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An empirical analysis of the determinants of trade balance in Ethiopia (1980-2017)

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DECLARATION

I, the undersigned, declare that this Project is my original work and has not been presented for Master's degree in any other University, and that all sources of material used for this thesis had been duly acknowledged.

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Abstract

The main objective of this study is to analyze the determinants of trade balance in Ethiopia during the specified period (1980-2017). Based on review of theoretical and empirical literature, five variables (GDP, GCE, HCE, ER and MS) were identified as general determinants of trade balance in Ethiopia. Moreover, variables are based on elasticity, monetary and absorption theories of trade balance. The study implements ARDL bounds test and error correction model to analyze a time series data from 1980-2017, collected from national bank, World Bank development indicators and IFS. The finding of this study shows that real exchange rate and gross domestic product have positive and significant effect on trade balance while money supply has negative and significant effect on trade balance in long run. Again, long run ARDL model reveals government consumption expenditure and household consumption expenditure have no effect on trade balance. The error correction model of the short-run regression shows that real exchange rate and government consumption expenditure have positive and significant effect on the speed of adjustment of the long-run trend of trade balance. The estimated short run model revealed that the trade balance converges to its equilibrium value. The coefficient of the error term that captures the speed of adjustment towards the long run equilibrium found with the correct sign and magnitude. The speed of adjustment is -0.90, which implies that around 90% deviations from long run equilibrium are adjusted every year and the rest 10% in the coming year.

Key words: *ARDL, Co integration, devaluation, Trade balance*

ACRONYMS

ADF	Augmented Dickey Fuller
AIC	Akaike information criteria
ARDL	Auto Regressive Distributed Lag
BOP	balance of payment
CUSM	Cumulative Sum
CUSMSQ	Cumulative Sum Square
ECM	Error correction Model
EFY	Ethiopian fiscal year
FDI	Foreign Direct Investment
GCE	Government consumption expenditure
GDP	Gross Domestic Product
HCE	household consumption expenditure
HQIC	Hannan-Quinnn information criteria
IFS	international financial statistics
IMF	International Monetary Fund
MS	Money Supply
OLS	Ordinary Least Square
REER	Real Exchange Rate
SBIC	Schwarz information criteria
TB	Trade balance

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CHAPTER ONE

1.1 Background of the study

The growth and development of African economies in general and of Ethiopia have been influenced significantly by both the external trade environment and domestic policies geared towards using the opportunities of trade and responding to trade constraints. The domestic policies involved include exchange rates, tariff structures, export taxation, import control, foreign exchange allocation systems, and the adjustment of policies to meet or adhere to international obligations and commitments. The most important external factors are the prices of primary commodities, in which for most economies taken as given. The application of trade policy instruments in Ethiopia guided by the need to stimulate domestic production, promote exports, safeguard domestic industry against dumping practices, and protect consumers. Ethiopia has been exercising its trade policy options in line with its international obligations. (Kip Kosgei, 2011)

Both the imperial and the Marxist governments tried to improve Ethiopia's balance of trade, the former by encouraging exports and the latter by curtailing imports. However, Ethiopia's foreign trade balance has been in deficit since l953, except for l975, when a combination of unusually large receipts from sales of oilseeds and pulses resulted in a surplus. In general, foreign trade has grown faster than the national economy, particularly in the early l970s, but it has accounted for only a small percentage of the national economy. In EFY 1972/73, exports and imports accounted for l3 and l2 percent of GDP, respectively. By EFY 1988/89, exports had declined to 8 percent of GDP, and imports had jumped to 2l percent. Virtually all machinery and equipment had been imported, as well as intermediate goods for agriculture and industry, including fertilizer and fuel. Increased cereal shipments accounted for the growth in imports. In the 1980s, Ethiopia faced several famines and droughts. Consequently, the country, which had been virtually self-sufficient in food supplies in the 1970s, became a net importer of food worth as much as 243 million birrs annually during the period EFY l983/84 to EFY l987/88. The military government failed to correct the country's historical trade deficit, despite efforts to regulate exports and imports. Consequently,

during the 1980s, the trade picture worsened as imports grew rapidly and foreign aid slowed. In May 1991, the Ethiopian landscape changed by major economic and political reforms. The military government collapsed and the transitional government of Ethiopia assumed the political power. Under the new reform program, foreign trade and exchange rate regimes liberalized. Prices of inputs and outputs were decoupled from arbitrary government regulation and interference; the financial market was reformed to allow private sector participation in commercial banking, insurance and micro credit services; export tariffs were abolished; export subsidies to domestic, export-oriented firms were eliminated and were replaced by incentives that provided the duty-free importation of raw materials. Moreover, in October 1992, Ethiopia's national currency devalued by 142% from its pegged rate of 2.07 per US dollar to 5per US dollar, showing the first major change on the value of birr. Currency devaluation designed to improve the external imbalance, boost output growth in general and export growth. Though still fragile and vulnerable to the vagaries of nature and aid money, the export sector in Ethiopia has shown tangible improvements since the country abandoned the fixed exchange rate regime in 1991. For instance, export receipts have increased by 35-fold between 1990/1991 and 2009/2010. The export industry has also shown significant diversification away from its dependence on coffee. In 1991/1992, when the reform package launched, coffee brought 53% of the country's total export revenue but in 2008/2009, its share declined to 26% while the shares of other goods such as oilseeds, chat, gold, flower, leather and leather products increased substantially. Though much of this diversification is within the same industry, the overall result shows a significant departure from the traditional, mono-crop dominated export sector. However, at worst, the problem is that import is near unresponsive to currency devaluation and its value increases by more than export value and this lead to further deterioration of the trade balance of Ethiopia. For instance, according to the data from Ethiopian Custom Authority, import spending has increased by 58-fold between 1990/1991 and 2009/2010. The total export values of Ethiopia during 2012/2003, 2013/2014 and 2014/2015 were 3115.8, 3300.1 and 3019.3 million US dollar, while the total import values during the same periods were 11,460.6, 13,712.3 and 16,458.6 million US dollar, respectively. So, the export earnings of

Ethiopia in 2014/2015 reduced by 8.5% as compared to export earnings in 2013/4 and this is mainly due to slowdown in export earnings from oilseeds, gold, chat, pulses, live-animals and electricity. However, total imports in 2014/2015 increased by 20% over last year and this is because of a rise in imports of capital goods, consumer goods, semi-finished goods and raw materials. As a result, the trade deficit in merchandise trade during 2014/2015 stood at USD 13.4billion, widened by 29.1% relative to the preceding fiscal year mainly due to the significant growth in total import bills; coupled with low performance in the growth of total export proceeds. Merchandise trade deficit in 2015/16 stood at USD 13.9billion which widened by 3.1percent over the preceding fiscal year mainly due to growth in total import bills in the face of falling merchandize export earnings. (NBE, 2016).

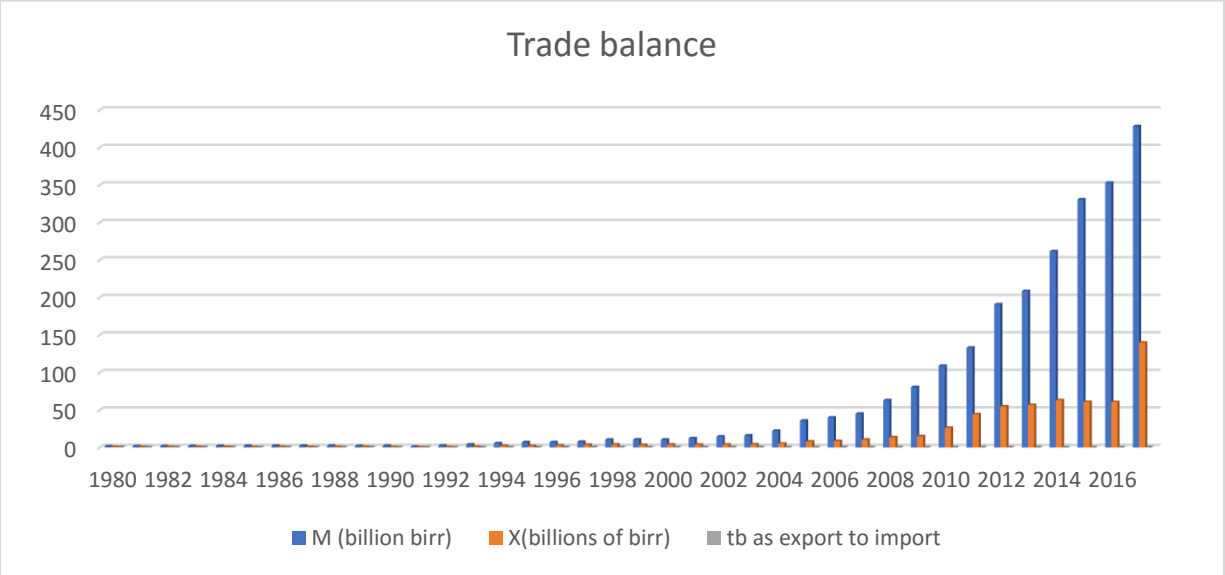


Fig 1.1 trade balance trends

The above figure depicts export import trends of Ethiopia in which the gap widens year to year when import grows significantly, and export registers a slow growth. Like most developing countries, a large proportion of the country's total exports consists of age-old traditional

agricultural exports in Ethiopia, these accounts for more than 95% of the total foreign exchange earnings. Of the total export earnings, coffee alone accounted for 65% in 1997. This clearly indicates that the dependency on a single product for foreign exchange earnings has increased, making the country much more vulnerable to the effects of a monoculture export profile. Exports have generally increased in terms of both volume and value since 1991. However, the sharp increase in the country's total foreign exchange earnings attributed to the increase in the volume of coffee exports significantly resulting from redirection from smuggling to official channels; the favorable world price for exports; an improved performance of services; and the rise in inward remittances. It is also due to the 1992-birr devaluation and subsequent depreciation of the national currency on the auction market vis-a-vis the US dollar as the dollar earnings converted into local currency at a much higher exchange rate. On the other hand, Ethiopia's imports constitute raw materials, semi-finished goods, fuel, capital goods and consumer goods, with the capital goods taking the leading share although this had overtaken by consumer goods in recent years. By comparison, the slow response of exports and the substantial increase in imports caused by escalating demand for consumer goods and capital goods imports to rehabilitate the economy since the initiation of the economic reform led to an ever-widening trade deficit. For instance, trade deficit has grown from 3.3% of GDP in 1991 to 13.4% in 1996. (IBID)

Ethiopia runs consistent trade balance deficits due to lower production of exportable goods and logistic difficulties. The country is a net importer of fuel, foodstuffs, technological products and textile apparel, which in aggregate result into a continuous trade balance deficit for a long period (more than four decades). This deficit remains high in spite of notable increases in exports and having flexible exchange rate that show-increasing trend especially in recent times. The trade balance gap is becoming wider in recent times because of importing many raw materials used by mega projects; including infrastructure and services that needs more of imported inputs. Import requirements associated with mega projects implemented in the country are main factors that exaggerate trade deficit of the country. Ethiopian exports tripled from 97.42million kilograms

worth of 9.64billion birr in 2006 to 1.13 billion kilograms worth 31.7billion birr in 2010. Though this is the case in the export side but the rate of increment in the import of the country is also very huge, which result into having wide trade balance deficit. Ethiopia's trade balance repudiated to narrow during the last five years despite the impressive growth of Ethiopia's export revenue. The export revenue covered only 26% of the country's import expenditure in 2010, which showed an improvement as compared to what it was in 2006 (only 24% of the import expense). The trend in 2009 showed a significant amount of reduction as compared to preceding years, in which exports able to cover only 18% of the country's import (Arega, 2012).

1.2. Statement of the Problem

The macroeconomic crises and changes in the international trade patterns in the era of globalization have caused the need for a clearer understanding of the factors underlying a country's trade balance position. Ethiopian external trade is highly dependent on advanced nation, such as, the United States, Germany, Italy, France, and the United Kingdom. A major share of Ethiopia's exports goes to these nations, and most imports originate in these advanced nations. Trade with African and other developing countries is relatively less. Labor-intensive agricultural products mostly characterize the Ethiopian exports. The country has problems of unstable export markets and worsening terms of trade. Ethiopia's exports are concentrated on a small number of products. In terms of value, the shares of major export items have been fluctuating over time due to volatile behavior of price and unpredictable demand in the international market. On the supply side, the agricultural items influenced by policy problems, war, structural constraints, natural factors (drought, disease), etc. (G/egziabher, 2003).

Ethiopia's ability to afford imports has come to depend increasingly on external financing. Foreign exchange controls and extensive use of foreign loans and credits have given rise to compartmentalize in the management of imports. Food and capital goods imports, largely paid for by external grants or loans, have soared, while general imports of raw materials, intermediate, consumption goods, and spare parts restrained by controls on the allocation of free foreign

exchange. These controls have become increasingly irritating, even to the privileged users of official foreign exchange in the public sector. External financing allowed the resource gap to widen, over the decade, from five percent of GDP to 11 percent. Though external assistance for disaster relief has been on grant terms, receipts of highly concessional development assistance from Western donors have been low and much of the external financing of the public development effort has been by way of semi-concessional or non-concessional loans. Debt service obligations have accumulated and, given the relative stagnation of export earnings, the ratio of debt service to exports of goods and non-factor services has risen since the early 1980s from 16 percent to 44 percent. Debt service, alongside food and fuel, has received priority in foreign exchange allocation and Ethiopia has so far severely honored its debt service obligations, without rescheduling, even at the expense of current imports. This achievement was at the cost of compressing general imports (Fasil, 2015).

In the background to the poor export performance and to the poor prices offered to producers is an exchange rate, pegged since 1973 to the US dollar, which, on real effective exchange rate evidence, has consistently overvalued for many years. It underpins a whole structure of administered prices in the public sector and in the public distribution of agricultural commodities compulsorily procured from the peasant sector. In the parallel market prices are higher, often much higher, reflecting domestic scarcities, restraints on private transport and trade, the parallel exchange rate (which discounts the Birr to between a half and a third of its official rate) and trade distortions caused by surcharges on own exchange imports, and partially cascading indirect taxes. There is inadequate incentive for the private sector, whose costs are determined in the parallel market, to produce for export. There are large implicit incentives for rent-seeking trading activity and for arbitrage between the official and parallel markets. Until recently, the number of traders' licenses has reduced but trading can be highly lucrative. It would serve the interests of increasing commodity production and of redirecting resources in capital and entrepreneurship away from rent-seeking if the divergence between parallel and official prices and exchange rates were diminished.

A number of factors such as exchange rate changes, monetary and fiscal policies, domestic and foreign income growth, supply shocks, and competitiveness determines the trade balance of a country. This study focuses on the determinants of trade balance such as exchange rate changes, money and income. The exchange rate is an important determinant of exports and imports of a country since it represents the rate at which the domestic goods and services that can be exchanged with the output produced by foreign countries. A depreciation of exchange rate, for example, will spur the demand for Ethiopian exports as foreigners find that they are able to purchase more of Ethiopian goods with the same amount of their exports since their imports have become relatively cheaper. On the other hand, Ethiopians will find that their imports have become more expensive and therefore they may reduce the purchase of foreign goods and increase the consumption of domestic substitute goods. This suggests that exchange rate depreciation affects trade balance, which in turn has a direct positive impact on the exportable and importable industries in the domestic economy creating more jobs and income for the citizens. Thus, exchange rate changes are major concerns to both developed and developing countries. Bantegizie & Dawit (2010) identified the short and long run determinants of trade balance in Ethiopian economy for the period 1978 to 2009. Here the variables are real effective exchange rate, Household consumption expenditure, Government consumption expenditure, Terms of trade, Money supply and Trade liberalization. The findings suggested that the most important long run determinants of trade balance are household consumption expenditure, real effective exchange rate and terms of trade while government consumption expenditure is the short run determinants of trade balance. This study did not consider the effect of GDP on trade balance and due to dynamic nature of economy, country's level of growth, direction of trade, volume of import and export that affect trade balance is now changed. Taking into consideration of those factors and changes, it necessitates performing of this study, which supposed to fill the time gap between previous study and status. Arega (2012) studied the determinants of trade balance in Ethiopia using error correction model for the period 1981-2011.The variables included were Gross domestic income, Agriculture growth, Inflation, World Oil Price, Trade percentage of GDP, Cereal Production, Elasticity of import and Elasticity

of export. The long-run co-integration result shows that GNI per capita, domestic inflation and trade dependency of the country have negative and significant integration with the ratio of export to import. Given this, world oil price, inflation has positive and significant effect on the ratio. The vector error correction model of the short-run regression shows that the previous year ratio (Export/Import), elasticity to import, previous year world oil price, agricultural growth and previous year GNI per capita have positive and significant effect on the speed of adjustment of the long-run trend of the ratio. Given this, elasticity of export, previous year inflation and current year GNI per capita affects the speed of adjustment negatively and significantly. This study did not consider money supply and ER and used only 30-year annual data. This study is different from earlier study because it tries to determine the relationship between the trade balance and its determinants by using recent econometric techniques (ARDL model).

1.3 Objective of the study

The main purpose of the study is to find the major determinants of balance of trade in Ethiopia. Fiscal and monetary policy of a country influenced by balance of trade. As a result, determinants of trade balance play vital role to policy makers. Thus, the main objective of this study is to focus on the determinants of balance of trade and their impact. More specifically the study has of the following objectives:

- To assess the trends of trade balance of Ethiopia from the year 1980 to 2017.
- To identify the effect of exchange rate on trade balance
- To identify the effect of money supply on trade balance
- To identify the effect of gross domestic product on trade balance
- To identify the effect of government consumption expenditure on trade balance
- To identify the effect of household consumption expenditure on trade balance

1.4 Scope and Limitations of the Study

Trade balance is a broad and complex concept; there are micro and macroeconomic factors influence it in one way or another. This paper consider macroeconomic factors. In addition, the

study was limited from 1980 to 2017 year. That is thirty-eight (38) observations using annual time series data.

There could be a number of limitations for this study. It only focused on trade balance and five independent variables namely exchange rate, government consumption expenditure, GDP, household consumption expenditure and money supply. The study relied on secondary data, which had already compiled by different organizations like World Bank development indicators and national bank of Ethiopia.

1.5 Significance of the Study

This study is expected to determine the most significant determinant variables on trade balance of Ethiopia. Thus, importance of this research is to provide a better knowledge and understanding of the factors that affect trade balance for researchers. The output of this study also serves as an input for the upcoming researchers to investigate the trade balance in more detail way. And identify in which point Ethiopia is not doing better so that more effort and new measures can be taken by policy makers to improve trade balance which will come by exporting more and hence reduce the range trade deficit of this country and if possible, attain trade surplus. Also new policy measures raised up to reduce the range of trade deficit, which lies in Ethiopian trade balance.

1.6 Organization of the study

The paper has five main chapters. Chapter one is the introduction part which contains background of the paper, statement of the problem, objective of the study, scope and limitation of the study, significance of the study and organization of the study. Chapter two is literature review which includes theoretical and empirical literature review. Chapter three is research design and methodology which contains research design, data source and sample size and methodology. Chapter 4 is the result and analysis part. Chapter five is finally conclusion and recommendation part.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Introduction

This chapter is devoted to the literature on the determinants of trade balance. It's divided into two main sections. The first section explores the theoretical literature while the second section reviews empirical studies related to the subject.

Definition of Terms

Trade is a basic economic concept that involves multiple parties participating in the Voluntary negotiation and then the exchange of one's goods and services for desired goods and services that someone else possesses. The advent of money as a medium of exchange has allowed trade to conduct in a manner that is much simpler and effective compared to earlier forms of trade, such as bartering. In financial markets, trading also can mean performing a transaction that involves the selling and purchasing of a security.

International trade is the exchange of capital, goods, and services across international borders or territories. In most countries, such trade represents a significant share of gross domestic product (GDP). While international trade has been present throughout much of history, it is economic, social, and political, importance has been on the rise in recent centuries. It is the presupposition of international trade that a sufficient level of geopolitical peace and stability are prevailing in order to allow for the peaceful exchange of trade and commerce to take place between nations.

Trading globally gives consumers and countries the opportunity to expose to goods and services not available in their own countries. Almost every kind of product found on the international market: food, clothes, spare parts, oil, jewelry, wine, stocks, currencies and water. Services traded like tourism, banking, consulting and transportation. A product sold to the global market is an export, and a product bought from the global market is an import. Imports and exports are

accounted in a country's current account in the balance of payment. International trade is also a branch of economics, which, together with international finance, forms the larger branch called international economics.

2.2 Theoretical review

Because no single theoretical approach can capture all possible determinants of trade balance, this study investigated main variables that can have possible impacts on trade balance from different approaches.

2.2.1 The elasticity theory

The elasticity approach to BOP is associated with the Marshall-Lerner condition, which works out independently by economists. It studies the conditions under which exchange rate changes restore equilibrium in BOP by devaluing a country's currency. This approach relates to the price effect of devaluation (Waliullah et.al 2006).

Whether devaluation improves the trade balance of the devaluating nation depends on the elasticity of foreign demand for the nation's export and the elasticity of domestic demand for imported goods in that nation, according to elasticity approach. Put differently, if the foreign demand for a nation's export is inelastic, then a devaluating nation will not be able to increase its foreign exchange earnings. This is because, even if devaluation has made the nation's export cheaper for the foreigners, the foreign countries' demand for a nation's export has failed to increase. This will not improve the trade balance of devaluating countries. In the same way, if the devaluating nation's demand for imported foreign goods is inelastic, the level of a nation's import will remain the same as before. However, devaluation has made imports costly to a devaluating nation and this implies that a devaluating nation will now spend more dollars on fixed amount of imports thereby leading to the worsening of the trade balance of the nation. However, if on the other hand, both the demand for import of a nation and the demand for export of a nation are elastic, devaluation improves the trade balance of a nation. Thus, the success and the failure of devaluation in correcting the disequilibrium in foreign sector depend mainly on the elasticity of demand for export of a nation

and elasticity of demand for imported foreign goods. Moreover, if the export demand is unitary elastic, currency devaluation has no impact on the trade balance situation of a nation. Simply put, if the export and import elasticities are more elastic, devaluation will help reduce the trade balance disequilibrium of a nation but, when these elasticities are lower, devaluation is helpless in correcting the disequilibrium in the foreign sector of a nation. Even worst, it will increase the size of deficit and worsen the trade balance situation of a nation. However, import demands for developing countries like Ethiopia, are inelastic as their imports are primarily composed of capital goods, semi-finished goods, fuels and the like of which, a nation cannot cut their imports. Similarly, small developing countries have in elastic export supply curve as their export is mainly composed of primary agricultural commodities with a longer gestation period. When a country devalues its currency, the domestic prices of its imports raised, and the foreign prices of its exports reduced. Thus, devaluation helps to improve BOP deficit of a country by increasing its exports and reducing its imports. However, the extent to which it will succeed depends on the country's price elasticities of domestic demand for imports and foreign demand for exports. This is what the Marshall-Lerner condition states: when the sum of price elasticities of demand for exports and imports in absolute terms is greater than unity, devaluation will improve the country's balance of payments, i.e.

$E_x + e_m > 1$

Where e_x is the demand elasticity of exports and E_m is the demand elasticity for imports. On the contrary, if the sum of price elasticities of demand for exports and imports, in absolute terms, is less unity, $e_x + e_m < 1$, devaluation will worsen (increase the deficit) the BOP. If the sum of these elasticities in absolute terms is equal to unity, $e_x + e_m = 1$, devaluation has no effect on the BOP situation which will remain unchanged. The following is the process through which the Marshall-Lerner condition operates in removing BOP deficit of a devaluing country. Devaluation reduces the domestic prices of exports in terms of the foreign currency. With low prices, exports increase.

The extent to which they increase depends on the demand elasticity for exports. It also depends on the nature of goods exported and the market conditions. If the country is the sole supplier and exports raw materials or perishable goods, the demand elasticity for its exports will be low. If it exports machinery, tools and industrial products in competition with other countries, the elasticity of demand for its products will be high, and devaluation will be successful in correcting a deficit. Devaluation has also the effect of increasing the domestic price of imports that will reduce the import of goods. By how much the volume of imports will decline depends on the demand elasticity of imports. The demand elasticity of imports, in turn, depends on the nature of goods imported by the devaluing country. If it imports consumer goods, raw materials and inputs for industries, its elasticity of demand for imports will be low. It is only when the import elasticity of demand for products is high that devaluation will help in correcting a deficit in the balance of payments. Thus, it is only when the sum of the elasticity of demand for exports and the elasticity of demand for imports is greater than one that devaluation will improve the balance of payments of a country devaluing its currency(IBID).

The J-Curve Effect:

Empirical evidence shows that the Marshall- Lerner condition is satisfied in the majority of advanced countries. However, there is a consensus among economists that both demand-supply elasticities will be greater in the end than in the short run. The effects of devaluation on domestic prices and demand for exports and imports will take time for consumers and producers to adjust themselves to the new situation. The short-run price elasticities of demand for exports and imports are lower and they do not satisfy the Marshall-Lerner condition. Therefore, to begin with, devaluation makes the BOP worse in the short- run and then improves it in the long run. This traces a J-shaped curve through time. This is the J-curve effect of devaluation. However, in case the country is on a flexible exchange rate, BOP will get worse when there is devaluation of its currency. Due to devaluation, there is excess supply of currency in the foreign exchange market, which may go on depreciating the currency. Thus, the foreign exchange market becomes unstable and the exchange rate may overshoot its long-run value. There has been much controversy over

the Marshall-Lerner condition for improvements in the balance of payments. Economists tried to measure demand elasticities in international trade. Some economists found low demand elasticities and others high demand elasticities (Fasil, 2015)

2.2.2 Monetary approach

The monetary approach to the balance of payments is an explanation of the overall balance of payments. It explains changes in balance of payments in terms of the demand for and supply of money. According to this approach, "a balance of payments deficit is always and everywhere a monetary phenomenon." Therefore, it corrected by monetary measures (Duasa, 2007).

The demand for money (M_D) is a stable function of income (Y), prices (P) and rate of interest (i)

$M_D=f(Y, P, I)$…… (1)

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

$M_s = D + R$…….……..…….(2)

Since in equilibrium the demand for money equals the money supply,

$M_d = M_s$ …….. (3)

On the other hand, $M_d = D + R$ [$M_S = D + R$] ….…….. (4)

A balance of payments deficit or surplus represented by changes in the country's foreign exchange reserves. Thus

$R = DM_d - DD$ …….…….. (5)

Alternatively, R = B …….…… (6)

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

A balance of payments deficit means a negative B, which reduces R and the money supply. On the other hand, a surplus means a positive B, which increases R and the money supply. When B = O, it means BOP equilibrium or no disequilibrium of BOP.The automatic adjustment mechanism in the monetary approaches explained under both the fixed and flexible exchange rate systems.

Under the fixed exchange rate system, assume that $M_D = M_S$ so that BOP (or B) is zero. Now suppose the monetary authority increases domestic money supply, with no change in the demand for money. As a result, $M_S > M_d$ and there is a BOP deficit. People who have larger cash balances increase their purchases to buy more foreign goods and securities. This tends to raise their prices and increase imports of goods and foreign assets. This leads to increase in expenditure on both current and capital accounts in BOP, thereby creating a BOP deficit. To maintain a fixed exchange rate, the monetary authority will have to sell foreign exchange reserves and buy domestic currency. Thus, the outflow of foreign exchange reserves means a fall in R and in domestic money supply. This process will continue until $M_s = M_d$ and there will again be BOP equilibrium.

On the other hand, if $M_S < M_d$ at the given exchange rate, there will be a BOP surplus. Consequently, people acquire the domestic currency by selling goods and securities to foreigners. They will also seek to acquire additional money balances by restricting their expenditure relatively to their income. The monetary authority on its part, will buy excess foreign currency in exchange for domestic currency. There will be inflow of foreign exchange reserves and increase in domestic money supply. This process will continue until $M_S = M_D$ and BOP equilibrium restored. Thus, a BOP deficit or surplus is a temporary phenomenon and is self-correcting (or automatic) in the long run. Under a system of flexible (or floating) exchange rates, when B = O, there is no change in foreign exchange reserves (R). However, when there is a BOP deficit or surplus, changes in the demand for money and exchange rate play a major role in the adjustment process without any inflow or outflow of foreign exchange reserves. Suppose the monetary authority increases the money supply ($M_s > M_D$) and there is a BOP deficit. People having additional cash balances buy

more goods thereby raising prices of domestic and imported goods.There is depreciation of the domestic currency and a rise in the exchange rate. The rise in prices, in turn, increases the demand for money thereby bringing the equality of M_D and M_s without any outflow of foreign exchange reserves. The opposite will happen when $M_d > M_s$, there is fall in prices and appreciation of the domestic currency which automatically eliminates the excess demand for money. The exchange rate falls until $M_d = M_s$ and BOP is in equilibrium without any inflow of foreign exchange reserves. Despite these criticisms, the monetary approach is realistic in that it takes into consideration both domestic money and foreign money. Emphasis is not on relative price changes, but on the extent to which the demand for real money balances will be satisfied from internal sources, through credit creation or from external sources through surplus or deficit in the balance of payments. A balance of payments deficit or surplus corrected through changes in money supply and their consequent effects on income and expenditure, or more generally on production and consumption of goods (IBID)

2.3.3 Absorption approach

The absorption approach to balance of payments is general equilibrium in nature and based on the Keynesian national income relationships. It also known as the Keynesian approach. It runs through the income effect of devaluation as against the price effect to the elasticity approach.

The theory states that if a country has a deficit in its balance of payments, it means that people are 'absorbing' more than they produce. Domestic expenditure on consumption and investment is greater than national income. If they have a surplus in the balance of payments, they are absorbing less. Expenditure on consumption and investment is less than national income. Here BOP defined as the difference between national income and domestic expenditure (Keynes, 1936).

The analysis explained in the following form

$Y = C + I_d + G + X\text{-}M$ …..... (1)

Where Y is national income, C is consumption expenditure, total domestic investment; G is autonomous government expenditure, X represents exports and M imports.

The sum of ($C + I_d + G$) is the total absorption designated as A, and the balance of payments ($X – M$) designated as B. Thus, Equation (1) becomes

$Y = A + B$

Alternatively, $B = Y-A$ …… (2)

Which means that BOP on current account is the difference between national income (Y) and total absorption (A). BOP improved by either increasing domestic income or reducing the absorption. For this purpose, Alexander advocates devaluation because it acts both ways. First, devaluation increases exports and reduces imports, thereby increasing the national income.

The additional income so generated will further increase income via the multiplier effect. This will lead to an increase in domestic consumption. Thus, the net effect of the increase in national income on the balance of payments is the difference between the total increase in income and the induced increase in absorption, i.e.,

$DB = DY-DA$ ……. (3)

Total absorption (DA) depends on the marginal propensity to absorb when there is devaluation. This is expressed as (a). Devaluation also directly affects absorption through the change in income, which we write as D. Thus

$Da = a\ DY + Dd$ ……..…. (4)

Substituting equation (4) in (3), we get

$DB = DY-aDY-DD$

Alternatively, $DB = (1 – a)\ DY-DD$ ……. (5)

The equation points toward three factors, which explain the effects of devaluation on BOP. They are: (i) the marginal propensity to absorb (a), (ii) change in income (DY), and (iii) change in direct absorption (DD). It may be noted that since a is the marginal propensity (MP) to absorb, (1 – a) is the propensity to hoard or save. These factors, in turn, influenced by the existence of unemployed or idle resources and fully employed resources in the devaluing country.

Effects of Devaluation on BOP:

Income Re-distribution Effect: Direct absorption falls automatically if devaluation redistributes income in favor of people with high marginal propensity to save and against those with high marginal propensity to consume. If the marginal propensity to consume of workers is higher than those of profit-earners are, absorption reduced. Further, when money incomes of lower income groups increase with devaluation, they enter the income tax bracket. When they start paying income tax, they reduce their consumption as compared with higher income groups that are already paying the tax. This leads to reduction in absorption in case of the former. Income redistribution also takes place between production sectors after devaluation. Those sectors whose prices rise more than their costs of production earn more profits than the other sectors whose costs rise more than their prices. Thus, the effect of devaluation will be to redistribute income in favor of the former sectors. Devaluation will also redistribute income in favor of sectors producing and selling traded goods and against non-traded goods sectors. Prices of traded goods rise more than that of non-traded goods. As a result, profits of producers and traders and wages of workers producing traded goods rise more as compared to those engaged in non-traded goods (IBID, p17)

Government Expenditure and Trade balance

The interaction between government expenditure and trade balance theoretically viewed through various channels. However, the study explains this interaction through two channels the IS-LM (investment saving liquidity money) Mundell-Fleming model and the absorption approach to balance of payments. Again, the interaction between government expenditure and trade balance explained in the context of the IS-LM Mundell-Fleming model. As government expenditure increases in an open economy, it causes aggregate demand to increase hence causing an outward shift in the IS-curve. The outward shift in the IS curve causes a rise in the level of equilibrium interest rate. According to the Mundell-Fleming model, higher levels of interest rate triggers net capital inflows from abroad resulting in an appreciation of the domestic currency. Appreciation of the domestic currency will adversely affect net exports, as domestic imports become relatively cheaper and domestic exports expensive on the international market. As imports increases relative to exports, it causes a decline in net exports. (minh et.al 2012)

2.3 Empirical literature

Shen (2013) Analysis of the Main determinants that have an impact on trade balance. This study focuses on the main cause of Trade deficit in Tanzania by analyzing the impact of Foreign Direct Investment (FDI), Human Capital Development (HCD), Household Consumption Expenditure (HCEXP), Government Expenditure (GEXP), Inflation (INF), Natural Resources Availability (NRA), Real Exchange Rate (REX) and Foreign Income (WY) and Trade Linearization (TLB) etc. In this study The Ordinary Least Square method (OLS) under the E-View 7.1 software has been used for the econometric analysis with a sample period spanning from 1980-2012. The literature reviews of the previous researchers have the mixed results on the factors in questions. However, this study used more variables that have rarely explored specifically in Tanzania. The main influencing factors for the case of Tanzania are Foreign Direct Investment(FDI),Human Capital Development(HCD),Household Consumption Expenditure(HCEXP), Government Expenditure (GEXP),Inflation (INF),Natural Resources Availability (NRA),Foreign Income(WY) and Trade Liberalization(TLB) so suggested policy measures should focus on them to reduce the trade deficit in the Tanzanian economy.

Arega (2012) assess the main determinants of the trade balance of Ethiopia by considering ratio of export and import as an approximation to trade balance. The study implements error correction model to analyze a time series data from 1981-2011, collected from World Bank. The long-run co-integration result shows that GNI per capita, domestic inflation and trade dependency of the country have negative and significant integration with the ratio of export to import. Given this, world oil price inflation has positive and significant effect on the ratio. The vector error correction model of the short-run regression shows that the previous year ratio (Export/Import), elasticity to import, previous year world oil price, agricultural growth and previous year GNI per capita have positive and significant effect on the speed of adjustment of the long-run trend of the ratio. Given this, elasticity of export, previous year inflation and current year GNI per capita affects the speed of adjustment negatively and significantly. The ECM result shows that the speed of adjustment of

the deviation from the long-run trend line is 91%, which indicates that Ethiopian economic system is responsive for each policy measures.

Suphian1(2014) in his paper "trade balance determinants in east African countries "examines the empirical determinants of trade balance in East African countries and propose possible trade balance deterioration remedies. The proposed trade balance model was estimated using co integration regression under the Full Modified Least Square (FMOLS) followed by the Vector Error Correction Model (VECM). Different mixed results were obtained across countries under study. However, among all other variables, the study found Foreign Direct Investment (FDI) as the main variable of interest and probable solution in improving the trade balance of EAC countries. Therefore, EAC countries should concentrate on export-oriented development policies that focus on export-oriented manufacturing industries because large amounts of FDI flow into those areas already.

Ray (2012) examines the role of various determinants like real effective exchange rate, domestic consumption, FDI and foreign income on balance of trade in determining short-and-long-run trade balance behavior for India over the period, 1972-73 to 2010-11. More precisely, the aim is to examine whether the trade balance is affected by exchange rates, FDI and household consumption and foreign incomes etc. Several econometric techniques and tools like Augmented Dickey Fuller test, Johansen Co integration test and VECM, OLS have been used to observe long run as well as short run causality among different macro- economic variables under consideration of the study. The result suggests that long run as well as short run causality existed among different macro-economic variables like real effective exchange rate, FDI, domestic consumption and foreign income and foreign direct investment and foreign income have significant positive impact on balance of trade whereas domestic consumption and real effective exchange rate affected negatively on balance of trade in India.

Minh et.al (2012) examines the factors impact on trade balance in Vietnam including oil price, foreign direct investment (FDI), government spending, domestic price, manufacturing growth rate and agricultural growth rate by using the monthly data during the period 2002 – 2011. The expected benefit of the study is understanding the factors that affect trade balance in Vietnam for the relevant parties to improve Vietnam competitiveness; and useful for the policy makers to adjust the policies appropriately with the economy's situation in Vietnam. This study used regression with logarithmic form to determine the impact of six factors on trade balance in Vietnam. Moreover, statistical program used to analyze the data. The regression result showed that there is only domestic price variable impact on trade balance in Vietnam. Domestic price had negative impact on trade balance in Vietnam. The other factors include oil price, foreign direct investment, government spending, manufacturing growth rate and agricultural growth rate had no impact on trade balance in Vietnam.

Ng Yuen-Ling (2008) attempts to identify the relationship between the real exchange rate and trade balance in Malaysia from year 1955 to 2006. This study uses Unit Root Tests, Co integration techniques, Engle-Granger test, Vector Error Correction Model (VECM), and impulse response analyses. The main findings of this paper are: (I) long run relationship exists between trade balance and exchange rate. Other important variables that determine trade balance such as domestic income shows a long run positive relationship between trade balances, and foreign income shows a long run negative relationship

(ii) The real exchange rate is an important variable to the trade balance, and devaluation will improve trade balance in the long run, thus consistent with Marshall-Lerner condition

(iii) The results indicate no J-curve effect in Malaysia case

Murshed (2014) attempts to identify the relationship between the exchange rate and trade balance in Bangladesh from year 1973 to 2011. This study uses Augmented Dickey Fuller (ADF) Unit Root Tests, Co-integration techniques, Engle-Granger test, and some other diagnostics test like

Multicollinearity test, Normality test, Chaw test, Lagrange Multiplier serial Auto-correlation test and Rumsey's RESET model specification test and so on. The main findings of this study are: (i) relationship exists between trade balance and exchange rate. Other important variables that determine trade balance such as domestic income shows a negative relationship between trade balances, foreign income shows a long run positive relationship and another important factor foreign asset has positive impact on trade balance dynamics. (ii) The real exchange rate is an important variable to the trade balance, and devaluation will improve trade balance in the long run, thus consistent with Marshall-Lerner condition. The coefficients are found to change smoothly like exchange rate, foreign asset and growth of domestic and foreign GDP has a significant impact on trade flows. Drawing inferences from these findings, this paper suggested that increase of exchange rate and foreign asset can keep highly substantial and feasible roles to make Bangladeshi product competitive in world market.

Bantegizie & Dawit (2010) attempted to identify the short and long-run determinants of trade balance in the case of Ethiopia's economy for the period 1978 to 2009. In order to achieve the stated objectives a synthesis model of absorption, elasticity and monetary approaches to trade balance is estimated using Engle- Granger two-step procedures of co integration and general to specific error correction model. The findings of the study suggest that the most important long run determinants of trade balance are household consumption expenditure, real effective exchange rate and terms of trade while government consumption expenditure, household consumption expenditure, real effective exchange rate and terms of trade are the short run determinants of trade balance. Based on the findings of this study the researcher recommended raising import tariff on final consumer goods, expand industrial base, increase domestic saving to finance domestic investment, depreciation or devaluation of birr and improving the quality of domestic products to solve the trade imbalance.

Medina (2015) tests the validity of Marshal Lerner condition for Ethiopian economy. With this aim, import and export equations estimated by using the OLS method. Estimation results show

that there is a positive relationship between exchange rate and export and devaluation will lead the nation's export to increase in the short run nevertheless, devaluation does not decrease import. Since the import coefficient is not statistically significant, the Marshall Lerner condition does not hold in Ethiopian economy even if the sum of the absolute value of elasticity of import and export is greater than one. Co integration techniques used to see the long run relation between the variables of both the export and import equations. The results indicated that there is no long run relation between the variables of the export equation such as export, exchange rate and world income and the import equation such as import, exchange rate and domestic national income.

Temesgen (2016) examines the short run and long run effect of real effective exchange rate on trade balance of Ethiopia together with other variables that assumed to have effect on trade balance such as real GDP, government consumption, money supply and trade openness. The Autoregressive Distributed Lag (ARDL) Approach used for analysis time serious annual data of period 1979/80 to 2013/34. As econometrics, result reveals that these macro-economic variables have short run as well as long run positive and significant effect on trade balance of the country except money supply, which has negative effect in the short run. That is in the short run real GDP, real exchange rate, government expenditure and trade openness have positive effect on trade balance of the country, while money supply has negative effects. Where as in the long run: real GDP, real effective exchange rate, money supply, government consumption and trade openness have significant and positive effect on trade balance. Based on the result this paper conclude that real effective exchange rate has short as well as long run effect on trade balance. To handle this series effect and reduce this continual deficit on trade balance government must formulate strong controlling mechanism on monitory policy and trade structure of the country.

Fasil (2015) examined the effect of Birr devaluation on trade balance of Ethiopia for the period 1970-2014 using the Vector Error Correction Model. The key results of this study revealed that Birr devaluation deteriorates the trade balance of Ethiopia in the short run and improves it in the long run. Moreover, the result from the long and short run models showed that real effective

exchange rate, money supply, domestic real income and term of trade are the major determinants of the trade balance of Ethiopia in both the short and long run. Besides the short and the long run model, the impulse response function and the descriptive analysis revealed that a J-curve phenomenon exists for the trade balance of Ethiopia. That means, the finding of this study showed that the Marshall-Lerner Condition holds only in the long run. So, the study revealed that the elasticity, monetary and absorption theories are significant in explaining the trade balance of Ethiopia. The policy implication is that policies that encourage productivity improvements, diversification of the export sectors and expansion of import computing industries are alternative policies for devaluation. Moreover, government may need to be conservative in using devaluation (exchange rate policy) to improve trade balance as it may worsen the situation in the short run. Thus, the country on the process of industrialization, first needs to promote import computing industries and then, once the production gets its way, devaluation would be clear.

Mohamed (2011) Analysis of the Main determinants that have an impact on trade balance. Specifically, this study focuses on the main cause of Trade deficit in Somalia by analyzing the impact of Foreign Direct Investment (FDI), exchange rate and inflation rate; In this study The Ordinary Least Square method (OLS) under the E-View 7.1 software has been used for the econometric analysis with a sample period spanning from 1970-2010. This study adopted the two-country imperfect substitute model of Rose and Yellen that analyses the relationship of the real exchange rate and the trade balance. The regression result showed that there is only foreign direct investment variable impact on trade balance in Somalia. Foreign direct investment had negative impact on trade balance in Somalia. The other factors include exchange rate and inflation rate had no impact on trade balance in Somalia. According to the result, there are some recommendations to solve the trade deficits problem in Somalia. The government should keep the policies stable to attractive more investors and should have policies to support export such as investment incentive and taxes incentive.

Sachin (2012) attempts to examine the role of various determinants like real effective exchange rate, domestic consumption, FDI and foreign income on balance of trade in determining short-and-long-run trade balance behavior for India over the period,1972-73 to 2010-11. More precisely, the aim is to examine whether the trade balance is affected by exchange rates, FDI and household consumption and foreign incomes etc. Several econometric techniques and tools like Augmented Dickey Fuller test, Johansen Co integration test and VECM, OLS have been used to observe long run as well as short run causality among different macro- economic variables under consideration of our study. The result suggests that long run as well as short run causality existed among different macro-economic variables like real effective exchange rate, FDI, domestic consumption and foreign income and foreign direct investment and foreign income have significant positive impact on balance of trade whereas domestic consumption and real effective exchange rate affected negatively on balance of trade in India.

Falk (2008) investigates the determinants of the trade balance using panel data for 32 industrialized and emerging economies for the period 1990–2007. The results based on fixed effects models and linear mixed models allowing for random slope coefficients, show that the trade balance as a percentage of GDP is significant and positively related to real foreign GDP per capita of the trading partners. Real domestic GDP per capita has a negative effect on the trade balance. A real depreciation of the real exchange rate index leads to an improvement of the trade balance. However, in countries with a negative trade balance and/or a large positive net foreign direct investment position the trade balance is much less sensitive to movements in the real effective exchange rate index.

Mika et.al (2015) study both the long-run determinants and the short-run dynamics of the trade balances in the EU-15 countries. Analyze each country separately and decompose the aggregate trade balance into the intra balance (trade balance vis-à-vis euro area) and the extra balance (trade balance vis-`a-vis the rest of the world). Overall, the result suggests that there are significant differences in the long-run relations across the EU-15 countries, which might be overlooked in the

panel co integration studies. In most of the countries, there is a long-run co integration relation between the variables, but in many cases, the coefficient of the trade balance variable is statistically insignificant in the relation. When the study analyzes the intra balances and the extra balances, we find that they do not adjust to the disequilibrium error in an error-correction representation of the variables. The results on the short-run dynamics indicate that in general the aggregate trade balance cannot be adjusted by expenditure-switching or expenditure-reducing policies.

Duasa (2007) examines the short- and long-run relationships between trade balance, real exchange rates, income and money supply in the case of Malaysia. The inclusion of income and money variables in the study is purposely to examine the monetary and absorption approaches to the balance of payments beside the conventional approach of elasticity, using exchange rates. Using the bound testing approach to co integration and error correction models, developed within an autoregressive distributed lag (ARDL) framework, we investigate whether a long-run equilibrium relationship exists between trade balance and the determinants. Additionally, we adopt an innovation accounting by simulating variance decompositions (VDC) and impulse response functions (IRF) for further inferences. Using this approach, we find evidence of a long run relationship between trade balance, income, and money supply variables but not between trade balance and real exchange rate. The findings also suggest that Marshall Lerner condition does not hold in the end for Malaysia and for policy wise the Malaysian trade balance/ balance of payments should be viewed from absorption and monetary approaches.

Mohammad (2010) explore the long run as well as short run determinant of trade deficit with reference to Pakistan by using Johansen co integration approach and Error correction model (ECM). The finding of this study suggests that foreign income, foreign direct investment, domestic household consumption and real effective exchange rate are significantly affect the trade deficit. To highlight the short run dynamics VECM (Vector Error correction model) was used. The result of VECM pointed out that there is disequilibrium in the short run, which adjusted within a year.

Sugema (2005) investigates the effects of real exchange rate depreciation and supply side shocks on exports and imports. Indonesia provides an interesting case study of the subject because this country experienced a large depreciation, banking sector collapse, and socio-political turbulence during the Asian crisis episode. The results suggest that trade balance will improve following devaluation through an increase in exports and a collapse in imports. Because the elasticity of imports with respect to the real exchange rate is greater than that of exports, improvement in trade balance would be mainly come from import compression. It was found that export performance could have been far better if Indonesia did not suffer from banking problems and socio-political turbulence.

Safiat (2015) employs the autoregressive distributed lag (ARDL) approach to co- integration and the associated error correction model (ECM), to examine the factors that determine the Sudan's trade balance in the long and the short-run over the period 1970-2014. Such factors are exchange rate, cost of finance, credit to the private sector, real per capita GDP, inflation rate and domestic investment. In the long run exchange rate, inflation and real per capita GDP exert negative effects, while cost of finance, credit to the private sector and investment has positive effect on trade balance. All coefficients have the expected sign and statistically significant except the coefficient of the exchange rate which has the wrong sign. This is because devaluation/depreciation of domestic currency increases the cost of local as well as imported production inputs, which leads to an increase in total imports and then deteriorates the balance of trade. In addition, the rigidities that characterize the Sudanese economy is one of the factors that leads to this inverse relationship between exchange rate and trade balance. Although we could not find any short-run relationship between the explanatory variables and trade balance in Sudan, these variables are found to be related in the long run. The results indicate that there is weak relationship between investment and trade balance, which is attributed usually to the prevailing situations of political instability, prolonged civil wars, and other factors such as uncertainty over agricultural leases, which resulted in declining investment, particularly in major agricultural projects.

2.4 Research gap

Many researchers agree (and have found empirically) that the variables in question (RER. Government expenditure, FDI, Domestic and foreign income, and money supply) have an impact on a country's trade balance in one or another way. Arega (2012) studied the determinants of trade balance in Ethiopia using vector error correction model for the period 1981-2011.The variables included in this study are Gross domestic income, Agriculture growth, Inflation, World Oil Price, Trade percentage of GDP, Cereal Production, Elasticity of import and Elasticity of export. This study did not consider money supply and RER and used only 30-year annual data. The literature suggested that the internal and external factors that influence an economy's trade balance vary from country to country and from time to time. As a result, their influences on the trade balance also vary significantly. A full account of such factors required a detailed country analysis in addition literature indicates that many researches had been conducted specially to show the relationship between exchange rate and trade balance, trade balance determinants across developing and developed countries, and in different approaches. Therefore, there is a gap in empirically testing trade balance determinants through the three theories of BOP since trade balance is its largest component. Hence, it was important to establish an empirical relationship between Ethiopia's trade balance and its determinants using elasticity, monetary and absorption approach of BOP. So that testing these theories fills the gap by introducing additional variables.

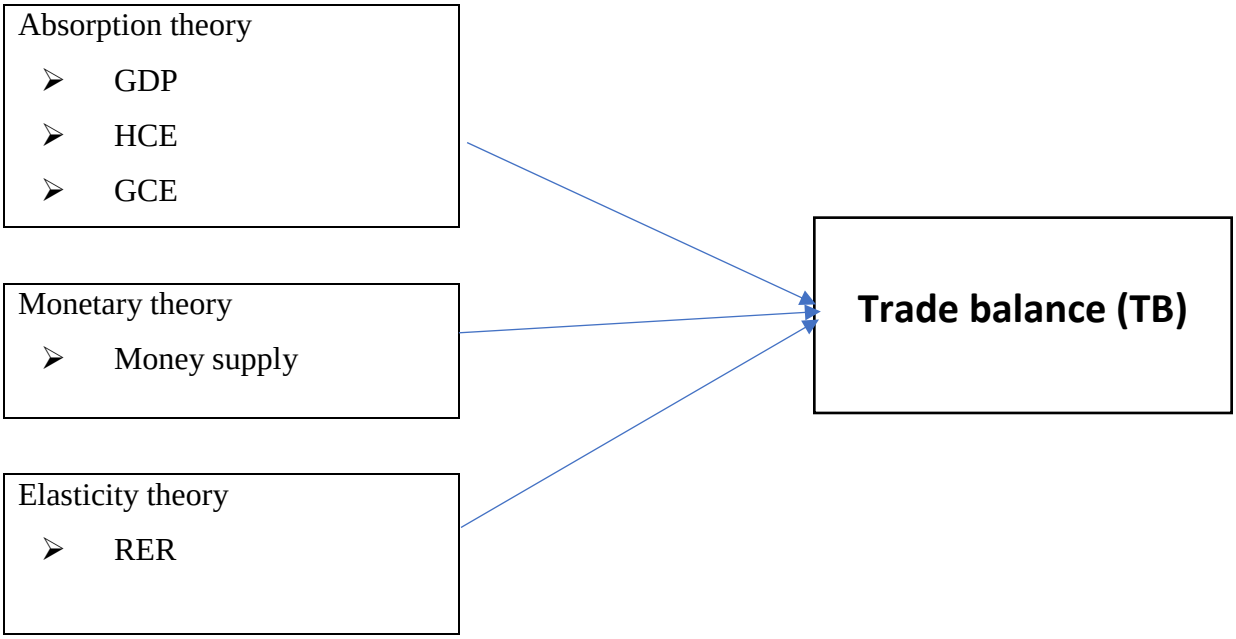
The specific contribution of the Ethiopian studies on trade balance is that they have identified the impacts of monetary and fiscal policies on Ethiopia's trade balance. However, they did not make comprehensive empirical investigation on the fundamental determinants of trade balance. This study expected to fill the gap of the previous studies on trade balance.

2.4 Conceptual framework

Based on theoretical and empirical literature reviewed above; the study has developed the schematic representation of the conceptual framework. Many factors affect trade balance such gross domestic product, exchange rate, money supply, household consumption expenditure and

government expenditure. This conceptual framework developed is based on the literature reviews, related theories and previous studies. The independent variables include gross domestic product, exchange rate, money supply, household consumption expenditure and government consumption expenditure and dependent variable is Trade balance. The conceptual framework of this study is as the following:

Fig 2.1 Conceptual frame work of independent and dependent variables



Source: theoretical and empirical review

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1 Research design

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. In fact, research design is the conceptual structure within which research conducted; it constitutes the blueprint for the collection, measurement and analysis of data. Thus, research design provides an outline of what the researcher is going to do in terms of framing the hypothesis, its operational implications and the final data analysis. To meet the objectives, this study employed explanatory type of research design to establish relationship between variables. The research is explanatory because the researcher used time series empirical data of the variables to examine the impact of independent variable (exchange rate, government consumption expenditure, household consumption expenditure, gross domestic product and money supply) on dependent variable Trade balance. Additionally, this type research design uses facts or information already available for critical evaluation. Besides, this study uses quantitative research approach to examine a stated objective.

3.2 The Source and Data Type

The study used simple random sampling method and took annual secondary time series data covering the period 1980-2017. This year has chosen as a sample period for this study because the data used in the trade balance function was likely to be available. Data of variables included in the model like government consumption expenditure and Household consumption expenditure obtained from World Bank's World Development Indicators (2017), gross domestic product and exchange rate from International Financial Statistics (IFS, 2017) ,and money supply, Export and import were obtained from National bank of Ethiopia (NBE).

3.3 The theoretical model

The main objective of this paper was to examine the determinants of trade balance. Economic and financial theory determines a number of key variables that have significant effect on imports and exports and hence trade balance based on three major theories of BOP (elasticity, absorption and monetary). Consider the following simple model of elasticity.

$Y_i = AX_i^{bi}$ …… (1)

Let express the above equation 1 in log form

$LY_i = LA + B_1LX_1 + B_2LX_2 + B_3LX_3$ …… (2)

Where L is the natural logarithm to base e

Let $LA = LB_0$

$LY = LB_0 + B_1LX_1 + B_2LX_2 + B_3LX_3$ ..... (3)

In the log linear model, the slope coefficient (Bi) measure the elasticity of dependent variable with respect to the explanatory variable (Xi), therefore it shows the percentage change in Y on a given percentage change in X or responsiveness of the dependent variable for the changing in the explanatory variable.

The model followed Shen (2013), Robert (2014), Ray (2012), Minh et.al (2012), and Mohammed (2016) which incorporates the basic variables that determine Trade Balance. Further, the modeling of the trade balance followed Mohamed Nuri Sharif (2010) but Money Supply (MS), government consumption expenditure (GCE) and household consumption expenditure (HCE) is incorporated. Therefore, an empirical model for a country's trade balance specified in the following functional form:

TB = F(ER, GDP, MS, GCE, HCE) …… (4)

To analyze the relationship between trade balance and its determinants, this study takes model of elasticity equation above so that coefficients interpreted as elasticities, therefore Ethiopia's trade balance model expressed as:

$$LTB_t, = \beta_0 + \beta_1 LER_t, + \beta_2\ LGCE_t, + \beta_3\ LHCE_t + \beta_4\ L\ GDP_t + + \beta_5\ LMS_t + \varepsilon t \ldots (5)$$

Where

TBt, is the trade balance at time t, taken as the ratio of export value (X) to import value (M). The ratio of X to M (i.e. X/M) or its inverse has been widely used in many empirical investigations of trade balance-exchange rate relationship. This ratio is preferable because it is not sensitive to the unit of measurement and interpreted as the nominal or real trade

ER_t, is the exchange rate at time t

GCE_t, is government consumption expenditure at time t, in billions of birr;

HCE_t is household consumption expenditure at time t in billions of birrs;

GDP_t is gross domestic product at time t. in USD;

MS_t is Money Supply, broad money measured in billions of birrs.

Ɛ is the error term capturing unexplained factors in the trade balance.

3.4. Hypothesis Development

Different articles and papers searched for assessment, validation and valuable conclusions. The variables used in the study were trade balance, exchange rate, government consumption expenditure, household consumption expenditure, gross domestic product and money supply. Based on the stated problem, the study objective, and the literature review, the study tested the following hypothesis:

1. Exchange rate has a significant positive effect on the trade balance.
2. Government expenditure has a significant negative effect on the trade balance.
3. Gross domestic product has a significant negative effect on the trade balance
4. House hold consumption expenditure has a significant negative effect on the trade balance
5. Money supply has significant negative effect on the trade balance

Trade balance (TB) - is the difference between values of its exports and imports. The trade balance of a country is the difference between the monetary value of its exports and imports over a certain period but this study takes trade balance as the ratio of export to import. A trade balance can be positive or negative. A trade balance can be positive (trade surplus) if the monetary value of a country's export is greater than its imports and negative (trade deficit) if the monetary value of its imports greater than its exports.

The Ethiopian trade balance is always negative or in deficit. This means that Ethiopian imports exceed its exports or unable to cover its import bills. The reasons to such a deficit trade balance are its level of development, policies and strategies in the country. It measures the relationship between a country's exports to the rest of the world and its imports from the rest of the world.

Exchange rate (ER +)-is defined as the real worth of foreign exchange in terms of a given domestic currency. Exchange rate in this context is calculated and expressed as domestic currency per foreign currency; as a result, an increase in ER implies devaluation (depreciation) of Birr while a decrease in ER is revaluation (appreciation).

A rise in the exchange rate (ER) indicates a real depreciation of Ethiopian birr. In such a situation, foreign goods become more expensive than domestic goods. This also will lead to an increase in competitiveness of Ethiopia's exports and a shift of resources from sectors that produce non-tradable to those producing tradable goods. This means that exports will rise relative to imports and hence trade balance will improve. A fall in ER (appreciation) will lead to an increase in the cost of production, thereby depicting deterioration in the country's international competitiveness

(that is, the country produces in a way that is less efficient than it used to be). These explanations lead us to expect that ER will affect the trade balance positively, but that depends on the ability of the country to manipulate the exchange rate, given the level of foreign reserves. It's expected to have a positive effect on trade balance.

Government Consumption expenditure (GE _) -consists of expenditure incurred by government on both individual consumption goods and services and collective consumption. The effect is that; if the government imports more than it exports—as always has been the case for developing countries— then the trade balance will widen. Government expenditures therefore expected to have a negative impact on the trade balance. The rise of this will worsen trade balance and so it's expected to have a negative sign. Since increase in expenditure in non-productive sectors always tends to have a negative effect on the trade balance of the country.

Gross domestic product (GDP _) - it is the total market value of all final goods and services produced in a country each year. Its expected to have negative relationship with trade balance. As the GDP or income increase then more to be imported, hence this will worsen trade balance of the country. The expected signs under the absorption and monetary is negative and positive respectively with some bold assumptions as already discussed in literature part. Higher income levels stimulate increased import demand as well as increased domestic production of tradable, leaving the ultimate impact on the trade balance somewhat indeterminate.

Household Consumption Expenditure (HCE -) Household consumption expenditure generally refers to the market value of all goods and services, including durable products such as cars, washing machines and computers purchased by individual households. The rise of Household consumption expenditure especially on import that might be due to the rise of income tends to worsen trade balance. Hence, we expect that to have a negative sign.

Money Supply (MS _) -is the total supply of money in circulation in a given country's economy at a given time. A fall in domestic money supply improves trade balance since foreigners send

their money domestically for more goods and services. It's expected to have a negative effect on trade balance. Even though there is difference on the rationale between schools of thought, they agree in principle that the signs on domestic money supply should be negative. According to the Monetarist view, increases in the money supply propel real balances above levels considered optional by economic agents, resulting in increased expenditure out of a given income thus stimulating imports and causing the trade balance to deteriorate. For Keynesians, increases in the money supply reduces interest rates thus stimulating increased absorption that puts negative pressure on the trade balance.

3.5 Model Estimation methods

This study used an econometric and descriptive method of data analysis. Precisely, this section clearly provides a brief overview of relevant econometric methods the study should covered like econometric models, stationary tests, parameter estimation and model diagnostic tests. The econometric part was analyzed using E-view version 10 statistical software package.

The study follows three steps

i) The test of stationarity of the individual series in the regression model or otherwise to determine the order of integration of the variables

ii) The test of the existence of a stable long-run equilibrium relationship between the variables (co integration test)

iii) The estimation of the long run and short run parameters (ECM) of the model.

3.5.1 Stationarity Test

As the paper is going to apply time series data, econometric tests regarding time series data has to be done with the help of EViews software. From a theoretical point of view, a time series is a collection of random variables. Such collection of random variables ordered in time called stochastic process. One important class of stochastic process is that of stationary stochastic process. A stochastic process said to be stationary if its mean and variance are constant over time

and the value of covariance between two-time periods depends on the distance or lag between two-time periods and not on the actual time at which the covariance is computed (Guajarati, 2004).

According to Guajarati (2004), letting Yt to be a stochastic time series variable that has the following property:

Mean: $E(Yt) = \mu$

Variance: $var(Yt) = E(Yt - \mu)^2 = \sigma^2$

Covariance: $E(Yt - \mu)(Yt+k - \mu) = \sigma k$

Where: σk is covariance between the values of Yt and Y_{t+k}, μ is mean and σ^2 is variance. If Yt is to be stationary mean, variance and auto covariance of Yt+m must be the same as those of Yt.

If a time series is not stationary in the sense just defined, it is a non-stationary time series. Non-stationarity has both economic and statistical implication. The statistical implication is that the variables will not have a constant mean, variance and covariance if they plotted against time (Guajarati, 2004). Using simple OLS for non-stationary variables will give us spurious regression results with high R2 thus; we cannot make any interpretation of the results unless we check the stationary of the variables. Hence, the first step in modelling time series econometric model is to check the stationarity using unit root test.

3.5.2 Unit root test

The unit root test indicates the order of integration of variables to make them stationary. According to Guajarati (2004), if a time series is differenced once and the differenced series is stationary, we say the original series is integrated of order I denoted by I (1). In general, if a time series has to be differenced d times before, it becomes stationary, and then it is integrated of order d or I (d). If d=0 the resulting I (0) process represents a stationary time series. Differencing variables will

enable us to obtain stationary data. However, differencing variables will make them stationary at the expense of long-run relationship among the variables.

The statistical procedure employed to determine the stationarity of a series is unit root test. This paper employed widely used stationarity test methods called Augmented Dickey Fuller (ADF) test. This is the most common method for testing unit root. The hypothesis used to test unit root for all the above tests stated as follows. When ADF statistic is greater in absolute value than critical value rejects null hypothesis of unit root and vice versa.

H0= there is unit root (nonstationary)

H1= there is no unit root (stationary)

If the time series data is not stationary at level the researcher make it stationary by differencing up to second order, but if it is not stationary up to second order, the time series data is not economically reasonable it is better to revise the data. However, if the non-stationarity is due to the existence of trend, it can be stationary by trending (including time) the time series data (Gujarati, 2004).

3.5.3 Co integration test

To check the relationship between the dependent and independent variables co integration test was used. According to James D. Hamilton (1994), ¨Co integration means that although many developments can cause permanent changes in the individual elements of Yt, there is some long-run equilibrium relation trying the individual components together. We can say variables are co integrated if they have the same trend through time.

According to Guajarati (2004), time series variables are co integrated if the linear combination of the variables is stationary, but the variables are individually non-stationary. The outcome of unit root testing matters for the empirical model estimation. The following cases explain the implications of unit root testing for further analysis.

CASE 1: Series in the model under examination are stationary. Technically speaking, all the variables are I (0) series (integrated of order zero). Under this scenario, co integration test is not required, as any shock to the system in the short run quickly adjusts to the long run. Therefore, only estimate the long run model using OLS. In econometrics, a long run model is a static model when there is no lag or difference of a variable.

CASE 2: Series in the model under consideration are I (1). Under this scenario, the series are non-stationary. One special feature of these series is that they are of the same order of integration. Under this scenario, the model in question is not useless although the variables are unpredictable. To verify further the relevance of the model, there is need to test for co integration. If there is co integration, the series in question combined in a linear fashion. This implies that, even if there were shocks in the short run, which may affect movement in the individual series, they would converge with time (in the end). However, there is no long run if series are not co integrated. This implies that, if there are shocks to the system, the model is not likely to converge in the end. Note that both long run and short run models needs to estimate when there is co integration. If there is no co integration, there is no long run and therefore, estimate only the short run model. There are however, two prominent co integration tests for I (I) series in the literature. They are Engle-Granger co integration test and Johansen Co integration test. The Engle-Granger test is for single equation model while Johansen is considered when dealing with multiple equations.

CASE 3: The series are different order of co integration.

Like case 2, co integration test is also required under this scenario. Recall that, Engle-Granger and Johansen co integration tests are only valid for I (1) series. Where the series are of different order of co integration, the appropriate test to use is the Bounds co integration test. Similar to case 2, if series are not co integrated based on Bounds test; estimate only the short run model. However, both the long run and short run models are valid if there is co integration.

ARDL bound testing models is a model that contains the lagged values of dependent variable, the current and lagged value of regress or as explanatory variable. It uses a combination of endogenous

and exogenous variables unlike VAR that is strictly for endogenous variables. Specify ARDL model if the variables integrated of different order. That is a model having a combination of variables with I (0) and I (1) order of integration. (Afees, 2016)

From the result of bound test, if the variables are co integrated specify both long run ARDL and short run ECM models and if variables are not co integrated only specify short run ARDL model. ARDL co integration approach has three advantages in comparison with other previous and traditional co integration methods. The first one is the ARDL does not need that all variables under study must be integrated of the same order; and applied when the under-lying variables are of order one, order zero or fractionally integrated. The second advantage is that the ARDL bounds test is relatively more efficient in the case of small and finite sample data sizes. The last and third advantage is that by applying the ARDL technique we obtain unbiased estimates of the long-run model (Harris and Solis, 2003). The ARDL model used in this study expressed as follows:

$\Delta Y_t = \beta_0 + \sum_{1=i}^{p} \beta i \Delta Yt - i + \sum_{1=i}^{q} \beta i \Delta Xt - i + \mu_1 Y_{t-1} + \mu_2 X_{t-1} + \grave{e}t$……. (6)

From this model, βs are short run coefficients and $\mu_{1 \text{ and }} \mu_2$ are ARDL long run coefficients

The ARDL approach to co integration (Pesaran et al. 2001) involves estimating the conditional error correction (EC) version of the ARDL model for trade balance and its determinants:

$DLTB=a_0+\beta_1 LTB_{t-1}+ \beta_2 LGDP_{t-1}+ \beta_3 LGCE_{t-1}+ \beta_4 LHCE_{t-1}+ \beta_5 LERt\text{-}1+ \beta_6 LMS_{t-1}+$

$+\sum_{1=i}^{p} a1D(LTBt-1) + \sum_{j=1}^{q} a2D(LGDPt-1) + \sum_{j=1}^{q} a3D(LGCEt-1) +$

$\sum_{j=1}^{q} a4D(LHCEt-1) + \sum_{j=1}^{q} a5D(LERt-1) + \sum_{j=1}^{q} a6D(LMSt-1)+et$ …….. (7)

Where DLTB is difference of trade balance, L in each variable is natural log, P is optimal lag length and D is the first difference, and et is the error term. β_1, β_2, β_3, β_4, β_5 and β_6 are long run coefficients while a1, a2, a3, a4, a5 and a6 are short run coefficients.

The bounds test applied based on the joint F-statistic, which its asymptotic distribution is non-standard under the null hypothesis of no co integration. The estimation of the equations for the existence of a long-run relationship among the variables done by conducting an F-test for the joint significance of the coefficients of the lagged levels of the variables.

3.5.4 Error correction model

When the concept of non-stationarity was first considered in the 1970s, a usual response was to take the first differences of each variables I (1) independently and then to use these first differences in any subsequent modelling process. consider two series, yt and xt, that are both I (1) The model that one may consider estimating is

$\Delta y_t = \beta \Delta x_t + u_t$……..(8)

One definition of the long run that is employed in econometrics implies that the variables have converged upon some long-term values and are no longer changing, thus yt = yt−1 = y; xt = xt−1 = x. Hence all the difference terms will be zero, i.e. Δyt =0; Δxt =0, and thus everything in the equation cancels. The above Model has no long-run solution and it therefore has nothing to say about whether x and y have an equilibrium relationship. (Brooks, 2014)

Fortunately, there is models that overcome this problem by using combinations of first differenced and lagged levels of co integrated variables. Consider the following equation

$\Delta y_t = \beta 1 \Delta x_t + \beta_2 (y_{t-1} - \gamma x_{t-1}) + u_t$ …… (9)

$\Delta Y_t = \beta_0 + \sum_{1=i}^{p} \beta i \Delta Yt - i + \sum_{1=i}^{q} \alpha i \Delta Xt - i + \delta Zt\text{-}1 + u_t$..... (10)

$\Delta LTB = \beta_0 + \sum_{1=i}^{p} \beta 1 D(LTBt - 1) + \sum_{j=1}^{q} \beta 2 D(LGDPt - 1) + \sum_{j=1}^{q} \beta 3 D(LGCEt - 1) + \sum_{j=1}^{q} \beta 4 D(LHCEt - 1) + \sum_{j=1}^{q} \beta 5 D(LERt - 1) + \sum_{j=1}^{q} \beta 6 D(LMSt - 1) + ECM(-1) + et$……10

This model is known as an error correction model or an equilibrium correction model, and yt−1 −γxt−1 is known as the error correction term. If yt and xt are co integrated with co integrating coefficient γ, then (yt−1 −γxt−1) will be I (0) even though the constituents are I (1). It is thus valid to use OLS and standard procedures for statistical inference on. It is of course possible to have an intercept in either the co integrating term (e.g. yt−1 −α−γxt−1) or in the model for Δyt (e.g. Δyt = β0 +β1Δxt +β2 (yt−1 −γxt−1) +Ut) or both. Whether a constant is included or not could be determined based on financial theory, considering the arguments on the importance of a constant.

The error correction model is sometimes termed as equilibrium correction model, and the two terms used synonymously. Error correction models interpreted as follows. y is purported to change between t−1and t as a result of changes in the values of the explanatory variable(s), x, between t −1 and t, and in part to correct for any disequilibrium that existed during the previous period. Note that the error correction term ($y_{t-1} - \gamma x_{t-1}$) appears above with a lag, γ describes the speed of adjustment back to equilibrium, and its strict definition is that it measures the proportion of last period's equilibrium error that is corrected for. (Brooks, 2014)

3.6 diagnostic tests

To check the verifiability of the estimated long run model, some diagnostic test is undertaken prior in doing any analysis. This study carried out several model stability and diagnostic tests, which includes serial correlation (Brush & Godfray LM test), Heteroscedasticity and Normality test (Jaque-Bera test). In addition to the above diagnostic tests, the stability of long run estimates has been tested by applying the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) test. Such tests are recommended by (Pesaran *et al.*2001). In order to reject or accept the null hypothesis, one can decide by looking the p-values associated with the test statistics. That is the null hypothesis is rejected when the p-value are smaller than the standard significance level (i.e. 5%).

CHAPTER FOUR

4. DATA ANALYSIS AND EMPIRICAL RESULTS

This chapter presents and discusses the results of empirical analysis based on descriptive and econometric framework given in chapter three. Firstly, this chapter described the structure of Ethiopian import, export trade balance and descriptive summary of variable. Then, the results of various preliminary tests and the estimation of the ARDL approach to co integration models presented. Subsequently, based on the ARDL approach for co integration the relationship and their magnitude of the dependent variable and explanatory variables analyzed. There were also diagnostic and Model Stability tests. Finally, the long run and short run estimates presented respectively.

4.1. The structure of Ethiopian import, export and trade balance

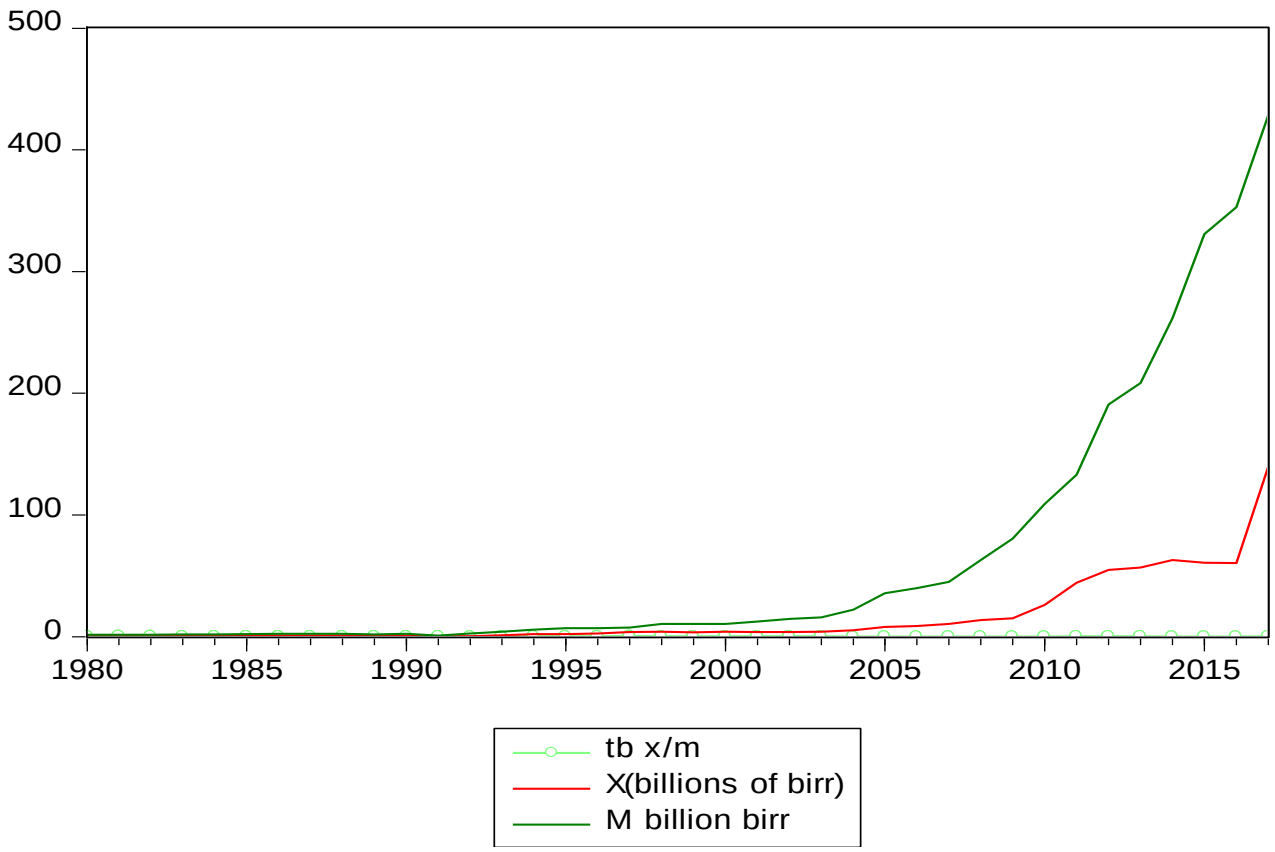
The Ethiopian economy showed a strong economic performance, especially during 2003 to 2015, due to improvement in the service, construction and agricultural sectors. Since then, the country has been on a sustained, strong path of economic performance with mean real GDP growth of eleven percent for the period of 2003 to 2015. On the other hand, Ethiopia has experienced a long period of unfavorable trade balance deficits that means the external sector characterized by structural trade deficits. This may be partly due to the composition of imports and exports and the import intensive nature of Ethiopian economy. Put differently, the composition of the imports of Ethiopia mainly includes capital goods, fuels, raw materials and consumer durables for which the country cannot afford to cut their imports despite the higher price. On the export side, the country highly depends on agricultural exports such as coffee, oilseeds, hide and skins, chat and the like which has unstable demand in the international market. Despite the colossal effort that Ethiopia government has made to improve the external imbalance and output growth via its expenditure switching policy (devaluation), the country has experienced a persistent trade balance deficit.

Like many other African countries, Ethiopian economy was highly dependent on the production of agricultural outputs in the past. Agricultural sector had been consisted for more than 50 % of

the total output share of the nation's Gross Domestic product though its share decreased to 40% now days. Not only the economy is highly dependent on the agriculture but also about 85% of the total population estimated to be dependent on the sector as a means of income generation directly or indirectly. As a result, the nation was (is) using agriculture as a backbone for both domestic economy and international trade. (Haile, 2008)

Ethiopia's export is highly dependent on the agricultural sector in general and on the production of coffee. In addition to coffee, the nation mainly exports hides and skins, pulses, chat, oilseeds, fruit, vegetables, gold and all these commodities together consists of 91% of the nation's export since 1980s to 1990s. It is obvious that if the nation's export is highly dependent on the agricultural commodities, the nation's economy would be in trouble whenever there are some natural or economic inconveniences like shortage of rainfall, shocks on the international price of the products, or some other environmental changes. (National bank of Ethiopia, 2010)

The share of the industrial sector for export is not that significant. Less than 10% of the total export items was came from the industrial sector for the years before 2000 but this share has got improved to 11.7% and 11.3 % in 2000 and 2001 budget years respectively. The share become continuously increasing to 12.8%, 13.9% and 13.9%, in 2002, 2003, and 2004 respectively. The nation has its own demand to import some commodities like, raw materials, semi-finished (processed) goods, fuel, beverage and tobaccos, chemicals (fertilizers and the like) capital goods (machinery and transport equipment's), consumer goods (including food items) and the like. (National Bank of Ethiopia, 2016).



Source: own construction 2019

Fig 4.1 graphical display of import export trade balance

As the above figure depicts Ethiopia's trade balance from 1980 to 2017. Until the beginning of 1990s there was almost constant trend of movement among export import and hence trade balance. After 1990s, the gap widens due to external policy reforms and devaluation of currency. The implication of gap is that import of Ethiopia grows faster than export. As shown in Figure 4.1, Ethiopia has experienced a long period of unfavorable trade balance deficits, which means the external sector characterized by structural trade deficits. In order to overcome this adverse situation, the government-initiated measures to bring about pragmatic changes in the trade balance via its expenditure switching policy such as currency devaluation.

Descriptive statistics summary

To provide a useful summary of determinants of trade balance when running empirical and analysis data, this study used descriptive statistics function. Descriptive statistics are ways of summarizing large sets of quantitative (numerical) information. Namely, The Mean or average is probably the most commonly used method of describing central tendency. To compute the mean, need to add up all the values and divide by the number of values. The Median is the score found at the exact middle of the set of values. One way to compute the median is to list all scores in numerical order, and then locate the score in the center of the sample. The standard Deviation is a more accurate and detailed estimate of dispersion because an outlier can greatly exaggerate the range. The Standard Deviation shows the relation that set of scores has to the mean of the sample. Maximum is the highest value in the sequence data. Minimum is the lowest value in the sequence data. Observations are the total sample that the researcher using.

Table 4.1 descriptive statistics summary

	GCE	GDP	HCE	MS	ER	TB
Mean	49.11195	20.30366	193.6179	77.88145	8.295789	0.326185
Median	13.35500	10.53900	49.39200	19.02100	7.530000	0.320239
Maximum	329.6580	80.87400	1147.630	573.3840	23.10000	0.594595
Minimum	2.004000	7.385000	11.87900	2.109000	2.070000	0.171473
Std. Dev.	81.33666	19.76221	306.3739	134.6246	6.422554	0.107157
Skewness	2.156096	1.784851	1.915340	2.302983	0.896012	0.578326
Kurtosis	6.732539	5.087996	5.494005	7.568425	2.692878	2.559511
Jarque-Bera	51.50083	27.07895	33.08243	66.63528	5.233980	2.425471

Probability	0.000000	0.000001	0.000000	0.000000	0.073022	0.297383
Sum	1866.254	771.5390	7357.479	2959.495	315.2400	12.39501
Sum Sq. Dev.	244779.2	14450.16	3473004.	670580.0	1526.220	0.424858
Observations	38	38	38	38	38	38

Source: own computation

With the dependent variable, the descriptive results in Table 4.1 Shows that the mean for Ethiopia's trade balance (ratio of export to import) from 1980 to 2017 is (0.32) with a standard deviation of standard of (0.10). The lowest of TB is (0.17) unit and the highest is (0.59) unit. Throughout the sample period the ratio is bellow one and declining year-to-year indicating export of a country did not cover import cost.

The average of household consumption expenditure is 193.61billions of birr and its standard deviation is 306.37, which shows the deviation of household consumption to the average. The lowest of HCE is 11.87 billion of birr in 1980 and its highest is 1147.63 billion of birr in 2017 indicating growth of household consumption from the beginning of sample period 1980 to 2017.

The average of exchange rate is 8.29 birr per dollar and its standard deviation is 6.42. The lowest of exchange rate is 2.07 birr per dollar and its highest is 23.10 birr per dollar indicating the continuous depreciation of Ethiopian birr from 1980 to 2017.

The average of money supply is 77.88 billion of birr and its standard deviation is 134.62, which shows the actual amount deviation from mean is significant. The minimum value of money supply is 2.10 billion of birr in 1980 and maximum value is 573.38 billion of birr, which shows increased amount.

The average of gross domestic product is 20.30 billion of US dollar and the deviation of actual value from mean 19.76. The minimum value is 7.38 billion of US dollar in 1980 and maximum

value is 80.87 billion of US dollar in 2017 indicating significant growth of Ethiopian economy from 1980 to 2017.

The average of government consumption expenditure is 49.11 billion of birr and standard deviation is 81.33. The minimum value is 2.004 billion of birr and maximum value is 329.65 billion of birr indicating a growth of government expenditure during sample period.

4.2 Econometric Results

4.2.1 Unit Root test results

In order to achieve a meaningful regression with time series data it is necessary to test the existence of unit roots in the variables. The variables used in the analysis need to be stationary and/or should be co integrated in order to infer a meaningful relationship from the regression.

Table 4.2-Unit root test result

LEVEL						
	ADF TEST			Phillip Peron (PP) Test		
variable	Constant	constant and trend	None	Constant	constant and trend	None
LTB	-3.2182**	-4.1908**	0.0702	-3.1511**	-4.1692*	-0.1694
LGCE	1.9263	-0.5048	6.6117***	2.2944	-0.4993	7.4954***
LHCE	2.5935	-1.6557	7.4347***	2.0999	-0.9413	6.1603***
LGDP	0.5698	-0.1143	1.7953	1.1644	-0.4061	2.4846
LER	-0.4446	-3.0137	1.3899	-0.0411	-2.3088	2.3894
LMS	2.4985	0.3895	2.9994	3.4558**	0.8590	10.1412***
FIRST DIFFERENCE						
LTB	8.2880***	-8.2291***	-8.3425	8.3906***	-8.5319 ***	-8.3425
LGCE	-5.0220	-4.6947 ***	-2.9429	5.0292***	-5.4734***	-2.8338

LHCE	-	-2.8476*	-	4.7919***	-5.6198***	-2.3733
LGDP	-3.7930	-4.1461***	-3.3068	-3.7930**	-4.1048***	-3.2928
LER	-3.5005	3.4550**	-2.8661	-3.3913**	-3.3453**	-2.8690
LMS	-2.3405	-3.4869 **	-0.4661	-2.1512	-3.4074**	0.1581

Source: own computation 2018

***, **, * indicates stationarity level at 1%, 5% and 10% level of significance

From the above table both ADF and PP test of unit root depicts similar results except for LHCE that is stationary at level without intercept and trend.

The results indicate that all variables except LTB (which is stationary at level at 5 percent) like LGCE, LGDP, LER, LHCE, and LMS are non-stationary at 10 percent levels and thus they require differencing to become stationary; this is in order to eliminate the possibility of spurious regression results and erroneous inferences. Consequently, after checking the first difference, the result indicates remaining variables are stationary and integrated at order one I (1). It can conclude that none of the variables entered in the regression are order two, which are not desire in applying ARDL model. So ARDL co integration technique proposed by Pesaran et al. (2001) is the most appropriate method for estimation or to check the long run relationship among the variables.

4.2.2 Lag Length Determination

Since the dependent variable is time series type, the previous year observation of either the dependent or independent variable considered as an explanatory. This implies that the previous year value of the dependent variable considered as an independent variable in the regression. This process could force the research to determine the lag length that taken in the operation. In this research, Hannan-Quinnn information criteria (HQIC) methods show that the maximum lag length considered in the operation is one. It is common to find consistent result when alternative strategies for model choice are used, it may lead to different outcomes that make some subjective judgment

necessary (Hill et al., 2011). Given this, the research considers only first lag of the dependent as well as the independent variables as an additional explanatory.

4.2.3 Co integration test

The bounds test assumes that the variables are I (0) or I (1). We denote the F-statistic of the test, which normalize on LTB by LTB (LGDP, LGCE, LHCE, and LMS). Two sets of critical values for a given significance level can be determined (Pesaran et al., 2001). The first level is calculated on the assumption that all variables included in the ARDL model are integrated of order zero, while the second one is calculated on the assumption that the variables are integrated of order one. The null hypothesis of no co integration was rejected when the value of the test statistic exceeds the upper critical bounds value, while it is accepted if the F-statistic is lower than the lower bounds value. Other ways, the co-integration test is inconclusive.

Table 4.3 ARDL bonds test result

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=38	
F-statistic	5.979771	10%	2.26	3.35
		5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68

The calculated F-statistic (F-statistic 5.9797) is higher than the upper bound critical value at the 1% level of significance (4.68), using restricted intercept and no trend.

4.2.3 Diagnostics and stability test

This require verifying whether the estimates from the model are reliable. The most relevant post estimation tests for dynamic model include normality test (using Jarque-Bera test), Serial

correlation (using LM test) and heteroscedasticity (using whites test). These tests are all residual based and performed on the preferred model.

Autocorrelation Test (LM Test)

To find out if our specification exhibits autocorrelation problem, EViews provides us with several methods of testing for the presence of serial correlation. The Breusch-Godfrey LM test is one of the prominent tests. The null hypothesis is that there is no serial correlation.

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.007850	Prob. F (2,28)	0.9922
Obs*R-squared	0.020736	Prob. Chi-Square (2)	0.9897

The null hypothesis of no serial correlation (Brush Cod fray LM test) is failed to reject for the reason that that the p-values associated with test statistic is greater than the standard significant level (I.e. 0.99> 0.05). Here LM test for testing serial correlation is applied because unlike the traditional Durbin Watson test statistic it is inapplicable when the lagged dependent variable appears as explanatory variables, LM test avoid such limitation of DW test.

Heteroscedasticity Test

From table below, there is no enough evidence to reject the null hypothesis of no heteroscedasticity. Therefore, residual of the model found Homosedastic (have constant variance).

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.799285	Prob. F (6,30)	0.5781
Obs*R-squared	5.099514	Prob. Chi-Square (6)	0.5311
Scaled explained SS	3.628405	Prob. Chi-Square (6)	0.7268

As we have seen from the above, we can reject at 5% significant level due to its p-value associated with the test statistics are greater than the standard significance level (I.e. 0.578>0.05)

Normality Test

A violation of the normality assumption of the residuals is not as serious as heteroscedasticity and autocorrelation. A moderate departure from normality does not impair the conclusion when the data set is large. Greene (2012 pp. 64-67) states that a normal distribution of the error term is not necessary for establishing results that allow statistical inference. These results based on the law of large numbers, which concerns consistency and the central limit theorem, which concerns the asymptotic distribution of the estimator.

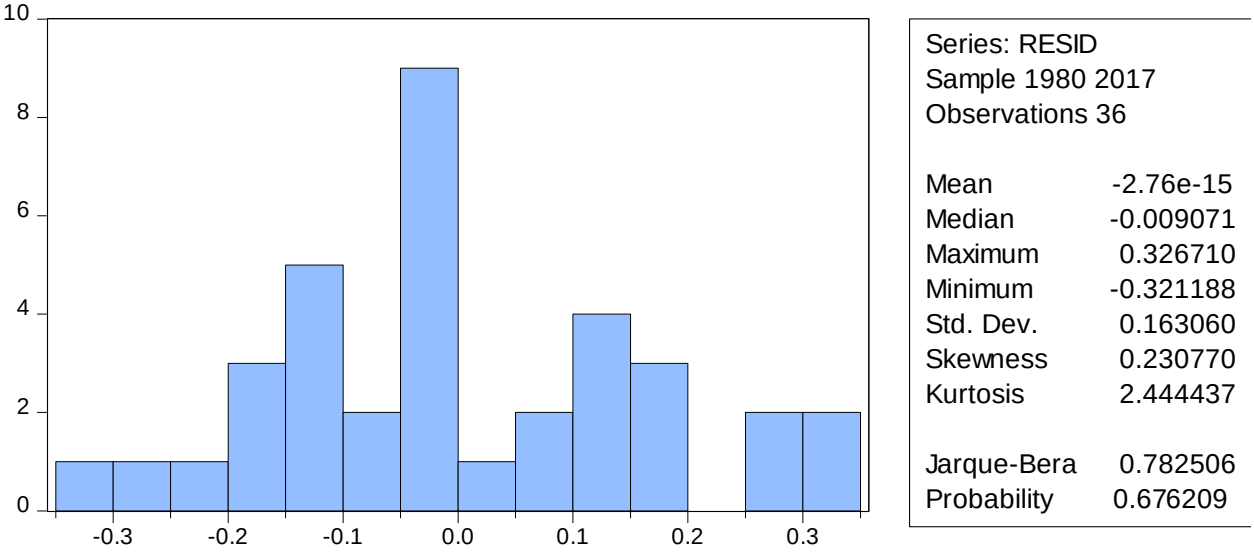


Figure 4.2 normality test

The above figure shows residuals are normally distributed. P-value of JB test is greater than 1% hence there is no evidence of non-normality in the model

Stability test for the model

The stability of the ARDL model and the result of post estimation diagnostics could affect the validity and robustness of the result and it should be tested prior to further analysis. Its tested by using cumulative sum (CUSUM) and cumulative sum square (CUSUMSQ) and as it is shown in

the graph below all dotes are in the boundary of 5% significance level. This shows that the ARDL model is satisfies the stability condition as it shown below on the graph**.**

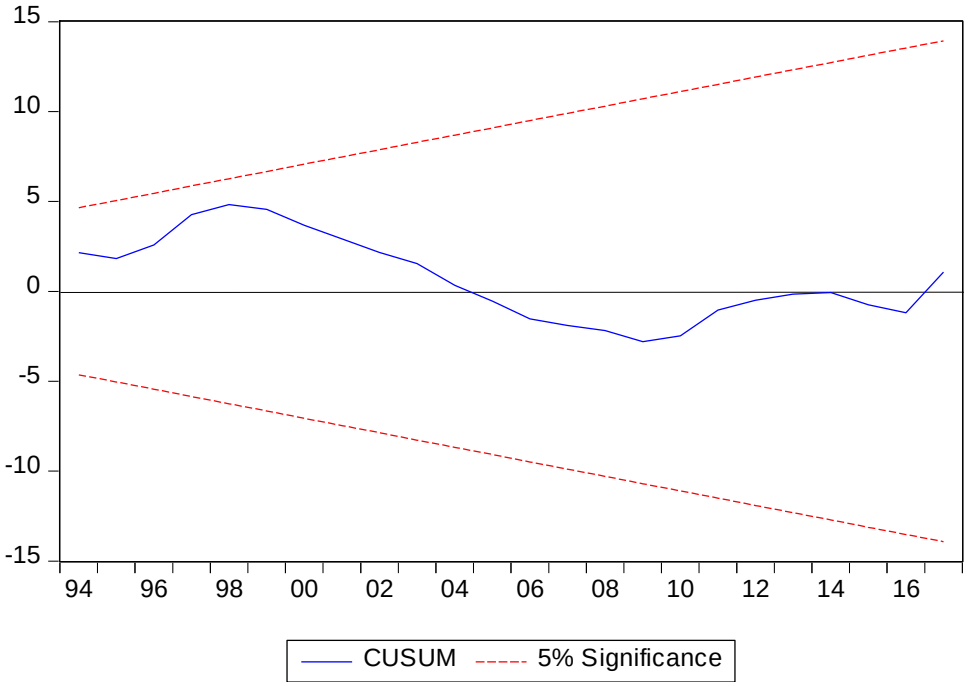


Fig 4.3 Cumulative sum (CUSUM) graph at 5% significance level

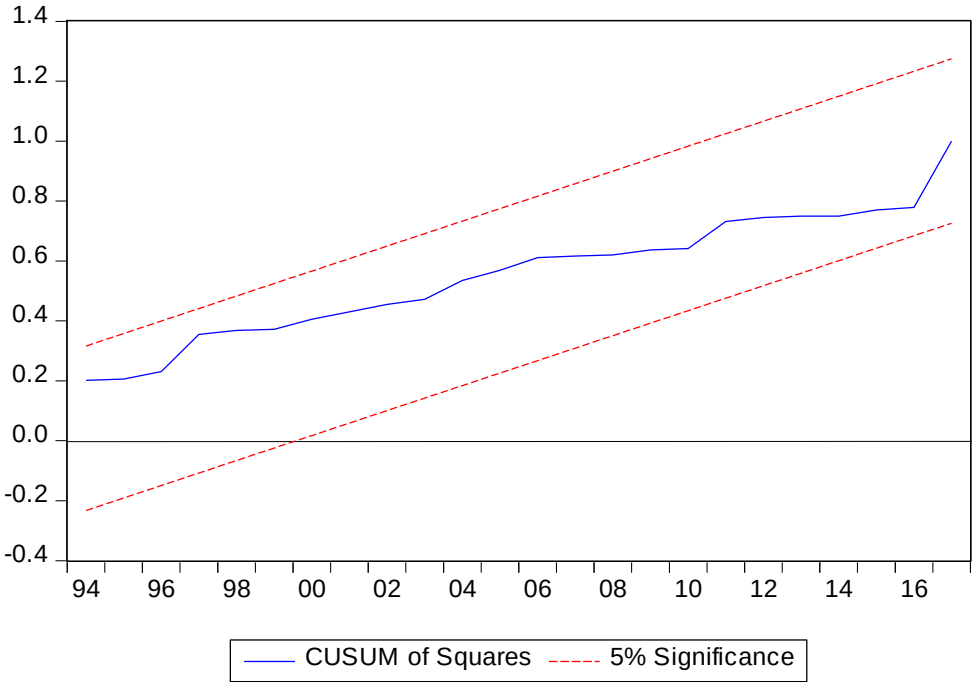


Fig 4.4 Cumulative Sum Square (CUSUMSQ) graph at 5% significance level

Based on the above testes we can say that specified model is power full to show a relation between dependent variable and independent variable.

4.3 Estimation of the Long-Run Relationship

Having found a long run relationship, we applied the ARDL method to estimate the long run coefficients for Equation (6).

Table 4.4 Estimation of long run coefficients

Dependent Variable: LTB

Method: Least Squares

Date: 12/13/18 Time: 19:37

Sample (adjusted): 1981 2017

Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	-1.562232	0.355803	-4.390716	0.0001
LTB (-1)	0.064903	0.176215	0.368316	0.7152
LHCE (-1)	-0.593398	0.599768	-0.989380	0.3304
LGCE (-1)	0.283307	0.241835	1.171487	0.2506
LMS (-1)	-1.015555	0.291373	-3.485408	0.0015
LGDP (-1)	0.987365	0.556065	1.775629	0.0859
LER (-1)	1.489063	0.617541	2.411279	0.0222

R-squared	0.649521	Mean dependent var	-1.189782
Adjusted R-squared	0.579425	S.D. dependent var	0.312715
S.E. of regression	0.202801	Akaike info criterion	-0.184523
Sum squared resid	1.233850	Schwarz criterion	0.120245
Log likelihood	10.41367	Hannan-Quinn criter.	-0.077078
F-statistic	9.266177	Durbin-Watson stat	1.827737
Prob(F-statistic)	0.000009		

Source: own computation

From Table 4.4 in the long run exchange rate and gross domestic product have positive effects, while money supply affects trade balance negatively. The significant variables appear to affect trade balance are exchange rate, income (GDP) and money supply (MS). Both signs for income and money supply are consistent to monetary theories. The theories indicate that a rise in domestic income increases the demand for money and therefore will increase exports and improve trade balance.

As expected, the coefficient of the exchange rate is positive and statistically significant. An increase in exchange rate (depreciation of birr) by 1% leads to an increase in trade balance (X to M) over time by 1.48% percentage at 5% significance level. This is because a rise in the exchange rate (ER) indicates depreciation of Ethiopian birr. In such a situation, foreign goods become more

expensive than domestic goods. This also will lead to an increase in competitiveness of Ethiopia's exports and a shift of resources from sectors that produce non-tradable to those producing tradable goods. This means that exports will rise relative to imports and hence trade balance will improve. Though the result obtained shows a positive relationship between the exchange rate and the trade balance, the significance of the variable obtained in the long-run result suggests the presence of the Marshall-Lerner condition.

Devaluation has been described as a policy prescription aimed at strengthen the trade balance, but the impact of devaluation normally entails time lag before showing any impact of trade balance and hence, the effect of both short and long run impacts of depreciation on trade are quite different. At theoretical level, it worsen trade balance situation initially after devaluation, but with time, it start to show positive impact until long-run equilibrium is achieved. The time path through which the trade balance follows generate a J-curve effect. The time-lag is a product of an effect of series of several lags such as production, regulation, decision and delivery. Apart from this, it normally take time in even deciding on what business relationship to go into and the replacement of new orders. There are delivery lags that explain the time taken before payments are made for new order that were placed soon before the price change. Procurement of new materials allowed waiting pending the time when inventories of materials are used and this is replacement lag. Lastly, the emergence of production lags and before which producers becomes sure that present market conditions will provide a profitable opportunity (Danmola 2010). In the same vain, since the long-run coefficient of the exchange rate variable is positive and significant, it concluded that there is a J-curve pattern. because, agricultural products mainly dominate Ethiopia's export sector with a large percentage being raw materials and semi-processed products, while its imports are highly dominated by capital-intensive goods as well as finished goods such as petroleum products, machines and equipment. The estimated results show that exchange rate depreciation positively related to the trade balance in the long run, consistent with the Marshall Lerner condition (Waliullah et al. (2010). However, the extent to which it will

succeed depends on the country's price elasticities of domestic demand for imports and foreign demand for exports. This result is also similar with Temesgen (2016) in Ethiopia, Dussa (2007) in Malaysia and Mohammad (2010) in Pakistan.

The coefficient of money supply is negative and statistically significant at 1 percent level. A 1 percent increase in the money supply on average results in a 1.01 percent decrease in trade balance (X to M). This indicates that monetary expansion worsens trade balance deficit in the long run. Thus, the coefficient of money supply in trade balance equation is in agreement with the monetary theory of the trade balance of a nation. Its likely mechanism is through its effects on real interest rates. The fall in money supply has resulted from the tight monetary policy aimed to control inflation while providing adequate liquidity to stimulate economic growth. An increase in money supply by the monetary authority through influences of interest rate by the financial sector, open market operations and occasionally changes in reserve requirements, relatively to demand for money, causes an increase in individual's money balances. Individuals with excess money balance turn to increase consumption expenditures comprising of both domestic and foreign goods. Because foreign products dominate local market, which meets the standard, taste and preference of the local demand, foreign products are highly demanded relative to the domestic ones, hence deteriorating the trade balance of the country. Duasa (2007), Nienga (2010) and Walliullah (2010) confirm similar results in Malaysia, Kenya and Pakistan respectively.

Results of the long-run model also show a positive relationship between GDP and trade balance. A 1% increase in gross domestic product improves trade balance on average by 0.98% at 5% level of significance. The theories indicate that a rise in domestic income increases the demand for money and therefore will increase exports and improve trade balance. The positive sign of the coefficient of income variable contradicts the Keynesian view that income increases will encourage citizens to buy more imported goods and thus worsens the trade balance which is similar

with Cergibozan (2015) a study on Turkey. This result is contrary to Temesgen (2016) in which change in GDP has no effect on trade balance in long run.

Regarding the long-run coefficient of government consumption expenditure, the result shows insignificant relationship between government consumption expenditure and the trade balance. The insignificance probably due to the fiscal policy exercised by the government. Household consumption expenditure has an insignificant negative impact on trade balance. Shen (2013) each find similar results in Tanzania.

The coefficient of determination (adjusted R-squared) is high explaining that about 58 % of variation in the trade balance (TB) attributed to variations in the explanatory variables in the model. In addition, the DW statistic does not suggest autocorrelation. The general prob (F-statistics) found to be significant at 1 percent level imply that the independent variables jointly can influence dependent variables and the F-statistics value which is also significant with the highest value of 9.266177 implying that the model was well specified.

4.4 Estimates of Short-run Error Correction model

The previous section analyzed the long run (co integration) relationship among the variables. This section focuses on the short-run relationship among variables, to achieve this the error correction model estimated. The coefficient of short–run dynamics obtained by regressing the first difference of the dependent variable on its lag, the lagged error correction term, which is derived from the long run static model, the first difference of all exogenous variables and their lags.

Table 4.5 Error correction model results

Method: Least Squares

Date: 12/14/18 Time: 14:58

Sample (adjusted): 1982 2017

Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	-0.002047	0.096613	-0.021191	0.9832
D (LTB (-1))	-0.121706	0.214595	-0.567141	0.5751
D (LHCE (-1))	-0.633867	0.544298	-1.164559	0.2540
D (LGCE (-1))	0.604968	0.298399	2.027379	0.0522
D (LMS (-1))	-0.938473	0.702654	-1.335612	0.1924
D (LGDP (-1))	0.502246	0.617469	0.813394	0.4229
D (LER (-1))	1.178187	0.615609	1.913856	0.0659
ECM (-1)	-0.903704	0.287677	-3.141380	0.0039

R-squared	0.577778	Mean dependent var	-0.012744
Adjusted R-squared	0.472222	S.D. dependent var	0.275543
S.E. of regression	0.200177	Akaike info criterion	-0.186098
Sum squared resid	1.121985	Schwarz criterion	0.165795
Log likelihood	11.34976	Hannan-Quinn criter.	-0.063278
F-statistic	5.473682	Durbin-Watson stat	1.745766
Prob(F-statistic)	0.000485		

Source: own computation

From table 4.5 error correction model indicate only real exchange rate and government consumption expenditure had significant impact on trade balance in short run. While the effect of gross domestic product, household consumption expenditure, money supply and lagged value of trade balance was insignificant in short run.

The short run result shows a statistically significant positive coefficient of exchange rate to the trade balance. Specifically, a one percent increase in exchange rate in short run on average results 1.17 percent improvement in trade balance at 10 % significance level. The results imply that depreciation improves trade balance in the short-run.

Again, government consumption expenditure found to have a positive and significant relationship with trade balance in the short-run. As government consumption expenditure increases, it causes the trade balance to improve on average by 0.6 percent. This result is significant at 5% error level. Implying that there have been sensible government interventions, such as investment in productive sectors, undertaken to promote exports. Government consumption expenditure constitutes two-folds; expenditure is either on domestic goods or on foreign goods. Again, expenditures by the government either diverted into productive ventures such as investing in productive sectors in order to promote exports or non-productive areas such as the purchase of luxury cars, military goods, machines and equipment, mostly not produced domestically. Therefore, improvement in trade balance may imply that, government spends less in non-productive sectors and diverting funds into productive ventures. Nienga (2010) and Shen (2013) confirm similar results in Kenya and Tanzania respectively.

The ECM coefficient shows how quickly/slowly variables return to equilibrium, and it should have a statistically significant coefficient with a negative sign. Table 4.5 shows that the expected negative sign of the ECM is highly significant and has the correct sign. The estimated coefficient of the ECMt-1 is equal to -0.9037, suggesting that deviation from the long-term TB path corrected by around 90 percent over the following year. This means that the adjustment takes place quickly. Approximately 90% of disequilibria from the previous year's shock converge back to the long-run equilibrium in the current year.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATION

5.1 conclusion

The main objective of this study is to analyze the determinants of trade balance in Ethiopia during the specified period (1980-2017). Based on review of theoretical and empirical review, five variables (GDP, GCE, HCE, ER and MS) identified that generally determine trade balance of Ethiopia. More over variables are selected based on elasticity, monetary and absorption theories of trade balance.

To determine the long run and short run relationship among the variables, Autoregressive Distributed Lag (ARDL) model was applied. Before applying the ARDL model, all the variables are tested for their time series properties (stationarity properties) using the ADF and PP tests. As a result, trade balance is stationary (no unit root problem) at level, while real exchange rate, gross domestic product, money supply and government consumption expenditure are stationary at first difference with intercept and trend. However, with trend and intercept, except household consumption expenditure (i.e., stationary in level without trend and intercept), all the variables are stationary in first difference.

Next to testing for time series property, the model stability done by testing the diagonal testing techniques. The result revealed that no evidence of serial correlation, the model is stable, residual is normally distributed and no evidence of heteroscedasticity problem. As discussed above, this study applied the methodological approach called ARDL model also known as bound test approach. As result indicted there is a long run relationship between trade balance and its determinants (exchange rate, gross domestic product, money supply, government consumption expenditure and household consumption expenditure) in long run during the study period.

The empirical result of the study indicates trade balance of the country can be affected by the change in one of independent variable (exchange rate and government consumption expenditure)

in the short run as well as in the long run (exchange rate, money supply and gross domestic product). Furthermore, Exchange rate is most dominant factor for trade balance in the study period. As the objective of this paper is to investigate long run and short run determinants of trade balance, exchange rate has positive and significant impact on trade balance in both cases. Moreover, this paper founds that government consumption expenditure of the country has positive and determinant factor on trade balance in the short run.

The estimated short run model revealed that the trade balance converges to its equilibrium value. The coefficient of the error term that captures the speed of adjustment towards the long run equilibrium is found with the correct sign and magnitude. The speed of adjustment is -0.90, which implies that around 90% deviations from long run equilibrium are adjusted every year and the rest 10% in the coming year.

5.2 Recommendation

Based on the findings, this study forwarded the following policy recommendations.

- In order to increase trade balance of the country Ethiopia should follow policy that depreciate the exchange rate in the end. Depreciation of currency improves trade balance in long run. In line with it, a country should improve the quality of exportable items in response to foreigner's demand.
- As seen from result in the analysis part money supply has negative impact on trade balance, excess money supply cause the rise in price for domestic goods and economic agents want to use more imported goods and service as substitute, as the result trade deficit will occurs. Therefore, strong money supply stabilizing policy is also important to the country.
- Government should discourage import of certain categories of goods and, at the same time, create an enabling environment for increasing domestic production.
- Government should design policies that encourage productivity improvements and spend on diversification of the export sectors and expansion of import substituting industries, curtails import growth, and thereby leads to improvements in the country's trade balance, output growth and a downward pressure on domestic price level.

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Appendix

A VAR Lag Order Selection Criteria

Endogenous variables: LTB

Exogenous variables: C

Date: 12/25/18 Time: 18:50

Sample: 1980 2017

Included observations: 35

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-6.343959	NA	0.089081	0.419655	0.464093	0.434995
1	0.529588	12.9615*	0.06369*	0.08402*	0.17290*	0.11470*
2	1.480982	1.739693	0.063886	0.086801	0.220117	0.132822
3	1.754820	0.485084	0.066631	0.128296	0.306050	0.189657

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

ARDL result

Dependent Variable: LTB
Method: ARDL
Date: 01/11/19 Time: 15:59
Sample (adjusted): 1982 2017
Included observations: 36 after adjustments
Maximum dependent lags: 2 (Automatic selection)

Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): LHCE LGCE LMS LGDP LRER
Fixed regressors: C
Number of models evalulated: 486
Selected Model: ARDL(1, 2, 2, 0, 0, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LTB(-1)	-0.012487	0.182936	-0.068261	0.9461
LHCE	0.146525	0.598578	0.244788	0.8086
LHCE(-1)	0.442561	0.520303	0.850584	0.4031
LHCE(-2)	1.197342	0.438604	2.729894	0.0114
LGCE	0.189520	0.348146	0.544368	0.5910
LGCE(-1)	0.239300	0.447838	0.534344	0.5978
LGCE(-2)	-0.692036	0.336747	-2.055065	0.0505
LMS	-0.167693	0.406489	-0.412540	0.6835
LGDP	-1.267078	0.676110	-1.874070	0.0727
LRER	-1.416893	0.788232	-1.797557	0.0843
C	-1.334059	0.436065	-3.059316	0.0052

R-squared	0.712161	Mean dependent var	-1.204471
Adjusted R-squared	0.597026	S.D. dependent var	0.303930
S.E. of regression	0.192936	Akaike info criterion	-0.206452
Sum squared resid	0.930604	Schwarz criterion	0.277401
Log likelihood	14.71614	Hannan-Quinn criter.	-0.037574
F-statistic	6.185426	Durbin-Watson stat	1.999038
Prob(F-statistic)	0.000105		

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

ARDL bounds test

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LTB)
Selected Model: ARDL(1, 2, 2, 0, 0, 0)
Case 3: Unrestricted Constant and No Trend

Date: 01/11/19 Time: 16:02
Sample: 1980 2017
Included observations: 36

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.334059	0.436065	-3.059316	0.0052
LTB(-1)*	-1.012487	0.182936	-5.534646	0.0000
LHCE(-1)	1.786428	0.805975	2.216481	0.0360
LGCE(-1)	-0.263217	0.328194	-0.802016	0.4301
LMS**	-0.167693	0.406489	-0.412540	0.6835
LGDP**	-1.267078	0.676110	-1.874070	0.0727
LRER**	-1.416893	0.788232	-1.797557	0.0843
D(LHCE)	0.146525	0.598578	0.244788	0.8086
D(LHCE(-1))	-1.197342	0.438604	-2.729894	0.0114
D(LGCE)	0.189520	0.348146	0.544368	0.5910
D(LGCE(-1))	0.692036	0.336747	2.055065	0.0505

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LHCE	1.764395	0.822533	2.145075	0.0419
LGCE	-0.259971	0.335783	-0.774222	0.4461
LMS	-0.165625	0.391007	-0.423584	0.6755
LGDP	-1.251450	0.699092	-1.790107	0.0856
LRER	-1.399418	0.824098	-1.698120	0.1019

EC = LTB - (1.7644*LHCE -0.2600*LGCE -0.1656*LMS -1.2515*LGDP
-1.3994*LRER)

F-Bounds Test Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)

			Asymptotic: n=1000	
F-statistic	5.979771	10%	2.26	3.35
K	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68
			Finite Sample:	
Actual Sample Size	36		n=40	
		10%	2.483	3.708
		5%	2.962	4.338
		1%	4.045	5.898
			Finite Sample:	
			n=35	
		10%	2.508	3.763
		5%	3.037	4.443
		1%	4.257	6.04

t-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-5.534646	10%	-2.57	-3.86
		5%	-2.86	-4.19
		2.5%	-3.13	-4.46
		1%	-3.43	-4.79

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.007850	Prob. F(2,28)	0.9922
Obs*R-squared	0.020736	Prob. Chi-Square(2)	0.9897

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 01/11/19 Time: 16:07
Sample: 1981 2017
Included observations: 37
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.003931	0.594096	-0.006617	0.9948
LTB(-1)	-0.001749	0.384495	-0.004548	0.9964
LHCE(-1)	0.021112	0.657428	0.032112	0.9746
LGCE(-1)	0.002595	0.295645	0.008777	0.9931
LMS(-1)	-0.005502	0.473316	-0.011625	0.9908
LGDP(-1)	-0.017540	0.639709	-0.027419	0.9783
LRER(-1)	-0.016638	0.758385	-0.021939	0.9827
RESID(-1)	-0.000801	0.455460	-0.001759	0.9986
RESID(-2)	0.028005	0.223512	0.125297	0.9012

R-squared	0.000560	Mean dependent var	-1.15E-15
Adjusted R-squared	-0.284994	S.D. dependent var	0.185131
S.E. of regression	0.209860	Akaike info criterion	-0.076975
Sum squared resid	1.233159	Schwarz criterion	0.314870
Log likelihood	10.42404	Hannan-Quinn criter.	0.061168
F-statistic	0.001963	Durbin-Watson stat	1.826588
Prob(F-statistic)	1.000000		

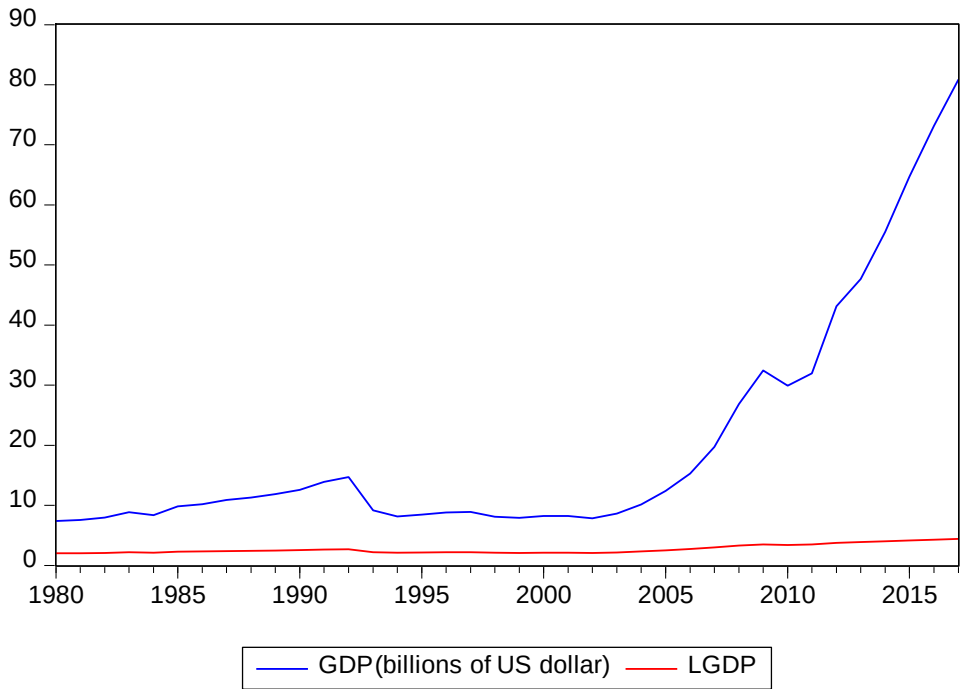
Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.799285	Prob. F(6,30)	0.5781
Obs*R-squared	5.099514	Prob. Chi-Square(6)	0.5311
Scaled explained SS	3.628405	Prob. Chi-Square(6)	0.7268

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 01/11/19 Time: 16:07
Sample: 1981 2017
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.074513	0.088762	0.839469	0.4078
LTB(-1)	0.000885	0.043960	0.020125	0.9841
LHCE(-1)	-0.070544	0.149624	-0.471477	0.6407
LGCE(-1)	0.010357	0.060330	0.171665	0.8649
LMS(-1)	0.059905	0.072689	0.824136	0.4164
LGDP(-1)	0.038369	0.138721	0.276592	0.7840
LRER(-1)	-0.034001	0.154057	-0.220703	0.8268

R-squared	0.137825	Mean dependent var	0.033347
Adjusted R-squared	-0.034610	S.D. dependent var	0.049739
S.E. of regression	0.050593	Akaike info criterion	-2.961362
Sum squared resid	0.076789	Schwarz criterion	-2.656594
Log likelihood	61.78519	Hannan-Quinn criter.	-2.853917
F-statistic	0.799285	Durbin-Watson stat	1.517239
Prob(F-statistic)	0.578138		


90
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1980
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2005
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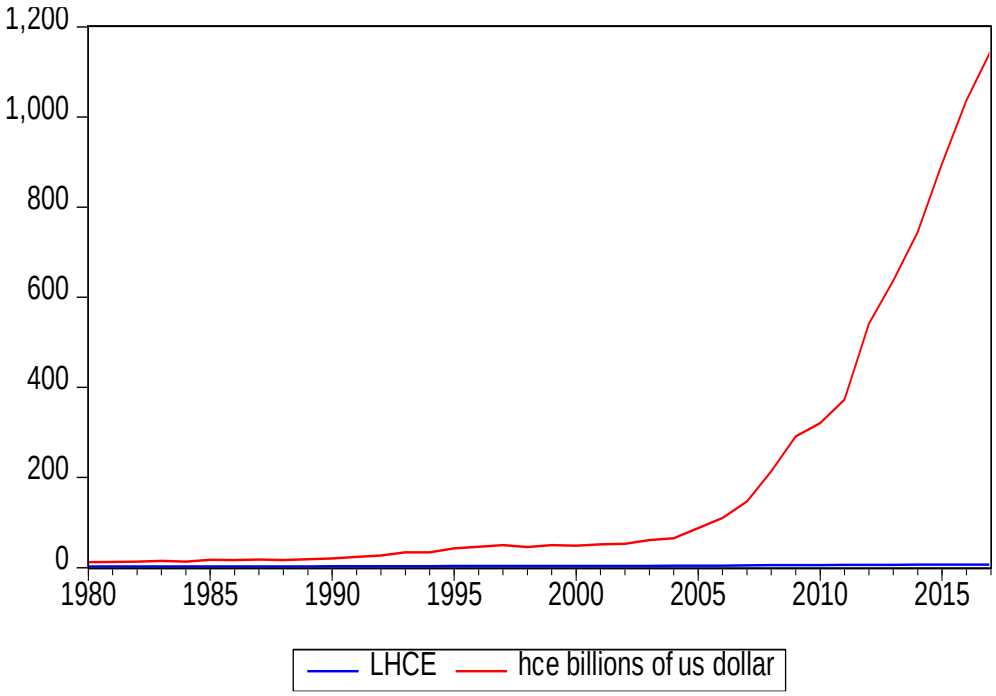
2015
GDP(billions of US dollar)
LGDP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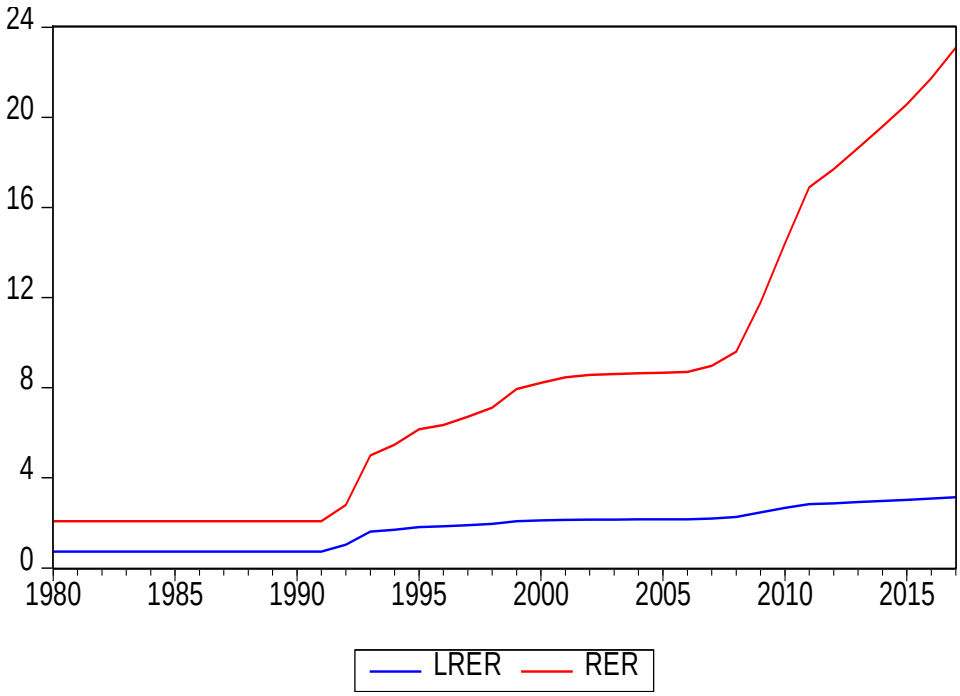
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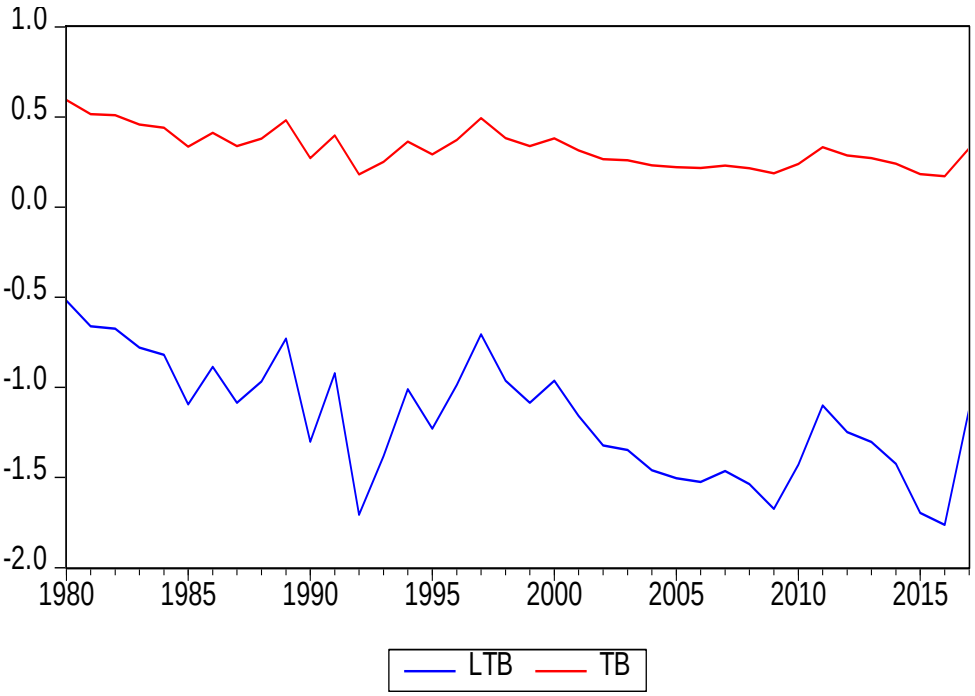
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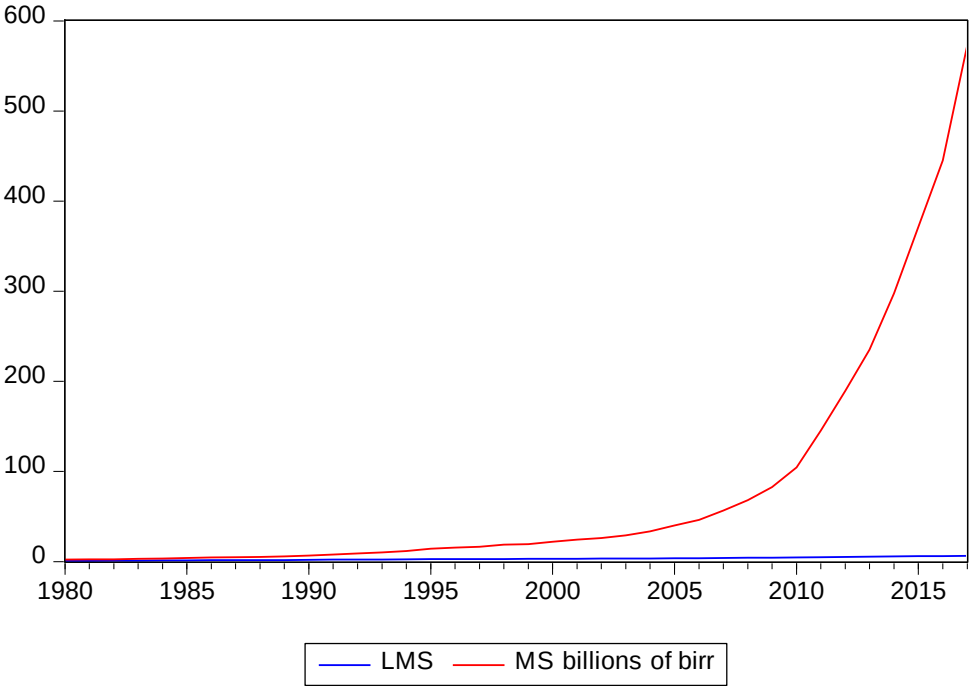
LTB
TB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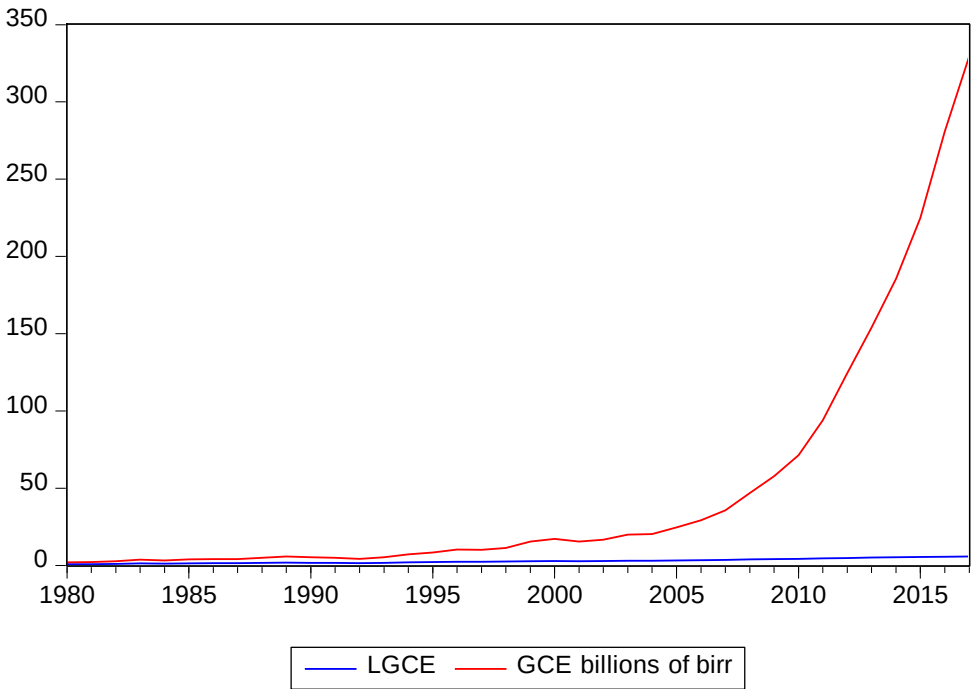
LMS
MS billions of birr

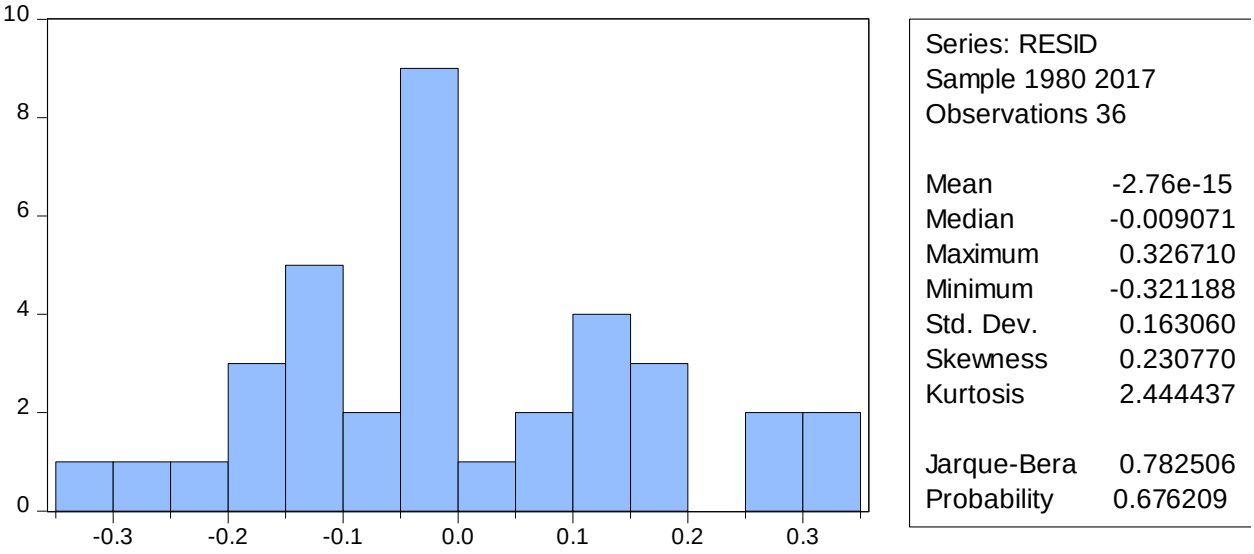


year	GDP (billions of US dollar)	GCE billions of birr	HCE billions of birr	RER	MS billions of birrs	M (billion n birr)	X (billions of birr)	TB (ratio of X to M)
1980	7.39	2.00	11.88	2.07	2.11	1.48	0.88	0.59
1981	7.58	2.16	12.69	2.07	2.38	1.53	0.79	0.52
1982	7.97	2.63	13.39	2.07	2.64	1.63	0.83	0.51
1983	8.86	3.79	14.88	2.07	3.04	1.81	0.83	0.46
1984	8.38	3.17	13.49	2.07	3.38	1.95	0.86	0.44

1985	9.81	3.88	17.24	2.07	3.85	2.06	0.69	0.33
1986	10.19	4.07	16.64	2.07	4.45	2.28	0.94	0.41
1987	10.89	4.02	18.07	2.07	4.81	2.28	0.77	0.34
1988	11.29	4.89	16.96	2.07	5.24	2.34	0.89	0.38
1989	11.87	5.73	18.84	2.07	5.70	1.95	0.94	0.48
1990	12.60	5.28	20.30	2.07	6.71	2.24	0.61	0.27
1991	13.93	4.85	24.25	2.07	7.96	0.98	0.39	0.40
1992	14.70	4.21	26.80	2.80	9.01	2.48	0.45	0.18
1993	9.14	5.22	33.85	5.00	10.14	3.94	0.99	0.25
1994	8.14	7.09	34.17	5.47	11.60	5.66	2.06	0.36
1995	8.43	8.37	43.06	6.16	14.41	7.04	2.06	0.29
1996	8.83	10.19	46.38	6.35	15.65	7.11	2.65	0.37
1997	8.91	10.02	50.07	6.71	16.55	7.49	3.70	0.49
1998	8.08	11.33	45.90	7.12	18.64	10.39	3.97	0.38
1999	7.93	15.45	49.71	7.94	19.40	10.51	3.55	0.34
2000	8.24	17.18	49.08	8.22	22.18	10.37	3.96	0.38
2001	8.22	15.38	51.66	8.46	24.52	12.32	3.87	0.31
2002	7.85	16.68	53.09	8.57	26.29	14.49	3.86	0.27
2003	8.62	19.84	61.11	8.60	29.06	15.93	4.14	0.26
2004	10.14	20.24	65.59	8.64	33.63	22.3	5.18	0.23
2005	12.41	24.57	87.73	8.67	40.21	35.77	7.95	0.22
2006	15.28	29.28	110.40	8.70	46.38	39.87	8.68	0.22
2007	19.70	35.56	147.23	8.97	56.65	45.08	10.42	0.23
2008	26.84	46.92	213.54	9.60	68.18	62.96	13.55	0.22
2009	32.46	57.77	291.17	11.78	82.51	80.52	15.09	0.19
2010	29.92	71.34	320.72	14.41	104.43	108.96	26.12	0.24

2011	31.96	93.89	373.09	16.90	145.38	133.03	44.30	0.33
2012	43.13	124.42	541.54	17.70	189.40	190.85	54.77	0.29
2013	47.66	153.93	636.90	18.63	235.31	208.52	56.69	0.27
2014	55.51	185.47	744.98	19.59	297.73	261.56	62.95	0.24
2015	64.68	224.88	896.21	20.58	371.33	330.75	60.67	0.18
2016	73.15	280.89	1037.27	21.73	445.27	353	60.53	0.17
2017	80.87	329.66	1147.63	23.10	573.38	428.40	139.81	0.33

Source; National bank of Ethiopia, World Bank indicators and



Source: EViews 10