional countries like Liberia, Nigeria and Ghana need the scarce foreign exchange to pay for their import requirements. Remittance inflow, in some instances, could lead to high capital accumulation which may lead to growth in labor market. According to the World Bank, the total money transfers by Africans living abroad to their region or home country surged by 3.4% to $35.2 billion, in 2015. The sum which includes intra-African transfers, represents 6 percent of total transfers by migrants worldwide to their region or country of origin. The total migrants transfers worldwide, though lesser compared to the previous year is estimated at $581.6 billion. Over the past four years, transfers by African migrants to their homes reached $134 .4 billion (WorldBank, 2016).

For most part of Africa, remittances also serve as a major source of income for many particularly the unemployed. As discussed by Gupta, *et al.* (2007) that the trend of remittances to Sub-Saharan Africa (SSA) has been rather increasing; since 2000, remittances to SSA have witnessed an increase of approximately 55 percent in U.S. dollar. This increament is spread across countries. Additionally, the official remittance values are a tiny protion of total remittances SSA recieved. In Liberia, there has been similar trend in the flow of inward personal remittance. Many unemployed depend heavily on remittance from family abroad to finance their personal consumption expenditures. Personal remittance contributes to a huge portion of total source of consumption spending and also make up a significant portion of the gross domestic product (GDP). Despite the unavailability of many studies on the impact of remittance on macroeconomic performance in an economy, it safe to say that remittances have a huge impact of monetary policy outcome in an economy, most certainly, in a dual currency regime. Elsewhere in Liberia, remittances play an inprtant role in the developmental process serving as a major channel for investment and consumption expenditure by firms and households respectively. These financial transfers are recieved in foreign currency, particularly the U.S dollar. This usual increase in the demand of the U.S dollar by households and firms reduces the demand for the local currency.

Figure 2.4. *Inward and outward remittances to Sub-Saharan Africa, 1980-2015*



Source: *World Development Indicators, World Bank Database, 2015*

Figure 2.4 depicts the trend in the total presonal remitances inflow and outflow to and from Sub-Saharan African countries from 1980 to 2015. For all the periods before 1994, remittances outflow, that is personal remittances paid, from Sub-Saharan African countries exceeded remittances inflow, that is personal remittances recieved, to the region. During the periods, 1994 to 2000, remittances recieved, though higher than remittances paid, there exists fluctuations in the movements of personal fund of the region. However, from 2001 up to 2015, there seems to be a rather increasing trend in remittances recieved relative to remittances paid out of Sub-Saharan Africa. Though unequally shared across Sub-Saharan African countries, these funds serve as catalyst that aid in the growth and development of many countries in the region.

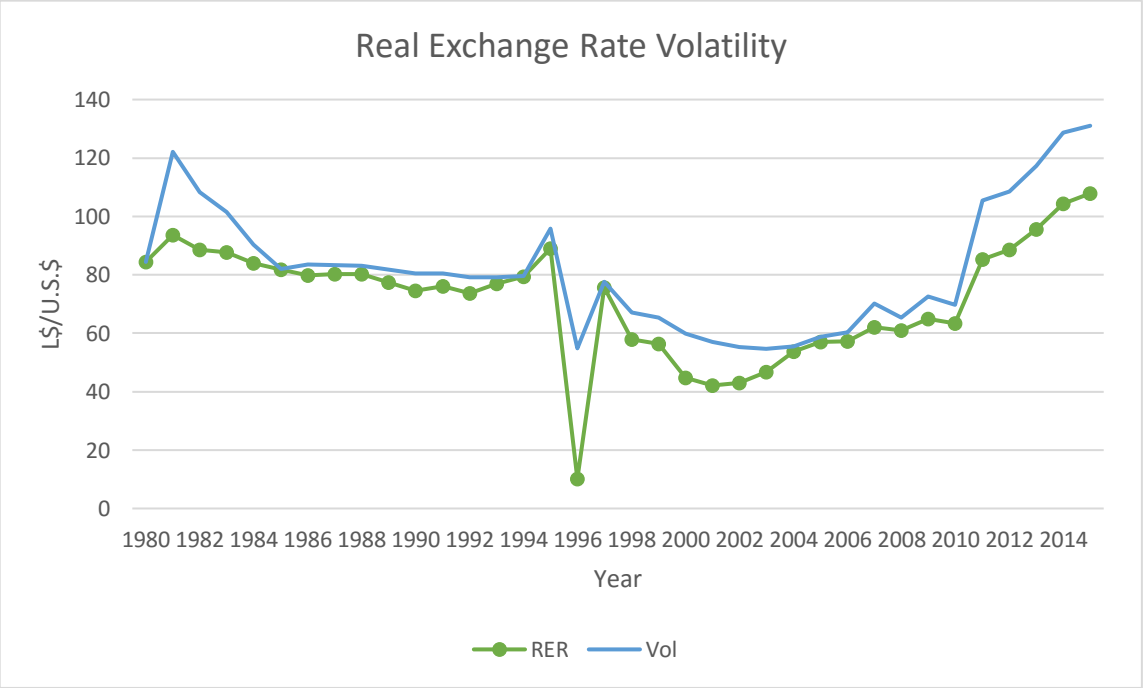
2.5.5.2. *Exchange rate volatility in Liberia*

Liberia's dual currency regime denotes that the Liberian official currency (Liberian dollar) is the official currency and the United States dollar is a legal tender and is used alongside the Liberian currency. Liberia adopted a fixed exchange rate regime between 1981 and 1997, with the Liberian dollar pegged to the United States dollar at a fixed parity. Since 1998, the Liberian dollar has floated freely against other foreign

currencies, especially the United States dollar. In 2000, the Central Bank of Liberia adopted a managed float exchange rate regime. Following this transformation, the exchange rate which remained stable under the fixed exchange rate regime, witnessed a significant depreciation rate of 97.7 percent in 1998, but appreciates thereafter. The currency further depreciated from 7.6 percent in 2000 to 23.9 percent in 2002. The value of the domestic currency; however, remained relatively stable between 2005 and 2010 (Tarawalie, A. B., *et al*, 2012).

Figure 2.5. shows movements in the real exchange rates alongside its risk measured as the volatility of real exchange rate for the periods 1980 to 2015. The moving average growth rates of the real exchange rates seem to be rather huge for most of the periods under review. The exchange rate risk measured by the volatility in the real exchange rate in Liberia seems high and its deviation from the actual exchange rate value was high during most of the period.

Figure 2.5: *Real Exchange Rate Volatility in Liberia, 1980-2015*

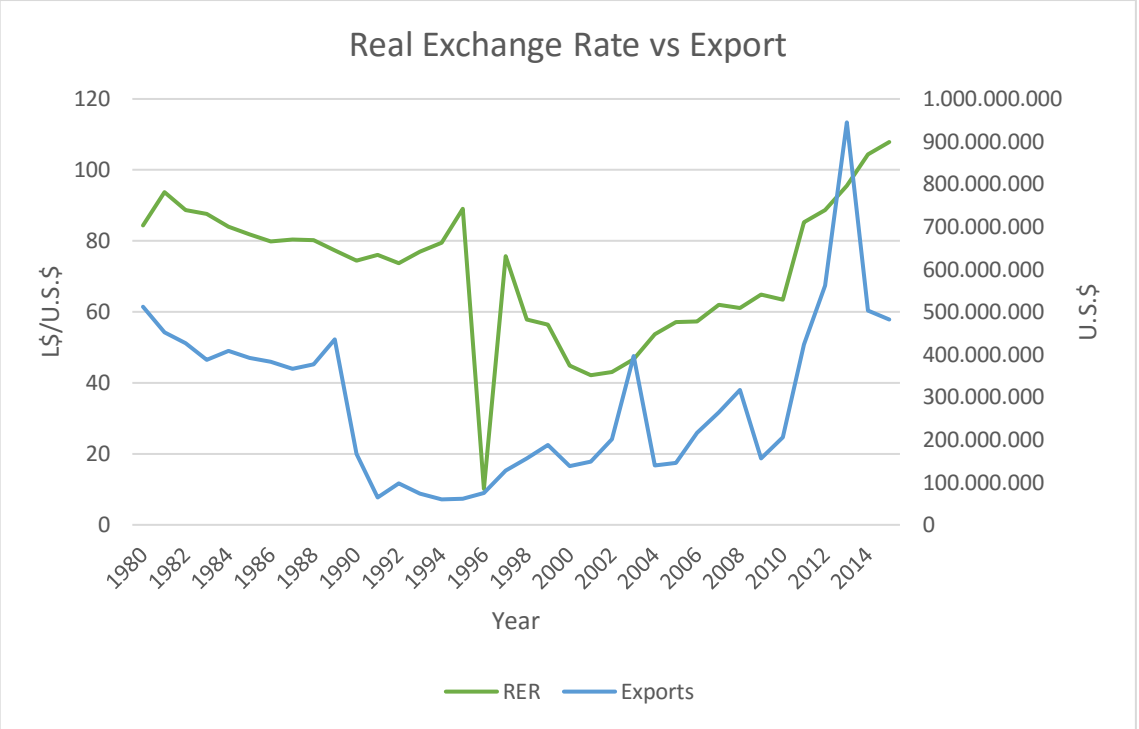


Source: *Author's computation*

Figure 2.6 presents fluctuations in the real exchange rate and export values from 1980 to 2015. The real exchange rate reached its lowest during the civil crisis in 1996. This was partly due to the fixation or pegging of the exchange rate and the underground economic activities that characterized the war. In 2015, real exchange rate reached its highest of 107.86 Liberian dollar per United States dollar. Export, on the other hand, has

been highly volatile during the 35-years period. It was at its maximum in 2013 as the result of the increase in concession activities in the extractive industries—particularly the export of iron ore, rubber, timber, etc. In 2015, export value dropped due to the reduction in the price of major commodities on the world market and the impact of the health crisis caused by the Ebola virus disease.

Figure 2.6: *Real Exchange Rate (RER) and Export, 1980-2015*



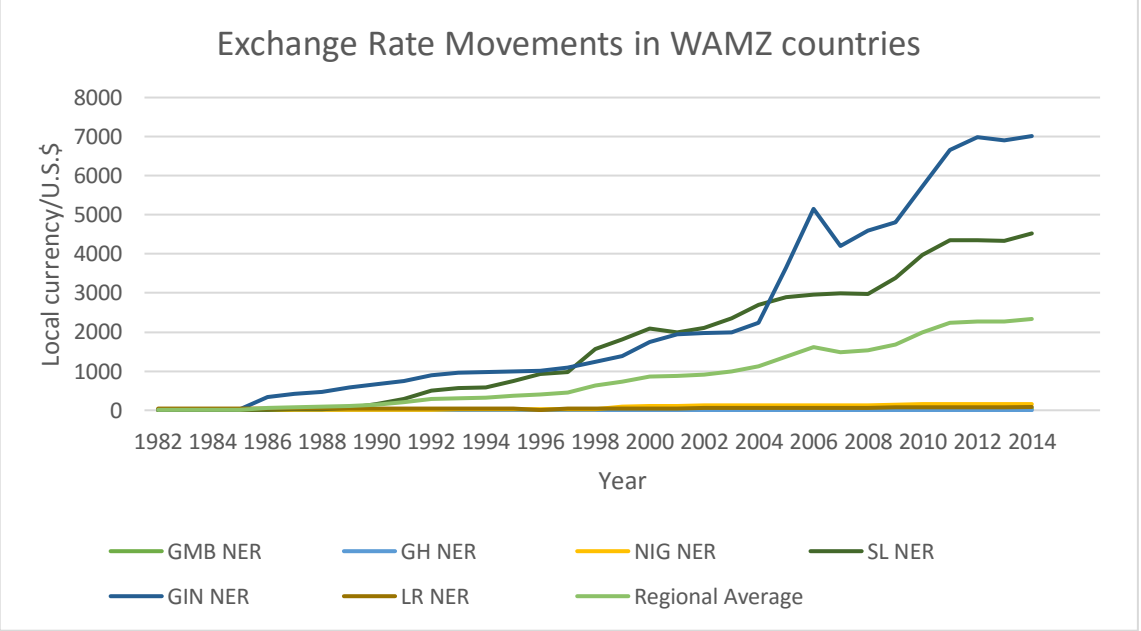
Source: *National Accounts, United Nations Statistics Division, 2015*

2.5.5.3. *Exchange rate volatility in other WAMZ countries*

Liberia is a member of a monetary zone comprising of other West African countries with the aim of establishing a single currency among its member states. These countries which include Nigeria, Ghana, Gambia, Sierra Leone and Guinea have also experienced serious volatility in the exchange rates of their respective domestic currencies. The WAMZ countries view exchange rate as a major monetary policy tool that allows for the enhancement of a country's trade competitiveness and also promoting export performance and achieving economic growth. These countries central banks' exchange rate policies are aimed at promoting exchange rate stability and aiding the central bank aim of achieving growth in exports. In this direction, they all have adopted favorable trade policies geared towards ensuring export growth that could lead to long-

run economic growth. These increased liberalizations of trade and foreign exchange controls, policies towards export promotion and trade agreements with other countries have given WAMZ countries better advantage to participate actively in the foreign market. Most of them have experienced depreciation in their domestic currencies relative to the United States dollar. Figure 2.7. presents exchange rate movements in each of the WAMZ countries. It shows that Sierra Leone and Guinea had the highest depreciation or relatively the weak currencies in the region. Their respective exchange rates are far above the regional average (Tarawalie, A. B., *et al*, 2012).

Figure 2.7. *Nominal Exchange rate movement in WAMZ countries, 1980-2014*



Source: *World Development Indicators, World Bank Database,2015 and Author's computation*

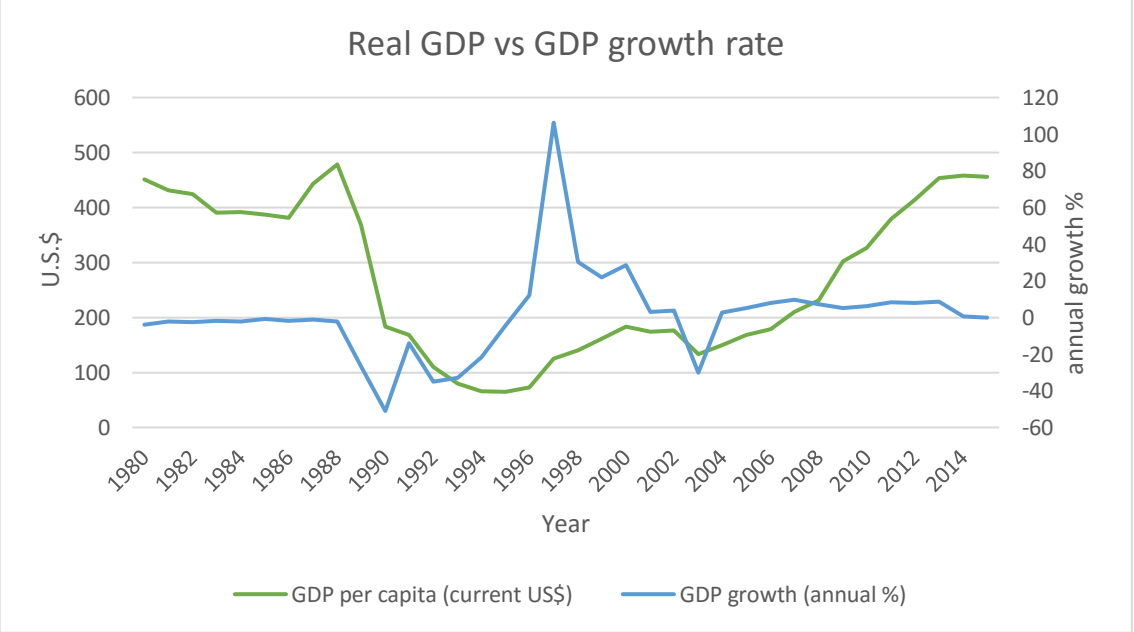
2.5.5.4. *GDP growth in Liberia*

Gross Domestic Product (GDP) is one of the important macroeconomic variables use for measuring economic performance in many economies in the world[8]. Liberia's economic performance has been severely volatile since 1980. Between 1980 and 1988, Liberia experienced continious economic decline, with the GDP growth rate twinkling between -4 and -2 percent. From 1988 to 1995, the GDP growth rate dropped

[8] Most countries aside than the United States report gross domestic product (GDP) rather than GNP as their main measure of national economic activity (Krugman and Obstfeld, 2006).

considerably, reaching a low of -51.0 percent in 1990. From 1996 to 2002, Liberia experienced exceedingly high economic growth, with the GDP growth rate reaching a high of 106.3 percent in 1997. In 2003, the GDP growth rate again declined, falling to -32.8 percent. However, throughout 2003-2013, real GDP had a growth rate on average of 7 percent, with agriculture and services sectors accounting for huge portion. Comodity price increase along with the health crisis resulted to decline in the country's growth rate to 0.7 percent in 2014. Figure 2.8. shows real GDP and GDP growth rates of Liberia from 1980 to 2015 (IMF, 2016 and ReSAKSS, 2015).

Figure 2.8. *Real GDP and GDP growth rate of Liberia, 1980-2015*



Source: *World Development Indicator (WDI), World Bank Data Base, 2015*

2.6. Trade Openness, Export Diversification and Import Outlook of Liberia

Simply put by Blanchard and Johnson (2013), trade openness result to the ability of consumers and firms to choose between domestic goods and foreign goods. This choice of restrictions is not free in any country. Regardless of how committed a country is to free trade, tariffs—taxes on imported goods—and quotas—limitations on the quantity of goods that can be imported—on at least some foreign goods. Additionally, in many countries, average tariffs are below average and continious reducing. But however, there are huge pressure on national governments to reduce tariffs and other barriers in international trade as a means of increasing trade volume and achieving economic growth.

Despite being in a region with climate variability and vulnerable to climate change, Liberia have many natural resources and a very good climatic season. Liberia's

economic growth has been powered mainly by the trade of raw materials from the extractive sectors. Economic activities are driven mainly by concession companies. Given the relatively large deposits of natural resources such as iron ore, diamonds and gold - and the suitability of the country's soil to the production of key commercial crops, such as palm oil, cocoa, coffee and rubber, it comes as no surprise that Liberia's exports mainly depends on primary natural resource. The country's production strength lies in the primary sector; producing mainly rubber, iron ore, timber, gold, and diamond. Liberia's export has been very concentrated in the past and still now on the production of rubber with some effort being made in the diversification of its production (IMF, 2016).

Table 2.2. *Liberia's Major Trading Partners and Products Matrix*

No.	**Export Partners**	**Export Items**	**Import Partners**	**Import Items**
1	China	Iron Ore	Cote D' Ivoire	Petroleum Products
2	France	Logs	Japan	Rice
3	Poland	Scrap Metal	China	Building Materials
4	Spain	Rubber	India	Vehicles
5	Germany	Cocoa beans	USA	Pharmaceutical Products
6	Belgium	Coffee beans	Turkey	Machineries
7	USA	Camwood	Netherland	Electronics
8	Luxemburg	Palm oil	Switzerland	Spare Parts
9	Cote D' Ivoire	Wood chips	France	Electrical Appliances
10	Netherland		UK	Stationaries

Source: *Ministry of Commerce and Industry, Liberia, 2015*

Liberia is a participant in China's Preferential Trade Agreement with Least Developed Countries (LDCs) and benefits from the African Growth and Opportunity Act (AGOA) and also the Third Country Fabric Provision of the United States of America. Liberia also benefits from the European Union's Everything but Arms Arrangement

allowing Liberia and other LDCs to export goods (except armaments) to European Union countries under duty-free and quota-free. Liberia is signatory to the regional negotiation with the EU on the Economic Partnership Agreement (EPA). In an effort to expand trade with China, Liberia did sign a 95% duty free and quota free agreement for exports to China. Liberia encourages active partnership and participation in the value chains production process of concession corporations and multinational companies in its infant industries. In an effort to reach middle income status, Liberia's trade with China seems to be a catalyst for boosting job creation and develop of business capacity in local communities. Labor cost in Liberia is relatively cheap and aid in the growth and development of SME growth and. China is progressively becoming Liberia's main trading partner. Table 2.2 provides a matrix of Liberia's major trading partners as of 2013. In terms of import, Liberia's import basket has grown increasingly over the years. Liberia is slowly improving its capacity to produce. The country currently imports 99% of its total consumption. Import volume of US$675,199,275.90 was recorded in 2013 and this figure fell in 2014 and 2015 partly due to the Ebola Health Crisis and the fall in the price of major world commodities as indicated by figure 2.9. However, the increase in import might just continue the increasing dependence on imports, either to help manufacturing activities or for final usage (MoCI, 2014).

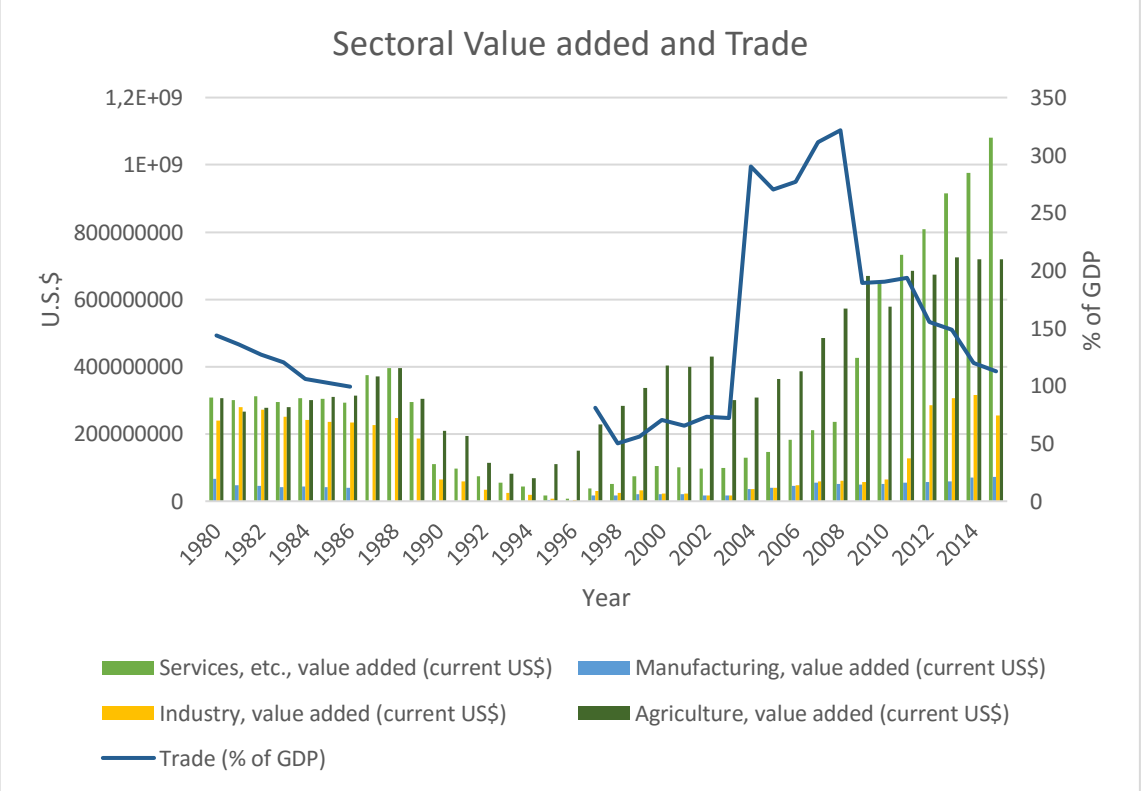
Figure 2.9. *Exports and Imports of Liberia, 1980-2015*

Source: *National Account, United Nations Statistical Division, 2015*

2.7. Production Sharing and Trade in Value Added in Liberia

The fragmentation of trade in intermediate inputs across borders accounts for as much as two thirds of international trade. By linking production processes across borders, this input trade creates imbalances across sectors within an economy. Production sharing and value added procuctivity is important in an economy. In recent years, value added productions has played a major role in international trade and made up huge component of trade valume across borders. Despite these bilateral final and intermediate goods linkages are not directly observed in standard trade and national accounting process, they serve as key components in facilitating trade and providing income and employment opportunities to participants involved. Value added production activity in Liberia is concentrated mainly in the service and agriculture sectors. Industrial and manufacturing sectors' value added contributions to the gross domestic product (GDP) of Liberia is relatively low as compare to other sectors.

Figure 2.8. *Sectoral Value Added Production and Trade as Percentage of GDP*



Source: *World Development Indicators, World Bank Database, 2015*

2.8. External Shocks to the Liberian Economy

The global financial crisis which started in 2008 had a spread-out negative impact on almost all the economies of the world with Liberia being one of the worst affected. This was mainly due to the country's huge dependence on foreign trade activities. This situation resulted to a negative shock on the economy between 2008 and 2009 and even up to 2010. Additionally, the health crisis and the decline in the prices of major world commodities in 2014 exposed the country's economy vulnerabilities. After recording almost negative growth in 2014, GDP was very low in 2015 particularly due to the low volume of activity in the mining and agricultural sectors thereby deteriorating the current account deficit. At the same time, international gross reserves increased during the past year, the Central Bank foreign exchange position reduced as a result of operational deficits and support to the banking sector (World Bank, 2015).

CHAPTER THREE

3. THEORETICAL FRAMEWORK AND METHODOLOGY

In this chapter, the various alternative theoretical approaches in measuring exchange rates and trade are presented, along with the methodology, and data collection source.

3.1. Alternative Theory to Measuring Exchange Rate and Foreign Trade

3.1.1. Mundell-Fleming-Dornbusch model

The open-economy policies issues based on the Keynesian open economy framework that was developed by Fleming (1962), Mundell (1976, 1964) and later extended by Dornbusch (1976) assumes that a small economy is usually faced with an external world foreign interest rate i^*, that is assumed to be constant.

$$i_{t+1} = i^* + e_{i+1} - e_i \quad (1)$$

$i_{t+1} = \log(1 + i_{t+1})$ is given as the logarithm of gross home-country nominal interest rate between periods t and $t+1, i^* = \log(1 + i^*)$, and e is considered as the logarithm of exchange rate and is defined as the value of foreign currency in the home-country's currency.

$$m_t - p_t = \eta i_{t+1} + \phi y_t, \quad (2)$$

where equation (2) is the home-country monetary equilibrium and m is termed as the log of the nominal money supply, p is given as the log of the home-country currency price level, and y is given as the log of home-country output.

$$y_t^d = Y_n + \delta(e_i + p^* - p_t - q), \delta > 0. \quad (3)$$

The Dornbusch model adequately combines all home-country output as a single basket of commodity and makes assumption that total demand for home-country output, y^d, is a function of the home-country real exchange rate $e + p^* - p$. And p^* is said to be constant throughout. And Y_n is considered the "natural" rate of production. Thus, real exchange rate can be denoted by:

$$q \equiv e + p^* - p \quad (4)$$

Here in equation (4), q is interpreted as the equilibrium exchange rate that is steady with the full employment level. To ease understanding, Ẏ and q are said to be fixed. It is assumed in equation (3) that an increase in foreign price level relative to home- country will ignite a shift of world demand toward home-country products that could be accounted for through verious instrument. Mundell, Fleming, and Dornbusch made an assumption

that the home-country may have monopoly power over the production of tradable goods it produces, adding further that home-country tradable goods could have a bigger consumer price index (CPI) weight in home-country than in foreign country. Real depreciation could, to some extend, result to an increase in demand for home-country goods by means of causing a change in domestic spending from foreign country tradable goods to home-country nontradable goods (Obstfeld and Rogoff, 1996: p. 609-610).

3.1.2. Purchasing power parity

Exchange rate and price level have long run relationship which can be explain by the purchasing power parity (PPP). As a means of comparing prices across countries, economists use PPP as a measure. The assumption of purchasing power parity (PPP) is also one main foundation of the flexible-price under a monetary model. In PPP measure, countries are assumed to have the same price levels when they are measured in a common currency.

$$P_t = \mathcal{E}_t P t^*$$

or in logs with e denoting log $\mathcal{E}$,

$$P_t = e_t + Pt^*,$$

implies purchasing power parity. With the underlining assumption that $\mathcal{E}$ is taking as the nominal exchange rate, defined as the price of foreign currency in terms of home currency, and p^* denotes the world foreign-currency price of the consumption basket with home-country price P (Obstfeld and Rogoff, 1996: p. 526-527).

3.1.3. Real exchange rates and changes in productivity

Whenever there is an increase in the prices of both tradable and non-tradable goods in a country, productivity changes in foreign countries can have implications for relative foreign price levels for real exchange rates. Balassa (1964), Samuelson (1964), and, Harrod (1933) used this pattern to explain international differences from PPP. The Harrod-Balassa-Samuelson effect is the likehood that countries with higher productivity strength in tradable goods in comparision to non-tradable goods could have higher price level. To postulate the Harrod-Balassa-Samuelson effect, let assume traded goods to be a single basket of goods with similar price in Home-country and Foreign country. Nontraded goods have different Home and Foreign prices in consideration to tradable goods, denoted p and p^*. If the price level is somehow of a geometric pattern, with the weights γ and $1 - \gamma$, of the prices of tradable and nontradables goods, trade could take

place as a value, with a same price of 1 in the Home-country and Foreign-country prices in indices are:

$$P = (1)^{\gamma} p^{1-\gamma} = p^{1-\gamma}, \qquad P^{*} = (1)^{\gamma} (p*)^{1-\gamma} = (p*)^{1-\gamma},$$

Thus, the Home-to-Foreign price level ratio is:

$$\frac{P}{P*} = \left(\begin{matrix} P \\ P* \end{matrix}\right)^{1-\gamma}$$

It can be observed that in this model, the Home-country's real exchange rate against Foreign-country real exchange rate depends solely on the domestic relative prices of nontraded products. The total factor productivity in traded goods can also summarized as:

$$A_T f(k_T) = rk_T + w, \;\; pA_N g(k_N) = rk_N + w \tag{5}$$

Equation (5) will hold if no expected shocks occur. As a result, when considering the natural logs of the equalities and differentiating them, while at the same time holding r constant, will result to:

$$\frac{dA_T}{A_T} + \frac{rk_T}{A_T f(k_T)} \frac{dk_T}{A_T f(k_T)} = \frac{rk_T}{A_T f(k_T)} \frac{dk_T}{A_T f(k_T)} + \frac{w}{A_T f(k_T)} \frac{dw}{w} \tag{6}$$

Here, the first-order condition for investment in the production of traded goods was considered in equation (6). Let a "bar" denotes a percentage change in X: $\dot{X} \equiv dlog\, X = \frac{dX}{X}$ for variable X constricted to take positive values. Let $\mu_{LT} \equiv wL_T/Y_T$ and $\mu_{LN} \equiv wL_N/pY_N$ be taken as labor's share of total income accured from the production of traded and nontraded goods respectively. Now, the next equation can be written in a reduced form as:

$$\hat{A}_T = \mu_{LT} \hat{w} \tag{7}$$

In same form, log-differentiation of non-profit condition for nontradables can be reached while making use of equation (7), results to:

$$\dot{P} + \hat{A}_N = \mu_{LT} \hat{w} \tag{8}$$

Replacing $\hat{w} = \hat{A}/\mu_{LT}$ from equation (8) will produce:

$$\dot{P} = \frac{\mu_{LN}}{\mu_{LT}} \hat{A}_T - \hat{A}_N \tag{9}$$

Moving on a perfect-foresight pathway, assuming the inequality $\frac{\mu_{LN}}{\mu_{LT}} \geq 1$ holds true, quicker productivity growth in tradable products than nontradable products will increase the price of nontradable products after a long period of time. Since the rate of

increase in price, p depends largely on wage growth, the multiplier effect seems greater. Assuming that the ratio of the log-differential is taken using equation (9), it can be observed that relative productivity will change due to changes in real exchange rates. Example, assuming two countries' products in proportion to each other with similar functions $F(K_T, L_T)$ and $G(K_N, L_N)$, but having unlike factor productivities. The effect can be viewed in the form:

$$\dot{\mathrm{P}} - \dot{\mathrm{P}}^* = (1-\gamma)(\dot{\mathrm{P}} - \dot{\mathrm{P}}^*) = (1-\gamma)\left[\frac{\mu_{LN}}{\mu_{LT}}\left(\hat{\mathrm{A}}_T - \hat{\mathrm{A}}_T{}^*\right) - \left(\hat{\mathrm{A}}_N - \hat{\mathrm{A}}_N{}^*\right)\right] \qquad (10)$$

If the feasible condition holds that $\mu_{LN}/\mu_{LT} \geq 1$, it means that the Home-country will experience real appreciation in its exchange rate provided its productivity advantage in tradable products exceeds its productivity-growth advantage in non-tradable products (Obstfeld and Rogoff, 1996: p. 208-212).

3.1.4. Marshall-Lerner condition and *J*-Curve phenomenon

By theory, other things being equal, a real depreciation in home-country currency instantly improves the current account balance whereas a real appreciation causes the current account to worsen promptly. This "Marshall- Lerner Condition" states that "the depreciation of a country's currency will result to an improvement in its balance of trade if the sum of the elasticity's of demand for both exports and imports exceeds one. This concept of *J*-Curve states that a real depreciation of a currency may initially lead to a deteriorating trade balance and later, to an improvement. The Marshall-Lerner condition which states that real depreciation in a currency may resultt to an increase in net exports can be derived in the following manner. Firstly, the real exchange rate is given by:

$$\epsilon \equiv \frac{E\,P}{P^*}, \qquad (11)$$

where the real exchange rate, ϵ is equal to the nominal exchange rate, E times the domestic price level, P, divided by the foreign price level, P^*.The net export of a country can be mathematically given as:

$$NX \equiv X - \frac{IM}{\epsilon}, \qquad (12)$$

here, NX is the net export, X is export, IM is import, and ϵ is real exchange rate. Imports of an economy depend on domestic income and the real exchange rate—the price of domestic goods in terms of foreign goods and can be derived as:

$$IM = IM(Y, \boldsymbol{\epsilon}) \tag{13}$$

Exports on the other hand, are foreign demands and depend of foreign income and the real exchange rate and is written as:

$$X = X(Y^*, \boldsymbol{\epsilon}) \tag{14}$$

By replacing *X* and *IM* by their expression in equation (17) and (18):

$$NX = X(Y^*, \boldsymbol{\epsilon}) - IM\ (Y, \epsilon)/\epsilon \tag{15}$$

And so, equation (15) shows the balance of trade as depending on the levels of home-country and foreign-country income and the real exchange rate. This equation shows that real devaluation in the exchange rate could affect trade balance by (i) increaseing Exports, *X*—the real devaluation makes home products relatively cheaper abroad which leads to an increase in foreign demand for home products (ii) decreasing imports, *IM*—the real devaluation makes foreign products relatively more expensive in home economy and may lead to a change in home demand toward home products and to a reduction in the quantity of imports, and (iii) increasing relative price of foreign products in terms of home products 1/$\boldsymbol{\epsilon}$— this increases the import bill, $IM/\boldsymbol{\epsilon}$. The exact amount of imports will cost more to purchase—in terms of domestic goods (Blanchard and Johnson, 2013: p. 429-430).

Trade balance of a country can be termed as the difference between exports and imports. Generally, if import exceeds export, the trade balance is considered to have a deficit. To eradicate a deficit from a trade balance, one best tool is currency devaluation—the lowering of the value of a country's currency in regards to another country's currency. By devaluing its currency, a country makes its exports cheaper in terms of foreign currency and its imports more expensive in terms of home currency thus resulting to an increase in export and at the same time decrease in import. There is a common idea share by many economists and policymakers that the devaluation or depreciation of a country's currency worsen the trade balance before improving it and can give advantages to a country in foreign trade. When a country devaluates its currency, domestic export goods become cheaper relative to its trading partners resulting in an increase in quantity demanded. The devaluation policy is mainly aimed at improving the trade balance. This

theoritical basis of the *J*-curve springs out of the Marshall-Lerner condition. This condition states that the sum of export and import demand elasticity has to be at least one and then currency depreciation will have a positive impact on the trade balance. The increase in the size of exports and slow progress of imports are anticipated to improve the trade deficit. However, due to some causes, after devaluation, trade balance usually deteriorate before improving. Given this within the trade balance over a period of time following devaluation seems like the letter *J*, economists have coined it as the *J*-Curve phenomenon (Grigoryan, 2015 and Simakova, 2013).

3.2. Data Collection, Model and Source

3.2.1. Data collection and source

Data on nominal exchange rate (NER), real gross domestic product RGDP, export value index and import value index were obtained from the World Development Indicators (WDI) of World Bank and use either in estimating the effect of real exchange rate on foreign trade or deriving at other variables. Data on exports (X), imports (IM), foreign direct investment (FDI), GDP deflators were gathered from the National Account of the United Nations Statistical Division. The periods of pegged exchange rate and periods of managed float exchange rate regime were considered using a dummy variable called 'Intervention' where '1' was used during period of exchange rate intervention and '0' otherwise. Another dummy variable was introduced to account for the period of external shocks and crisis—civil war and health crisis) termed as 'Shock'. Again 1 was used to represent periods of shock and 0 to represent otherwise.

The terms of trade (ToT) for Liberia are calculated as the value of its exports as percent of the value of its imports. An increase in the terms of trade means that the value of exports is higher than the value of imports. In such situation, a country can afford to buy more imports with the revenue from its exports. Real Gross Domestic Product (RGDP) is the gross domestic product divided by mid-year population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsides not included in the products. Exports of goods and services comprise all transactions between residents of a country and the rest of the world involving sale and purchase of general merchandise, nonmonetary gold, and services. Imports of goods, services and primary income is the sum of goods imports, service imports and primary income payments. The nominal exchange rate is the official annual average of the price

of a country's currency measure in other currrency, in this case, the United States dollar. The real exchange rate (RER) for the home country at time t is given as:

$$RER_t = NER_t \frac{P_t}{P^*_t} \quad (16)$$

In equation (16), RER_t is the real exchange rate for Liberia in United States dollar at time t,and NER_t is the nominal exchange rate of Liberia measured in United States dollar at period t. And P_t^* is foreign consumer price index, and P_t is the domestic price index[9]. The terms of trade which represents the value of export of Liberia relative to the value of its import is calculated by the following equation:

$$ToT_t = \frac{P_{x_t}}{P_{m_t}} x\ 100 \quad (17)$$

Here ToT_t is the terms of trade of Liberia at time t, P_{x_t} is the index of export values of Liberia, and P_{m_t} is the index of import values of Liberia at period t. The calculation of the term of trade (ToT) and the real exchange rate (RER) for Liberia is essential given the unavailability of already computed data.

3.2.2. Econometric model estimation

The models to be employ in this study follow the theoretical basis of a model that describe an equilibrium in the goods market in an open economy. This indicates the equilibrium level in an economy combining both monetary policy and fiscal policy. This equation can be written as:

$$Y = C(Y - T) + I(Y, r) + G - \frac{IM(Y, \epsilon)}{\epsilon} + X(Y^*, \epsilon)$$

In the above equation, consumption, C, have a positive relationship with disposable income $Y - T$, Investment, *I*, and output, *Y*, are positively related and inversely related to real interest rate, r. Government spending, *G*, is taken as given. And the quantity of imports, *IM*, have a positive relationship with output, *Y*, and the real exchange rate, ϵ. The value of import in terms of domestic goods is equal to the quantity of imports divided

[9] Implicit price deflator is use as a proxy for consumer price index due to the unavailability of consumer price index data for Liberia during the period under consideration. The U.S. inplicit price deflator is used as a proxy for foreign consumer price index.

by the real exchange rate. And exports, *X*, depends positively on foreign output, Y^*, and negatively on the real exchange rate, ϵ.

To achieve the desire objective in this study, the researcher look separately at the effect of nominal exchange rate and real exchange rate on export, import and trade balance and determine whether there exists a positive, negative or *J*-curve effect for Liberia. To this effect, we employed the below export demand equation:

$$X_t = f(RGDP_{f_t}, NER_t, RER_t, ToT_t, INT_t, Shock_t, Vol_t) \quad (18)$$

Where X_t denotes the total exports at time t, $RGDP_{f_t}$ measures the real gross domestic product of foreign country at period t, NER_t represents the average nominal exchange rate of Liberia at time t, RER_t is the real exchange rate of Liberia at period t, ToT_t is the terms of trade of home country at time t, and Vol_t is the exchange rate volatility measure at time t, accounting for movements in the real exchange rate and therefore exchange rate risk overtime. *INT* is intervention and *shock* is the external shock dummy.

For the import demand function, the researcher adopted the function as used by Bakhromov, (2011), Tarawalie, A. B. *et al*, (2012) and Vergil, (2000) and expressed below:

$$IM_t = f(RGDP_{d_t}, NER_t, RER_t, ToT_t, FDI_t, INT_t, Shock_t, Vol_t) \quad (19)$$

Here in equation (19), IM_t is total imports of Liberia at time t, $RGDP_{d_t}$ denotes the real gross domestic product at period t, and FDI_t is the foreign direct investment of Liberia at time t. *INT* is foreign exchange intervention dummy and *shock* is the external shock dummy. The rest of the variables remain the same as previously explained. Additionally, in developing the trade balance function, the researcher follows works done by Simakova, (2013), and Grigoryan, (2015). The trade balance function is given as:

$$TB_t = f(RGDP_{d_t}, RGDP_{f_t}, NER_t, RER_t, ToT_t, INT_t, Shock_t, Vol_t) \quad (20)$$

Where TB_t is considered as the ratio of export to import at time t, and the rest of the variables remain the same as mentioned above. The choice of using the ratio of export to import as a proxy for trade balance is to avoid dealing with negative numbers in an

effort to capture the logarithm form of the series. This was also supported by the literature in previous works.

By introducing the two dummy variables representing foreign exchange intervention and external shock to the Liberian economy, the long-run functions for export demand, import demand and trade balance in a log-linear form can now be constructed as:

$$lnX_t = a_0 + a_1 lnRGDP_{f_t} + a_2 lnNER_t + a_3 lnRER_t + a_4 ToT_t + \beta_5 INT_t + \beta_6 Shock_t + a_7 Vol_t + \mathcal{E}_1 \quad (21)$$

In equation (21), all the variables maintain their respective meaning as discussed previously. Additionally, it is expected that the estimated parameters, $a_0 > 0$. The researcher anticipates the following relationships between the various variables: $RGDP_f \uparrow \rightarrow X \uparrow$, $NER \uparrow \rightarrow X \uparrow$, $RER \uparrow \rightarrow X \downarrow$.The long-run import demand function is expressed in the form of:

$$lnIM = \beta_0 + \beta_1 lnRGDP_{d_t} + \beta_2 lnNER_t + \beta_3 lnRER_t + \beta_4 lnToT_t + \beta_5 FDI_t + \beta_6 INT_t + \beta_7 Shock_t + \beta_8 Vol_t + \mathcal{E}_2 \quad (22)$$

Here $\beta_0 > 0$, $RGDP_d \uparrow \rightarrow IM \uparrow$, $NER \uparrow \rightarrow IM \downarrow$, $RER \uparrow \rightarrow IM \uparrow$, $FDI \uparrow \rightarrow IM \uparrow$. As per equation (22), the researcher constructed the long-run trade balance function and expressed it in the form below:

$$lnTB = \delta_0 + \delta_1 lnRGDP_{d_t} + \delta_2 lnRGDP_{f_t} + \delta_3 lnNER_t + \delta_4 lnRER_t + \delta_5 lnToT_t + \beta_6 INT_t + \beta_7 Shock_t + \delta_8 Vol_t + \mathcal{E}_3 \quad (23)$$

In this function, all the variables maintained their respective definition except $lnTB$ which is considered as the log of the ratio of export to import taking as trade balance to avoid negative numbers. This function was developed in line with the literature and followed that of Grigoryan, (2015) and Odili, (2015).

3.2.3. Measuring exchange rate uncertainty

Despite there seems to be no consensus among researchers on a single method or model use to measure exchange rate volatility, some popular models generally used to measure exchange rate uncertainty are the moving average standard deviation and ARCH or GARCH models. In this study, it is important to derive the measure of exchange rate volatility to account for period of high and low exchange rate volatility. This study computed exchange rate volatility by use of the sample standard deviation of the growth rate of real exchange rate as:

$$V_t = \left[\frac{1}{m}\sum_{i=1}^{m}(RER_{t+i-1} - RER_{t+i-2})^2\right]^{1/2} \quad (24)$$

where m is the order of the moving average, RER_t is the ratio of the U.S implicit price deflator (P_t^*) to the domestic implicit price deflator (P_t), multiplied by the yearly nominal exchange rate (NER_t), expressed as the number of domestic currency units per foreign currency, in this case the U.S dollar. The use of real exchange rate volatility as opposed to nominal exchange rate volatility takes its backing from theoretical basis. Here the order of the moving average, $m = 12$ (Chowdhury, 1993). Studies done by Akhtar and Spence-Hilton (1984), Arize, Osang and Slottji (2000) and Olimov and Sirajiddinov (2008) used this measure. See also Chowdhurry (1993), Kumar and Dhawan (1991), Bailey, Tavlas and Ulan (1987), Koray and Lastrapes (1989) and Peree and Steinherr (1989).

3.2.4. Testing for stationarity (unit root test)

The researcher examines the stationarity requirement of each of the variables. The importance of this test is that testing for non-stationarity determines whether variables have unit root . When dealing with time series data, it is important to test whether the time series follows a unit root. Stationarity analysis in the series in this study will be done via the use of the Augmented Dickey Fuller (ADF) test developed by Dickey and Fuller (1979, 1981) and the Phillips-Perron (PP) test proposed by Phillips and Perron (1988). The choice of using these two tests procedure is to reinforce the test results in a more complementary way.

3.2.5. Autoregressive distributed lag model (ARDL) model

The Autoregressive Distributed Lag (ARDL) model introduced by Pesaran *et al.* (2001) in order to incorporate I(0) and I(1) variables in the same estimation will be adopted in this study. However, if all the variables are stationary I(0) and at the same time

non stationary I(1) then it is advisable to do Vector Error Correction Model (VECM), Johansen Approach to cointegration. ARDL models are standard regressions that incorporate lags of both the dependent and explanatory variables as regressors (Greene, 2008). To alleviate such problem, Pesaran and Shin (1999) and Pesaran *et al*. (2001) postulated that cointegrating system could be estimated as ARDL models considering that the variables either be I(0) or I(1), not being required to specify in advance the difference of I(0) or I(1) variables.

Firstly, the researcher adopts an ARDL error correction framework for the export model (equation 21), import model (equation 22) and trade balance model (equation 23) that were discussed earlier were constructed in the forms below:

$$\begin{aligned}\Delta lnX_t = {} & a_0 + \sum_{i=0}^{p} a_{1i}\,\Delta lnRGDP_{f_{t-i}} + \sum_{i=0}^{p} a_{2i}\,\Delta lnNER_{2t-i} + \sum_{i=0}^{p} a_{3i}\,\Delta lnRER_{3t-i} \\ & + \sum_{i=0}^{p} a_{4i}\,\Delta lnToT_{4t-i} + \sum_{i=0}^{p} a_{5i}\,\Delta INT_{5t-i} + \sum_{i=0}^{p} a_{6i}\,\Delta Shock_{6_{t-i}} \\ & + \sum_{i=0}^{p} a_{7i}\,\Delta Vol_{7t-i} + a_8 lnRGDP_{f_{t-1}} + a_9 lnNER_{t-1} + a_{10} lnRER_{t-1} \\ & + a_{11} lnToT_{t-1} + a_{12} INT_{t-1} + a_{13} Shock_{t-1} + a_{14} Vol_{t-1} \\ & + a_{15} ECM_{t-1} \\ & + \varepsilon_t \end{aligned} \qquad 26$$

where in equation (25) $a_1, a_2, a_3, a_4, a_5, a_6, a_7$ is the short-run coinfficient of this model and $a_8, a_9, a_{10}, a_{11}, a_{12}, a_{13}, a_{14}$ represent the long-run coefficient. The null hypothesis here is $a_8 = a_9 = a_{10} = a_{11} = a_{12} = a_{13} = a_{14} = 0$, means there exist no long-run relationship amongst the variables. The ECM_{t-1} is considered as the error correction term in time $t-1$ and represent the speed of adjustment in the growth of export. The researcher also constructs an ARDL version of our import model from equation (26) in the below form:

$$\Delta IM_t = \beta_0 + \sum_{i=0}^{p} \beta_{1i}\, \Delta lnRGDP_{d_{t-i}} + \sum_{i=0}^{p} \beta_{2i}\, \Delta lnNER_{2t-i} + \sum_{i=0}^{p} \beta_{3i}\, \Delta lnRER_{3t-i} + \sum_{i=0}^{p} \beta_{4i}\, \Delta lnToT_{4t-i} + \sum_{i=0}^{p} \beta_{5i}\, \Delta lnFDI_{5t-i} + \sum_{i=0}^{p} \beta_{6i}\, INT_{6t-i} + \sum_{i=0}^{p} \beta_{7i} \Delta Shock_{7t-i} + \sum_{i=0}^{p} \beta_{8i}\, \Delta Vol_{8t-i} + \beta_9 lnRGDP_{d_{t-1}} + \beta_{10} lnNER_{t-1} + \beta_{11} lnRER_{t-1} + \beta_{12} lnToT_{t-1} + \beta_{13} FDI_{t-1} + \beta_{14} INT_{t-1} + \beta_{15} Shock_{t-1} + \beta_{16} Vol_{t-1} + \beta_{17} ECM_{t-1} + \varepsilon_t \quad 26$$

Here in equation (26) $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8$ is the short-run coefficient of this model at the same time $\beta_9, \beta_{10}, \beta_{11}, \beta_{12}, \beta_{13}, \beta_{14}, \beta_{15}, \beta_{16}$ is the long-run coefficient. The null hypothesis (H_0: $\beta_9 = \beta_{10} = \beta_{11} = \beta_{12} = \beta_{13} = \beta_{14} = \beta_{15} = \beta_{16} = 0$)) denotes that there exist no long-run relationship that exist amongst these variables.The ECM_{t-1} represents is considered as an error correction term in time $t-1$ represent the speed of adjustment of import growth. Below is the ARDL framework for the trade balance model as an attempt to determine the long-run relationships amongst trade balance and exchange rates and to also determine whether there exist a *J*-curve.

$$\Delta lnTB_t = \delta_0 + \sum_{i=0}^{p} \delta_{1i}\, \Delta lnRGDP_{d_{t-i}} + \sum_{i=0}^{p} \delta_{2i}\, \Delta lnRGDP_{f_{2t-i}} + \sum_{i=0}^{p} \delta_{3i} \Delta lnNER_{3t-i} + \sum_{i=0}^{p} \delta_{4i} \Delta lnRER_{4t-i} + \sum_{i=0}^{p} \delta_{5i}\, \Delta lnToT_{5t-i} + \sum_{i=0}^{p} \delta_{6i}\, \Delta INT_{6t-i} + \sum_{i=0}^{p} \delta_{7i}\, \Delta Shock_{7t-i} + \sum_{i=0}^{p} \delta_{8i}\, \Delta Vol_{8t-i} + \delta_9 lnRGDP_{d_{t-1}} + \delta_{10} lnRGDP_{f_{t-1}} + \delta_{11} lnNER_{t-1} + \delta_{12} lnRER_{t-1} + \delta_{13} lnToT_{t-1} + \delta_{14} INT_{t-1} + \delta_{15} Shock_{t-1} + \delta_{16} Vol_{t-1} + \delta_{17} ECM_{t-1} + \varepsilon_t \quad 27$$

Again, here in equation (27) $\delta_1, \delta_2, \delta_3, \delta_4, \delta_5, \delta_6, \delta_7, \delta_8$ is the short-run coefficient of this model and $\delta_9, \delta_{10}, \delta_{11}, \delta_{12}, \delta_{13}, \delta_{14}, \delta_{15}, \delta_{16}$ denotes the long-run coefficient. The

null hypothesis here is $\beta_9 = \beta_{10} = \beta_{11} = \beta_{12} = \delta_{13} = \delta_{14} = \delta_{15} = \delta_{16} = 0$, connotes that the variables are not related in the long-run.The ECM_{t-1} can be considered as the error correction term in time $t-1$ is the speed of adjustment of the trade balance growth rate of.

3.2.6. Long-run cointegration relationship (bound testing)

The determination of cointegrating relationships amongst variables is usually done using traditional methods such as Engle-Granger (1987) or Johansen's (1991, 1995) method, or simple equation methods such as Fully Modified Ordinary Least Squared, OLS; or Dynamic Ordinary Least Squared. By use of either of the above mentioned method, variables are required to be I(1), or require initial information and description of the status of the variables in terms of I(0) and I(1). We conduct the Bound test to determine whether the ARDL model contains a level (or long-run) relationship between the dependent variable and the independent variables as stated above.

3.2.7. Stability and diagnostic testing

When adopting ARDL model, it is important to perform diagnostic test on the residuals to determine normality in the errors, the existance of serial correlation and to test for heteroskedasticity in the residuals of the equation. In this respect, we test the robustness and stability of the model against residual autocorrelation by means of diagnostic tests—particularly, serial correlation Lagrange multiplier (LM), normality and heteroskedasticity.

CHAPTER FOUR

4. FINDINGS AND INTERPRETATION

This chapter presents findings and discussion of the study in a rather analytical way, pointing out key findings of the study. The Dataset were collected from both the World Development Indicators of World Bank and the Statistical Division of the United Nations. Data on exports (X) import (IM), real foreign gross domestic product (RGDPf), U.S (foreign) implicit price deflator, Liberia's implicit price deflator, index of export and index of import values of Liberia were collected from the Statistical Division of the United Nations. Foreign Direct Investment (FDI), real gross domestic product of Liberia (RGDPd) and nominal exchange rate (NER) were obtained from the World Bank. Other data such as real exchange rate (RER), exchange rate volatility and term of trade (ToT) were computed by the author due to the unavailability of data as discussed earlier in previous the chapter. This study considered data from 1980 to 2015 on an annual basis. The log of all the data were taken except for Foreign Direct Investment (FDI) and volatility which were taken at their original values. Here, time series properties of the data are examined and the Autoregressive Distributed Lagged (ARDL) model to cointegration was used to determine the short-run and long-run relationship amongst the parameters.

4.1. Descriptive Statistics Analysis

Skewness can be considered as the lack of equality of a variable from the normal distribution in each set of statistical data. It is a measure of asymmetry of the distribution of the series around its mean. Conditional on the skewness of the mean within the distribution, this value could emerge as negative or positive. From the Table 4.1, it is observed that the variables import, terms of trade exchange rate volatility and Foreign Direct Investment show a positive skewness which stipulates that evaluation of the future data points of the variables can be made. Export, trade balance, nominal exchange rate, real exchange rate, real gross domestic product for Liberia and real gross domestic product for foreign are negatively skewed suggesting that estimated can be made about the future trend in the data. Kurtosis is considered as a statistical measure which is used to describe the distribution of observed data around the mean. It measures the peakedness or flatness of the distribution of the series. The kurtosis of a normal distribution is 3. If the kurtosis exceeds 3, the distribution is peaked relative to the normal and if the kurtosis is less than 3, the distribution is flat relative to the normal. The kurtosis values for all variables are positive value, indicateing a high kurtosis which indicates the presence of

low and even distribution and a chart with fat tails within the variables. The Jarque-Bera Test is a type of Lagrange multiplier test that is used to determine the normality of a set of data. It is a test statistic for testing whether the series is normally distributed. The test statistic measures the difference of the skewness and kurtosis of the series with those from the normal distribution. A Jarque-Bera probability result of 1 means that the null hypothesis has been rejected at the 5% significance level. In other words, the data does not come from a normal distribution. A value of 0 indicates the data is normally distributed. The Jarque-Bera probability value of all the variables are either zero or close to zero (that is less than one) indicating that the variables are normally distributed.

Table 4.1. *Descriptive Statistics Table*

	*ln*X	*ln*IM	*ln*TB	*ln* NER	*ln* RER	*ln* RGDPd	*ln* RGDPf	*ln* TOT	FDI	Vol
Mn	19.23	19.61	-0.38	3.92	4.21	5.41	10.35	5.11	2.24	10.42
Med	19.19	19.51	-0.04	3.83	4.33	5.34	10.40	5.22	1.08	6.78
Max.	20.67	21.39	0.86	4.46	4.68	6.17	10.94	7.66	1.31	44.66
Min.	17.91	17.69	-1.61	1.70	2.32	4.17	9.56	3.16	-1.32	0.07
Std. Dev.	0.72	1.07	0.72	0.44	0.41	0.62	0.42	0.88	3.08	9.75
Sk.	-0.28	0.04	-0.31	-3.66	-2.86	-0.46	-0.36	0.37	1.65	1.53
Kur.	2.13	2.16	1.74	19.98	13.78	2.08	1.95	3.52	5.74	5.51
JB	1.57	1.04	2.89	498.77	217.37	2.45	2.38	1.20	26.91	22.91
Prob.	0.46	0.59	0.24	0.00	0.00	0.29	0.30	0.55	0.00	0.00
SSD	17.85	38.98	17.71	6.55	5.77	13.14	5.93	26.83	3.22	3229.16
Obs.	35	35	35	35	35	35	35	35	35	35

Source: *Author's Computation, 2017 (Eviews 9.5 Output)*

Note: Mn = Mean, Med.= Medium, Max = Maximum, Min = Minimum, Std. Dev. = Standard Deviation, Sk. = Skewness, Kur =Kurtosis, JB = Jarque-Bera, Prob. =Probability, SSD = Sum of Squared Deviation, Obs. = Observations. X =Export, IM = Import, RER = Real Exchange Rate, NER = Nominal Exchange Rate, TB = Trade Balance, RGDPd = Real Gross Domestic Product of Liberia, RGDPf = Real Gross Domestic Product of Foreign Country, ToT = Terms of Trade, FDI = Foreign Direct Investment, Vol = Volatility.

4.2. Time Series Properties Analysis

As in any time series data analysis and testing, stationarity tests are usually conducted to determine whether the data are stationary or non-stationary. Whenever data are non-stationary, it implies that the means and variances are not constant over time. Stationarity test was conducted with the aid of the statistical software Eviews 9.5 using the Augmented Dickey Fuller (ADF) test and Phillip-Perron (PP) test methods. Test for stationarity, unit root testing results shows that some of the variables are stationary at level while other are stationary at first difference with confirmation from both ADF test and PP test methods. The result is presented in Table 4.2.

Table 4.2 *Augmented Dickey-Fuller and Phillip-Perron Tests Results*

Variables	ADF Values	Critical Values	Decision	PP Values	Critical Values	Decision
lnX	-5.6220*	-3.6394	I (1)	-5.6634*	-3.6394	I (1)
lnIM	-4.4277*	-3.6394	I (1)	-4.4277*	-3.6394	I (1)
lnNER	-4.4493*	-3.6329	I (0)	-4.5905*	-3.6329	I (0)
lnRER	-4.5901*	-3.6329	I (0)	-4.7057*	-3.6329	I (0)
lnRGDPd	-2.4370**	-1.9513	I (1)	-3.4670**	-2.9511	I (1)
lnRGDPf	-2.7184***	-2.6143	I (0)	-6.5958*	-3.6329	I (0)
lnTB	-6.5238*	-3.6394	I (1)	-6.7258*	-3.6394	I (1)
lnToT	-7.2322*	-3.6394	I (1)	-7.7272*	-3.6394	I (1)
FDI	-7.4636*	-3.6394	I (1)	-9.7938*	-3.6394	I (1)
Vol	-4.1423*	-3.6394	I (0)	-4.1088*	-3.6394	I (0)

Source: *Author's computation, 2017.*

Note: Values marked with one, two and three asterisk denotes rejection of the null hypothesis at 1%, 5% and 10% respectively based on the critical values. ADF is Augmented Dickey Fuller and PP stands for Phillip-Perron. 'ln' stands for logarithm, X is export, IM is import, NER is nominal exchange rate, RER is real exchange rate, RGDPd is real gross domestic product (domestic), RGDPf is real gross domestic product (foreign), TB is trade balance, ToT is Term of Trade, FDI is foreign direct investment and Vol is volatility.

In addition to the ADF and PP tests conducted, the Break Point Unit Root test was also conducted to complement the ADF and PP tests results since seasonality was initially observed to be present in the dataset. Time series graphs that show seasonality or trend in the data are provided in the appendix. This result was further supported by the Break Point unit root test as presented in Table 4.3.

Table 4.3 *Augmented Dickey-Fuller Break Point Unit Root Test Results*

Variables	Breakpoint Test Values	Critical Values	Breakpoint Year	Decision
lnX	-5.8097	-4.9491*	2010	I(1)
lnIM	-5.6640	-4.9491*	1996	I(1)
lnNER	-5.9906	-4.9491*	2001	I(0)
lnRER	-5.2302	-4.9491*	1995	I(0)
lnRGDPd	-7.4031	-4.9491*	1996	I(1)
lnRGDPf	-4.6600	-4.4436**	2012	I(0)
lnTB	-6.5373	-4.9491*	2003	I(0)
lnToT	-7.7696	-4.9491*	2014	I(1)
FDI	-5.9702	-4.9491*	2010	I(0)
Vol	-5.9600	-4.9491*	1996	I(0)

Source: *Author's computation*
Note: One and two asterisks indicate 5% and 10% significant level.

4.3. Bound Testing Procedures

When using the ARDL approach to cointegration, the initial step by establishing whether there exist cointegration among the variables. In order to determine such relationship the F-statistic of the test is usually measure against with the critical value (Pesaran *et al*., 2001; Pesaran and Pesaran, 1997). According to the null hypothesis, there is no long-run relationship among the variabes is rejected when the test statistic falls

below the lower bound depending on the order of integration of the variables. Bound test was conducted to determine the relationship among the variables as stated in the previous chapter. The selection of lag length was done using the SBC, AIC and HQ criteria. The results for the export, import and trade balance model show that there is long-run cointegration relationship among the variables since the F-statistic values for all the models are above the upper and lower bound test at various critical values as presented in Table 4.4.

Table 4.4 *Bound Tests Results for Export, Import and Trade Balance Models*

Panel A. ARDL Bound Test (Export Model)		
Test Statistic	Value	k
F-statistic	3.676084	7
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	1.92	2.89
5%	2.17	3.21
2.5%	2.43	3.51
1%	2.73	3.9
Panel B. ARDL Bound Test (Import Model)		
Test Statistic	Value	k
F-statistic	5.682034	8
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	1.85	2.85
5%	2.11	3.15
2.5%	2.33	3.42
1%	2.62	3.77
Panel C. ARDL Bound Test (Trade Balance Model)		
Test Statistic	Value	k
F-statistic	5.008353	8
Critical Value Bounds		
Significance	I0 Bound	I1 Bound

10%	1.85	2.85
5%	2.11	3.15
2.5%	2.33	3.42
1%	2.62	3.77

Source: *Author's Computation, 2017*

4.3. Model Selection and Diagnostic Test Analysis

Residual diagnostics tests are usually carried out to determine whether a model is unbiased and consistent with the theory due to the present of lagged dependent variable among the independent variables in the equation. Residual diagnostic tests were performed by means of the Breusch-Godfrey serial correlation Lagrange Multiplier (LM) test, Jarque-Bera Residual Normality test and the Breusch-Pagan-Godfrey heteroskedasticity test. Table 4.5 shows the diagnostic test results for all three models used during the study. The results prove the absent of serial correlation and heteroscedasticity in all three models due to the rejection of the null hypothesis. Residuals normality tests were conducted and the test results were accepted that the error terms are normally distributed. Thus, the three ARDL models seem to be strong against residuals autocorrelation.

As a means of determine the effect of foreign exchange and real exchange rates on foreign trade in Liberia, this research regressed the independent variables against the dependent variables in three separate models. The optimal lags, as recommended by the AIC, SBC and HQC, out of the twenty best models were used in this study. The best twenty models for all three equations are provided in the appendix.

Table 4.5 *Diagnostic Test Result for Export, Import and Trade Balance Model*

Panel I: Export Model short-run diagnostic test statistics			
Model Selection: AIC: (1,1,0,0,0,1,2,2) SBC: (1,1,0,0,0,1,2,2) HQC: (1,1,0,0,0,1,2,2)			
Test Type	Breusch-Godfrey LM Test	JB Test	Breusch-Pagan-Godfrey
Serial correlation	F(2, 16)= 0.0127 (0.1284)		
Normality		0.720 (0.697)	
Heteroscedasticity			F(14,18) = 0.3632 (0.9889)
Panel II: Import Model short-run diagnostic test statistics			

Model Selection: AIC:(2,1,2,2,2,1,2,1,0) SBC: (2,1,2,2,2,1,2,1,0) HQC: (2,1,2,2,2,1,2,1,0)			
Test Type	Breusch-Godfrey LM Test	JB Test	Breusch-Pagan-Godfrey
Serial correlation	F(2,10)= 0.0127 (0.1946)		
Normality		1.719 (0.423)	
Heteroscedasticity			F(21,12) = 0.7079 (0.8712)
Panel III: Trade Balance short-run diagnostic test statistics			
Model Selection: AIC: (3,1,3,3,3,3,3) SBC: (3,1,3,3,3,1,3) HQC: (3,1,3,3,3,1,3)			
Test Type	Breusch-Godfrey LM Test	JB Test	Breusch-Pagan-Godfrey
Serial correlation	F(2,6)= 0.0309 (0.3151)		
Normality		1.6311 (0.442)	
Heteroscedasticity			F(24,8)= 0.6130 (0.4589)

Source: *Author's computation, 2017*

4.4. Short-run and Long-run Estimate Results

The results for the three models estimated show that the cointegration equation (ECM) is both significant and negative thus signaling that there exist short-run relationships amongst the variables in various models. For the export model, the results indicate that in the short-run that nominal exchange, terms of trade, intervention (monetary), exchange rate volatility and U.S GDP are significant in explaining growth in export of Liberia. The export model coefficient of ECM (Cointeq (-1)) term of -0.641 suggests a swift adjustment of approximately 64 percent of disequilibria in the previous year's shock adjust back to the long-run equilibrium level in the current year. As displayed by Table 4.4, nominal exchange rate (NER) appreciation has a positive relationship with export (X) growth. A unit increase in nominal exchange rate (NER) increases export growth (X) by 2.966 units. Additionally, the U.S GDP growth (RGDPf) is also positively related to export (X) growth in Liberia. A unit increase in the GDP growth rate of U.S increases Liberia's export growth (X) by 11.183 units. This is due to the huge trade transactions between the two economies, with United States being one of Liberia major trading partners. Real exchange rate risks, measure as volatility, is positively related to

export growth. A unit increase in volatility (Vol) increases export (X) earnings by 2.4%. In the long-run, nominal exchange rate (NER) and the foreign exchange intervention on the foreign exchange market represented by the dummy (INT) are both positively related to export with statistical significant. U.S GDP per capita (RGDPf) and volatility (Vol) also have statistically significant values with an inverse relationship with export.

Table 4.6 *ARDL Cointegration Results for Export Model*

Panel I: Short-run output results	Dependent Variable: lnX_t	
Regressors	ARDL (1,1,0,0,0,1,2,2)	
$\Delta lnRGDP_{f_t}$	11.183	(0.000)*
$\Delta lnNER_t$	2.966	(0.000)*
$\Delta lnRER_t$	0.628	(0.305)
$\Delta lnToT_t$	0.304	(0.018)*
$\Delta Shock_t$	0.125	(0.332)
ΔINT_t	-0.343	(0.346)
ΔINT_{t-1}	5.039	(0.000)*
ΔVol_t	0.024	(0.073)**
ΔVol_{t-1}	0.025	(0.008)*
ECM_{t-1}	-0.641	(0.000)*
Adjusted R-Squared		(0.767)
F-statistics		(8.528)
Durbin Watson-statistics		(2.407)
Residual Sum of Squared		(2.214)
Panel II: Long-run output results	Dependent Variable: lnX_t	
$lnRGDP_{f_t}$	-4.359	(0.002)*
$lnNER_t$	4.798	(0.002)*
$lnRER_t$	0.965	(0.264)
$lnToT_t$	0.442	(0.163)
$Shock_t$	-0.549	(0.181)
INT_t	3.788	(0.007)*
Vol_t	-0.026	(0.334)
Constant	36.454	(0.001)*

Source: *Author's Computation, 2017*

Note: Values marked with one and two astericks connotes 1% and 5% significance level respectively. Cointeq=lnX - (-4.3599*lnRGDPF + 4.7978*$lnNER$ + 0.9658*$lnRER$ + 0.4424*$lnToT$ - 0.5494*Shock + 3.7884*INT - 0.0269*Vol + 36.4545

For the import model, the results show that in the short-run nominal exchange rate (NER), terms of trade (ToT) and the dummy variable (shock) are significant in explaining import growth Liberia. The import model coefficient ECM (Cointeq (-1)) term of -0.915 indicates a speedy adjustment process of about 91 percent of the disequilibria of the previous year's shock adjust back to the long-run equilibrium in the current year. Nominal exchange rate (NER) and external shock (shock) are negatively related to import of Liberia. Additionally, real exchange rate (RER) and terms of trade (ToT) are inversely related to import with statistically significant values. There is also a long-run relationship among the variables. In the long-run, nominal exchange rate (NER), external shock to the Liberian economy (shock) and terms of trade (Trade) are all negatively related to import with statistically significant values. Monetary intervention in the foreign exchange market (INT) and gross domestic product (Liberia) have statistically significant values and are positively related to import of Liberia as shown in Table 4.7.

Table 4.7 *ARDL Cointegration Results for Import Model*

Panel I: short-run output result	Dependent Variable: $lnIM_t$	
Regressors	ARDL	(2,1,2,2,2,1,2,1,0)
$\Delta lnIM_{t-1}$	-0.344	(0.010)*
$\Delta lnRGDP_{d_t}$	0.080	(0.703)
$\Delta lnNER_t$	-3.515	(0.000)*
$\Delta lnNER_{t-1}$	-2.707	(0.000)*
$\Delta lnRER_t$	3.856	(0.000)*
$\Delta lnRER_{t-1}$	3.080	(0.000)*
$\Delta lnToT_t$	0.241	(0.004)*
$\Delta lnToT_{t-1}$	0.412	(0.000)*
ΔFDI_t	-0.000	(0.726)
$\Delta Shock_t$	-0.251	(0.009)*
ΔINT_t	0.145	(0.455)
ΔVol_t	0.006	(0.389)
ECM_{t-1}	-0.915	(0.000)*

Adjusted R-squared		(0.966)
F-statistics		(46.343)
Durbin Watson-statistics		(2.684)
Residual Sum of Squared		(0.473)
Panel II: long-run output results	Dependent Variable: $lnIM_t$	
$lnNER_t$	-1.292	(0.020)*
$lnRER_t$	0.637	(0.355)
$lnRGDP_{d_t}$	1.066	(0.000)*
$lnToT_t$	-0.345	(0.000)*
FDI_t	-0.000	(0.220)
$Shock_t$	-1.298	(0.001)*
INT_t	2.376	(0.000)*
Vol_t	0.007	(0.462)
Constant	17.268	(0.000)*

Source: *Author's Computation, 2017*

Note: Figures marked with one and two astericks denotes significance level at 1% and 5% respectively. Cointeq = logImport – (1.0665*LogRGDPd – 1.2923*LogNER + 0.6379*LogRER – 0.3453*logToT – 0.0000*FDI -1.2923*Shock + 2.3763*INT + 0.0079*Vol +17.2686)

The results from the trade balance model indicate that in the short-run, trade balance of the previous period (TB), the U.S real gross domestic product (RGDPf), real gross domestic product (Liberia) (RGDPd), nominal exchange rate (NER), real exchange rate (RER) and external shock (shock) are all significant in explaining changes in the trade balance of Liberia. The coefficient term of the Trade balance model, ECM (Cointeq (-1)) of -0.849, describes a quick adjustment process of approximately 84 percent of the disequilibria of the previous year's shock adjust back to the long-run equilibrium in the current year. Domestic GDP, nominal exchange rate (NER) and foreign GDP are positively related to trade balance (TB) with statistical significant values. However, real exchange rate (RER), terms of trade (ToT) and external shock (shock) are inversely related to trade balance. Table 4.6 provides the coefficients and probability statistics for all the variables in the trade model.

Table 4.8 *ARDL Cointegration Results for Trade Balance Model*

Panel I: short-run output result		Dependent Variable: $\Delta lnTB_t$
Regressors	ARDL	(3,2,2,2,2,1,2, 1,1)
$\Delta lnTB_{t-1}$	0.138	(0.147)
$\Delta lnTB_{t-2}$	0.384	(0.002)*
$\Delta lnRGDP_{d_t}$	0.056	(0.823)
$\Delta lnRGDP_{d_{t-1}}$	2.967	(0.000)*
$\Delta lnRGDP_{f_t}$	3.108	(0.143)
$\Delta lnRGDP_{f_{t-1}}$	12.151	(0.000)*
$lnNER_t$	1.307	(0.017)*
$\Delta lnNER_{t-1}$	1.882	(0.001)*
$\Delta lnRER_t$	-1.396	(0.006)*
$\Delta lnRER_{t-1}$	-2.239	(0.000)*
$\Delta lnToT_t$	-0.040	(0.641)
$\Delta Shock_t$	0.0258	(0.769)
$\Delta Shock_{t-1}$	-0.177	(0.067)**
ΔINT_t	-0432	(0.104)
ΔVol_t	0.0108	(0.228)
ECM_{t-1}	-0.849	(0.000)*
Adjusted R squared		(0.887)
F-statistics		(11.532)
Durbin Watson- statistics		(2.752)
Residual Sum of Squared		(0.488)
Panel II: long-run output result		Dependent Variable: $lnTB_t$
$lnRGDP_{d_t}$	-0.673	(0.138)
$lnRGDP_{f_t}$	0.866	(0.389)
$lnNER_t$	2.917	(0.064)**
$lnRER_t$	-2.024	(0.042)*
$lnToT_t$	0.619	(0.068)**
$Shock_t$	0.682	(0.166)
INT_t	-3.192	(0.039)*

Vol_t	0.049	(0.103)
constant	-11.438	(0.274)

Source: *Author's Computation, 2017*

Note: Numbers marked with one and two asterick denotes 1% and 5% significance level respectively. Cointeq = LogTB –(-0.6735*LogRGDPd + 0.8660*LogRGDPf + 2.9179*LogNER -2.0245*LogRER + 0.6191*LogToT + 0.6829*Shock -3.1926*INT + 0.0492*Vol – 11.4382)

CHAPTER FIVE

5. RESULTS, DISCUSSION AND RECOMMENDATIONS

This chapter presents the results, discussion and policy recommendation of this study in a precise and clear form. It contains the full results and recommendation of this study.

5.1. Results

The autoregressive distributed lag (ARDL) model introduced by Pesaran and Shin and later advanced by Pesaran *et al.* (2001) was adopted in this study to determine the effect of foreign exchange and real exchange rate on foreign trade in Liberia. This study confirms that there is exist short-run and long-run relationship between nominal exchange rate, real exchange rate, export, import and trade balance. The results further show a long-run statistically significant positive relationships between nominal exchange rate and export, real gross domestic product of U.S and export, terms of trade and export, and central bank (intervention) and export. The results also indicate that there is a short-run and long-run statistically significant positive relationship between real exchange rate and import and terms of trade and import. Conversely, nominal exchange rate is inversely related to import of Liberia in both the short-run and long-run. Terms of trade tends to adjust in the long-run to a negative value and at the same time domestic GDP seems to contribute positively towards import growth of Liberia. Additionally, the results show that there exist short-run and long-run relationship between real gross domestic product (foreign) and trade balance, real gross domestic product (domestic) and trade balance, nominal exchange rate and trade balance, and real exchange rate and trade balance. Nominal exchange rate and terms of trade have a statistically significant positive relationship with trade balance. Real exchange rate has a statistically significant inverse relationship with trade balance in both the short-run and lung-run.

5.2. Recommendations

Based on the results of this study, the researcher would like to make the following recommendations:

- Promotion of Value Added Production and Trade Activities: There is a need for the introduction of trade policies geared towards the promotion of value added production and improvement in manufacturing and industrial sectors as a mean of providing income,

employment and subsequently resulting to appreciation of the local currency and improving terms of trade and trade balance.

- "Fiscal" De-dollarization of the Liberian Economy: The dual currency and high dollarization seems to be putting huge pressure on the local currency as the demand for U.S dollar continue to increase. Fiscal policies—taxes and revenues—must support the current de-dollarization process if a tangible result is to be achieved. By initially quoting prices, taxes, and other business related costs in Liberian dollar and also making government payments in Liberian dollar, the de-dollarization process will be fully realized and quickly achieved. This may allow policymakers to implement proper monetary policy gear towards achieving the overall economic goal of Liberia.
- Promotion of Financial Inclusion: The lack of the availability of commercial bank branches in many parts of the country reduces people's chances of assessing various bank services including holding bank accounts, borrowing and investing. Thus, rendering the economy to be more informal. The need to promote financial inclusion in various forms that will aloow for the availibility of funds to businesses as a mean of investment in entrepreneur activities that will lead to strengthening the economy cannot be overemphasized.
- The Establishment of an Institution for the Collection and Recording of Reliable Data for Policy Research: The unavailability of credible data for most macroeconomic indicators makes research that could provide policy options for implementation difficult to carryout. The government needs to ensure the regular collection of key macroeconomic data for the ease of doing research geared towards policy recommendation.

References

Akan, Y., and Arslan, I. (2008). The Impact of Exchange-Rate Policies on the Foreign Trade: The Case of Turkey. *International Journal of Emerging and Transition Economies*, Vol. 1, Issue 2, 257-256.

Akhtar, M., and Spence, R. H. (1984). Effect of Exchange Rate Uncertainty on German and U.S Trade. *Federal Reserve Bank of New York Quarterly Review*, Vol. 9, 7-16.

Alvarez-Plata, P., and García-Herrero, A. (2008). *To Dollarize or De-dollarize: Consequence for Monetary Policy*. Berlin: German Institute for Economic Research (DIW) and BBVA, Working Paper.

Aristotelous, K. (2001). Exchange-Rate Volatility, Exchnage-Rate Regime, and Trade Volume: Evidence from the UK-US Export Function (1989-1999). *Economics Letters*, 72, 87-94.

Arize, A. C., Osang, T., and Slottji, D. J. (2000). Exchange-Rate Volatility and Foreign Trade: Evidence From Thirteen LDC's. *Journal of Business and Economic Statistics*, 18:1, 10-17.

Bailey, M.J., Tavlas, G.S., and Ulan, M. (1987). The Impact of Exchange-rate Volatility on Export Growth: some theoretical Considerations and Empirical Results. *Journal of Policy Modeling*, 9, 225-243.

Bakhromov, N. (2011). The Exchange Rate Volatility and the Trade Balance: Case of Uzbekistan. *Journal of Applied Economics and Business Research, JAEBR*, 1(3): 149- 161.

Bank, W. (2015). *World Bank* . www.worldbank.org adresinden alındı

Broda, C., and Romalis, J. (2003). *Identifying the Relationship Between Trade and Exchange Rate Volatility.* Federal Reserve Bank of New York and University of Chicago.

CBL. (2005). *Central Bank of Liberia Annual Report.* Monrovia: Central Bank of Liberia.

CBL. (2016, December 8). *Central Bank of Liberia*. Central Bank of Liberia Microfinance: https://cbl.org.lr/2content.php?sub=218&related=32&third=218&pg=sp&pt=Rural%20Community%20Finance%20Institutions adresinden alındı

Chowdhury, A. R. (1993). Model, Does Exchange Rate Volatility Depress Trade? Evidence From Error-Correction. *Review of Economics and Statistics*, 75, 700-706.

Clark, P. Tamirisa, N. Wei, S. Sadikov, A. and Zeng, L. (2004). Exchange Rate Volatility and Trade Flow-Some New Evidence. *International Monetary Fund (IMF)*.

Clark, P., Tamirisa, N., Wei, J., Sadikov, A., and Zeng, L. (2004). *Exchange Rate Volatility and Trade Flows - Some New Evidence.* International Monetary Fund.

Danladi, J. D., Akomolafe, K. J., Babalola, O., and Akpan, E. A. (2015). Exchange Rate Volatility and International Trade in Nigeria. *Research Journal of Finance and Accounting*, Vol. 6 No: 18.

De Grauwe, P. (1988). Exchange Rate Variability and the Slowdown in Growth of International Trade. *Staff Papers, International Monetary Fund (IMF)*, s. Vol. 35, No.1 pp. 63-84.

Doganlar, M. (2002). Estimating the Impact of Exchange Rate Volatility on Exports: Evidence from Asian Countries. *Applied Economics Letters*, 9:13, 859-863.

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, 251-276.

Gardner, L. A. (2012). The Rise and Fall of Sterling in Liberia, 1847-1943. *Unpublished*.

Greene, W. H. (2008). The econometric approach to efficiency analysis. *The measurement of productive efficiency and productivity growth*, 1, 92-250.

Grigoryan, G. (2015). The J-Curve Effect on the Trade Balance in Armenia. *International Journal of Economics, Finance and Management Sciences*, Vol. 3, No. 3, pp. 270-278.

Gupta, S., Pattillo, C., and Wagh, S. (2007). Making Remittances Work for Africa. *Finance and Development*, 44(2), 1-8.

Hayakawa, K., and Kimura, F. (2008). The Effect of Exchange Rate Volatility on International Trade in East Asia. *ERIA Discussion Paper Series*, 03.

IMF. (2006, July 31). *Data and Statistics*. IMF website: https://www.imf.org/external/np/mfd/er/2006/eng/0706.htm adresinden alındı

Johansen, S. (1988). Statistical Analysis of Cointegrating Vectors. *Journal of Economic Dynamics and Control*, 12, 231-254.

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

Johansen, S. (1995). Identifying restrictions of linear equations with applications to simultaneous equations and cointegration. *Journal of econometrics*, 69(1), 111-132.

Johansen, S., and Juselius, I. (1990). Maximum Likelihood Estimation and Inference on Cointegration-With Applications to Demand for Demand. *Oxford Bulletin of Econornics and Statistics*, 52, 169-2 10.

Koray, F. a. (1989). Real Exchange Rate Volatility and U.S. Bilateral Trade: A VAR Approach. *Review of Econornics and Statistics, ,* 71, 708-712.

Koray, F. K., Lastrapes, W. D. (1989). Real Exchange Rate Volatility and U. S. Bilateral Trade: VAR Approach. *Review of Economics and Statistics*, 71 (4), pp.708-712.

Krugman, P. R., and Obstfeld, M. (2006). *International Economics: Theory and Policy.* Boston: Pearson Addison-Wesley.

Krugman, P. R., Obstfeld, M., and Melitz, M. J. (1996). *International Economics.* Boston: Pearson Addison-Wesley.

Kumar, R., and Dhawan, R. (1991). Exchange Rate Volatility and Pakistani's Exports to the Developed World, 1974-1985. *World Development*, 19: 1225-1240.

McKenzie, M. D. (1999). The Impact of Exchange Rate Volatility on International Trade Flows. *Journal of Economic Surveys*, Vol. 13, No. 1, 706-106.

MoCI. (2013). *Ministry of Commerce and Industry* . Exports: http://www.moci.gov.lr/2content.php?sub=74&related=18&third=74&pg=sp adresinden alındı

Mundaca, B. G. (2001). Central bank interventions and exchnage rate band regimes. *Journal of International Money and Finance*, 20(5), 677-700.

Odili, O. (2015). Real Exchange Rate Volatility, Economic Growth and International Trade in an Emerging Market Economy: Evidence from Nigeria. *International Journal of Academic Research in Business and Social Sciences*, Vol.5, No.7.

Olimov, U., and Sirajiddinov, N. (2008). The Effect of the Real Exchange Rate Volatility and Misalignments on Foreign Trade Flows in Uzbekistan. *The Open-Access, Open-Asssement E-Journal*, 29.

Papaioannou, M. (2006). *Exchange Rate Risk and Management: Issues and Approaches.* IMF Working Paper.

Peree, E., and Steinherr, A. (1989). Exchange Rate Uncertainty and Foreign Trade. *European Economic Review*, 33, 1241--64 .

Pesaran, M. H., & Pesaran, B. (1997). Working with microfit 4.0. *Camfit Data Ltd, Cambridge.*

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., Shin, Y., & Smith, R. P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association,*, 94(446), 621-634.

Phillips, P. C., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, 335-346.

Rahutami, A. I. (2013). Real Exchange Rate Volatility and International Trade: ASEAN Experience towards ASEAN Economic Community.

ReSAKSS. (2015, July). *Regional Strategic Analytic and Knowledge Support System*. ReSAKSS: http://www.resakss.org/region/monitoring-progress/liberia adresinden alındı

Serenis, D., and Serenis, P. (2008). The Impact of Exchange Rate Volatility on Export: Evidence Four European Countries. *In International Conference on Applied Economics--ICOAE*, (s. p. 835-937).

Simakova, J. (2013). Estimation of the J-curve effect in the bilateral trade of Hungary. *Central European Review of Economic Issues*, Volume 16: 183-191.

Tarawelie, A. B., Sissoho, M., Conte, M., and Ahortor, C. R. (2012). Exchange Rate, Inflation and Macroeconomic Performance in the West African Monetary Zone (WAMZ). *WAMI Occasional Paper Series* , No. 2.

Vergil, H. (2000). Exchange Rate Volatility in Turkey and its Effect on Trade Flows. *Journal of Economic and Social research*, 4(1), 83-99.

WorldBank. (2015, October 25). *World Bank Website*. Countries Context: http://www.worldbank.org/en/country/liberia/overview adresinden alındı

WorldBank. (2016, April 13). *News*. World Bank website: http://www.worldbank.org/en/news/press-release/2016/04/13/remittances-to-developing-countries-edge-up-slightly-in-2015 adresinden alındı

WorldBank. (2016, October 2). *World Bank Topic*. World Bank: http://www.worldbank.org/en/topic/financialinclusion/overview adresinden alındı

Yeun-Ling, N., Wai-Mun, H., and Geii-Mei, T. (2009). Real Exchange Rate and Trade Balance Relationship: An Empirical Study on Malaysia. *International Journal of Business and Management*, Vol. 3, No. 8.

Appendices

Appendix A:1. Estimated ARDL Export Model

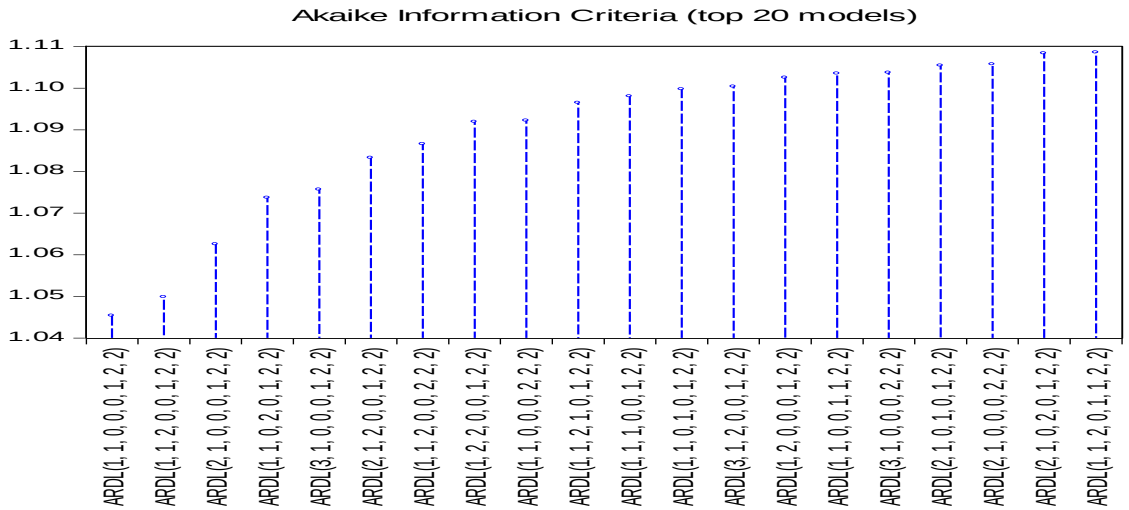
Dependent Variable: LOGEXPORT
Method: ARDL
Date: 03/29/17 Time: 17:12
Sample (adjusted): 1983 2015
Included observations: 33 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): LOGRGDPF LOGNER LOGRER LOGTOT SHOCK INTERVENTION VOL
Fixed regressors: C
Number of models evalulated: 6561
Selected Model: ARDL(1, 1, 0, 0, 0, 1, 2, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOGEXPORT(-1)	0.369001	0.145297	2.539639	0.0205
LOGRGDPF	10.94641	4.883121	2.241682	0.0378
LOGRGDPF(-1)	-13.69749	4.738894	-2.890440	0.0097
LOGNER	3.027984	0.897076	3.375394	0.0034
LOGRER	0.609396	0.538360	1.131949	0.2725
LOGTOT	0.279182	0.179740	1.553256	0.1378
SHOCK	0.116152	0.186641	0.622331	0.5415
SHOCK(-1)	-0.462795	0.221608	-2.088352	0.0512
INTERVENTION	-0.364547	0.465969	-0.782341	0.4442
INTERVENTION(-1)	7.806565	2.376671	3.284664	0.0041
INTERVENTION(-2)	-5.051541	1.889699	-2.673199	0.0155
VOL	0.028067	0.014917	1.881515	0.0762
VOL(-1)	-0.021050	0.011565	-1.820154	0.0854
VOL(-2)	-0.024005	0.009997	-2.401180	0.0274
C	23.00274	7.585600	3.032422	0.0072

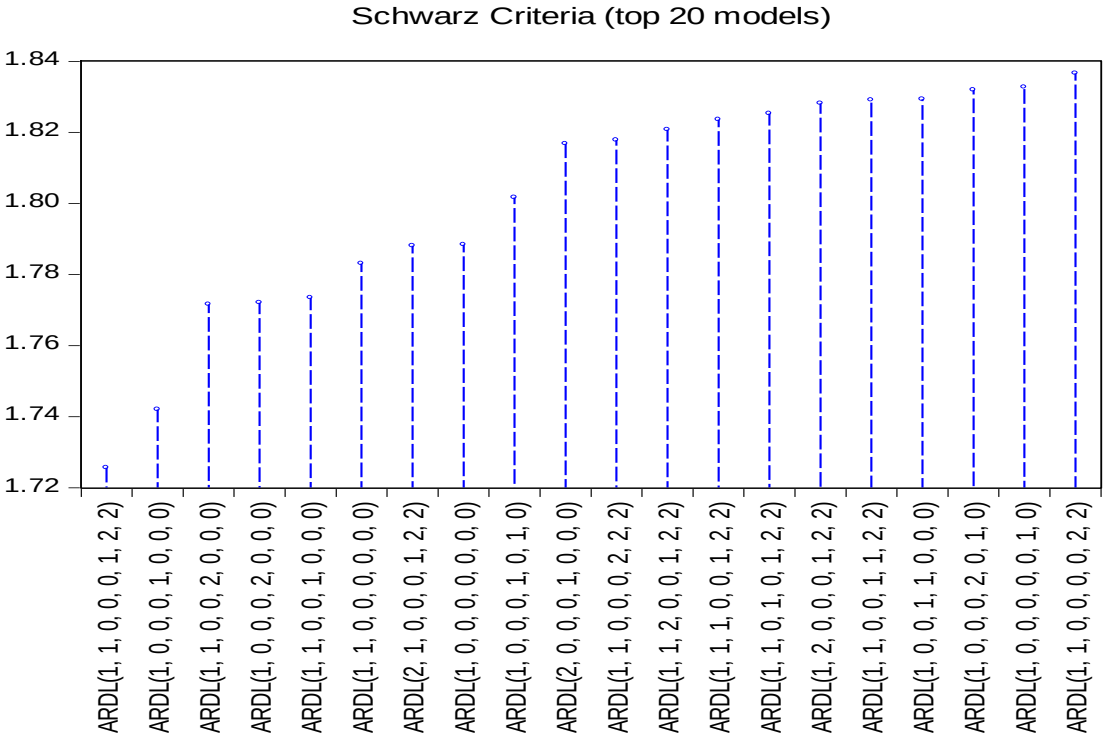
R-squared	0.868994	Mean dependent var	19.19240
Adjusted R-squared	0.767101	S.D. dependent var	0.726769
S.E. of regression	0.350736	Akaike info criterion	1.045389
Sum squared resid	2.214282	Schwarz criterion	1.725619
Log likelihood	-2.248911	Hannan-Quinn criter.	1.274265
F-statistic	8.528473	Durbin-Watson stat	2.407392
Prob(F-statistic)	0.000027		

*Note: p-values and any subsequent tests do not account for model selection.

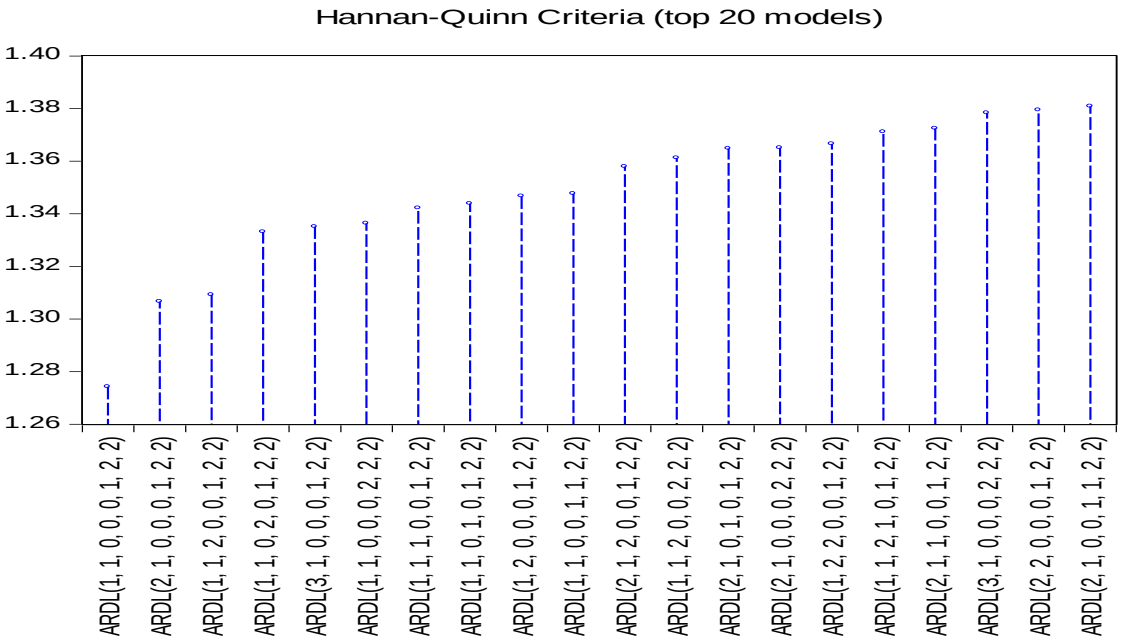
Appendix A: 2.. Export Model AIC criteria



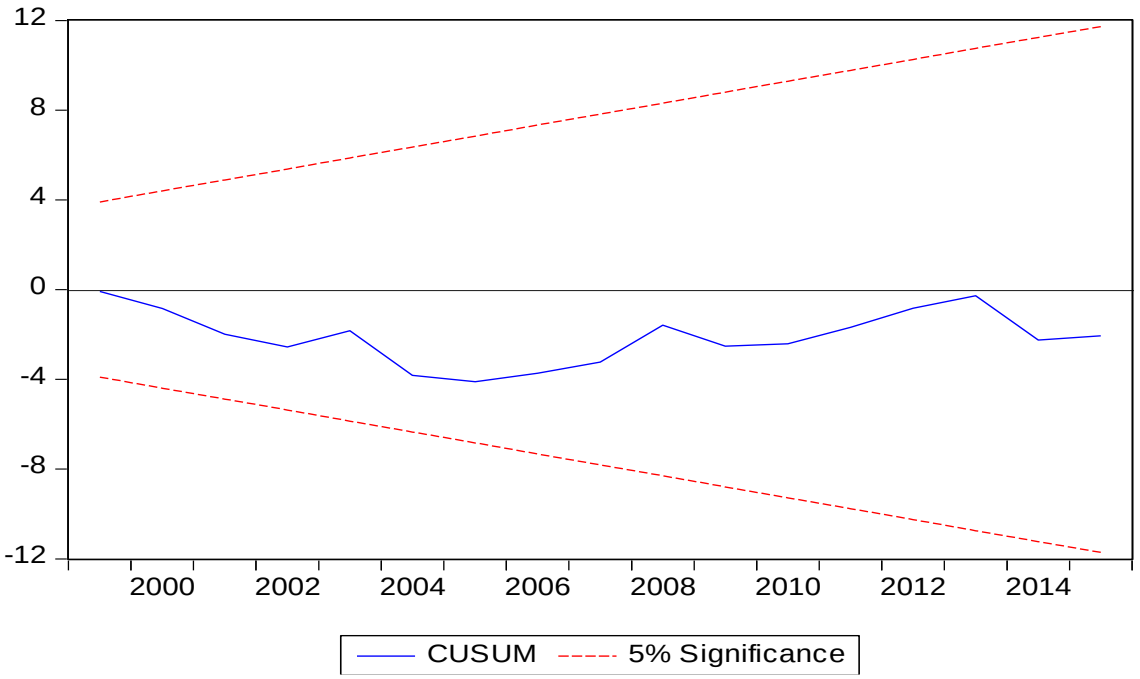
Appendix A: 3. Export Model SBC criteria



Appendix A: 4. Export Model HQC Criteria



Appendix A: 5. CUSUM Test for Export Model



Appendix B:1. Estimated ARDL Import Model

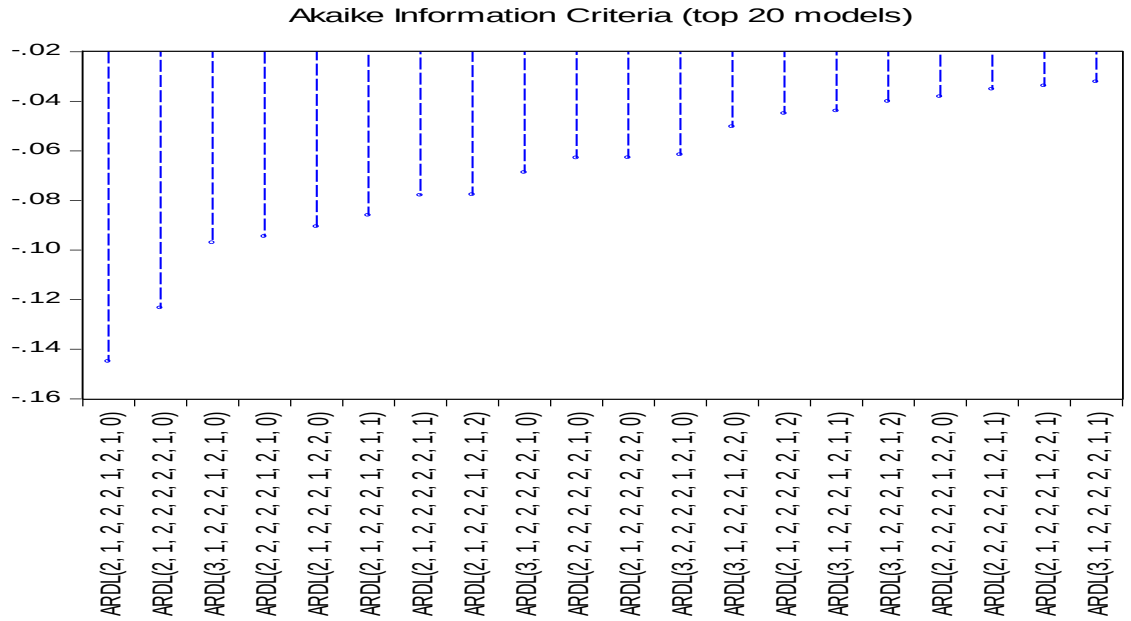
Dependent Variable: LOGIMPORT
Method: ARDL
Date: 03/29/17 Time: 17:33
Sample (adjusted): 1982 2015
Included observations: 34 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): LOGRGDPD LOGNER LOGRER LOGTOT FDI SHOCK INTERVENTION VOL
Fixed regressors: C
Number of models evalulated: 19683
Selected Model: ARDL(2, 1, 2, 2, 2, 1, 2, 1, 0)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOGIMPORT(-1)	-0.264190	0.247122	-1.069067	0.3061
LOGIMPORT(-2)	0.346232	0.182067	1.901675	0.0815
LOGRGDPD	0.076753	0.390871	0.196364	0.8476
LOGRGDPD(-1)	0.902261	0.463858	1.945123	0.0756
LOGNER	-3.511385	0.699009	-5.023377	0.0003
LOGNER(-1)	-0.391586	0.988568	-0.396115	0.6990
LOGNER(-2)	2.716726	0.760039	3.574456	0.0038
LOGRER	3.862574	0.768652	5.025127	0.0003
LOGRER(-1)	-0.186011	1.058159	-0.175788	0.8634
LOGRER(-2)	-3.090973	0.839986	-3.679792	0.0032
LOGTOT	0.240625	0.133653	1.800375	0.0970
LOGTOT(-1)	-0.143876	0.125084	-1.150239	0.2725
LOGTOT(-2)	-0.413720	0.138058	-2.996700	0.0111
FDI	-6.03E-11	2.65E-10	-0.228016	0.8235
FDI(-1)	-5.76E-10	3.49E-10	-1.650119	0.1248
SHOCK	-0.251704	0.172133	-1.462268	0.1694
SHOCK(-1)	-0.506780	0.140096	-3.617386	0.0035
SHOCK(-2)	-0.433914	0.147473	-2.942324	0.0123
INTERVENTION	0.140739	0.347748	0.404716	0.6928
INTERVENTION(-1)	2.040635	0.559308	3.648500	0.0033
VOL	0.007255	0.009262	0.783317	0.4486
C	15.85186	4.050777	3.913288	0.0021

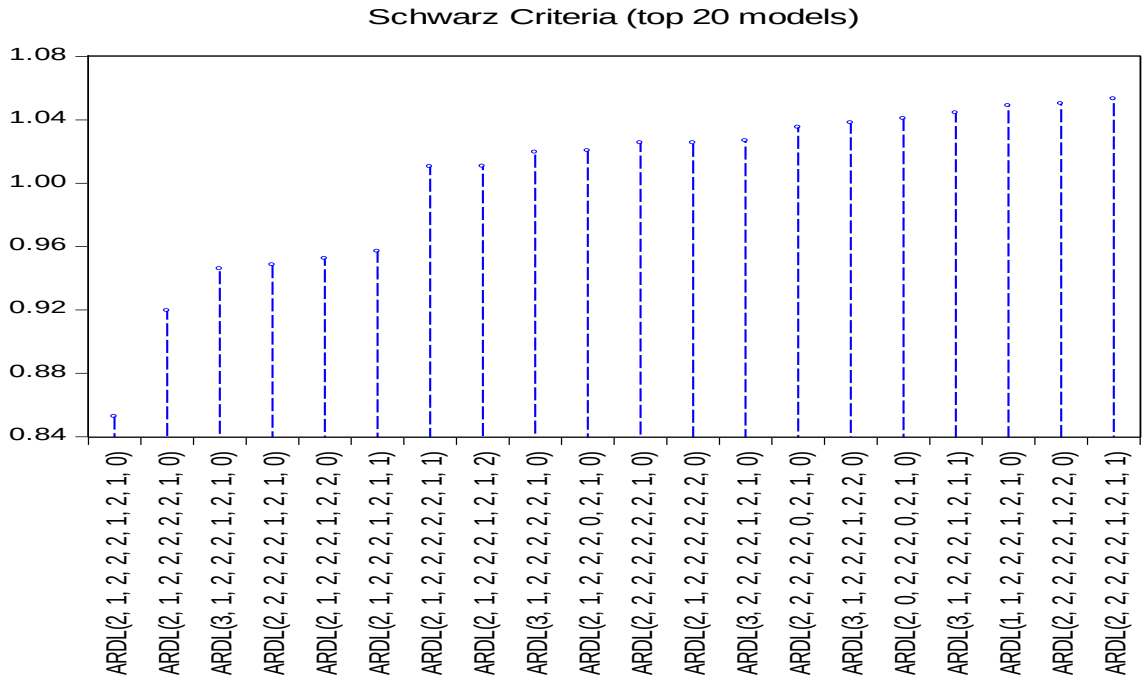
R-squared	0.987820	Mean dependent var	19.60339
Adjusted R-squared	0.966505	S.D. dependent var	1.085126
S.E. of regression	0.198596	Akaike info criterion	-0.142424
Sum squared resid	0.473285	Schwarz criterion	0.845221
Log likelihood	24.42121	Hannan-Quinn criter.	0.194391
F-statistic	46.34378	Durbin-Watson stat	2.684130
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

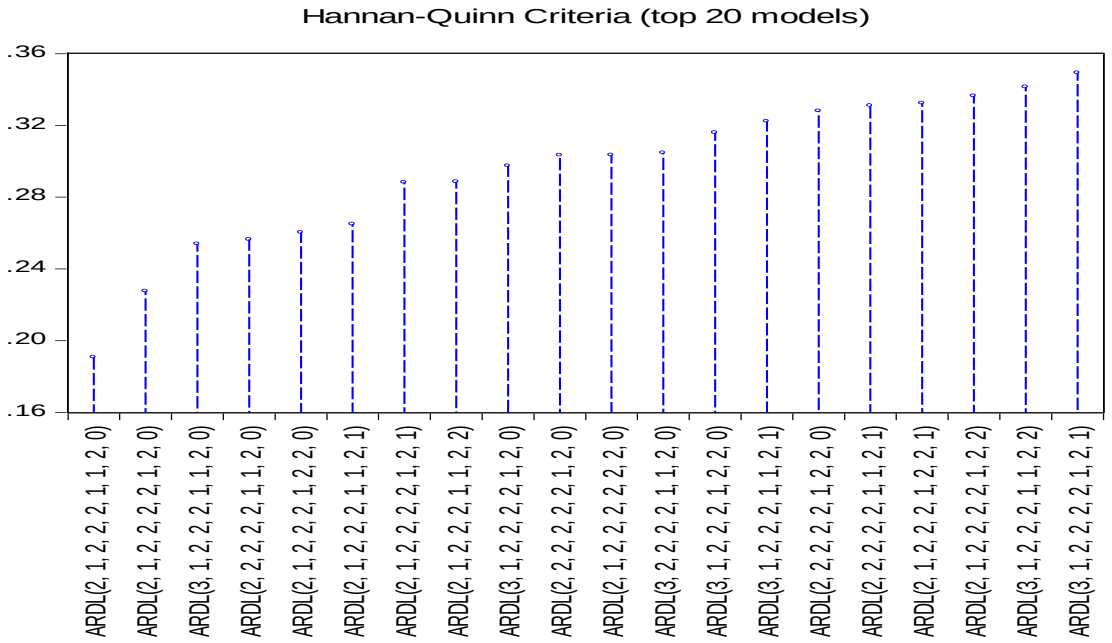
Appendix B:2. Import Model AIC criteria



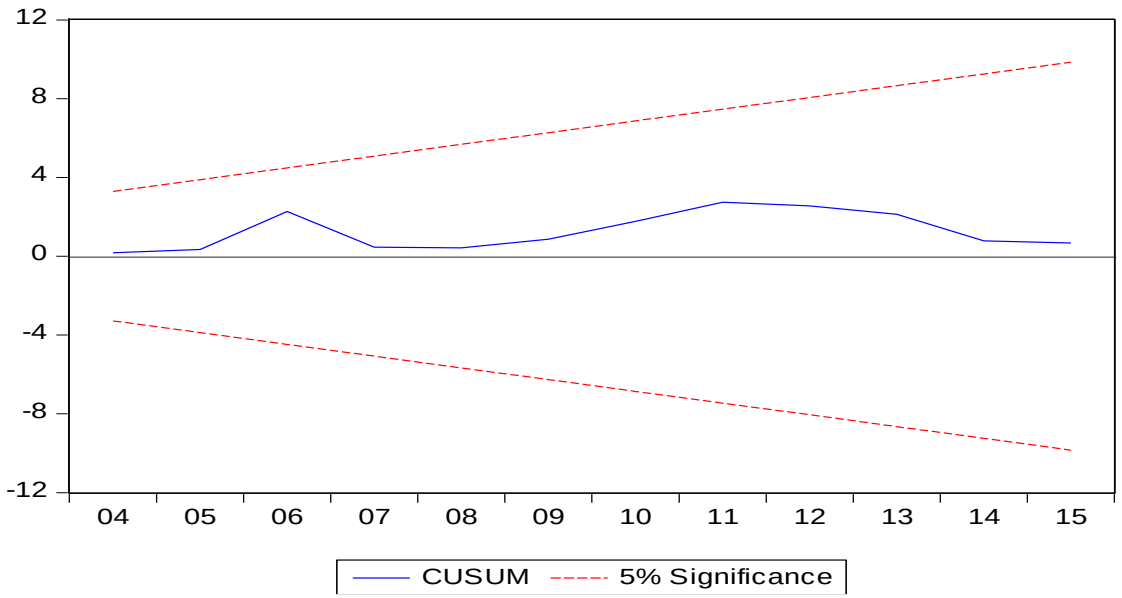
Appendix B:3. Import Model SBC criteria



Appendix B: 5. Import Model HBC Criteria



Appendix B: 6. CUSUM Test for Import Model



Appendix C: 1. Estimated Trade Balance Model

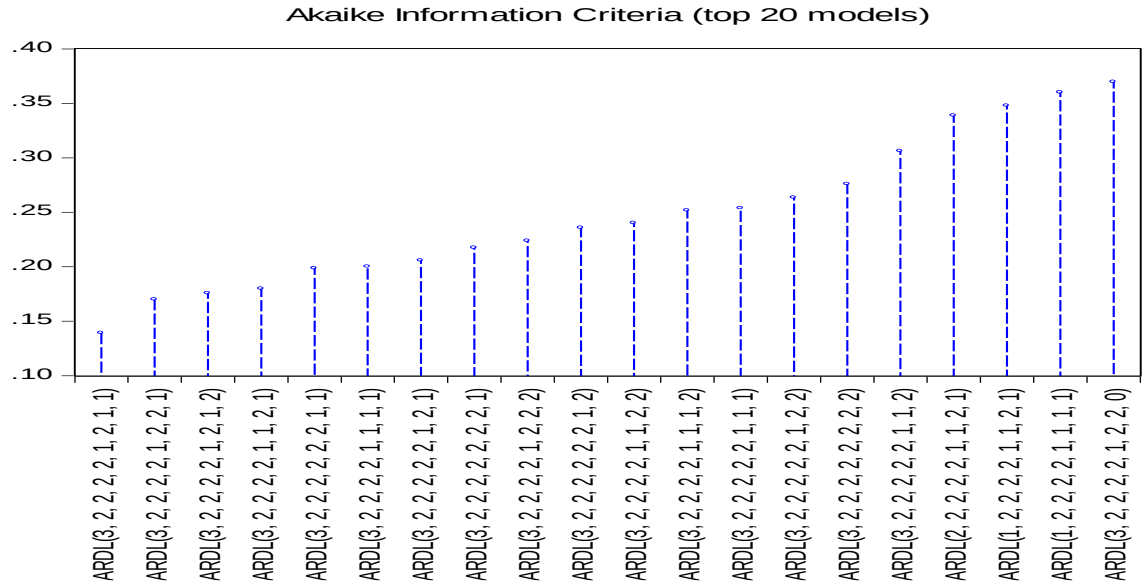
Dependent Variable: LOGTB
Method: ARDL
Date: 03/29/17 Time: 17:42
Sample (adjusted): 1983 2015
Included observations: 33 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): LOGRGDPD LOGRGDPF LOGNER LOGRER LOGTOT SHOCK INTERVENTION VOL
Fixed regressors: C
Number of models evalulated: 19683
Selected Model: ARDL(3, 2, 2, 2, 2, 1, 2, 1, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOGTB(-1)	0.288673	0.170224	1.695839	0.1284
LOGTB(-2)	0.246391	0.170514	1.444988	0.1865
LOGTB(-3)	-0.384852	0.212153	-1.814031	0.1072
LOGRGDPD	0.056876	0.575846	0.098769	0.9238
LOGRGDPD(-1)	2.338641	0.713355	3.278370	0.0112
LOGRGDPD(-2)	-2.967882	0.624561	-4.751948	0.0014
LOGRGDPF	3.108738	5.085438	0.611302	0.5580
LOGRGDPF(-1)	9.778232	7.675449	1.273962	0.2384
LOGRGDPF(-2)	-12.15105	4.320039	-2.812718	0.0227
LOGNER	1.307547	0.870129	1.502704	0.1713
LOGNER(-1)	3.054936	1.276861	2.392536	0.0437
LOGNER(-2)	-1.882845	0.981717	-1.917910	0.0914
LOGRER	-1.396336	0.687666	-2.030545	0.0768
LOGRER(-1)	-2.563511	1.163906	-2.202508	0.0588
LOGRER(-2)	2.239485	1.053874	2.125003	0.0663
LOGTOT	-0.040263	0.181203	-0.222198	0.8297
LOGTOT(-1)	0.566329	0.192861	2.936461	0.0188
SHOCK	0.025843	0.181307	0.142534	0.8902
SHOCK(-1)	0.377368	0.235632	1.601512	0.1479
SHOCK(-2)	0.177111	0.174291	1.016179	0.3393
INTERVENTION	-0.432414	0.542862	-0.796544	0.4487
INTERVENTION(-1)	-2.280586	0.805212	-2.832280	0.0221
VOL	0.010819	0.019885	0.544053	0.6012
VOL(-1)	0.030999	0.018395	1.685169	0.1304
C	-9.720043	7.457165	-1.303450	0.2287

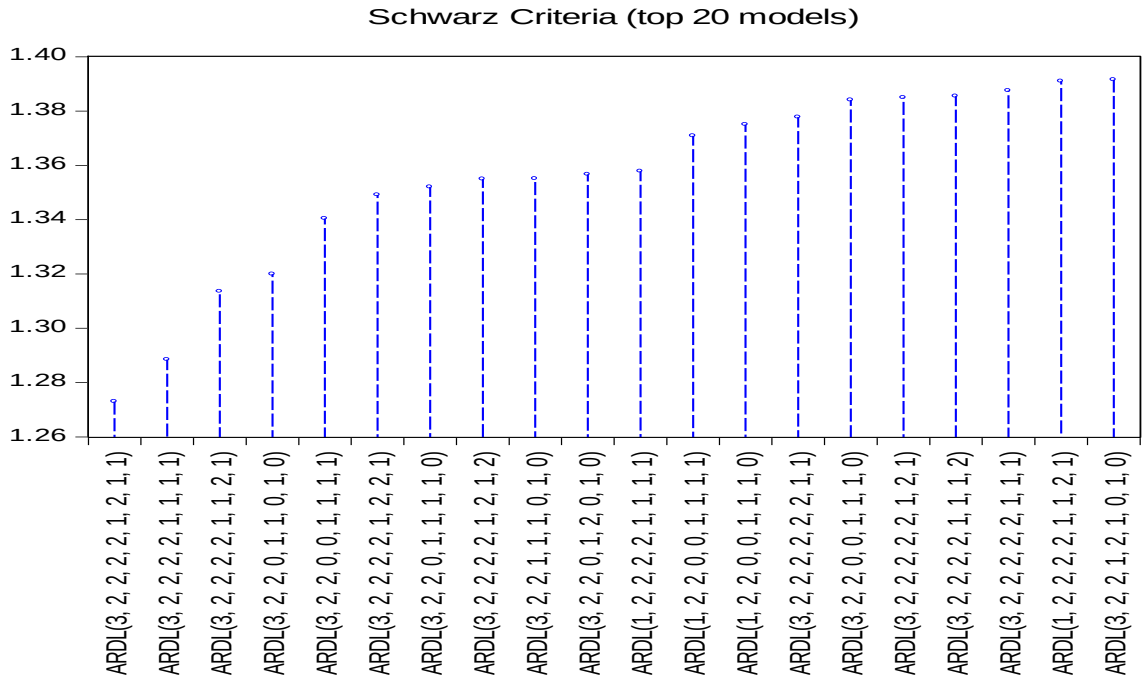
R-squared	0.971909	Mean dependent var	-0.404727
Adjusted R-squared	0.887634	S.D. dependent var	0.736880
S.E. of regression	0.247009	Akaike info criterion	0.139305
Sum squared resid	0.488109	Schwarz criterion	1.273023
Log likelihood	22.70147	Hannan-Quinn criter.	0.520767
F-statistic	11.53269	Durbin-Watson stat	2.752270
Prob(F-statistic)	0.000663		

*Note: p-values and any subsequent tests do not account for model selection.

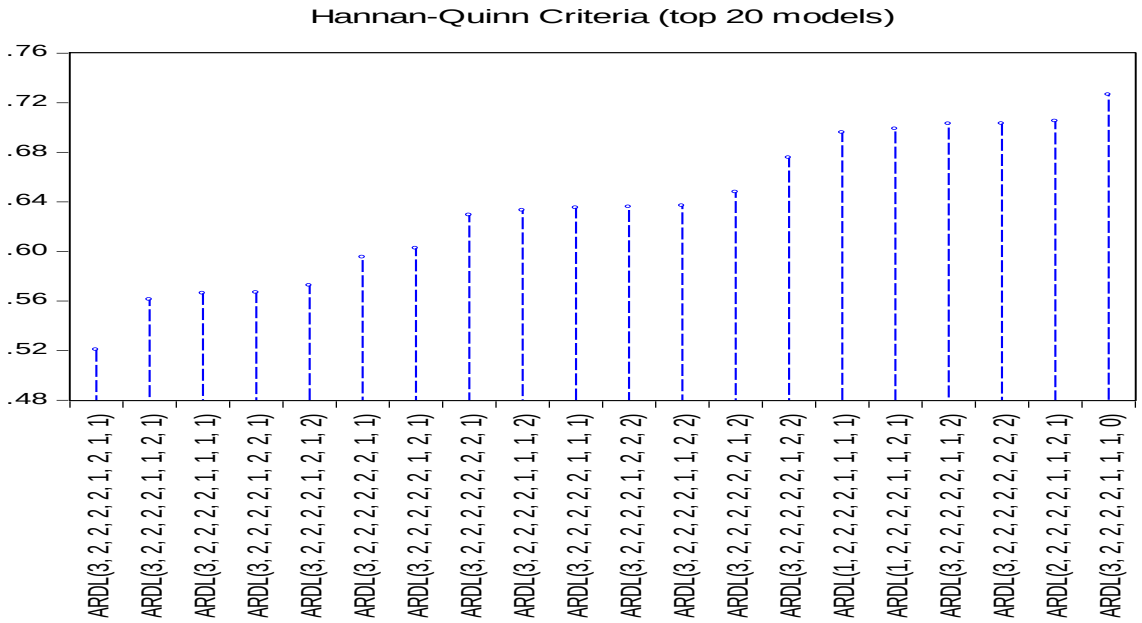
Appendix C:2. Trade Balance Model AIC top 20 model selection



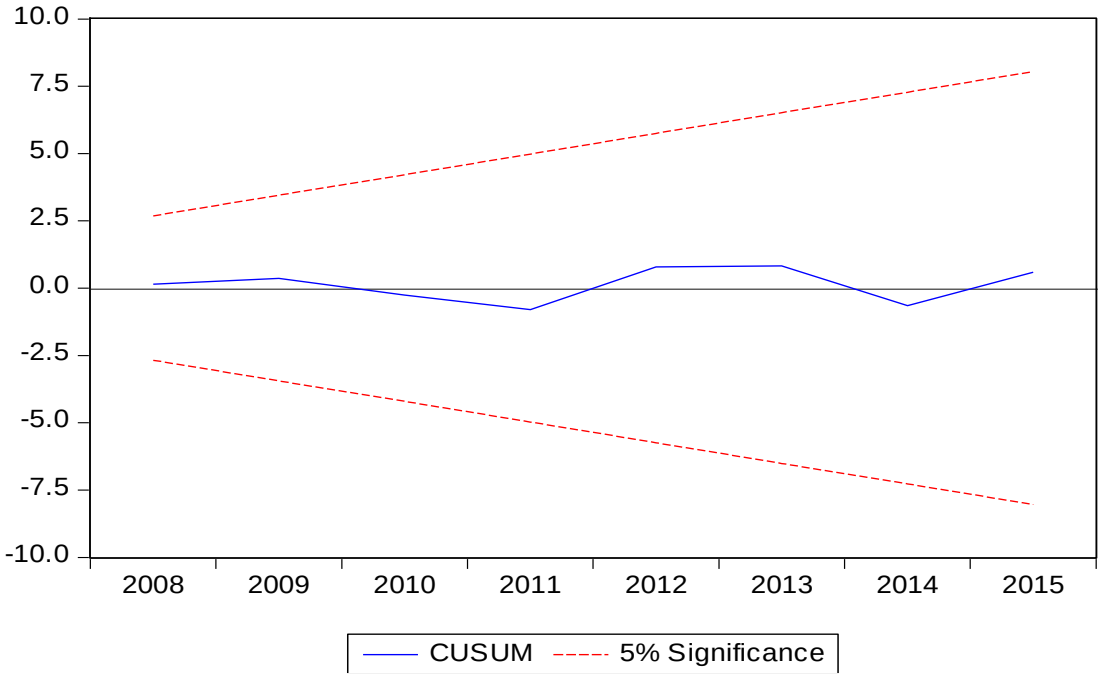
Appendix C: 3. Trade Balance SBC Model Selection criteria



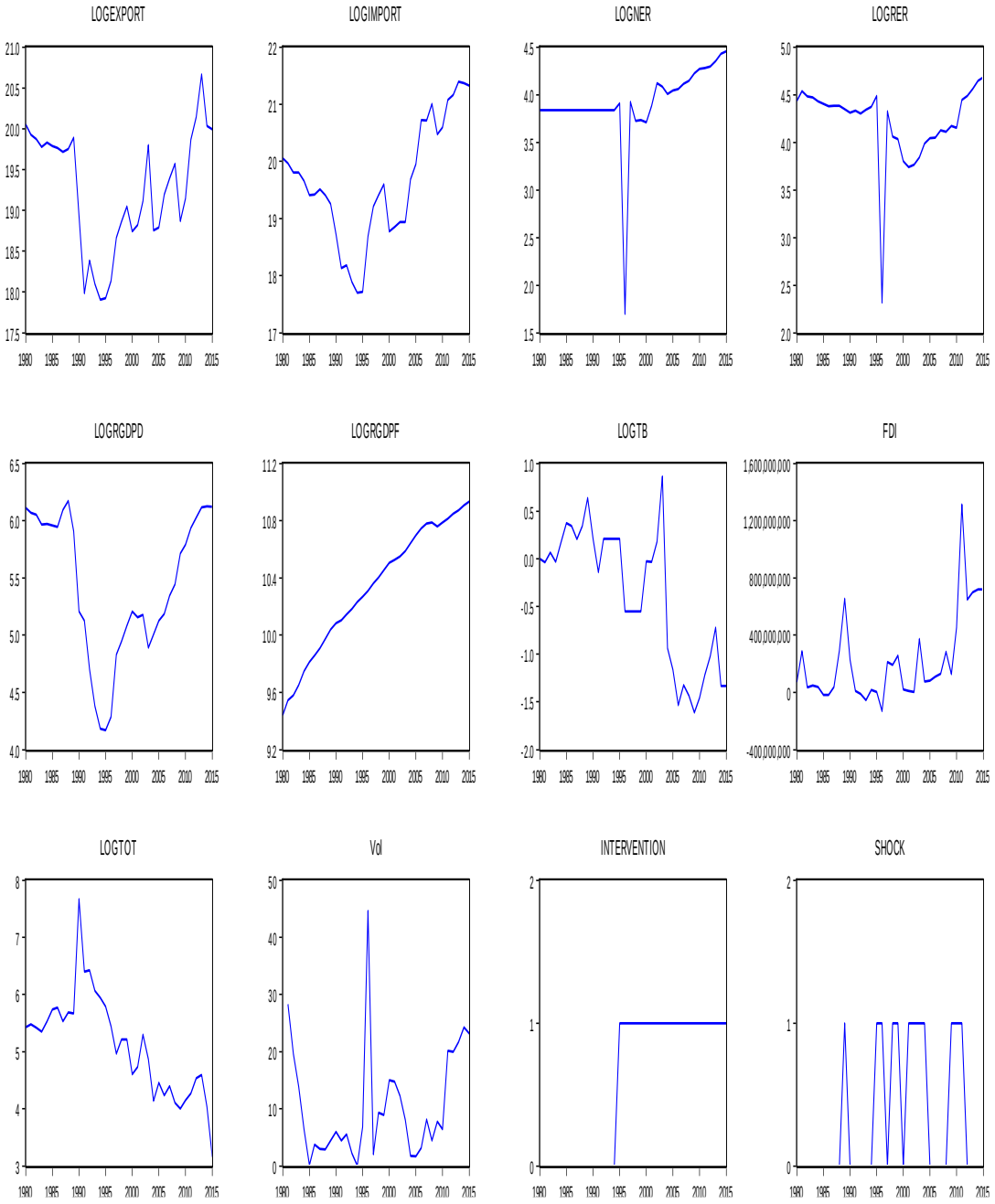
Appendix C: 4. Trade Balance HQC Model Selection criteria



Appendix C: 5. Trade Balance Model CUSUM Test Result



Appendix D: 1. Time Series Trend and Seasonility



Tez Hazırlama Kontrol Listesi	Evet	Hayır
Tez, "Tez Yazım Kılavuzu"na uygun olarak yazıldı.	☐	☐
Dış kapak ve iç kapak sayfası eklerde belirtilen şekilde düzenlendi.	☐	☐
Ön sayfalar i, ii, iii şeklinde Romen rakamları ile numaralandırıldı.	☐	☐
Dizinler, "Tez Yazım Kılavuzu"na göre sıralandı ve metin içindeki yerleşime göre sayfa numaraları verildi.	☐	☐
Özet ve Abstract hazırlandı.	☐	☐
Onay sayfası "Tez Yazım Kılavuzu"na uygun olarak hazırlandı ve imzalatıldı.	☐	☐
Etik İlke ve Kurallara Uygunluk Beyannamesi sayfası imzalandı.	☐	☐
Simgeler, kısaltmalar, tablolar ve şekillerin tamamı kontrol edilerek ilgili dizinde gösterildi.	☐	☐
Ana metinde harf karakteri, harf büyüklüğü ve satır aralıkları "Tez Yazım Kılavuzu"na uygun olacak şekilde düzenlendi.	☐	☐
Görsel ögeler, tablolar (çizelgeler), şekiller ve denklemler metin içine "Tez Yazım Kılavuzu"na uygun şekilde yerleştirildi.	☐	☐
Kaynakça "Tez Yazım Kılavuzu"na göre düzenlendi.	☐	☐
Kaynakların tamamına tez içerisinde atıfta bulunularak kaynakça bölümünde yer verildi.	☐	☐
Etik Kurul onayı gerekli ise teze eklendi. (Etik Kurul onayı gerekmiyorsa yandaki "HAYIR" kutucuğunun altına "YOK" yazılacak).	☐	☐
Anket, görüşme veya veri formları kullanıldıysa ilgili kurumlardan alınan izin yazıları ve formlar teze eklendi. (Bu formlar kullanılmadıysa yandaki "HAYIR" kutucuğunun altına "YOK" yazılacak).	☐	☐
Ekler "Tez Yazım Kılavuzu"nda belirtildiği şekilde sunuldu.	☐	☐

(Ek kullanılmadıysa yandaki "HAYIR" kutucuğunun altına "YOK" yazılacak).		
Güzel Sanatlar Enstitüsüyle ilgili anasanat dallarında sergi, konser, gösterim vb. sunumları hazırlandı.	☐	☐

"Liberya'da Nominal ve Reel Döviz Kurunun Ticarete Etkisi" başlıklı Tez, yukarıdaki listede yer alan konularla ilgili olarak tarafımızca kontrol edilmiş ve gerekleri yerine getirilmiştir.

..../..../.....

.....	.....
Emmanuel Dweh TOGBA	Yrd. Doç. Dr. Bilgin BARI