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THE IMPACT OF REAL EFFECTIVE EXCHANGE RATE ON TRADE BALANCE IN ETHIOPIA

BY

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ACRONYMES

AIC : Akaike Information Criterion

ADF: Augmented Dickey Fuller

ARDL: Autoregressive Distributed Lag

ECM: Error correction Model

EPRDF: Ethiopian People Revolutionary Democratic Front

CUSAM: Cumulative Sum

CUSAMSQ: Cumulative Sum Square

GDP: Gross Domestic Product

GEX: Government Expenditure

RGDP: Real Gross Domestic Product

REER: Real Effective Exchange Rate

IMF: International Monetary Fund

LDCs: less developed countries

ERCA: Ethiopian revenue and customs Authority,

MoFEC: Ministry of Finance and Economic Cooperation

MS: Money Supply

DOLS: Dynamic Ordinary Least Square

SAP: Structural Adjustment Program

SBC: Schwarz Bayesian Criterion

TOP: Trade Openness

Abstract

In the era of globalization, global macroeconomic crises and the changes in the international trade pattern have accentuated the need for clearer understanding of the factors underlying a country's balance of trade position. In this onset, this paper 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 is used for analysis time serious annual data of period 1979/80 to 2013/34. Different diagnostic tests are under taken to check this time series data consistency and stability of selected model.

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 I 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 have to formulate strong controlling mechanism on monitory policy and trade structure of the country.

1. Introduction

1.1. Background of the study

Ethiopian international trade has experienced rapid expansion together with dramatic increase in economic growth in the country which resulted from stable political system, vast natural resources and abundant labor force and government incentive for those who invest in export enhancing sectors in the country.

Due to conducive climate provided for domestic as well as foreign investors there has been progress in the involvement as well as growth of investor. However, the economy has been subject to chronic trade deficit that resulted from the imbalance between export and imports of goods and services. Different literature argue the role of international trade in the growth of economy through increasing the volume of production, transfer of knowledge and technology as well as paving the way for sustainable economic growth. the available evidence confirms that countries that are engaged in international trade are found to be more efficient and growing fast than countries that are engaged in the production of goods and services to solely for domestic market.

Exchange rate administration is one of the most significant issue of the recent and past policy debates on economic reform in developing countries. This is because of that exchange rate has been taken to be an important relative price signaling inter-sectoral growth in the long run and recognized as a decisive link between the internal economy and external world (Aron et al., 1997; and Gahtak, 1995:224); and hence it can be used as an indicator of competitiveness of in the foreign trade of a country (Williamson, 2008).Comment: Moreover, the effectiveness of

different exchange rate system in promoting competitiveness in international trade and their impact on macroeconomic stability have been discussed by Wickham (1985), Sachs (1996), Frenkel (1996) and others as part of an ongoing scholarly debate. The level of follows the shock to domestic and international economic fundamentals that affects the decision to invest in a country depending on that the currency over valued or not comparison with the investing country; and influence private investment and export, and hence international competitiveness of a country (Caballero and Corbo, 1989; Serven and Solimano, 1991; and Kipici and Kesriyeli, 1997).

The current debate on persistent trade imbalances and on the revival of non-traditional trade restrictive measures has led to a renewed interest in better understanding the effect of exchange rates on international trade. In spite of the increasing number of studies on the topic, the actual effect of exchange rates on international trade is still an open and controversial question.

Against this background, this paper aims to investigate the impact of exchange rate on trade balance in Ethiopia for the period from 1980 to 2014, this period is selected because of the data availability. In fact, numerous studies, theoretically and empirically, have attempted to find the nature of the relationship between exchange rate volatility and foreign trade for the last few decades.

This paper assumed contributes to understanding the relationship between exchange rates and international trade by investigating the effect of exchange rate volatility and misalignment on international trade and by exploring whether exchange rate affects trade policy decisions.

1.1 Statement of the problem

The effectiveness of exchange rate depreciation in improving the trade balance has long been an issue of considerable interest to economists and policy makers. Especially, since the break down of the Bretton Woods Accord in 1973, and the advent of floating exchange rates, there has been renewed interest on the effect of devaluation on the trade balance of both developed and developing countries. The mixed empirical support of the relationship between trade balance and changes in exchange rate provides the impulsion for study of the relationship. Developing countries failing to meet their development plan have lurched from one development paradigm to another: from industrialization to import substitution, to export promotion, to Structural Adjustment Program (Rawlins and Praven, 1993).

Structural Adjustment Program (SAP) is an expression used by the IMF for the changes it recommends for developing countries so that they could get loans with certain conditionality. In implementing one of the essential conditions of the SAP, less developed countries (LDCs) facing balance of payment problems due to expansionary financial policies, a deterioration in terms of trade, price distortions, high debt servicing or combination of these factors have often resorted to devaluing their currencies (Nashashibi, 1983).

Ethiopia, as one of the LDCs, faced various problems including some of the mentioned and others which were the root causes of poor economic performance of the country. Even though the causes of poor economic performance were numerous and various, poor macro-economic policies were the prominent ones. Thus, need for comprehensive, compatible, timely and sequential policy restructuring was indisputable for reliable and sustained growth and development and for maintenance of both external and internal balance of the country. In order

to do that Ethiopia has undergone various policy and structural reforms on both micro-and macro level of the economy in the form of implementing Structural Adjustment Program (SAP), which began in 1992, after the fall of the Derg regime. As part of these over all reform programs, on October 1, 1992, Ethiopian Birr devalued from its nominal level of 2.07 Birr per US dollar to 5.00 Birr per US dollar (Befikadu and Kibre, in Mekonen and Abedulahamid, 1994)

When the Structural Adjustment Program was introduced in October 1992, the nominal exchange rate of Birr in respect of the US Dollar had been fixed for nearly three decades, except the revaluation of 1971, 1972, and 1973 with cumulative nominal revaluation of 17 percent. Such a passive exchange rate policy, coupled with expansive monetary and fiscal policies, led to continuous overvaluation (Alem, 1996). Despite the fact that the rate was fixed against the dollar for this period, it was floating against all other major currencies, following the fluctuation of US dollar against these currencies (Befekadu and Berhanu, 1999/2000). After the massive devaluation of 1992, the Ethiopian Birr has consistently been depreciating in nominal terms from year to year and by the year 2014/15, the average nominal exchange rate stood at 20.208 Birr per US dollar; this shows that depreciation of about 304 percent compared to the 1992, 5.0 Birr per USD.

As brilliantly explained in Reinhart (1995), devaluations have often been used by developing countries to reduce large external inbalancement, correct perceived "overvaluations" of the real exchange rate, increase international competitiveness, and promote export growth. However, devaluation can only accomplish these tasks if it translates in to a real devaluation and if trade flows respond to relative prices in significant and predictable manner. This shows that nominal devaluation is not a goal in itself.

However, it is discussed in Edwards (1989) that in theory and under most common circumstances, nominal devaluation will affect an economy in three main ways:

a. Devaluation will usually have an expenditure reducing effects. To the extent that as a result of devaluation the domestic price level goes up, there will a negative wealth effect that will reduce the real value of domestic currency dominated nominal assets, including domestic money. A lower real value of assets will reduce expenditure on all goods.
b. It will tend to have an expenditure changing effect. This involves shifts in the pattern of domestic demand from tradable towards non-tradable, and the pattern of domestic production from non-tradable to tradable. The combined effect of expenditure reducing and expenditure switching will, of course, improve the external situation of the country.
c. Devaluation will increase the domestic price of imported intermediate inputs and imported capital goods. This will increase the cost of production and results in a contraction of real output or aggregate supply, including non-tradable.

Although economic theory hypothesizes that devaluation of a country's currency will likely improve the trade balance, there are conflicting theories about the effect of devaluation on trade balance. Empirical findings of Rose (1990), Dhakal D. (1997) both suggested mixed results. Therefore this paper aims to see impact of exchange rate on trade balance in Ethiopia considering different factors for that exchange rate responds.

1.2 Objectives of the study

The general objective of this research is to analyze the impacts of changes in exchange rate movement on trade balance, i.e., whether reduction improves trade balance or not. More specifically, the study attempts:

- To briefly look at exchange rate regimes and developments in Ethiopia
- Briefly investigate the structures and trends of import and export situation in Ethiopia.
- To empirically investigate the short run and long run impact of change in exchange rate of Birr on trade balance of Ethiopia
- To make conclusions and policy implications

1.3 Significance of the study

There are limited studies that have examined the impact of changes in the exchange rate on trade balance of Ethiopia. The importance of this paper to see the effect of exchange rate and also to contributing the definitive understanding of how changes in the exchange rate affects trade balance that could have vast implications to the endeavor to improve the country's competitiveness and to promote export value added domestic products, and so to formulate good policy that could help improving the persistent trade deficit.

1.4 Data source and methodology of the study

The data source for this study include different annual publications of the National Bank of Ethiopia, Ethiopian revenue and customs Authority (ERCA) , Ministry of Finance and Economic Cooperation (MoFEC), The IMF and World Bank data bases, and it covers a period

of 34 years. The employed model is believed to be appropriate and simple to examine the relationship between exchange rate changes and trade balance using econometric techniques.

1.5 Organization of the Paper

The paper is organized in five chapters. The first chapter presents introductory part of the study. The second chapter deals with the review of theoretical and empirical literature on the research topic. The third chapter presents a brief look at the structure of and trends in exports and imports. The fourth chapter presents the model to be used in the analyses and presents the empirical results of the study. The last chapter presents conclusion and policy implications.

2. Literature review

2.1. Theoretical Literature

The theoretical literature on the issue provides little guidance as the presumption that exchange rates directly affect trade depends on a number of specific assumptions but which do not hold in all cases. Some of these different approaches to the relationship between exchange rate changes and trade balance revised accordingly.

2.1.1. The Elasticity Approach

The elasticity approach provides an analysis of what will happens to trade balance when a country devalues its currency and conditions that must prevail in the foreign exchange market for a devaluation or depreciation of the currency to improve the trade balance starting from equilibrium (Pongsak Hoontrakul (1999).

According to Sugman (2005), the analysis was developed by Alfred Marshall, Abba-Lerner and later extended by Joan Robinson in 1937 and Fritz Machlup in 1955. At the outset, the model makes some simplifying assumptions. It is partial equilibrium analysis holding constant everything else that may affect the supply of and demand for foreign or domestic currency, except the change in the relative price of foreign and domestic goods arising from the change in the exchange rate itself. The approach focuses on demand conditions and assumes the supply elasticity for the domestic export goods and foreign import goods are infinite, that is perfectly elastic. So, that changes in demand volumes have no effect on prices (the domestic price of exports, the foreign price of imports and prices of import and export substitutes are constant). In effect these assumptions mean that domestic and foreign prices are fixed so that changes in relative prices are caused by changes in the nominal exchange rate. Under these assumptions, the

condition for a devaluation to improve the trade balance which directly contributes to the improvement of the balance of payments (starting from equilibrium) is known as the Marshall-Lerner condition. It states that devaluation will improve the balance of payments on trade balance if the sum of the foreign price elasticity of demand for exports (ηx) and domestic price elasticity of demand for imports (ηm) exceeds unity, in absolute value,

That is if: $|\eta x + \eta m| > 1$ ……………………………….(**2.1**)

Consider a small one percent devaluation which leads to a one percent fall in the foreign price of domestic exports. If the demand for exports rises by less than one percent, foreign exchange earnings will fall; if demand rises by more than one percent foreign exchange earnings will raise, and if demand rises by exactly one percent, foreign exchange earnings will remain the same. In this last case of unitary elasticity of demand, it would then only require a minute hold back in import demand (an elasticity of demand for imports slightly greater than zero) for foreign exchange earnings to improve in total.

Any combination of price elasticity of demand for exports and imports will improve foreign exchange earnings provided that they sum to greater than unity.

Starting from equilibrium, the change or improvement in the trade balance (dTB) is measured as:

$$\mathbf{dTB = X(\eta x + \eta m - 1)dE} \quad \text{……………………………… (2.2)}$$

Where X is the initial level of exports is equals to imports, and dE is the instantaneous change in the exchange rate (measured as the domestic price of a unit of foreign currency).

In keeping with Pugel and Lindert (2000), the central message of the elasticity approach is that there are two direct effects of devaluation on trade balance one which works to reduce and the other one works to worsen. These two effects are the price effect and the volume effect.

The price effect clearly contributes to the worsening of trade balance because exports become cheaper measured in foreign currency and imports become expensive measured in the home currency. The volume effect obviously contributes to the improving of trade balance. This is because of the fact that exports become cheaper should encourage an increased volume of exports and the fact that imports become expensive should lead to a decreased volume of imports. The net effect depends on the dominant one whether volume or price.

According to a general consensus by the economists that elasticity are lower in the short-run than long-run, in such a case Marshal-Lerner condition may only hold in the middle to long run. The possibility that in the short run, Marshal-Lerner may not be fulfilled although it generally holds over the long run leads to the phenomenon of what is popularly known as the J-curve effect.

The idea underlying the J-curve effect is that in the short run export volumes and import volumes do not change much, so that the price effect is more important than the volume effect leading to deterioration in trade balance. Three of the most important reasons advanced in explaining the J-curve effect are time lag both in producers and consumers response and imperfect competition. Driskell, Robert A. (1981), made a refinement of the elasticity approach by incorporating income effects into the analysis. According to them, if autonomous money expenditure remains constant, allowing for income effects does not alter the Marshall-Lerner condition for a successful devaluation, but the magnitude of the effect on the balance of payments is altered. With this effect equation (2.2) becomes:

$$dTB = \frac{S}{S+m} X\,(\eta x + \eta m - 1)\,dE \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ (2.3)$$

Where s is the propensity to save and m is the propensity to import. Since $\frac{S}{S+m}$ is less than one, then change in the balance of payments is smaller with income effects than without (becomes less severe).

With the same source, an opposing result was derived by Harberger *(1983)*. His models hold real expenditure constant implying a rise in autonomous expenditure in money terms, which suggests that the income effects of devaluation alter the Marshall-Lerner condition, making it more severe. According to these models the condition for trade balance improvement becomes:

$$|\eta x + \eta m| > 1 + m_1 + m_2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2.4)$$

Where m_1 is the marginal propensity to import of devaluing of the country 1, and m_2 is the marginal propensity to import of the other countries 2. This model specification should be preferred depends on whether a successful devaluation is interpreted to mean one which improves the balance of payments with real income falling or without real income falling.

Mariana Colacelli (2006) argued that outside of the confines of the partial equilibrium framework adopted by the elasticity approach, supply elasticity matter both in themselves, and as determinants of the terms of trade. What happens to expenditure (or absorption) as the terms of trade change also matters? It can be shown, for example, that if the product of the supply elasticity of exports and imports exceed the product of the demand elasticity, the terms of trade will decline, and if expenditure does not fall by as much as real income, the balance of payments will worsen.

In general, there is highly held view that this approach made very simplistic assumption and it is by no means certain that in practice the elasticity condition are satisfied, or that, by the time they are satisfied the competitive advantage gained by depreciation has not been eroded by the induced price rise.

2.1.2. The Absorption Approach

Absorption approach by Alexander (1952) and Johnsen (1967) and popularized by Miles (1979) was developed to overcome some of the shortcomings of the elasticity approach. The major purpose of the absorption approach is to integrate the balance of payments with the functioning of the total economy in a general equilibrium framework, in which balance of payments disequilibrium on current account is viewed as the outcome of the difference between decisions to produce and spend, or to save and invest. Taking the national income identity:

$$\mathbf{Y = C + I + G + X - M} \quad \text{.....(2.5)}$$

Where C is consumption; I is investment, G is government expenditure, X is exports and M is imports and defining domestic spending or absorption as $\mathbf{E = C + I + G}$ and trade balance as $\mathbf{TB = X - M}$ from equation (2.5) it can be rearranged as:

$$\mathbf{TB = Y - E} \quad \text{.....(2.6)}$$

That is, the difference between income (gross domestic product) and absorption is trade balance. Alternatively, since **Y – C– G** is total savings (**S**), from national income identity equation it can be rewritten as:

$$\mathbf{TB = S - I} \quad \text{..... (2.7)}$$

Similarly, the absorption approach can be spelled out using the leakage -injection terminology (Hallwood, Paul, and Macdonald, 2000). Thus,

$$S + T + M = I + X + G \quad \text{.....(2.8)}$$

and after some arithmetic rearrangement on equation (2.8) it becomes

$$(S - I) + (T - G) = X - M \quad \text{.....(2.9)}$$

Where **T** is tax and the other variables are as defined above .That is net national saving equal's trade balance. Within this framework, devaluation can be evaluated in terms of whether it raises income (**Y**) relative to absorption (**E**), or saving (**S**) relative to investment (**I**). Therefore, understanding how devaluation affects both income and absorption is central to the absorption approach. Policies to raise **Y** are termed expenditure switching policies, and include tariffs, import quotas, export subsidies and devaluation. Policies to reduce **E** are termed expenditure reducing policies and include higher taxes, lower government expenditure, higher interest rates (Hallwood, Paul, and Macdonald, 2000 and Thirlwall, 2004). Taking the first difference of equation TB, we have:

$$dTB = dY - dE \quad \text{.....(2.10)}$$

Devaluation will have direct effects on income (dY), direct effects on absorption (dE), and indirect effects on absorption working through changes in income whose magnitude depends on marginal propensity to absorb, α (determined by the propensity to consume and invest)

(α dY). Thus, the change in total absorption dE is given by :

$$dE = \alpha dY + dEd \quad \text{..... (2.11)}$$

Substituting for Ed in difference equation of trade balance

$$dTB = dY - (\alpha dY + d\bar{E}) = dY(1-\alpha) - d\bar{E} \text{ .....(2.10)} \quad , \quad \text{where } \mathbf{dEd = d\bar{E}}$$

This equation reveals that there are three factors to be considered in the analysis of the impact of devaluation in the absorption approach.

(i) How does devaluation affect income?

(ii) What is the value of α, the propensity to absorb, and

(iii) How does devaluation affect absorption directly?

The Effects of devaluation on national income: There are two direct effects of devaluation on income. The first is an idle resource (less than full employment) effect and the second is a terms of trade effect.

Employment effect: If there are idle resources and providing the Marshall- Lerner condition is fulfilled, income will increase depending on the degree to which the rest of the world absorbs more exports and the value of the income multiplier. It is noteworthy, however, that even if income increases, the trade balance will only improve if the marginal propensity to absorb is less than unity i.e., $\alpha<1$.

The terms of trade effect: The term of trade is the price of exports over the price imports, which can algebraically be expressed as: Price of exports/ Price of import $S = P/(EP^*)$, where E is nominal exchange rate Deterioration in terms of trade follows devaluation, because devaluation tends to make imports more expensive in domestic currency term which is not matched by corresponding rise in export prices. This deterioration in terms of trade lowers

national income, because deterioration in terms of trade means a loss of real national income, as more units of exports have to be given to obtain a unit of import. However, Laursen and Metzler (un-dated) noted that the deterioration in terms of trade following devaluation will have two effects on absorption: the substitution effect and the income effect.

While the deterioration in terms of trade lowers national income and thereby income related absorption, it also makes domestically produced goods relatively cheaper compared to foreign produced goods. This implies a substitution effect in favor of increased consumption of domestically produced goods. If the positive substitution effect outweighs the negative income effect, Laursen –Metzler (un-dated) noted that a devaluation which results in a deterioration of terms of trade could actually lead to a rise in absorption.

In the elasticity approach, a worsening of the terms of trade will improve the trade balance if the Marshall-Lerner condition is satisfied. In the absorption approach, it depends on the value of α. If $\alpha < 1$, a worsening of the terms of trade which reduces income will worsen the trade balance. Generally, the effect of devaluation on income of the devaluing country is ambiguous and depends on the net effects of employment effect and terms of trade effect. If there is full employment ($Y = 0$) and/or if $\alpha > 1$ and income expands, devaluation cannot be successful in improving the balance of payments unless there is a direct fall in absorption ($\bar{E}<0$).

The Effects of devaluation on direct absorption: There are different possible ways through which devaluation can be expected to impact upon direct absorption such as the real income effect, the income redistribution effect, money illusion effect, etc. The real income effect: Given an unchanged money stock, i.e. the case where the authorities do not alter the level of money supply to the change in money demand, devaluation tends to raise the overall price index. This

rise in price likely reduces the real value of people's money holdings. If economic agents try to restore their real money holdings, this will force economic agents to cut down direct absorption. If, however, the authorities try to respond to the increased money demand by increasing money supply, the effects of devaluation on direct absorption will be sterilized.

The income redistribution effect: A rise in general price index resulting from devaluation is likely to have many effects on income redistribution: from fixed income groups to the rest of the economy; from wages to profits; from imported input reliant firms to exporting firms; from tax payers to government. All these effects are plainly exposited in Thriwall (2004). If devaluation / depreciation effects lead to the redistribution of income from those with low marginal propensity to absorb to those with high marginal propensity to absorb, this will increase direct absorption. The reverse effect lowers direct absorption.

Money illusion: It may likewise reduce real consumption, because of that economic agents hold money to maximize their utility through holding, although perhaps only temporarily until agents realize that they are spending less in real terms.

Finally, as discussed above the effects of devaluation are many, often conflicting and indeterminate. It should also be noted that equations (2.9) and (2.10), which portrays the balance of payments as the difference between income and expenditure, or savings and investment, are derived from the national income identities, and causation must never be inferred from these identities (Thriwall,2004).

2.1.3. The Monetary Approach

The monetary approach to devaluation analysis was pioneered by M.Whitman, K.Frekel and H.Johnson (Carbaugh, 1995). The fundamental basis of the monetary approach to the balance of payments is that the balance of payments is a monetary phenomenon and not a real phenomenon. It is argued that any disequilibrium in the balance of payments is a reflection of disequilibrium in money markets. Three key assumptions that underlie the monetary model are the stable money demand function, vertical aggregate supply schedule and purchasing power parity.

The elasticity and absorption approaches apply to the trade account of the balance of payments, neglecting the capital movements. Thus, the essence of the monetary approach to the balance of payments is that it takes the balance of payments as a whole (the current and capital account) and assumes that changes in international reserves (as the measure of payments imbalance) are a function of disequilibrium between the supply of, and demand for, money. An excess supply of money leads to a loss of international reserves (a deficit), and an excess demand for money leads to a gain in international reserves (a surplus); and changes in the level of reserves are the mechanism by which the balance between the supply and demand for money is restored. The monetary approach argues that currency depreciation can only be successful if it increases the nominal demand for money relative to the supply, as the price level rises, or by reducing the real supply of money in relation to the real demand (Thirlwall, 2004). Quoting the same author "Johnson (1967) once asserted ‘all balance of payments disequilibria are monetary in essence. So-called “structural” deficits or surpluses simply cannot exist’. The IMF, which is heavily ‘monetarist’ in its thinking, rationalizes devaluation not only in terms of its encouragement to

supply more traded goods, but also within this monetary approach, by devaluation reducing the real value of the money supply".

The monetary approach emphasizes that a devaluation will a have only a transitory beneficial effect on the balance of payments only so long as the authorities do not simultaneously engaged in an expansionary open market operation. The theme of the monetary approach is that exchange rate changes are viewed as incapable of bringing about a lasting change in the balance of payments. As already mentioned, exchange rate change operates strictly by causing disequilibrium in the money market, causing a deficit or surplus in the balance of payments which continues only until equilibrium is restored in the money market via reserve changes.

According to Thirlwall (2004), there are two reasons why the monetary approach to the balance of payments has died a slow death. The first is that, strictly speaking, the model assumes fixed exchange rates with changes in the excess supply/demand for money affecting the level of reserves, whereas since 1972 the world has been on floating rates under which the balance of payments is supposed to look after itself (at least if the floating is 'clean') so that there is no need for reserves. The supply and demand for money determines the exchange rate and not the balance of payments. The second, and more important, reason concerns the assumptions on which the monetary approach is based, which have come to be seen as totally unreal in the changing and volatile conditions of the world economy over the past few years.

The first major assumption is that deficits can only arise if there is disequilibrium in the money market. This supposition, as in the absorption approach, is also derived from an identity. In this case, the identity is Walras's Law that in a model of only two assets, money and goods, an

excess demand for goods (i.e. a balance of payments deficit) must mean an excess supply of money.

Apart from the confusion between plans to spend and produce and actual spending and production, the limitations of the model are obvious when it is extended too many assets, with disequilibrium in the capital market or any other market as the source of disequilibrium, combined with ex-ante equilibrium in the money market. Another major weak assumption is that there is no sterilization of reserve movements by the monetary authorities through open market operations so that the money supply always falls as reserves fall, and rises as reserves rise. If there is sterilization of reserve movements, there cannot be a one-to-one relation between the money supply and reserve movements.

2.2. Empirical Literature

Many empirical analyses, both multi-country panel regressions and econometric models applied to individual countries, have been conducted to show how exchange rate changes affect the trade balance of developing and developed countries. Despite these overabundances of theoretical and empirical researches into how exchange rate changes affect trade balance, there is still considerable disagreement concerning the relationships between these economic variables and the effectiveness of currency devaluation as a tool for increasing a country's balance of trade (Onafowora, 2003).

Existing empirical analyses show mixed results of how exchange rate changes affect the trade balance. The following empirical works clearly witness these facts as presented in Sugman (2005) and states that "Amongst thirty countries studied, Rose (1990; 271-3) finds that the

impact of devaluation on trade balance is insignificant for twenty eight countries, and one country shows negative impact. He concluded that devaluation does not necessarily lead to an increase in trade balance.

Upadhyaya and Dhakal (1997; 343-5) also suggested that improvement in trade balance is only found in one country out of eight countries studied. On the other hand, others like Bahmani-Oskooe (1998; 89-96) and Himarios (1989; 143-68) found trade balance improvement following currency devaluation." Damoense and Agbola (2004) in his result that supports the view that devaluation of exchange rate worsens trade balance. In their study of the impact of devaluation on trade balance of South Africa, they found that in the long run, devaluation of exchange rate worsens trade balance. Similarly, the empirical study by Agbola (2004), by using the Johansen multivariate co-integration procedure and the Stock-Watson dynamic Ordinary Least Square model (DOLS), revealed that devaluation did not improve the trade balance of Ghana. Contrary to this, Sugman's (2005) finding of the effects of real exchange rate depreciation on the real trade balance of Indonesia divulges improvement in trade balance following depreciation.

The study by Rawlins and Praveen (2000), examined the impact of devaluation on trade balance of a sample of 19 countries in Sub-Saharan Africa by specifying and estimating an Almon Distributed lag process of trade balance using annual data. They found in no case did real exchange rates revert to their pre-devaluation levels and in seventeen of nineteen countries real exchange rate depreciation did improve a country's trade balance in the year of the devaluation.

Onafowora (2003), also examined the short run and long run effects of real exchange rate changes on the real trade balance of three Asian countries in their bilateral trade with Japan and USA and found improvement in their trade balance but with time lag. In the case of Ethiopia, the

study by Equar (1999) showed that real exchange rate depreciation improves trade balance. However, the study by Equar has not included very important explanatory variables (due to unavailability of the data) that could have radical change on the results obtained and this paper included some of these variables. Generally, these mixed results clearly indicate that both empirical and theoretical studies could not definitely put the relationship between exchange rate changes and trade balance.

The link between trade and macroeconomic variables emanates from the fundamental macroeconomic identity which describes the real side of the economy as explained by the absorption model. The Keynesian absorption theory suggests that an increase in the budget deficit would induce domestic absorption and thus, import expansion, thereby causing a current account deficit. This model links macroeconomic variables such as consumption, savings, investment and income with the external balances.

A positive association between the government budget and trade balance can be shown and supported in the context of a simple Keynesian open-economy model. Therefore a persistent deficit in the balance of trade in the long run may lead to an increase in foreign debt burden, thereby leading to disruption of the market mechanism, currency depreciation and a decline in economic growth. There is an extensive set of literature which explains the effects of trade imbalances on macroeconomic variables.

2.2.1. Exchange Rate Regimes in Ethiopia

Different countries use different exchange rate regimes and experimented with various types of exchange rate arrangements within each ever since the emergence of the international Gold Standard by 1870 to the emergence of the floating rate of 1973.

As it is clearly indicated in Pugel and Lindert (2000) that the success or the failure of these different exchange rate regimes depends historically on the severity of the shocks with which those systems have had to cope with. When come to history of exchange rate regimes in Ethiopia, the country experienced only two major exchange rate regimes. These are the pre-1992 fixed exchange rate regime where the Ethiopian Birr was pegged to the USD and the post -1992 managed -floating exchange rate regimes. After the birth of IMF and also after the issuance of Ethiopian legal currency, Ethiopia, as one of the founding members, committed itself to the Articles of agreement of IMF under which each currency assigned a central parity against USD and was allowed to fluctuate by plus or minus 1 percent $(\pm 1\%)$ of this parity.

Countries were allowed to devalue or revalue their currencies only in case of 'fundamental disequilibria' (Felleke, 1994). Ethiopian legal tender currency was issued on 23 July 1945, by defining the monetary unit as the Ethiopian dollar (E$) with a value of 5.52 grains (equivalent to 0.355745 grams) of fine gold and replaced the ‘Maria Theresa’ which had been circulating as legal tender. The linkage with fine gold was in accord with the monetary system established by the Bretton Woods Agreement of 1944 and it automatically established the exchange rate between the national currency and other currencies with the same arrangement. Accordingly, the official exchange rate of Ethiopian currency with US dollar was created (with the official exchange rate of 2.48 Birr per US dollar) on July 23, 1945. After almost two decades, that is, on

1 January1964, the Ethiopian Birr was slightly devalued to 2.50 Birr per US dollar. Following the collapse of the Bretton Woods System in 1971 and the floating of dollar and ceasing of its convertibility to gold, the Birr was revalued to 2.30 Birr per US dollar (i.e. by 8.75%) on 21 December1971. The subsequent 10% devaluation of the US dollar had temporarily brought about under valuation of the Birr.

To realign the Ethiopian Birr, it was again revalued to 2.07 Birr per US dollar in February 1973. This fixed official exchange rate was left unchanged for two decades despite the floating of the major world currencies including the US dollar (Befekadu, 1991; Derrese, 2001). According to Haile Kibret (1994), Equar Dasta (2001), Alem Abraha (1996), as a result of fixation of exchange rate, Birr became over-valued in terms of the US dollar as well as many other foreign currencies.

This overvaluation had adverse effect on national economy such as misallocation of resources, loss of international competitiveness, development of illicit parallel market for foreign exchange and illicit cross border trade. Aware of these facts, the massive devaluation of 1992 took place. Following this devaluation, in an attempt to liberalize foreign exchange market, the National Bank has taken a number of initiatives. Accordingly, the fortnightly auction market for foreign exchange was introduced on May 1, 1993 with two rates, namely the Dutch auction system (official rate) and marginal pricing auction system (marginal rate). These two rates were unified in July 1995. In August 1996, the fortnightly auction market was changed to weekly to accommodate the growing demand for foreign exchange and commercial banks were allowed to also established foreign exchange Bureaus.

In September1998, the retail auction system was replaced by wholesale system .In the same year; the inter-bank foreign exchange market was introduced and worked alongside the auction system until October 25, 2001 when the daily inter-bank has fully replaced wholesale auction system (Deresse, 2001). In the present day, the official exchange rate is determined in the daily inter-bank foreign exchange market as the weighted average exchange rate prevailing on the preceding day.

3. The Structure and Trends of Exports and Imports of Ethiopia

According to the theory increase in net exports leads to an increase in the aggregate demand; it also increases the output (often called the real **gross domestic product** or real GDP) and income (often called the real national income) in the economy. This can be explained in terms of ***Keynesian macroeconomic*** theory.

When aggregate demand in the economy increases, producers increase the output of goods and services to meet the increased demand. The increased production of goods and services in the economy generates additional income in the economy. Thus, net exports can be a source of economic growth for an economy. If the economy is very large relative to the magnitude of the change in the net exports, effects of changes in net exports may not be very noticeable. Nevertheless, an export-dependent small economy can experience visible influences on its economic growth if net exports increase sharply. As an increase in net exports has favorable effects on the economic growth of a nation, a decrease in net exports will has opposite effect on the growth of its output and income. Having this idea let we visit Ethiopian foreign trade composition and trade balance.

Ethiopia's export is dominated by only a few numbers of agricultural commodities such as coffee, chat, oil seeds, pulses, live animals and lather and lather products. However these products were exported without any addition of value; So that Ethiopia can't get what can from this sector for the past many years. Now a day Ethiopia try to initiate value added export through many incentives for those investor works on the area. And facilitate pre condition for that foreign and local investor who going to invest on value added export. And it shows increment through a

time because of the attention given to the exporter sector and many others government policy reform to move towards middle income country level in 2025. Even though it is not such appreciating, While import is increase with greater amount than that of export trade, and its main compositions are industrial imputes, capital goods, fuel, and consumer durable and non durable goods with respective order. As it is in the Table 3.1 below import as well as export grow with continues trend while the growth rate is shows big difference. As it is shown import is grow faster than export and this shows that there is trade imbalance in a country. Since, this results trade balance deficit in a country.

As it described above Ethiopian economy most dominantly depend on agriculture and Ethiopia export for the past many years non-value added agricultural product and import industrial inputs, capital good, accessories and fuel in large amount from abroad. However Ethiopia is in the process of transforming the economy from agriculture to agriculture leading industrialization but still domestic product is not sufficient to satisfy intermediate impute for those infant level industrialization; not intermediate even raw materials produced in the country doesn't satisfy need for raw materials for those newly emerging industries. This is the fact behind that we import large amount commodity than we export for rest of the world market.

When we see the trend of import and export of the country as it shown in the fig. 3.1 export and import trade shows increasing trend except for the period between 1984/85 -1993/94. Growth rate of export decline dramatically for this period, It was a time that there is no political instability in a country and there was war between Derg Regime and EPLF, whereas import increases through a time. From a table 3.1 below we can see that growth rate of export increase

but it is less than the growth rate of import. Therefore the trade balance of the country shows deficit as it is shown in the figure below.

Table 3.1 Export, Import and Trade balance of Ethiopia for the past thirty five years.

	year	Export in million birr	% Growth of Export	Import in million birr	%growth of import	Trade Balance
1	1979/80-1983/84	845.26	-----	1,655.34	-----	(810.08)
2	1984/85-1988/89	828.01	(2.04)[1]	2,118.73	27.99	(1,290.72)
3	1989/90-1993/94	719.57	(13.10)	2,824.80	33.33	(2,105.23)
4	1994/95-1998/99	3,307.30	359.62	8,760.04	210.11	(5,452.74)
5	1999/00-2003/04	4,201.55	27.04	15,320.19	74.89	(11,118.64)
6	2004/05-2008/09	11,068.77	163.44	52,851.57	244.98	(41,782.80)
7	2009/10-2013/14	48,678.59	339.78	175,631.06	232.31	(126,952.47)

Source: Ethiopian Revenue and Customs Authority

[1] Negative growth for export and it shows trade deficit for trade balance column.

Fig.3 .1 Ethiopian export and import trained

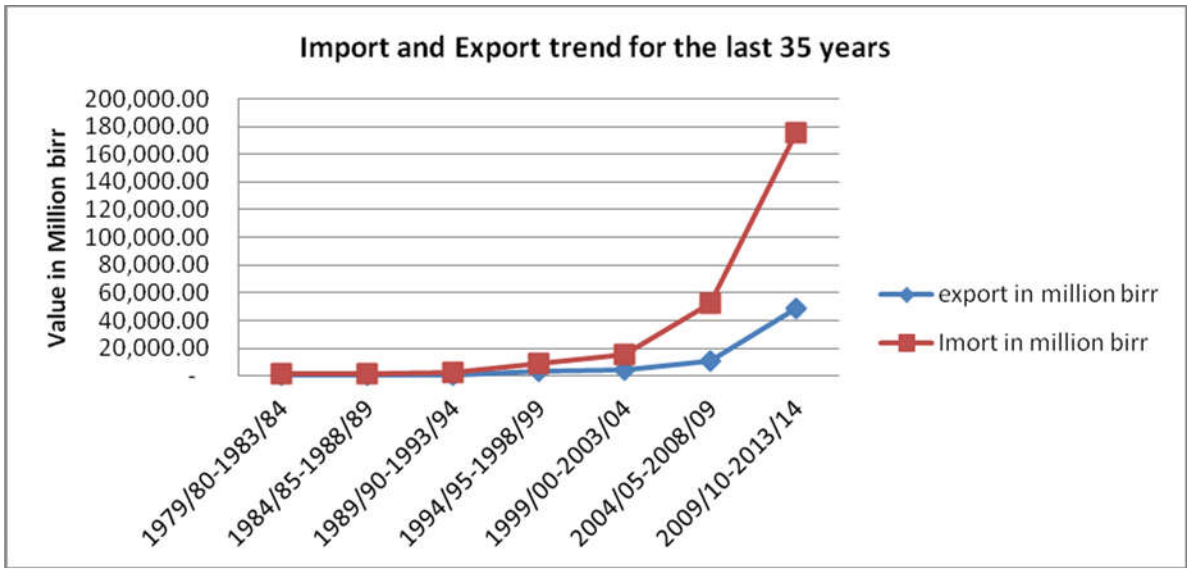
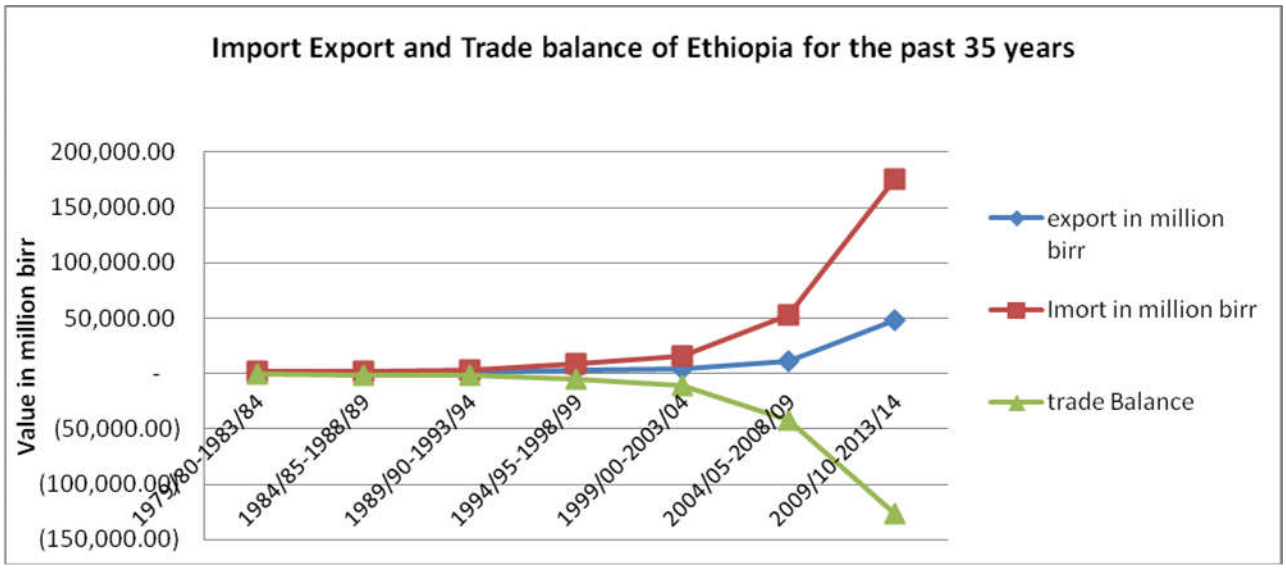


Fig. 3.2 Import, Export and trade balance



As it is seen in the figure above there is trade deficit in the country

As it is in the figure trade deficit grow dramatically starting from 1989/90-1993/94 and it shows increment of import in large amount than that of export, even export shows slowest change and trade balance decline almost with same change of import.

4. Model Specification

The main thing to investigate here is that the impact of exchange rate on trade balance. The balance of trade forms part of the current account, which includes other transactions such as income from the international investment position as well as international aid. If the current account is in surplus, the country's net international asset position increases correspondingly. Equally, a deficit decreases the net international asset position.

The trade balance is identical to the difference between a country's output and its domestic demand (the difference between what goods a country produces and how many goods it buys from abroad; this does not include money re-spent on foreign stock, nor does it factor in the concept of importing goods to produce for the domestic market).

Factors that can affect the balance of trade include:

- The cost of production (land, labor, capital, taxes, incentives, etc.) in the exporting economy *vis-à-vis* those in the importing economy;
- The cost and availability of raw materials, intermediate goods and other inputs;
- Exchange rate movements;
- Multilateral, bilateral and unilateral taxes or restrictions on trade;
- Non-tariff barriers such as environmental, health or safety standards;
- The availability of adequate foreign exchange with which to pay for imports; and
- Prices of goods manufactured at home (influenced by the responsiveness of supply)

As it is specified above trade balance is the difference between earning from the export and payment to the import.

$$TB = X - M \quad \text{.....(4.1)}$$

Where: TB is the trade Balance, X is export earning, M is import payment

The relationship between the balance of trade and its determinants can be captured by a generic function of the following form

BOT = f (REER, RGDP, GEX, MS, TOP)

Where: - REER- real exchange rate, GEX – government expenditure, RGDP real GDP, TOP – trade openness.

And the model is

$$\ln TB = \beta_o + \beta_1 lnREER + \beta_2 lnRGDP + \beta_3 lnGEX + \beta_4 lnMS + \beta_5 lnTOP + Ui \quad \text{.....(4.2)}$$

This model thought that can capture the effect of those explaining variables on trade balance. However there is variable does not included in the model because of data unavailability.

Expected sign of the variable

REER (+) in this study, the real effective exchange rate is defined as the units of the home currency per a unit of the foreign currency taken accounts of trade partner countries' trade weight and relative inflation, depreciation (an increase in REER) is expected to improve the trade balance. The exchange rate with the trading partners (real effective exchange rate) index is taken

because it is this exchange rate that is usually taken as measure of competitiveness. RGDP (-) the impact of the real income variable on trade balance is uncertain. The expected signs under the absorption and monetary approaches are a 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. However, it is argued that the former effect dominates the latter.

RGEX (-) It is assumed that any increase in domestic government expenditure that fails to displace an equal amount of private expenditure will increase total spending (absorption) thus worsening the trade balance. But there is some ambiguity as the increase in government expenditure might be complementary to some investment initiative, thus resulting in a larger output of tradable goods. Nevertheless, it is often assumed with some degree of uncertainty that the sign on the coefficient of RGE is negative.

RMS (-) 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 reduce interest rates thus stimulating increased absorption which puts negative pressure on the trade balance.

TOP (+) Defined as the relative price of exports to imports, deterioration in terms of trade has two effects on domestic absorption (hence trade balance): the income effect and the substitution

effect and the net effect depends on the relative strengths of these two effects. However, it seems that there is a dominant view that lack of trade openness lowers national income, because if there is no liberalized trade system with other part of the world means a loss of real national income, Hence, the effect of the trade openness on trade balance is expected to be positive with some ambiguity of illegal trade.

4.1. Stationary test

It is suggested that when dealing with time series data, a number of econometric issues can influence the estimation of parameters using OLS. Regressing a time series variable on another time series variable using the Ordinary Least Squares (OLS) estimation can obtain a very high R2, although there is no meaningful relationship between the variables. This situation reflects the problem of spurious regression between totally unrelated variables generated by a non-stationary process. Therefore, prior to testing Co-integration and implementing the Granger Causality test, econometric methodology needs to examine the stationarity; for each individual time series, most macro economic data are non stationary, i.e. they tend to exhibit a deterministic and/or stochastic trend. Therefore, it is recommended that a stationarity (unit root) test be carried out to test for the order of integration. A series is said to be stationary if the mean and variance are time-invariant.

A non-stationary time series will have a time dependent mean or make sure that the variables are stationary, because if they are not, the standard assumptions for asymptotic analysis in the Granger test will not be valid. Therefore, a stochastic process that is said to be stationary simply implies that the mean [(E(Yt)] and the variance [Var(Yt)] of Y remain constant over time for all t, and the covariance [covar(Yt, Ys)] and hence the correlation between any two values of Y taken from different time periods depends on the difference apart in time between the two values

for all t≠s. Since standard regression analysis requires that data series be stationary, it is obviously important that we first test for this requirement to determine whether the series used in the regression process is a difference stationary or a trend stationary. The Augmented Dickey-Fuller (ADF) test is used. To test the stationary of variables, we use the Augmented Dickey Fuller (ADF) test which is mostly used to test for unit root. The ADF test avoid the problem because it corrects for serial correlation; by adding lagged differences terms (Green,2003:643). The ADF test is formulated as:

$$y_t = \rho y_{t-1} + \emptyset \Delta y_{t-1} + \emptyset \Delta y_{t-2} + \cdots + \emptyset \Delta y_{t-p} + \varphi + \psi_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots \quad (4.3)$$

This equation can be represented to give an equivalent expiration of the form

$$\Delta y_t = \rho y_{t-1} + \sum_{j=1}^{p=1} \Pi y_{t-1} + \varphi + \psi_t + \varepsilon_t \;;\; \varepsilon_t \sim iid(0, \delta^2) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4.4)$$

Where t is time trend, p is number of lags, $\Pi = -\sum_{k=j+1}^{p} \phi_k$, $\sum_{i=1}^{p} \rho_1$-1

The ADF test the null hypothesis of non-stationary, Ho: $\rho = 1$ (or ρ*=0) against the alternative hypothesis of stationarity H_A= $\rho < 1$ *or* ρ*<0; However before testing for stationarity the appropriate number of lags to include must be determined using the standard information criteria. This is because adding too few lags may tends to over reject the null hypothesis when it is true and too many lags tends to reduce the power of the test (Davidson and Mackinnon,1999: 612). The optimal lag order is allowed to be automatically determined by Schwarz information criteria (SIC). However ADF test is problematic with small sample size; because adding the lagged value of the dependent variable reduces the power of the test due to the loss of degree of freedom (Nkurnziza, 2002).

Unit root test
Table: 4.1. Augmented Dickey –Fuller stationery test

Variables	Test statistics under different assumption			Order of Integrations
	Intercept	Trend and Intercept	Non Trend and Intercept	
Ln TB	1.121008	-1.620715	5.256196	I(0)
D(Ln TB)	-7.201545***	-7.517395***	-1.208189	I(1)
Ln RGDP	3.921120	0.560331	5.02219	(0)
D(Ln RGDP)	-1.7.69077	-6.360423***	-0.645245	I(1)
Ln GEX	-0.845999	-2.622983	1.366361	I(0)
D(lnGEX)	-4.549089***	-4.475794***	-4.392542***	I(1)
Ln REER	-1.024104	-1.693675	-0.87803	I(0)
D(LnREER)	-4.878786***	-4.801771***	-4.891655***	I(1)
Ln TOP	0.671350	-2.370975	-2.370975***	I(0)
D(Ln TOP)	-5.756251***	-5.915319***	-2.268449***	I(1)

Note:*, for 10% level of significancy ,** for 5% significance level,*** for 1% significance level,

This paper adopts the recent developed autoregressive distribution lag (ARDL) frame work by Pesaran and shin (1995,1999),Peseran et al.(1996) and Pesaran (1997) to establish the direction of causation between variables there advantage of using this approach instead using other approach. ARDL method employs only single reduced form equation (pesaran and Shin, 1995).

The ARDL method does not involve pre testing variables ,which means that the test on the existence of relation between variables in levels is applicable irrespective of whether the underlying regressor are purely I(0) , purely I(1) or mixture of both. This future alone, given the characteristics of the cyclical components of the data ,makes the standard of co-integration techniques unstable and the existing unit root test to identify the order of integration and still

highly questionable. Farther more, the ARDL method avoid the larger number of specification to be made in the standard co-integration test. These include decision regarding the number of endogenous and exogenous variables if there is any to be included, the treatment of deterministic elements as well as the optimal number of lags to be specified.

The empirical results are generally very sensitive to the method and various alternative choices available in the estimation procedure (Pesaran and smith, 1998). With ARDL, it is possible that different variables have different optimal lag, which is impossible with the standard co-integration test. Most importantly this model could be used with limited sample data from 30 to 80 observations in which the set of critical value were developed originally by Narayan (2004) by using GAUSS.

$$\ln TB = \beta_o + \beta_1 lnREER + \beta_2 lnRGDP + \beta_3 lnGEX + ln\,\beta_4 MS + \beta_5 lnTOP + Ui \text{.....(4.5)}$$

The above equation is expressed in the form of an Autoregressive Distributed Lag (ARDL) format. The ARDL specification of the short-run dynamics can be derived by constricting an error correction model (ECM) of the following form:

$$\Delta \ln TB = \beta_0 + \sum_{i=1}^{n1} \beta_1 \Delta lnREER + \sum_{i=1}^{n2} \beta_2 \Delta lnRGDP + \sum_{i=1}^{n3} \beta_3 \Delta lnMS + \sum_{i=1}^{n4} \beta_4 lnGEX + \delta ECM_{t-1} + \mu_i$$

.....(4.6)

Where ECM_{t-1} is error correction term and it expressed as

$$ECM_{t-1} = \delta_1 lnREER_{t-1} + \delta_2 lnRGDP_{t-1} + \delta_3 lnMS_{t-1} + \delta_4 lnGEX_{t-1} + \delta_4 lnTOP_{t-1+} + u_i$$

.....(4.7)

Whereas all coefficients of short run equation are coefficients relating to the short run dynamics of the model's convergence to equilibrium and δ represent the speed of adjustment.

In this set up, the null of no co-integration defined by H0: $\delta 1 = \delta 2 = \delta 3 = \delta 4 = 0$ is tested against the alternative of H1: $\delta 1 \neq \delta 2 \neq \delta 3 \neq \delta 4 \neq 0$ by the means of familiar F-test. However, the asymptotic distribution of this F-statistic is non-standard irrespective of whether the variables are I(0) or I(1). Pesaran et al. (2001) have tabulated two sets of appropriate critical values. One set assumes all variables are I(1) and another assumes that they are all I(0). This provides a band covering all possible classifications of the variables into I(1) and I(0) or even fractionally integrated. If the calculated F-statistic lies above the upper level of the band, the null is rejected, indicating co-integration. Therefore we reject the null hypothesis mean that we accept the alternative one. This is shows that there is long run relationship between variables. Once cointegration is established, one shifts back to Equation of ARDL and tries to estimate the entire model using an appropriate lag selection criterion such as Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC). Only an appropriate lag selection criterion will be able to identify the true dynamics of the model.

4.2. Heteroskedasticity test

Heteroskedsticity test is help to control miss specification of the model. As it is seen from table below there is no enough evidence to reject the null hypothesis of no heteroskedsiticity. Therefore residual of the model are found Homosadistic. Mean that there is no correlation between the residual and independent variable.

Table. 4.2. Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.687841	Prob. F(9,24)	0.7128
Obs*R-squared	6.971691	Prob. Chi-Square(9)	0.6401
Scaled explained SS	4.434842	Prob. Chi-Square(9)	0.8805

4.3. Bound Test

The test involves asymptotic critical value bounds, depending whether the variable are I(0) or I(1) or a mixture of both. Two set criteria values are generated which one set refers to the I(1) series and the other for the I(0) series . The critical value for the I(1) serious are referred to as upper bound critical values , while the critical values for I(0) series are referred to as the lower bound critical value.

Table 4.3. ARDL Bound test
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	K
F-statistic	3.616829	5
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

If the F test statistics exceeds their respective upper critical values, That is F- statistics is 3.63 which is greater than critical value at 10% then we can conclude that there is evidence of a long run relationship between the variables regardless of the order of integration of the variables. If the test statistics is below the upper critical value, we cannot reject the null hypothesis of no co-instigation and if it lies between the bound, a conclusive inference cannot be made without knowing the order of integrations of the underlying regresses.

As it is shown in the table there is an evidence for long run relationship (co-integration) of the variables, therefore long run model is estimated as :

$$lnTB_t = \alpha_1 + \sum_{i=1}^{p} \beta_{1i} ln\, TB_{t-1} + \sum_{i=0}^{p} \theta_{1i} lnREER_{t-1} + \sum_{i=0}^{p} \varphi_{1i} lnRGDP_{t-1} + \sum_{i=0}^{p} \gamma_{1i} lnMS_{t-1} + \sum_{i=0}^{p} \delta_{1i} lnGEX_{t-1} + \sum_{i=0}^{p} \rho_{1i} lnTOP_{t-1} + \mu_t$$

..... **(4.8)**

4.4. 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. It is tested by using cumulative sum (**CUSUM**) and cumulative sum square (**CUSUMSQ**) and as it is shown in the graph below all rotes are in the boundary of 5% significance level. This shows that the ARDL model is satisfies the stability condition as it is seen below on the graph.

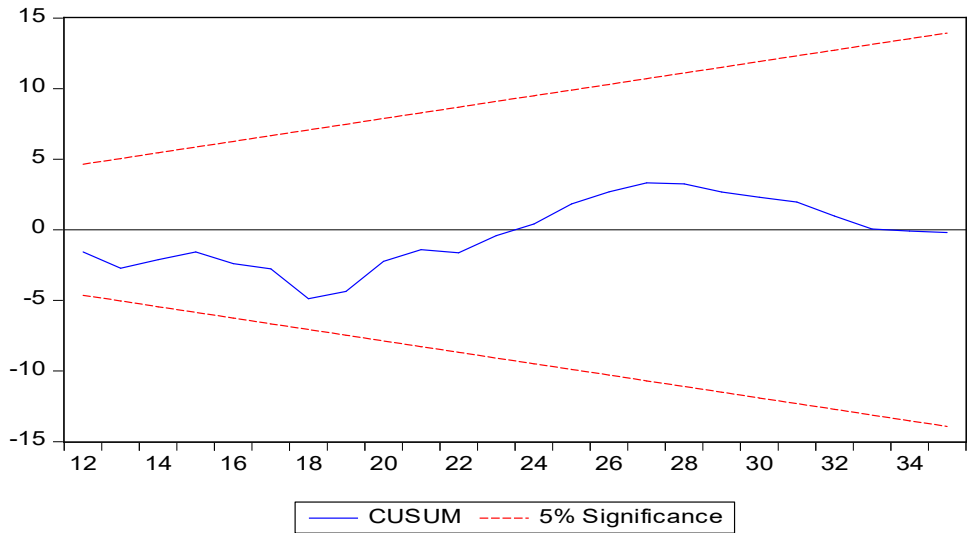


Fig 4.1. Cumulative sum (**CUSUM**) graph at 5% significance level

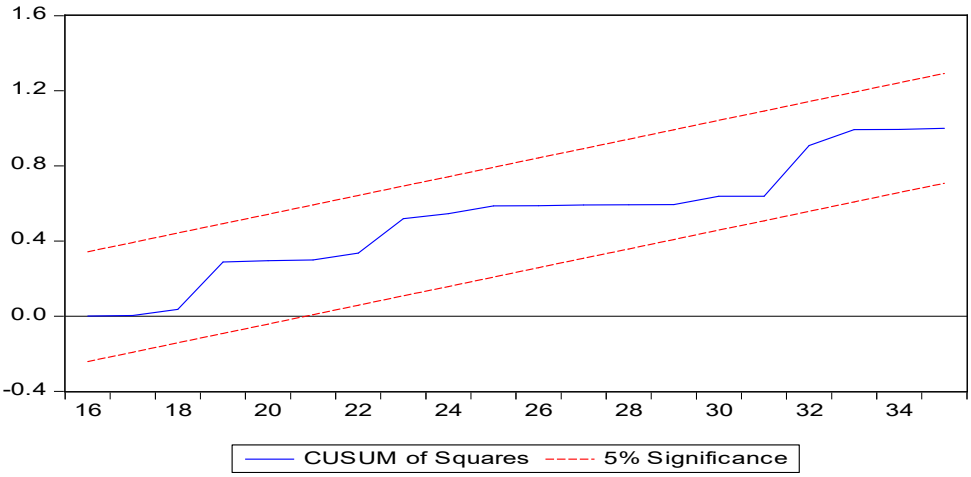


Fig 4.2. Cumulative Sum Square (**CUSUMSQ**) graph at 5% significance lavel

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

4.5. Result

The objective of this paper was to examine the impact of exchange rate on trade balance of Ethiopia. Even so there is also other determinants that can affect trade balance of the country directly or indirectly for example money supply of the country, gross domestic product (GDP), inflation rate , trade openness. By the way these are not the only determinant of trade balance but due to lack of time serous data I tried to see the impact of specified variables above and the model for this paper is designed by taking these variables in to consideration and different testes are taken to robustness of this model.

Even though the ARDL frame work does not require pre-testing variables to be done, the unit root test could be convince us whether or not the ARDL model should be used. The result in the table 4.1 shows that there is a maximum of I(1) and I(0) of underlying regeressors , the ARDL testing could be proceeded.

After having the result from test for robustness for the model, then I tried to see long run and short run effect of variables on trade balance of the country.

4.6. Short Run Effect of Variables

After the acceptance of long-run coefficients of the growth equation, the short-run ECM model is estimated. The error correction term (ECM), indicates the speed of adjustment to restore equilibrium in the dynamic model. It is a one lagged period residual obtained from the estimated dynamic long run model. The coefficient of the error correction term indicates how quickly variables converge to equilibrium. Moreover, it should have a negative sign and statistically significant at a standard significant level of 5% (i.e. p-value should be less than 0.05)

According to this result it is shown in Table 4.6 real exchange rate has the short run significant effect of on trade balance of the country, not only real exchange rate but also real GDP, government expenditure, money supply and trade openness have significant effect on trade balance of the country in the short run. Specifically in the short run real GDP , real exchange rate, government expenditure and trade openness have positive effect on trade balance of the country in the short run; while money supply has negative effects on trade balance of the country in the short run. When we see the case of real GDP higher income levels stimulate increased import demand as well as increased domestic production of tradable and this is consistent with what it assumed before; whereas for the case of trade openness leaving the ultimate impact on the trade balance somewhat indeterminate. This may be different from the theoretical back ground of trade openness.

Many a debate over the merits of free trade focuses on whether a country that is more exposed to international markets makes itself more vulnerable to a form of economic whiplash known as a

"sudden stop." Jeffrey A. Frankel and Eduardo A. Cavallo , (2004). The term refers to situations in which a country experiences an abrupt cessation of foreign investment, which can precipitate a currency crisis. Some argue that an economy deeply integrated into the global market is at high risk of suffering shocks from abroad. Others contend that free traders actually have an easier time withstanding tremors that occur in the world of international finance. Different economic studies have offered support for both points of view. Some may find this counterintuitive trade protectionism does not 'shield' countries from the volatility of world markets as proponents might hope. On the contrary, less trade openness leads to greater vulnerability to sudden stops. In addition to that informal cross border trade (contraband) can affect trade balance and it can lead to negative result.

As it is seen from output in the table , in the short run for 1% increase in real GDP, real exchange rate, government expenditure, and trade openness trade balance increase by 1%, 37.5% , decreases by more than 100 %, increases by 30% , increases by more than 100%. From this we can see that money supply create trade balance deficit in the short run, while trade openness has dominant effect on trade balance in the short run but also real GDP has a great effect.

Table 4.6. ARDL Co-integrating And Short Run Form
Dependent Variable: LNTB
Selected Model: ARDL(1, 1, 0, 1, 0, 1)
Included observations: 34

Co-integrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LN_RGDP)	1.006745	0.450111	2.236662	0.0349
D(LN_GEX)	0.374649	0.110552	3.388893	0.0024
D(LNMS)	-1.113914	0.532667	-2.091200	0.0473
D(LNREER)	0.299460	0.103679	2.888336	0.0081
D(LNTOP)	1.186365	0.150612	7.876970	0.0000
CointEq(-1)	-0.763319	0.153588	-4.969907	0.0000

The error correction coefficient, estimated at -0.7633 is highly significant, has the correct negative sign, and imply a very high speed of adjustment to equilibrium. According to Bannerjee *et al*. (2003) as cited in Kidanemarim (2014), the highly significant error correction term further confirms the existence of a stable long-run relationship.

Moreover, the coefficient of the error term (ECM-1) implies that the deviation from long run equilibrium level of real GDP in the current period is corrected by 76.33 % in the next period to bring back equilibrium when there is a shock to a steady state relationship. The coefficient of determination (R-squared) is high explaining that about 99.7 % of variation in the real trade balance (TB) is attributed to variations in the explanatory variables in the model. In addition, the DW statistic does not suggest autocorrelation and the F-statistic is quite robust.

4.7. Long run relation between Variables

When we see the long run relation of variables with trade balance of the country, all variables have positive and significant effect on trade balance except real GDP. Contrary to the fact that, raises in domestic income increase the demand for money and therefore will increase export and it improves a trade balance of a country (It has no effect on trade balance in the long run. i.e. Change in real GDP has no effect on trade balance in the long run).

Table 4.5 : Long run coefficients of dependent variable and their significance.

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_RGDP	0.113489	0.420351	0.269988	0.7895
LN_GEX	0.490816	0.136300	3.601002	0.0014
LNMS	0.552556	0.110900	4.982486	0.0000
LNREER	0.392314	0.131466	2.984139	0.0064
LNTOP	0.818988	0.146117	5.605029	0.0000
C	-2.527003	4.170847	-0.605873	0.5503

From the above result in Table 4.5 the long run equation is written as :

$$\mathbf{Cointeq} = \mathbf{lnTB} - (\mathbf{0.1135} * (\mathbf{lnRGDP}) + \mathbf{0.498} * (\mathbf{lnGEX}) + \mathbf{0.5526} * (\mathbf{lnMS})$$

$$+\mathbf{0.3923} * (\mathbf{lnREER}) + \mathbf{0.81908} * (\mathbf{lnTOP}) - \mathbf{2.5270}) \quad \text{.....(4.9)}$$

The error-correction coefficient is negative ($-\mathbf{2.5270}$), as required, but it is not significant. Importantly, the long-run coefficients from the co-integrating equation are reported, with their standard errors, t-statistics, and p-values

Moreover as it is seen in the table for 1% increase in government expenditure, Money supply, real Exchange rate and trade openness trade balance of the country will increases by 49%, 55%,

39% and 82% respectively. As we see from this according to the result in the long run trade balance of the country can be mostly affected by trade openness of the country as a country create liberalized trade system become more exposed to international markets and this create more market for domestic goods and services in the rest of the world as a result trade balance of the country increased. In the second place money supply affects trade balance as money supply increased price of domestic product increases agents want to substitute domestic products by imported one then amount that imported increase than the amount of Export. In the third place as government expenditure increased by 1% trade balance of the country increases by 49% , and finally real exchange rate has less effect on trade balance relative to the others; mean that trade balance is only increased by 39% as real exchange rate increased by 1% . Therefore in the long run real exchange rate has less effect on trade balance of the country when it compared with trade openness.

5. CONCLUSION AND POLICY RECOMMENDATION

5.1. CONCLUSION

The main objective of this study is to analyze the effect of real effective exchange rate on trade balance in Ethiopia during the specified period. To determine this long run and short run relationship among the dependent and Independent 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 tests. As a result, all variables are stationary (no unit root problem) at first difference.

Next to testing for time series property, the model stability was done by using different diagnostic tests. The result revealed that no evidence of serial correlation, no functional form problem (the model is correctly specified), the residual is normally distributed and no evidence of hetroscedasticity problem and the model is stable. As we discussed above, this study applied the methodological approach called ARDL model also known as bound test approach. As the result indicted the bound test (F-statistic) value is larger than the upper bound critical value both for Pesaran *et al.(*2001) and Narayan(2004), which indicates there is a long run relationship between real trade balance and its determinants (real GDP, government expenditure , money supply, real effective exchange rate and trade openness) in the short run and long run during the study period.

As it is shown above in the empirical result trade balance of the country can affected by the change in one of independent variable in the short run as well as in the long run. Furthermore trade openness of the country is most dominant factor for trade balance in the study period. While as it is specified in the objective of this paper is to investigate the short run and long run impact of change in real effective exchange rate of Birr on trade balance of Ethiopia, As it is in result exchange rate has positive and significant impact on trade balance of the country in the

long run as well as in the short run. Moreover I fund that trade openness of the country has positive and determinant factor on trade balance in the short run as well as in the long run.

5.2. Policy Recommendation

Based on the finding of this study, the following policy recommendations are forwarded.

In order to increase trade balance of the country Ethiopia has to follow policy that depreciate the real exchange rate in the long run.

Even if trade openness of the country has its own impact on the economy of the country, Ethiopia has to develop trade liberalization together with strong controlling mechanism to be protected from financial crises in the country that makes trade partnership with.

As more government invest on infrastructure that motivate investment on tradable goods and services that substitute import, then investment in this area increases and as the result it increase productivity and this reduce import and increase Export finally trade balance of Ethiopia will appreciate. For the fact that government has to invest more on infrastructure sector.

As we seen from result in the analysis part money supply has negative impact on trade balance, according to the theory of economics if there is excess money supply this 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. So that strong money supply stabilizing policy is also important to the country.

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Appendixes

Table for selected Model

Method: ARDL
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): LN_RGDP, LN_GEX, LNMS
LNREER and LNTOP
Fixed regressors: C
Selected Model: ARDL(1, 1, 0, 1, 0, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNTB(-1)	0.236681	0.153588	1.541014	0.1364
LN_RGDP	1.006745	0.450111	2.236662	0.0349
LN_RGDP(-1)	-0.920117	0.427253	-2.153562	0.0415
LN_GEX	0.374649	0.110552	3.388893	0.0024
LNMS	-1.113914	0.532667	-2.091200	0.0473
LNMS(-1)	1.535690	0.508588	3.019516	0.0059
LNREER	0.299460	0.103679	2.888336	0.0081
LNTOP	1.186365	0.150612	7.876970	0.0000
LNTOP(-1)	-0.561216	0.164548	-3.410664	0.0023
C	-1.928908	3.094357	-0.623363	0.5389

R-squared	0.997141	Mean dependent var	8.855532
Adjusted R-squared	0.996069	S.D. dependent var	1.746133
S.E. of regression	0.109478	Akaike info criterion	-1.346258
Sum squared resid	0.287650	Schwarz criterion	-0.897329
Log likelihood	32.88639	Hannan-Quinn criter.	-1.193161
F-statistic	930.0991	Durbin-Watson stat	1.968765
Prob(F-statistic)	0.000000		

VAR Lag Order Selection Criteria

Endogenous variables: LNTB LN_RGDP LN_GEX LNMS LNREER LNTOP
Exogenous variables: C
Sample: 1 36
Included observations: 34

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-5.191182	NA	7.78e-08	0.658305	0.927663	0.750164
1	231.5751	376.0406*	5.99e-13*	-11.15148*	-9.265972*	-10.50847*

* 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

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.687841	Prob. F(9,24)	0.7128
Obs*R-squared	6.971691	Prob. Chi-Square(9)	0.6401
Scaled explained SS	4.434842	Prob. Chi-Square(9)	0.8805

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Sample: 2 35
Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.274542	0.405495	-0.677052	0.5048
LNTB(-1)	0.009481	0.020127	0.471088	0.6418
LN_RGDP	0.019661	0.058984	0.333334	0.7418
LN_RGDP(-1)	0.013367	0.055989	0.238741	0.8133
LN_GEX	-0.013636	0.014487	-0.941258	0.3560
LNMS	-0.102339	0.069803	-1.466119	0.1556
LNMS(-1)	0.094301	0.066647	1.414932	0.1699
LNREER	-0.002581	0.013586	-0.189996	0.8509
LNTOP	-0.012638	0.019737	-0.640338	0.5280
LNTOP(-1)	-0.003073	0.021563	-0.142520	0.8879

R-squared	0.205050	Mean dependent var	0.008460
Adjusted R-squared	-0.093057	S.D. dependent var	0.013722
S.E. of regression	0.014346	Akaike info criterion	-5.410710
Sum squared resid	0.004940	Schwarz criterion	-4.961780
Log likelihood	101.9821	Hannan-Quinn criter.	-5.257612
F-statistic	0.687841	Durbin-Watson stat	2.392610
Prob(F-statistic)	0.712791		

ARDL Bounds Test

Date: 05/24/16 Time: 21:36
Sample: 2 35
Included observations: 34
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	3.616829	5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Test Equation:
Dependent Variable: D(LNTB)
Method: Least Squares
Date: 05/24/16 Time: 21:36
Sample: 2 35
Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LN_RGDP)	1.213906	0.515049	2.356876	0.0269
D(LNMS)	-0.854587	0.599708	-1.425006	0.1670
D(LNTOP)	0.947332	0.140396	6.747563	0.0000
C	-2.611720	3.560146	-0.733599	0.4703
LN_RGDP(-1)	0.301380	0.365664	0.824198	0.4179
LN_GEX(-1)	0.312468	0.130358	2.397005	0.0247
LNMS(-1)	0.321168	0.137586	2.334303	0.0283
LNREER(-1)	0.108922	0.112867	0.965044	0.3441
LNTOP(-1)	0.538103	0.216414	2.486450	0.0203
LNTB(-1)	-0.717040	0.178958	-4.006747	0.0005

R-squared	0.718998	Mean dependent var	0.170395
Adjusted R-squared	0.613623	S.D. dependent var	0.197239
S.E. of regression	0.122602	Akaike info criterion	-1.119812
Sum squared resid	0.360752	Schwarz criterion	-0.670883
Log likelihood	29.03681	Hannan-Quinn criter.	-0.966715
F-statistic	6.823195	Durbin-Watson stat	2.037878
Prob(F-statistic)	0.000079		

ARDL Co-integrating And Long Run Form

Dependent Variable: LNTB
Selected Model: ARDL(1, 1, 0, 1, 0, 1)
Date: 05/24/16 Time: 21:44
Sample: 1 36
Included observations: 34

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LN_RGDP)	1.006745	0.450111	2.236662	0.0349
D(LN_GEX)	0.374649	0.110552	3.388893	0.0024
D(LNMS)	-1.113914	0.532667	-2.091200	0.0473
D(LNREER)	0.299460	0.103679	2.888336	0.0081
D(LNTOP)	1.186365	0.150612	7.876970	0.0000
CointEq(-1)	-0.763319	0.153588	-4.969907	0.0000

Cointeq = LNTB - (0.1135*LN_RGDP + 0.4908*LN_GEX + 0.5526*LNMS
+0.3923*LNREER + 0.8190*LNTOP -2.5270)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LN_RGDP	0.113489	0.420351	0.269988	0.7895
LN_GEX	0.490816	0.136300	3.601002	0.0014
LNMS	0.552556	0.110900	4.982486	0.0000
LNREER	0.392314	0.131466	2.984139	0.0064
LNTOP	0.818988	0.146117	5.605029	0.0000
C	-2.527003	4.170847	-0.605873	0.5503

Declaration

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

Declared By:

Name: TEMESGEN TESEMA

Signature: _____

Date: _____

Confirmed by (Advisor)

Name: GIRMA ESTIPHANOS (PhD)

Signature: _____

Date: _____

Place and date of Submission: _____