



**ST. MARY'S UNIVERSITY  
SCHOOL OF GRADUATE STUDIES  
INSTITUTE OF AGRICULTURAL AND DEVELOPMENT STUDIES**

**THE EFFECT OF DEVALUATION ON TRADE BALANCE IN  
ETHIOPIA**

**BY:  
BERKTI GETU**

**ADVISOR:  
KURABACHEW MENBER (PhD)**

**A Thesis Submitted to School of Graduate Studies, St. Mary's University Institute  
of The Agriculture And Development Studies, and For Partial Fulfillment of the  
Requirements for the Masters Of Science Degree in Development Economics**

**JUNE, 2020  
ADDIS ABABA, ETHIOPIA**

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**Board of Examiners**

As members of the Examining Board of the final MSc, open defense, we certify that we read and evaluated the thesis prepared by Berkti Getu and recommend that it be accepted as fulfilling the thesis requirement for the Msc in Development Economics.

1. _____	_____	_____
Name of Chairman	Signature	Date
2. _____	_____	_____
Name of Internal Examiner	Signature	Date
3. Hagos Gemechu (PhD)		Oct, 1, 09, 2020
Name of External Examiner	Signature	Date
4. _____	_____	_____
Name of thesis advisor	Signature	Date

## **DECLARATION**

I declare that this MSc Thesis is my original work and has never been presented for the award of any degree in this or any other university and all source of materials used for the thesis have been duly acknowledged.

Berkti Getu

Signature \_\_\_\_\_

St. Mary's University

Addis Ababa, Ethiopia

June, 2020

## **ENDORSEMENT**

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a University advisory.

Advisor's Name and Signature:

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## **LIST OF ABBREVIATION**

ARDL	Autoregressive Distributed Lag
ECM	Error correction model
UNCTAD	United Nations Conference on Trade and Development
IMF	International Monetary Fund
MOFEC	Ministry of Finance and Economic cooperation
CSA	Central statistics Agency
NBE	National Bank of Ethiopia
GDP	Gross Domestic Product
PPP	Purchasing Power Parity
NEER	Nominal Effective Exchange Rate
ADF	Augmented Dickey–Fuller test
PP	Phillips Perron test
KPSS	Kwiatkowski–Phillips–Schmidt–Shin test
CUSUMSQ	cumulative sum of squares of recursive residuals
CUSUM	cumulative sum of recursive residuals
LM	Lagrange multipliers
TB	Trade Balance

## **ABSTRACT**

*Previous studies and economists argue that there is no agreement regarding the effect of devaluation on the economy and particularly on trade balance. This study seeks to contribute some disagreements in the literature by investigating the effect of devaluation on Ethiopian trade balance using time-series data (a sequence of numerical data points in successive order) that covers the period 1997-2018. The study employs the Autoregressive distributed Lag (ARDL) approach and Error Correction Model (ECM) for analysis. The findings of the study show that trade balance positively and significantly associated with the long run devaluation. The error correction model (short run) coefficient also shows that the adjustment of disequilibrium in the subsequent year is significant. Overall, the study finds that devaluation of the Ethiopian Birr could improve Ethiopia's trade balance. However, the study cautions that consecutive devaluation of the currency would not improve trade balance in the country. This is because of the non-responsiveness of import to devaluation, shortage of domestic products that could substitute imports, and the staggering dependency of exports on primary agriculture products. Therefore, government policy should encourage and subsidize the infant industries Promote enterprises that are the source for manufacturing industries to raise the export commodities of the industrial products in the country through research and development.*

**Key terms:** *Devaluation, Log run effects, Short run effects, Ethiopian trade balance*

# CHAPTER ONE

## 1 INTRODUCTION

### 1.1 Background

Every nation has economic goals to attain both in the short and the long run by achieving economic growth, creating more employment, and having no or minimum inflation simultaneously. To achieve these goals and make their countries better off, countries use monetary and fiscal policies as a strategy. While fiscal policies is about letting the government collect taxes and spend it on public sectors, and mainly focuses on the domestic economy, monetary policy deals with both domestic and international economies. The government can use monetary policy and the exchange rate policy of devaluation to affect the domestic and international markets (Fratzscher, Duca and Straub, 2014). Most of the third world countries are incapable of giving subsidies and essential incentives for producers and exporters. In the meantime, the government and its institutions would be out of the track if it applies the tax exemption policy on exportable goods and would be totally under the control of foreign donors, lenders and international financial institutions. Therefore, devaluating domestic currency would be the only means of affecting the nation's foreign trade, and in recent times reducing the value of the domestic currency in terms of foreign currency has become the basic macroeconomic policy issue in most less developed countries.

Devaluation is an official downward adjustment to the value of the nation's currency relative to another currency, group of currencies, or standard. It is a means of letting the devaluating country to lose some percentage of the value of its currency relative to a dollar or any other currency (Folks and Stansell, 1979). Exchange rate policy emerged as one of the controversial policy instruments in developing countries in the 1980s, with strong opposition to devaluation for fear of its inflationary impact, among other effects. Due to their vulnerability to external shocks, less developed countries have considered the exchange rate as the central policy issue over the years. The external economic shocks, as argued, contribute to the deterioration of the

trade balance, domestic inflationary pressure, and the overall competitive position of less developed countries (UNCTAD, 2005). A study by Hailemariam (2011) stated that on the Ethiopian economy and Lawrence (2001) on the South African economy; found that currency devaluation improves the trade balance of a country. Loto (2011) examined the Marshall Lerner condition for the trade balance of Nigeria. The study adopted the elasticity approach of the Marshall-Lerner condition to the balance of payment adjustment mechanism. The empirical results showed that devaluation does not improve the trade balance of Nigeria since the sum of demand elasticity for imports and exports is less than unity (0.78). Despite the colossal effort that the Ethiopian government has made to buoy export performance and curtail imports via its expenditure switching policy (devaluation), there has been a persistent rise in a trade deficit of Ethiopia over the past 25 years. Despite the wide interest in the impact of devaluation on the trade balance of a country, most empirical research on this topic that focused on African countries in general and Ethiopia, in particular, has been extremely limited.

## **1.2 Statement of the Problem**

Despite the extensive literature on the subject, one point in the formal theory of foreign exchanges still needs clarification: the effect of devaluation on the trade (or current account) balance when total imports (current payment) are not equal to total export (current receipts). As Marshall (1991) points out that devaluation might produce an unfavorable effect on a balance of trade in equilibrium on the condition that “the total elasticity of demand of each country be less than unity, and on the average be less than half” he added that “nothing approaching this has restated this theorem in his economics of control.

The theory was considerably amplified by Brown (1942) who added the elasticity of supply, the marginal propensities to import, and several other factors to the demand elasticity as determinants of the trade balance up on devaluation. The starting point of brown’s investigations remained, however, a trade balance in equilibrium. This assumption was discarded by Joan Robinson (1952) who derived the correct formula for the effect of devaluation on trade balance which is not in equilibrium, but only for the case of the balance expressed in domestic currency: she ignored the fact that a different expression obtains for the usually more important balance in terms of foreign currency. This paper started with theories assumption that devaluation improves

trade balance through the effects like expenditure switching. Also, elasticity demand and supply are important, as Marshal Lerner's theory (1991) concludes currency devaluation helps to improve trade balance as long as the volume effects of demand and supply are greater than one. J-curve theory overcomes the 'lag' problem in the Marshal Lerner theory where it takes into account the slow adjustment process for devaluation to be effectively helped to improve the trade balance.

The effects of devaluation on real economic activities are mixed; some suggest expansionary effects and other contractionary effects. Connolly (1983) analyzed the effect of a nominal exchange rate on the rate of economic growth. The coefficient obtained was positive and marginally significant, providing some support to the hypothesis of expansionary devaluation. The study by Gylfason and Risager (1984) suggests that devaluations are generally expansionary in developed countries and likely to be contractionary in developing countries. Haile (1999) used a macro simulation approach to study the impact of devaluation on the macroeconomic performance of Ethiopia and found that devaluation would improve the current account balance, while it decreases output and employment. Yilkal (2014) studied the short and long-run effects of currency devaluation on output growth in Ethiopia using a vector auto-regression model. The findings show that currency devaluations are contractionary in the long run and neutral in the short run. Also, Taye (1999) applied a macro-simulation approach to a macroeconomic model for Ethiopia. His results indicated that devaluation has a positive impact on the trade balance because of the reduction in imports and stagflationary via its impact on output and employment. As discussed so far, Ethiopia is frequently devaluating currencies and still has a negative trade balance. Keeping this in mind, the researcher will study why Ethiopia has a trade deficit even after devaluating its currency significantly? Could devaluation be able to decrease the trade deficit of Ethiopia? The study will also try to see if devaluation has a positive effect on the Ethiopian trade balances regarding decreasing imports and increasing exports both in the short and in the long run. Several analysis measures the effect of currency devaluation on the trade balance and a definite answer is difficult itself and inevitably bias. Hence, this study tries to fill this gap.

This research focuses on establishing the link between effect of devaluation and trade balance. Thus, it will have paramount importance for the literature and the contemporary policy discourse

in developing economies such as Ethiopia. First, the relation between currency devaluation and trade balance is a controversial topic in economics, and various opinions have arisen in the literature research. Unless supported by strong evidence and good explanations. The attention of this study is to offer a broader view of the topic without going into complexity and mathematical details, and it will focus on the analysis presented above as the core-view towards the topic.

### **1.3 Objectives of the study**

The general objective of the study is to estimate the effect of devaluation on Ethiopian trade balance. The specific objectives of the study are to:

- Examine the relationship between devaluation dimensions and trade balance in Ethiopia.
- Examine the effect of devaluation dimensions on Ethiopian trade balance.
- Investigate the long run and short run effect of devaluation dimensions on Ethiopian trade balance.

### **1.4 Hypothesis**

To investigate the effect of devaluation on trade balance, after taking into considerations the theoretical and empirical literature reviews, the following hypothesis are proposed.

**H<sub>1</sub>**: Domestic income does not have statistically significant effect on trade balance.

**H<sub>2</sub>**: Foreign income does not have statistically significant effect on trade balance.

**H<sub>3</sub>**: Nominal effective exchange rate does not have statistically significant effect on trade balance.

### **1.5 Significance of the study**

Foreign currency has become the basic macroeconomic policy issue in most less developed countries and devaluation is one of the important factors that determine the macroeconomic performance of a country. Therefore, the study will benefit policymakers to examine the likely effect of devaluation on economic growth as well as output growth. Moreover, devaluation can achieve and maintain international competitiveness and ensure a viable trade balance. In line

with this, the study may have its contribution to government officials. And finally, the study may also motivate further research in the area.

## **1.6 Scope of the study**

This study explores the possible ways through which devaluation affects trade balance in Ethiopia. To achieve this objective, the data cover the time Ethiopia experienced currency devaluation. Due to the availability of data, the period chosen not be by the appearance of a dark spot on the economy but from the period were Ethiopia experienced devaluation.

## **1.7 Limitation of the study**

Although this study attempts to explore the possible ways through devaluation affects trade balance in Ethiopia, It suffers from certain limitations. The first problem arises from inconsistency in data by different institutions. Even the data obtained from the reports of the National bank of Ethiopia shows different figures for the same year and full data not available. I also suffered from getting the data from the institutions that I mentioned because of the lockdown (covid19) situation in our country, the officers were not available at their office when I went there for frequently and it has been a challenge.

## **1.8 Organization of the Paper**

The rest of the thesis is organized as follows. Chapter two presents the review of the theoretical and empirical literature in the area and a conceptual framework that guides the present study. Chapter three discusses the research methodology and the model specification. Chapter four presents and discusses the findings of the study. Chapter five concludes with policy recommendations.



## **CHAPTER TWO**

### **2 REVIEW OF RELATED LITERATURE**

This section reviews the theoretical and empirical literature related to the objectives of the study. This helps to situate the study in the existing body of the literature. It also helps to develop the testable hypotheses stated earlier.

#### **2.1 Theoretical Literature**

##### **2.1.1 Conceptual Literature**

In order to take a look at the effects of devaluation on the trade balance, a number of studies have been conducted and the researchers found quite different results according to the nation's economy under consideration.

Starting from the advent of floating exchange rate in 1973, there has been a heated debate on the effect of devaluation on the trade balance. Several theories have been used to analyze the effects of exchange rate movements on the trade balance in developing countries and these include the structuralists' (elasticity theory), the Keynesian and the monetary theories. The elasticity theory argues that the price effect outweighs the volume effect in the short run while the volume effect dominates the price effect in the long run (Krueger, 1983). The monetary theory on the other hand, insists that devaluation increases the domestic price and this leads to a fall in real money supply. As a result of the fall in real money supply, imports decrease and trade balance improves. On the other hand, monetary theory also argues that higher money supply leads to trade deficit, whereas lower money supply causes surplus in trade balance. The last but not the least one is the Keynesian theory or absorption approach which assumes that devaluation improves a trade balance of a nation if the substitution towards domestic goods in response to the change in relative price boosts output more than spending (Pilbeam, 1998). Furthermore, empirics on the impact of currency devaluation on trade balance of devaluating nation in general has shown contradicting results and this section will present the various theories on the effect of currency devaluation on trade balance of a nation.

### **The elasticity theory of trade balance**

Whether devaluation improves the trade balance of the devaluating nation depends on the elasticity of foreign demand for the nation's export and the elasticity of domestic demand for imported goods in that nation, according to elasticity approach. Put differently, if the foreign demand for a nation's export is inelastic, then a devaluating nation will not be able to increase its foreign exchange earnings. This is because, even if devaluation has made the nation's export cheaper for the foreigners, the foreign countries' demand for a nation's export has failed to increase. This will not improve the trade balance of devaluating countries. In the same way, if the devaluating nation's demand for imported foreign goods is inelastic, the level of a nation's import will remain the same as before. However, devaluation has made imports costly to a devaluating nation and this implies that a devaluating nation will now spend more dollars on fixed amount of imports thereby leading to the worsening of the trade balance of the 106 J. Econ. Int. Finance nation. But, if on the other hand, both the demand for import of a nation and the demand for export of a nation are elastic, devaluation improves the trade balance of a nation. Thus, the success and the failure of devaluation in correcting the disequilibrium in foreign sector depend mainly on the elasticity of demand for export of a nation and elasticity of demand for imported foreign goods. Moreover, if the export demand is unitary elastic, currency devaluation has no impact on the trade balance situation of a nation. Simply put, if the export and import elasticities are more elastic, devaluation will help reduce the trade balance disequilibrium of a nation but, when these elasticities are lower, devaluation is helpless in correcting the disequilibrium in the foreign sector of a nation. Even worst, it will increase the size of deficit and worsen the trade balance situation of a nation. However, import demands for developing countries like Ethiopia, are inelastic as their imports are primarily composed of capital goods, semi-finished goods, fuels and the like of which, a nation cannot cut their imports. Similarly, small developing countries have in elastic export supply curve as their export is mainly composed of primary agricultural commodities with a longer gestation period (Mannur, 1995).

### **The absorption theory of trade balance**

Under elasticity approach, devaluation is assumed to work on trade balance via its price effects, so that devaluation directly increase the prices of imports and reduce the price of exports, and leads to improvement in the trade balance of a nation if import and export demand elasticities are

large enough. So, under elasticity approach, the effects of currency devaluation are on external variables viz. exports(X) and imports (M) (Keynes, 1936). However, the Keynesian theory considers macro approach towards the impact of devaluations which considers the income effect. According to this theory, devaluation affects domestic variables viz. consumption, investment and national income and this need to be taken into account in analyzing the effects of devaluation on the balance of payment situation of a nation.

### **The monetary theory of trade balance**

Mundell and Johnson (1968) developed the monetary approach towards the balance of trade and stated that the balance of trade is essentially a monetary phenomenon. According to this theory, balance of trade deficit and surplus is caused by easy and tight monetary policy, respectively. Currency devaluation has an impact on the balance of trade via its impact on the real money supply. This means that, when there is currency devaluation, domestic prices rise and real money supply decreases which will lead to lower imports. However, if devaluation of currency is followed by further rises in the nominal money supply, the initial disequilibrium will reestablish and the positive impact of devaluation will be negated. Therefore, according to the monetary theory of trade balance, devaluation leads to improvement in trade balance of a nation via its demand channel by decreasing imports as long as the money supply remains unchanged (Blanchard, 1993). The essence of this theory is that the trade deficit and surplus in the balance of payments is denoted as disequilibrium in the money market. So, the trade deficit or surplus or disequilibrium in the money market is a transitory phenomenon which lasts only until government responds by changing money supply.

If there is disequilibrium in the money market, this will lead to greater import or export which in turn brings equilibrium in the money markets via its impact on the nation's monetary base. This implies that when the money market is in equilibrium, so does the balance of payments. Therefore, the nation's balance of payments surplus/deficit is a temporary and self-correcting phenomenon (Dornbusch, 1990, 1998; Dornbusch and Fischer, 1996).

### **The J-curve phenomenon**

The J-curve phenomenon predicts that the long run and the short run effects of devaluation on the trade balance are not the same. The time path which the balance of trade follows generates a J-curve phenomenon. The nation's trade balance may worsen sooner after devaluation or

depreciation, before improving later. This is mainly due to the tendency of the domestic currency price of imports to rise faster than export price, soon after devaluation, with quantities not changing very much. But, in the long run, there are two volume effects which move in opposite direction. The volume of export should increase and the volume of import should decrease because imports are more expensive. Therefore, in the very short run, the price effect will dominate the volume effect while the volume effect will dominate the price effect in the long run. This is mainly due to the difference in elasticity of demand and supply in the short and long run, with the long-run elasticities generally exceeding the short-run elasticities. This difference between the long and short-run elasticities laid the foundation for the J curve effect of devaluation (Lindert, 1993).

### **2.1.2 Exchange Rate Systems**

Exchange rate can simply be defined as the current market price of the home currency exchanged for foreign currency (Obstfeld, Maurice, and Rogoff, 1995). It is one of the key barometers of economic performance, indicating output growth, demand conditions, levels and trends in monetary and fiscal policy stance. According to Klein and Shambaugh (2009) and other many economists, there are three main types of exchange rate regimes, that are discussed below.

#### **Free floating (flexible) exchange rate regime**

It is a type of exchange rate in which the value of a nation's currency is allowed to fluctuate based on the demand and supply of the foreign exchange market. The price is determined by market forces of the demand and supply of the foreign currency without any intervention by the government. Therefore, there is a probability of getting different prices for one currency in terms of the other currency with in some specific time interval, following fluctuations in the demand and supply of foreign currency. These fluctuations will lead us to say that there is either depreciation or appreciation of domestic currency.

Depreciation makes the price of domestically produced goods to be cheaper in the world market while their production cost remains the same so that, the traded goods gets more demand and export becomes more promoted on one hand and relative price of imported goods become more expensive so that, import get discouraged while export get promoted and the nations balance of

payment account get improved. Appreciation: refers to an increase in the value of domestic currency with respect to other foreign currencies. In other words, if the nation can purchase the same amount of foreign currency by using less amount of domestic currency then we can say that the nation's currency has got appreciated. Appreciation makes imported goods to be cheaper in domestic market while it discourages exports through decreasing the foreigners demand for domestically produced commodities following the relative price increase caused by currency appreciation. The nation may face balance of payment deficit after the implementation of currency appreciation. Free floating exchange rate works without any government intervention and the market automatically adjusts itself when fluctuation occurs in the demand or supply of foreign currency (appreciation or depreciation). The adjustment process enables the exchange rate to get its new equilibrium price level and which results balance of payment to react accordingly based on the elasticity of demand and supply of imports and exports and finally end up with getting new equilibrium (Asmamaw, 2008).

### **Fixed (pegged) exchange rate regime**

In a fixed exchange rate, a country's currency is fixed against the value of another single currency, or to another measure of value, like gold. It is a system in which government plays significant role regarding with deciding the worth of its currency in terms of either a fixed weight of gold, or a fixed amount of another currency. When there is a mismatch between the nation's fixed exchange rate and free market rate of foreign exchange which is determined by the demand and supply of hard currency in the nation, the government obligated to fill the gap by taking from its foreign exchange reserve. The government may interfere in to the market through two different ways. First, it can interfere through buying or selling of its own currency or foreign currencies. Under the fixed exchange rate system, commercial banks have to buy and sell the domestic currency at the determined rate. But the market equilibrium exchange rate may not coincide with the pre announced spot rate. Due to this reason the central banks always maintain reserves of foreign currencies and gold which they can sell in order to intervene in to the foreign exchange market to make up the excess demand or take up the excess supply.

Second, Government can simply make trading currencies at any other rate is illegal. In fact, this method is rarely used because it is hard to enforce and sometimes it leads to a black market in foreign currency. If the nation faces shocks which arise from money demand or supply primarily,

the policy of a fixed exchange rate regime looks attractive. “If a monetary shock causes inflation, it will also tend to depreciate a floating exchange rate and thus transmit a nominal shock into a real one. In this setting, the fixed exchange rate provides a mechanism to accommodate a change in the money demand or supply with less output volatility” (Calvo and Mishkin, 2003).

Advantages of fixed exchange rate regime are reducing both volatility, uncertainty, high inflation, and destabilization of currency market speculation on one hand and facilitating trade and investment on the other hand. A fixed exchange rate enables fluctuations in relative prices and currency volatility to reduce. It provides a nominal anchor to price inflation for internationally traded goods and it leads private sectors to reduce their inflation expectations in the economy (Obstfeld and Rogoff, 1995: 6-7). It is known fact that stability in real economic activities can be achieved through less fluctuation both in relative prices and currency volatility and also through less expectation of future inflation. Uncertainty is no longer a problem in fixed exchange rate system since exchange rate is predictable and non-volatility therefore; exchange rate risks that are related with uncertainty will be eliminated (Obstfeld and Rogoff, 1995: 6).

### **Managed (Dirty) floating exchange rate regime**

We can say that Managed floating exchange rate system is a system which combines both fixed and floating exchange rates. On one hand, it allows the market to adjust the exchange rate and arrives at its equilibrium level and on the other hand it allows the government to intervene in to the exchange market whenever intervention is needed so as to protect the domestic currency, trade balance and nation’s economy from external shocks, it might be through buying and selling of currencies or through some other means.

As Bofinger and Wollmershäuser (2001: 51) described, “there is nothing in existing theory that prevents a country from pursuing a managed float in which half of every fluctuation in demand for its currency is accommodated by intervention and half is allowed to be reflected in the exchange rate.” Which means in other words, almost all currencies could be considered as the one who is practicing managed floating exchange rate regime as long as central banks or governments intervene to the foreign exchange market in order to influence the value of their currencies. Dollarization “It can be defined as the holding by residents of a significant share of their assets, in the form of foreign currency-denominated assets. Usually, it is differentiated between official or de jure, and unofficial or de facto dollarization. The former refers to the case

in which foreign currency is given (typically exclusive) legal tender status. This implies that the foreign currency is used for purposes a currency may have, including as a unit of account for public contracts. De facto dollarization represents the situation of a foreign currency being used alongside the domestic currency as means of exchange (for transaction purposes, i.e., as currency substitution) or as means of saving in hard currency (i.e., as asset substitution)” (Alvarez-Plata and Garcia- Herrero, 2008). Full dollarization occurs when every inhabitants of the nation starts using a foreign currency instead of the domestic one and we can take Zimbabwe as an example. As Berg and Borensztein (2000) stated, full dollarization has some advantages.

### **Advantages of Dollarization**

It eliminates the risk of a sudden and sharp devaluation of the country's domestic exchange rate, It also avoids currency and balance of payments crises. If there is no domestic currency, there will never be a sharp and sudden change in the value of domestic currency (depreciation or appreciation of domestic currency will not happen in the economy) therefore; sudden capital outflow motivated by fear of devaluation will no longer exist in the dollarized economy. Dollarization enables the nation to reduce the risk premium attached to its international borrowing, the economies could enjoy a higher level of confidence among international investors, it may let them to enjoy with the Lower interest rate spreads on their international borrowing, reduced fiscal costs, and more investment and growth, since Dollar has lower transaction cost and assured stability in its prices, the nation who realized dollarization will become more integrated with both the global and U. S. economies and more importantly it definitely rejects the possibility of inflationary finance and which enables countries to strengthen their financial institutions through creating a positive attitude towards the domestic and international.

#### **2.1.3 The Theory of Devaluation**

Devaluation is often confused with depreciation and is in contrast to revaluation (Folks and Stansell, 1979). Even if the domestic currency becomes relatively weak in both of devaluation and depreciation cases, the type of exchange rate regime is different for them. Devaluation can occur either in fixed or managed floating exchange rate regime and the government has some rights over controlling the foreign exchange market whereas, depreciation occurs only in free

floating exchange rate regime and the government never decide about the value of domestic currency, which is fully decided by the market's demand and supply interaction. On the other hand, revaluation is a calculated increment to a country's official exchange rate relative to some other currencies or standard measures like gold. Revaluation occurs either in fixed or managed floating exchange rate regimes and the decision of the price of domestic currency that is exchanged for another currency is made by the central bank. In contrast, when the price of domestic currency increases through the demand and supply interactions, without any intervention of the government, it's called appreciation.

There is debate on the effectiveness of devaluation in improving the nation's trade based on their theoretical and empirical researches. According to Solomon (2010), the application of devaluation in an economy might result contraction of both aggregate demand and aggregate supply. To start with the reasons that make aggregate demand to contract following the adoption of devaluation as a policy measure; devaluation results a redistribution of income towards those with high marginal propensity to save. In other words, exporters who have high marginal propensity to save would be beneficiary from devaluation and the nation's aggregate demand would remain constant. As a result, a fall in investment would be a case or it could stay stagnant.

Devaluation leads to a low government marginal propensity to spend out of tax revenue. This is specially a case if the nation imports machineries or other construction materials in order to realize infrastructures or other government projects. Real income declines under an initial trade deficit which happens following the adoption of devaluation in the economy. In other words, whenever devaluation implemented in an economy, both importers and export suppliers will not react immediately either to decrease the volume of imports or increase the level of export since contracts has to be signed couple of days before trade therefore, the nation's trade balance would face deficit immediately after devaluation and leads real income to decrease.

Devaluation could also results reduction in real wealth. When one nation "Nation A" devaluates its currency against the other nation "Nation B" may also devaluates it's currency against the first country "Nation A" and by doing so both nations may discourage their import demands while their export demand remains unchanged and this may results a reduction in total output of both nations. Reasons which make aggregate supply to decrease following the realization of devaluation are: - Firstly, more expensive imported production inputs; if exporting companies



use imported goods as an input, devaluation would be discouraging for the companies that import production inputs and it would have an adverse effect on the aggregate supply of exportable goods. Secondly, a frequent devaluation stimulates speculation and leads to confidence erosion; Continuous devaluation makes the domestic currency to lose its purchasing power continuously so that it creates distortion in many economic variables such as house hold real income, consumption, industrial growth, public finance, imports, exports, manufacturing growth, money supply and the like.

It is known fact that if the consumers consumption pattern decreases, the producers production pattern also decrease and the companies production pattern has a direct relationship with public finance or government revenue. Thirdly, demand for export is not only determined by export prices but also on trade reliability, perception of the inhabitants of importing nation towards the quality of the product to be exported and the like. Therefore, the nation's aggregate supply might decrease following the adoption of devaluation if there is no change in import demand of the importing nations of our export commodities (Solomon, 2010). In contrary, according to expenditure switching policy, devaluation makes imported goods expensive in domestic market and exported goods relatively cheaper in the world market. As a result, the nation's trade balance improves following the adoption of devaluation. On the other hand, Bahmani-Oskooee and Niroomand (1998) described that the effect of devaluation on trade balance could be determined by the sum of elasticity of demand for import and export in absolute value. If the sum of the absolute value of elasticity of demand for import and export is greater than 1, devaluation results improvement for the nation's trade balance and if it is less than 1, the trade balance gets more worsen as devaluation adopted as a policy.

Devaluation has its own effect on the nation's trade balance and different countries would like to adopt devaluation as a monetary policy, so as to overcome their economic constraints caused by over valuation of their own currency but the effect of devaluation on developed countries is quite different from that of the developing ones.

#### **2.1.4 Foreign Exchange Regime in Ethiopia**

After the Bretton Woods agreement the Ethiopian Dollar proclaimed to be changed to the value of 0.355745 grams of fine gold and it could be changed for other currencies according to its value in terms of gold. Based on the gold price of the currency of USA and Ethiopia, 1 USD was

exchanged for 2.48 Ethiopian Dollars for almost two decades. The Ethiopian dollar got a small change in its value of exchange and devaluated to the American dollar in 1964. Later on, after Bretton Woods's system, the nation's currency regained its value more than before and 1USD was changed to 2.3 Ethiopian birr in 1971. Two years later, the Ethiopian birr got further revaluation and exchanged for 2.07 per 1 USD due to the depreciation of the US dollar in terms of another currencies. When Ethiopia started using a pegged type exchange rate system during the Derg regime, which lead the nation from 1974-1991, the late exchange rate (2.07 birr /1 USD) became the peg exchange rate amount for almost two decades and last long in 1992 while the rest of the world including USA were changing (moderating) the value of their currencies in terms of another currency according to the world market and world economy. This leads the Ethiopian Birr to be overvalued for two decades and let the nation lose the competition over the world market for Ethiopia made exported goods (Lencho, 2010).

When the current government of Ethiopia (EPRDF) came to power, it was already realized that the nation's currency had over valued for several years and significant devaluation was needed to sort out the adverse effect of the overvalued currency on the economy. As a result, the central bank made a massive devaluation over the domestic currency in 1992 and it started auction market for foreign financial exchange in May 1 1993. Starting from August 1996, auction market starts to operate in a weekly basis due to an increment of the domestic demand for foreign currencies, and by offering some specific amount of foreign currency for the bidders to bid over it, the central bank used to fulfill the people demand for hard currency. In the same year (1996), the commercial banks got a permission to open their foreign exchange bureaus and this brought the introduction of inter-bank foreign exchange market and worked alongside the auction system since 1998. These days, the nation's official exchange rate is determined by inter-bank foreign exchange market in a daily basis (Lencho, 2010: 8).

### **2.1.5 Monetary and Fiscal Policy in Ethiopia**

Despite the fact that, it is very hard and almost impossible to get books or any other studies on the macroeconomic policy of Ethiopia during different regimes, the study tried to describe the macroeconomic policy which was in use in different political regimes of Ethiopia. The study classified the regimes in to three categories (Haile Selassie, Derg and EPRDF regimes) and discussed how they were (are) took the policy in use. The sources of the following part of the

literature are mostly newspapers and magazines published at different point in time. After the introduction of the monetary and fiscal policy in 1930's, like any other countries, different Ethiopian regimes have also used the policy so as to achieve economic growth in the nation.

**Fiscal and Monetary Policy During Feudalism (Haile Selassie Regime):-** During this time, the economy was seems like open for the international companies and some big manufacturing companies like WonjiSuger factory & Tendaho Cotton plantation were under the control of the British & Dutch companies were operating in the economy but the economy was a bit strict for the ordinary citizens of the nation and they had no right even to own land. In fact, land was under the control of the feudal government, land lords, and the Church and the rest of the population was mostly either tenant, or nomad.

The people of Ethiopia were familiar with tax during and even before this regime though the system was not that developed and there was no harmonized structure of taxation. The government officials whom were responsible to collect tax were collecting tax from both international capitalists and domestic tenants. In fact, the officers who were responsible to collect tax from the tenants were simply imposing taxes as their wish without considering any rule which harmonize the taxing system across the nation. The Haile Selassie regime wasn't only collecting taxes but also spending some portion of the government revenue on the construction of infrastructures. The establishment of Ethiopian Airlines, National Bank of Ethiopia without the intervention of foreign stockholder, and Addis Ababa University could be taken as a simple example to show the government's spending in public institutions and infrastructures.

Ethiopia has introduced its own currency notes after the establishment of the National Bank of Ethiopia and the notes were issued with the value of 1, 5, 10, 50, 100, and 500 birr and the currency were circulating across the nation. Beside the circulation of domestic currency, the national bank of Ethiopia was also fixing the exchange rate of the domestic currency in terms of other currencies according to the Britton Woods agreement. The establishment of the national Bank of Ethiopia became a starting point to set an official rate of interest on deposits and loans which is paid in terms of paper money. In fact, people had been using interest rates even before the introduction of banking system in the economy but mostly the mode of interest payment were salt, wheat, precious metals, land or any other thing which was used as a means of making

transaction in the bartering system. Therefore, by looking at the structure of the economy, we can conclude that the government (Haile Selassie regime) was implementing both of the macroeconomic policies in the economy. U.S. Library of Congress,

**Fiscal and Monetary Policy during the Derg Regime (1974-1991):-**The regime was characterized by socialism and the nation was one of the socialist nations at the time being. When the regime came to power, the lands previously owned by the land lords, feudals, and the church became under the control of the socialist government. The rulers of the socialist Derg regime decided to reward the land for the tenants and tenants became the owner of the field they were farming for plenty of years, for the first time by this regime. There was a high government manipulation of the economy and even the nation was following command economic system at the time being. As a result, most manufacturing industries, service sectors, and mechanized farming were under the full control of the government.

The government had also power to decide over prices of goods and services and if someone ignored the government price level and set his/ her own price, he/ she would be punished for the crime he /she has committed. There was no place for the free market demand and supply interaction to take place. The nation's banking system got high improvement and the central bank proceeded playing the crucial role in issuing the note, controlling the money supply, determining the exchange and interest rates, and controlling the overall financial market. The Pegged type of exchange rate which was 2.07birr/1USD and relatively high average interest rate which used to be 4.4, 3.6, and 6.6 during the year 1970, 1980, and 1990 respectively were taken as the government monetary policies for almost 2 decades (Geda, 2005).

The fixed exchange rate system and the high interest rate policy had their own adverse effects on the economy. For instance, High foreign exchange reserve was needed to let the system properly function in the pegged exchange rate regime and the realization of high interest rate let the people to save their money in the bank and wait for the interest rate rather than using it for the production purpose. At the meantime, since the interest rate was so high, people were not interested to take loan and invest in the nation therefore; government was highly engaged in the production of industrial outputs, construction of public goods, and performing mechanized

farming, more than the private sectors. During this regime tax was one means of the government revenue generating mechanism and it was collected by the tax authorities. The collected money was used for the construction of roads, hospitals, schools, and so on. The government were not only spending the money on the construction of public goods but also on the settlement of different kinds of factories like cement, sugar, Gun, textile industries and so on. Big infrastructures like hydroelectric power generation, water and phone facilitations, and dam constructions were also taken place by the regime. To sum up, the regime has used both of the policies more seriously at a time.

### **Fiscal and Monetary Policy during EPRDF regime (current government of Ethiopia)**

Today's monetary policy of Ethiopia consists: Managed floating exchange rate system is used in today's Ethiopian economy in order to set the value of domestic currency in terms of another currency and the nation's currency can fluctuate within the interval of some specific amount for some specific time period and the interval for the exchange rate would be changed accordingly when it is necessary to take that measure. Unlike the Derg regime, EPRDF is using quite small amount of interest rate in the banking system so as to promote private investment. Selling and purchasing of financial assets such as bonds, treasury bills and the like are also taking place. By doing so, it is controlling the money supply which is circulating in the market.

The government is also intervening to the market through changing the money supply which circulates on the economy, which might be realized through making more notes and pumps it to the economy, or through issuing bonds, treasury bills and other financial assets. The fiscal policy of EPRDF consists of; Privatization: - The government could be characterized by selling the industries, and companies that were previously owned by the government to the private sectors by aiming the improvement of the efficiency of production in the nation. So, the policy of privatization is something which is highly promoted by the current government.

Tax collection: - The tax collection mechanism got a high improvement following the down fall of the Derg regime and the nation uses progressive type of taxation system in the economy to tax people who get relatively more profit or more income higher than that of the poor people. Spending money on the construction of infrastructures; - different infrastructures including the rail way construction, public apartments, highways, great Renaissance dams and the like are in the process of construction over and over. Generally, the government is playing with these two

economic policies so as to solve the nation's financial and economic problems (Zerihun, Kibret and Wakiaga, 2014)

### **2.1.6 The Structure of Ethiopian Import, Export and Trade Balance**

Ethiopia is located in the horn of Africa and like many other African countries; its economy was highly dependent on the production of agricultural outputs in the past. Agricultural sector had been consisted for more than 50 % of the total output share of the nation's Gross Domestic product though its share decreased to 40% now days. Not only the economy is highly dependent on the agriculture but also about 85% of the total population is estimated to be dependent on the sector as a means of income generation directly or indirectly. As a result, the nation was (is) using agriculture as a back bone for both of the domestic economy and international trade (export). (Asmamaw, 2008)

Ethiopia's export is highly dependent on the agricultural sector in general and on the production of coffee in particular. In addition to coffee the nation mainly exports hides and skins, pulses, chat, oilseeds, fruit and vegetables, gold and so on and all of these commodities together consists of 91% of the nation's export since 1980's to 1990's. (National bank of Ethiopia, 2010) It's obvious that if the nation's export is highly dependent on the agricultural commodities, the nation's economy would be in trouble whenever there are some natural or economic inconveniences like shortage of rainfall, shocks on the international price of the products, or some other environmental changes. The share of the industrial sector for export is not that significant. Less than 10% of the total export items was came from the industrial sector for the years before 2000 but this share has got improved to 11.7% and 11.3 % in 2000 and 2001 budget years respectively. The share become continuously increasing to 12.8%, 13.9% and 13.9%, in 2002, 2003, and 2004, respectively (Lencho, 2010)

The nation has its own demand to import some commodities like, raw materials; semi-finished (processed) goods, fuel, beverage and tobaccos, chemicals (fertilizers and the like) capital goods (machinery and transport equipments), consumer goods (including food items) and the like (National Bank of Ethiopia, 2010). It is obviously known fact that, the products that Ethiopia is importing have inelastic type of demand so, even if there is a change in the price of the products, there might not be a significant change in the volume of import of the nation. Furthermore, since the number of the population is increasing very rapidly (it was 57.042 million in 1995 and

became 86.613986 million in 2013), the importation of these products is getting to be taken place in bulk quantity.

As we have seen earlier, Ethiopia mainly exports agricultural outputs and imports some sophisticated industrial commodities and the total value of the imported goods always exceeds the price of exported ones therefore, most of the time the nation faces trade deficit in its international trade.

## **2.2 Empirical Literature**

In spite the evidence supporting the positive correlation between currency depreciation and the trade balance, there are still arguments and controversies whether it plays out in reality. This section focuses on the review of the literature.

The first effects of a depreciation of the foreign exchange value of a currency are felt by those goods entering into the export and import trade of a nation. Exports are stimulated because depreciation of the currency makes goods exported by that nation cheaper; imports are discouraged because depreciation makes the imported articles more expensive. Silverstein (1937) Brown (1942) also supported that depreciation helps to improve trade balance, particularly in consistent with Marshal linear's elasticity analysis. In addition, he emphasized that the equilibrium rate of exchange between two countries is important.

The elasticity of supply and along other factors are also important in determine the trade balance effects after currency depreciation. On the other hand Alexander (1952) questions the methodology used in the standard theories analysis, He argues that the Marshal linear elasticity analysis failed to capture the exports and imports as a whole, While supply and demand curves are very useful tools for analyzing the factors that determine price and output for a single good, their value is much more questionable when applied to imports and exports as a whole'. Alexander (1952) instead, used a new 'conventional approach' where total elasticity was considered and not 'partial elasticity' as he believed was the case of Marshal Linear. While Marshal Linear focused on the effect to demand and supply when price changes after depreciations. His analysis takes on broader issues 'other things have changed that are likely to change as a result of the devaluation' Alexander (1952). As result, the effects devaluation has on TB is depends on how the economic systems behave, such as unemployment and real income.

Miles (1979) also adapted new ways of testing whether devaluation improves the trade balance. His analysis is based on the statistical relationship between devaluation and TB rather than theories, which provided stronger evidence in comparison of Alexander's work. He is, in contrast, quite skeptical of the notion that devaluation improves TB. 'If devaluation causes a significant improvement in the trade balance, this improvement should be statistically observable regardless of which theoretical approach is used' Miles (1979). He also criticized that most papers do not compare the balance account with the pre-devaluation figures to the post-devaluation figures and thus failed to determine the actual effects. In addition, many have ignored the government fiscal policy and only focused on the 'raw account figures' following devaluation is reported. For example in his paper, he argues that Cooper's (1971) result is invalid where the impact effect of 15 of 24 devaluations is to improve the TB, there is no evidence show that the improvement is permanent and that the data provided were before devaluation, thus it is impossible to judge whether devaluation improved TB. His paper is different to others that he takes into account all those three factors and to focus on the long term effects rather than the immediate effect of devaluation on TB.

A different result revealed in his paper that devaluation does not improve TB. Rather, it improves the balance of payments. When Monacelli and Perotti (2006) examined this issue from a fiscal policy perspective he also concluded a similar result. By using a technique called Structural Vector Auto Regression methodology to test the effects of government spending on series of OECD countries including Canada, US, UK and Australia. They find that an increase in government spending tends to led currency depreciates (except Canada). More importantly, their result presented a stark contrast with the standard Keynesian model assumed a negative relationship between currency depreciation and TB.

While arguments are widely different from one another, components and data used were also distinct. Nevertheless, Lane and Milesi-Ferretti (2001) again, argues that in the long run devaluation does not improve TB and there is a negative relationship between TB and the real exchange rate. Their arguments emphasizes that the relative price of non-tradable and country size are the key in determining such result. The comparison of home relative price of non-tradable to foreign relative price of Non-tradable indicated a negative correlation relationship between the real exchange rate and TB in the long run. They suggested that there are other



factors including 'demography, fiscal positions and relative incomes' are important in determining the long run TB instead, and the real exchange rate is derived by the positive external wealth of a country rather than nominal interest rate. In contrast, Musila and Newark (2003) strongly supports the standard Keynesian model. As they have found evidence in Malawi that devaluation helps to improve TB.

Depreciation curtails the growth of imports in the long run, which lead to improvement in the trade balance position. 'Our investigation of the correlation between the real exchange rate and the nominal exchange rate for Malawi supports the neo-Keynesian view. A correlation coefficient of 0.75 was computed, suggesting that the variability in the real exchange rate might have been caused in large part by changes in the nominal exchange rate.' Musila and Newark (2003) In addition, their analysis has included the pre/post devaluation comparison that Miles (1979) criticized earlier. This makes the test itself much more valuable and the results are more persuaded. They also stated that the ML condition does hold in the long run as well as short run, with strong evidence in support such results.

Empirical researches that tried to test these theories are arguably strong, that some had rejected such assumption inconsiderably and some strongly in support. Results shown in Silverstein (1937), Brown (1942) and Alexander (1952) supported the Keynesian model assumption. Especially Musila and Newark (2003) strongly support the view that nominal devaluation can be a quite powerful tool in minimizing the imbalances of international trade. In contrast, results were the opposite from Miles (1979), Lane & Milesi-Ferretti (2001), and Monacelli & Perotti (2006), when adapting different approach and time frames to Keynesian model, they get different results and all rejected that currency devaluation helps to improve trade balance. It is important to point out that each of these studies had used different data sets or techniques of analysis, while all provided useful insight to the understanding of the real exchange rate and trade balance. The expected results can be therefore, different. As conclusion, the effects on trade balance with currency depreciation can be effective in the short run and different results may occur due to differences in the specification and method identification. Other factors should be considered such as government policies, which can be used to manipulate balance of trade to the greater benefit of the country.

## **2.3 Conceptual Framework**

In theory, when a country's currency depreciates, foreigners find that its exports are cheaper and domestic residence find that imports are more expensive (Feenstra and Taylor 2008) i.e., stronger (appreciation) Euro implies European can buy foreign goods more cheaply and foreigners find European goods more expensive and demand falls. When Euro depreciates (weaker), the opposite scenario occurs. Thus, an exports dependent country needs a weaker currency, because if it's too high, it will lose its competition. E.g.: Japan, a highly exports dependent country and its currency (Yen) has been increasing in value since 2007. They wanted to decrease Yen to keep its competition: by issuing more Yen (sell Yen to international market) to increase supply, so domestic price decrease and thus increase competition. Conversely, high imports countries should keep their currency strong. In contrary many researchers got a negative relation between devaluation and trade balance in Ethiopian economy.

The nation's export is highly dependent on the agrarian economy and import on the sophisticated industrial outputs, petroleum and so on, even if the nation adopt devaluation as a monetary policy, the trade balance doesn't get better. Furthermore, the nation's trade balance may even deteriorate whenever the domestic currency loses its purchasing power especially when the domestic industry uses petroleum and semi processed imported goods as an input. As we have seen earlier, Ethiopia mainly exports agricultural outputs and imports some sophisticated industrial commodities and the total value of the imported goods always exceeds the price of exported ones therefore, most of the time the nation faces trade deficit in its international trade.

## **CHAPTER THREE**

### **3 METHODOLOGY**

This chapter presents the research methodology employed in this study. It discusses the research design, data collection methods, and the empirical strategy.

#### **3.1. Research Approach and Design**

The study adopts quantitative research approach. Because quantitative approach indicate the investigators primarily uses postpositive claims for developing knowledge that is the cause and effect relationship between known variables of interest or it employs strategies of inquiry which is collect data on predetermined instruments that yield statistics data and the purpose of this study is to investigate the effect of devaluation on trade balance. The study use explanatory research design. In this study the problems are well structured as in descriptive studies and will examine the effects. The main task is to identify the cause variable and to say to what extent they lead to such effects. This study use explanatory research design to assess the influence of devaluation over trade balance.

#### **3.2. Method of Data Collection and Source**

Data for this study are obtained from various sources including the World Bank Indicators, University of Pennsylvania (Penn World Tables), Ethiopian Investment Agency, Ministry of Finance and Economic Development (MoFEC), National Bank of Ethiopia (NBE), and the Central Statistics Agency (CSA) of Ethiopia. Since the official exchange rate was first announced in 1992, the time period covered in the study is between 1997 and ends in 2018. Use of high frequency time series data (such as quarterly data) would have been ideal to examine the long run effect of exchange rate or currency devaluation on trade balance. However, this research is based on annual data. The variables of interest include trade balance (measured as the ratio of imports to exports), nominal effective exchange rate and domestic and foreign income (GDP). Both foreign and domestic incomes are adjusted for PPP. The value of imports and exports are both recorded in current United States Dollars.

### 3.3. Empirical Strategy

#### 3.3.1. Econometric Model Specification

Bourgeoning research on the various methods on how several nations have yielded a positive trade balance after devaluation has led to the growth of specific post-devaluation policy tools, put into practice to deliver improvements in trade balance. Yiheyis (2006) notes that output growth in the post-devaluation period, which plays a pivotal role in achieving a positive trade balance, is influenced by improvements in monetary and fiscal policy. However, a variety of studies covering all possible variables, rather than the mere literature available on the effect of devaluation on trade balance in Ethiopia, are yet to be realized.

Although different literatures on the topic of devaluation and its effect on trade balance use a standard framework, the choices of variables analyzed differ among the studies. In such studies, a reduced form of the standard trade balance model is employed which includes both foreign and domestic income, exchange rate and other variables which may be of interest to the study (Musilaand Newark, 2003). The interest in this study is to study the effect of currency devaluation on trade balance. The following equation is used to estimate the effect of devaluation on trade balance:

$$\ln\left(\frac{M}{X}\right) = \alpha + \beta \ln(Y) + \phi \ln(Y_F) + \gamma \ln(NEER) + \epsilon$$

$\ln(Y)$  And  $\ln(Y_F)$  are the natural logarithms of domestic and foreign incomes. The demand for imports for Ethiopia from a foreign country will depend on the relative price and domestic income. Alternatively, the foreign country's demand for imports from Ethiopia will depend on foreign income.  $\ln(NEER)$  Is the nominal effective exchange rate and  $\epsilon$  is the error term.

The nominal effective exchange rate is the average of the bilateral exchange rates of the currencies of Ethiopia's main trading partners and is presented as an index number. Therefore, appreciation in Ethiopian currency against other currencies will see a rise in NEER. Alternatively, foreign income is measured using a weighted average of GDP for Ethiopia's main trading partners.

Theoretically, as foreign income increases, the volume of exports to a foreign country increases. Alternatively, when there is devaluation in local currency, the volume of exports should increase and because imports are now more expensive, trade balance should improve as a result of declining imports (at least in the long run). However, if a large proportion of the import bill is composed of raw materials used in the production of goods within Ethiopia, conventional theory may not hold. In addition, Ethiopia is a predominantly agricultural economy. Will devaluation affect the volume of agricultural products sold (improve trade balance), considering the fact that agricultural products have a diminishing marginal utility?

When one cointegrating vector exists, Johansen and Juselius (1990) cointegration procedure cannot be applied. Hence, it become imperative to explore Pesaran and Shin (1995) and Pesaran et al (1996b) proposed Autoregressive Distributed Lag (ARDL) approach to cointegration or bound procedure for a long-run relationship, irrespective of whether the underlying variables are  $I(0)$ ,  $I(1)$  or a combination of both. In such situation, the application of ARDL approach to cointegration will give realistic and efficient estimates. Unlike the Johansen and Juselius (1990) cointegration procedure, Autoregressive Distributed Lag (ARDL) approach to cointegration helps in identifying the cointegrating vector(s). That is, each of the underlying variables stands as a single long run relationship equation. If one cointegrating vector (i.e the underlying equation) is identified, the ARDL model of the cointegrating vector is reparameterized into ECM. The parameterized result gives short-run dynamics (i.e. traditional ARDL) and long run relationship of the variables of a single model. The re-parameterization is possible because the ARDL is a dynamic single model equation and of the same form with the ECM. Distributed lag Model simply means the inclusion of unrestricted lag of the regressors in a regression function.

### **3.3.2. Dependent Variable**

Trade balance, the dependent variable of interest in this study, is defined as the ratio of imports to exports ( $M/X$ ). Consequently, a decrease in the ratio would imply an improvement in the trade balance whereas an increase indicates a decline which would imply a worsening trade balance. Although it is common to measure trade balance as the difference between exports and imports, using the ratio eliminates the unit measurement problem.

### **3.3.3. Independent Variables**

The independent variable of interest is nominal effective exchange rate used as proxy for devaluation. The nominal effective exchange rate is the average of the bilateral exchange rates of the currencies of Ethiopia's main trading partners and is presented as an index number and it is calculated as a weighted average of bilateral nominal exchange rates of national currency against foreign currencies. There are other control variables in the study: domestic income and foreign income. Domestic income is defined as the total income received by all sectors of an economy within a State. It is measured by the output method by calculating the total value of goods and services produced in the country during the year. The money value of goods and services produced in an economy in an accounting year is called Gross National Product (GNP). Foreign income includes any income that is not Ethiopian source, and it is measured using a weighted average of GDP.

### **3.3.4. Tests for Stationary and Heteroscedasticity**

Many economic and financial time series exhibit trending behavior or non-stationary in the mean. Therefore, it is necessary to test the stability of the series before identification of the relationship between variables.

**1) Stationary (Unit Root) Diagnosis:** A time series is said to be stationary if its mean and variance are constant over time and the value of covariance between the two periods depends only on the distance or gap or lag between the two time periods and not the actual time at which the covariance is computed. (Gujarati,2004). Time series data are rarely stationary in level forms. Regression involving non-stationary (I.e., variables that have no clear tendency to return to a constant value or linear trend) time series are lead to the problem of spurious regression. This occurs when the regression results reveal a high and significant relationship among variables but no relationship exists in fact. Stock and Watson (1996) have shown that the usual test statistics (t, F, DW, and) will not possess standard distributions if some of the variables in the model have unit-roots. The other precondition for testing unit root test when we applying the ARDL model is to check whether the variables enter in the regression are not ordered two (I.e. I(2)). So, it is necessary to test for time series variables before running any sort of regression analysis because it affects the estimation procedures. In general, non-stationarity can be tested using the

Augmented Dickey-Fuller (ADF) test, Phillips Perron (PP) test, and Kwiatkowski- Phillips-Schmidt-Shin (KPSS) test. However, to ensure the reliable result of the test for stationarity, this study employs both the Augmented Dickey-Fuller (ADF) test and Philip-Perron (PP) tests.

2) **Heteroscedasticity and Stability Test:** The diagnostic test examines the serial correlation, normality distribution of the residuals, functional form, and heteroscedasticity associated with the model. The stability test employs the cumulative sum of squares of recursive residuals (CUSUMSQ) and the cumulative sum of recursive residuals (CUSUM) and examines the structural stability of the model.

## CHAPTER FOUR

### 4 RESULTS AND DISCUSSION

This chapter presents the results of the study. It begins with the presentation and discussion of the descriptive statistics results. The results from the econometric models are presented in section 4.2.

#### 4.1 Descriptive Statistics

The descriptive statistics for the dependent and independent variables of interest are provided in Table 4-1.

Table 4-1: Descriptive statistics for dependent and independent variables

Variables	Mean	Median	Maximum	Minimum	Std. Dev.
<i>Dependent variable:</i>					
Trade balance (in thousands)	-95854839	-42085897	-4869801	-324000000	109000000
<i>Independent variables:</i>					
Domestic income (in millions)	506443.6	327445.3	1717795	167917.5	468393.2
Foreign income (in thousands)	55279203	29223012	165000000	3137683	56668816
Exchange rate	12.82518	9.0192	26.1082	6.5007	6.005381

**Source:** Own estimation based on NBE (2020)

Note: Observations = 22

The results show that the average trade balance is -95,854,839, and the value ranges between -324000000 and -4869801. The average domestic income is 506443.6, and it ranges between 167917.5 and 1717795. Likewise, the average foreign income is 55279203 that range between 3137683 and 165000000. Exchange rate is 12.82518 on average with the minimum and maximum values of 6.5007 and 26.1082 respectively. The trade balance, domestic and foreign income are characterized by high variation as it is evident from the considerably high standard deviation. The implications of the high range is that the presence of out layers which in turn affects the mean value of data.



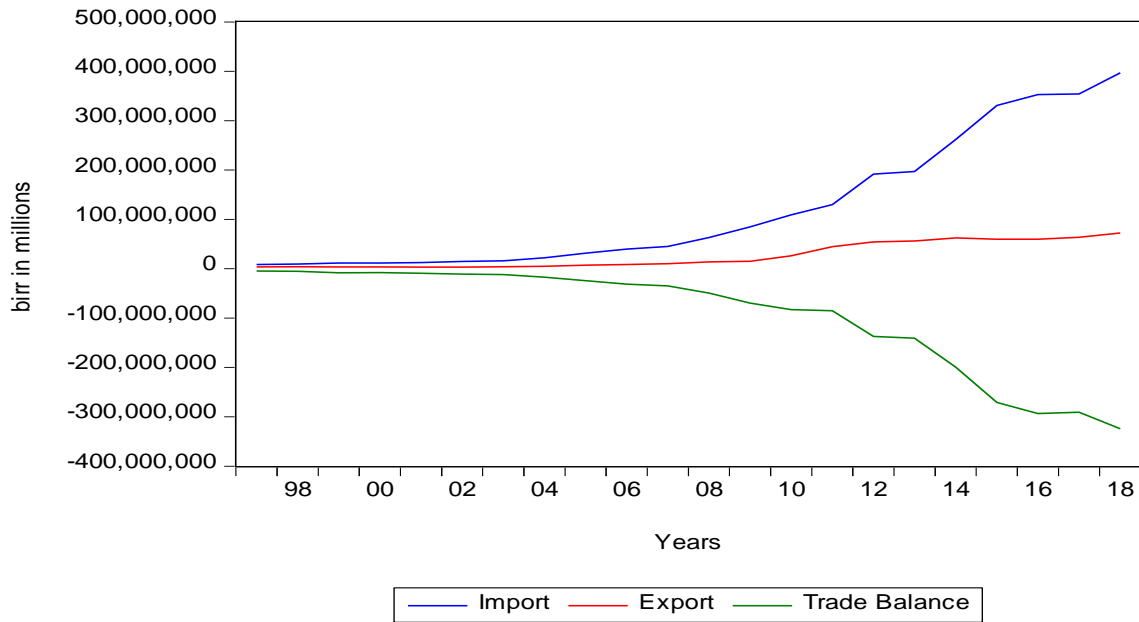


Figure 4-1: Trends in import, export and trade balance in Ethiopia (1997-2018)

As can be seen from figure 4.1, the trade balance of Ethiopia has been negative all the way from 1997 to 2018. The trade deficit is attributed to high quantities of import and almost constant amount of export throughout time.

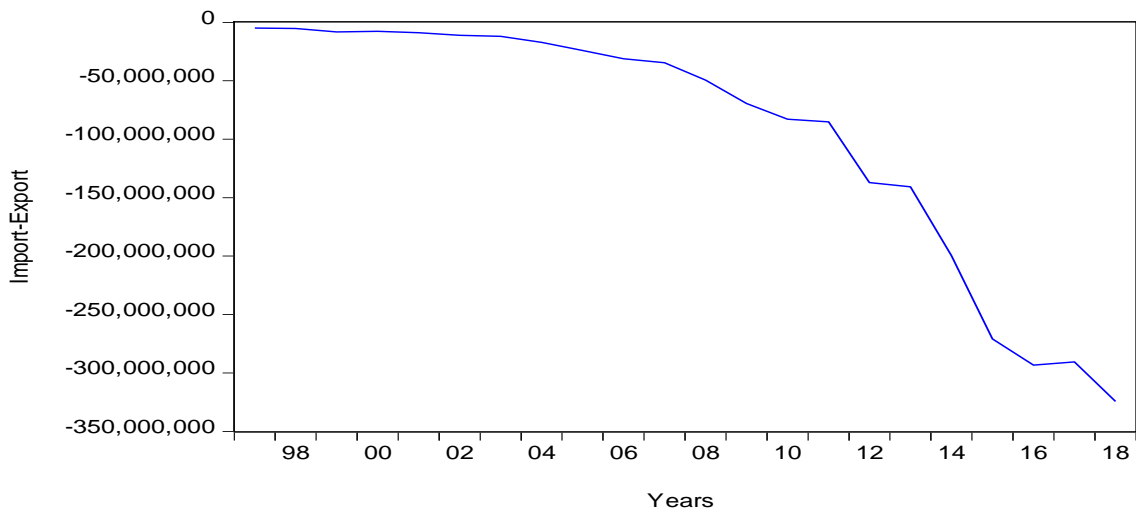


Figure 4-2: Trends in trade balance in Ethiopia (1997-2018)

As it can be seen from figure 4.1-2, trade balance has been slightly decreasing from 1998 up to 2002, showing a small difference between exports and import. After 2008, trade balance appears to significantly drop until 2018. The results suggest that trade balance has been decreasing at a

decreasing rate during the period under consideration. Given that the nation’s export is highly dependent on the agricultural export items such as coffee, sesame, species, it implies that most of the products that have been exported do not include value added products and importing sophisticated industrial outputs, petroleum and so on.

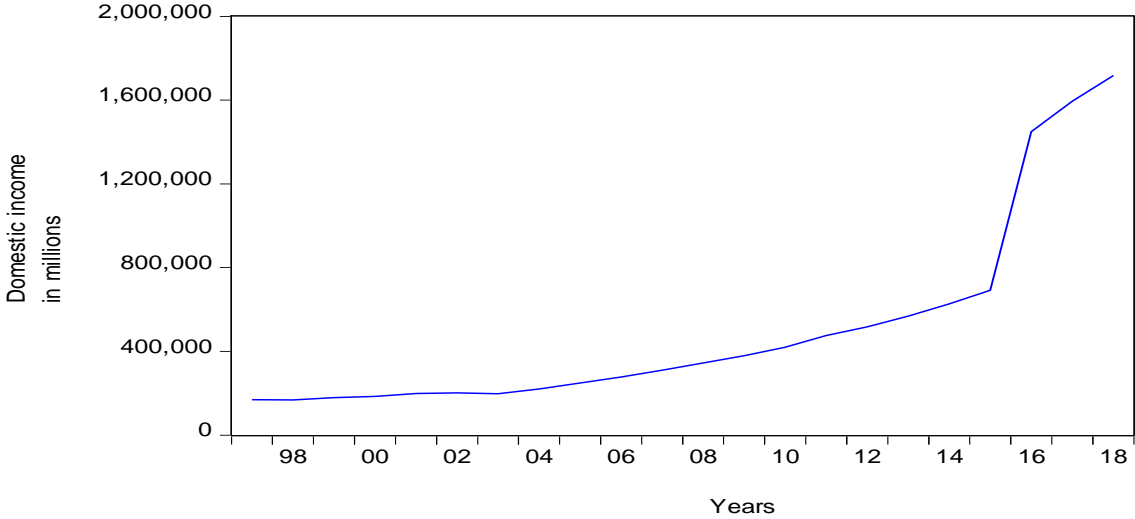


Figure 4-3: Domestic income in Ethiopia (1997-2018)

The above graph indicated, the domestic income is increasing slightly from the beginning up to 2002 and starting from 2004 up to now the trend of domestic income is increasing at increasing rate. Surprisingly, domestic income reaches 1,600,000 million in 2018 form 400,000 million in 2015.

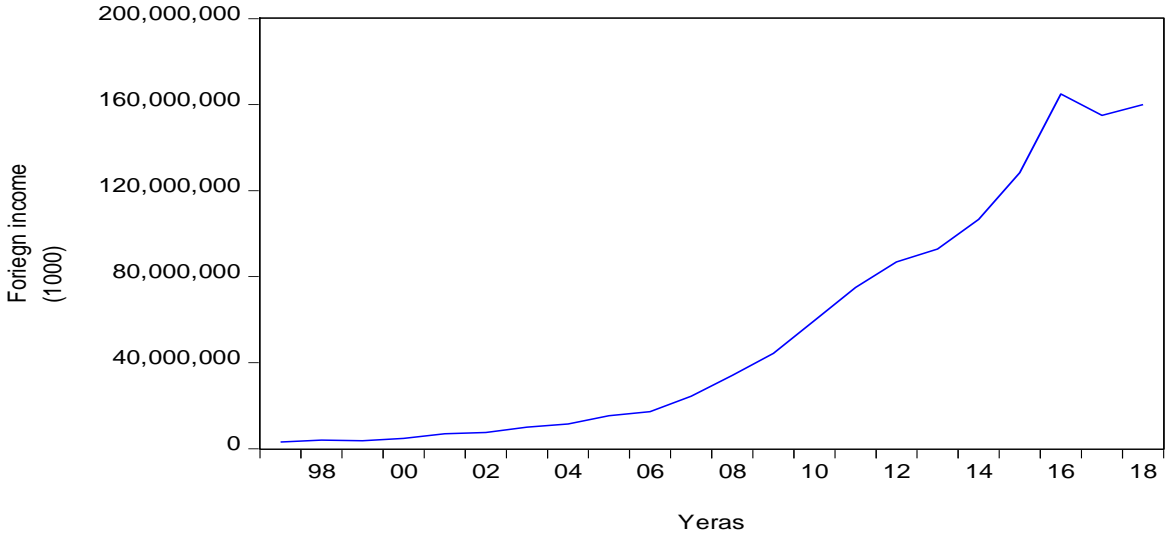


Figure 4-4: Trends in foreign income (1997-2018)

Figure 4.4 shows that foreign income has been increasing at a decreasing rate, but after 2006 it started to increase at an increasing rate. Foreign income reaches maximum in 2016 and it declines in 2017.

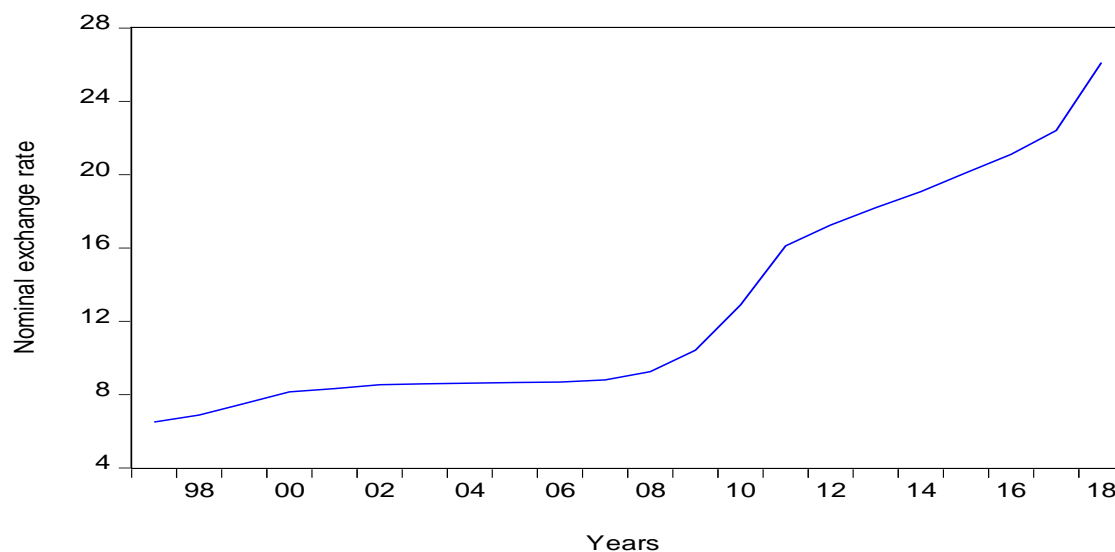


Figure 4-5: Trend of nominal exchange rate

The trend in figure 4.5 above indicates that the nominal exchange rate of domestic currency for foreign currency for the year 1997 to 2018. The trend line shows that exchange rate was increasing at decreasing rate from 1997 to 2008. It was increasing at increasing rate from 2009 up to now. This indicated Ethiopian was borrowing from world market and remittance from citizens of the country they live in abroad is increasing through time.

## 4.2 Results of Diagnostic Tests

Before presenting and discussing the econometric model results, first discuss the different diagnostic test results regarding the data and the model performance.

### 4.2.1 Results of Unit Root Test

Most macroeconomic time series data were trended and, therefore, in most cases are non-stationary. In order to receive consistent and reliable results, the non-stationary data needs to be transformed into stationary data. Unit Root test is used to make the data stationary. So before utilizing the data in estimating ARDL model, it is important to check the time series properties of each series. When a series contains unit root, it is common to transform the variables through differencing so as to make it stationary. In order to determine the degree of integration, a unit

root test is carried out using the standard Augmented Dickey Fuller (ADF) tests. Moreover, in applying ARDL model all of the variables should be integrated of order zero (I (0)), integrated of order one I (1) and a mixture of the two. But it should not be integrated of order two (I (2)). To check these conditions, unit root test is conducted before any sort of action taken. Therefore, the unit root test could convenience us whether or not the ARDL model should be used. The result in table 4.2-1, below shows that there is I (1) but not any order two.

Table 4-2: ADF Unit Root Test Results

Variables (At level & 1 <sup>st</sup> difference (D))	With intercept only		Test critical values:		
	t-statistics	Prob	1% level	5% level	10% level
TB	2.142908	0.9998	-3.788030	-3.012363	-2.646119
D(TB)	-3.174648	0.0370	-3.808546	-3.020686	-2.650413
FI	-0.544184	0.8591	-3.886751	-3.052169	-2.666593
D(FI)	-6.042640	0.0000	-2.708094	-1.962813	-1.606129
DI	3.141126	1.0000	-3.886751	-3.052169	-2.66659
D(DI)	-3.590766	0.0158	-3.808546	-3.020686	-2.650413
EXR	-0.859768	0.7794	-3.808546	-3.020686	-2.650413
D(EXR)	-4.463884	0.0029	-3.040391	-3.857386	-2.660551

**Source:** Own estimation based on NBE (2020)

Based on the above table, the ADF Unit root test result, all variables are stationary in first difference. This indicates that, none of the variables are I (2). Therefore, ARDL co-integration technique proposed by Pesaran et al. (2001) is the most appropriate method for estimation or to check the long run relationship among the variables. We can Run ARDL when we have our data stationary mix I.e. Few variables are stationary at level and few ones at first difference but it's also important to know that ARLD also can be run if our variables are purely stationary at level or purely at first differences (M.SaEid Aas Khan Meo, 2016)

#### 4.2.2 ARDL Bound Tests for Cointegration

After checking the stationary of the variables, the next step is checking the bound test for co-integration. The first task in the bounds test approach of co-integration is estimating the ARDL model using the appropriate lag length selection criteria. A maximum lag of order 1 was

automatically chosen for the conditional ARDL model. Because according to Pesaran and Shine (1999) for the annual data are recommended to choose a maximum of one or two lag lengths. In addition the stationarity of the results confirmed that both variables were of order 1 and according to Wooldridge, (2009) the more lags we include, the more initial values we lose. The F-test through the Wald test (Bound test) is performed to check the joint significance of the coefficients. . Then Wald (bound test) is performed and the value for F-statistic obtained. The computed F-statistic value is compared with the lower bound and upper bound critical F-values that have been provided by Pesaran *et al.* (2001) and Narayan (2007). As it is indicated in table below,

Table 4-3: Results of bound test

Test statistics	Value	K	Critical value bound		
			Significance	I0 bound	I1 bound
F-statistics	5536.375	3	10%	2.37	3.20
			5%	2.79	3.67
			2.5%	3.15	4.08
			1%	3.65	4.66

**Source:** Own estimation based on NBE (2020)

Table 4.2-2 shows that the F-statistic is 5536.37, higher than the upper bounds of the critical values at all significance levels. This indicates that the null hypothesis of no long run relationship among the variables is rejected. The result suggests the presence of long run relationship between the variables of interest.

#### 4.2.3 Model Stability and Diagnostic Test

The results for tests for serial correlation (the Lagrange multipliers (LM) test for autocorrelation), test for normality (based on a test of Skewness and kurtosis of residuals) and the test for heteroskedasticity (based on the regression of the squared residuals on square fitted values) are presented in Table 4.4. The p-values associated with both the LM version and the F versions of the statistics are higher than any of the significance levels. The results show that the long run ARDL model estimated in the study passes all the diagnostic tests.

Table 4-4: Results of the ARDL Bound Test

Test statistics	LM Version	F Version
A: Serial Correlation	CHSQ( 2) = 2.780309 [0.2490]	F( (2,14) = 1.130227 [0.3507]
B: Normality	CHSQ( 2) = 2.38145 [0.30400]	F( (2,16) = Not applicable
C: Heteroskedasticity	CHSQ( 3) = 4.831652 [0.1845]	F( (2,16) = 1.698854 [0.2074]
A: Lagrange multiplier test of residual serial correlation		
B: Based on a test of Skewness and kurtosis of residuals		
D: Based on the regression of squared residuals on squared fitted values		

Source: Own estimation based on NBE data (2020)

The first test answers the question whether there is or not an interdependence/correlation between the two residuals—an autocorrelation test. The Brush God Fray LM test failed to reject the null hypothesis because the p-values associated with test statistics is greater than the 5% standard significance level (i.e. 0.2490 > 0.05). This implies that there is no problem of autocorrelation in the data. Secondly, the test is about the nature of distribution of the residual. Since the p-value associated with the Jaque-Berra normality test is larger than the standard significance level (i.e. 0.3040 > 0.05), we fail to reject the null hypothesis. The last diagnostic test deals about the variance nature of the residual i.e. hetroskecedasitcity test. The null hypothesis is constant variance of the residual or homoskecedasitcity as we observed from the above table the p-value of the test statistics is higher than the associated significance level (i.e. 0.1845 > 0.05), then we fail to reject the null hypothesis. Therefore, it can be concluded that there is no specification error.

#### 4.2.4 Stability Tests

To gauge the stability of the model, the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of residuals (CUSUMQ) are plotted against the critical bound of the 5% significance level (Brown et al., 1975). The stability of the long run coefficients is used to form the error correction term in conjunction with the short run dynamics. CUSUM test is based on the first set of n observations.

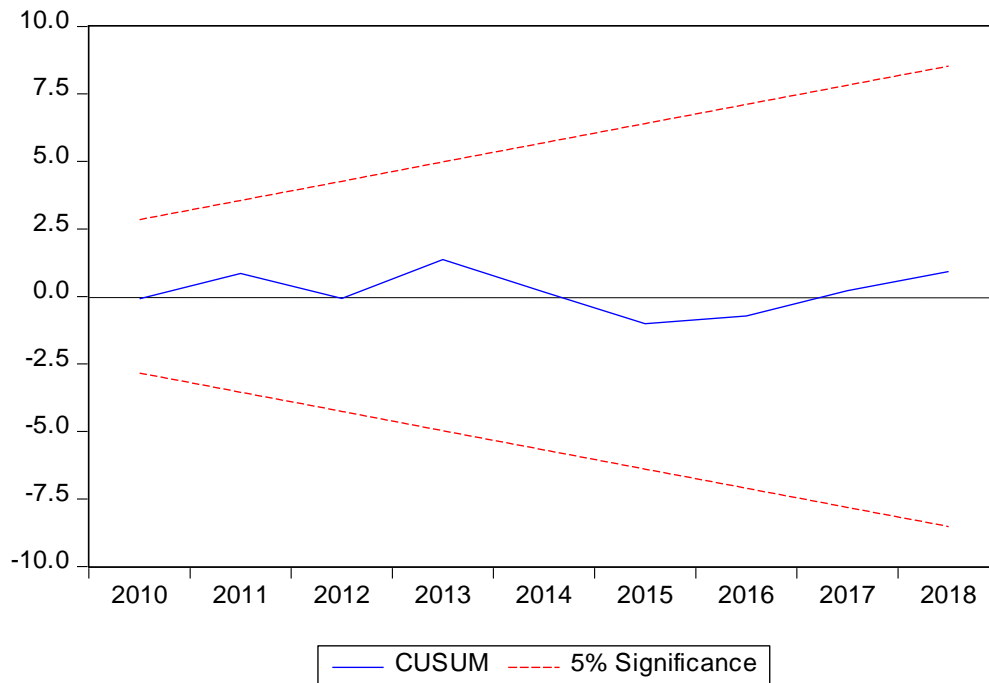


Figure 4-6: Plot of Cumulative Sum of Recursive Residuals (CUSUM)

Source: Own estimation based on NBE (2020)

If the plot of CUSUM stays within the 5% significance level, then the estimated coefficients are said to be stable. This is similar to carrying out the CUSUMQ that is based on the squared recursive residuals. Depending on the plotted graph, one can identify at what point of time a possible instability (structural break) occurred. If the plot of CUSUM and CUSUMQ statistic moves without crossing the straight lines, then the estimated coefficients are said to be stable.

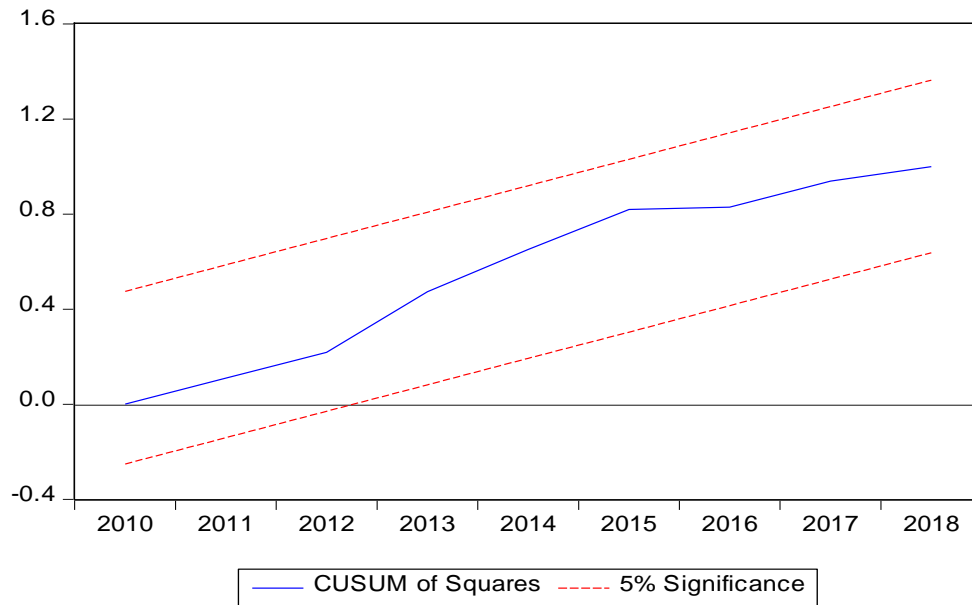


Figure 4-7: Plot of Cumulative Sum of squares of Recursive Residuals

Source: Own estimation based on NBE and World Bank data sets (2018)

As the figure 4.7 shows, both the CUSUM and the CUSUMQ test statistics for the model did not cross the critical value lines, so it is safe to conclude that the model is stable. Accordingly, the results of the estimated model are reliable and efficient.

## 4.3 Econometric Results

### 4.3.1 Long run relationship between trade balance and devaluation

After running the bound test for integration, the next step is the long run model estimation. The results of the bound test demonstrate the existence of a long run relationship between the dependent variable (trade balance) and the independent variables (exchange rate, domestic income and foreign income). The results from the long run ARDL model are presented in Table 4.5.



Table 4-5: Results of the ARDL Long-run Estimation

Variables	Coefficient	Std. Error	t	p-value
Foreign income	-7.51	0.20	-37.11	0.0172
Exchange rate	59947265	1860717	32.22	0.0198
Domestic income	1072.25	39.41	27.21	0.0234
Constant	7833800	221074.3	35.44	0.018

Source: Own estimation based on NBE (2020)

Note: Dependent variable is trade balance (ETB), all variables are in first difference.

The significance of constant term ( $B = 0.018$ ) implies that the other factors which affect the trade balance in Ethiopia. The results of the study show that domestic income and exchange rate are positively and significantly correlated with trade balance at 5% level of significance. This suggests that trade balance increases with increase in domestic income and nominal exchange rate (in this case devaluation). The positive and significant association between trade balance and domestic income could be possibly because when the county real GDP increases it can expand or increase the export capacity. The finding is consistent with results from previous studies Kennedy (2013), Taye (1999), Veeramani (2008), Atingi-Ego and Sebudde (2000), Sweidan (2013). The explanation for the association between trade balance and exchange rate could be positive. The long run model result indicates that trade balance is negatively associated with foreign income. The negative coefficient of foreign income suggests that trade balance decreases with increase in foreign income, holding other factors constant.

The conventional belief of currency devaluation impact on trade balance shows that devaluation improves trade by lowering export price (Meade, 1951). However, results from previous studies and claims from economists indicate that there is no agreement on the impact of devaluation on the economy and particularly on trade balance and export. Taye (1999) found that devaluation of currency improves trade balance; however, the improvement is not due to economic or export growth but due to decreases in imports. Lencho (2013) proved that depreciation of ETB improved the trade deficit of Ethiopia.

In this research, exchange rate or devaluation has a positive significant effect on Ethiopian trade balance. This agrees with the findings from a study by Kennedy (2013) that empirically investigates Kenya's foreign trade balance using annual data for the period 1963-2012. He employed Johansen integration approaches to estimate the long and short run determinants of trade and find that the real exchange rate depreciation strongly and significantly improves the trade balance. Taye (1999) studied the impact of devaluation on macroeconomic performance in and find that devaluation helps to improve the current account balance, but the improvement might not be due to an increase in the output or export but most likely due to a decrease in imports. Veeramani (2008) shows that depreciation of real exchange rate increases Indian merchandise export earnings. Atingi-Ego and Sebudde (2004) suggest that depreciation of the real exchange significantly boosts the export competitiveness of the non-tradition exports in Uganda. Exchange rate is also found to have a positive and significant effect on the Taiwanese exports of agricultural products than other sectors (Wang & Barrett, 2007). Sweidan (2013) also found that the exchange rate only has a positive effect in the short run, not in the long run. Musila and Newark (2003) strongly supports the standard Keynesian model, finding evidence that devaluation helps to improve trade balance in Malawi. Depreciation curtails the growth of imports in the long run, which lead to improvement in the trade balance position. 'Our investigation of the correlation between the real exchange rate and the nominal exchange rate for Malawi supports the neo-Keynesian view. Devaluation is positive significant effect on trade balance in Ethiopia because of it proportion country's exports and it generates foreign currency that the country is highly faced.

#### **4.3.2 Results of the Short-Run Error Correction Model**

After the acceptance of long run coefficients of the trade balance equation, the short run Error Correction Model (ECM) is estimated. ECM indicates the speed of adjustment to restore equilibrium in the dynamic model. It is a two period lagged residual obtained from the estimated dynamic long run model. The coefficient of short-run dynamics can be obtained by regressing the first difference of the dependent variable on its lag, the lagged error correction term which is derived from the long-run static model, the first difference of all exogenous variables and their lags. However, the determination of the coefficient of the short-run model uses the general to specific model selection technique to obtain Error Correction Model (ECM).

Table 4-6: Error Correction Representation for the selected ARDL model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DTB(-1))	-1.64	0.006	-293.63	0.0022
D(DFI)	-6.28	0.016	-395.09	0.0016
D(DFI(-1))	3.95	0.021	187.34	0.0034
D(DEXR)	-303804.3	70000.58	-4.34	0.1442
D(DEXR(-1))	-47419540	163047.6	-290.83	0.0022
D(DDI)	180.5894	0.634	284.83	0.0022
D(DDI(-1))	-1672.78	4.467	-374.43	0.0017
CointEq(-1)*	-0.85	0.005	-372.03	0.0017
R-square	0.94			
Adjusted R-square	0.89			

**Source:** Own estimation based on NBE (2020)

**Note:** The dependent variable in trade balance (first differenced); the coefficients are statistically significant at 1%. ARDL based on Akaike info Criterion (AIC).

The equilibrium error correction coefficient is equal to -0.850497, implying that approximately 85% of the disequilibrium from the previous year's shock converges back to the long-run equilibrium in the current year. The coefficient of the value of the ECM (-1) shows the rate at which the trade balance equation adjusts to shocks in the system, has a negative sign, and statistically significant with a 1% level of significance and thus, we can conclude that the model is correct. In the short-run model, the coefficient of the first lag of NEER is positive and statistically significant at 1% level of significance (Table 4.6). This means that the trade balance of Ethiopia deteriorates in the short run following the devaluation. So, the coefficient of the log of the first difference of NEER is positive and statistically significant in the fails to cut import volumes and increase export volumes in the short run. However, the coefficient of the lag of NEER is negative and statistically significant in the long-run model and this implies that Birr devaluation improves the trade balance of Ethiopia in the long run.

## CHAPTER FIVE

### 5 CONCLUSION AND RECOMMENDATION

#### 5.1 Conclusion

The study seeks to assess the short run and long run effect of devaluation on trade balance of Ethiopia using time-series data than covers the period 1997-2018. The empirical strategy used in the study is the (ARDL) model. Various tests are conducted regarding the stationarity of the data. The unit-root test results show that none of the variables are stationary in levels, but they are stationary in first difference, suggesting the appropriateness of the selected empirical method. The presence of potential co-integration of a time-series is tested using bounds co-integration tests. The results show the presence of long run relations.

Findings of the study show that nominal exchange rate and domestic income are positively and significant associated with trade balance in both the long run and short run specifications. However, trade balance appears to have a negative and significant association with foreign income in the long-term and in the short run. Overall, the results suggest that devaluation of the Ethiopian birr could improve trade balance. However, in practice, the trade balance of Ethiopia is not improved through consecutive devaluation of the Birr. This may be resulted from the non-responsiveness of import to devaluation of the Birr, shortage of import substitute domestic products and the dependency of exports on primary agriculture products.

#### 5.2 Recommendation

Based on the findings of this study, the following recommendation are forward.

- ✓ The export responsiveness to exchange rate change is low when compared to import of the Ethiopia. Increasing the export volume through decreasing the domestic price of the product to improve the trade balance might lead to inefficient use of resources. Therefore, in order to boost the country's export at the expense of import, the government should encourage and subsidize the infant industries in the country through research and development, among others.

- ✓ The Ethiopian export has a very narrow base that makes it vulnerable to different shock. Therefore, export diversification and exporting finished products should be the right decision to improve the trade balance.
- ✓ The Ethiopian export commodities are characterized by primary products that are vulnerable to shocks in the world commodities price. It should be essential to promote small, micro and medium scale enterprises that are the source for manufacturing industries to raise the export commodities of the industrial products.
- ✓ The Ethiopian export sector is characterized by a multitude of problems that could limit its competitiveness in the international market. These challenges include low quality product, inadequate service delivery, and low investment in exported product, lack of marketing knowledge and skills and high transaction cost. In order to solve these problems, the government should invest in research and development.
- ✓ Domestic income and real exchange rate have a significant effect on the trade balance in the long run. Therefore, government policy in trade balance needs to consider these factors into account.

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