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THE EFFECT OF REAL EFFECTIVE EXCHANGE RATE IN OUTPUT OF ETHIOPIAN ECONOMY

By Dawit Samuel

June 2020

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This Submitted to the School of Graduate Studies of Addis Ababa University
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The Effect of Real Effective Exchange Rate in Output of Ethiopian Economy

By Dawit Samuel

Approved by Advisor

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June 2020

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DECLARATION

I, Dawit Samuel Tadesse declare that, this study, The Effect of Real Effective Exchange Rate in Output of Ethiopian Economy is my own work. I have undertaken the research work independently with the guidance and support of the research advisor. This study has not been submitted for any degree or diploma program in this or any other institution. It is in partial fulfillment for the requirement of the program for the degree of Master of Science in Developmental Economics. All sources of material used for the research have been acknowledged.

Name: Dawit Samuel Tadesse Signature: _____

Date: June, 2020

ENDORSEMENT

This thesis has been submitted to Addis Ababa University, Collage of Business and Economics for examination with my approval as a university advisor.

Advisor: Worku Gebeyehu (PhD)

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Date: June, 2020

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COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

Board of Examiners Approval Sheet

As members of board of examining of the final MSc thesis, we certify that we have read and evaluated the Thesis prepared by Dawit Samuel entitled The Effect of Real Effective Exchange Rate in Output of Ethiopian Economy that the Thesis is accepted as fulfilling the thesis requirement for the degree of Master of Science and Developmental Economics.

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Abstract

The main objective of this study was to examine the effect of real effective exchange rate on trade and the Ethiopian economy at large. This study covers the period from 1980/1981 up to 2018/2019 of Ethiopian macroeconomic data. Firstly, export and import equations are estimated through OLS on the first differences of the dependent and independent variables after conducting the required time series tests to check whether or not the Marshall-Lerner condition holds. The estimation results show that devaluation affects export performance negatively because of the fact that our exports are largely primary products; which are price and income inelastic. Devaluation affects import negatively as expected; because imports become expensive than before in terms of local currency. Some exported goods use imported intermediate inputs, whose cost increases as a result of depreciation and negatively affect export performance. The effect of REER on real GDP of Ethiopia is investigated with the use of VECM and the result suggested that REER affect the real output of the Ethiopian economy negatively. The policy implication is rather than devaluing the currency constantly to stimulate export and improve trade balance; government continue to subsidize the export sector that help reduce dependency on imported goods.

Key words: Devaluation, Real Effective Exchange Rate, Export, Import, Marshall Lerner Condition

CHAPTER ONE

1. Introduction

The world is composed of countries that have different features in terms of economic, political and social matters. Considering the economic matter only, one can see that some countries are very rich, some are very poor and the remaining others are found between them. However, every nation has one main economic goal to attain both in the short and in the long run. This is achieving economic growth (Medina, 2015).

In order to achieve this goal and make their countries better off, governments use monetary and fiscal policies. Fiscal policy is the use of government spending and taxation to influence the economy. Governments typically use fiscal policy to promote strong and sustainable growth and reduce poverty on the domestic economy (Horton and El-Ganainy, 2009). Monetary policy deals with both domestic and international economy and affect real economic variables at the aggregate level (such as real output, real rates of interest, employment, and real exchange rates) and nominal variables (such as the inflation rate, nominal interest rates, nominal exchange rates, and the supply of money) (Carl, 2010).

As indicated above, one of the policy parameters that are used in monetary policy is the rate at which we exchange the domestic currency with foreign currencies. Upon the collapse of the Bretton Woods system of fixed exchange rates in 1973, exchange rates became endogenous variables that result from the complex interaction with macro-economic variables (MEYVECİ, 2014).

There are many variables that contribute to economic growth. According to old and new school of thoughts export is considered as one of the very important accelerators of growth. For instance the trade policy dedicated by mercantilist philosophy was intended to encourage exports, discourage imports, and take the proceeds of the resulting export surplus in gold because mercantilists believed that these precious metals were the only type of wealth worth pursuing (Brue and Grant, 2012).

For modern liberal view and classical school, trade is considered to be an engine of economic growth. David Ricardo highlighted the importance of exports promotion strategy accordance with the principle of comparative advantage. When a country specializes in a product, which it can produce competitively, the goods become available to the community of the world at cheaper prices (Elena, 2014). The 'Asian tigers' are good examples in this regard. They have experienced a dynamic economic growth and transformed themselves within few decades. Different reasons have been mentioned for their success, one of the reason is openness to international trade, which played a crucial role in the historical economic growth achievement of the four East Asian Tiger economies (South Korea, Hong Kong, Singapore, and Taiwan), (Senait, 2014).

Now in many countries, especially the developing ones, the weakening of their currency (the decrease or depreciation of their own currency in terms of foreign currencies) has become a central growth issue (Genye, 2011). Development organizations like International Monetary Fund (IMF) support the idea of exchange rate flexibility to help strengthen competitiveness, reduce foreign exchange shortages and support reserve accumulation.

According to (Yolcu, 2014), the traditional Mundell (1963)-Fleming (1962) model proposes that an increase in the exchange rate (currency depreciation or devaluation) is expansionary assuming that the Marshall-Lerner conditions are satisfied. The depreciation of the exchange rate boosts aggregate demand by encouraging exports and creating a substitution from imports to domestic goods. This "orthodox" view is originated by the money-less Keynesian model of Meade (1951) and it is extended by the monetary approach of Dornbusch (1973, 1986). Based on this orthodox view, it is believed that by stimulating the export sector, real devaluations of the currency helps countries to avoid financial crisis and provide sustained growth. Surprisingly, developing countries like Ethiopia are frequently devaluing their currencies and still, they have a negative trade balance.

Ethiopia is the 11th poorest country in the world with a per capita income of $783, (WB, 2016). However, Ethiopia's economy experienced strong, broad-based growth averaging 10.3% a year from 2006/07 to 2016/17. Its real gross domestic product (GDP) growth decelerated to 7.7% in 2017/18 due partly to civil unrest, political uncertainty, and policy adjustments that involved fiscal consolidation to stabilize the public debt (AEO, 2019). Despite encouraging growth of

GDP in Ethiopia over the ten years period, the export sector is very small in a number of dimensions and the trade deficit of the country continued to remain wide as the growth of imports also accelerated fast (Abebe, 2014).

1.1. Statement of the problem

In theory, currency devaluation is used as one of the policy tools for enhancing exports. According to BjØrnskov (2015), depreciation of the local currency makes local products less expensive in the world market and the country to be more competitive internationally. Especially, since the breakdown of the Bretton Woods Agreement in 1973, and the advent of floating exchange rates, there has been renewed interest to study on the effect of devaluation on the trade balance of both developed and developing countries (Borena, 2013).

Economists often considered devaluation to be a tool for improving the export sector of an economy. According to the traditional views, devaluation has expansionary effect on output and aggregate demand (Asif et al., 2011). Contrary to the traditional view, some argue that devaluation would affect the supply side of the economy by increasing the cost of imported inputs used in production, resulting in a decline of the aggregate supply in the economy (Aklilu, 2018). There was no serious controversy over the positive effects of devaluation on economic growth before 1970's recession took place in Latin America which implemented orthodox adjustment programs (Yolcu, 2014).

Ethiopia passed through two political regimes during this period; namely the Imperial regime from 1930-1974 and the Derg regime from 1974-1991. Nevertheless, both political regimes adopted the same type of exchange rate regime; namely a fixed exchange rate system with relatively strict controls on the activities related to the system (Fentahun, 2011).

Like any other countries, Ethiopia has been engaged in international trade for several decades. Nevertheless, the country has not been experiencing positive trade balance (Medina, 2015).The World Economic Forum in its global competitiveness report of 2009 shows that Ethiopia's export are among the last competitive at world ranked 118^{th} out of 149 countries and ranked 21^{st} in Africa.

Based on NBE (2017), in order to restore the trade balance and the trade competitiveness, the government has perused three major devaluations since 1992. One was taken by the newly

inaugurated Ethiopian People's Revolutionary Democratic Front (EPRDF) in 1992, where the official exchange rate of the nation jumped from 2.07 Birr/dollar to 5 birr/dollar; this 142% devaluation rate is the highest in the Ethiopian history. The other one took effect in September 2010; during which the rate jumped from 13.6 Birr/dollars to 16.3 Birr/dollars amounting to 16.7 percent. The official devaluation of Birr against US dollar increased by 15% in November 2017, which moved up the exchange rate from 23.3 Birr per dollar to 27 Birr per dollar (NBE, 2017). The current exchange rate of Birr/dollar is around 29.

However, the effects of devaluation on real economic activities are controversial. Some suggest expansionary effects and others contractionary effects. The study conducted by Ufoeze et al. (2017) investigated the effect of exchange rate fluctuations on Nigerian economy from the period 1970 to 2012. The result revealed that exchange rate has significant positive effect on GDP during the fixed exchange rate era and it affect the GDP negatively on the floating exchange rate. Unlike the previous, Akpan and et al. (2011) investigated the effect of exchange rate movements on real output growth in Nigeria, for the period covering from 1986 to 2010. The estimation results suggest that there is no evidence of a strong direct relationship between changes in exchange rate and output growth.

In Ethiopia several studies have been conducted to grasp the effect of exchange rate on macroeconomics variables. The study conducted by (Abebe, 2014), using impulse response function revealed that trade balance in Ethiopia after depreciation of currency follows a J-curve pattern, in the short run trade balance deteriorated and subsequently improved in the long run.

Aklilu, (2018) using Dynamic Computable General Equilibrium (DCGE) Model found out that devaluation results in a decline in the overall GDP growth and domestic absorption and the trade balance has been improved under all simulation scenarios. Borena (2013) examined the relationship between exchange rate and trade balance. The study found that in the long run depreciation succeeds in improving trade balance deficit of Ethiopia and also the short run dynamic error correction model indicated that changes in trade balance in the short run is explained by changes in real effective exchange rate. Contrary to the previous finding, sing coingeration tests Zelalem (2014) revealed that there is long run relationship among variables. However, his estimation results indicated that the sign of real effective exchange rate is positive and insignificant which confirms against Marshal- Learner condition.

As discussed so far, studies have been conducted to capture the real effect of exchange rate on economic growth and trade balance of Ethiopia. However, their estimation was between real GDP and trade balance as dependent variables with REER using time series model and they have found a positive or negative relationship between them respectively and concluded that J-curve effect in Ethiopia occurred in some and not in others. For example, Zelalem, (2014) used the Trade balance as a function of Real Effective Exchange rate, domestic income, foreign income and dummy and concluded that Marshall-Lerner condition doesn't hold in Ethiopia.

Tirsit,(2011) tried to analyze the relationship between GDP and REER using Gross Domestic Product per capita as a function of Education, Private Investment, Demographic factor, Trade Openness, Public Expenditure, Exchange rate, Drought and Famine and War in the country respectively and showed devaluation to have a negative effect on GDP per capita during the same year whereas the coefficient for the one year lagged exchange-rate was significantly positive thus devaluation has a time varying effect.

The basic question that this research raises is, does the Marshal Lerner condition work for Ethiopia? The study mainly attempts to examine the existence of J-Curve effect in Ethiopia to fill the gap in the Ethiopian literature; which concluded about the J-Curve's occurrence or not by focusing only on the effect of the exchange rate policy on GDP or Trade balance on Ethiopian economy and the economic growth of the country. In this study, there is a belief that in order to know the exact J curve effect, one needs to estimate the Marshall Lerner condition by first estimating an export supply and import demand functions of the country and obtaining the relevant elasticity figure. Once the researcher is able to observe that the Marshall Lerner condition existed in Ethiopia, he would proceed to estimate the relationship between GDP and REER. This procedure is considered to make the result to be more accurate and more concrete than only estimating the relationship between Real GDP and REER.

1.2. Objectives of the Study

The main objective of this research is to grasp the effect of exchange rate movement on the GDP of Ethiopia.

The specific objectives of the study are:-

- To test the Marshall Lerner condition works in the Ethiopian case
- To estimate the effect of devaluation of the Ethiopian currency on major macroeconomic indicators like export and import
- To identify the major determinants of real gross domestic product growth

1.3. Significant of Study

The study has its own importance in terms of empirically testing the relationship between exchange rate and the output of Ethiopian economy and providing some policy inputs and essential information for the policy makers on the effectiveness of the policy of devaluation on boosting exports and improving balance payment and how it can affect some other macroeconomic variables directly and GDP indirectly.

1.4. Hypothesis

This study is to verify the hypothesis that there is positive relationship between devaluation and export amount of quantities. Devaluation has also a positive impact on the economy by improving the trade balance and affects the GDP positively.

1.5. Scope of the study

This research used secondary data sources including National Bank of Ethiopia, International Monetary Fund and World Bank cover from the 1980/1981 to 2018/2019. This paper didn't include imperial regime of macro-economic data because of lack of data. In GDP equation there are some omitted variables like Investment and Foreign Aid

1.6. Organization of the Study

The remaining part of the paper will proceed as follows. Section two will present both theoretical and empirical literature. The third chapter consists of models which the researcher will use to examine the effectiveness of exchange rate movement on trade balance and GDP in Ethiopia. Adequate statistical and econometric analyses will be used to assure the validity of the model. Lastly, chapter five concludes the thesis by highlighting the main findings and some policy implications.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical literature review

2.1.1 Definitions and Concepts

2.1.1.1 Exchange rate

Exchange rates allow someone to determine how much of one currency he or she can exchange for another. In simple terms, it is the price of a nation's currency in terms of another currency. An exchange rate thus has two parts, the local currency and a foreign currency, and can be quoted either directly or indirectly. It can be defined directly, the price of a unit of currency from abroad is expressed in terms of the domestic currency. In an indirect quotation, the price of a unit of domestic currency is expressed in terms of the foreign currency (Amadeo, 2016).

Pentecost (1993) in Elias (2011) argued that there are many reasons for people and government nations need other currencies of other countries currency including the use of foreign exchange to have transactions that determine their balance of payment. These are to buy foreign goods and services, to make unilateral transfer payments; to hold deposits in oversees banks, to make long and short- term loans to foreign residents, firms and government.

The modern theory regarding exchange rate determination is known as the supply-demand theory (Nipun, 2019). The demand–supply framework enables to predict the next period's exchange rate (Evrensel, 2019). Foreign exchange demanded by the domestic residents in order to import goods and services, to meet expenditure incurred in foreign tours and when people want to make gains -from appreciation of currency (Chand, 2019). In reality, there is a wide range of different exchange rate regimes but for the simplicity economist usually analyze three types of exchange rate: the fixed exchange rate, the floating exchange rate and the managed floating exchange rate BjØrnskov (2015).

2.1.1.1.1 Exchange rate systems

a) Fixed exchange rate systems

Fixed exchange rate system is when the government try to keep the value of a currency fixed against another currency. A fixed exchange rate is when a country ties the value of its currency to some other widely-used commodity or currency (Amadeo, 2016).In this type of exchange rate system, there is complete government intervention in the foreign exchange market.

Central bank or national bank intervene in the foreign exchange market to fix exchange rates. The main tool of central bank transactions in asset markets is the central bank balance sheet, which records the assets held by the central bank and its liabilities. One of central bank asset is foreign asset which make up the central bank's official international reserves, and their level changes when the central bank intervenes in the foreign exchange market by buying or selling foreign exchange. It sells foreign exchange when there is too much demand for it and buys foreign exchange when there is too much supply of it in the market to stabilize the price of foreign exchange at a given equilibrium rate (Krugman, 1998).

Some of the advantages of fixed exchange rate regime are to help ensuring import stability, reduce risk and uncertainty. Aside from providing stability to the economy, it makes foreign exchange to be cheaper to buy, and therefore able to pay for infrastructure and other structural investments, which are required in low-income countries if economic growth rates are to be maintained. It also reduces foreign exchange debt burden in local currency, both in terms of servicing costs and as a percentage of the economy (Ferrand, 2018).

Even if fixed exchange rate system has the above advantages, it has also some disadvantages. The system cannot automatically adjust itself. A fixed exchange rate system mainly aims to maintain stable balance of trade but when a trade deficit occurs, there will be more demand for the hard currency, rather than the domestic one. This will exert a pressure on the price of the foreign currency to increase in terms of the domestic currency or depreciates whenever there is a trade deficit. Nonetheless, appreciation or depreciation is not allowed in the system. In order to keep the exchange rate constant, central bank must withdraw hard currencies from its reserves and spend it on the market; this may in turn create some financial inconveniences especially in

the case of LDCs (Medina, 2015). In most cases the reserves will be lower, making shocks harder to manage unless much of the cost of shocks is securely underwritten by donor resources and commitment (Ferrand, 2018).

b) Floating exchange rate systems

In a floating exchange rate regime, the exchange rate is a price freely determined in the market by supply and demand. A central bank would be unable to use monetary policy to promote any other goal; in practice, there is limited leeway to pursue other goals without disrupting the exchange rate (Labonte, 2004).Under this system there is appreciation and depreciation of foreign exchange rate that brings BOP to equilibrium. But the fact that automatic adjustment in the exchange rate brings equilibrium in the BOP depends on the elasticity of supply and demand for imports and exports.

The maintenance of a floating exchange rate does not require support from monetary and fiscal policy. This frees the government to focus the monetary and fiscal policy on stabilizing the economy in response to domestic changes in supply and demand. Fiscal and monetary policy can be focused on domestic goals, such as maintaining price and output stability, without being constrained by the policy's effect on the exchange rate (Labonte, 2004).

According to Evrensel, (2013) floating exchange rates have their own advantages. Unlike fixed exchange, floating exchange rates don't require controller such as the International Monetary Fund to look over current account imbalances. Under the floating system a currency depreciation will be applied if a country has large current account deficits. Therefore, floating exchange rate regimes will enhance market efficiency.

One of economic drawback to floating exchange rates is that exchange rate volatility and uncertainty may discourage the growth of trade and international investment. Uncertainty of an exchange rate can led to wary the traders. For example, after an international sale has been negotiated, one party to the transaction will not know what price he will ultimately receive in his currency because upon payment the exchange rate may be higher or lower than when he made the trade (Labonte, 2004).

c) Managed Floating Exchange Rate

Managed floating exchange rate system is a combination both fixed and floating exchange rates. In this system *"exchange rates among the major currencies are free to float to their equilibrium market levels, but nations occasionally use currency interventions in the foreign exchange market to stabilize or alter market exchange rates"* (Pilbeam K, 1998). Intervention can be done by central bank through buying and selling of foreign exchange against the domestic one by aiming to affect the exchange rate (Sarno and Taylor, 2002).

Managed floating exchange rate system has some critical importance in stabilizing capital flows. For example "*depreciation may encourage the central bank to support the weakening currency, and vice versa. If private participants in the exchange market believe that the central bank will behave in such a stabilizing way, they may be encouraged to follow the same pattern, that is, to support a declining currency in expectation that the central bank will push it back up, thus making their transactions profitable. Central bank intervention is sometimes intended to encourage such stabilizing behavior by other investors"* (Dunn and Mutti 2000).

2.1.1.2 Definition and concept of devaluation

Devaluation defined as the official decrease in the value of domestic currency in terms of foreign currency. It raises the local prices level of imports and reduces the external prices of exports (Asif, 2011). Assuming the Marshal-Lerner condition satisfied, the policy of devaluation of domestic currency is usually applied for adjusting the deficit in the balance of trade and payment. Devaluing the domestic currency exports of the country will boost up the country export and hence leads to favorable situation of balance of payment which leads to high economic growth. Devaluation does not only affect the balance of trade but it also affects the external debt as well. If there is a fall in the value of currency that will basically uplift the burden of debt as for that we have to pay more of debt for now than before (Khan and Ali, 2016).

Devaluation is often confused with depreciation. A devaluation occurs when a country makes a conscious decision to lower its exchange rate in a fixed or semi-fixed exchange rate on the other hand a depreciation is occur when there is a fall in the value of a currency in a floating exchange rate (Pettinger, 2018).

There is an argument based on the effectiveness of devaluation in improving the nation's trade based on their theoretical and empirical researches. Devaluations is the most important component of orthodox stabilization programs. According to the traditional theory it is expected that devaluation will result in expenditure switching, increased production of tradable, higher exports, and in an improvement of the external position of the country (Edward, 1986).

Applying appropriate fiscal and monetary policy has a major impact on successfulness of devaluation. Devaluations have both microeconomic and macroeconomic effects. The significance of our study lies in understanding how changes in the exchange rate can affect the GDP by increasing the export performance and other macro-economic variables. We will assess the different approaches in the evaluation of this relationship. These are the Elasticity approach, the Keynesian analysis called the absorption model and the monetarists analysis called the monetary approach to be discussed in detail below (Dunn and Mutti 2000).

2.1.2 Approaches to evaluate the relationship between exchange rate and trade balance

a) Elasticity Approach

The elasticity approach to the balance of payment provides an analytical framework as what happens to the current account balance when a country devalues its currency. This model tries to capture the responsiveness of demand for imports and exports following the adoption of devaluation in an economy. The theory was pioneered by Alfred Marshall (1923) and Abba Lerner (1944), and later extended by Joan Robinson (1973) and Fritz Machlup (1939). At the outset, the model makes some simplifying assumptions. The model focuses on the demand conditions and assumes that the supply for export goods from the domestic market and import goods from foreign markets are perfectly elastic, so that the change in demand volume have no effect on price. In effect, this assumption implies that domestic and foreign prices are fixed so that change in the relative price is caused only by change in the nominal exchange rate.

According to elasticity approach there are two direct effects of a devaluation on the current balance, one of which works to reduce deficit and the other will make the deficit worse than before.

Based on these assumptions, the condition for a devaluation to improve the trade balance which directly contributes to the improvement of the balance of payments (starting from equilibrium) is known as the "Marshall-Lerner condition".

> *"The contributions to the elasticity approach by Marshall (1923), Lerner (1936) and Harberger (1950) are often celebrated for formalizing the sufficient condition for a devaluation of the exchange rate to improve the balance of trade – that the sum of the demand elasticities of imports and exports be greater than unity in absolute value*" (Sarno & Taylor, 2002).

The effect of these increases in domestic prices on the volume of imports depends on the elasticity of demand. If that elasticity is high, a relatively large decline in import volumes occurs, and the devaluation has its intended effect. If the elasticity is less than one, however, the volume reduction will be insufficient to offset the price increase, and the local currency value of imports will rise. The higher the demand elasticity, the better prospects for the success of the devaluation (Dunn and Mutti 2000).

Rødseth (2000) in Asmamaw (2008) stated that the nation's trade balance is the difference between exports and imports. It is standard to measure a country's trade balance in terms of home goods. Which is mathematically expressed as follows:-

$NX = X - RM$, $R = EP^*/P$, substitute for R …… (1)

$NX = X - (EP^*/P)\, M$ …….. (2)

Where P is the price of domestic goods in domestic currency, P* is price of foreign goods in foreign currency, E is nominal exchange rate, M is volume of imports of the domestic country, X (volume of exports of domestic country), NX (the net export of the nation) and R (real exchange rate) it is the relative price of foreign goods to domestic goods and can be computed by multiplying the domestic spot rate with the price of foreign goods and divide it to the price of domestic goods in domestic currency.

In theory it is known that devaluation promotes export of the devaluating nation by making the price of exported goods relatively cheaper in the world market. Cause of devaluation the relative

price of goods which are produced in other countries will be expensive in the domestic market and leads to increase the demand for domestic products in local and abroad.

Sometimes, the nation's import demand will increase as a result of currency devaluation and tends to worsen the trade balance. This is called the price effect. Since there are both positive and negative consequences of the realization of devaluation, one needs to check which effect is dominant to determine whether devaluation can improve trade balance or not.

The effectiveness of devaluation in improving trade balance, therefore, depends on the fulfillment of the Marshal-Learner condition. In order to check the Marshal-Learner condition the elasticities of demand for export and import will be estimated and considered. The elasticities of demand of both export and import measure the responsiveness of buyers to price changes. In simple terms it captures the effect of a 1% increase in the price of imports and a 1% decrease on the price of exports on quantity demanded of imports and exports respectively.

The price elasticity of demand for export η*x,* isdefined as the percentage change in export over the percentage change in price as represented by percentage change in exchange rate

$$\eta x = \frac{dX/X}{dS/S}$$

Where X means export and S implies the price, therefore, I have applied the elasticity formula

On the other hand the price elasticity of demand for imports η*m,* is defined as the percentage change in imports over the percentage change in their price as represented by the percentage change in exchange rate

$$\eta m = \frac{dM/M}{dS/S}$$

M stands to import

If the sum of the foreign price elasticity of demand for exports (ηx) and domestic price elasticity of demand for imports (ηm) exceeds unity, we can say that devaluation can improve the balance of payment on the trade balance of a particular country

$$\left| (\eta x) + (\eta m) \right| > 1$$

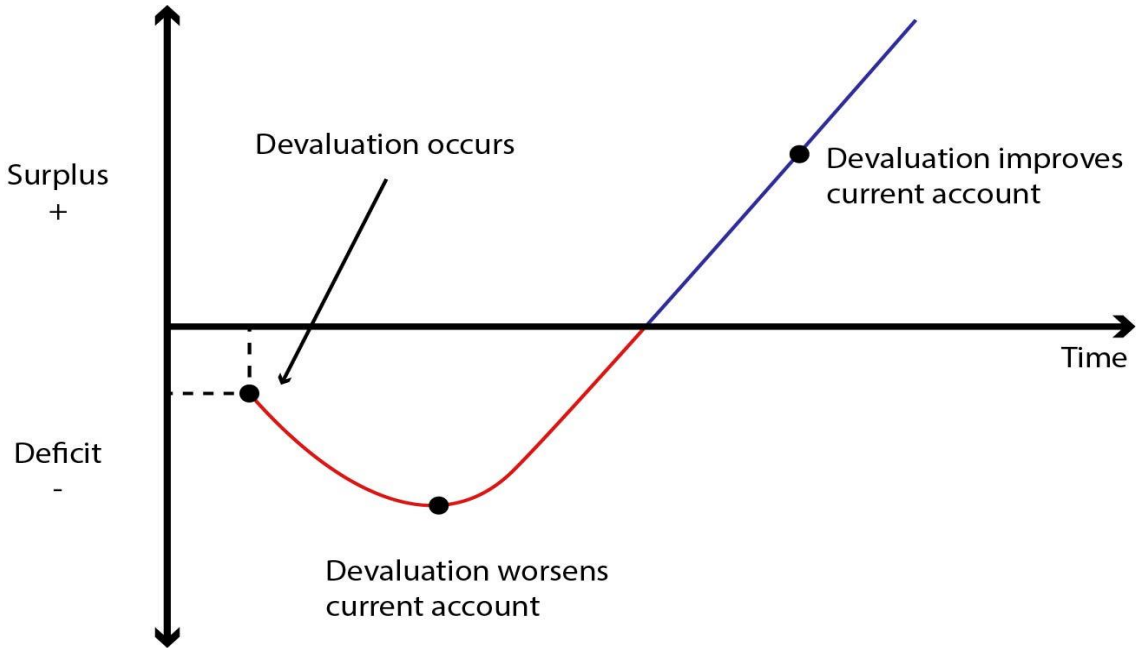
Price effects versus volume effects

Devaluation may reduce the trade balance deficit or it may worsen it. These two effects are the price effect and the volume effect. The price effect will worsen of trade balance because exports become cheaper measured in foreign currency and imports become expensive measured in the home currency.

On the other hand, volume effect clearly will improve the balance of trade. This is because exports become cheaper and will tend to an increasing volume of exports. Imports become expensive and this leads to a decline in the volume of imports. The net effect depends upon whether volume or price effect dominates.

In the countries, where the Marshall-Lerner condition holds following devaluation, a slight increase in the level of trade deficit could be observed at the beginning. As time goes on, trade surplus could be observed due to the fact that devaluation makes exported goods cheaper for international buyers and imported goods expensive for domestic consumers in the long run and which is called J curve effect(Petrović, and Gligorić, 2010)

In the short run the Marshall- Lerner may not be satisfied it will take a long run to raise the export amount because of their lower more competitive prices to foreign buyers, and domestic consumers. This is known as J curve effect which is illustrated in the following figure.



Reason to explain the slow responsiveness export and import volume in the short run are a time lag in consumer response a switching away from foreign imported goods to domestic produced goods will takes time because consumers will be worried about the issue rather than the price such as the reliability and the reputation of domestic good compared to the imported goods. A time lag in producer response will also take time for domestic producers to expand production of exportable (Pilbeam K, 1998).

b) Absorption approach

The elasticity approach alone seems insufficient to assure the nation's economic wellbeing after devaluation. How the nation will react following devaluation should also be taken into consideration.

In order to determine whether devaluation has a positive or negative effect on the trade balance, even if the condition of elasticity approach are satisfied, we need to consider whether the condition of absorption approach is satisfied or not. In other words, there is a need to assess. How the nation will react in terms of production, supply and spending as a result of the changes in exchange rate because of devaluation. In fact, the absorption approach goes beyond the elasticity approach, and tries to explain the impact of devaluation on trade balance by using important macroeconomic variables.

Alexander (1952) is one of the pioneer papers in evaluating the absorption effect. In his paper current account imbalance is viewed as the difference between domestic output and domestic spending (absorption).

According to Carbaugh (2005), the absorption approach starts with the idea that the value of total domestic output (Y) equals the level of total spending, where total spending is composed of consumption (C), investment (I), and government expenditure (G) and net export (X-M).

Y=C+I+G+X-M…….. (1)

Domestic absorption is defined as **A=C+I+G** and Net export is defined as **Z=X-M**

Therefore, Total domestic output became the sum of absorption and the level of net exports (X - M), and which is re written as follows by substituting A and Z into the former formula.

Y = A +Z..…. (2)

To get the balance of trade (net export) we have to deduct "A" from "Y" the formula for the trade balance can be written as follows:

Z = Y – A….. (3)

If the national output (Y) is greater than domestic absorption (A), in the above equation, the economy's trade balance will be positive and trade surplus will be the case. In the contrary, if the trade balance is negative, it indicates that the economy is spending beyond its ability to produce and trade deficit will be experienced. The absorption approach tells us that if devaluation is needed to achieve improvement in trade balance, the nation's total output production should get improved and at the mean time it should reduce its total absorption. In other words, the growth rate of absorption must not be greater than the rate of growth of the total national output.

c) The monetary approach

The main argument of this approach is the cause of disequiliburm in the balance of payment is a reflection of disequilibrium in money markets. The monetary approach also has three main assumptions these are stable money demand function, purchasing power parity and vertical aggregate supply (Pilbeam k, 1998).

Based on these assumptions, the monetary approach can be expressed in the form of the following relationship between the demand for and supply of money:

The demand for money (M_D) is function of income (Y), rate of interest (i) and price (p)

$M_D=f(Y, P, i)$ … (I)

The money supply (M_s) is a multiple of monetary base (m) which consists of domestic money (credit) (D) and country's foreign exchange reserves (R). for simplicity the approach took Ms at constant,

$M_S = D + R$ … (II)

Demand for money are equilibrium with supply for money,

$M_D = M_s$.... (III)

Or MD = D + R [$M_S = D + R$] … (IV)

Changes in the country's foreign exchange reserves can affect a balance of payments in deficit or surplus way

$\Delta R = \Delta M_D - \Delta D$ … (VI)

Or $\Delta R = B$ … (VII)

Where B represents balance of payments which is equal to the difference between change in the demand for money (ΔM_D) and change in domestic credit (ΔD).

A balance of payments deficit means a negative B which reduces R and the money supply. On the other hand, a surplus means a positive B which increases R and the money supply. When B = O, it means BOP equilibrium or no disequilibrium of BOP.

Thirlwall (2004) and Johnson (1977) in Dessalegn (2013) indicated that the monetary approach focuses on both current and capital accounts of balance of payment. It assumes that a change in international currency reserve is a function of disequilibrium of the supply of and demand for money. In other words, its international currency reserve is a function of fluctuation of demand for and supply of the currency. Changes or fluctuations of the level of reserves will lead to the equilibrium level of supply and demand for money to be achieved. Based on the argument a devaluation has only one important effect on the balance of payments: it raises the price level and thereby reduces the real money supply**.** Put in nominal terms, "*devaluation raises nominal GNP because of an increase in the price level, and it thereby increases the demand for nominal money balances. In either form, the conclusion is the same: the problem of the excess supply of money is solved. Short-term elasticities of demand and Keynesian absorption conditions are unimportant. The only important role of a devaluation is to raise the price level, thereby reducing the real money supply (or increasing the demand for nominal money balances) and eliminating the excess supply of money that caused the deficit"* (Dunn and Mutti, 2000).

2.1.1.3 Economic Growth and Exchange rate

Upon the collapse of the Bretton Woods system of fixed exchange rates in 1973, exchange rates became endogenous variables that result from the complex interaction with observable macroeconomic fundamentals and unobservable factors such as speculative trades in the money

market. This feature of the exchange rates renders the task of explaining exchange rate movements very difficult (Meyveci, 2014).

As a key relative price affecting the economy through many channels, the implications of real exchange rate changes for economic growth have become a growing focus of attention in the recent policy debate. One of the main reasons behind the increased attention on the growth effects of real exchange rates is the growth experiences of East-Asian countries which have been assessed as pursuing a successful export-led growth strategy maintaining a competitive and stable exchange rate policy (Yolcu, 2014).

2.2 EMPREICAL LITERATURE REVIEW

A number of researches have been conducted to look at the effects of exchange rate on the macroeconomic variables including GDP, The researchers found quite different results for different countries, different periods and different models. Broadly countries are classified into two categories as developed and developing countries to assess the impact of devaluation on the economy. Some researchers found the effects of currency devaluation on growth of economic performance and export to be expansionary for some other researchers, the effects are contractionary.

According to Petrović and Gligorić, (2010) a real exchange rate depreciation has a significant positive long run impact on the trade balance in Serbia, and that in the short run trade balance first deteriorates before it later improves.

Using ARDL((Autoregressive distributed lag model), Khanl and Ali (2016) find a long run relationship between balance of trade and currency devaluation, external debt in Pakistan over the period of 1980 to 2014. The negative coefficient of real effective exchange rate indicates the absence of J-curve in case of Pakistan. These results clearly indicate that devaluation will disfavor trade balance in case of Pakistan.

In Africa, Matlasedi (2015) investigated the impact of the real effective exchange rate depreciation on the trade balance in the South African economy. The results showed that a depreciation of the ZAR (South African rand) improves the trade balance in the long run, thus

confirming the Marshal-Lerner condition. In the short run, the depreciation of the ZAR leads to the deterioration of the trade balance, thus confirming the J-curve effect in the RSA economy.

As Akpan and Atan, (2011) provided empirical estimates of the relation between exchange rate and economic growth in Nigeria. In the long run, the exchange rate and income may drift apart, but in a short run the adoption of devaluation in an economy will bring economic growth to some extent their relationship is strong and direct.

In Ethiopia various studies have been undertaken by different researchers. According to Genye (2011), devaluation had a negative effect on Ethiopia GDP per capital growth in very short run.

But the lagged exchange rate had expansionary effect on Ethiopian growth and suggests that devaluation has a time varying effect.

Yilkal (2014) showed that in the long run devaluation has negative effect on output while the effect is insignificant in the short run. In the long run devaluation has contractionary effect on output in the Ethiopian case.

Elias (2011) found that, real exchange rate is one of the factors that can affect the level of export of hides and skin but there is no guarantee for its intended long run effect that the change in real exchange rate definitely positively affects the level of export. By using cointegration and unit root test he fail to reject the null hypothesis for both volume of export of hides and skin, real exchange rate. He concludes that there is no long run tendency for exchange rate and volume of export to settle down to an equilibrium track. His finding indicates that exchange rate is one but not the only factor that affects the export volume of hides and skin. By its nature the production of hides and skins are subject to many other factors including weather condition, the farmer's attitude, and government effort for improved technology dissemination, type of sheep and goat bear and many other which are not included for estimation.

According to Abera (2016), the results of the estimations shows us that as devaluation occurs in the economy, export will increase to some extent but unlike the theoretical expectations, devaluation has a positive impact on Ethiopian imports. Since the country's production is highly dependent on imported goods as essential inputs not only for agricultural products like fertilizers, pesticides, sophisticated outputs, machineries petroleum but also intermediate inputs for manufacturing industry are imported from outside world, devaluation makes the cost of

production to rise and this might lead the domestic production to decrease or not to grow up as it was expected.

In Ethiopia many research has been done to capture the effect of exchange rate movement in output or single macroeconomic variable, however some of the studies has done via technique of VAR, for example the study conducted by Yilkal (2014), estimated using quarterly time series data over the period (1998) to (2010) instead of covering the whole time series data. Another research conducted by Elias (2011) tried to estimate only the relationship between exchange rate and level of export of hide and skin, however even though the result suggested that has negative impact on export of hide and skin it's difficult to formulate an exchange rate policy without knowing of its effect on all over economic performance.

Previous researches which were made before 2017 didn't include the 15% devaluation of Ethiopian birr from 23 to 27 Birr per USD. This study is now curious about the three years consecutive and continual devaluing of Birr to USD which is now around 32 Birr per USD. The last but not the least is, in the previous studies nobody has adopted the GMM technique rather they used VAR, DCGE and testing Marshall Lerner condition but this thesis come up with new model which is never tried before in Ethiopia in order to estimate the effect of exchange rate.

CHAPTER THREE

3.1 Methodology

3.1.1 Model specification

The main objective of this paper is to examine whether the Marshall Lerner (ML) condition holds in the Ethiopian economy. To this effect, price elasticity of imports and exports should be estimated separately with their own respective explanatory variable. In order to tell whether the Marshall Lerner Condition holds, we need to prove that the sum of price elasticity of imports and exports in absolute terms is greater than 1 ($|\eta x) + (\eta m)| > 1$). After assuring Marshal-Lerner is existed, the next objective is to study the relationship between real GDP (dependent variable) and the real effective exchange rate (the main independent or explanatory variable). This study consider the effect of fiscal and monetary policy variables of Ethiopia. These variables are useful to grasp the relationship between government policy and growth.

A lot of the literature has been done on the balance of trade based on the so-called "elasticity approach", namely on testing the extent to which trade flows are responsive to relative price changes, more specifically whether a devaluation improves the trade balance, which implies that the well-known Marshall-Lerner (ML) condition holds (Guglielmo and et al,2014).

The seminal empirical paper by Houthakker and Magee (1969) found inconclusive evidence. Several subsequent studies using least-squares methods to estimate price elasticities in import and export equations also produced mixed results.(See, e.g., Khan 1974, Goldstein and Khan 1985, Wilson and Takacs 1979, Warner and Kreinin 1983, Bahmani-Oskooee 1986, Krugman and Baldwin 1987).

Therefore, models in the equations (1) and (2) are used to check the validity of Marshal Lerner condition for the Ethiopian economy using the following equations.

Export value= f (real effective exchange rate, real world income)……. (1)

Import value=f (real effective exchange rate, real domestic income)…… (2)

$lnx = \beta 0 + \beta_1 lnreer + \beta_2 lnrwi + e1$ …… *(1)*

$lnm = \beta\ 0 + \beta_1 lnreer + \beta_2 lnrdi + e2$ ..... *(2)*

Equation 1 and 2 will be used to test Marshal-Lerner condition

The above model specification is adopted from Ilyas and Merve (2018), who used the export import demand functions as indicated by $x_t = \alpha_o+\alpha_1 y_t^*+\alpha_2 e_t+\varepsilon_t$ and $m_{t=} \beta_0+ \beta_1 y_t + \beta_2 e_t+\varepsilon_t$ respectively; where y_t and y_t^* show domestic and foreign real income, .respectively and e_t stands for real exchange rate . $\alpha_2$and β_2 coefficients represent export and import elasticities respectively. Siok and Wai (2014), also adapted the same model. A study conducted by Aman et al, (2014) also estimated import model with dependent variable of domestic income and the export model with dependent variable of real world income. Another research conducted by Javed et al, (2014) formulated an import demand function using REER and Pakistan's GDP as a dependent variable and an export function using REER and Pakistan's GDP. Generally several studies have been conducted using import and export function to estimate Marshall-Lerner condition. (See, e.g. Guglielmo and et al, (2014) and Aman and et al, (2004)).

Macroeconomic adjustment is essential when a country has an imbalance between aggregate demand and aggregate supply. The demand- supply imbalance can be resulted from deterioration in the terms of trade and inappropriate domestic policies that expand aggregate demand too rapidly;, these include a widening current account deficit, inflation, overvaluation of the domestic currency and loss of international competiveness (Khan, 1986).

The general objective of an adjustment program is to eliminate the imbalance between aggregate demand and resource availability. According to Khan (1982) and Knight (1985) in Khan (1986) the adjustments are grouped according to whether their primary impact on the level of absorption (demand management policies), on the level of potential output (structural policies) and exchange rate policies.

Demand management policies typically include monetary and fiscal measures to affect the aggregate level of demand to production. On the other hand, structural policies are intended to increase the supply of goods and services in the economy at any given level of domestic demand. Policies to improve international competitiveness and expand the supply of tradable goods through both reduced consumption and increased production principally involve a change in the real exchange rate.

Comprehensive and long-term macroeconomic adjustment would involve elements of all three of polices listed above.

> "*Programs aimed at adjustment with growth cannot rely exclusively on demand management policies, nor for that matter solely on structural policies. In fact, these policies are closely interrelated. The policy package must be designed to reduce the level of aggregate domestic demand and simultaneously to cause a shift in the composition of demand away from current consumption and toward fixed capital formation. Exchange rate policies will assist in the adjustment process by dampening demand and creating incentives for investment in the tradable sector"* (Khan, 1986).

Based on Khan and Knight (1981), Edward (1986) argued that the level of economic activities in developing countries will be affected by a number of variables, including the existing disequilibrium in the money market and the level of fiscal expenditure. An exchange rate term is also added into the regression analysis to explicitly investigate the effect of devaluations on real aggregate output.

For the purpose of the analysis, Ethiopia is treated as a small open developing economy. In estimating the impact of exchange rate on output of developing countries, most studies have included the fiscal and monetary policy variables (see, for example, Edward, (1986), Bahmani-Oskooee, (1988), Galebostwe and Andrias, (2011)) adopted the following model specification.

$\ln Yt = \beta 0 + \beta 1 \ln \text{REER} + \beta 2 \ln \text{M2}t + \beta 3 \ln \text{GOVEXP}t + \varepsilon t$

This study is to estimate the effect of REER (real effective exchange rate) on the response of total volume of output (Yt) in Ethiopia due to devaluation of Birr, broad money supply (M2), government expenditure (GOVEXP) and export (EXP).

However, one of the most challenging things for economists is to explain "how countries become rich". Adam Smith observed that some nations are richer even if not all the individuals in that society work whereas other nations are extremely poor, even if all the individuals work .There has been expanding literature in this field but theories and empirical analyses about economic growth consistently diverge (Tridico, 2006).

This study presents a simple growth model that attempts to capture some of the major macroeconomic factors affecting economic growth in Ethiopia. "*Macroeconomic theory has identified various factors that influence the growth of a country from the classical, neo classical and the new growth theories. These factors include natural resources, investment, human*

capital, innovation, technology, economic policies, foreign aid, trade openness, institutional framework, foreign direct investment, political factors, socio-cultural factors, geography, demography and many others" (Tewdros, 2015).

Fischer (1992) in Themba and Nicholas (2016) used human capital, investment and budget surplus to investigate the macroeconomic stability and economic growth in Sub-Saharan Countries and found that those variables were positively and significantly associated with economic growth. On the other hand he revealed that inflation were negatively affect the economic growth.

This study wants to address other determinant of growth as a control variable because as stated on above many schools of thought suggested different variables as determinant for economic growth, therefore the following model is formulated in order to avoid omitted variables. All variables are in value of money

Real GDP= f (real effective exchange rate, broad money supply, government expenditure, export, human capital, inflation rate)……. (1)

$$lny_t = \beta_0 + \beta_2 lnreer_t + \beta_3 lnm2_t + \beta_4 lngxp_t + \beta_5 lnx_t + \beta_6 lnhc_t + \beta_7 lninf_t + \varepsilon_t$$

3.2 Definition of Variables

Real effective exchange rate (REERI)= *lnreer* is the main regressor of the equation for both Marshall Lerner and output equation and it represents the natural logarithm of real effective exchange rate. It is expected to have a negative sign to export and positive sign for import equation, because according to the NBE's data when the REERI declines it reflects real appreciation of domestic currency against trading partners so whenever there is appreciation it will negatively affect the export amount. Citrus paribus, rise in REER (deprecation) encourage export amount of a given nation and vice versa. The effect of REER on output is also expected to have positive sign too. REER is calculated as nominal exchange rate multiplied by foreign price and divided the result by domestic price. For example a National bank of Ethiopia's' study which is conducted on behalf of (Dessalegn, 2010) stated the REER as the units of foreign currency per a unit of the domestic currency

$$R = E (P^*/P)$$

Where R is real exchange rate, E is nominal exchange rate, P is domestic price and P* is foreign price. Nominal exchange rate can be defined as the amount of local currency needed to buy a one note of a foreign currency. So when we say E is rising it means the amount of local money is rose in order to buy a one note of foreign money.

Real domestic income (RDI)=is domestic income. Other things remains constant, it is expected to have a positive sign. Because as domestic income level increases, individuals may shift from using domestically produced goods to foreign goods.

Real world income (RWI) = Represents world real income and it is calculated by taking the average real domestic income of major trading partners Its sign is expected to be positive because other things remain constant as the income of foreigners rise the demand for domestic goods will tend to rise, which will have a positive impact on domestic export. Based on NBE report from 2015 to 2019 Ethiopia's top trading partners among the continent are china and Saudi Arabia from Asia, Germany and Netherlands from Europe and USA.

Broad money supply (M2) = money supply refers to the total sum of money available to or held by the public in the economy at a point of time. Money supply isa is a flow representing the value of goods and services produced per unit of time, usually taken as a year. This monetary variable is expected to have a positive sign on Real GDP.

The term public include households, firms and institutions other than banks and the government. The reason behind considering money supply as held by the public is because to separate the producers of money from those who use money to fulfill their various types of demand for money.

Broad money is the most inclusive method of calculating money supply of a given country. The money supply is the totality of assets that households and businesses can use to make payments or to hold as short term investments, such as currency, funds in bank accounts and anything of value resembling money. The formula for calculating money supply different from the country to country. Whereas broad money is always the farthest reaching, narrow money includes fewer elements in the calculation.

Government Expenditure (GOVEXP) =Government purchases are expenditures on goods and services by federal, state, and local governments. The combined total of this spending, excluding transfer payments and interest on the debt, is a key factor in determining a nation's gross domestic product (GDP). The amount of government spending as stance of fiscal policy has expected to have a positive sign.

Export (Exp) =Exports are one component of international trade**.** Exports are the supply of goods and services produced in one country and purchased by countries from abroad. It can be good or service. It can be send at any means. It can be shipped, sent by email, or carried in personal luggage on a plane. **(EXP)** represent the annual export value of Ethiopia. In this study export of goods and services valued in US dollar.

CHAPTER FOUR

4.1 Regression Analysis of Marshall Lerner Condition

As discussed previously, the first objective of this research is to estimate and validate the Marshall-Lerner condition of Ethiopia. Once this study is assured that J-curve effect is applied in Ethiopia, we go further to estimate the effect of devaluation on overall economic of Ethiopia by making real GDP as a dependent variable. Before we go to the regression in time serious analysis, the stationerity of the variable is the first thing that need to be considered so as to overcome spurious regression. As a result all variables were tested whether they have unit roots or not. Using various unit root testing techniques such as Philip Peron, Dickey-fuller test and Augmented Dickey- fuller unit root test etc…Augmented Dickey-fuller test was applied to test stationerity of the variables.

Table.1Augmented Dickey-fuller unit root test for variables of the export equation

Variable	t-statistics	Critical value at 1%	Critical value at 5%	Critical value at 10%	p-value
lnx	1.187	-3.662	-2.964	-2.614	0.9959
lnreer	-1.703	-3.662	-2.964	-2.614	0.4298
lnrwi	0.402	-3.662	-2.964	-2.614	0.9816

As we can see from Table.1 of the Augmented Dickey-fuller test results of lnx (export value), lnreer (real effective exchange rate) and lnrwi (real world income), the absolute value of each of the t statistics is smaller than the absolute values of each of the critical value. Specifically in the case of lnx, the t statistic is equals 1.187, which is less than the critical t value at 5 percent level of significance or -2.964. Thus, it is impossible to reject the null hypothesis; which was claiming the variable to be non- stationary at level. Similarly, in the case of lnreer, the t statistics is less than the 5% critical value (-1.703 < -2.964). The absolute value of the t statistics of lnrwi is smaller than the absolute value of the critical values, (0.402 < -2.964), we can't reject the null hypothesis meaning that, the variables are non- stationery at level.

Since the variables (lnx, lnreer, and lnrwi) have unit root, it's impossible to estimate the model directly and we need to fix the problem by taking the first difference of the variables and check it again if it's stationary. The original data need to be changed in to its first difference and Dickey fuller test need to be checked once again.

Table.2Augmented Dickey-fuller test on the of first difference of export equation

variable	t-statistics	Critical value at 1%	Critical value at 5%	Critical value at 10%	p-value	Order of integration
dlnx	-5.337	-3.668	-2.966	-2.616	0.0000	I(1)
dlnreer	-5.211	-3.668	-2.966	-2.616	0.0000	I(1)
dlnrwi	-3.854	-3.668	-2.966	-2.616	0.0024	I(1)

The result from the above Augmented Dickey fuller test results of Table 2, the t statistics are greater than that of the critical values and the p value of the variables are significant (which are less than 1%) and this enables us to reject the null hypothesis (non-stationary). The DF test has applied for all dlnx, dlnreer, and dlnrwi and all the variables became stationary after their first differences are taken in to account.

Table.3Augmented Dickey fuller unit root test of import equation

Variable	t-statistics	Critical value at 1%	Critical value at 5%	Critical value at 10%	p-value
lnm	1.822	-3.662	-2.964	-2.614	0.9984
lnreeri	-1.703	-3.662	-2.964	-2.614	0.4298
lnrdi	2.403	-3.668	-2.966	-2.616	0.9990

On Table3, we have seen that there are smaller t statistic values as compared to the critical values and the p-value of the variables are not statistically significant; (which is greater than 5%). Thus, we can't reject the null hypothesis (non-stationary assumption). Meaning that, lnm (import

value), lnreeri (real effective exchange rate) and lnrdi (real domestic income) are not stationary at level. Therefore, the first differences of the values of the three variables need to be taken into consideration and DF test has to be done once again before estimating the model.

Table.4Augmented Dickey fuller unit root test on the first difference of import equation

Variable	t-statistics	Critical value at 1%	Critical value at 5%	Critical value at 10%	p-value	Order of integration
dlnm	-5.898	-3.668	-2.966	-2.616	0	I(1)
dlnreer	-5.211	-3.668	-2.966	-2.616	0	I(1)
$dlnrdi_{t-1}$	-3.704	-3.675	-2.969	-2.617	0.0041	I(1)

As we can see from Table 4, by taking the first difference of each of the variables such as import value and real domestic income and real effective exchange rate, the problem of unit root will be fixed and the data became stationary. As it is shown in the above table, the t statistics of the first difference of lnm, lnreer and lnrdi, is greater than the critical values and the p-values of each of the variables is less than 1%. Therefore, we reject the null hypothesis; meaning, the data is stationary after differencing. As a result, it is possible to estimate the model and run the regression. Since the first difference of the variables became stationary, it is possible to estimate the import model.

If all the dependent and independent variable are stationary at first difference, performing a cointegration test is necessary to establish a long run relationship. The hypothesis stated that HO: no cointegration equation and H1: HO is not true.

Table 5: Co-integration Test Results of export equation Using Johansen's Maximum Likelihood

Trend: Constant		Number of obs=37 Lags=2			
Maximum rank	Parms	LL	Eigenvalue	Trace statistics	5% critical value
0	12	59.23176	__	25.2862*	29.68
1	17	68.304192	0.38762	7.1413	15.41
2	20	71.874546	0.17551	0.0006	3.76
3	21	71.874844	0.00002		
Maximum rank	Parms	LL	Eigenvalue	Trace Statistics	5% critical value
0	12	59.23176	_	18.1449	20.97
1	17	68.304192	0.38762	7.1407	14.07
2	20	71.874546	0.17551	0.0006	3.76
3	21	71.874844	0.00002		

The table above shows us the Johansen tests for co integration between the three variables. The null hypothesis of there is no co integration is tested against the alternative that there is cointegration. The guideline for the above test is when the trace statistic value is greater than the 5% critical value, we reject the null hypothesis and as we can see, 7.1413 is less than 15.41 and we cannot reject the 0 null hypotheses. Therefore, test results show that there is no long run cointegration between export, real effective exchange rate and the real world income.

Table 6: Co-integration Test Results of import equation Using Johansen's Maximum Likelihood

Trend: Constant		Number of obs=37 Lags=2			
Maximum rank	Parms	LL	Eigenvalue	Trace statistics	5% critical value
0	12	73.014844	__	16.8099*	29.68
1	17	78.404282	0.25272	6.0311	15.41
2	20	80.963724	0.12920	0.9122	3.76
3	21	81.419815	0.02435		
Maximum rank	Parms	LL	Eigenvalue	Trace Statistics	5% critical value
0	12	73.014844	_	10.7789	20.97
1	17	78.404282	0.25272	5.1189	14.07
2	20	80.963724	0.12920	0.9122	3.76
3	21	81.419815	0.02435		

As the result of table 6 the test statistics show, we can't reject the hypothesis of no cointegration among the variables cannot be rejected. The trace statistic value is greater than the 5% as we can see 20.5768 is less than 29.68 and there is no cointegration.

Table 7 unit root test of export equation of residual

Variable	t-stat	Critical value at 1%	Critical value at 5%	Critical value at 10%	p-value
Ex	-2.221	-3.662	-2.964	-2.614	0.1987

Table 8 unit root test of import equation of residual

Variable	t-stat	Critical value at 1%	Critical value at 5%	Critical value at 10%	p-value
Em	-2.350	-3.668	-2.966	-2.616	0.0000

Both ex and em are residuals derived from regression of export and import equation at first level and the unit root test results show that they are not cointegrated in the long run so we will proceed to var analysis to show their short run relationship. Before estimating the var model we need to determine the optimal lag length for both export and import equation via lag selection criteria.

Table 9: Lag selection order criteria of export equation

Lag	LL	LR	df	P	FPE	AIC	HQIC	SBIC
0	-82.7972				0.027028	4.94872	4.94872	5.03601
1	60.004	285.6*	9	0.000	0.000013	-2.74311*	-2.55903*	-2.20985*
2	66.2889	12.569	9	0.183	0.000015	-2.26579	-2.26579	-1.65473
3	72.0268	11.476	9	0.245	0.000019	-1.94132	-1.94132	-1.06837
4	76.8189	9.5843	9	0.385	0.000026	-1.56281	-1.56281	-0.427979

From table 9 we can clearly see that the optimal lag order to use given the indicated information criteria. In this case I will be using the AIC information criteria because the lower the value the better the model. Therefore I will use -2.74311 of AIC outcome.

Table 10 var estimation of export equation

	Coef	Std.Err	z	P > |z|
lnx				
L1.	0.699618	0.1745207	4.01	0.000
L2.	0.0616795	0.2062252	0.30	0.765
lnreer				
L1.	0.1824432	0.3790799	0.48	0.630
L2.	0.1943915	0.3678707	0.53	0.597
lnrwi				
L1.	0.7837952	0.5036259	1.56	0.120
L2.	-0.3226388	0.6540362	-0.49	0.622
_cons	-7.5692	3.625242	-2.09	0.037

Table 11: Lag selection order criteria of import equation

Lag	LL	LR	df	P	FPE	AIC	HQIC	SBIC
0	-65.5374				0.01008	3.91642	3.96244	3.92309
1	68.7415	268.56	9	0.000	7.9e-06	-3.24258	-3.0585*	-2.70932*
2	78.8358	20.181*	9	0.017	7.5e-06*	-3.3049*	-3.06786	-2.37169
3	84.4209	11.17	9	0.264	9.4e-06	-3.10977	-2.66054	-1.77661
4	90.8113	12.781	9	0.173	0.000012	-2.96065	-2.38493	-1.22755

AIC of -3.3049is chosen from the table result of lag selection order, as shown on the above the AIC result is the lowest number from the rest of results and the p value is significant at 1% of lag order 2.

Table 12 var estimation of import equation

	Coef	Std.Err	z	P > |z|
lnm				
L1.	0.7164222	0.1830382	3.91	0.000
L2.	0.0342212	0.175758	0.19	0.846
lnreer				
L1.	-0.0960902	0.1719128	-0.56	0.576
L2.	-0.1129643	0.1822756	-0.62	0.535
lnrdi				
L1.	0.6594546	0.2423673	2.72	0.007
L2.	-0.3427059	0.2594752	-1.32	0.187
_cons	-0.102482	0.5254485	0.11	0.845

The var estimation of both export and import equation result came up with statistically insignificant and it is impossible to interpret each dependent variable short run effect on dependent variable of both import and export equation. However real domestic income of has positive impact on import on average ceterius paribus.

Diagnostic test of export var estimation

Diagnostic Test

Table 13: Autocorrelation Test of var estimation of export

Lag	Chi2	df	Prob > chi2
1	5.3365	9	0.80404

HO: no autocorrelation at lag order

Based on our p-value result we can reject the null hypothesis (no serial correlation). So the var estimation of export equation is free from correlation problem.

Table 14: Jarque-Bera test of var estimation of export equation

Equation	Chi2	Df	Prob > Chi2
lnx	3.504	2	0.17340
lnreer	1.154	2	0.56151
lnrwi	1.058	2	0.58905
ALL	5.717	6	0.45562

Both the dependent and independent variables are not normally distributed and the overall normality test result also shown us there is no normality distribution.

Table 15 Eigen value stability condition of export equation

Eigen value	Modulus
1.002045	1.00204
0.9579064	0.957906
0.3438314+ 0.36492661	0.50139
0.3438314 + 0.34592661	0.50139
-0.2657978	0.265798
-0.191698	0.265798

At least one eigenvalue is at least 1.0 VAR does not satisfy stability condition

Diagnostic test of import var estimation

Table 16: Autocorrelation Test of var estimation of import

Lag	Chi2	Df	Prob > chi2
1	7.1450	9	0.62203
	6.4165	9	0.69762

HO: no autocorrelation at lag order

Based on our p-value result we can reject the null hypothesis (no serial correlation). So the var estimation of import equation is free from correlation problem at lag order 2.

Table 17: Jarque-Bera test of var estimation of import equation

Equation	Chi2	Df	Prob > Chi2
lnm	0.227	2	0.89253
lnreer	0.429	2	0.80682
lnrdi	0.174	2	0.91682
ALL	0.830	6	0.99123

Both the dependent and independent variables are not normally distributed and the overall normality test result also shown us there is no normality distribution.

Table 18 Eigenvalue stability condition of import equation

Eigenvalue	Modulus
1.018928	1.01893
0 .7577591	0.774832
0.7577591- 0.16176041	0.774832
0.4455711	0.445571
-0.2657978 0.18966721	0.189815
-0.191698 0 .18966721	0.189815

At least one eigenvalue is at least 1.0 VAR does not satisfy stability condition

Estimation of export equation

Table 19 dependent variable dlnx (first difference of log of the export)

Variable	Cofficent	Std.error	t-statstics	p-value
Dlnreer	-0.8888448	0.3105702	-2.86	0.007
Dlnrwi	0.4952823	0.3916843	1.26	0.214
Cons	0.0872649	0.0591146	1.48	0.149
R-squared=0.32 Adjusted R-squared=0.2811 Prob>F=0.0012 Number of obs=38 Durbin Watson= 1.86934				

Source: Own computation based on National Bank of Ethiopia (NBE) and World Bank (WB)

Latest studies which were conducted by IMF, World Bank and other conclude that Ethiopian economy is suffering from an overvalued exchange rate and they recommend that devaluing real exchange rate would provide a more conducive environment to manufacturing led structural transformation, sustained growth acceleration, and improve the balance of payment deficit.

World Bank and other international institution are always insisting to adopt the neo- liberal economic strategy and their one of policy strategy is encouraging developing countries like Ethiopia and Africa to devalue their currency in order to reduce the trade balance deficit. But empirically African countries are suffering rather than gaining an economic advantage.

For example a study conducted by Akpan and Atan, (2011) tried to investigate the effect of exchange rate movement (deprecation) on real output of Nigerian economy and the GMM estimation result suggested that there is no strong relationship between them and they recommend that, rather deprecating of the local currency, monetary variables has strong positive impact on flourishing the output of Nigerian economy.(Mashilana and Hlalefang, 2018), estimated the impact of exchange rate on export performance of South Africa and the (ARDL) Autoregressive Distributed Lag approach result indicated that exchange rate affect the export sector of the country negatively. Abdel-Haleim, (2008) analyzed the relationship between exchange rate changes and the output of Egyptian economy, adopting Vector Auto regression model the result tell that devaluations have a contractionary effect on output.

Unlike Africa including Ethiopia, devaluation has positive and an expansionary policy in Asia countries see for e.g. Asif and et al, (2011) founded that devaluation has a significant expansionary effect on the output growth of Pakistan economy both in long run and short run. Petrović and Gligorić, (2011) showed that deprecation has a positive effect on trade balance of Serbia. Thorbecke, (2006) examined the relationship between the change in exchange rate on export volume of Asia, The results indicated that the change in exchange rate (appreciation) can cause significant declines in exports of intermediate and capital goods from developed Asia to developing Asia.

The Asian countries are successful in devaluing their currency to be more competitive this because they have higher skilled worker, produce sophisticated technology intensive intermediate goods and capital goods and unlike Africa they are not highly import dependent of intermediate and capital goods.

When we come to Ethiopia, the estimation result from table 19 is the same as other African countries and a rise in real effective exchange rate affect (deprecation) the export negatively. The reason why Ethiopia and Africa are suffering from deprecation are Africans are price taker on international market, their export competiveness are mostly dependent on non price factors like quality, reliability and branding while a deprecation of an exchange rate will not have significant effect to increase the competiveness of African export, (Simwaka, 2014). Therefore before decreasing the value of local currency, government should work on increasing the efficiency of production using fiscal and monetary variables. For instance central bank must have to decrease the tax rate of manufacturing sector and need to offer them credit at low interest rate.
When we come to Ethiopia, most of Ethiopian exportable commodities like coffee (29.5%), oil seeds (14.9%), pulses (9.5%), Chat (9.3%), cut flowers (8%), and gold (3.5%) are partially dependent on imported goods such as fertilizer, tractor, petroleum and also this export sector also dependent on infrastructural development, so if we need to expand our volume of the export, exporters should buy a factor inputs in cheap price and they can easily increase the number of their production. so a 1% increase in REER will have contractionary effect on export by 88% at 1% of significant level. The other weakness of Ethiopian export sector are they don't add values on their export goods for instance coffee has a largest share in the export but most of the coffees are exported in raw rather than roasting and packing it.

The estimation result of real world income is insignificant. As I have mentioned on the above NBEs' report of Ethiopians major exports are coffee (29.5%), oil seeds (14.9%), pulses (9.5%), Chat (9.3%), cut flowers (8%), and gold (3.5%), this implies that most of Ethiopian exportable commodities are agricultural products and their time to provide those commodities are seasonal, because of traditional agriculture system the supply of Ethiopian exportable commodities will not react immediately in order to fulfill the rise of demand from abroad and the above estimation result indicated that an increase income of the trading partner won't affect the volume of

Ethiopian export. The cause for being stuck in traditional agricultural system is due to continual devaluing of currency tends to lower the purchasing power of local exporters and couldn't modernize their agrarian system.

Estimation of import equation

Table 20 dependent variable dlnm (first difference of log of the import)

Variable	Cofficent	Std.error	t-statstics	P-value
Dlnreer	-0.4643143	0.1411717	-2.52	0.002
$dlnrdi_{t-1}$	0.7163465	0.2102399	1.72	0.002
Cons	0.069963	0.0347791	0.052	0.011
R-squared= 0.3642 Adjusted R-squared=0.3268 Prob>f=0.0005 Number of obs=37 Durbin Watson= 2.43				

Source: own computation based on NBE (National Bank of Ethiopia) and WB (World Bank)

Like the theoretical assumption the estimation result of real effective exchange rate affect the import negatively that means a devaluing of the local currency decrease the import by 46% with less than 5% level of significance.

The negative sign REER on import is not surprising at all, because our export equation showed us that deprecating birr value will tend to decrease the income of foreign currency and it will affect traders to buy goods from abroad. This kind of scenario will create black market since Ethiopia is a highly dependent on import good and has an inelastic demand, buyers will be forced to get dollars from illegal group whose provide foreign currency at higher price, following this import commodities will be much more expensive and create inflation.

The real domestic income also has a positive sign at 1% significant level. A rise of real domestic income by 1% will led to an increase of import by 71%. The researcher regress the real domestic income with one year lagged variable, its make sense because whenever an Ethiopian income

rise it will take a time to buy or import a certain commodities because of factors like a poor government bureaucracy, according to the latest World Bank annual ratings Ethiopia is ranked 159 among 190 countries and this will affect local buyer to import their commodities immediately right after an increase of income. Banks restriction on providing a hard currency also another factor, due to insufficient amount of foreign currency banks will not exchange their whole hard currency with importers and traders should wait their turn to get the currency.

Based on the above two tables of estimation result, this study tried to test the validity of Marshal-Lerner condition of Ethiopia. Even though the slope of two equation results is differenced equation, other studies like Siok and Wai, (2014) used the first difference export and import equation to test the Marshal Lerner condition. The other study also conducted by Iqbal and et al, (2015) also used the first difference model and estimated it via OLS to test validity of Marshal Lerner condition. Results from the estimation show that devaluation has an expansionary on nations export and real effective exchange rate has strength to explain the export and it's statistically significant.

As presented in the previous sections of estimated result, the study found that the sum of the change in the value of Ethiopian import with respect to exchange rate (import elasticity) and the change in the value of Ethiopian export with respect to real exchange rate (export elasticity) is greater than one $|\boldsymbol{\varepsilon X} + \boldsymbol{\varepsilon M} > 1|$, (0.88+0.46=1.34) it is possible to conclude that the Marshal Lerner condition holds.

Post Regression Test for export equation

Table 21 Durbin's alternative test for autocorrelation of export equation

Lag(p)	Chi2	Df	Prob>chi2
1	.126	1	0.7231

HO: no serial correlation

From the above table 21 we notice that the OLS estimation of export equation is free from serial correlation problem we can't reject the null hypothesis because p-value is greater than 5% meaning that no serial correlation problem.

Table 22 Multicollinertiy test of export equation

Variable	Vif	1/vif
dlnreer	1.26	0.793958
dlnrwi	1.26	0.793958
Mean vif	1.26	

The result of multicollinerity test shows the above the mean vif is less than 10 so we can say that there is no serious multicollinertiy problem therefore it is easy to know the separate effect of each explanatory variables.

Table 23 Breusch-pagan/cook-weisberg test for hetroskedasticity of export equation

Chi2(1)=0.22	Prob>chi2=0.6419

HO: constant variance

If the p value greater than 5% we can't reject the null hypothesis (no hetroskedasticity problem) that the error term in the regressing equation have a common variance

Post Regression Test for import equation

Table 24 Durbin's alternative test for autocorrelation of import equation

Lag(p)	Chi2	Df	Prob>chi2
1	1.896	1	0.1686

HO: no serial correlation

The result of table 16 by using the test of Durbin Watson alternative test it assured that there is no serial correlation in the import equation since p-value is greater than 5%.

Table 25 Multicollinertiy test of import equation

Variable	Vif	1/vif
dlnreer	1.02	0.976969
dlnrdi	1.02	0.976969
Mean vif	1.02	

The mean vif result shows us it is less than 10 meaning that the model is free from collinerity problem.

Table 26 Breusch-pagan/cook-weisberg test for hetroskedasticity of import equation

Chi2(1)=0.01	Prob>chi2=0.6450

HO: constant variance

From the above result there is no hetroskedasticity problem because the p value is greater than 5% we can't reject the null hypothesis (no hetroskedasticity problem)

4.2 Regression Analysis of Real Output

Based on the Marshall-Lerner result in Ethiopia, this study has found that REER can affect the export volume in the long run and will make the trade balance positive. Following the MC result the other main objective of this research is to examine the effect of REER on overall output performance of Ethiopia.

Table.27 Augmented Dickey-fuller test on the of GDP equation

Variable	t-statistics	Critical value at 1%	Critical value at 5%	Critical value at 10%	p-value
lny	-0.972	-3.662	-2.964	-2.614	0.7632
lnreer	-1.629	-3.662	-2.964	-2.614	0.4682
lnm2	-0.833	-3.662	-2.964	-2.614	0.9690
lnhc	-1.448	-3.662	-2.964	-2.614	0.5589
lngxp	0.125	-3.662	-2.964	-2.614	0.9690
lninf	-5.953	-3.662	-2.964	-2.614	0.0000
lnx	-0.577	-3.662	-2.964	-2.614	0.8760

The reason of conducting unit root taste is to avoid the problem of spurious regression-case and another implication of stationary means have constant mean and variance over timeThe ADF result of GDP equation show that time series in level are not stationary except inflation is stationary at level zero. Based on the above table result we will proceed to test ADF test at first difference level.

Table.28 Augmented Dickey-fuller test on the of First difference of GDP equation

Variable	t-statistics	Critical value at 1%	Critical value at 5%	Critical value at 10%	p-value	Order of integration
dlny	-3.986	-3.668	-2.966	-2.616	0.0015	I(1)
dlnreeri	-5.015	-3.668	-2.966	-2.616	0.0000	I(1)
dlnm2	-4.078	-3.668	-2.966	-2.616	0.0000	I(1)
dlnhc	-4.141	-3.668	-2.966	-2.616	0.0008	I(1)
dlngxp	-5.580	-3.668	-2.966	-2.616	0.0000	I(1)
dlnx	-7.938	-3.668	-2.966	-2.616	0.0000	I(1)

After taking first difference, the ADF test result showed that the presence of unit root. This implies that differencing variables at I(1) could make the variables stationary. The t-statistics result of all variables is greater than the critical value at 1%. Following the result of all variables are stationary at first difference, performing a cointegration test is necessary to establish a long run relationship. The hypothesis stated that HO: no cointegration equation and H1: HO is not true.

Table 29: Co-integration Test Results of GDP equation Using Johansen's Maximum Likelihood

Trend: Constant			Number of obs=37 Lags=2		
Maximum rank	parms	LL	Eigenvalue	Trace statistics	5% critical value
0	56	65.424585	__	153.1308	124.24
1	69	89.092515	0.72178	105.7950	94.15
2	80	109.58303	0.66965	64.8139*	68.52
3	89	122.33889	0.49818	39.3022	47.21
4	96	132.32543	0.41714	19.3291	29.68
5	101	139.80523	0.33257	4.3695	15.41
6	104	141.79214	0.10183	0.3957	3.76
7	105	141.99	0.01064		

Maximum rank	Parms	LL	Eigenvalue	Trace Statistics	5% critical value
0	56	65.424585	_	47.3359	45.28
1	69	89.092515	0.72178	40.9810	39.37
2	80	109.58303	0.66965	25.5117	33.46
3	89	122.33889	0.49818	19.9731	27.07
4	96	132.32543	0.41714	14.9596	20.97
5	101	139.80523	0.33257	3.9738	14.07
6	104	141.79214	0.10183	0.3957	3.76
7	105	141.99	0.01064		

The result of the test statistics show that the hypothesis of no cointegration among the variables can't be rejected, the trace statistics 105.7950 is greater than 94.15 at 5% critical level and the maximum rank of the cointegration is 1.

Table 30: Johansen normalization restriction imposed

Beta	Coef.	Std.Err	Z	P > /z/	[95% Conf.Interval]
_cel					
lny	1	_			
lnreer	64.40111	11.9739	5.38	0.000	40.93269 87.86953
lnm2	1.494302	11.17169	0.13	0.894	-20.40182 23.39042
lngxp	39.96133	18.18699	2.20	0.028	4.315483 75.60718
lninf	-2.790295	0.930857	-3.00	0.003	-4.614013 -0.9665763
lnhc	-67.39376	9.963487	-6.76	0.000	-86.92183 -47.86568
lnx	-20.3298	5.741514	-3.54	0.000	-31.58296 -9.076638
_cons	-85.22532				

Table 22 shows the vecm result (long run equation), in order to apply vecm the variables should be stationary at first difference level. *"The table contains the estimated parameters of the cointegration vector for this model, along with their standard errors, zstatistics, and confidence interval"*(Stata Manual,2013). In the long run equation case the sign of the variables are reversed. In the long run lnreer (log of real effective exchange rate) has a negative impact on GDP that's means since we know a rise in reer means a devaluation, we can say that a devaluing currency has a negative impact on GDP at 1% of significance level. Government expenditure has

unexpected sign and its affect the GDP negatively in the long run and also its statistical significant at 5%.

An inflation and human capital also hast positive long run effect on GDP with 1% significant. The broad money supply result is not statistically significant in the long run and it has unexpected long run negative sign. Generally lnreer, lngxp, lninf, lnhc, lnx have asymmetric effect of on lny in the long run in average, ceteris paribus. On the other hand lnm2 has no long run effect on lny in average, ceteris paribus.

Diagnostic Test

Table 31: Autocorrelation Test

Lag	Chi2	Df	Prob > chi2
1	49.8958	49	0.43752
2	73.436	49	0.01347

HO: no autocorrelation at lag order

The autocorrelation result indicated that there is no autocorrelation at lag order 1 and autocorrelation would be existed alt lag order 2.

Table 32: Jarque-Bera test

Equation	Chi2	Df	Prob > Chi2
d_lny	44.740	2	0.00000
d_lnreer	0.747	2	0.68822
d_lnm2	0.766	2	0.68178
d_lngxp	0.786	2	0.67496
d_lnif	205.941	2	0.00000
d_lnhc	17.462	2	0.00016
d_lnxu	0.086	2	0.95815
ALL	270.528	14	0.00000

Variable GDP, Inflation and human capital are normally distributed and real effective exchange rate, broad money supply, government expenditure and export are not normally distributed. The overall result indicated that are not normally distributed.

Table 33 Eigenvalue stability condition

Eigenvalue	Modulus
1	1
1	1
1	1
1	1
1	1
1	1
0 .6492059	0.649206
0.3811591 + 0.31892081	0.496984
0.3811591 - 0.31892081	0.496984
-0.2683931 + 0.23004321	0.353489
-0.2683931– 0.23004321	0.353489
-0.3314986 + +0.090771131	0.343702
-0.3314986 - 0.090771131	0.343702
-0.2046002	0.2046

The VECM specification imposes 6 unit moduli.

4.3. Conclusion and Recommendation

The study has tried to examine the Marshall-Lerner condition of Ethiopia to answer the vital question of the exact effect of devaluation on Ethiopia economy. This study showed how real effective exchange rate movement affect the supply side (export) and the demand side (import), later it tried to indicate the overall effect of real effective exchange rate on Ethiopian economy.

As I have mentioned on my statement of problem, rather than jumping on the estimating the of REER effect on GDP and concluding, this study came up with new idea to explain how REER affect variables which are also going to affect the GDP of Ethiopia. REER may affect the economy positively or negatively but how? This study developed numerical evidences than giving theoretical assumption to create strong evidence the way how GDP affected by REER numerically as well as theoretically.

Even though Marshall- Lerner condition holds in Ethiopia, a continual deprecation of Ethiopian currency will affect the supply side of the economy. A result from table 19 shows that devaluation has a negative impact on export volume and it implies that volume of Ethiopian export commodities are dependent on factor inputs which are imported from abroad and also table 20 result indicate that devaluation will also decrease an import volume of Ethiopia. Based on these results we can clearly see that export and import are interdependent each other so the government must increase its production efficiency via encouraging local entrepreneur and inventor to produce machineries which can substitute our import goods so exporters will buy those inputs from local with local currency as well and will led to increase their production volume and as the same time a government can devalue the currency to be more competitive. In short version the Ethiopian government should adopt import substitution technique like Asian Tiger. Once the governments achieve to not be dependent on imported goods, it can devalue the local currency to attract buyers from abroad and also it won't be affected by the rise of price of imported goods, in addition they can increase the volume of export commodities at any time.

From table 30 result shows that the long run effect of REER on GDP of Ethiopia is negative and it's not surprising at all, because we have already seen that how deprecation of REER affect the output side of the export and it also affect the overall of output of Ethiopian economy. This justifies that lowering the local currency value will not help the output to flourish unless there is

institutional changes is taken by government like building up production efficiency of local producers by creating ways for them to buy their input goods from local market.

Government expenditure, inflation, human capital and export has a long run positive effect on GDP of Ethiopia and also it's expected. Government expenditure for investments have expansionary effect on GDP, inflation also create an opportunity for local sellers and producers to expand their product volume and affect all over output of Ethiopian economy positively. A rise in Human Capital also has an expansionary effect on the economy and Ethiopians' largest population share is youth and educating youth will create the way to have a skilled man power so they can produce import substitution goods and will create a good opportunity to flourish the economy of Ethiopia.

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