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Department of Economics

The Effect of Exchange Rate Movement on Trade Balance In Ethiopia

Author

Solomon Addis

Supervisor

Fantu Guta (PhD)

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THE EFFECT OF EXCHANGE RATE MOVEMENT ON TRADE BALANCE IN ETHIOPIA

Thesis Submitted to the School of Graduate Studies of Addis Ababa University, in Partial Fulfilment of the Requirements for the Degree of Masters of Science in Economics (Economic Policy Analysis)

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This is to certify that the thesis prepared by Solomon Addis, entitled with: The Effect of Exchange rate Movement on Trade Balance in Ethiopia and submitted in partial fulfilment of the requirements for the Degree of Master of Science in Economics (Economic Policy Analysis) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Declaration

I hereby declare that this Msc. thesis entitled "The Effect of Exchange rate Movement on Ethiopia's Trade Balance" was carried out by me for the masters of Science in economics under the guidance and supervision of Dr. Fantu Guta, Addis Ababa University, college of Business and Economics, Department of Economics. The interpretations put forth are based on my reading and understanding of the original texts and they are not published anywhere in the form of books, articles and reports. The other books, articles and websites, which I have been made use of are acknowledged at the respective place in the text. For the present thesis, which I am submitting to the University, no degree or diploma or distinction has been conferred on me before, either in this or in any other University.

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ABSTRACT

This study uses annual data for the period 1974/75-2018/19 to investigate the effect of exchange rate on Ethiopia's trade balance using both descriptive and time series econometrics techniques. Based on the assertions made by the traditional theory it is expected that devaluation of domestic currency (i.e. appreciation of exchange rate) generally decreases the relative price of domestically produced goods and thereby stimulates demand for domestic export hence, the devaluation of currency can be expected to have a positive effect on trade balance of Ethiopia. So, this study uses empirical model and econometric method to examine the effect of change in exchange rate on trade balance of Ethiopia. It has to be noted that devaluation affects other items of the balance of payment; the study focuses only on the effects of exchange rate (devaluation) movement on the trade balance of the country and hence further researches has to be conducted.

The empirical result finds it devaluation exerts negative effect against trade balance of Ethiopia. The finding prevails that this negative effect is because of that Marshall-Lerner condition is not applicable in Ethiopia. Following the finding of the study policy recommendations have been given. First, the structure of Ethiopian exports has to be changed. Second, the government should design a policy which enables to attract foreign direct investment. Third policy makers have to rely on supply side policies. Fourth diversification of exportable to take comparative advantage, improve the quality of the existing export commodities and providing training for exporters.

Fifth Proper awareness creation has to be made on the consumers on the local product usage which costs high bills. Finally it is advisable to have research and development center domestically.

Keywords & Phrases: Real Effective Exchange rate, Trade Balance, economic growth, VAR model, VECM.

Table of contents

List of Table

List of Figures

List of Acronyms

ADF	Augmented Dickey Fuller Test
AIC	Akaike Information Criteria
BOP	Balance of Payment
CPI	Consumer Price Index
DRC	Domestic Resource Cost
ECM	Error Correction Model
EEA	Ethiopian Economic Association
GDP	Gross Domestic Product
IMF	International Monetary Fund
INF	Inflation
LDCs	Least Developed Countries
M2	Broad Money supply
MEDAC	Ministry of Economic Development and Co-operation
MOFED	Ministry of Finance and Economic Development
NBE	National Bank of Ethiopia
REER	Real Effective Exchange Rate
RGDP	Real Gross Domestic Product
SAP	Structural Adjustment Program
TB	Trade Balance
TOT	Terms of Trade
TGE	Transitional Government of Ethiopia
UK	United Kingdom
VAR	Vector Autoregressive
VECM	Vector Error Correction Model

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

After the fall of Britton Woods's agreement in, 1973, the applicability of floating exchange rate has embarked and the interest of analysing the effect of exchange rate on trade balance has been renewed in both less developed and developed countries.

The hybrid results of the relation between changes in exchange rate and trade balance gives the impetus on one another. Ethiopia as one of the less developed countries (LDCs), it has encountered different challenges in achieving its development plane because of difference(s) in paradigm(s) from one development plan to the other. Amongst them first industrializing the sectors of the country's economy to substitute the imported goods and services then to enhance the export undergone Structural Adjustment Programme (SAP). Structural Adjustment Programme (SAP) is a term used by IMF to provide loan to less developed nations with certain conditionality.

It has long been an issue for economists and policy makers on the effectiveness of exchange rate depreciation in improving country's trade balance. The combined support in empiricism of the linkage between exchange rate changes and trade balance furnishes an opportunity in further evaluating and investigating the relationship. Least developed countries failing to endure development plan have roll from one development paradigm to another; from industrialization to import substitution, from export promotion to Structural Adjustment Programme Rawlins and Praven (1993). Structural Adjustment Programme (SAP) is an IMF term used for loan accoutre purpose for those countries that comply the desired conditions. In executing one of the imperative elements of the Structural Adjustment Programme (SAP) developing countries facing balance of payment trouble due to expansionary fiscal policies ,a deterioration on terms of trade ,price warping high debt servicing or association of these factors have often hangout to devaluing their currencies(Nashashibi,1983).

Thus this research will address the problem(s) related with the effect of exchange rate movement on the country's trade balance through analysing different data source which covers 44 years of countries reality.

1.2 Statement of the problem

As one of LDCs, Ethiopia come across a lot of challenges some of which are the prior listed once and others become root causes causing the country's week economic performance in 1970s and 1980s. Despite, having many causes for the week performance of the economy policies linked to the macro-economy are the major ones. Hence, to keep the internal and external balance of the country's economy it is found critical to have inclusive, compatible, time based and sequential policy changes that go in line with the reality of the nation in turn to have well established growth and development of the country. To do so the country have gripped several structural and policy changes both at macro and micro levels of the economy in the form of fulfilling structural adjustment programme(SAP) since,1992. Among the reform programmes made; on October 1, 1992 Ethiopian government devalued the country's currency from 2.07 per us dollar to 5:00 per us dollar which is about 141% of depreciation.

Before October, 1992 the nominal exchange rate of birr against the US Dollar was fixed about three decades, except the revaluation of 1971, 1972, and 1973 with average nominal revaluation of 17%. Such a weak exchange rate policy, along with expansive monetary and fiscal policies, lead to ceaseless overvaluation Alem (1996). Despite the fact that the rate was fixed against the dollar for this period, it was floating against all other major currencies, following the fluctuation of US dollar against these currencies Befekadu and Berhanu (1999/00). Ethiopian birr have been depreciating from year to year after the massive devaluation in 1992 and the average exchange rate reached 18.6518 Birr per US Dollar in 2012/13 which is about 274% as compared to the prior ones.

Devaluation in developing countries often used to reduce external imbalances, promotes global competitiveness and also helps to promotes export growth Reinhart (1995). Devaluation can only perform the above major tasks if only transformed to real devaluation and if trade flows react to relative prices in expected and significance manner. Hence nominal devaluation is not dream and goal by itself. In most common cases and in theory the nominal devaluations affect the economy in three different ways. First, devaluation commonly have an expenditure

reducing effects. To the extent that as a result of devaluation the domestic price level raise up, there have a negative wealth effect that diminishes the real value of domestic currency pacify nominal assets, including domestic money. A lower real value of assets degrades expenditure on all goods. Second, it tend to have an expenditure switching effect. This causes shifts in the pattern of domestic demand from tradable towards non-tradable, and the pattern of domestic production from non-tradable to tradable. The collective effect of expenditure reducing and expenditure switching, of course, enhance the external situation of the country. Third, devaluation boosts the domestic price of imported intermediate inputs and imported capital goods. This supply includes both non-tradable and tradable. Although economic theory conflicts that devaluation of a country's currency likely boosts the trade balance, there are inconsistent theories about the effect of devaluation on trade balance. Empirical findings of Rose (1990) and Dhakal (1997) both suggested mixed results. Because of this inconsistency I am interested to further study on the effect of devaluation in Ethiopia.

1.1. Objective of the study

1.1.1. The general objectives of this research is:

To investigate the effect of exchange rate movement on trade balance of the country's economy, i.e., to check out weather depreciation of birr against foreign currencies enhances trade balance or not.

1.1.2. The specific objectives of this research are:

a. To see exchange rate developments and regimes in Ethiopia.

b. To investigate trends of export and import situation in Ethiopia.

c. To empirically analyse the short run and long run effect of exchange rate changes of the domestic currency on trade balance of Ethiopia.

1.2. Significance of the study

To the extent of researcher's accord, there would have been studies that have conducted on the effect of changes in exchange rate movement on trade balance of Ethiopia. However, this paper is assumed to provide two major contributions; one to the existing literature and contributing to how the country's trade balance is affected by exchange rate changes that would have plenty of implications endeavour to enhance country's competitiveness and boost export and then formulate favourable policy that helps pertinacious trade crunch.

1.3. Data and Methodology of the Study

The study uses secondary data for the period 1974/75-2018/19. The rationale to use this period is that the study employs "before-after" approach to look at the effect of devaluation on trade balance taking into account the era before devaluation and after devaluation. The reason to use this approach is to show results of policy action outcomes conducted before devaluation and after devaluation of Ethiopian birr against foreign hard currencies.

The data is obtained from both unpublished and published materials. The main sources of the published data is National Bank of Ethiopia annual and quarterly report, Ministry of Finance and Economic Cooperation (MoFEC), Ethiopian Macro Economic Data, Ministry of Economic Development andCooperation (MEDAC) and Ethiopian Economic Association (EEA).While the unpublished data sources will also be undergraduate students senior essay and MA (MSc) thesis.

The methodology of the study involves both descriptive analysis and Vector Autoregressive model (VAR) in the econometric part of the study, which is believed to be appropriate, flexible and simple to evaluate the relationship and the impact of exchange rate movement in the trade balance of the country using tables, mathematical calculations and graphical descriptions. The rationale to use the VAR model is it has proven to be especially useful for describing the dynamic behaviour of economic and financial time series and forecasting.

VAR model is typically used for data description and forecasting, it can also be used for structural inference and policy analysis. In structural analysis, certain assumptions about the causal structure of the data under investigation are imposed, and the resulting causal impacts of unexpected shocks or innovations to specified variables on the variables in the model are summarized. These causal impacts are usually summarized with impulse response functions and forecast error variance decompositions.

1.4. Hypothesis of the study

According to Edward (1989) under common conditions nominal devaluations affect the economy in three ways:

- Devaluation has an expenditure changing effect: it results shifting of patterns of domestic production and demand from tradable to non-tradable.
- Devaluation has an expenditure reducing effect: because of devaluation as price goes up it have negative effect of wealth in turn this reduces the real value of domestic currency dominated assets. The lower value of assets results reduction in expenditure on good.
- Devaluation increases domestic price of imported capital and intermediate goods. This results increment in cost of production which in turn results shrinkage in aggregate supply.

As properly explained by Reinhart (1995), countries could devalue their currencies (mainly developing countries) to reduce huge external imbalances, to enhance global competitiveness, to correct "overvaluation" of real exchange rate. All this could be possible devaluation is translated to real devaluation; hence nominal devaluation is not a goal by self.

Even though economic theories hypothesize that devaluation improves trade balance, there are contradicting ideas on the effect of devaluation on trade balance; therefore, this paper go through that devaluation of the domestic currency of the country does not improve the trade balance of the country; rather it worsens the existing problem of trade deficit in turn this makes the countries trade balance to be affected negatively.

1.5. Organization of the study

The study is organized in six chapters. The first chapter is going to be an introduction. The second chapter is review of literature which includes both theoretical and empirical reviews. The third chapter should be description of the sources of the data and methodology of the study including specifications of the models. The fourth chapter is an overview of the Ethiopian economy. Chapter five is estimation and analysis of results. The last chapter, i.e., Chapter six offers conclusion and policy recommendations of the study.

CHAPTER TWO

LITRATURE REVIEW

2.1 EXCHANGE RATE CONCEPT

Exchange rate refers to the price of a currency interims of another currency Naspel (1994). Although there exists an ambiguity in the use of this definition: consider for instance, 1 US dollar exchange for 38 Birr .We calculate the price of foreign currency (dollar) in terms of domestic currency (Birr)-which is 38 Birr per dollar. Optionally we could calculate the price of Birr in terms of the price of dollar which is 0.0263 per Birr. So long as there are two exchange rate types, the first one is nominal exchange rate which is not a good indicator of competitiveness of domestic economy at the level of international economy. The second one is real exchange rate which is a good indicator of competitiveness of domestic economy in international economy. Specifically real exchange rate is equal to nominal exchange rate (E) times the ratio of foreign price level (P*) to the domestic price level (p):

$$Real\ Exchange\ rate = E \times \frac{p*}{p}$$

EP^* Provides the international price level in terms of domestic currency. Hence the real exchange rate basically shows the ratio of price of foreign goods to that of domestic one in which both expressed in domestic currency. Keeping other things remain unchanged the home country becomes more competitive relative to the foreign country when the real exchange rate increases Militades (1990). Although there are various currencies in the international market, Birr will not depreciate or appreciate uniformly relative to them as long as we are dealing with two currencies. To reduce such irregularities we construct an index called Effective exchange rate (the weighted average of bilateral exchange rate of Birr such as, Birr-dollar rete, Birr - franc rate, Birr-yen rate, Birr-euro rate, Birr-pound rate, Birr-Swedish crooner rate, and Birr-other currencies rate). Generally, the effective exchange rate has three approaches: import market rate, export weighted index and trade weighted index. The trade weighted nominal effective exchange rate (NEER) expressed as:

$$NEER = \sum W_{ij} E_{ij}$$

Where W_{ij} =weighted attached to trade partner j of country i

E_{ij} =the nominal exchange rate of currency i against j.

Real effective exchange rate (REER) also indicates global competitiveness of the home country and defined by Edward (1989) as follows:

$$REERit = \frac{\sum W_{ij} P^* jt}{P_{it} \sum W_{ij} E_{ij}} . P^* it / P_{it}.$$

Where $REER_{it}$ =the real effective exchange rate of country i at time t.

W_{ij} =the weight attached to trade partner of a country (domestic).

E_{ij} =the nominal exchange rate of a currency of a country i against j.

$P *_{it}$ = the price index of country j at time t.

P_{it} =the price index of country i at time t Edward (1989).

The usual share of the country under study is represented by the weight attached to each trading partner .Edward (1989) differentiate among purchasing power parity (PPP) areas of assay and the recent one by articulating that selecting perspective consumer price indexes (CPI) for the measurement of both P_{it} and $P *_{it}$ corresponds to purchasing power parity (PPP) method while selecting whole sale price index for $P *_{it}$ and CPI for P_{it} corresponds to recent approach.

2.2 Theory of Devaluation

Devaluation is the government policy measure of fiat of official proclamation. More specifically, devaluation is the decrement in the foreign value of country's currency unit. Depreciation resulted due to market allocation which happens when demand for foreign exchange exceed supply of foreign exchange in the foreign exchange market. According to Mannur (1998) depreciation is a situation by which deficient disequilibrium in the Balance of payment of a country is adjusted underneath of freely floating exchange rate system. Devaluation is the policy measure by government organs of the country through policy actions to enhance trade balance the country so that the overall performance of the economy will be boosted (Encyclo-

paedia of Britannia). This is explained in fashionable manner as follows: Devaluation is an official government action undertaken intentionally and officially Mannur (1998).

So far attempt is made to provide different explanations to distinguish devaluation and depreciation in different ways. The Britton Woods Accord which is global monetary accord or arrangement incorporated in 1944 or (1944-1971) accredited legal or official remodels in exchange rate as a policy action to combat disequilibrium in the BOP of the country.

Decreasing per value constitutes an act of devaluation. The main reason for the establishment of Britton Woods Accord was for the purpose of obtaining exchange rate stability and it does not revolve frequent use of devaluation. Hence the accord is the final decision making organ, i.e. when all other actions to adjust BOP disequilibrium proved ineffective (Ibid). There are different approaches to currency devaluation. These approaches of the study of currency devaluation categorized under three different but complimentary approaches: elasticity approach, absorption approach, monetary approach.

2.2.1 The Elasticity Approach

The approach only takes in to account the relative prices of the commodities that are important to size up the possible effectiveness of devaluation. All that is believed important to know is price elasticity's of supply of and demand for goods and services exported and imported by a country, Mannur (1998). There is a crucial condition in this, that is, Marshall-Lerner condition which affirm that devaluation enhances balance of trade, i.e. reduces deficit. Marshall-Lerner condition is the condition that asserts when the sum of two price elasticity of demand for imports and exports, in absolute value greater than one devaluation improves balance of trade deficit, Militades (1990). By driving the mathematical expression of Marshal-Lerner condition that the sum of elasticity's of demand must exceed unity for foreign exchange market to be stable Salvator (1987)

The mathematical expression of Marshal-Lerner condition can be derived as follows: let P_m and P_x=the foreign currency price of imports and exports. Q_x And Q_m=quantity of exports and imports respectively. V_m And V_x the foreign currency value of imports and exports respectively. Hence trade balance (B) is:

$$B = V_X - V_M = P_X Q_X - P_M Q_M \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(1)}$$

For a small devaluation the change in trade balance B (db) is:

$$DB = P_X dQ_X + Q_X dP_X - (P_M dQ_M + Q_M dP_M) \ldots\ldots\ldots\ldots \text{(2)}$$

Based on the assertion of Salvator, since P_X is horizontal P_M does not change (i.e. dP_M=0) with devaluation of home currency. By then re arrange we get;

$$DB = dQ_X P_X + Q_X dP_X - dQ_M P_M \ldots\ldots\ldots\ldots \text{(3)}$$

The price elasticity's of demand for exports (E_X) measures the percentage change in Q_X for a given percentage change inP_X. That is

$$E_X = dQ_X/Q_X \div \frac{dP_X}{Q_X} = \frac{dQ_X}{Q_X} \div K(\frac{P_X}{P_X}) = \frac{dQ_X P_X}{Q_X}.KP_X \ldots\ldots\ldots\ldots \text{(4)}$$

Where, $K = -dP\_X/P_X$ (percentage change of devaluation of domestic currency), likewise the coefficient of price elasticity of the demand for imports (E_M) is:

$$E_M = -dQ_M/Q_M \div dP_M/P_M = Q_M.P_M/Q_M.dP_M \ldots\ldots\ldots\ldots \text{(5)}$$

From equation 4 we get

$$dQ_X.P_X = E_X.Q_X.P_X.K \ldots\ldots\ldots\ldots \text{(6)}$$

But, this is the first term in equation 3 we can also re write the second term in equation 3 as $Q_X.dP_X = Q_X(dP_X/P_X)P_X = -Q_X.K.P_X - Q_X.K.P_X$ ………………………..……………..... (7)

Finally from equation 5 we get:

$$dQ_M.P_M = E_M.Q_M\ .P_M = E_M.Q_M.P_M.K \ldots\ldots\ldots\ldots \text{(8)}$$

Where, $k = dP_M/P_M$. It has to be noticed is that while $dP_M = 0$ in terms of the foreign currency, it is positive in domestic currency. Equation 8 is the third term in equation 3. Substituting equation 6, 7 and 8 in equation 3 we get:

$$dB = E_X.Q_X.P_X.k - Q_X P_X - (E_M.Q_M.P_M.K) \ldots\ldots\ldots\ldots \text{(9)}$$

Through simplifying algebraically we get:

$dB = K(Q_X P_X(E_X - 1) + E_M . Q_M . P_M)$…… (10)

If to begin with $dB = Q_X P_X - Q_M P_M = 0$ then $dB = K(Q_X . P_X(E_X + E_M - 1)$ and $dB > 0$ if:

$E_X + E_M - 1 > 0$ Or E_X+E_M, Where both E_X and E_M are positive.

Based on the statement of Salvator (1987) if depreciation or devaluation take place from the condition of V_M>V_X. E_M Should be given a proportionally greater weight than E_X in the Marshall-Lerner condition for a conducive foreign exchange market to became more easily remunerated or satisfied and given by: $E_X + (V_X/V_M)E_M > 1$

Generally speaking Marshall-Lerner condition poses the following rules for the effectiveness of devaluation:

1. If the sum of elasticity's of demand for exports and imports greater than 1 devaluation improves trade balance (i.e. reduce deficit).

2. If the sum of elasticity's of exports and import less than 1 devaluation worsening trade balance (i.e. increase deficit).

3. If the sum of elasticity's of export and import equal to 1 devaluation is neutral, i.e., it will have no effect on trade balance.

It has to be noted is that Marshall-Lerner condition holds only to commodity trade or current account balance.

2.2.2 The Absorption Approach

Now I am going to deal with the effect of induced changes in income in correcting trade deficits in the balance of payment of the country via devaluation or depreciation of national currency. As per our discussion above elasticity approach to devaluation operates on balance of payment via its price effect.

Devaluation or depreciation directly decreases export prices and increases import prices and thereby enhance trade balance, keeping other things remains constant. And it is represented symbolically as follows:

$B = X - M$ Where M is value of import and X is value of export. The absorption approach introduced by Sidney Alexander, emphasize macro approach to devaluation; while the elasticity approach takes on micro approach. Alexander started by income identity production or income (Y) is equal to consumption (C) investment (I) plus international trade balance. $Y = C + I + (X - M)$

Let C+I, the domestic absorption, to be A and trade balance to be B: Y=A+B, and then by subtracting A from both sides gives B=Y-A. Accordingly, for the trade balance (B) to enhance as the result of devaluation or depreciation, Y must increase and or A must decrease Salvator (1998). If a country was at full employment to start with, real income (Y) or production cannot increase devaluation or depreciation can be fruitful only if domestic absorption (A) decreases, either automatically or as a result of measures taken like contractionary monetary or fiscal policy, Salvator (1987).

If devaluation causes export to rise in turn it results national product (Y) to increase proportionately with the value of multiplier (k). The lower the multiplier, the lower will be the national income (Y) and vice versa and there results favourable on balance of payment. There are two effects of increase in national income (Y). Increase in national product (Y) results in increase in import (M), despite the fact that, the actual amount of import (M) depends on marginal propensity to import (m). If the marginal propensity of import (m) is high it worsens the effort to eliminate trade deficit. Two, as national product (Y) increases it would increase the demand for investment and consumption. And it should have to be noted that the increase in investment and consumption depends on the marginal propensity to invest (g) and the marginal propensity to consume (b). The higher marginal propensity to invest (g) and consume (b) more undesirable would the situation be for devaluation to subtract the deficit in trade balance, Mannur (1998).According to Alexander (1952) the sum of marginal propensity to consume and invest will be marginal propensity to be absorbed (e), i.e., $e = b + g$ for this when marginal propensity absorb (e) gets higher it will reduce the chance for devaluation to reduce trade deficit. Alexander (1952), for the given marginal propensity to import (m), stated the following assertions:

1 .Trade balance will be enhanced if *e* is less than 1.

2. Trade balance will be worsen if *e* greater than 1.

3. Trade balance will be neutral if *e* equal to 1.

2.3 The Monetary and Portfolio balance approach

Starting from the end of 1960s and fully developed in 1970s completely different approach was initiated: by Johnson and Mundell monetary approach and in 1970s alternative approach portfolio balance approach was initiated along the same line with monetary approach. The study of monetary approach is extended part of domestic monetarism (streamed from the Chicago school) to the global economy in that it considers balance of payment as an efficient monetary phenomenon, i.e., money plays vital role in the long run adjustment and disturbance in the nation's balance of payment Salvator(1990). The Monetarists started by the assertion that the demand for nominal money balance is directly related to the amount of the nominal national income and this can be shown by the quantity theory of money $QTM: MV = PQ$, v is velocity of circulation of money, P is general price index and Q is real output.

Defining $K = 1/v$ and $Q = Y$ then we will get the demand for money equation$M_d = KPY$. Where M_d= demand for nominal money balance.

K= ratio of nominal money balance to that of nominal national income i.e. $K = M_d/P_y$.
P=domestic price level

Y= real output.
On the other hand the nation's supply of money is provided by: $Ms = m(D + F)$; where M_S=national money supply, D=domestic national monetary base, F=foreign component of national monetary base n=money multiplier.

D is domestic credit provided by nation's monetary authority or domestic asset backing nation's money supply. F indicates foreign reserves of the nation which can be increased or decreased by the balance of payment surplus or deficit respectively. F+D is known as high powered money or monetary base of the nation. Starting from the equilibrium condition, where

$M_d = M_S$ an increase in money demand can be satisfied either by the inflow of international reserves, or by an increase in country's domestic monetary base (D), or by the BOP surplus F.

An increase in D and M_s under unchanged money demand (M_d), results outflow of reserve out of the country and lead a decrease in F (deficit in the country's BOP). Based on the monetarists assertion the only way that a policy can affect country's BOP is via its effect on the supply of money and the demand for money in the country. On one hand any policy that encourages an increase in the country's demand for money relative to the supply of money will lead to an inflow of money (reserve) from abroad that shows the surplus in the county's BOP under fixed exchange rates.

Any policy that encourages an increase in the country's money supply relative to the demand for money will lead to an outflow of money (reserves) abroad, that shows the deficit in the BOP of the country. Hence, devaluation of country's currency increases home price of imported goods: this effect will generate increases in demand for nominal money balance in the country. If this increase in demand for money is not compensated, on average, by an equal increase in the supply of money by the country's monetary authority, the situation will be resolved by the inflow of money from abroad, i.e., BOP surplus until the excess money demand is totally eliminated and thus, equilibrium restored. Devaluation only lasts till balance of disequilibrium is adjusted. This tells us devaluation has only transitory effect on the country's BOP. So far we have presented the monetary approach which mainly focuses on domestic supply of and demand for money, but it does not take into account financial assets. This is the basic shortcoming of the approach and it is addressed by the portfolio balance approach.

2.3.1 The Portfolio Balance Approach

This is the model in which firms and individuals prefer holding their financial resource in some combination of domestic money, a foreign bond denominated in foreign currency, domestic bond. The motive to hold bonds is emanated from the interest that they provide. It has to be noted that holding domestic bond does not yield interest, but it is riskless.

An individual can hold part of his or her financial resources in money and bond any time as he or she wishes. Keeping the owners taste and preference, his/her financial resource, the lev-

el of home and foreign interest rates, her/his expectation as to the future value of foreign currency, inflation rate at domestic and foreign, and so on remain unchanged, he/she will choose the portfolios which maximize his/her level of satisfaction. Generally, this is the approach that postulates: domestic money is only one among spectrum of financial wealth that the resident of a country may want to hold.

2.4 Devaluation: Expenditure Switching Policy

To adjust its BOP disequilibrium a country takes a measure of devaluing its currency. And to correct its BOP surplus problem the country undertakes the measure of revaluing its currency. Now we have to focus and restrict ourselves to devaluation. The reason is that it is the major issue in the country. In the meantime devaluation is best known as expenditure switching policy because it is used to whip domestic and foreign costs away from foreign services and goods to the domestically produced one. And also devaluation causes changes on terms of trade i.e. devaluation raises import prices and reduces export prices and thus, it turns the term of trade against the domestic (or devalues) a nation.

According to Mannur (1998), devaluation results in worsening commodity terms only to enhance income terms of trade for devaluing country. Devaluation is expected to discourage imports of goods and services so as to improve exports and in turn enhance current account balance. Devaluation also encourages unilateral transfer(s) in to devaluing nation. Based on the assertion of Junz and Rhomberg (1973) there are five possible lags in the quantity response to price changes in international trade.

(i) the recognition lags prior to the price change become evident, (ii) the decision lag to take the advantage of the price change, (iii) the delivery lag of new order placed due to price changes, (iv) the replacement lag to use up existing inventories before new order are placed, and (v) the production lag to alter the output mix as a result of price changes.

“By measuring the quantity response only during the year of the price change, econometric studies had under estimated long run elasticity’s” (Junz and Rhomberg). Actually it is most likely that the country’s trade balance will worsen soon after a depreciation or devaluation because of the affinity of the country’s currency price of imports to increase faster than export

prices, as quantities not changing very much initially. As time goes up the quantity of export increases and the quantity of import decreases and export prices string along with import prices, so the initial deterioration in the nation trade balance is ceased and then reversed. According to Savator (1987), Economists' call this way of national trade balance to first deteriorate before improving as a result of devaluation or depreciation in the country's currency effect.

The impact of devaluation on agriculture sector of less developed countries is tiny in the short run. This is due to long gestation period of tree crops that make the short run elasticity's of supply much lower than that of the long run, Johanson (1987). This happens because of capacity constraint raised due to land fragmentation, backward technology or rudimentary technology, land shortage, and also there are financial constraints. According to the arguments of, Baghwat and Onituska (1994) the different in elasticity's among a small and large nation, and said that a bigger nation is likely to have a more elastic export supply than a small one. This is because export constitutes a smaller portion of output in most industries in large countries. And it is likely to pass through a much greater proportion of devaluation than exporters in a small country Bhagwat and Onituska (1994).

2.5 Empirical literature

Basically in less developed countries various researches have been conducted using different approaches to evaluate the impact of devaluation in particular and stabilization programs in general. It is well known in most cases evaluating the effect of stabilization programs such as devaluation to use one or a combination of the following four approaches. The first approach is before-after method which takes the comparison of relative performance before and after currency devaluation. The second method is with-without or control-group that compares economic progress of devaluing countries. The third is the approach of actual-versus-target which targets on analyzing actual performance of some macro-economic aggregates compared to their pre specified targets using econometric models. Finally the last method applies simulation technique to examine the impact of changes in the exchange rate on economic activity, Haile (1994).

Most sub-Saharan African countries inquire real deprecation to remunerate for the worsening term of trade since 1980s, World Bank Report (1994). Added to this most African countries began with large insurance premiums in the parallel foreign exchange rates. Countries with

fixed exchange rate are still exerting more effort to bring much needed real depreciation because of no- supportive role of fiscal policies, while countries with flexible exchange rates have made significant improvement in increasing their international competitiveness. According to World Bank Report (1994), between 1987 and 1991 the average export growth rate for African adjusting countries was 3.6 percent a year.

Exchange rate reforms have played one of the best and most important achievements of Nigerian program Faruqee (1994). There were most remarkable achievements in sustaining devaluation of the Naira's value between 1985 and 1992. Within four years naira have been experienced sustainable devaluations; from 1988 to 1992, the average quarterly exchange rate of naira per U.S dollar devalued by 27 percent, 58 percent, 61 percent 67, percent and 83 percent over the 1987 base period. The tremendous devaluation of naira enhanced the relative price of tradable; which could able to make a huge price incentive for exports. As a result in 1989 oil export revenue enhanced, and additional windfall gains have occurred in 1990s, thus BOP improved first in 1989, and balanced current account was occurred for the first time since 1980. It has to be noted that the serious of devaluation via the economic recovery program sought to promote the term of trade and incentive structure for export producers.

According to Papell (1994) estimated model of price and exchange rates for seven countries: Canada, France, Italy, Japan, USA and UK, and the three ensures of the price levels; the consumer price index (CPI), the producer price index (PPI) and GDP deflator. He found reasonable differences in the effect of exchange rates on price depending up on the measure of price index, with the effect strongest for the producer price index (PPI), followed by consumer price index(CPI) and GDP deflator. And also he found reasonable variation across countries, with effects strongest for the UK, followed by Canada and USA.

The Study by Maurice (1986) had scrutinized the impact of devaluation under capital account restriction. Under an intertemporal model which is a monetary approach literature, devaluation is no longer neutral in the long run. As per the study by Edwards (1989), scrutinized 39 devaluation episodes applying with-with approach and regression analysis and found that in many situations devaluation had negatively affected the growth of output (at least in the short-run) and real wages but, enhanced the current account balance.

In the short-run devaluation might not work the way we usually assume, Krugman and Taylor (1978). They argue that in the short-run the balance of payment deficit is structural, that is, both exports and imports are not very sensitive to price changes for a given level of domestic output. As a result, the major and primary source of any favorable short-run effect of devaluation on trade balance comes through economic contraction but, not substitutions. Hence, devaluation is costly, and devaluation is not big enough to adjust the BOP deficit considerably in the short-run.

According to Turnovsky (1981), by his study of the effect of devaluation under the rational expectation analysis, real output is the reason for the unanticipated component of changes in exchange rate. On one hand under predicted (an anticipated) devaluation might lead to a less than proportionate increase in the price of domestic output in the short-run, along with an expansion in real domestic activity, on the other hand over predicted (anticipated) devaluation might lead to a more than proportionate increase in the price of domestic output, in turn this lead to the level of domestic output to decrease.

The prominent role of devaluation justified in Ethiopia is to increase the relative price of export of goods and services there by making them more profitable and enhance production ultimately leading to higher exports. But, it is often argued that: where there is no room for adaptability and flexibility, supply responses to higher price in Africa might not yield as high results as can be expected in developed economies.

World Bank (1987) study indicates that the long-run and short-run price elasticities for Ethiopia's total agriculture were 0.56 and 0.24 respectively.
The above outcomes are higher than long-run and short-run elasticities calculated for nine sub-Saharan African countries which were 0.21 and 0.18 respectively.

According to Befekadu and Kebre (1994) analysis made on the impact of devaluation on the supply of coffee, the supply of coffee to devaluation is not that much good in the short to medium run due to (i) its gestation period which, at the minimum, last over three years. Second

and most importantly, expected increase can mater only if we assume farmers price expectations to run ahead of four years and more. Keeping the host of uncertain overhanging in the production process of such perennial crops and adaptability or experience of farmer regarding price volatility, such an assumption is an over stretched one.

As per the assertion of Marshall-Lerner condition if the absolute value of the sum of marginal propensity to import and marginal propensity to export is greater than unity, depreciation or devaluation will improve the trade balance.

This condition for import and export demand function of Ethiopia is satisfied Haile (1994). Hence, to the extent that the economic model that is applicable in Ethiopia is a simple Keynesian open economy model and one has faith in the elasticity approach, devaluation will enhance the trade balance of the country. However, the price elasticity of demand for exports with respect to change in exchange rate is very inelastic (0.2) while the elasticity of demand of that of imports with respect to change in exchange rate is strongly elastic, Haile (1994). This infers that any improvement in the trade balance due to devaluation basically originates from a decrease in imports not from an increase in export.

CHAPTER THREE

DATA AND METHODOLOGY OF THE STUDY

3.1 Data Type and Methodology of the Study

3.1.1 Data Type and source

The study uses secondary data for the period 1974/75-2018/19. The rationale to use this period is that the study employs "before-after" approach to look at the effect of devaluation on trade balance taking into account the era before devaluation and after devaluation. The reason to use this approach is to show results of policy action outcomes conducted before devaluation and after devaluation of Ethiopian birr against foreign hard currencies.

The data is obtained from both unpublished and published materials. The main sources of the published data are National Bank of Ethiopia annual and quarterly report, Ministry of Finance and Economic Cooperation (MoFEC), Ethiopian Macro Economic Data, Ministry of Economic Development and Cooperation (MEDAC) and Ethiopian Economic Association (EEA).While the unpublished data sources also be undergraduate students senior essay and MA (MSc) thesis.

3.1.2 Methodology of the Study

The methodology of the study involves both descriptive analysis and Vector Autoregressive model (VAR) in the econometric part of the study, which is believed to be appropriate, flexible and simple to evaluate the relationship and the effect of exchange rate movement on the trade balance of the country using tables, mathematical calculations and graphical descriptions. The rationale to use the VAR model is it has proven to be especially useful for describing the dynamic behaviour of economic and financial time series and forecasting.

VAR model is typically used for data description and forecasting, it can also be used for structural inference and policy analysis. In structural analysis, certain assumptions about the causal structure of the data under investigation are imposed, and the resulting causal impacts of unexpected shocks or innovations to specified variables on the variables in the model are sum-

marized. These causal impacts are usually summarized with impulse response functions and forecast error variance decompositions.

However, VAR models might have their own drawbacks; the reduced VAR is found to be better in many ways. The reduced model is simple and fits the data and all variables are treated equally. So long as the reduced form of VAR can also be restricted or unrestricted, hence it has to be noted that the nature of the data determines which one to use for estimation. If variables are non-stationary or I(1) but co integrating, discriminating VAR specification from Error Correction Model leads to misspecification problem Aliyu eta al (2007), Ca' Zorzi eta al (2007). Thus, based on the data we get VEC model might be implemented since the variables are non-stationary but cointegrated.

VEC model shows both long run and short run causalities of variables, this is the importance of using this model. Having statistically significant ECM term shows the existence of long run causality. If the ECM term is negative and significant, it is a good indicator that the variables in the model cause each other in the long run. Like other models it has drawbacks when the ECM term does not clearly show which variable causes which one.

Reminding that, the main point of our study is investigating the effect of changes in exchange rate on trade balance in Ethiopia. This provides room to specify trade balance. Both empirical and theoretical literatures convey abundant of important variables that have major impact on import and export and in turn on trade balance. Trade balance is usually calculated as the difference between receipts of export of goods and expenditure on imports of a nation during a specific period of time. According to the work of Praveen and Rawlins (2000), Agbola (2004) and Sugman (2005) trade balance can be defined as:

$$\boldsymbol{TB = X - M\left(\frac{P_X}{E}, Y^*, P_M \cdot E, Y\right)} \quad \text{.... 4.1}$$

Where: TB is trade balance, X is export earning, M is import payment, P_M is the foreign price of imports, P_X is the domestic price of exports, E is birr per unit of foreign currency, and Y and $Y^*$are domestic and foreign income respectively.

The usual measure of trade balance is the difference between total values of exports and total value of imports. Based on the work of Onafowora (2003) and Rincon (1998) this measure has been tested in different empirical analyses of trade balance –exchange rate relationships. Accordingly, there are plenty of advantages in using this measure. (i), either they are in nominal or real terms or in foreign or domestic currency, it is steady, i.e., it is steady to units as one measures imports and exports, (ii), for constant elasticity the regression equation can be set in log linear form which gives the Marshall-Lerner condition exactly rather than approximation.

Here I use long linear form and regress trade balance over a number of explanatory variables|:

$$\ln(TB) = \beta_0 + \beta_1 \ln(RGDP) + \beta_2 \ln(K) + \beta_3 \ln(M2) + \beta_4 \ln(REER) + \beta_5 \ln(INF) + \beta_6 \ln(TOT) + \varepsilon_i \quad \text{.....4.2}$$

Where Ln is natural logarithm, TB is trade balance, RGDP is real domestic product , REEIR is real effective exchange rate, M2 is broad money supply, INF rate of inflation , K is capital and Ei, is disturbance term.

The model is believed to address the effect of the exchange rate on the trade balance in a model that set up together the elasticity, absorption, and monetary approach to the balance of payments. Because of lack of material data, part of explanatory variables is missing out. Thus, what is preferable is to consider the expected theoretical effect of the pertinent explanatory variables on trade balance.

3.2 The Expected Sign of Explanatory Variables

Real gross domestic product (RGDP): real gross domestic product or real income has an ambiguous effect on trade balance of the country. As per our discussion under literature review part, keeping other things remain unchanged, the expected signs in the monetary and absorption approaches are positive and negative respectively. As the income level gets higher it encourages the demand for imported goods and services as well as increased domestic production of tradable, providing the net effect on the trade balance somewhat undetermined. Even though, it is asserted that the negative effect outweighs the positive effect.

Broad money supply (M2): trade balance is positively affected by the broad money supply, there is a better payment for workers when there is injection of money supply into the domestic country, in which this enhances production capacity and in turn trade balance gets improved.

Inflation (INF): trade balance is positively affected by the rate of inflation. The price for imported goods gets higher more than domestic goods as the rate of inflation increases. This stimulates the domestic producers to produce more goods and services to replace the previously consumed imported goods, in which increase in exports promotes improvement of trade balance in the near future.

Real effective exchange rate (REER): in this paper, real effective exchange rate is expressed as the unit of the domestic currency per a unit of foreign currency taking in to account that the trade partner country's trade weight and relative inflation, depreciation (an increase in REER) is believed to improve the trade balance. The rationale to take real effective exchange rate index (the exchange rate with trading partners) is that it is the exchange rate that is considered as the measure of competitiveness.

Capital (K): trade balance is negatively affected by capital, this is due to the fact that, when more wealth is accumulated by consumers, their consumption level move to luxury level in which this encourages the demand for imported goods, i.e., it reduces domestic production leading to discouraging of exports which in turn affects negatively the trade balance of the country

Terms of Trade (TOT): terms of trade is the relative price of exports to imports, there are two outcomes in trade balance if it deteriorates; (i) the income effect and the (ii) substitution effect and the overall effect fluctuates based on the relative magnitude of these two effects. Although, there is a proncipal idea that lack of trade openness reduces national income, because absence of liberalized trade with the rest of the world means forfeit of real national income, thus, keeping other things remain unchanged, trade balance positively affected by the trade openness of the country.

3.3 Stationarity or Unit Root Test

When dealing with time series data a number of econometric cases can affect the estimation of parameters using OLS. For instance higher R^2 might happen when we regressing one time series variable on another time series variable using the Ordinary Least Squares (OLS) estimation method, despite non-existence of sound relationship among the variables, which is an identity of the problem of spurious (false) regression between unrelated variables generated by a non-stationary process. Therefore, before testing for Co-integration and carry on the Granger Causality test, econometric methodology needs to examine the stationarity of each individual time series. Most macro-economic data are non-stationary, i.e. they tend to exhibit a deterministic and/or stochastic trend. It is therefore recommended to conduct a unit root test (stationarity) to test for the order of integration. If the mean and variance are time invariant we call the series is stationary.

A non-stationary time series tend to have dependent mean, because if they are not, the standard assumptions for asymptotic analysis in the Granger causality test will not be hold. Therefore, for a stochastic process to be stationary the mean $[(E(X_t)]$ and the variance $[Var(X_t)]$ should remain constant over time for all t, and the covariance $[covar(X_t, X_s)]$ and thus, the correlation between any two values of X taken from different time periods depends on the lag length for all $t \neq s$.

Augmented Dickey Fuller (ADF) test is most commonly used to test for unit roots. This test avoids the problem of serial correlations of the errors by adding lagged differenced terms (Green, 2003:643).

3.4 Cointegration Test

The linear combination of two or more non-stationary series may be stationary Granger and Engle (1987). If this stationary linear combination exists we call the non-stationary time series to be co integrated. Knowing the stable long run relationship among variables is the usual interest in economics. To do so studies are conducting a cointegration test to check the existence of long run relationship among variables under study. Hence, the study conducts residual based cointegration test which is developed by Engle and Granger (1987). The Engle-Granger test uses a parametric, Augmented Dickey-Fuller (ADF) approach.

If all our variables are integrated process of order I, we consider using the Johanson's approach to test for cointegration. Johanson cointegration test is the test which assesses the validity of cointegrating relationships, using maximum likelihood estimates (MLE).

The importance of this approach over Engle-Granger is, it allows for more than one cointegrating relationship. If the order of integration of the variables is not the same, say for example, some variables are stationary and others are integrated process of order one, we 0use the bounds test for cointegration.

The main issue that the paper wants to emphasize is the effect of exchange rate movement on trade balance and this can be executed using OLS techniques.

CHAPTER FOUR

AN OVERVIEW OF THE ETHIOPIAN ECONOMY

4.1 EXCHANGE RATE POLICIES IN ETHIOPIA

Since 1940s Ethiopian Birr has been pegged to depreciate. Exchange rate systems were conditionally fixed to gold parties and fluctuations are allowed only during fatal disequilibrium under Bretton woods exchange rate system. In the industrial world exchange rate was converted to flexible exchange rate regimes following the collapse of Bretton woods exchange rate system due to huge balance of payment deficit in United States of America in 1970 and 1971. Since then the country has been tracing a relevant exchange rate policy leaving the birr to depreciate and appreciate with the dollar. Exchange rate was fixed at Birr 2.30 per a US dollar by 1971. By February 1973 the exchange rate was set at Birr 2.07 per USD.

As clearly seen (annex one-Table 4.1) even though, the official exchange rate of Birr was constantly fixed for a long time, the real effective exchange rate (REER), i.e., the trade weighted exchange rate adjusted for differences in inflation between Ethiopia and its trade partners has been rising (NBE). A rise in the REER shows real appreciation of exchange rate of the Birr. Premium (the ratio of parallel market exchange rate to legal exchange rate of the country) on legal exchange rates can also be used as measure of an overvaluation. Based on the data obtained from annex 1, the premium was so high during the period early 1970s and early 1990s which shows there was overvaluation of the exchange rate of Birr. Even though the domestic resource cost (DRC) of majority of exportable which is calculated by dividing the unit values of export (F.O.B) by world price in foreign currency (USD) is founded to be very high, it might reflect, to some extent, the inefficiencies of parastatals.

4.2 Export Earnings of Major exportable

As clearly shown at (annex 2-Table 4.2), Coffee export contributes relatively the largest portion in GDP of the country which is, on average, 4% of GDP in 1970s, 1980s and 1990sand 3% of GDP during the last ten years.

Recently Chat contributes relatively the largest portion next to coffee, taking the place of hides and skins in 1998/99 and contributing on average for about USD 71 million which is es-

timated to be 13% of exports during the last ten years. And also it has to be noted that the share of commodities like oil seeds, pulses, and live animals has been gradually increasing.

Other commodities have contributing remarkable increase in the value of export such as flower, fruit and vegetables, meat and meat products and spices are among the products. This indicates the capacity of the country to remove single commodity dominance and it is remarkable result that shows an effort in market and commodity diversification.

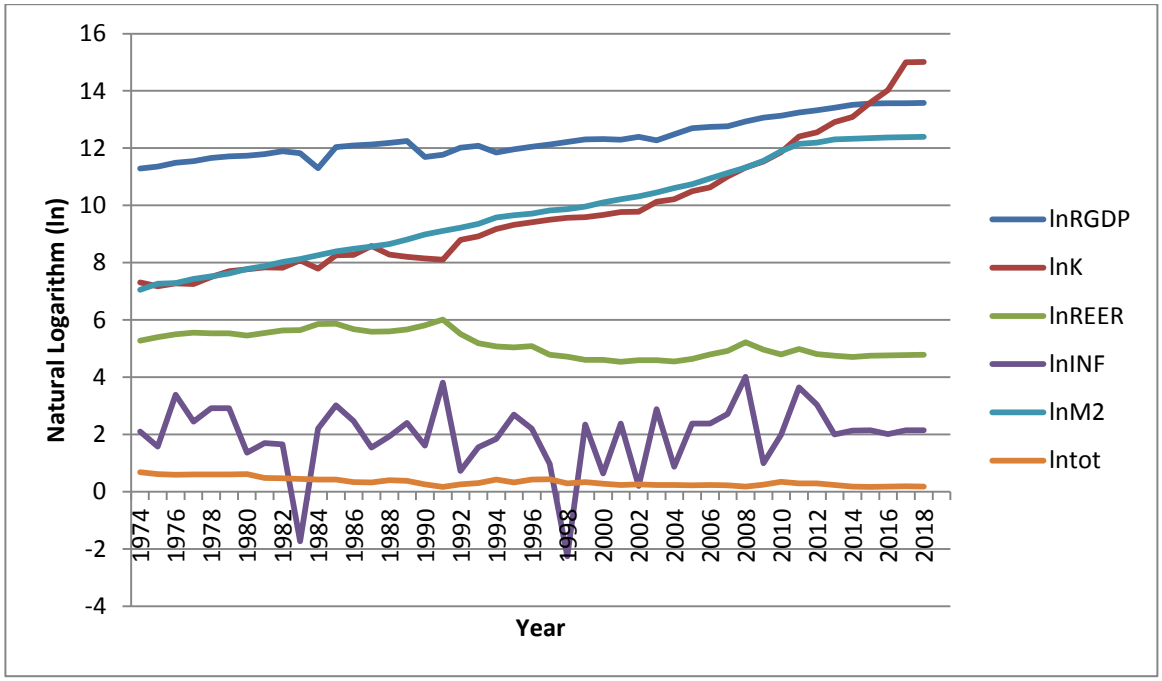
By the end of 1980s the achievement of the export is diminishing and in 1991/92 coffee and total export accomplished its lowest record under observation. Due to the 1992's devaluation both coffee and total export showed an astonishing improvement. According to the report of Ethiopian economic association of 2011/12 there have been improvements although the cumulative performance of export sector has been shy for the last four decades.

4.3 Average Values and Share of import by Commodity Groups

As clearly depicted at (annex 3-Table 4.), the structure of imports mainly remained the same for the period under study. Consumer goods and capital goods together provided about 2/3 of total imports in 1970s, 1980s and 1990s and this shows heavy dependence on imported consumer and capital goods. As per our observation from annex three keeping fuel remain constant, the average contribution of capital goods and raw materials is declining and that of semi-finished and consumer goods are increasing. Since 1991/92 the share of imports in GDP is have shown progress.

The country's imports are basically manufactured goods dominated by consumer and capital goods while export is primarily goods dominated by coffee. To sum up, the structure of both imports and exports are basically the same, however; existence of significant changes in the share of individual commodity items for the period under review.

4.4 Movements in RGDP, K, INF, REER, M2 and TOT



Source: National Bank of Ethiopia

Figure: 4.4. Depicts movements of RGDP, K, REER, M2 and TOT

The above fig demonstrates the movement of the country's real effective exchange rate (REER), real gross domestic product (RGDP), capital (K), rate of inflation (INF) and the broad money supply (M2).

From 1970s to beginning of 1980s real gross domestic product is experiencing gradual growth. Despite, experiencing gradual growth in 1970s and beginning of 1980s real gross domestic product was decreasing between 1983 and 1985. Due to policy measures of devaluing domestic currency taken by Transitional Government of Ethiopia (TGE) real GDP have been experiencing growth for the period under consideration, despite some ups and downs in some years.

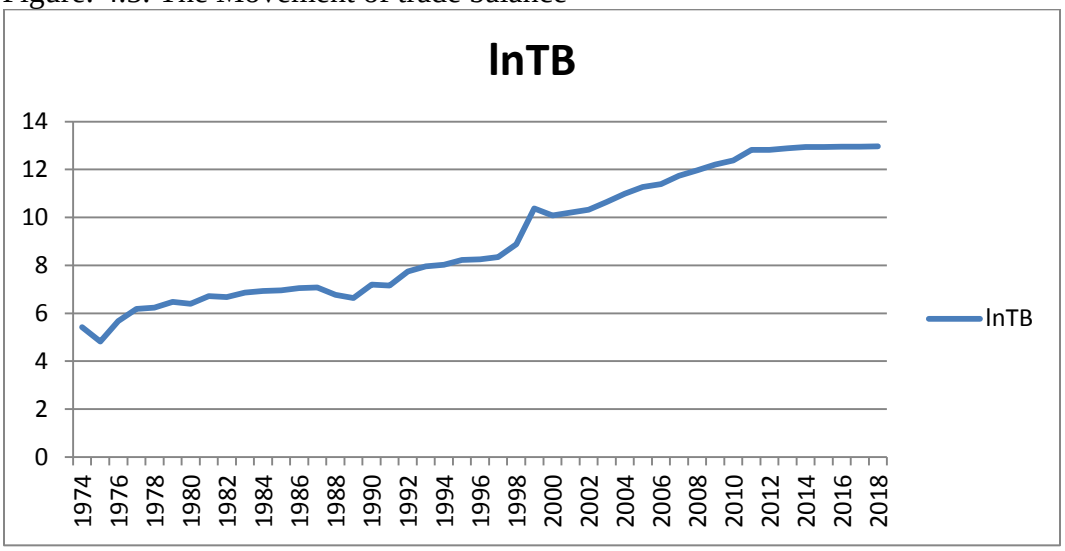
And also the policy measures of Transitional Government of Ethiopia allow the Capital K to grow more rapidly. The broad money supply has been growing nearly linearly. Starting From 1970s to 1980s the steady growth of the natural logarithm of real effective exchange rate has been practiced. Real effective exchange rate had been reached nearly its highest level around 1991 and later from 1991 to 2008 it has decreasing; finally it has recorded steady growth from

2008 onwards. Natural rate of inflation rate was decreased during 1980s to 1998, but in 1998 it has reached its lowest level.

The natural growth rate of inflation has shown some sort of increments in 1991/92, 2008/09 and 2010/11finally from 2008/09 onwards it has been increasing consistently and transformed to create problems.

The natural growth of terms of trade has shown improvement 1992,1996 and 2010 but it is steadily decreases since 2014, this might be the country's demand for imported goods is increasing and local producers are not producing goods to meet local demand.

Figure: 4.5. The Movement of trade balance



Source; National Bank of Ethiopia

The above fig shows the movement of trade balance in natural logarithms. As it can be seen clearly the growth is positive, this is due to transforming the absolute magnitude of trade balance in logarithms. But, in reality it is negative growth. Following 1992's devaluation both import and export grows steadily. Even though both export and import are growing, the import growth outweighs the export growth which leads to the difference of the later to the former to be negative i.e. the trade balance to be negative.

Several findings assert that Ethiopia's export is particularized by high commodity and geographic concentration, highly exposed to external shocks, high dependence on agricultural export that in turn depend on wave of nature, and high price and low income elasticity of de-

mand. In contrary to exports, imports basically are highly price inelastic due to the nature of imported commodities which are either basics in production or consumption or very crucial commodity and are in need and required by the country.

Finally, it is doubtful to expect the neo-classical theory to apply to Ethiopia due to the very nature of export and import. However; this is mere trend analysis and theoretical justification which need to be supported by further empirical examination.

4.5 The impact of devaluation on trade balance

In Ethiopia in many occasions the export earning couldn't cover the imported material bills i.e. trade balance is in deficit. But, the country has also trade surplus experiences. For instance, according to Negarit-Gazeta of the year (1949) because large amount of food items exported to rest of the world during second world war Ethiopia's trade balance was in surplus in 1940s, but later in 1949 due to global recession and devaluation the country's trade balance was in deficit.

Based on table 4.4 below the 1960s and early 1970s, although the average trade deficit had been birr 86.8 million birr, the growth rate of trade deficit was 6.03%. This shows that a larger trade deficit of the country, as compared to the trade deficit of the country before and post devaluation eras of 6.6% and 21.05%, respectively, which in turn implies average increase in the deficit of the country.

Table 4.4: value and growth of trade balance from 1963/64-1973/74

Year	Trade balance (in millions of birr)	Growth of trade deficit (in %)	Year	Trade balance (in millions of birr)	Growth of trade deficit
1963/64	-52.7	-	1969/70	-96.2	-42.2
1964/65	45.1	14.4	1970/71	-123.2	28.06
1966/67	-127.3	47.8	1972/73	-51.2	-67.01
1967/68	-105.0	-17.5	1973/74	54.0	205.5
1968/69	-166.5	58.8			

Average value of trade balance=86.8 million birr
Average value of growth of trade balance=-6.3%
Source: National Bank of Ethiopia Various Bulletins.

The pre and post devaluation trends of value of trade balance are shown in table 4.5. The trade deficit of the country was increasing over time during pre-devaluation period as shown by a positive 6.6% average growth of trade deficit and birr 1223.03 million in the value of trade balance. And also the post devaluation periods to the time under consideration of this paper, it is positive 21.05% of average growth of trade deficit and 8824.95 million in the value of trade balance. This implies that for a long period of time value of imports was greater than the value of exports.

According to MEDAC (1999), the overvaluation of the currency during this time resulted in shortage of foreign exchange to cover the country's import, and this increased the country's trade deficit. The government has taken several measures to avoid such problems; among the measures the following are the fore fronts provision of discriminatory access to foreign exchange for public enterprises, strict control on the type and quality of imported goods, increased import tariff and duties and arbitrary allocation of foreign exchange among state owned enterprises for foreign exchange control to solve the problem of trade deficit. However, the actions taken did not bring long lasting solutions to solve the problem of trade deficit of the country instead it aggravates the situation by establishing favourable environment for the existence of black market in the country.

However to improve trade balance of the country devaluation measure was under taken in 1992; the average value of trade deficit has increased from birr1223.03 million in the pre devaluation period to birr 8824.95 million in the post devaluation period and also the average growth rate of trade deficit has increased from 6.6% to 21.05%. And the average growth rate of trade deficit has been positive 21.05% and the value of trade balance is 8824.95 million during the post devaluation periods to the time under consideration of this paper. This shows that after devaluation the export is not sufficient enough to influence the import to bring favourable trade balance.

According to MEDAC (1999) the main reasons for ever increasing trade deficit are the following:

(I) Ethiopia is exporting primary goods which are price and income inelastic in nature. This implies that devaluation decreases the global price of agricultural exports; consumption does not increase proportionally to price decline. Hence, export income failed to offset the increased imports.

(II) The country's heavy dependence on very limited number of exportable for its foreign exchange earnings. Agricultural products dominated the export of the country, coffee for instance accounts for 60% of the total volume of export followed by hides and skin and chat. The attempt to bring significant quantitative increase in the supply of these export items in the short run is very problematic because of fluctuation in agricultural production due to weather change, pests and diseases and long gestation period of many agricultural products like coffee.

(III) The nature of Ethiopian imports; the country's majority of imports are capital goods, fuel, fertilizer and semi-finished goods which are very essential for the development process of the country. This implies that, if only the development effort of the country is compromised, it is unlikely to decrease the import of those goods. Therefore due to this view, import of the country keep on increasing rather than declining which results in worsening the trade deficit of the country.

(IV) Ethiopia is price taker in most of its exports and its exports are subject to world price fluctuations. For instance, Ethiopian coffee was sold at 1.5 USD per pound in 1988/89 but, in 1989/90 and 1990/91 this price dropped to 0.99 and 0.83 USD, respectively, in 1994/95 the world price of coffee rose to 1.82 USD per pound. But later it dropped consistently (MEDAC, 1999). This implies that export earnings are subject to fluctuation. In general devaluation does not result in reduction in import and trade deficit of the country as expected.

CHAPTER FIVE

ESTIMATION AND ANALYSIS OF THE RESULT

5.1 Unit Root test for Stationarity

Hear an Augmented Dickey Fuller Test is conducted. Testing for existence of unit roots is of major interest in the study of time series models and co-integration. The presence of a unit root implies that the time series under investigation is non-stationary; while the absence of a unit root shows that the stochastic process is stationary. Thus we have performed the tests for examining the stationary of the data. The individual series are tested for their order of integration by ADF-test. ADF-test confirms that the order of integration by of the individual series is 1 or the same for all series. It is performed after first difference at two lags with no trend for all series.

This is deducted from the fact that for the levels of the variables, the absolute values of ADF-test statistics are less than the absolute values of the critical values. However, for the first difference of the variables, the test statistic is greater than the critical value.

Table 5.1 Unit root (ADF) test for stationary

Variables After first difference	ADF-test statistics	Critical value With no intercept and trend	Order of integration
d(lntb)	-9.998	-3.628	I(1)***
d(lnm2)	-5.464	-3.628	I(1)***
d(lnrgdp)	-3.524	-2.950	I(1)**
d(lnk)	-4.642	-3.628	I(1)***
d(lnreer)	-5.969	-3.628	I(1)***
d(lninf)	-12.002	-3.628	I(1)***
d(lntot)	-6.814	-3.628	I(1)***

MacKinnon approximate p-value for Z(t) = 0.0000,

*Significant at 10 percent ** significant at 5 percent *** significant at 1 percent
Source: Regression out

The null hypothesis is that there is a unit root and it is rejected. That implies all variables are stationary after first difference. More specifically all the above variables are stationary at 1% except real gross domestic product lnrgdp which is stationary at 5%. The next step is to check if there is long run relationship between the variables using Johansen co|-integration test.

5.2 Johansen Co-integration test

First we have selected appropriate lag length for co-integration test on the basis of the Akaike information criterion (AIC). The appropriate selected lag length is two. Then we have investigated the number of co-integrating vectors by applying the trace and maximum Eigen value tests of the stochastic matrices of the Johansen (1991) procedure.

Table 5.2: Johansen Co-integration test

Hypothesized no of CEs	Eigen value	Trace test	
		Trace Statistics	Critical level at 5% level of significance
None	-	88.9287	94.15
At most 1	0.57827	126.0541	124.24
At most 2	0.55148	54.4515	68.52
At most 3	0.38837	33.3112	47.21
At most 4	0.33247	15.9318	29.68
At most 5	0.21837	5.3380	15.41
At most 6	0.11598	0.0370	3.76

* indicates rejection of the null at 5% level of significance level

The trace statistics co-integration rank test is reported in the above. A cursory glance in the above table reveals that the null hypothesis of no co-integrating equation is rejected. Consequently we can conclude that there is one co-integrating vector using the trace statistics specified in the model. In other words, there is a stable long run relationship between them.

5.3 Vector error correction model (VECM)

This model become popular after the concept of co-integration came into existence. When there is a co-integrating relation in the system of variables, the role played by the unrestricted VAR (Vector Auto Regressive) model is not the most convenient form. Rather consider parameterizations that support the co-integration structure analysis known as Vector Error Correction Models (VECM). In particular, the findings that the variables are non-stationary and are not co-integrated suggest the use of unrestricted VAR models. However, if they are co-integrated a Vector Error Correction model (VECM) needs to be used. Since we have got all the variables stationary and co-integrated after first difference (of order one), we have applied the VECM.

5.3.1 Dynamic long-run estimation

The estimated long run model for lnTB is given as follow:

$$\boldsymbol{ETC = 17.386 + lnTB - 5.851lnM2 + 3.385lnRGDP + 2.026lnK - 1.464lnREER - 0.853lnINF - 4.748lnTOT}$$

The disturbance term is assumed to be zero in equilibrium and hence, the above equation can written as follows:

$$\boldsymbol{LnTB = 5.851lnM2 - 3.385lnRGDP - 2.026lnK + 1.464lnREER + 0.853lnINF + 4.748lnTOT}$$

There is one co-integrating relationship as per the Johansen co-integration test and this study aimed to examine the impact of broad money supply, real GDP, gross capital accumulation, real effective exchange rate, inflation rate and terms of trade on trade balance of the country.

In the long run Broad money supply significantly affects trade balance positively at one percent level of significance; which implies a one percent increase in broad money supply leads to 5.851 percent increase in trade balance. If there a better payments for workers when there is injection of money supply into the domestic country, this enhances production capacity and in turn trade balance gets improved.

The long-run impact of real GDP is found to be negative and significant at one percent level of significance in explaining trade balance, which tells that a one percent increase in real GDP of a nation results in reduction of trade balance by 3.385 percent in the long run. This is related with the theory that real GDP has a capacity to attach with high productivity and new inventions in which this enhances export and import. Contrary higher income levels braces increased import demand as well as increased domestic production of tradable, providing ultimate effect on the trade balance somewhat indeterminate. Although, it is argued that negative impact outweighs the positive impact in explaining trade balance.

From the regression output it is understood that capital significantly affects the trade balance negatively in the long run at five percent of significant. One percent increase in capital accumulation results 2.026 percent decrease in trade balance. This is due to the fact that, when

more wealth is accumulated by individual consumers, their consumption level moves to luxury level in which this encourages the demand for imported goods, i.e., it reduces domestic production leading to discouraging of exports which in turn affects negatively the trade balance of the country

The long run impact of real effective exchange rate is positive at five percent significance in explaining trade balance that implies a one percent increase in the real effective exchange rate significantly increases the growth of trade balance by 1.464 percent in the long run. This is because (i) in the trade theory the real effective exchange rate is an important factor of trading activity and it has appositive effect on commerce of the nation and (ii)depreciation (an increase in REER) is believed to improve the trade balance because, when a nation's currency depreciates it opens an opportunity for the foreign nationals to purchase country's product at relatively lower price, hence makes export price cheaper, in turn this enables local producers to produce more which enhances trade balance. The reason to take real effective exchange rate index (the exchange rate with trading partners) is that it is the exchange rate that is considered as the measure of competitiveness.

The inflation rate is also found to be positive and significant in affecting the long run level of the trade balance. That is a one percent increase in the rate of inflation can increase the trade balance by 0.853 percent in the long run. This is when the price for imported goods gets higher more than domestic goods as the rate of inflation increases. This stimulates the domestic producers to produce more goods and services to replace the previously consumed imported goods, this increases export which in turn enhances trade balance in the near future.

Trade Balance also positively affected by Terms of trade that is a one percent increase in terms of trade results in 4.748 percent increase in trade balance; this is due to the fact that lack of trade openness reduces national income, because absence of liberalized trade with the rest of the world means a forfeit of real national income, thus, keeping other things remain unchanged, trade balance positively affected by the trade openness of the country.

5.3.2 Dynamic Short-run estimation

Table-5.3:- Short Run Coefficients When lnTB is a dependent variable:

	Coefficient	Std. Error	Prob.
ECM1(-1)	-0.2559703	0.104698	0.014
ΔlnTB(-1)	-0.3673126	0.3447158	0.287
Δ lnM2(-1)	-0.0192469	0.0013893	0.000
Δ lnRGDP(-1)	-0.0196443	0.0604485	0.745
Δ lnK(-1)	0.1983175	0.5580481	0.722
Δ lnREEIR(-1)	0.0598647	0.0715593	0.403
Δ lnINF(-1)	-0.9469892	0.2219317	0.000
Δ lnTOT(-1)	-0.0066116	0.2975671	0.982
C	0.3149201	0.2975173	0.290

Source: *From regression output*

The adjustment term or error correction term (-0.255) has the correct sign and is statistically significant at 5% level, suggesting that previous years error (deviation from long run equilibrium) are corrected for with in the current year at a convergence speed of 25.5%(a high speed of adjustment).

But the fourth and eighth error correction coefficients should not be considered here because they are not statically significant despite having the correct sign, While the coefficients for gross capital formation and real effective exchange rate do not have the correct sign and insignificant too in the short run.

Real effective exchange rate is not significant in the short run in defining trade balance this might be due to the fact that if there is appreciation of domestic currency against foreign currency the export price may rise which will result lack of demand for local products in the external market which in turn will affect trade balance.

The capital formation is not significant in the short run, which is an odd result. This result may be explained by the theory of investment. Today's investments become productive most-

ly after years and affect the trade balance. So in the short run investment is not effective, but this happens if the effect on the demand side is small.

The estimated short-run model reveals that only broad money supply and the rate of inflation are significant to contribute to trade balance at 1% level of significance. Broad money supply is significant. This may be because the proxy will have a capacity generate inflation; if money is injected to the market it will have an impact both in the short and long run. In the short run, when money get out of the hands of the government everyone will have it and thus the purchasing power of consumers will enhanced and at the same time the people demand new products in which this encourages domestic producers to produce more to satisfy local demand and in the meantime, the producers capacity boosted to export products in turn this enhances trade balance of the nation.

And when we investigate the effect of inflation on trade balance it will rises up the price of more of imported goods and services which motivates domestic firms to produce more and keep exporting, thus this boosts the growth of the country.

Terms of trade is not significant in the short run, this because of there is a supreme idea that absence of trade openness reduces national income, because absence of liberalized trade with the rest of the world means a forfeit of real national income.

Real gross domestic product is not significant in explaining trade balance in the short run; this is because when consumers have enough money on hand they would prefer to go for imported goods which makes local producers week and hence this results a favourable result in terms of trade.

5.4 . Diagnostics and Tests

The aim of conducting diagnosing and testing is the major interest in conducting research to ascertain whether the model is correct or not .Among the VECM diagnostic tests the common ones are test for autocorrelation, test for normality and test for stability are the prominent ones.

5.4.1 Test for Residual Autocorrelation

The covariance between two consecutive error terms i.e. $cov(\epsilon_{it}, \epsilon_{i,t-1})$is statistically zero we can say that the error term is uncorrelated to each other or simply the error terms are not subject to autocorrelation Verbeek (2000). Time series model assumes serially uncorrelated disturbances, where the covariance between error terms over time is zero. The error terms are said to be serially correlated if they are correlated with one another.

To test for autocorrelation of error terms different literatures suggest various tests among them the most common are Breusch Godfrey test, Wooldridge-Drukker and Baltagi and Li (1995) LM statistic and Lagrange-multiplier test. In this paper we will apply the latter test. As clearly shown below and appendix part test for serial correlation indicated that in all tests the P-value greater than 0.05. The tests do not reject the null hypothesis, indicating the residuals are not serially correlated.

Table: 5.4 show Lagrange-multiplier test for serial correlation

Lag	Chi2	df	prob>chi2
1	33.7437	49	0.95245
2	44.0054	49	0.67537

Source: Stata output

H_o: No Autocorrelation at lag order two H_1: Not H_o

5.4.2 Jarque-Bera test for Normality

To do validity of specification, forecasting and inference normality assumption plays a crucial role. In order to check the normality of the disturbance term, this study applied the extended version of the famous Jarque - Bera testes for the time series data model.

Galvao et al. (2013) developed the test. Joint and individual tests for normality in both components of error terms indicated not reject the null hypothesis of normality because the P-value is greater than 5%.

Table: 5.5 show Jarque-Bera test for Normality.

Equation	Chi2	Df	prob>chi2
D_lntb	**0.325**	**2**	**0.85013**
D_lnm2	**0.141**	**2**	**0.93183**
D_lnrgdp	**0.815**	**2**	**0.66515**
D_lnk	**2.702**	**2**	**0.25895**
D_lnreer	**1.404**	**2**	**0.49572**
D_lninf	**0.372**	**2**	**0.83038**
D_lntot	***0.272***	**2**	**0.87294**
All	**6.031**	**14**	**0.96571**

Source: Stata output

5.4.3 Test for Stability

Conducting time series econometrics model stability is the major interest. Here stability tells how strong stationary is the residuals of the final model. From the table below the VECM imposes six unit moduli we can learn that the model is stable.

Table 5.6 test for model stability

Eigenvalue	Modulus
1	1
1	1
1	1
1	1
1	1
1	1
-0.9886562	**0.988656**
0.9438991	**0.943899**
.02276107 + .5345524i	**0.535037**
.02276107 - .5345524i	**0.535037**
-0.5262858	**0.526286**
-0.29774	**0.29774**
-.10455 + .0941554i	**0.140698**
-.10455 - .0941554i	**0.140698**

CHAPTER SIX

CONCULUSION AND POLICY RECOMMENDATION

6.1 Conclusions

For many years unhealthy and poor economic performances have been the nature of Ethiopian economy like many African countries. Situation was exacerbated by different factors like social, economic and political factors. Ethiopia has experienced an adverse balance of trade deficit. To estimate such deficit the country has been following different exchange rate policies like devaluation, flexible exchange rate, revaluation etc. The main issue of this paper has been to distinguish the long-and short-run effects of real exchange rate changes on trade balance of Ethiopia and to adequately understanding of the relationship between the two.

The country had followed fixed exchange rate regime from the period 1974/75 to 1991/92. This made the country's export items to be artificially expensive and its imports relatively cheaper in turn this makes Ethiopian export to decline while, imports increased with negative implication in the country's' trade balance. Under the framework of the structural adjustment program (SAPs) and the recent past government of Ethiopia started to follow market oriented economy and accordingly it started to follow flexible exchange rate regime. It devalued its currency from birr 2.07 to birr 5.00 in 1992.

The long run trade balance regression equation results is obtained from VECM and the result clearly shows that, in the long run, there is positive and significant impact of the real exchange rate depreciation, broad money supply, rate of inflation, and terms of trade on trade balance. This finding tells us that real exchange rate depreciation can improve the international competitiveness of the country in improving its trade balance deficit and as a result it improves the balance of payment deficit in the long run. The domestic money supply coefficient is positive and statistically significant in which this implies that when there is better payment for the workers there will be productivity thereby improves trade balance of the country. The positive and statistically significant coefficient of rate of inflation shows that when the price

for imported goods gets higher more than domestically produced goods as the rate of inflation increases. This stimulates the domestic producers to produce more goods and services to replace the previously consumed imported goods in turn this improves trade balance in the near future. The term of trade variable indicates that advancement in terms of trade, keeping other things remain unchanged, improves trade balance of Ethiopia.

But, when it comes to real gross domestic product and capital accumulation; both have negative impact on trade balance. When it comes to capital; when more wealth is accumulated by consumers, their consumption level will move to luxury level in which this encourages the demand for imported goods, i.e., it reduces domestic production leading to discouraging of exports which in turn affects negatively the trade balance of the Ethiopia. And when coming to real gross domestic product as the income level gets higher it encourages the demand for imported goods and services as well as increased domestic production of tradable, providing the net effect on the trade balance somewhat doubtful. However, it is asserted that the negative effect outweighs the positive effect.

To sum up, the result of the study indicates that devaluation does not have any positive impact on trade balance of Ethiopia contrary it instead worsened the existing situation. This is supported by the data in chapter four where the deficit of trade balance has become 27.5% after devaluation contrary to the number before devaluation (6.6%). This might be due to export unable to grow sufficiently following devaluation to outweigh ever increasing import because of supply inelasticity of Ethiopian import. This may have something to do with the inelasticity of demand of imports and long gestation period of the country's agricultural export. The inelasticity of demand of imports may also be because of Ethiopian import are crucial goods which are strategic for growth, and domestic consumers preference for imported goods over domestically produced goods.

The findings of this research indicate that the country's export has shown some sort of incremental trend following the devaluation of the birr. This is because of; (i) in terms of domestic currency, the amount of money the country receives from a given quantity of export has increased (ii) smuggling of exports made to neighbouring countries may have relatively reduced and (iii) due to rise in the price of exportable commodities the domestic consumption of export may have declined.

On the import side due to the nature of imported commodities which are strategic commodities and crucial for the development process of the nation; import does not show tendency to decrease.

According to Marshall-Lerner condition devaluation improves trade balance. But the condition did not hold for Ethiopia, i.e., devaluation has not enhanced trade balance of the nation. Despite the fact that, exports have raised after devaluation the increase was not sufficient enough to overcome the increase in import. This may be because of the structure of imports and exports and inelastic nature of imports.

6.2 POLICY RECOMMENDATIONS

In order to improve the trade balance of the country and based on the results of the study, the following policy recommendations are given:

A. The structure of Ethiopian export has to be changed. That is, the country's export has to shift from agricultural product to at least semi-processed agricultural products that have relatively higher value.
B. The country cannot stop especially the importation of capital goods and semi-finished goods, because these goods are essential for development and also our capacity to produce domestically is somehow limited so; the government should design a policy, which enables to impress foreign direct investment, and thereby to produce the imported items domestically.
C. Devaluation is not desirable policy option to boost trade balance of the country since Marshall-Lerner condition does not hold for Ethiopia. So, the policy makers should have to focus on supply side policies, such as decreasing taxes on the profit or relaxing rigid labour conditions.
D. The government better have a research and development centre domestically which would have an active and independent participation for the change of output of the country including its supply consistency as well.
E. **On import side:** first local producers of relatively high quality substituents should have to be motivated then the awareness of the consumers has to be built on locally produced substitute good to reduce high import bills.

F. **On export side:** diversification of exportable to take comparative advantage, improve the quality of the existing export commodities and providing training for exporters.

6.3 Further research area

The study is not free from limitations. Among others, the major limitation of the study is services are intangible or invisible: in the sense that receipts and payments are not recorded at the port of entry or exit. Because of, this limitation the study deals with visible or tangible items that are on goods account alone.

Moreover, devaluation affects other items of the balance of payment; the study focuses only on the effects of exchange rate (devaluation) movement on the trade balance of the country.

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Appendix

Table 1 Unit root test for Stationarity

```
. dfuller dlntb, lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        43

                                 ———— Interpolated Dickey-Fuller ————
                    Test         1% Critical       5% Critical     10% Critical
                Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)             -9.998            -3.628            -2.950           -2.608
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.0000

. dfuller dlnm2, lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        43

                                 ———— Interpolated Dickey-Fuller ————
                    Test         1% Critical       5% Critical     10% Critical
                Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)             -5.464            -3.628            -2.950           -2.608
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.0000

. dfuller dlnrgdp, lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        43

                                 ———— Interpolated Dickey-Fuller ————
                    Test         1% Critical       5% Critical     10% Critical
                Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)             -3.524            -3.628            -2.950           -2.608
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.0074
```

```
. dfuller dlnk, lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        43

                              ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)            -4.642           -3.628            -2.950           -2.608
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.0001

. dfuller dlnreer, lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        43

                              ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)            -5.969           -3.628            -2.950           -2.608
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.0000

. dfuller dlninf, lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        43

                              ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)           -12.002           -3.628            -2.950           -2.608
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.0000

. dfuller dlntot, lags(0)

Dickey-Fuller test for unit root                   Number of obs   =        43

                              ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)            -6.814           -3.628            -2.950           -2.608
——————————————————————————————————————————————————————————————————————————
MacKinnon approximate p-value for Z(t) = 0.0000

.
```

Table 2 Johansen test for cointegration

```
. vecrank lntb lnm2 lnrgdp lnk lnreer lninf lntot, trend(constant) max

                    Johansen tests for cointegration
Trend: constant                                      Number of obs =      43
Sample:  1977 - 2019                                       Lags =       2
```

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	56	44.487702	.	126.0541	124.24
1	69	63.050402	0.57827	88.9287*	94.15
2	80	80.288999	0.55148	54.4515	68.52
3	89	90.859156	0.38837	33.3112	47.21
4	96	99.548828	0.33247	15.9318	29.68
5	101	104.84574	0.21837	5.3380	15.41
6	104	107.49621	0.11598	0.0370	3.76
7	105	107.51474	0.00086		

maximum rank	parms	LL	eigenvalue	max statistic	5% critical value
0	56	44.487702	.	37.1254	45.28
1	69	63.050402	0.57827	34.4772	39.37
2	80	80.288999	0.55148	21.1403	33.46
3	89	90.859156	0.38837	17.3793	27.07
4	96	99.548828	0.33247	10.5938	20.97
5	101	104.84574	0.21837	5.3009	14.07
6	104	107.49621	0.11598	0.0370	3.76
7	105	107.51474	0.00086		

Table 3 Short run-test results

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_lntb						
_ce1						
L1.	-.2559703	.104698	-2.44	0.014	-.4611746	-.050766
lntb						
LD.	-.3673126	.3447158	-1.07	0.287	-1.042943	.308318
L2D.	.0229696	.3673091	0.06	0.950	-.696943	.7428823
D_lnm2						
_ce1						
L1.	-.0192469	.0013893	-13.85	0.000	-.0219699	-.0165238
lntb						
LD.	.0641232	.0045744	14.02	0.000	.0551576	.0730889
L2D.	.0963335	.0048742	19.76	0.000	.0867802	.1058868
D_lnrgdp						
_ce1						
L1.	-.0196443	.0604485	-0.32	0.745	-.1381211	.0988326
lntb						
LD.	.0614325	.1990253	0.31	0.758	-.3286499	.451515
L2D.	.0774489	.2120698	0.37	0.715	-.3382003	.4930981

D_lnk						
_ce1						
L1.	.1983175	.5580481	0.36	0.722	-.8954366	1.292072
lntb						
LD.	.0803376	1.837361	0.04	0.965	-3.520824	3.681499
L2D.	.9749298	1.957785	0.50	0.619	-2.862258	4.812118
D_lnreer						
_ce1						
L1.	.0598647	.0715593	0.84	0.403	-.0803889	.2001183
lntb						
LD.	.0741941	.2356073	0.31	0.753	-.3875877	.535976
L2D.	-.0339594	.2510495	-0.14	0.892	-.5260073	.4580885
D_lninf						
_ce1						
L1.	-.9469892	.2219317	-4.27	0.000	-1.381967	-.5120111
lntb						
LD.	.3390663	.7307051	0.46	0.643	-1.093089	1.771222
L2D.	.6021901	.7785969	0.77	0.439	-.9238317	2.128212
D_lntot						
_ce1						
L1.	-.0066116	.2975671	-0.02	0.982	-.5898323	.5766091
lntb						
LD.	-.8926507	.9797329	-0.91	0.362	-2.812892	1.027591
L2D.	1.719446	1.043946	1.65	0.100	-.3266515	3.765543

Table 4 VECM test for long-run relationships

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
lntb	1	.	.	.	.	.
lnm2	-5.851271	1.235406	-4.74	0.000	-8.272621	-3.429921
lnrgdp	3.38565	1.194778	2.83	0.005	1.043928	5.727373
lnk	2.026533	.8907654	2.28	0.023	.2806646	3.772401
lnreer	-1.464996	.6365277	-2.30	0.021	-2.712568	-.217425
lninf	-.8534787	.1037028	-8.23	0.000	-1.056732	-.6502249
lntot	-4.748292	.7088387	-6.70	0.000	-6.13759	-3.358994
_trend	-.5817854	.	.	.	.	.
_cons	17.38649	.	.	.	.	.

Table 5 VEC Diagnostic Tests for Normality

```
. vecnorm, jbera
```

Jarque-Bera test

Equation	chi2	df	Prob > chi2
D_lntb	0.325	2	0.85013
D_lnm2	0.141	2	0.93183
D_lnrgdp	0.815	2	0.66515
D_lnk	2.702	2	0.25895
D_lnreer	1.404	2	0.49572
D_lninf	0.372	2	0.83038
D_lntot	0.272	2	0.87294
ALL	6.031	14	0.96571

Table 6 VEC Diagnostic test for Residual Autocorrelation

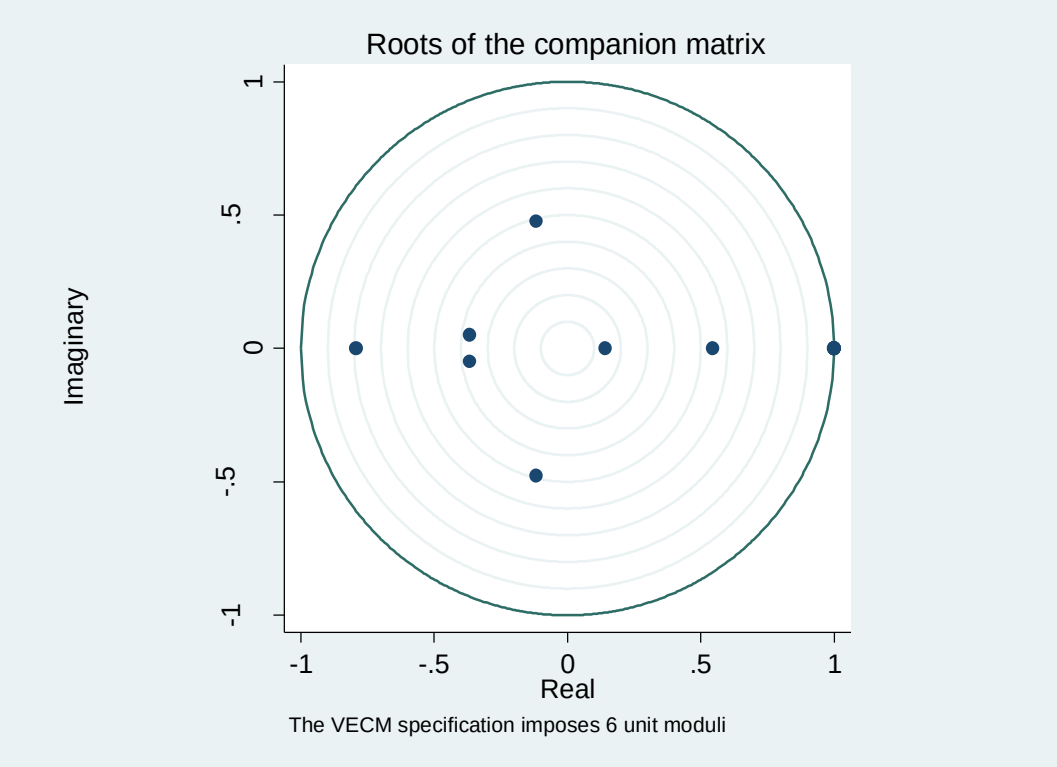
```
. veclmar
```

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	33.7437	49	0.95245
2	44.0054	49	0.67537

H0: no autocorrelation at lag order

Figure 1 VEC Diagnostic test for Stability



The VECM specification imposes 6 unit moduli

```
. vecstable
```

Eigenvalue stability condition

Eigenvalue	Modulus
1	1
1	1
1	1
1	1
1	1
1	1
-.9886562	.988656
.9438991	.943899
.02276107 + .5345524*i*	.535037
.02276107 - .5345524*i*	.535037
-.5262858	.526286
-.29774	.29774
-.10455 + .0941554*i*	.140698
-.10455 - .0941554*i*	.140698

The VECM specification imposes 6 unit moduli.

Annex 1

Table 4.1 Legal exchange rates, parallel exchange rate and Exchange Rate Premiums.

Period	Legal Exchange Rate	Parallel Exchange Rate	Premium	Period	Legal Exchange Rate	Parallel Exchange Rate	Premium
1971	2.3	2.3	1	1995	6.25	7.7	1.23
1972	2.3	2.8	1.21	1996	6.32	7.55	1.19
1973	2.07	3.1	1.49	1997	6.5	7.18	1.10
1974	2.07	3.34	1.61	1998	6.88	7.03	1.02
1975	2.07	3.78	1.82	1999	7.49	8.00	1.06
1976	2.07	4.00	1.93	2000	8.33	8.79	1.055
1977	2.07	4.21	2.03	2001	8.54	8.64	1.012
1978	2.07	4.11	1.98	2002	8.58	8.70	1.015
1979	2.07	3.17	1.53	2003	8.61	8.67	1.006
1980	2.07	2.82	1.36	2004	8.65	8.71	1.007
1981	2.07	3.09	1.49	2005	8.68	9.02	1.040
1982	2.07	3.32	1.60	2006	8.79	8.95	1.019
1983	2.07	3.52	1.70	2007	9.24	9.54	1.033
1984	2.07	4.02	1.94	2008	10.42	11.81	1.133
1985	2.07	4.85	2.34	2009	12.89	13.68	1.061
1986	2.07	3.83	1.85	2010	16.11	16.52	1.026
1987	2.07	6.02	2.90	2011	16.90	17.55	1.038
1988	2.07	6.62	2.19	2012	17.70	18.21	1.028
1989	2.07	6.03	2.91	2013	18.71	19.34	1.033
1990	2.07	6.13	2.96	2014	19.67	20.56	1.045
1991	2.07	7.00	3.38	2015	20.68	22.69	1.098
1992	5.0	7.40	1.48	2016	21.83	24.79	1.13
1993	5.1	7.6	1.49	2017	23.96	28.29	1.18
1994	5.77	6.8	1.18	2018	27.66	34.04	1.23

Source: Various NBE Publications

The average DRC for tradable for 1984/84-1988/89 is 4

Annex 2

Table 4.2. Export Earnings of Major exportable

Period	1974-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009	2010-2014	2015-2019
Coffee	241.04	247.07	256.99	149.80	318.21	214.00	220.42	221.25	233.32
Oil seeds	11.1	10.31	5.69	3.58	26.26	59.22	61.00	62.02	63.01
Hides and skins	32.06	44.21	59.74	39.88	44.87	58.24	59.99	58.03	59.05
Pulses	0.23	11.68	8.65	6.01	12.81	23.94	24.66	22.58	23.52
Meat and meat product	1.5	3.06	1.70	0.34	3.63	5.52	5.69	5.71	6.03
Fruit and vegeta-bles	1.08	2.21	4.22	2.73	5.16	10.65	10.97	3.06	5.96
Sugar	4.01	4.51	8.24	2.95	0.77	9.40	9.68	9.71	10.07
Live animals	3.21	6.61	9.78	1.22	1.18	3.25	3.35	3.70	4.01
Chat	8.32	12.14	8.45	14.80	46.62	71.26	73.40	75.05	81.87
Petrol and pet. Product	18.25	32.72	14.75	11.41	4.81	0.00	0.00	0.00	0.00
Gold	Na	Na	Na	27.44	25.99	41.34	42.58	43.56	44.25
Others	13.89	22.92	21.04	14.51	26.71	66.77	68.77	69.96	71.74
Grand total	334.69	397.43	399.26	274.67	517.00	563.58	580.49	574.63	602.83
%cof-fee in total export	72.01	62.14	63.81	53.41	61.41	37.57	38.70	38.50	38.70
Coffee in GDP	4.79	4.58	3.57	2.41	4.98	2.90	2.99	2.96	2.97
Export in GDP	6.67	7.36	5.52	4.34	8.08	7.70	7.93	7.88	7.90

Source: NBE and partly from personal computation Na=Not available

Annex 3

Table 4.3 Average Values and Share of import by Commodity Groups

Prod-uct	1974-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009	2010-2014	2015-2019
Raw Mate-rial	27.33	29.35	28.97	18.75	25.98	30.11	31.01	32.02	32.9
Semi-fin-ished goods	112.45	116.53	148.08	115.95	227.83	379.86	391.26	394.26	398.42
Fuel	177..68	175.69	109.45	139.79	229.62	359.29	370.07	379.54	487.21
Capital goods	310.45	312.49	415.48	312.42	463.75	710.09	731.39	736.36	769.54
Con-sumer goods	240.02	239.06	324.92	292.89	353.01	718.25	739.80	755.20	785.41
Mis-cella-neous	2.00	2.05	3.44	44.24	60.39	52.60	54.18	55.38	57.01
Total im-ports	869.93	875.17	1030.43	924.04	1360.5	2250.2	2317.71	2352.76	2530.49
%capi-tal goods in total import	35.68	35.28	40.21	33.43	34.16	30.98	31.91	31.12	30.41
Consum total	28.01	27.56	31.44	31.76	25.95	32.66	33.64	33.26	33.03
Import in GDP	16.00	15.72	14.26	13.89	21.28	30.29	31.20	31.23	31.31

Source: NBE and Personal computation

Table 4.5: Growth and Value of trade balance

Year	Trade balance (millions birr)	% growth of trade balance	Year	Trade Balance (million birrs)	% growth of trade balance
1981/82	(835.4)	-	1992/93	(2669.54)	-24.4
1982/83	(943.36)	8.8	1993/94	(3321.2)	11.8
1983/84	(1139.37)	20.8	1994/95	(3711.6)	68.6
1984/85	(1024.79)	(9.9)	1995/96	(5101.15)	(26.3)
1985/86	(1287.08)	26.6	1996/97	(4613.7)	12.6
1986/87	(1427)	13.1	1997/98	(5196.42)	55.4
1987/88	(1486.6)	3.6	1998/99	(8064.7)	13.6
1988/89	(1192.2)	(20.8)	1999/00	(9158)	0
1989/90	1067.21	(11.5)	200/2001	9101.1	16.7
1990/91	1585.2	(4.6)	2001/2002	10620.9	9.9
1991/92	1492.51		2002/2003	11787.1	45.25
Average	1223.03	6.6		8824.95	21.05

Source: Various sources of NBE Bulletins