

**Determinants of Current Account Balance in Ethiopia:  
An Autoregressive Distributed Lag Approach**

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## ABSTRACT

Determinant of Current Account balance of Ethiopia Economy: An

Autoregressive Distributed Lag Approach

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*The purpose of this paper is to investigate the empirical linkage between current account balance of Ethiopia and macroeconomic variables based on the inter-temporal approach using recent econometric techniques from 1980 to 2015. Auto Regressive Distributed Lagged Model adopted to investigate the existence of short run and long run relationship between current account balance and set of macroeconomic variables. The model based on inter-temporal approach to current account considers current account as an inter-temporal phenomenon given that; it is the difference between domestic saving and investment. The result of the econometric analysis indicated that there is a long run relationship between current account balance and fiscal balance, real effective exchange rate, terms of trade, and Real GDP growth and statistically significant. Variable such as foreign direct investment, age dependency, financial deepening, trade openness and relative income found statistically insignificant in the long run. Among policy implication that comes out of this study is that large amount of government spending is needed in order to expand infrastructures which are supposed to increase private investment particularly for those participate in manufacturing and export sectors. In addition, devaluation of domestic currency that improves current account balance is appropriate but government should be careful in taking such measurement since it increases the cost of imported inputs and inflationary pressure on domestic price.*

Key words: Current account Balance, Inter-temporal approach, ARDL

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## List of Acronyms

ADF: Augmented Dickey Fuller

AEO: Africa Economic Outlook

AIC: Akaike Information Criteria

ARDL: Auto Regressive Distributed Lag

CUMSUM: Cumulative Sum of Recursive Residuals

CUMSUMSQ: Cumulative Sum of Squares Recursive Residuals

ECM: Error Correction Model

GDP: Gross Domestic Product

HLME: Harberger-Laursen-Metzler Effect

IMF: International Monetary Fund

M-F: Mundell-Fleming

ML: Marshall-Lerner

MoFED: Ministry of Finance and Economic Development

NBE: National Bank of Ethiopia

NFA: Net Foreign Asset

OLS: Ordinary Least Square

PP: Philips and Peron

SBIC: Schwarz's Bayesian information criterion

UECM: Unrestricted Error Correction Model

UNCTAD: United Nations Conference on Trade and Development

WDI: World Development Indicator

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## CHAPTER ONE: INTRODUCTION

### **1.1. Background of the Study**

Achieving a sustainable economic development with stable macroeconomic balance and, build a welfare state is one of the ultimate goals of any of policymaker and government of a country. Identifying and knowing those economic variables that determine macroeconomic situations are helpful in designing a good economic policy for the future prospect. Current account position of a country is one of an indicator that shows the status of an economy and it is a component of balance of payment which is defined as, the records of export and imports of goods and services and international receipts or payments. In other words, it is an aggregate of trade balance which is the difference between export and import, income balance, a difference in income receipts on assets owned abroad and income payment on foreign owned assets, net international compensation to employers and net unilateral transfer that shows the difference between gift received from rest of the world and gifts made to foreign countries (Urbie, and Schmitt-Grohie, 2014).

Current account balance has big role in conveying information about different participants of economic agents of a country, Since it determines the evolution of country's stock of net claims to the rest of the world, it reflects the inter-temporal decision of residents of both domestic and foreign with respect to saving, investment, fiscal position and demographic factors (Knight and Scaccivailani, 1998). Although, it does not appear as ultimate policy target variable, it could be used as a source of information about the behavior of economic agents and as an indicator of the stance of macroeconomic positions.

The concern of current account position is not only a matter of developing nations, but it has also been a matter of all developed nations and, the existence of global imbalances is in the center of debate among policymakers' and economists. Largest concern in global economy regarding current account positions has been United State's current account deficit and China's current account surplus, this is basically due to the fact that, U.S is being in a higher level of current account deficit than any other state and this net deficient economies is financed by those of net savings of surplus economies mainly Asian states; In Sep 2008, the level of U.S national debt was around 9,684 trillion dollars (S.Perelstinion, 2009).

In many developed and developing countries, trade balance is the main drivers of current account position. For instance, In the United States, the trade balance and current account have been in equal magnitude and, in case of China it displays both trade balance and current account surplus (Urbie and Schmitt- Grohie, 2014).

As noted by Unevskaja and Jovanovich (2011), Current account deficit does not necessarily indicate need for a policy adjustment, for instance, deficit that caused by a drop in international export prices may lead to a temporary imbalance. However, persistent current account deficit necessitates policy adjustments, since a country cannot finance the deficit constantly by borrowing abroad or by depletion of international reserves. The existence of frequent macroeconomic imbalance in most developing countries necessitates for a clear understanding of factors underlying countries' current account position (Calderon et.al., 1999).

There are different factors that contribute for severe and frequent crisis particularly in developing countries that affect current account balance.

According to Insel and Kayikçi (2013) differentiation of exchange rate regimes, technological improvements in the financial markets, the globalization of the world and international capital flows that became more mobile and increased in magnitude had introduced this problems.

In Africa, there are concerns on current account imbalance and on the issue of sustainability. Current account deficits are features of Africa economies. Like any other developing nation, trade deficit is the main driven of current account imbalance; this is mainly because of their high imports. The other factor for most Africans' high deficit is tend to be the result of low saving than high investment which contributes to high accumulated external debt (Osakwe and Versick, 2007).

A recent economic report also shows this fact; most African countries have a “twin deficit” with both the government budget and the current account deficit which leads to declining foreign reserves and inflationary pressures that may pose serious risks to macroeconomic stability. In 2015, worsening of current accounts was accompanied by deterioration of the fiscal position and other factors like currency depreciation which contributed to the recent deterioration of external balances by pushing up import prices (AEO, 2016).

Ethiopia is the second most populous sub-Saharan African countries after Nigeria and has experienced double-digit economic growth, averaging 10.8% since 2005, which is mainly driven by public-sector that placing the country among world's fast-growing economies. The share of agriculture, services and industry sectors accounted for 38.8%, 46.6% and 15.2% of real GDP, respectively and real gross domestic product is estimated to have grown by 10.2% in fiscal year 2014/15 (AEO report, 2016). However, according to IMF 2016 report, total GDP growth of Ethiopia is estimated to have 6.5 percent in 2015/16, this slowdown relative

to previous due to the impact of drought. The fiscal deficit is moderate as (3% of GDP in 2015). The report further states that the main challenge on overall economy is an increasing of current account deficit. Despite a strong remittance growth posted (28 percent), as did FDI (44½ percent), the current account deficit remain wide and the overall current account deficit which is estimated (as of July 2016) at about US\$7.4 billion (10.7 percent of GDP). Country also characterized by low foreign currency reserve which contributes for poor performance of the economy.

Persistence on current account deficit has been a feature of Ethiopian economies since the Imperial regime. Some writers argue that the problem of persistent current account deficit in Ethiopia is a reflection of the overall economic development. A macroeconomic policy of the country also reflects that the economy is not a competitive in external sectors; reviewing those macroeconomic variables will provide information about the nature of the economy and the possible impact of some macroeconomic variables on current account (Gebregzabier, 2003). Therefore, in order to apply appropriate policy action, it is necessary to determine factors that affect current account balance.

In the past international economics has tried to identify a dynamic relationship between current account positions and other economic variables like real exchange rate, level of economic activity, monetary and fiscal positions through several theoretical approaches starting from Mundell-Fleming model. However, their main focuses were developed nation particularly United state (Machi, 2013, Calderon et.al., 1999). Since different countries have different experience and institutional set up empirical evidence on current account performance is inconclusive and varies from country to country and thus, no consensus on determinants of current account balance. The same apply for the case of Ethiopia, despite

extensive theoretical literature on the subject there is scarce studies that empirically investigate the effect of macroeconomic variables on current account positions. This study tries to identify the fundamental economic variables that affect current account position of Ethiopia using a time series data from 1980 to 2015.

## **1.2. Statement of the Problem**

According to IMF (2016), Ethiopia's current account deficit widened further from (7.9 % of GDP) in 2013/14 to 12.0% of GDP in 2014/15 and, estimated slightly to be improving to 10.7% of GDP in 2015/16. In addition, a country has consistently run very high current account deficit for the last thirty five years on average 6.9% of GDP per annum (NBE, 2016). Even though, recently the country achieved consecutive double digit economic growth, the current account deficit is still higher and the gap is widened. The current account deficit is usually shaped by foreign trade in goods and services. Poor performance and volatility in export earnings, and ever-increasing demand for imports have led to deterioration in current account balance Ethiopia. Large deficit is financed by both domestic and foreign debt. However, excessive reliance on foreign financing in the long run leads to problems of debt sustainability and increase in interest payments, causing a large debt for future generations and thus, a lower standard of living.

In 2015, Ethiopia's external debt risk had raised from low to moderate (IMF, 2016). The increase in debt risk might affect the capability of the country in attracting sufficient external capital and both domestic and foreign investors lose their confidence to come and invest to fill the gap and, this will lead to use foreign exchange reserve. For instance, on the eve of the revolution (1973-74), the country had 16.8 months of import cover. However, by 1989-90 this had down to 0.3 months that made availability of foreign exchange very serious bottleneck (Eshetu and Makonnen, undated).

Various trade policy measurements had been taken in those three ruling regimes in order to minimize current account deficit. Import substitution trade regime of the imperial government with the objective of increasing exports by making full use of the agricultural potential, diversifying exports, and improving the quality of exported goods. While, during the military regime, foreign trade policy was aimed at expanding foreign exchange earnings, to diversity exports, to accelerate the socialization of foreign trade and to promote import substitution. However, those attempts by the two regimes were unsuccessful in minimizing the gap. Although the existing governments took different measurement towards the foreign trade sector, including adequate private capital participation in foreign trade, adjustment of exchange rate, encouraging investment in export-oriented and so on, still the current account deficit remain high (Gebregzabier, 2003).

Looking at the factors underlying trends in merchandise trade and income flows as well as current transfers, would give an incomplete picture, particularly when structural explanatory patterns are being examined. So, it is important to investigate the macroeconomic variable which affects the current account position of Ethiopia. Despite extensive theoretical literature on the subject there are few studies that empirically investigate the effect of macroeconomic variables on current account. Most studies are in the form of aggregate that examine the average behavior countries and their methodological approach focused on cross-sectional and panel data. See paper by Aristovnik (2007), Cevis and Camurdan (2015) and Calderon *et.al* (2002).

The purpose of this paper is to investigate the empirical linkage between current account balance of Ethiopia and macroeconomic variables. Consequently, the study addresses the following questions: What factors determine current account balance of Ethiopia both in the short run and long run and what are the policy options?

Early attempt to provide in a more comprehensive characterization of current account behavior of Ethiopia was performed by Gebregzabier (2003) However, due to dynamic nature of economy, country's level of growth, direction of trade, volume of import and export, level of saving and investment, the inflow of capital as well as net unilateral transfers that affect current account 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 current status.

This study is different from earlier study because it tries to determine the relationship between the current account balance and its determinants by using recent econometric techniques (ARDL model).In addition, unlike the previous study which treats current account balance as the outcome of trade balance, this study is based on the inter-temporal approach that views current account balance as an outcome of forward-looking dynamic saving and investment decisions. This is mainly due to the fact that the inter-temporal approach to current account analysis result from forward-looking calculations based on expectations of future productivity growth, government spending demand, real interest rates and so on. Besides being dynamic, the approach achieve a synthesis of both absorption and elasticity's approaches by accounting for macroeconomic determinants of relative prices and by analyzing the impact of current and future prices on saving and investment (Obstfeld and Rogoff, 1996).

### **1.3. Objective of the study**

The general objective of this study is to find out the major determinants of Ethiopia's current account balance using the data for the period 1980 to 2015. More specifically, the study aims at achieving the following objectives.

- i. To determine the short run and long- run determinants of current account balance.
- ii. To identify whether a causal relationship exist between fundamental variables and current account balance
- iii. To devise policy instruments based on the findings

### **1.4. Significance of the study**

This study is expected to determine the most significant fundamental variables to the current account balance. It provides an overview of both the evolution of economic thinking and empirical evidences on determinates of current account and their implications for the behavior of current account balance with particular attention to the Ethiopia economy. A better understanding of the factors underlying short and long-term developments in the current account will provide policymakers in assessing whether policies aimed at attaining domestic economic objectives are compatible with a sustainable external position. Therefore, the study that I am going to deal will help in designing appropriate socio-economic policy which has implication on Ethiopia's current account positions. The output of this study will also serve as an input for the upcoming researchers to further investigate the Current account in more detail and Systematic way.

### **1.5. Scope of the study**

This study focuses on the determinants of current account balance of Ethiopia from 1980 to 2015. The study is limited to the case of Ethiopia. Due to this the policies recommended at the end of the paper might not fit to other developing countries.

### **1.6. Organization of the Study**

The rest of the paper is organized as follows. Chapter two gives a brief review of both the theoretical and empirical literatures with respect to current account determination. Subsequently the third chapter deals with the overview of the Ethiopian economy in general and current account related issues in particular. Chapter four explains model specification, the data type used and source along with methodology adopted. The econometric analysis is discussed in chapter five. The last chapter deals with conclusions and policy implications based on findings obtained from the analysis.

## CHAPTER TWO: LITERATURE REVIEW

### 2.1. Theoretical Review

#### 2.1.1. Definition of Concepts

Current account is sub accounts of balance of payment together with the financial account and capital transfer which provides a compilation of all the economic transactions between residents of reporting countries and residents of rest of the world within a given period. It covers the flows of goods and income and precisely, it can be defined as the sum of both tangible and intangible trade balance that records exports and imports of goods and services and international receipts or payments of income (Pilbeam, 2006, Urbie, and Schmitt-Grohie, 2014).

Those exports and income receipts enter with a plus in current account balance while imports and income payments enter with a minus. For instance, if an Ethiopian resident buys a car from china for \$30,000, then the Ethiopian current account goes down by \$30,000. This is because this transaction represents an import of goods worth \$30,000 and, the opposite is true if the foreign residents buy our goods it goes up by the same amount. Therefore, current account balance links the nation's international transactions and its national income by adding together all sales and purchases of currently produced goods and services, investment incomes, and unilateral transfers that have effect on domestic production. Countries with current account surplus stimulate domestic production and income, while a current account deficit dampens domestic production and income (Salvatore, 2013)

Focus on the export and import of goods and services, investment income, debt service payments, and private and public net remittances and transfers allows analyzing the impact of various commercial policies (Todaro and Smith, 2012). As noted by Krugman et.al (2012), ignoring other transfers, current account balance is defined as the difference between exports

goods and services and import of goods and services. Based on the definition, we call it current account deficit if countries import exceeds its export, while if export exceeds its import it is referred to as current account surplus. For example, as mentioned by Urbie and Schmitt- Grohie (2014) In U.S economy trade balance and current account have been equal to each other in their magnitude over the past thirty years and, the differences between the other two components (income balance and unilateral transfer) have been close to zero.

Current account balance has big role in international macroeconomics that is expressed through GDP identity which is the sum of total expenditure on domestic output and net exports. Since, the right hand side of GDP identity provides total domestic absorption; any changes in current account can be associated with total output which has effect on employment (Krugman et.al, 2012).

If country consumes more than domestically produced, it is forced to import. This is, of course possible, if the economy is in an open economy to fill that additional demand and also if import is excessive than its export, it necessitates borrowing from other foreign countries in order to finance the current account deficit. Therefore, the role of current account balance in macroeconomics is not only limited by the total output changes but it has importance in measuring the size and direction of international borrowing. This theoretical explanation seems like true in real world because those countries with current account surplus finances current account deficit of trading partners by lending to them. For instance, U.S deficit has been financing by East Asian Surplus countries particularly China (S.Perelstinion, 2009).

### **2.1.2. Saving, Investment and Current Account**

From National income account identity total output is linked with current account. Here, we can also see the link between current account balance and macroeconomic aggregates (Krugman,

2012, Urbie and Schmitt-Grohe, 2014). To verify this, let define national saving which is the portion of total income that is left-out after consumption and let the economy is an open economy. Then, national saving can be expressed as the sum of investment and current account.

This identity can be expressed as follows:

The national income accounting identity is given by;

$$Y=C+I+G+CA \dots\dots\dots 2.1$$

$$CA=Y-(C+I+G) \dots\dots\dots 2.2$$

Where Y national income, C consumption, I investment, G government expenditure, CA difference between exports and imports,

In an open economy, national saving S, is the difference between national income and the sum of private and government consumption

$$S=Y-C-G \dots\dots\dots 2.3$$

From the above two equations it follows that,

$$S=I+CA \dots\dots\dots 2.4$$

The final equation tells that in an open economy, nations can save either through investing and accumulation of capital stock or by acquiring foreign wealth. This theoretical expression has important implication in developing countries like Ethiopia. For instance, if government of Ethiopia decides to build a new hydroelectric plant other than what it is being built, it can import the materials it needs from the China which is now a days one of a major ally of Ethiopian economy and borrow China funds to pay for them in the future and this transaction automatically raises Ethiopian domestic investment because the imported materials contribute to expanding the country's capital stock and, contrary to this the transaction also raises Ethiopia's current account

deficit by the amount equal to the increase in investment. But, Ethiopia's saving does not have to change, even though investment rises. Here, we can view the current account balance as a difference between savings and investment. If savings are less than investment, it indicates that an economy needs to import resources to finance investment beyond the level of capital accumulation in the domestic economy (Osakwe and Verick, 2007).

We can also investigate the role of the government in the determination of the current account that centered on the so-called twin-deficits hypothesis. According to this hypothesis, fiscal deficits lead to current account deficits. From above definition we have the current account as the difference between national savings and aggregate investment. National savings is the sum of private savings and government savings (or fiscal surpluses). This, in turn, Expansionary on government spending lowers government savings. If we assume that private savings and investment are unaffected by the expansionary fiscal policy, then the current account must deteriorate by the same amount as the decline in government savings.

### **2.1.3. Theories of Current Account Balance**

Policymakers have tried to incorporate new theoretical approaches towards open economy macroeconomics in order to have deeper understanding on current account movement and their interaction with other macroeconomic variables. Varieties of theoretical models have been used to explain the determinants of the current account balance. Each of the models applies to different economic environment and can have varying economic policy implications.

This section review both traditional and modern theories that explain the movements of current account and it tries to link this theories with empirical evidences. The first approach towards current account balance is the elasticity approach which was pioneered by Alfred Marshall (1923) and Abba Lerner (1944). The analysis provides that what happen to current account

balance when country adjust its currency specifically when it devalues its currency (Pilbeam, 2006). It states that the elasticity of demand for export by foreigners and that of import by domestic residents with respect to changes in exchange rate determine current account balance assuming that both domestic and foreign prices are fixed. The changes in exchange rate affects relative prices of goods and services, which ultimately affect demand by both domestic and foreign consumers.

Central to this approach is the Marshall-Lerner (ML) condition, which states that, assuming initial equilibrium condition, devaluation will improve the current account balance only if the sum of the foreign elasticity of demand for export and the domestic country elasticity of demand for import is greater than unity. However, if the sum of the elasticities is less than unity devaluation will lead to deterioration of current account balance. The argument for this, devaluation of the exchange rate makes domestic exports cheaper in foreign markets which increase the demand for goods and, imports become more expensive in the domestic market, and their demand become diminishes. The net effect will depend on price elasticity and if export goods are elastic, quantity demanded will increase proportionately more than the decrease in price, and total export revenue will increase. Similarly, if goods imported are elastic, total import expenditure will decrease. In both cases, current account will be improved.

This elasticities pessimism view dominated until the mid-1970s and there was a policy debates whether devaluation would result in an improvement in the country's external position particularly in less developed countries (Edwards, 2001).

Most economists agreed that elasticity is lower in the short run in which Marshall-Lerner conditions may not hold. Empirical evidences are also confirmed this argument, in the short run

Marshall-Lerner condition does not hold for both developing and developed country but in the long run condition is generally met as stated in J curve hypothesis. Result by Kwalingana and Nkuna (2009) and Sadiku *et.al* (2015) show that in the long-run devaluation will improve current account balance that confirms Marshall-Lerner condition. The main weakness of this approach is that, it is a partial equilibrium based analysis as it only looks at the traded goods. However, changes in imports and exports will have implications for national income (Alekaw, 2012).

The second approach towards current account balance is the absorption approach that views current account balance as the difference between domestic output and absorption (spending) and was developed against some limitations on the conventional elasticity approach (Pilbeam, 2006). One of the major defects of the elasticity approach is that it is based up on the assumption that other things are equal. However, changes in imports and exports will have implication for national income.

To elaborate this, let start from national income identity, Where by  $Y=C+I+G+X-M$  and, define domestic absorption.  $A=C+I+G$ .

Therefore, CAB is written as:  $CAB=X-M=Y-A$ .....2.5

This equation states that if an economy spends more than it produces (i.e. absorption exceeds income), it forces the country to import from others to fill the excess consumption and these leads the country to run a current account deficit. On the other hand, if this economy spends less than what it produced (i.e. income exceeds absorption), it runs a current account surplus. The approach provides how depreciation or devaluation affects current account balance through national income and domestic absorption. It states that if devaluation raises domestic absorption relative to domestic income the current account deteriorates. This means a country must increase

its total output and reduce its absorption to have current account surplus. But, the effect depends upon income or substitution effect. Reduction on domestic goods price has two effects; first there is a substitution effect that causes a shift in the composition of demand from foreign goods towards domestic goods. Second, an income effect which would increase absorption, and then reduce the current account balance (Alekaw, 2012). It provides more inclusive and less misleading framework to analyze and forecast the current account than does the elasticity approach by making it easier to incorporate determinants of financial account transactions into model but it criticized for neglecting price and other countries policy effect and for inappropriateness to operate in fixed exchange rate system.

The third approach to balance of payment (current account balance) is the monetary approach which is pioneered by Marina Whitman (1975), Jacob Frenkel and Harry Johnson (1976). The fundamental basis of the monetary approach is that the balance of payments is essentially a monetary phenomenon and not a real phenomenon (Pilbeam, 2006). It is based on three key assumptions, stable money demand function, vertical aggregate supply schedule and purchasing power parity. It is argued that any disequilibrium in the balance of payments is a reflection of disequilibrium in money markets. It analyzed from the point of view of the supply and demand of money. The money supply of the domestic economy is made up of two Components, the domestic value of international reserves and the monetary asset holdings of monetary authorities and change in international reserves is reflected in the change in the money supply. According to monetarist view, a deficit in the balance of payment is due to an excess of money supply in relation to demand. On the other hand, if the demand for money is excess in relation to stock of money supply result in surplus in balance of payment. It argues that currency depreciation can only be successful if it increases the nominal demand for money relative to the supply. As

already mentioned, exchange rate change operates strictly by causing disequilibrium in the money market, causing a deficit or surplus in the current account which continues only until equilibrium is restored in the money market. This approach later criticized regarding balance of payment as entirely a monetary phenomenon is questionable assumption.

The fourth approach to current account balance is Mundell-Fleming analysis, which got wide popularity since 1960s. As clearly explained by (Knight and Scacciovillani, 1998), it is based on the assumption of international capital mobility, imperfect substitutability between domestic and foreign goods, fixed aggregate price level and variable real output. It explicitly treats markets for goods, money balance and foreign exchange using the combination of interest rate ( $R$ ) and income ( $Y$ ). States that the economy can be either at deficit or surplus depends on the values of certain parameters such as the level of economic activity, real exchange rate and differential between foreign and domestic interest rate. For instance, under fixed exchange rate and high capital mobility the model explain that expansionary fiscal policy lead current account into deficit and this deficit is mainly financed by higher capital inflow, which is induced by interest rate increase.

The model also explains the movement of current account when there is an expansionary monetary policy under floating exchange rate. It concludes that expansionary monetary policy induces fall in domestic interest, raises income and depreciation of home country's real exchange rate but improvement or deterioration of current account depends on the impacts of exchange rate depreciation and increase in income on exports and imports. The strength of the model is that it tries to build macroeconomic policies from the perspective of achieving both internal balance (high employment) and external balance (balance of payment equilibrium). Major weakness of this model is that it neglects the impacts of net investment on stock of productive

capital and current account imbalances on net international indebtedness and also criticized for its only describe the short run effect of policies and static.

In order to avoid contraction of consumption and investment, an open economy country can borrow from the rest of the world. On the hand, country can lend to rest of the world to participate in foreign productive investment. When this type of resource exchange across time happens, we call it an inter-temporal trade that is linked with macroeconomic action which is measured by current account balance. Recent or modern view towards current account balance is the inter-temporal approach to current account that highlights the role saving-investment decision. It is an extension of absorption approach that recognize the saving and investment decisions into the current account which is the result of forward –looking economic agent, based on expectation of future productivity growth, government spending demand, real interest rate and so on (Obstfeld and Rogoff,1996).

Large imbalance in current account that the world experienced during the 1970s, particularly due to the oil price shocks, generated significant concern among policy makers and analysts and prompted to analyze the determinants of the current account. One of the major developments during this large swing in current account balance was a move away from trade flows to the inter-temporal dimensions of the current account. This movement was accomplished by the recognition of two interrelated facts. First, from a basic national accounting perspective the current account is equal to savings minus investment. Second, since both savings and investment decisions are based on inter-temporal factors such as life-cycle considerations and expected returns on investment projects, the current account is necessarily an inter-temporal phenomenon (Edwards, 2001). As stated in (Knight and Scaccivailani 1998), current account position is mainly determined by the saving-investment gap which ultimately depends on the willingness of

foreigners to hold its liability and countries with high saving ratio tend to be net capital exporter and run current account surplus. This approach analyzes long run sustainability of current account position inter-temporally unlike M-F model which analyze current account position for short-term change only. This refers the optimality decision of economic agent and, if agents are rational and optimal in their saving as well as investment decisions, the resulting CA balance should also be optimal. Optimization decision to current account balance has different implications; one could be the accumulation of foreign liabilities or assets will not be sustainable; on the other hand, the imbalances could be the response of economic agents to changes in government expenditure or investment (Machi, 2013).

Inter-temporal approach also became appropriate framework to analyze the dynamics of the current account as the global integration of the financial markets increased from mid 1970's. It was a time that characterized by rapid expansion of two-way capital flows and gross external asset and liability positions that contributed to the creation and sustainability of current account imbalances (Camarero et.al, undated).

In general, this approach has several advantages over the other approach, it achieves a synthesis of both absorption and elasticity approaches by accounting for macroeconomic determinants of relative prices and by analyzing the impact of current and future prices on saving and investment. Second, due to inter-temporal nature of saving and investment, it has a strong theoretical foundation on their determinants and third, it is helpful if the goal of researcher is to understand how policy intervention affects current account balance (Kariuki, 2009).

#### **2.1.4. Macroeconomic Variables and Current Account**

In order to deduce alternative economic policies we need to have sufficient information on the factors that influence long-term and short-term fluctuations of the current account balance. Based on theory and economic literatures we describe the fundamental variables and their expected relationships with the current account.

##### **I. Real Effective Exchange Rate and the Current Account**

Real effective exchange rate is used when trying to obtain an overall measure of a country's external competitiveness and especially when relating exchange rates to international trade balances. Even if nominal exchange rates do not change, an increase in domestic price relative to prices of abroad will appreciate the domestic in real terms and vice versa. An increase or decrease of the real effective exchange rate play an important role in the relative income and asset position of an economy and it can affect the current account balance in two ways. The appreciation of the REER on the one hand increases the purchasing power of domestic agent in terms of imported goods of current and future income, as well as the value of the accumulated monetary and property asset. An increase of purchasing will raise consumption and at the same time reduce the propensity to save. Since current account is increasing in savings, a decrease in the saving ratio will lead to a decrease in an economy's current account balance. Therefore, an increase in REER is expected to decrease private saving and hence, the current account.

On the other hand, according to the consumption smoothing hypothesis, a real appreciation of domestic currency should result in an improvement of the current account. This hypothesis suggests that the current account acts as a buffer to smooth consumption in the face of shocks to national cash flow. Contrary to the first argument additional income in response to an increase in the REER (appreciate) would allow economic agent to invest abroad rather than allow

consumption to increase and run a current account surplus. As a result, a home currency appreciation can result in an improvement of the current account. Overall, the link between the real exchange rate and saving ratio can only be determined empirically (Brissimis et.al, 2010, Yang, 2011, Oshota and Badejo,2015).

## **II. Government Budget Balance and Current Account**

Theoretically, the relationship between budget balance, private saving and current account depends on the extent to which consumers react weather in conventional (Keynesian) or the neoclassical (Ricardian) manner. The conventional approach establishes a link between budget deficit and current account deficit while the neoclassical approach finds no such relationships. For instance reduction of government tax affects current account balance differently in the two approaches. According to the Keynesian model, cutting of tax which lowers tax revenue or higher government spending increases disposable income and thereby consumption and decreases private saving. This decrease in saving leads to a higher current account deficit as result of a government tax reduction or due to higher fiscal deficit.

The theory asserts that budget deficits increase domestic absorption which leads to import expansion and worsens the current account balance. The economic reaction of private agents under the Keynesian model supports the twin-deficit hypothesis and wider fiscal deficits should usually be accompanied by wider current account deficits. On the other hand, this twin-deficit hypothesis may not hold, if economic agent reacts in a Ricardian manner.

According to the Ricardian equivalence hypothesis, consumers are forward-looking and, therefore, base their spending not only on their current income but also on their expected future income. If economic agents perceive that the fiscal situation is unsustainable, they expect that tax increases or reduction in government spending in the future which will affect future net wealth of

agents'. In this case, reduction of tax which is accompanied by a higher fiscal deficit (or lower fiscal surplus) in the present decreases consumption and increases precautionary saves, so that agents maintain their long-run rate of consumption, in an environment of reduced future disposable income. Therefore, consumers internalize the government budget constraints and thus the timing of any tax change does not affect their change in spending. As a result, an inter-temporal shift between taxes and budget deficits would have no current account balance. Therefore, the link need to be determined empirically (Brissimis et.al, 2010, Mankiw, 2001).

### **III. Terms of trade and the Current Account Balance**

Terms of trade defined as the ratio of export prices to import prices and the relationship with current account balance has come out with different prediction. According to Harberger (1950) and Laursen and Metzler (1950), a terms-of –trade deterioration implies deterioration of the current account balance, what we call the Harberger-Laursen-Metzler effect. Positive change of the terms of trade would increase real income (given a constant marginal propensity to consume of less than one) would cause a rise in private savings and an improvement of the current account. As it is clearly explained by Gebregzabier (2003) cited for Svensson and Razin (1983), deterioration in terms of trade decreases real income, and decrease in real income reduces saving out of a given income which is measured in terms of exportable.

It is on the basis of the assumption that investment is constant and there is no government budget deficit. This idea was challenged in the early eighties when Sachs (1981) came up with a dynamic framework, contended that the HLME depends on the duration of the shock. As stated by Chinn and Prasad (2000), economic agents could save more in order to smooth their consumption during volatility of terms of trade. Only if the shock is temporary does the HLME appear. If it is permanent, the final result is ambiguous (Duncan, 2003).

#### **IV. Openness and the Current Account Balance**

The openness measured as the ratio of, sum of exports and imports to GDP. It measure both trade openness and trade restriction of an economy. Country's trade openness can be expressed through receptiveness of new technology transfers, the ability of the country to pay their external debt through revenue earning from export or could be attribute of liberalized international trade. On the other hand, this variable could also be related to trade restriction that a country follows in order to impede a flow of goods and services. Trade restriction or openness has own impact on country's economies. With more trade restriction of economy, it is unlikely to attract foreign direct investment that send an adverse signal to foreign investors. On the other hand, with less restrictions to international trade tends to be relatively more attractive to foreign capital. Therefore, trade openness has a role in measuring both openness and restriction which has a great impact on the inflow of capital to an economy. Consequently, trade openness is likely to be associated negatively with the current account balance (Yang, 2011, Nkuna, 2013).

#### **V. Relative income and the Current Account Balance**

The relative income is measured as the ratio of domestic real output (Ethiopia real GDP) to U.S. real output. This variable is included in order to capture the stage of development effect. According to the stage of development hypothesis, a country with low level of income is likely to run current account deficits. A country with low level of income need more capital goods and requires external financing in order to import these capital goods. This leads a country to run current account deficits at early stage of development. On the other hand, as economy grow and reach high stage of development or with high level of income they become exporter of capital goods to less developed economies and runs current account surplus. This implies the country to repay the previously accumulated external liabilities. In general, the relationship between relative

income and current account balances is expected to be positive (Yang, 2011, Chinn and Ito, 2007).

## **VI. Financial deepening and the Current Account Balance**

Financial deepening is expressed by total money supply (M2) which is defined as the sum of nominal money and quasi money. Nominal money comprises the sum of currency outside banks, demand deposits other than those of the central government. On the other hand, quasi money comprises the time deposits and savings deposits. It is an important determinant of saving. According to traditional interpretation, financial deepening taken as a measure of depth and sophistication of financial system which induce more saves. Contrary to this, it viewed as borrowing constraint faced by individual and therefore it is associated with the lower level of private saving.

Some literature coincide financial deepening with financial development. Accordingly, financial development enhances saving and investment because it contributes to raising returns as well as lowering the cost of capital and the risk of investment by ameliorating information asymmetry, reducing information and transaction cost, improving corporate governance and facilitating risk management. Hence, it is important to consider financial development/deepening as one of the determinants for the saving and investment decision. While the effect of financial development on investment is unambiguous (i.e., positive), that on saving is not, because higher returns and lower risk of financial investment create effects on saving akin to income and substitution effects (Chinn and Ito, 2007, Oshota and Badejo, 2015, Chinn and Prasad, 2000).

## **VII. Dependency Ratio and Current Account Balance**

It is defined as the ratio of people younger than 15 and older than 65 years of age over the working age population. In developing countries, however, increases in relative size of the working age population could lead to stronger per capita growth provided the additional labor resources are productive (Nkuna, 2013). An increase in the dependency ratio or the fertility rate will decrease the saving ratio because, according to the life-cycle hypothesis, the young and the old are net consumers. However, other factors like the desire of the elderly to leave bequests, the uncertainties about the lifespan after retirement and the financial support that will be required, as well as the public-pension portion of their incomes, may urge them to save rather than spend. Consequently, the effect of the demographic variable on private saving and the current account may be positive or negative. (Brissimis et.al, 2010, Medina et.al, 2010)

## **VIII. RGDP growth rate and the Current Account Balance**

The relationship between real GDP growth and current account balance is through saving and, the effect of real GDP growth on saving is ambiguous. The impact of RGDP growth on saving is depending on household perception for their permanent income. According to life cycle permanent income hypothesis, if current high growth rate were interpreted as signaling as increases in permanent income then saving rate as proportion of current income is actually decline. On the hand, increase in RGDP growth rate that viewed as transitory would tend to rise saving rates (Chinn and Prasad, 2000). But according to Medina et.al (2010), the effect of GDP per capita growth has negative effect on the current account balance. An increase in the domestic output growth rate is expected to expand the current account deficit. Fast-growing economies have a higher income potential, which would allow them to have a lower level of savings today. Therefore, the link needs to be determined empirically.

## **IX. Foreign Direct Investment and the Current Account Balance**

Most of countries are worried about on how to attract FDI but not with the consequences of FDI on domestic economy. The following are among the benefit of foreign direct investment to one's economy, it contributes to the development of companies, enhances international trade and integration, brings new technology and know-how and increases competition which has positive spill-over effect to the improvement of current account balance. On the other hand, concentration of FDI in highly profitable activities such as financial services, retail trade, and telecommunications has nothing contribution to the horizontal or vertical transfer of technology and know-how of the host country, and also, that FDI might increase imports more than exports creating trade deficit rather than trade surplus.

FDI can also reduce competition particularly in a small country, establish a powerful monopoly which destroys and/or prevents creation of potential domestic competitors. This assertion brings us to the relationship between inward FDI and current account balance. The effect of FDI can either positive or negative to current account balance (Menninger, 2008). However, Medina et.al, (2010), noted that current account deficits financed by FDI should be less prone to sudden stops and therefore more sustainable than those financed by other type of inflows. Hence, higher FDI should be associated with weaker current account balances. Similarly Unevska and Jovanovich (2011) asserted that current account financed by large inflows of foreign direct investment is more sustainable than a deficit financed by short-term flows. In which Short-term flows can be reversed easily if market conditions change, while FDI is less volatile.

## **2.2 Empirical Literature**

There are several studies that have examined the determinants of the current account balances in both developed and developing countries using different methodologies and giving different findings. In this section we reviewed studies which are more convenient to our study.

### **2.2.1 Cross -Country Studies on Current Account**

This section reviews the empirical studies that have been carried out in a multi-economy framework using different estimation approaches.

Based on the inter-temporal approach to current account, Yang (2011) empirically examines both the long-run and short-run impacts of initial stock of net foreign assets, degree of openness to international trade, real exchange rate and relative income on current account balances for eight largest emerging Asian economies. Quarterly data over the period 1980-2009 was used and adopts a co-integrated VAR approach to analyze between current account balances and a set of macroeconomics determinants. Result suggested that nature of current account in emerging Asian economies is not homogenous; Variables affect countries current balance both negatively and positively. This is mainly due to structural difference among countries. There was also strongly significant long-run relationship among the current account, initial stock of NFA, trade openness, REER and domestic relative income for all the sample economies. In addition the initial stock of NFA and the degree of trade openness are more important factors in explaining the long-run behavior of current account in most of the sample economies. However, China's case was exceptional where long-run and short-run fluctuations of the initial stock of NFA were found as a current account significant factor.

Aurangzeb and Asif (2012), under their study, they compared the current account balances of Asia and Europe. Of this countries, three European (Italy, France, and Germany) and four Asian

(Pakistan, India, Japan and Bangladesh) were taken for period from 1980 to 2010. Study uses Johansson and Juselius (1990) co-integration regression analysis and granger causality tests to detect relationship among variables. Six macroeconomic variables were identified, including Gross domestic products, exchange rates, import of goods and services, export of goods and services, inflation rate, and income receipts were identified as explanatory variables. Results indicated that all the variables have significant impact on the current accounts of all the selected countries except inflation for Pakistan and income receipts for Bangladesh that have no significant impact. Current account has a positive and significant relationship with the growth for all the countries; that means increase in GDP should decrease current account deficit. Finding also show there was nothing much to differentiate between the two regions. One of the weakness of this paper is it lack interpretation after the result is found. The sign of Coefficients are put, but it does not tell whether current account balance will improve or deteriorate.

Calderon *et.al* (2002), studied the empirical relationship between the current account deficit and a broad set of economic variable for a sample of developing countries. Sample consist unbalanced panel of 44 developing countries for the period 1966-94 and adopting a reduced form approach and also applying more recent econometric techniques to control for joint endogeneity distinguishing between within-country and cross-country effects. The explanatory variables were the lagged current account deficit, the domestic output growth rate, the real effective exchange rate, the terms of trade, the extent of balance of payment controls, the black market premium, the output growth rate of industrialized countries, and the international real interest rate. Result suggested that increase in the domestic output growth; reductions in international real interest rates, an appreciation of the real exchange rate and a worsening of the terms of trade generate an increase in the current account deficit for a given country. In addition, countries whose per capita

GDP are farther from that of industrialized countries tend to run larger current account deficits. On the other hand, an improvement in the growth rate of industrialized countries, an increase of public saving rates in a given country leads to a moderate decrease in the current account deficit and also Current account deficits were moderately persistent.

Cevis and Camurdan (2015), investigate the determinants of the current account balance in 18 countries that followed inflation target monetary strategy using yearly data's within the period beginning from 1990 to 2006 and adopts the panel data analysis framework to capture the relationships among variables. Result suggested that the real domestic GDP growth rate, the export/import coverage ratio, the degree of trade openness, the percentage change of the real exchange rate and the real interest differentials were the main determinant of current account balance. The domestic growth rate & percentage change of real exchange rates have negative effect on current account balance under inflation targeting discipline. On the other hand, increase in trade openness level, the improvement in the export/import coverage ratio and the highness of the domestic real interest rate in comparison with the foreign real interest rate ( USA) have positively effects on current account balance

Oshota and Badejo (2015), examined the determinant of current account balance within the panel in West African region using Autoregressive distributed lag (ARDL) approach for period from 1980–2012. Pooled Mean Group (PMG) and Dynamic Fixed-Effect (DFE) were estimated. Results indicated that there exists a long-run relationship between the current account balance and its determinants. GDP per capital, investment, financial deepening (M2) and Dependency ratios (DER) in PMG model positively impact current account while the real effective exchange rate (REER) has a negative and statistically significant long term effect on current account balance.

Aristovnik (2007), examined the short- and medium-term empirical link between current account balances and a broad set macroeconomic variables that focused on the Middle East and North Africa which covered 17 countries using pooled cross-sectional and time-series (unbalanced panel ) data for period 1971-2005. GDP growth, domestic investment, financial deepening, relative income, general government consumption expenditure, openness, foreign direct investment, oil price, GDP growth of the OECD and the foreign interest rate (in USA) were identified as explanatory variable. The study found that domestic and foreign investment and foreign interest rate had negative impact on the external positions whereas open economy, higher oil prices and domestic economic growth generate an improvement in the external balance. Further, the existence of the twin deficit hypothesis as well as current account was somewhat persistent. In addition the results reject the validity of the stages of development hypothesis that state poor countries run higher current account deficit since poorer countries in the region show a higher current account surplus (or a lower deficit).

Jaumotte and Sodsriwiboon (2010) examined the causes, consequences, and potential cures of the large current account deficits in the Southern Euro Area (SEA) and also tried to investigate whether it was related to the formation of the European Monetary and exceed equilibrium levels as determined by fundamentals. Result suggested that decline in the current accounts was coincided with a large decrease in private saving rates that spurred by the financial liberalization that took place in the early and mid-1990s and due increasing dependency ratios. This was mainly related to the creation of European monetary union with the introduction of the euro, contributed to the declines in current accounts by allowing countries to maintain their investment levels above what could be financed from domestic saving.

Further, finding shows that the 2008 current account deficits of most SEA countries exceed norms with substantial variation across countries and the large current account deficits threaten the economy even in a currency union and matter. Finally, the researcher recommended policy options which were expected to improve current account balance including fiscal improvement to increase government saving, an internal devaluation through lowering unit labor costs, structural policies to increase productivity and growth, and tightening financial policies to curb credit growth and improve loan.

Using hazard models MU and YE (2013), investigate the role of exchange rate regimes in the timing of current account adjustment in developing countries. It was based on the Friedman hypothesis that whether exchange rate rigidity hinders current account adjustment. Result revealed that fixed exchange rate regimes are significantly associated with the longer duration of high current account deficit. Fixed exchange rate regimes tend to delay the current account adjustment and result was robust to a variety of model specifications and alternative exchange rate regime classifications. Therefore, the results strongly support the Friedman's hypothesis that exchange rate rigidity hinders current account adjustment.

### **2.2.2 Country Specific Studies**

Kwalingana and Nkuna (2009) examined current account balance based on the saving-investment gap theory; the paper uses co-integration analysis and error correction model to identify and examine the long run and short-run determinants of Malawi's current account deficit using annual data from 1980 to 2006. Result suggested that there was a long-run relationship between current account deficit and terms of trade, external debt stock and the real exchange rate and was positive, which implies that the accumulation of debt has led to the worsening of the current account over time and, real exchange rate appreciations also have an adverse effect on

current account balance. In contrast, openness and current account liberalization dummy variable were negatively related with current account deficits, meaning that current account liberalization policies reduce the current account deficit.

Based on the recent econometric techniques Sadiku *et.al* (2015), investigate the empirical linkage between current account deficits and macroeconomic variables and, potential determinants of current account positions in FYROM for both the short run and long run dynamics covering the period 1998q1-2013q4 using ARDL approach. Empirical finding indicated that there was strong co-integration relationship between current account and fiscal balance, financial development, terms of trade and trade openness. The financial development (monetary aggregate M2), fiscal balance and terms of trade are positively correlated with the current account balance, while openness to international trade is negatively correlated with the current account balance. Meaning that growth of M2 has effect on improving the current account balance while increased fiscal deficit causes an increase in the current account deficit which is called twin deficit hypothesis. Positive relationship of the current account and trade conditions, suggest that the improvement in the terms of trade leads to a reduction of the current account deficit, opening to international trade deteriorates current account deficit and this is expected because of higher degree of openness can lead a country to pursue ongoing deficits. In addition, inclusion of lagged current account as endogenous variable in the model indicates the current account deficits persistence which is present developments of current account balance is strongly determined by past developments.

Sustainability of the current account is another issues and very complex and most literature does not give a clear answer to the question what is the level of the current account deficit that sustainable. Several different approaches have been developed for analyzing external

sustainability of one country. Unevskaja and Jovanovich (2011) applied the structural model which viewed the current account as the outcome of variations in macroeconomic structural determinants that influence the saving-investment balance, in order to estimate the sustainable level of the Macedonian current account in the period 1998-2009. Empirical results show that Macedonian current account is determined by the budget balance, GDP growth rate, foreign direct investment and new credits (financial intermediation). The sustainable level of the current account deficit is in the range of 5.3%-9.1% of GDP and fluctuating around this indicates that external equilibrium was not jeopardized.

UZ (2010), investigate the long-run and short-run empirical relationship between current account balances and a broad set of macroeconomic in Turkey using the simple Mundell-Fleming approach. The bounds testing autoregressive distributed lag (ARDL) approach to co-integration was used. Exchange rates, private savings and public savings for exogenous variables while current account used as an endogenous variable and the results indicate that there was strong support for co-integration relationship between current account balance and the selected variables. There were a positive relationship between the current account and private saving decisions both in the long run and short run, but only significant in the long-run and also government saving and current account is positive that shown existence of the twin deficit phenomenon. The positive relationship between exchange rate and current account refers to appreciation of the currency causes improvement in the current account balance. The possible explanation for the positive relationship between current account and private saving in the short run is that increase in savings reduces consumption both on domestic and foreign products which reduce imports and leads to improve current account.

Jawaid. T and Raza. A (2012), investigates the determinants of current account deficit in Pakistan by using the annual time series data for the period 1976 to 2010. The co-integration results suggested that, positive and significant long run relationship of current account deficit with exchange rate, trade deficit and fiscal deficit, while significant negative relationship was found with external debt and private saving. The error correction model also confirms the significant positive relationship of current account deficit with exchange rate, trade deficit and fiscal deficit in short run. The Granger causality test shows the bidirectional causality run from exchange rate and external debt to current account deficit and, unidirectional causality is found from current account deficit to external debt and fiscal deficit.

Insel and Kayikci (2013), examine the theoretical and empirical linkage between current account deficits and a broad set of macroeconomic variables in Turkey using Auto Regressive Distributed Lag (ARDL) model for period from 1987 to 2009. Results indicated that the impacts of growth, inflation, and investment are higher than the other variables. The effects of savings, openness, oil prices, and real exchange rate are not significant and are so small in magnitude. Inflation affects the current account balance positively, whereas growth, openness, oil prices, and appreciation of the real exchange rate cause the current account balance to deteriorate.

Mwangi(2014), investigate the determinants of the current account balance in Kenya that covered the period from 1970 to 2010 and, Vector error correction model (VECM) was employed. Results confirmed that the impact of the GDP growth rate, investment, exchange rate, budget deficit and current account balance are positive on the current account balance whereas the impact of inflation, balance of trade are negative and also there was a persistency in the current account.

Using the Johansen Co-integration analysis and Error Correction Model (ECM) on quarterly data over the period 1995Q1 – 2006Q4 period, Bitzis *et.al* (2008), investigate the factors that contributed to the widening of the Greek current account deficit after the EMU accession. Result shown that deterioration of competitiveness that expressed through real effective exchange rate and the real interest rate have had the greatest impact on current, the cyclical position of the Greek economy and to lesser extent the fiscal expansion, the ongoing process of real convergence, which has been primarily facilitated by strong credit growth reflecting the impact of financial liberalization and lower interest rates and the increases in the terms of trade have had a greater impact on consumer spending rather than on investment that affect current account negatively were the main factors for higher current account deficit from a point of a long-run perspective and exogenous factor including developments in oil and freight prices had significant role on the short-run dynamics of the current account imbalance.

By including worker remittance Gulzar *et.al* (2007), investigated factor influence the current account balance in Pakistan using Vector Autoregressive and Error correction model for period 1972 to 2005. Result indicated that there exist long run relationship between current account balance and balance of trade, domestic saving, total consumption and worker remittance and was significant. An increase in domestic saving, balance of trade and worker remittance improve current account balance while increase in consumption affect negatively.

Fotourehchi *et.al* (2013), evaluated current account imbalances and conducted an empirical analysis on the possibility of common factors account for current account patterns of Iran and Turkey by adding management of foreign currency reserves by monetary authority and applying the Seemingly Unrelated Regression [SUR] Method, for period 1980-2011. The study found that factors that affect the current account of countries were not similar. An increase in the domestic

credit/GDP, PPP per capita and dependency ratio (young) tend to decrease current account balance of Iran while increase in foreign currency reserves , net oil export and net foreign asset tend to increase current account surplus. The positive relation between CAB and foreign reserve was due to the fact that intervention by monetary authorities or government in foreign exchange markets prevents appreciation of domestic currency and effect on current account position positively. On the other hand, Turkey' current account tend to decrease by any increase in GDP growth and net lending/borrowing of budget (twin deficit).

Using inter-temporal approach that highlights the role of fundamental determinants of saving and investment, Kariuki(2009),examined the determinants of current account balance in Kenya using Engle Granger two step residual based method in order to carried out Error correction mechanism and co-integration analysis for both long and short term relationships for the period 1970 to 2006.Results indicated that variables like terms of trade, real exchange rate, economic growth and fiscal balance influenced current account balance positively while money supply, dependency ratio and foreign direct investment affect current account balance negatively. Enhancing export competitiveness in order to improve terms of trade, discouraging expansionary monetary policies, domestic savings mobilized through diversification of financial markets were among the recommendation by researcher in order to improve current account balance.

From the empirical literature, we can observe that variables such as GDP growth, terms of trade, Fiscal balance, Real effective exchange rate, trade openness, financial deepening are commonly used by most researcher. Evidence is still inconclusive as to the specific determinants of the current account balances, as can be seen from the conflicting results on the different variables. For instance, in some study appreciation of real effective exchange rate result in deteriorate of current account balance; see paper by Jawaid.T and Raza.A (2012), Kwalingana and Nkuna

(2009), Cevis and Camurdan (2015) . On the other hand some result shows appreciation of currency improves current account balance; See paper by Oshota and Badejo (2015), UZ (2010) and, similarly there are conflicting results on the other variables. Taking this into consideration this paper tries to identify the major determinants of current account balance with particular attention to Ethiopia economy.

### **2.2.3 Studies in the Case of Ethiopia**

Using bound testing approach to co-integration and error correction model, Alekaw (2012), examined the short-run and long-run determinants of trade balance in Ethiopia for the period of 1970/71 to 2010/11. In his study, variables such as income, money supply, real exchange rate, budget balance and foreign income in Ethiopia are identified as explanatory variables. His results show that there exist long-run relationships between trade balance and its determinants. Among the variables real income, real money supply and budget balance are appeared to affect trade balance and, statistically significant factors whereas the other variables, real exchange rate and foreign real income are found to be insignificant. According to the result, there is a negative relationship between trade balance and, money supply and real income. The impact of budget balance is positive which support twin deficit hypothesis. Finally, he recommended that deficits in trade balance corrected through fiscal and monetary policies rather than exchange rate policy.

Gebregzabier (2003), tried to analyze the relationship between fundamental macroeconomic variables and the current account balance of Ethiopia in a comprehensive way that covered the three different regimes for the period from 1961/62 to 1999/00 using the vector auto-regressive (VAR) and the short run dynamic error correction models to explore the long run and short run effects of the variables and Johannes's maximum likelihood method to test for co-integration between the variables. Fiscal policy, the stage of development, demographics, financial

deepening, and terms of trade, openness and capital control were identified as the major determinants of the Ethiopian current account balance. He finally recommended further research to be done by including some important macroeconomic variables which have potential impact on current account balance. Taking those suggestions this paper tries to assess the impact of macroeconomic variables on current account balance by including variables like GDP growth in Ethiopia and real effective exchange rate and foreign direct investment which have been recommended by both theoretical and empirical evidences and also this paper uses the recent econometric technique which is Autoregressive distributive lag approach which has a superior advantage over the other model VAR (See chapter four). In addition, recent empirical studies have tended to use the saving-investment approach in examining the determinants of current account balance. See paper by; M. Kariuki (2009), Kwalingana and Nkuna (2009). There is no study that has used the Inter-temporal approach to specifically examine the determinants of Ethiopia's current account balance. This study is supposed to fill the gap.

### **Summary**

The existence of such vast empirical literature on the subject of current account balance indicates that, examining its behavior is a vital one to know the external and internal macroeconomic situation of a given economy. The development of the literature also reveals that the earlier frame works (elasticity and Absorption approach) are replaced by contemporaneous framework (inter-temporal approach). This is because of the ability of the model in capturing the inter-temporal decision of economic agents that makes inter-temporal approach more preferable for empirical works.

## **CHAPTER THREE: OVERVIEW OF THE ETHIOPIAN ECONOMY**

### **3.1. General Overview**

Ethiopia is the second-most populous country in Sub-Saharan Africa with a population of about 93 million in 2015. The country is one of the poorest nations in the world even though this trend has become improved. According to WB(2016), the country moved from being the 2nd poorest in the world in 2000 to the 11th poorest in 2014 and poverty declined substantially from 55.3 percent in 2000 to 33.5 percent in 2011, this achievement is mainly due to the result of past decade strong economic growth.

The report further states that Ethiopia's economic growth has been remarkably rapid and stable over the past decade and real GDP growth averaged 10.9 percent in 2004–2014 and pace of growth is the fastest that the country has ever experienced and it also exceeds what was achieved by low-income and Sub-Saharan African countries during that period but income per capita is still low at US\$590 for 2014, only slightly over one-third of the SSA average.

However, this macroeconomic turnout has been adversely affected by a severe drought and the weak global environment. According to IMF (2016), output growth is estimated to have slowed down in 2015/16 to 6.5 percent. Macroeconomic policies, to stabilize short term problem including drought-related food imports, curbed inflationary pressures, with overall inflation move back to single digit in July 2016. The external economic performance of the country remains poor and current account deficit, estimated at 10.7 percent of GDP, become wide and, the main risks stem from external imbalances is the risk of external debt distress, currently assessed as moderate, and is vulnerable to a worse-than-expected export performance.

Revenue from export stagnated due to weak international commodity prices, despite increases in export volumes and diversification to new export markets.

Although oil price in the international market had decrease, savings on fuel imports were more than offset by increased drought-related food imports and other imports. Both cash and capital inflow to country like remittances and FDI posted strong growth, helping to limit the deterioration of the external position. However, the foreign reserve was less than 2 months of import coverage. The 2015/16 foreign borrowing requirement of the non-financial public sector is estimated at 5 percent of GDP, a significant reduction compared to the recent past. Public and publicly-guaranteed debt is estimated to have been 54.2 percent of GDP in June 2016, of which 30.2 percent of GDP corresponds to external debt.

Despite this economic performance, some are arguing that economic freedom of the country is uneven and business and investment regimes are opaque. Country under perform in many key areas that are critical to long-term economic development. Pervasive corruption, poor quality, inefficiency of government services, increasing the cost of conducting business and the underdeveloped labor market hinders employment growth, trapping much of the labor force in the informal economy are made worse ([Heritage.org/Index](http://Heritage.org/Index)).

When talking about the performance of the Ethiopian economy, in one way or another, it is talking about the performance share of each sector. This is because the overall performance of the economy is determined by what happens in the individual sector. If we look the share of agricultural sector to GDP, it has been declining steadily in the past decade. According to NBE (2014), agriculture in Ethiopian economy during the F.Y 2013/14 was 39.9 percent that decreased by 1.9 percentage compare to the preceding year. The share of industry in total domestic output was 14.2 percent that point up by 1.3 percentages.

On the other hand, the service sector became the dominant sector in Ethiopia since 2010/11 after it overtook the agricultural sector and the share of service sector in GDP was about 45.9 percent.

## **3.2. Ethiopia External Economy Performance**

### **3.2.1. Merchandise Trade**

The trade balance of Ethiopia is characterized by high deficit and this trade deficit is widened from year to year. According to NBE 2015 annual report, deficit in merchandise trade for 2014/15 was USD 13.4 billion that increased by 29.1 percent relative to preceding fiscal year which was USD10.5billion trade deficit. During 2014/2013 fiscal year trade deficits has also shown 24.8% widened compare to preceding year. The reason behind annual increment in deficit is mainly due to significant growth in total import bills coupled with low performance in the growth of total export proceeds. For instance, for 2013/2014 F.Y the total import has been increased by 19.7 percent relative to preceding year while export has only increased by 5.6 percent which registered low performance compare to imports.

If we look export and import to GDP ratio, during 2014/2015 F.Y, export to GDP ratio went down by4.6percent and import to GDP ratios went up by 26.5 percent points. It is similar if we see the previous year trend, for 2013/2014F.Y, export to GDP ratio was down and import to GDP ratio up by 8.4 and 3.4 percentage points respectively. Given this statistics, achieving of narrowing trade deficit in near future seems to be difficult. As explained by ( Tewodros,2012 ), in order to have a surplus after 10 years, import continues its 20 percent growth, exports would have to grow by more than 40 percent per annum for coming the next ten years and, this necessitate the usual export promotion trade strategy to be revisited.

The annual report of NBE 2015 reveals that the total amount from export including electricity was USD 3 billion which decrease by 8.5 percent relative to the previous fiscal year. In contrast 2014/2013 F.Y total amount from export was USD 3.3billion that shown a 5.6 percent growth relative to preceding year. Decrease in both international commodity price and volume in export had contributes for this poor performance. In terms of earning, Export from oilseeds reached

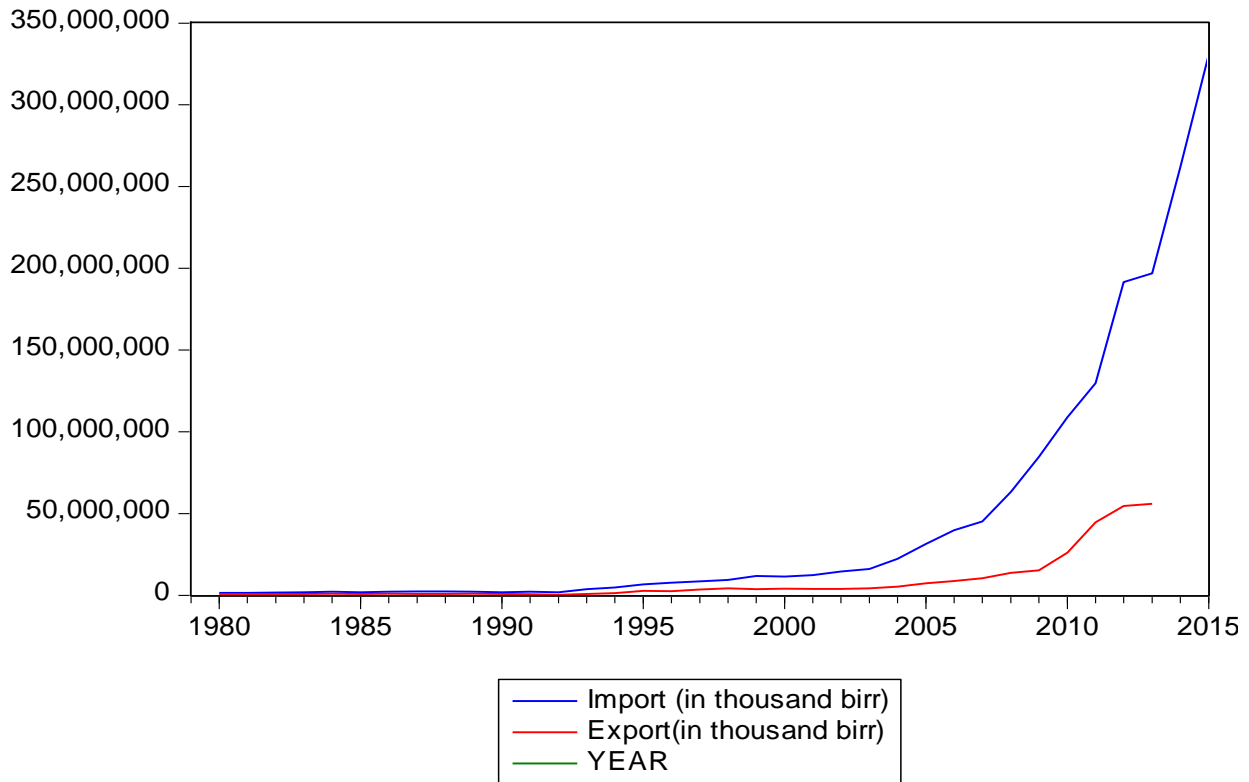
USD 510.1 million which was down compare to previous year earning that was USD 651.9 million depicting a 21.8 percent fall. From total merchandise export oilseeds accounted a 16.9 percent compared with 19.8 percent last year. Contrary to oilseed, export of coffee increased by 9.2 percent and reached USD 780.5 million due to a 12.7 percent rise in international price despite 3.1 percent fall in export volume. Thus, the share of coffee in total export earnings accounted for 25.8 percent which was higher than 21.6 percent share last year.

To summarize, the share of each export commodities from total export for 2014/2015 were coffee (25.8%), oilseeds (16.9%), gold (10.6%), chat (9%), pulses (7%), flower (6.7%), leather and leather product (4.4%) and other (19.3%). While for 2013/14 F.Y share of exported commodities were, coffee (21.9%), oilseeds (20%), gold (14%), chat (9.1%), pulses (7.7%), flower (6.1%), leather and leather product (4%) and other (17%). From above only coffee, flower and other commodities shows an improvement while the rest fall in the total share of export.

When we come to the total merchandise of imports it shows annual increment. Annual report of 2014/15 NBE, reveals that total merchandise imports in 2014/15 increased by 20 percent over last year and reached USD 16.5 billion. Similarly, 2013/2014 total import also showed a 19.7% increment which was USD 13.7 billion. This is mainly as a result of rise in imports of capital goods, consumer goods, semi-finished goods and raw materials. Import of capital goods amounted to USD 6.9 billion mainly due to increased import of industrial and transport capital goods and the share in total import bills increased to 41.8 percent from 35.3 percent. Import of consumer goods rose by 22.1 percent due to higher imports of non durable and durable goods by 15.3 and 36.7 percent, respectively. Thus, the share of consumer goods in total import bills went up to 27.4 percent from 26.9 percent the preceding year. In contrast, Fuel import has declined by

20.7 percent in 2014/15 and amounted to USD 2 billion that was USD 2.5 billion in 2013/14 and this mainly due to the international price of crude oil dropped by 32.7 percent.

Figure 3.1 Trends of import and export of Ethiopia for the period 1980 to 2015



Source: Ethiopia Revenue and customs Authority 1980-2015 G.C

### 3.2.2 Direction of trade

Europe and Asian countries are major importers of Ethiopian commodities. The 2014/15 annual report of NBE tells that 38.4 percent of total export of Ethiopia went to Asia that took the share from Europe. In 2013/14 the total share Europe imports from Ethiopia was 37.7% while Asian share was 34.5 percent. Within the Asian countries, the shares of China, Saudi Arabia, United Arab Emirates, Japan and Israel were 12.1 percent, 6.6 percent, 3.2 percent and 3.1 percent, respectively. The major exports items shipped to China include oilseed, leather & leather products, natural gums, textile materials, coffee and mineral products. Ethiopia's Coffee, meat &

meat products, live animals, flower, oilseeds and cereals were sent to Saudi Arabia. Similarly, Coffee, oilseeds, flower and bees wax were sent to Japan while items include oilseeds, coffee, cereals, chat and spices were mainly imported by Israel.

Europe account for 33.6 percent of Ethiopia's total merchandise export went down compare to 2013/14 F.Y total share which was 37.7 percent. Within European countries Switzerland was the largest market accounting for 10.6 percent of the total export which less compare to previous year share that was 14.1 percent and largely for gold and coffee. Germany was the second major export destination market that took the share from Netherlands constituted 6.9 percent of Ethiopia's exports primarily for coffee, textile & garment and flower and, Netherlands followed having 5.9 percent of Ethiopia's exports mainly flower, coffee, vegetables and oilseeds. About 20.2 percent of Ethiopia's total export proceeds were to African countries of which Somalia, Djibouti, Sudan and Egypt accounted for 82.7 percent of the total export proceeds to the continent. Export earnings from the America comprised 7 percent.

Regarding imports of commodities by continents of origin, Asia had been leading about 70.3 percent of commodities export to Ethiopia while the rest 19.5 percent from Europe, 5.4 percent from America and 4.7 percent from Africa in 2014/15F.Y and this is close to share of precedes year. Major Country import origin with the largest share was China (38.3 percent), India (6.7 percent), Saudi Arabia (5.1 percent) and Kuwait (4.5) percent. Import from china included electric materials, metal & metal manufacturing, machinery & air craft materials, road & motor vehicles, clothing, textiles and rubber product. About 40.4 percent of Ethiopia's Petroleum products came from Saudi Arabia and share was decline from 50.8percent in 2013/14.

Europe in total imports to Ethiopia was 19.5 percent, of which Italy (3.1 percent), Turkey (2.5 percent), Germany (2.1 percent), the Netherlands (1.6 percent) and United Kingdom

(1.3percent).Items include Machinery & aircraft materials, road & motor vehicles, fertilizer, electrical materials and metals & metal manufacturing were imported from Italy. America took 5.4 percent of Ethiopia's import bill of which USA, Brazil and Canada alone constitute over 95.9 percent of the total imports. Machinery & aircraft materials, food and electrical materials were the major imports items from USA and machinery & aircraft materials and road & motor vehicles from Brazil. Imports originated from Africa accounted 4.7 percent and Within African countries, the major imports were from Morocco (30.2 percent) and items like petroleum products, electrical materials and road & motor vehicles while petroleum products, metal & metal manufacturing & paper manufacturing were imported from Egypt.

In general, widened of trade deficit coupled with decline in public transfer and net service outflow contribute current account deficit widened from year to year. In 2014/15 F.Y, it was USD 8 billion from USD 4.7 billion and USD 2.7 billion deficit in two precedes year respectively.Net services account recorded USD 341.4 million outflows which was high compared to USD 559.5 million surpluses in the preceding year. This is mainly due to decline grants from international institution and donors. When we see capital account it showed a USD 7 billion surplus and was higher compare to previous year that was USD 3.9 billion. By the end of 2014/15F.Y gross international reserve of national bank of Ethiopia was adequate to cover 2.5 months of imports, showed slight improvement compare to previous year that was 2.3 months of import.

The overall country's debt position had shown an increment and External debt stock of the country at the end of 2014/15 amounted to USD 18.2 billion, depicting a 29.9 percent increase over the preceding year that was USD 13.9 billion. Of this, higher debt owed to commercial (9.2 billion), multilateral (USD 6.2 billion) and bilateral creditors (USD 2.7 billion) and the country's

external debt stock to GDP ratio rose to 29.1 percent from 25.5 percent. The overall balance of payments exhibited a USD 521.4 million deficits compared with USD 96.9 million deficits last year.

### 3.2.3 Trend in Current Account Balance of Ethiopia

For the last four decades Ethiopian current account balance is characterized by current account deficits. The largest component that accounts for the entire deficit is the merchandise trade. In contrast to merchandise trade, it has trade surplus from service trade for that period. The following table summarizes the trends of current account balance of Ethiopia for selected years from 1980 to 2015.

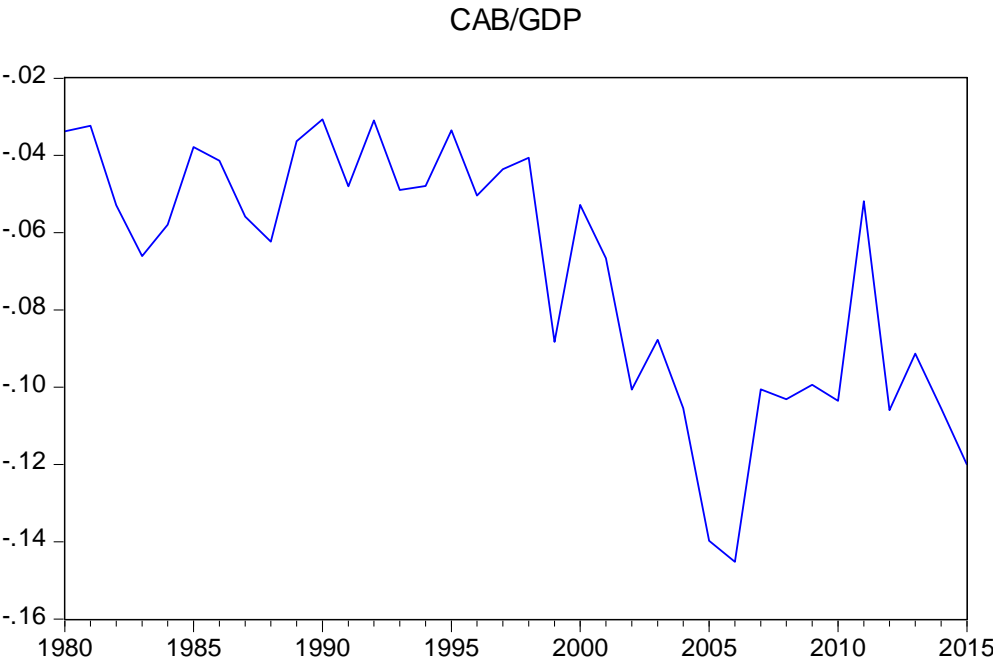
Table 3.1 Composition of the current account (in Millions of Birr)

Items	1980	1985	1990	1995	2000	2005	2010	2015
Merchandise								
Export	950.4	744.6	736.8	2732	3742.6	7076.3	26115.3	60674.7
Import	1468.2	1770.4	1824.1	6546.3	11438.7	31434.5	108956.3	330745.2
Balance	-517.8	-1025.9	-1,087.3	-3814.2	-7696.1	-24358.3	-82841	-270070.5
Net Services	55.1	103.1	89.2	333	399.9	2095	5886	-6861.3
Net transfer	41.3	300	354.6	1944.9	3341.6	8848.9	34930.5	98099.1
Current Account Balance	-421.4	-622.8	-643.5	-1536.3	-3954.6	-13414.3	-42024.5	-178832.7

Source: National Bank of Ethiopia (NBE), 2016

To give more meaning for the trend of current account balance of Ethiopia the following figure depict the magnitude of current account balance relative to the total size of the economy. The figure shows that there has been large increase in the size of current account balance as a percentage of GDP. For all period from 1980 to 2015 is negative that implies the country didn't enjoy any surplus in those period. However, according to Eshetu and Makonnen (undated), on the eve revolution (1973/74) the country had achieved a positive trade balance of Birr 76 million. But since then, the balance has been negative and also widening from year to year reaching Birr 1.5 billion deficits in 1987/88.

Figure 3.2 current account balances as percentage of GDP (1980-2015)



Source: own computation on data from NBE, 2016.

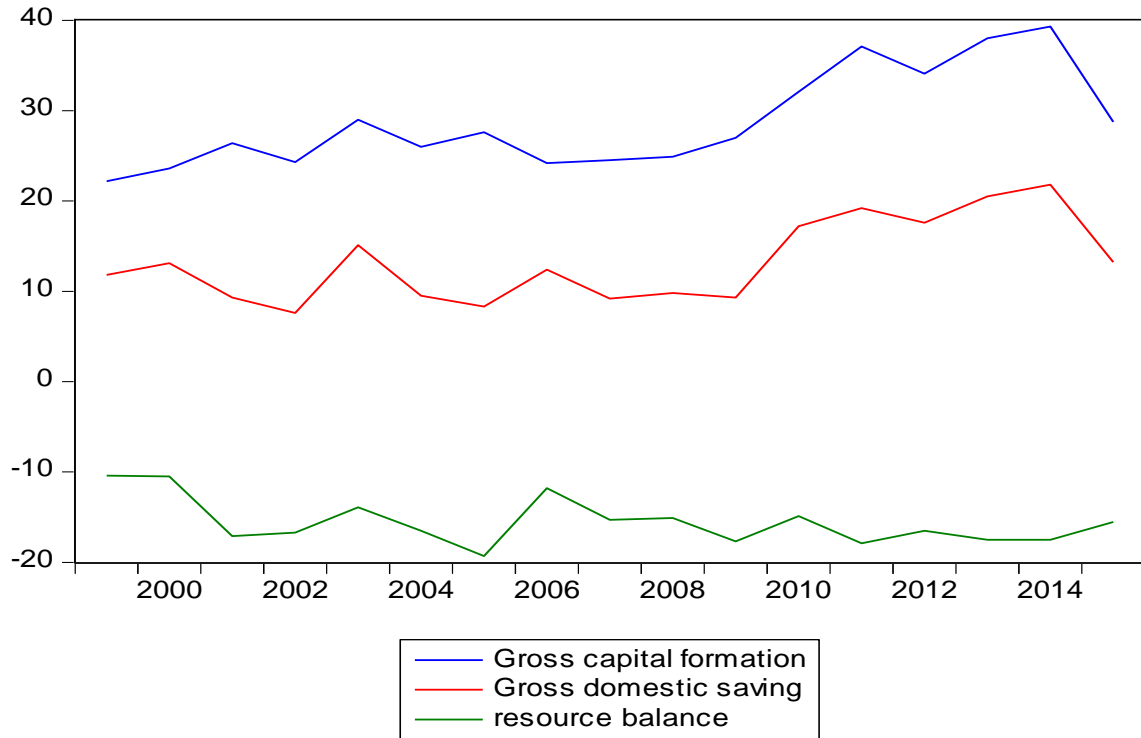
Different explanation forwarded for the persistence deficit of Ethiopian current account balance. As its major current account deficit comes from merchandise trade, it indicated that most Ethiopian export product for the rest of the world are primary products that characterized by fluctuation of price in international goods market.

#### **3.2.4. Trend in Savings and Investment of Ethiopia**

Country's current account balance can be expressed through the difference in its income and expenditures. Country that runs current account deficit spend more than what it is producing whereas the reverse is true for surplus countries. We can also express current account balance in terms of saving and investment. A country that saves more than it invests runs surplus whereas the reverse is true for a deficit country. We can view the current account balance as the difference between saving and investment. Since saving is the difference between income and consumption, and expenditure consists of consumption and investment (Park and Shin, 2009). Saving is what is left after consumption governs the growth path of a country.

The more the peoples of the nation saves the more resources are available for investment. According to NBE 2014/15 annual report, the gap between Gross Domestic Savings and the investment rate widened from year to year. For instance in 2012/13 the gross domestic saving was 17.6 while gross capital formation was 34.1 and there was 16.5 percent resources gap which was filled either by domestic or foreign borrowing. Similarly there was 17.5 resources gap during 2014/2015. This resource gap has negative impact on current account balance. During the *Derg* era, Ethiopia's saving rate was declined steadily and reached averaging about 4 per cent despite private consumption decline. This is mainly due to drastic increases in military spending (Eshetu and Makonnen, undated).

Figure 3.3 Trend in saving and investment in Ethiopia from 1999/00 to 2014/15



Source: NBE 2014/15 annual report

The graph shows the trend and gap between gross domestic saving and gross capital formation. The average domestic saving in this period was around 13.23 while the gross capital formation was 28.76 and the average resource gap was 15.35 that has been filled either domestic or foreign borrowing.

To summarize, weak performance of Ethiopia’s external trade with low level of domestic saving make the country vulnerable to external world. Underperformance in this area leads the country to high level of debt accumulation, low level of foreign reserve and increasing of debt risks. Therefore, this study tries to deal with the above issues and deduce some policy implication.

## **CHAPTER FOUR: DATA AND METHODOLOGY**

This chapter looks at the methods that are adopted to achieve the objective of this study. The chapter basically focuses on how the entire study was done. Issues such as model specification, data sources, estimations procedures and definitions of variables are covered by this chapter.

### **4.1. Data Source**

The data for this study is secondary data which is obtained from world development indicators (WDI) for terms of trade, US Bureau of Economic Analysis for Real GDP of United State; National Bank of Ethiopia (NBE) for current account, Real effective exchange rate and broad money; Central Statistics Authority (CSA) for dependency ratio; Ministry of Finance and Economic cooperation (MoFEC) for Ethiopia Real GDP, budget balance and Real GDP growth; Ethiopian revenue and custom authority (ERCA) for import, export, United Nations Conference on Trade and Development (UNCTAD) for foreign direct investment.

### **4.2. Method of Data Analysis**

An econometric method of data analysis is used. The econometric part is analyzed using E-view version 9 statistical software packages.

### **4.2. Theoretical Framework**

Many Economic theories establish theoretical framework for analyzing the determinants of current account and as it was discussed in chapter two, current account can be defined in different ways. It can be defined as net exports of goods and services plus net transfers or it can be as income minus absorption. However, the most contemporaneous analysis of determinants of current account is inter-temporal approach.

This study builds the model based on inter-temporal approach to current account which considers current account as an inter-temporal phenomenon given that; it is the difference between domestic saving and investment (Obstfeld and Rogoff, 1996: 16, Urbie and Schmitt-Grohe, 2014: pa 45).

In order to shows this;

Let us begin by recalling trade balance definition from chapter two which is the difference between export and import of goods and services. This can be expressed as:

Letting  $X_t$  denote exports in period  $t$  and  $IM_t$  denote imports in period  $t$ , we then have that

$$TB_t = X_t - IM_t \dots\dots\dots 1$$

From national income account identity, we have that

$$Q_t + IM_t = C_t + I_t + G_t + X_t \dots\dots\dots 2$$

Where  $Q_t$  denotes the amount of final goods and services produced domestically in period  $t$  that typically referred to as gross domestic product, or GDP,  $C_t$  denote the amount of goods and services consumed domestically by the private sector in period  $t$ ,  $G_t$  denote government consumption in period  $t$ , and  $I_t$  denotes the amount of goods and services used for domestic investment (in plants, infrastructure, etc.) in period  $t$ .

This identity states that the aggregate supply of goods, given by the sum of GDP and imports, can be used in four ways: private consumption, investment, public consumption, or exports.

Using the fact that equation (1) the  $TB_t = X_t - IM_t$  rearranging,

we obtain,

$$TB_t = Q_t - C_t - I_t - G_t \dots\dots\dots 3$$

Again, the current account is equal to the sum of the trade balance and net investment income ignoring net international compensation to employees and net unilateral transfers. Then

$$CA_t = TB_t + rB_{t-1} \dots\dots\dots 4$$

Where  $TB_t$  denotes the trade balance in period  $t$ , and  $r$  denotes the interest rate

Plugging equation 3 into 4 that yields

$$CA_t = rB_{t-1} + Q_t - C_t - I_t - G_t \dots\dots\dots 5$$

The sum of GDP and net investment income ( $rB_{t-1}$ ), is called national income, or gross national product (GNP). We will denote national income in period  $t$  by  $Y_t$ , that is,

$$Y_t = Q_t + rB_{t-1}.$$

Combining the last two expressions results

$$CA_t = Y_t - C_t - I_t - G_t \dots\dots\dots 6$$

National savings, which we will denote by  $S_t$ , is defined as the difference between national income and the sum of private and government consumption, that is,

$$S_t = Y_t - C_t - G_t.$$

We finally obtain from equation (6) that the current account is equal to savings minus investment,

$$CA_t = S_t - I_t \dots\dots\dots 7$$

The final relation reveals that a deficit in the current account occurs when a country's investment exceeds its savings. Conversely, a current account surplus results when a country's investment falls short of its savings. This theoretical framework closely follows: Kariuki (2009), Yang (2011), Kwalingana and Nkuna (2009), Debelle and Faruquee, 1996; Chinn and Prasad, 2000; Calderon et al, 2002 that focused on macroeconomic variables that affect the two variables (i.e., saving and investment) will determine also the position of current account balance.

### 4.3. Model Specification

Based on this theoretical framework, the general function of current account balance as a function of its determinant set as follows:

$$CAB = f(REER, TOT, OPPEN, M2, FDI, FB, DR, RI, RGDP_{gr}, \dots) \dots \dots \dots 8$$

Where:

**CAB:** current account balance as percentage of nominal GDP, **REER:** real effective exchange rate, **TOT:** terms of trade (Price of export/ Price of import), **RGDP<sub>gr</sub>:** RGDP growth rate **OPPEN:** openness of economy ((Export+ Import)/GDP)\*100), **M2:** financial deepening as percentage GDP (broad money (M2)/GDP), **FB:** government budget balance as percentage of nominal GDP, **DR:** dependency ratio (number of dependent population/labor force \* 100),

**FDI:** foreign direct investment as percentage of GDP, **RI:** Relative income (the ratio of Ethiopian RGDP indexes to USA)

#### 4.3.1. Definition of Variables

**Current Account Balance (CAB)** Current account measures the difference between Ethiopia's total exports and imports of goods and services, plus net services, and private transfer. Current account deficit is represented by a negative value while a positive value represents current account surplus and measured at current prices, but normalized by expressing it as a ratio of nominal GDP (M. Kariuki, 2009).

**Real Effective Exchange Rate (REER)** is measured by adjusting the nominal exchange rate by relative prices (that is, foreign prices relative to domestic prices). This means even if nominal exchange rates do not change, an increase in domestic price relative to prices of abroad will appreciate the domestic in real terms and vice versa. Depreciation of the real exchange rate makes domestic exports cheaper which stimulate exports demand. Thus, increase income and

savings. On the other hand, imports become more expensive leading to decreasing demand. As a result, depreciation improves CAB. However, possibility of perverse effects of depreciation and the J-curve phenomenon cannot be ruled out, whereby depreciation worsens CAB in the short-run, but improves after some period. Therefore, the overall link between the real exchange rate and saving ratio can only be determined empirically ( Brissimis et.al, 2010, Yang, 2011, Oshota and Badejo, 2015).

**Government Budget Balance (FB)** defined as total government revenue (including grants) minus total government expenditure (T-G) and expressed as a ratio of GDP. A larger fiscal deficit reduces national savings and thereby lowers the current account balance. A positive relationship between current account and fiscal balance, which confirms the twin-deficit hypothesis, is expected in the absence of the Ricardian Equivalence (Medina et.al, 2010).

**Terms of trade (TOT)** is defined as price of exports index over the price of imports index. An increase in export price index or a decrease in import price index leads to improved terms of trade which is expected to increase exports earnings in effect national income and saving that result in improved CAB (Nkuna, 2013, Kariuki, 2009).

**Openness of the economy (OPPEN)** is measured as the sum of exports and imports to GDP ratio. A more open or liberalized economy or an economy with less trade restrictions and more exposure to international trade tends to be relatively more attractive to foreign capital is expected to increase its exports as a result of larger market availability, thus improving the CAB. In cases of developing countries like Ethiopia which largely rely on imports of capital and intermediate inputs, the more an economy is open, the more it attracts capital and other imports. On the other hand, an economy with more trade restrictions is likely to send an adverse signal to foreign investors and unfavorable global trading systems adversely affect exports from developing

countries, hence reducing income and saving resulting to worsening CAB. Consequently, trade openness is likely to be associated negatively with the current account balance (Yang, 2011, Nkuna, 2013).

**Relative income (RI)** is measured as the ratio of domestic real output to U.S. real output. This variable captures the stage of development effects (Yang, 2011).

The stages of development hypothesis for the balance of payments suggests that countries, as they move from a low to an intermediate stage of development, typically import capital and, therefore, run current account deficits. As they reach an advanced stage of development, countries run current account surpluses in order to pay off accumulated external liabilities and also to export capital to less advanced economies (Chinn and Ito, 2007).

**Financial deepening (M2)** Money and quasi money comprise the sum of currency outside banks, demand deposits other than those of the central government, and the time savings, and foreign currency deposits of resident sectors other than the central government. This definition of money supply is frequently called M2 and normalized by expressing it as a ratio of nominal GDP. If the financial markets are well developed high financial deepening leads to higher savings. On the other hand, increased money supply lowers interest rate which increases investment. Thus, the effect of money supply on current account balance can be either positive or negative (Oshota and Badejo, 2015, Kariuki, 2009).

**Dependency Ratio (DR):** is expressed as a percentage and defined as the ratio of economically dependent part of the population to the productive population that comprises aged less than 14years and people aged 65 years and above. The productive population makes up the gap in between 15-64 years the young ratio, both over the economically active population. A higher share of elderly tends to reduce national savings and thus decrease the current account balance as

they are in the consumption stage of their life cycle. A larger share of young population should enhance future productivity growth and facilitate future repayment of current account deficits incurred in the present. Hence, we expect that both young and old dependency ratios to have a negative impact on the current account balance (Medina et.al, 2010, Kariuki, 2009).

**RGDP growth rate ( $RGDP_{gr}$ )** is considered for the national income growth rate. Fast-growing economies have a higher income potential, which would allow them to have a lower level of savings today. Hence, GDP per capita growth should have a negative effect on the current account balance. On the other hand, income growth, affects both saving and investment, hence the CAB outcome is ambiguous (Medina et.al, 2010, Kariuki, 2009).

**Foreign direct investment (FDI)** is one of the mechanisms through which current account deficit is financed and measured at current prices, but normalized by dividing by nominal GDP. Current account deficits financed by FDI should be less prone to sudden stops and therefore more sustainable than those financed by other type of inflows. Hence, higher FDI should be associated with weaker current account balances. Since it enhances investment, a negative relationship with CAB is expected (i.e. a negative coefficient) (Medina et.al, 2010).

## **4.4. Methodology**

### **4.4.1. Unit Root Test**

When dealing with time series data, it is necessary to assess whether the series is stationary or not. This is because the presence of unit roots has implications for model building, estimation strategy, and statistical inference. Regression of a non-stationary series on another non-stationary series leads to what is known as spurious regression. This occurs when the regression results reveal a high and significant relationship among variables when there exists no meaningful relationship between the dependent variable and the explanatory variables.

Time series data are noted of carrying past memories. This implies past events do influence current and future events (Hossain, 1995). Most macroeconomic time series data are trended and in most cases are non stationary. If the data series contains a unit root then the exogenous disturbances have permanent effects on the variable in question in the sense that the effects of the shocks do not disappear over time. That is, shocks to such a variable have permanent effects.

On the other hand, if there is no unit root in the data series then exogenous disturbances only have transient effects in the sense that the effects of such disturbances die down over time and, in the long-run, the variable reverts back to its long-run path. Thus, statistical tests of the parameters resulting from unit root regression may be biased and inconsistent. Thus, to eliminate the possibility of these spurious regressions and erroneous inferences, the study determined the order of integration of these series through unit root tests both in the levels and in the first differences.

Differencing is one way to remedy non-stationarity, though this would lead to loss of long-run information. A series that is differenced  $d$  times to achieve stationarity is said to be integrated of order  $d$  that is  $I(d)$ . A non-stationary series has one unit root or more, and is therefore differenced to make it stationary and hence it is integrated of order one,  $I(1)$  or higher. By contrast, a stationary series is time-independent, has short memory, constant mean, finite variance, transitory innovations and reverts to its mean or equilibrium value. A stationary series has no unit root and does not require differencing, hence it is integrated of order zero, that is  $I(0)$  and it does not have estimation problems. Several tests are employed to test for unit roots. The augmented Dickey-Fuller (ADF) and the Phillips-Peron are considered reliable and as such accepted by many in econometric analysis for the test for unit roots and are employed in the study.

The ADF tests the null hypothesis of the series  $y_t$  is integrated of order one against it is integrated of order zero. The test is based on the estimation of a test regression which is stated below in a general form where an intercept and trend is included.

$$\Delta Y_t = \alpha_0 + \alpha_1 t + \Phi y_{t-1} + \beta \sum_{j=1}^p \Delta y_{t-j} + \varepsilon_t \dots \dots \dots 9$$

Where:  $y_t$  is the variable in the model to be tested for stationarity  $\alpha_0$ ,  $\alpha_1$  and  $\beta$  are parameters to be estimated, p refers to maximal lag length,  $\Delta$  is the first difference operator and  $\varepsilon_t$  is the error term.

The null hypothesis is  $\Phi=1$  against an alternative hypothesis of  $\Phi<0$ . A rejection of the null hypothesis means that the time series is stationary or it does not contain a unit root while accepting the null indicates that the time series is non-stationary. The computed value will be compared with critical values to determine whether the series are stationary or not. Another test used in this study to check for the existence of unit-root in the variables is the Phillips-Perron Test, first suggested by Phillips and Perron (1988). The PP test differs from ADF test in that it does not take lagged difference terms into account for a potential serial correlation in the error terms; instead it uses non-parametric statistical method. PP test is robust with respect to unspecified autocorrelation and heteroskedasticity in the disturbance process of the test equation.

**4.4.2 Long Run Relationship: Co-integration**

Most econometric literature provides different methodological procedures to empirically examine the long-run relationship and dynamic interactions between two or more time-series variables.

The most commonly used methods include the two-step residual based procedure for testing the null hypothesis of no co-integration which is attributed to Engle and Granger (1987) and Phillips and Ouliaris (1990) and the full information maximum likelihood-based approach of Johansen (1988) and Johansen and Juselius (1990) (Pesaran *et al.*,1999).

All these methods require that the variables under investigation should be integrated of order one. This normally involves a step of stationarity pre-testing, by introducing a certain degree of uncertainty into the analysis. Furthermore, these tests suffer from low power and do not have good small sample properties (Cheung and Lai, 1993). From the above problems, we make use of a newly developed approach to co-integration that has become popular in recent years. The Autoregressive Distributed Lag (ARDL) or Bound Test approach to co-integration developed by Pesaran and Shin (1999) and further extended by Pesaran et al. (2001) is adopted for this study.

The procedure is adopted for the following reasons.

Firstly, the bounds test procedure is simple. As opposed to other multivariate co-integration techniques such as Johansen and Juselius (1990), it allows the co-integration relationship to be estimated by OLS once the lag order of the model is identified. Secondly, the bounds testing procedure does not require the pre-testing of the variables included in the model for unit roots unlike other techniques such as the Johansen approach. It is applicable irrespective of whether the regressors in the model are purely  $I(0)$ , purely  $I(1)$  or mutually co integrated. Besides, endogeneity and serial correlation problems, that exist in many empirical studies, and inability to test hypothesis on the estimated coefficients in the long run associated with Engle and Granger (1987) method is avoided (Pesaran and Shin, 1999).

Apart from this, the long run and short run parameters of the model under consideration are determined simultaneously.

Thirdly, the test is relatively more efficient in small or finite sample data sizes. Estimates derived from Johansen-Juselius method of co-integration are not robust when subjected to small sample sizes as compared to bounds test. Fourth as the name suggests, this approach allows both the dependent and independent variables to enter the model with lags, thereby allowing the past values of variables to determine its present values. This flexibility in terms of the structure of lags of the regressors is particularly plausible because reactions to a change in each variable may be different depending on various factors and in some cases they may respond to the changes in underlying factors with a lag; thus there is usually no reason to assume that all regressors should have the same lags as suggested by the co-integration VAR models, where different lags for different variables are not permitted (Pesaran *et al.*, 2001).

Another advantage of the ARDL is that one can include dummy variable in the co integration test process. With these reasons specified, we adopt the ARDL model for this study (Heidari *et al*, 2012).

The ARDL approach requires three steps. The first step is to check the existence of long run relationship among the variables of interest that is determined by F- test. The second step requires the estimation of long run relationship and to determine their values, thereafter the short run elasticity of the variables with error correction representation of the ARDL model. This application of error correction version of the ARDL model is mainly to determine the speed of adjustment to the equilibrium. Meaning that the ECM estimates the speed at which our dependent variable returns to the equilibrium given the change in the independent variable (Mikias, 2012).The study proceeds to estimate the short run and long run relationship by following the Unrestricted Error Correction Model (UECM) which is unrestricted intercepts and no trends based on the assumption made by Pesaran et.al (2001).

The ARDL bounds test modeling involves estimating unrestricted error correction model (UECM) using OLS (Narayan.K.M and Smyth.R, 2004).

Let us define a vector of variables

$z_t$  Where  $z_t = (y_t, x_t)'$   $y_t$  is the dependent variable and  $x_t$  is a vector of regressors. The data generating process of  $z_t$  is a p-order vector auto regression. For co-integration analysis it is essential that  $\Delta Y$  be modeled as a conditional ECM:

$$\Delta Y_t = \beta_0 + \Pi_{xy}Y_{t-1} + \Pi_{yx,x}Y_{t-1} + \sum_{i=1}^p \theta_i \Delta Y_{t-i} + \sum_{j=1}^q \phi_j \Delta X_{t-i} + \theta W_t + \mu_t \dots \dots \dots 10$$

Here,  $\Pi_{xy}$  and  $\Pi_{yx,x}$  are long-run multipliers.  $\beta_0$  is the drift and  $W_t$  is a vector of exogenous components e.g. dummy variables. Lagged values of  $\Delta Y_t$  and current and lagged values of  $\Delta X_t$  model the short-run dynamic structure.

The model in this specific case can be stated as

$$\begin{aligned} \Delta \ln CAB_t = & \beta_0 + \sum_{i=1}^p \beta_1 \Delta \ln CAB_{t-i} + \sum_{i=1}^p \beta_2 \Delta \ln REER_{t-i} + \sum_{i=1}^p \beta_3 \Delta \ln TOT_{t-i} + \\ & \sum_{i=1}^p \beta_4 \Delta \ln OPPEN_{t-i} + \sum_{i=1}^p \beta_5 \Delta \ln M2_{t-i} + \sum_{i=1}^p \beta_6 \Delta \ln FB_{t-i} + \sum_{i=1}^p \beta_7 \Delta \ln DR_{t-i} + \\ & \sum_{i=1}^p \beta_8 \Delta \ln RI_{t-i} + \sum_{i=1}^p \beta_9 \Delta \ln RGDP_{t-i} + \sum_{i=1}^p \beta_{10} \Delta \ln FDI_{t-1} + \alpha_1 \ln CAB_{t-1} + \alpha_2 \ln REER_{t-1} + \\ & \alpha_3 \ln TOT_{t-1} + \alpha_4 \ln OPPEN_{t-1} + \alpha_5 \ln M2_{t-1} + \alpha_6 \ln FB_{t-1} + \alpha_7 \ln DR_{t-1} + \alpha_8 \ln RI_{t-1} + \\ & \alpha_9 \ln RGDP_{t-1} + \alpha_{10} \ln FDI_{t-1} + \varepsilon_t \dots \dots \dots 11 \end{aligned}$$

Where  $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9$  and  $\beta_{10}$  characterize the coefficients of the short run dynamics of the model whereas,  $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \alpha_7, \alpha_8, \alpha_9$  and  $\alpha_{10}$  coefficients show the long run relationship. To test the presence of long run relationship between the underlying variables, the above equations is estimated using OLS and to test the significance of lagged levels of the variables in this study, the appropriate test statistics is the familiar F or Wald test

under the generalized Dickey-Fuller types of regressions in an unrestricted error correction regression. The null hypothesis for test of long run co-integration is stated

$$H_0: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = \alpha_9 = \alpha_{10} = 0 \quad \text{against}$$

$$H_1: \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq \alpha_7 \neq \alpha_8 \neq \alpha_9 \neq \alpha_{10} \neq 0$$

The co integration test is based on the F-statistics or Wald statistics. The F-test has a nonstandard distribution. Thus, Pesaran et al (2001) has provided two sets of critical values for the co integration test. The lower critical bound assumes that all the variables are I(0), meaning that there is no co integration among the variables, while the upper bound assumes that all the variables are I(1). If the computed F-statistic is greater than the upper critical bound, then the null hypothesis will be rejected, suggesting that there exists a co integrating relationship among the variables. If the F-statistic falls below the lower critical bounds value, it implies that there is no co integration relationship. However, when the F-statistic lies within the lower and upper bounds, then the test is inconclusive.

In this context, the unit root test is conducted to ascertain the order of integration of the variables. If all the variables are found to be I(1), then the decision is taken on the basis of the upper critical value. On the other hand, if all the variables are I (0), then the decision is based on the lower critical bound value. The ARDL method estimates  $(P + 1)^k$  number of regressions in order to obtain the optimal lags for each variable, where p is the maximum number of lags to be used and k is the number of variables in the equation (Shrestha and Chowdhury, 2005). The model is selected based on the Schwartz-Bayesian Criterion (SBC) or Akaike Information Criterion (AIC). The SBC uses the smallest possible lag length and is therefore described as the parsimonious model. The AIC chooses the maximum relevant lag length (see Shrestha and Chowdhury, 2005; and Jalil et al, 2008).

Once co-integrating relationship is ascertained, the long run and error correction estimates of the ARDL model are obtained as given

$$\Delta \ln CAB_t = \alpha_0 + \alpha_1 \ln CAB_{t-1} + \alpha_2 \ln REER_{t-1} + \alpha_3 \ln TOT_{t-1} + \alpha_4 \ln OPPEN_{t-1} + \alpha_5 \ln M2_{t-1} + \alpha_6 \ln FB_{t-1} + \alpha_7 \ln DR_{t-1} + \alpha_8 \ln RI_{t-1} + \alpha_9 \ln RGDP_{t-1} + \alpha_{10} \ln FDI_{t-1} + \varepsilon_t \dots \dots 12$$

After the long run model is estimated, the next duty is to model the short run dynamics of the model by estimating an Error Correction Model associated with the long run estimates. The error correction representation of the series can be given as follows:

$$\Delta \ln CAB_t = \beta_0 + \sum_{i=1}^p \beta_1 \Delta \ln CAB_{t-i} + \sum_{i=1}^p \beta_2 \Delta \ln REER_{t-i} + \sum_{i=1}^p \beta_3 \Delta \ln TOT_{t-i} + \sum_{i=1}^p \beta_4 \Delta \ln OPPEN_{t-i} + \sum_{i=1}^p \beta_5 \Delta \ln M2_{t-i} + \sum_{i=1}^p \beta_6 \Delta \ln FB_{t-i} + \sum_{i=1}^p \beta_7 \Delta \ln DR_{t-i} + \sum_{i=1}^p \beta_8 \Delta \ln RI_{t-i} + \sum_{i=1}^p \beta_9 \Delta \ln RGDP_{t-i} + \sum_{i=1}^p \beta_{10} \Delta \ln FDI_{t-1} + \div ECM_{t-1} + \varepsilon_t \dots \dots \dots 13$$

$ECM_{t-1}$  Where the speed of adjustment of the parameter and is the residual obtained from equations (i.e. the error correction term). The coefficient of the lagged error correction term  $\div$  is expected to be negative and statistically significant to further confirm the existence of a co integrating relationship. Before directly get on estimating the long run relationship of the model using ARDL bounds testing procedure, it is must to first test the order of integration of each variables included in the model. It is mainly to ensure that the variables are not co-integrated of order two (I (2)). This is because as stated earlier, ARDL approach is based on the assumption that the underlying series is either I(1), I(0) or mutually co-integrated. If the variable are found to be I(2), the computed F or Wald statistic are not going to be valid which may lead to erroneous conclusion. The diagnostic test statistics of the selected ARDL model can be examined from the

short run estimates at this stage of the estimation procedure. Similarly, the test for parameter stability of the model can be performed by the Cumulative Sum of Recursive Residual (CUSUM) and Cumulative Sum of Square of Recursive Residuals (CUSUMSQ) statistics. If the plots of CUSUM and CUSUMSQ statistics stay within the critical bounds of five percent level of significance, the null hypothesis of all coefficients in the given regression are stable cannot be rejected.

#### **4.4.3 Granger Causality Test**

The co-integration relationship indicates the existence of causal relationship between variables but it does not indicate the direction of causal relationship between variables. Therefore it is common to test for detecting the causal relationship between variables using the Engle and Granger (1987) test procedure. Granger (1969) definition of causality states that  $X_t$  causes  $Y_t$  if the past history of  $X_t$  can be used to predict  $Y_t$  more accurately than simply using the past history of only. This test enables an evaluation of the information content in the past values of a variable in predicting the contemporaneous as well as the future path of another. It is therefore vital for two main reasons.

First, it is equivalent to the econometric exogeneity in the sense that unidirectional causality that runs from the explanatory variables to the dependent variables serves a prerequisite for the consistent estimation of distributed lag models that do not involve lagged dependent variables. Second, it can be likened to leading indicators and rational expectations. Thus, Granger (1969) observed that it is difficult to determine the direction of causality between two related variables.

The following model is appropriate to check the causality between two variables X and Y;

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta Y_{t-i} + \sum_{i=1}^p \alpha_2 \Delta X_{t-i} + \varepsilon_{1t} \dots \dots \dots 14$$

$$\Delta X_t = \beta_0 + \sum_{i=1}^p \beta_1 \Delta X_{t-i} + \sum_{i=1}^p \beta_2 \Delta Y_{t-i} + \varepsilon_{2t} \dots \dots \dots 15$$

Here the null hypothesis to be tested is  $H_0: \beta_1 = \beta_2 = \dots = \beta_q = 0$ ; against the alternative hypothesis  $H_1$ : At least one of them is not zero.  $\varepsilon_{1t}$  and  $\varepsilon_{2t}$  are random error terms, which are serially uncorrelated with zero mean and constant variance. If the null hypothesis is rejected for equation (14), it can be said that there is a unidirectional causality from X to Y. Conversely, if the null hypothesis is rejected for equation (15) it can be said that there is a unidirectional causality from Y to X. If the null hypothesis is rejected for both equations, it can be said that there is bidirectional causality between Y and X. They are referred to as the short run Granger causality test (Hossain, 2013).

## **CHAPTER FIVE: RESULTS AND DISCUSSIONS**

The study first tested for unit roots in order to determine the stationarity status of the variables using the Augmented Dickey-Fuller (ADF) and Phillips Peron (PP) tests and further tested for co integration and causality using the Autoregressive Distributed Lagged Model (ARDL) and the Pair wise Granger causality test respectively. The analysis of these tests then helped us to know the relationship between current account balance and real effective exchange rate, terms of trade, RGDP growth rate, openness of economy, financial deepening (M2)/GDP, government budget balance, dependency ratio, foreign direct investment and Relative income.

### **5.1. Empirical Results for Unit Root Testing**

As we discussed in chapter four ARDL model is a valid instrument for estimation, if the variables are stationary at I (0) and I (1), but the estimation procedure will be inappropriate if any of the variables are integrated at I(2). In reality, the bounds test approach to co integration does not really require the pretesting of the variables for unit roots, it is however important to perform this test to verify that the variables are not integrated of an order higher than one. The purpose is to free the result from spurious regression. The results for the ADF unit root test are presented in table 5.1.

Table: 5.1. ADF Unit Root Test

Variables	ADF t-statistic at level I(0)			ADF t-statistic at level I(1)			Order of Integration
	Intercept (C)	Trend and intercept(C &T)	None	Intercept (C)	Trend& Intercept (C&T)	None	
CAB/GDP	(2.0375)	(3.4074)***	(0.2751)	(6.1077)**	(6.008)**	(8.362)**	I(0)
FDI/GDP	(2.304)	(3.048)	(1.450)	(5.966)**	(5.872)**	(5.972)**	I(1)
DR	(0.074)	(2.086)	(0.957)	(6.481)**	(6.600)**	(6.463)**	I(1)
LnM2/GDP	(2.455)	(1.974)	(1.749)***	(4.899)**	(3.209)	(4.854)**	I(1)
FB/GDP	(3.558)**	(4.272)**	(0.989)	(5.871)**	(8.206)**	(8.396)**	I(0)
LnREER	(1.154)	(1.447)	(0.731)	(4.751)**	(4.675)**	(4.790)**	I(1)
LnOPPEN	(0.259)	(3.613)**	(1.320)	(3.476)**	(3.412)***	(3.694)**	I(0)
LnTOT	(5.203)**	(4.908)**	(0.538)	(5.155)**	(5.286)**	(5.147)**	I(0)
RGDPgr	(1.674)	(5.704)**	(0.533)	(9.577)**	(9.418)**	(9.670)**	I(0)
LnRI	(1.554)	(0.840)	(1.342)	(4.310)**	(4.523)**	(4.018)**	I(1)

Source: E-views 8 output. \*, \*\* and \*\*\* imply statistical significance at 1%, 5% and 10%, level of significance, respectively.

The current account balance, government budget balance, foreign direct investment and financial deepening are normalized with nominal gross domestic product to overcome the heteroskedasticity problem that would arise due to use of nominal variables in an equation.  $\ln M2/GDP$  refers to the natural log of financial deepening,  $\ln REER$  is the natural log of real effective exchange rate,  $\ln OPPEN$  is the natural log of trade openness,  $\ln TOT$  is the natural log of terms of trade,  $\ln RI$  refers to the natural logarithm of relative income and DR is dependency ratio in percent form and  $RGDPgr$  is real GDP growth respectively.

The results from the stationarity test equations under the ADF are shown in the above table. The null hypothesis of no stationarity (unit root) can be rejected for all variables at 5% level of significance. The ADF test statistics is greater than the critical value which indicates rejection of the null hypothesis that implies the stationarity of the time series variable. Conversely, if the ADF test statistics is less than the critical value, the decision is fail to reject the null hypothesis of unit root or non stationarity. Then, we take the first difference of the variables and check for stationarity. The result shows that every variable became stationary with trend, trend and intercept and without trend at 1%, 5% and 10% significant level. In addition, the Phillips-Perron test given in annex 2 gives a result which is consistent with the ADF test and the variables used in the model are a mixture of  $I(0)$  and  $I(1)$  and none of the variables are integrated of order two ( $I(2)$ ) which is a pre condition to use ARDL model. Therefore, the ARDL model is the appropriate procedure of estimating the models as all variables are  $I(0)$  and  $I(1)$ .

## **5.2 Bounds Test for Co-integration**

The first task in the ARDL approach to Co-integration is to test the presence of Co-integration or long run relationship among the variables and this is done using the F-statistic. Maximum of lag length is recommended based on the Akaike information criterion (AIC) and a lower value of

AIC is better model (Pesaran and Shin, 1999). AIC is a more appropriate criterion than other criteria in selecting optimal lag length for a small sample size data (i.e. observations less than 80). We first start estimating an OLS regression for the first difference part of the equation and then test for the joint significance of the parameters of the lagged level variables when added to the first difference regression. This is mainly used to simply look at the joint significance of the variables (Pesaran, 2001).

The F-test is used for investigating a level (long-run) relationship and will then be compared with the lower and upper bounds of critical value. If the F-statistic is greater than the upper bound it can be concluded that there is long run relationship among the variables. Conversely, if the F-statistic is less than the lower bound test one can conclude that there is no long run relationship among the variables under consideration. However, if the F-statistic falls between the upper and lower bound critical values, it can't conclude and need to look at the sign and significance of the error correction model in order to conclude.

Table 5.2 F-Statistic Result and Critical Values (lower and upper bound) for the *ARDL* Modeling Approach

Test Statistic	Value	k
F-statistic	3.438767	9

#### Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	1.88	2.99
5%	2.14	3.3
2.5%	2.37	3.6
1%	2.65	3.97

The calculated F statistics is (3.4387) which is higher than both lower and upper bound critical value at 5 and 10 percent of significance level, respectively. As a result, it is possible to reject the null hypothesis of no co-integration. In other words, the result implies the variables are co-integrated in the long run.

### **5.3. Long-run Diagnostic and Stability Tests**

Testing the soundness of the model is one of the important steps and diagnostic tests are made in order to test the standard property of the model. In this study, diagnostic tests that will provide explanation for the existence of serial correlation (Brush and Godfray LM test), functional misspecification test (Ramsey's RESET test), test for normality (Jaque- Bera test ) and heteroskedasticity test are conduct.

A. Serial correlation test is used to test whether the residual is serially correlated or not. If the residual is not serially correlated our model is best model. Annex 5a result show that the p-value is 0.0731 (7.3 percent) which is more than 5 percents, we can't reject null hypothesis. Our null hypothesis is there is no serial correlation. Therefore the model is best model.

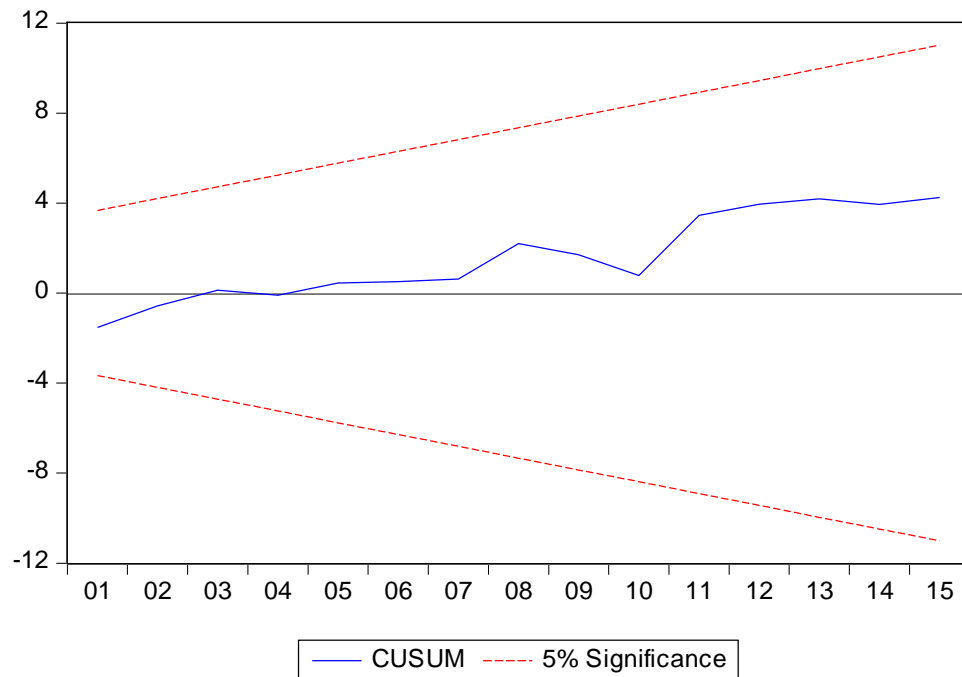
B. Heteroskedasticity test is used to test whether the residual is heteroskedasticity or not, that means to be a best model the residual must be homoskedasticity. Annex a 5b result show that the P-value is 0.0501 (5.01 percent) which is more than 5 percent, meaning that we can't reject null hypothesis. Our null hypothesis is that residual is not heteroskedasticity which is desirable. Therefore our model is best

C. Ramsey RESET Test for functional form indicates that whether the models are well constructed or not. Annex a 5c result show that the P-value is 0.82 (82 percent) which is more than 5 percent. We failed to reject the null hypothesis of Ramsey RESET test. Result proves that the model did not have omitted variable bias and the models are well constructed

D. Jaque-Berra normality test is used to test whether the residuals are normally distributed or not. Annex a 5d result shows that the P-value is 0.25 (25 percent) which is more than 5 percent, meaning that we can't reject null hypothesis. Our null hypothesis is that the residuals are normally distributed. The results in above indicate that there is no serial correlation and heteroskedasticity, and the errors are normally distributed. In addition, the Ramsey functional form test confirms that the model is specified well .Hence; the relationship between the variables is verifiable.

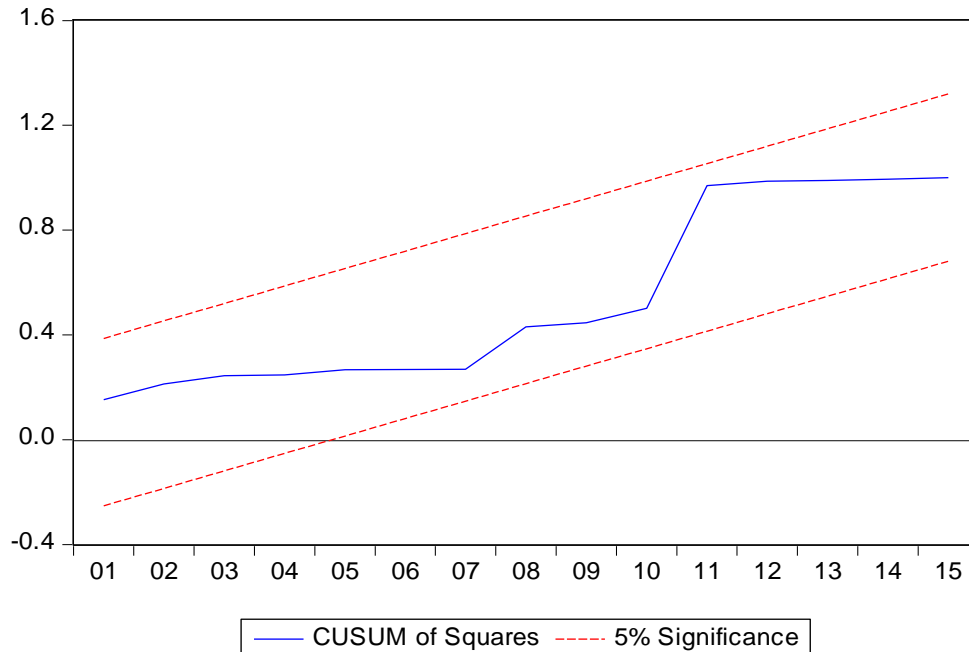
Apart from the above diagnostic tests, the stability of long –run estimates has been tested by utilizing cumulative sum of recursive residuals (CUMSUM) and cumulative sum of squares recursive residuals (CUMSUMSQ) tests which are recommended by (Pesaran and Shin, 1999, 2001). Since these kinds of stability tests can be graphed, one can easily identify not only their significance but also the point at which stability (structural break) possibly occurred. For the stability test the graph plots both the cumulative sum of residual with 5% critical lines. And, if the cumulative sum remains inside between the two critical lines or bounds back after it is out of the boundary lines, the null hypothesis of correct specification of the model cannot be rejected. But, if the cumulative sum goes outside (never returns back) between the two critical bounds there exists series parameter instability problem.

Figure 5.1 Graphical Representation of CUMSUM Result



The straight lines represent critical bounds at 5% significance level- As depicted in the figure above, the plot of cumulative sum of recursive residuals graphical test of stability revealed by oscillation of the calculated statistics between the critical bounds at 5% level of significance and it is the indication of stable parameters under study. This is re-enforced by the same pattern of the plot of cumulative sum of the squares of recursive residuals shown in the figure below.

Figure 5.2 Graphical Representation of CUMSUMSQ Result



The straight lines represent critical bounds at 5% significance level-

The plots of CUMSUM and CUMSUMSQ stay within the lines, and, therefore, this confirms the equation is correctly specified and the model is stable. Furthermore, the result shows that there is no structural instability in the model during the sample period. Therefore, we can conclude that long and short run estimates are quite stable and there is no any structural break showing the results of the estimated model are reliable and efficient

#### 5.4. Long Run ARDL Model Estimation Results

In the stationarity test, the result shows that the variables are stationary at level and at first difference. The F statistic result which indicates the existence of long run co-integration among the variables also confirmed to precede to the estimation of the long run coefficients of the model. The following table presents the results found after running the appropriate ARDL model

to find out the long run coefficients. The numbers in bracket are number of lag chosen by the model for each variable.

Table 5.3 Estimated Long Run Coefficients using the ARDL Approach

<b>Regressors</b>	<b>Coefficient</b>	<b>St. Error</b>	<b>T-Ratio [Prob]</b>
FDI_GDP	0.8669	0.7525	-1.152(0.282)
DR	0.00071	0.0010	0.706(0.500)
LN2_GDP	0.0373	0.0493	0.755(0.471)
FB_GDP	-0.836	0.3584	-2.333(0.047)
LNREER	0.1185	0.0447	2.649(0.029)
LNOPEN	0.0151	0.0252	0.601(0.564)
LNTOT	-0.031	0.0133	-2.348(0.0468)
RGDPGR	-0.004	0.001	-2.386(0.0441)
LNRI	-0.041	0.046	-0.887(0.400)
C	-1.383	1.0317	-1.340(0.21)

Source: Eviwes ARDL (2, 2, 1, 2, 0, 2, 2, 2, 1, 2) model estimate result

The empirical results of the long run model coefficients are presented in Table 5.3 the results suggest that factors which include fiscal balance, real effective exchange rate, terms of trade, and Real GDP growth of current account found to be determinants of current account balance of Ethiopia and significant. However, variable such as foreign direct investment, age dependency, financial deepening, trade openness and relative income found statistically insignificant in determining current account balance in the long run.

The long-run relationship between the current account balance to GDP and fiscal balance to GDP is negative and statistically significant. One percent increase in the ratio of budget balance to GDP results in a 0.836 percent decrease in the ratio of current account balance to GDP. This implies that, as the budget deficit increase by one percent the current account deficit will

decrease by 0.836 percent, this is due to the fact that the Ethiopian economy is characterized by both budget deficit and current account deficit. This result is contrary to the twin deficit hypothesis which states that there is a positive relationship between budget deficit and trade deficit on the basis of stable saving investment gap assumption. An increase in public sector deficit will directly increase the trade deficit. The result is not in line with Kariuki (2009), Mwangi (2014), Abbas et.al (2011), and in case of Ethiopia with Gebregzabier (2003), Alekaw (2012). The possible explanation for this result could be private investment cannot be neutral of government spending and it could be affected by government expenditure. If the government and private expenditures are substituting each other, an increase in government expenditure should induce a fall in private spending and decrease in private spending is more than an increase of government expenditure leads to a positive impact on current account balance. As a result a fall in current account deficit from saving investment gap perspective. The other possible reason could be an increase in government expenditure may induce a decrease in private sector expenditures due to the change in the present discounted value of tax burden.

The coefficient of real effective exchange rate is positive and statistically significant. One percent increase in the real effective exchange rate results in a 0.118 percent increase in the ratio of current account balance to GDP. The positive coefficient of the real effective exchange rate indicates that an appreciation of domestic currency. Appreciation of domestic currency adversely affects the current account as the theory predicts not only through worsened international competitiveness and reduced net exports but also through reduced saving due to higher purchasing power in terms of imported goods. The appreciation of the real effective exchange rate increases the purchasing power of domestic agent in terms of imported goods. An increase of purchasing will raise consumption and at the same time reduce the propensity to save and

decrease in the saving ratio will lead to a decrease in an economy's current account balance. Therefore, an increase in REER is expected to decrease private saving and increase the current account deficit. This result is in line with theoretical prediction and with findings of Mwangi (2014), Kariuki (2009) and, Kwalingana and Nkuna (2009).

The long-run relationship between the current account balance to GDP and terms of trade is negative, with a statistically significant coefficient. One percent increase in the terms of trade result in 0.031 percent decrease in current account deficit. This result implying that an improvement in terms of trade has impact in reducing the deficit as hypothesized by Harberger-Laursen-Metzler effect (HLME). According to this hypothesis, the increasing real income as a result of improvement in terms of trade leads to increasing of marginal propensity to save. In addition, the effects of terms of trade are reflected by the changes in export revenue and import expenditure. Improvement in terms of trade leads to a relatively higher export revenue than import expenditure, which results in fall current account deficit. Therefore, the result is consistent with HLME prediction. The finding is in line with Gebregzabier (2003) and contrary to Kwalingana and Nkuna (2009).

The long run response of current account to GDP to changes in real GDP growth is found to be negative and statistically significant. One percent increase in real GDP growth results into 0.004 percent decrease in current account balance. This negative estimated coefficient of real GDP growth implies that the current account deficit will narrow as real GDP growth increases. Income growth is expected to influence both saving and investment, the study results indicate that output growth positively influences saving more than investment, hence, the decrease in current account deficit (increase in surplus). The result is similar to Kariuki (2009) and Brissimis et.al (2010) findings.

In general, the long run relationship between foreign direct investment, age dependency, financial deepening and trade openness with current account balance is positive. It indicates that an increasing one percent leads to deteriorating current account balance by the amount of coefficients but all variables are statistically insignificant. Contrary to this, an increase in relative income decreases current account deficit by the stated amount of coefficient but insignificant.

The estimated long run equation can be presented as follows:

$$\begin{aligned}
 CAB_{GDP} = & -1.383 + 0.8669(FDI_{GDP}) + 0.0007(DR) + 0.0373(LNM2_{GDP}) \\
 & - 0.83(FB_{GDP}) + 0.1185(LNREER) + 0.0151(LNOPPEN) \\
 & - 0.031(LNTOT) - 0.004(RGDPGR) - 0.041(LNRI)
 \end{aligned}$$

## 5.5. Short Run Model ARDL Estimation Results

Short-run relationships between the current account balance and macroeconomic variables are examined with the Error Correction Model (ECM) based on the ARDL approach. It indicates the speed of adjustment to restore equilibrium in the dynamic model and the coefficient of the ECM which has to be negative and statistically significant shows how quickly the dependent variables converge to the long run equilibrium. Results of the error correction model based on the ARDL model are presented in Table 5.4

Table 5.4 Error Correction Representation for the Selected ARDL Model

Dependent Variable: CAB\_GDP  
 Selected Model: ARDL(2, 2, 1, 2, 0, 2, 2, 2, 1, 2)  
 Date: 05/08/17 Time: 21:15  
 Sample: 1980 2015  
 Included observations: 34

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CAB_GDP(-1))	-0.174522	0.238204	-0.732658	0.4847
D(FDI_GDP)	0.518691	0.351113	1.477277	0.1779
D(FDI_GDP(-1))	1.251213	0.402667	3.107311	0.0145
D(DR)	-0.002791	0.001028	-2.714807	0.0265
D(LNM2_GDP)	-0.165562	0.075421	-2.195165	0.0594
D(LNM2_GDP(-1))	-0.185617	0.086563	-2.144310	0.0643
D(FB_GDP)	-0.879187	0.370756	-2.371339	0.0452
D(LNREER)	-0.011904	0.049830	-0.238889	0.8172
D(LNREER(-1))	-0.066638	0.034915	-1.908567	0.0927
D(LNOPPEN)	0.001352	0.028227	0.047901	0.9630
D(LNOPPEN(-1))	0.020842	0.029463	0.707382	0.4994
D(LNTOT)	-0.036904	0.015429	-2.391925	0.0437
D(LNTOT(-1))	0.034834	0.014420	2.415598	0.0421
D(RGDPGR)	-0.001677	0.000898	-1.868075	0.0987
D(LNRI)	0.093935	0.051737	1.815627	0.1070
D(LNRI(-1))	0.143306	0.072071	1.988389	0.0820
CointEq(-1)	-1.050923	0.300489	-3.497380	0.0081

Short run analysis results reveal that the current account balance is affected by the lagged value of itself but it is statistically insignificant. Lagged foreign direct investment, lagged terms of trade and relative income affect current account balance positively and significant at 10 percent while age dependency ratio, financial deepening, fiscal balance, terms of trade, real effective exchange rate and real GDP growth affect current account balance negatively and is significant at 10 percent. The coefficient of trade openness is positive and statistically insignificant.

From the Table above lagged foreign direct investment is positively related to current account balance and statistically significant. One percent increase in foreign direct investment results in

1.25 percent increase in current account deficit. The possible explanation to this result is that increasing net inflows of FDI contributes to higher national investment. Since investment is decreasing of current account balance, it widened the current deficit. In addition, investment incentives and customs duty free given to investor as a mechanism of attracting FDI such as machinery and equipment could lead to high inflow of capital goods which increase imported capital good and widened current account deficit further in the short term. The result is in line with Unevskaja and Jovanovich (2011).

The short run relation between age dependency and current account balance is negative and statistically significant. The result implies as the number of dependents increase the current account balance (deficit) decrease. This result is contrary to life cycle hypothesis which state that the young and the old age are net consumer that leads to decreases in domestic savings and deteriorate current account balance. The possible explanation for this result could be elderly may save rather than spend to leave bequests or due to uncertainties about the lifespan after retirement that requires financial support. This leads to enhance saving and hence improve current account balance.

The coefficient of financial deepening is negative and statistically significant in the short run. As financial deepening increases by one percent current account balance increase by 0.165 percent, this is because financial deepening (financial development) enhances saving, it contributes to raising returns as well as lowering the cost of capital by reducing information and transaction cost further financial deepening could induce more saving through more depth and sophistication of the financial system and thus it narrows current account deficit.

The short run relationship between fiscal balance and current account balance is negative and statistically significant. This result is similar to long run estimation result. Similarly, lagged real effective exchange rate is negatively related with current account balance. This implies that in the short run devaluation does not improve current account balance that Marshal-Lerner condition is not fulfilled. The relationship between terms of trade and current account balance is negative and statistically significant. One percent increase in terms of trade result into 0.036 current account balance decrease. It implies that an improvement of terms of trade leads to a fall in current account deficit. The result is consistent with long-run estimation result.

The short-run impact of real GDP growth on current account balance is negative and significant. This suggests that as real GDP growth increases current account deficit narrows. The result coefficient is similar to long-run model estimation result.

The short-run response of current account to the changes in relative income ratio is positive and statistically significant. The variable relative income captures the stage of development. One percent increase of relative income leads to 0.14 percent increase in current account. This suggests that at an early stage of the development process where the relative income level is low, an economy runs current account deficits as it usually imports capital due to its external financing requirement (see chapter two)

The error correction coefficient  $CointEq(-1)$  has negative sign and statistically significant indicating that there is evidence of co-integration. The estimated short-run coefficient for the error correction term is -1.050 showing that there is high speed of adjustment to the long run equilibrium after the short run shock has been occurred.

The value -1.050 indicates that short term deviation of long term relation is corrected each year by an amount of 100 percent. In other words, it takes one year to eliminate short term disequilibrium and restore long run equilibrium relationship between these variables.

### **5.6 Granger Causality Tests**

In causality test four outcomes are possible. There may be unidirectional causality meaning that A may Granger cause B but not the other way round. There may also be the case where B Granger causes A, but not the other way round. It could happen A and B Granger causes each other implying bi-directional causality. When the sets of coefficient are not statistically significant, we say that, none of the variables Granger causes each other, implying that, the variables are independent. The granger causality test result in annex 7 reveals that there is unidirectional causality between foreign direct investment and current account balance to GDP. This is because we reject the null hypothesis of FDI\_GDP does not Granger Cause CAB\_GDP at (0.0011 less than 0.05). There is unidirectional causality from Age of dependency, and real effective exchange rate to current account balance. There is also unidirectional causality from current account balance to fiscal balance, financial deepening and real GDP growth. However, there is no bidirectional causality among variables (See annex 7).

## **CHAPTER SIX: CONCLUSION AND POLICY IMPLICATIONS**

### **6.1 Conclusion**

In order to achieve stable macroeconomic balance, it is necessary to identify economic variables that determine macroeconomic situations. Current account position of a country is one of an indicator that shows the status of its economy. Although, it does not appear as ultimate policy target variable, it could be used as a source of information about the behavior of economic agents. The existence of global imbalances is in the center of the debate among policymakers' and economists and persistence of current account deficit that countries experienced also raise the question about what determine current account balance. The Ethiopian economy is characterized by persistent current account deficit since the Imperial regime. Recent IMF report also shows this and in 2014/15 current account deficit was (12.0% of GDP).

Despite extensive theoretical literature on the subject, there is little study that empirically investigates the effect of macroeconomic variables on current account positions of Ethiopia. The purpose of this paper is to investigate the empirical linkage between current account position and macroeconomic variables using recent econometric techniques from 1980 to 2015 and based on inter-temporal approach. Auto Regressive Distributed Lagged Model adopted to investigate the existence of short run and long run relationship between current account balance and a set of macroeconomic variables proposed by both theoretical and empirical literature. In the empirical literature, the study explored the relationship between current account balance and its selected determinants and it was clear that the bulk of the literature produced mixed relationship.

The study builds the model based on inter-temporal approach to current account which considered current account as an inter-temporal phenomenon given that; it is the difference between domestic saving and investment. We started the estimation process by testing for the stationarity properties of the variable using the Augmented-Dickey Fuller (ADF) and Phillips-Peron test statistics. The unit roots result shows that every variable became stationary with trend, trend and intercept and without trend at 5% significance level. In addition, the Phillips-Perron test gives a result which is consistent with the ADF test and the variables used in the model are a mixture of  $I(0)$  and  $I(1)$  and none of the variables are integrated of order two  $I(2)$  which is a pre condition to use ARDL model. The result of the econometric analysis indicated that there is a long-run relationship between current account balance and fiscal balance, real effective exchange rate, terms of trade, and Real GDP growth.

Variables such as foreign direct investment, age dependency, financial deepening, trade openness and relative income found statistically insignificant in the long run. The long-run relationship between the current account balance to GDP and fiscal balance to GDP is negative and statistically significant which is contrary to the twin deficit hypothesis. The coefficient of real effective exchange rate is positive and statistically significant. The positive coefficient of the real effective exchange rate indicates that an appreciation of domestic currency. The long-run relationship between the current account balance to GDP and terms of trade is negative, with a statistically significant coefficient. This result implying that an improvement in terms of trade has impact in reducing the deficit as hypothesized by Harberger-Laursen-Metzler effect (HLME).

The long run response of current account to GDP to changes in real GDP growth is found to be negative and statistically significant implying that the current account deficit will narrow as real GDP growth increases. Short-run analysis results reveal that lagged foreign direct investment, lagged terms of trade, and relative income affect current account balance positively and are statistically significant while age dependency ratio, financial deepening, fiscal balance, terms of trade and real GDP growth affect current account balance negatively and are statistically significant at 10 percent. The coefficient of trade openness is statistically insignificant. Foreign direct investment and relative income ratio are positively related to current account balance and statistically insignificant. The error correction coefficient ( $CointEq(-1)$ ) that shows the speed of adjustment to the long run equilibrium is negative sign and statistically significant.

## **6.2. Policy Implications**

The persistence of the current account deficit in Ethiopia implies that, policies that have been implemented in the past decades to improve the current account position haven't worked yet. Therefore, in order to progress towards a favorable current account balance which aimed at reducing persistent deficits, several policy options should be pursued.

Fiscal balance is one of the important determinant factors in the current account deficit. The result of the study suggests that there is negative relationship, which implies that current account deficit can be minimized by running budget deficit. This can be done by increasing government spending in key development areas. Large amount of spending is needed in order to expand infrastructures which are supposed to increase private investment particularly for those participating in manufacturing and export sectors. Moreover, the tax collection system should have efficient and the rent seeking behavior in the public sector should be minimized in order to control excess supply of budgets.

The negative relationship between terms of trade and current account deficit has great implication. As the terms of trade improve the purchasing power of a country's exports increases and consumption smoothing effect leads individuals to save more and consume later, hence the current account deficit will be minimized. This can be achieved by enhancing export competitiveness through product diversification, quality improvement and technological upgrading in value-addition industries. In addition, restrictive trade policy can lead to an increase in the terms of trade. For instance, the imposition of a tariff by the home country reduces the demand for the foreign good on the world market. Consequently, the world price of the imported good will fall, while the ratio of the price of exports to imports will rise.

The empirical results suggest that real effective exchange rate is positively related to current account deficit in the long-run which implies that appreciation of currency will deteriorate current account balance. This result is consistent with elasticity approach which states that devaluation will improve the current account balance if the sum of the foreign elasticity of demand and the domestic country elasticity of demand for import is greater than unity. However, even if devaluation of domestic currency improves current account balance, government should be careful in taking such measurement since it increases the cost of imported inputs and inflationary pressure on domestic price. In addition to domestic price increase it may lead terms of trade to deteriorate and slow growth especially in developing countries which heavily rely on imported capital and intermediate inputs. The negative estimated coefficient of real GDP growth implies that the current account deficit will narrow as real GDP growth increases. Income growth is expected to influence both saving and investment, the study results indicate that output growth positively influences saving more than investment. Therefore, government should promote the culture of saving besides achieving fast growth economy.

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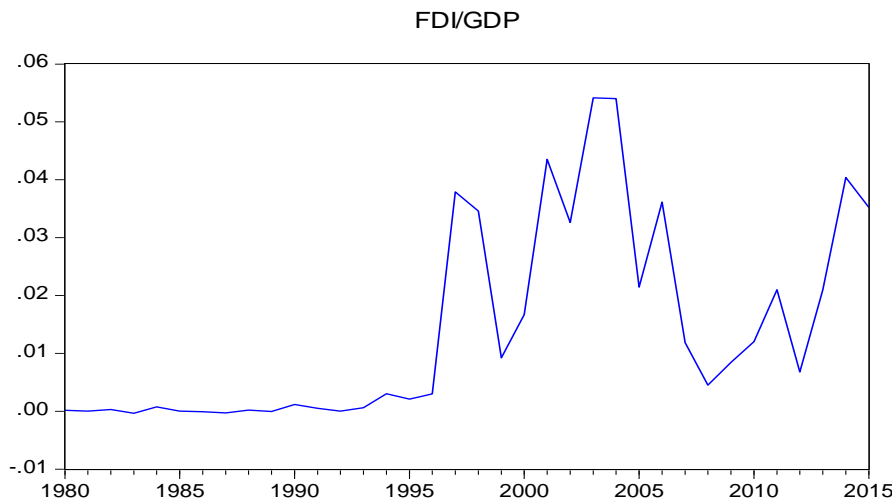
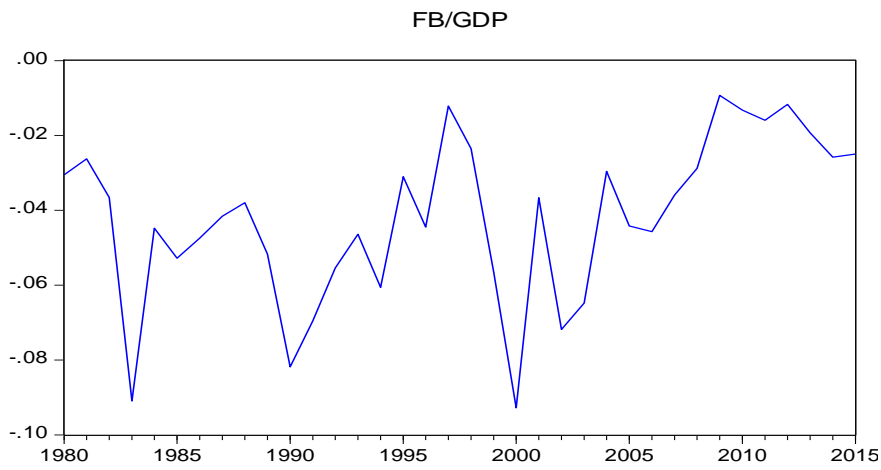
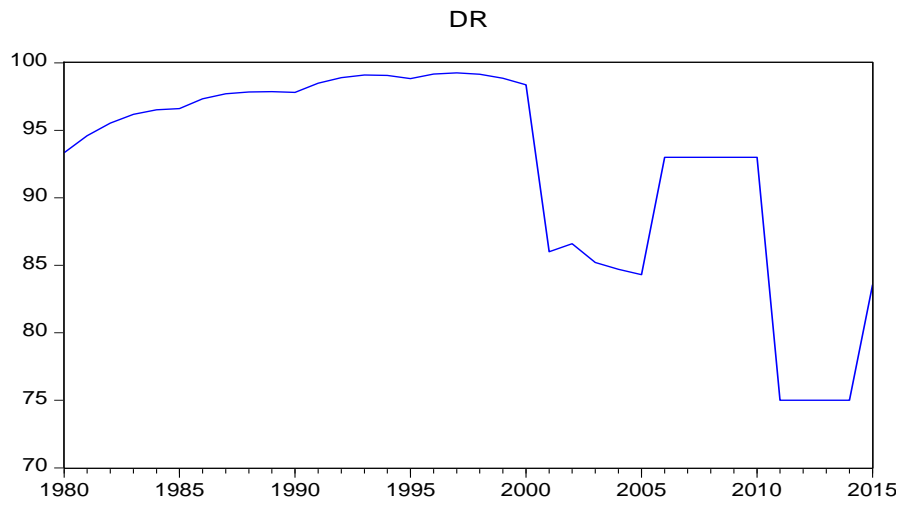
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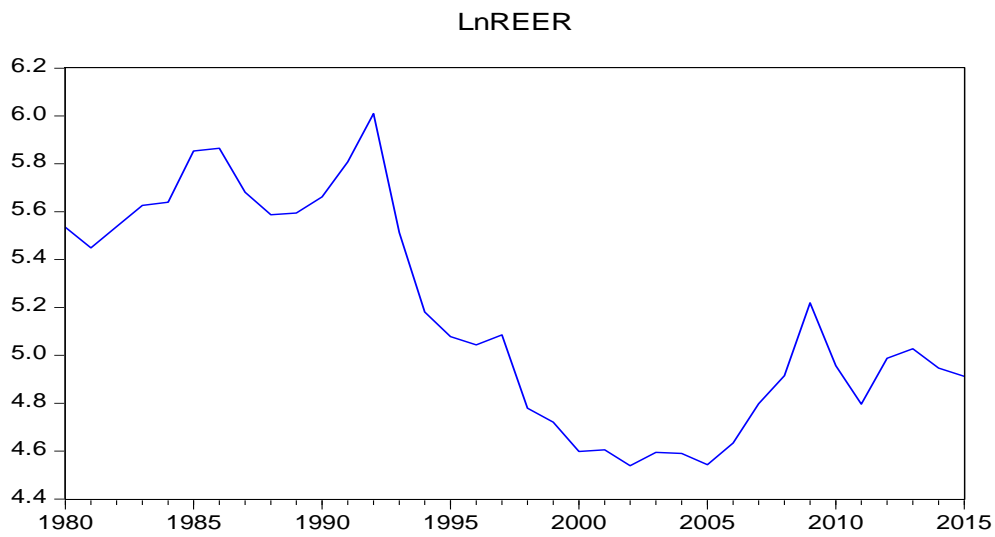
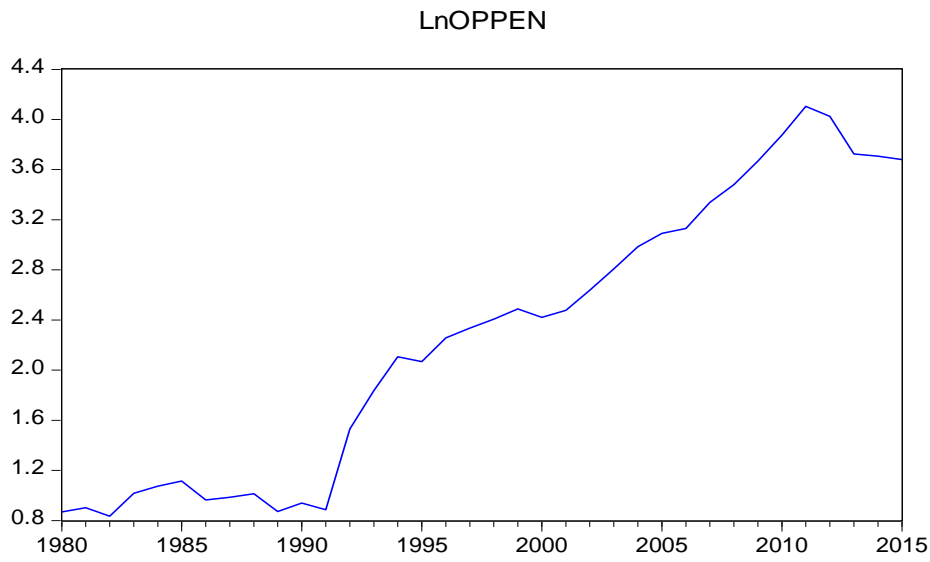
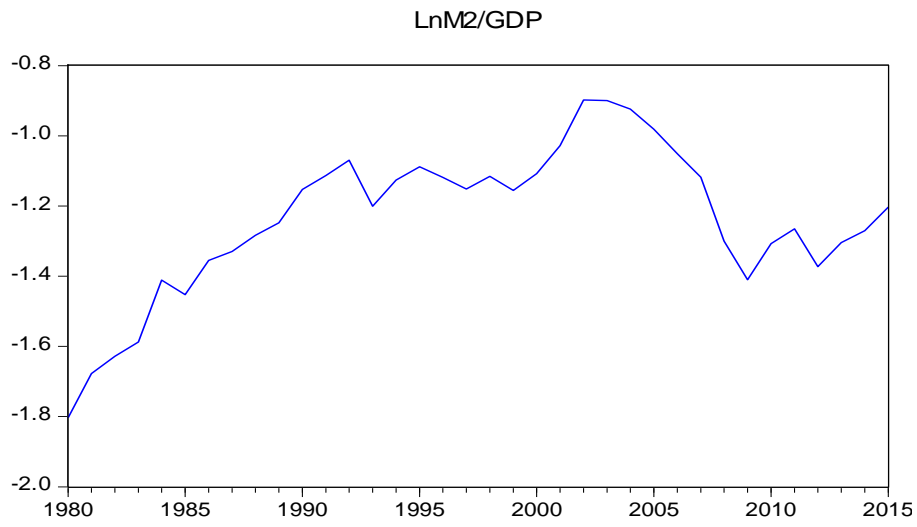
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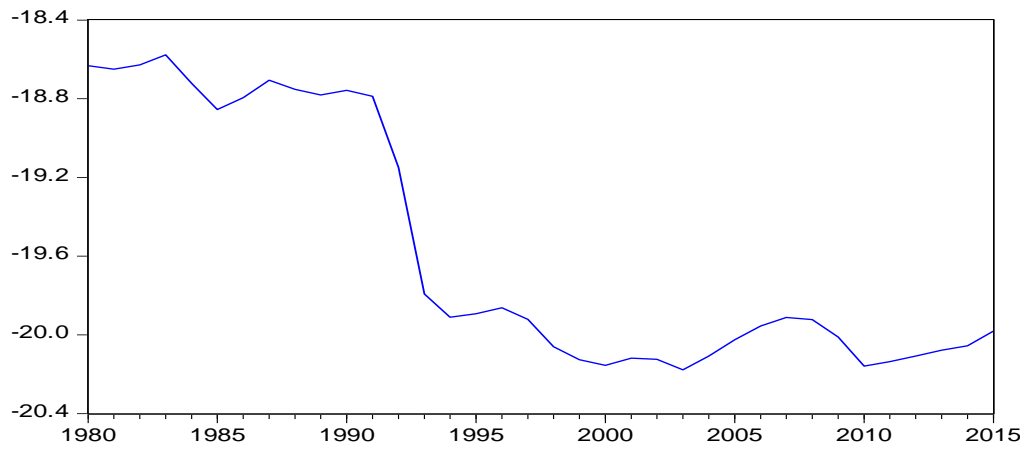
# APPENDICES

## Appendix 1 Time series plot

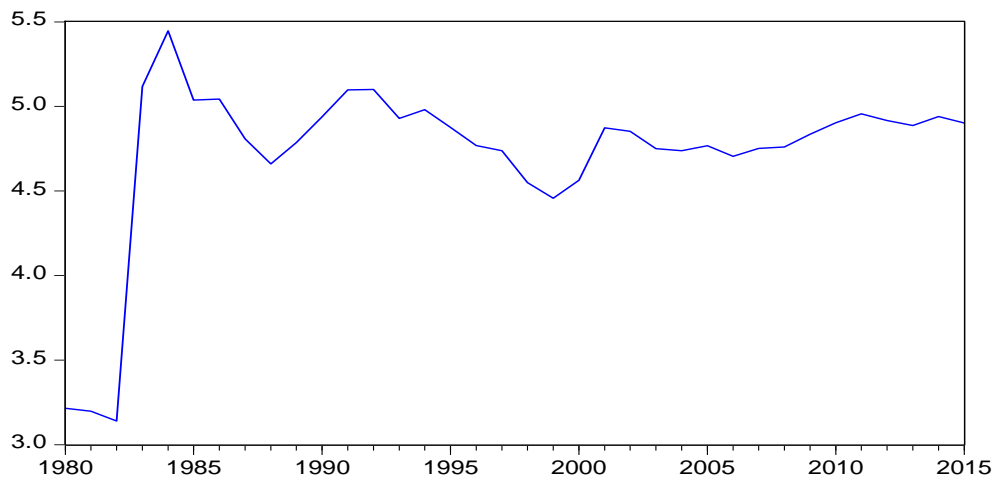




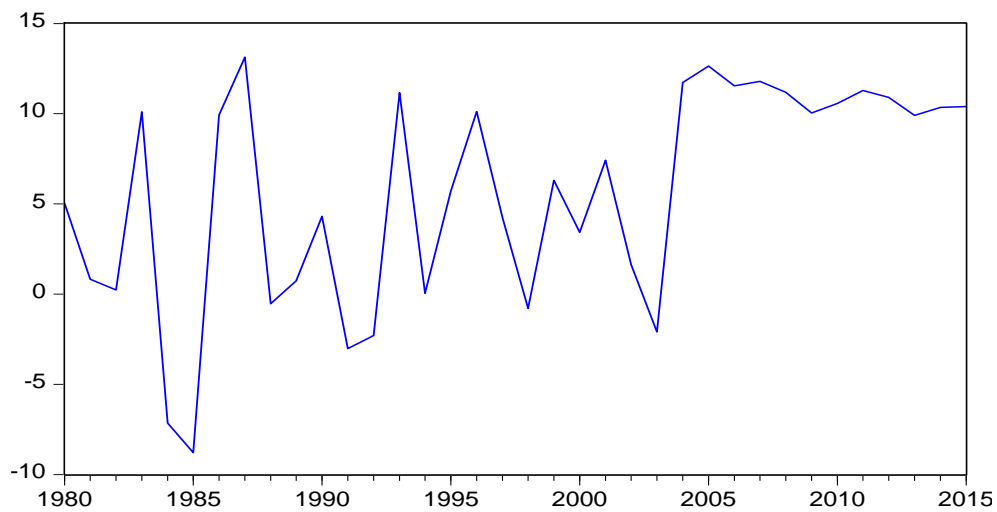
LnRI



LnTOT



RGDPgr



## Appendix 2 PP Stationarity Test

Variables	P-P t-statistic at level I(0)		P-P t-statistic at first difference I(1)		Order of Integration
	Intercept (C)	Trend and intercept(C &T)	Intercept (C)	Trend& (C&T)	
CAB/GDP	(1.819)	(3.461)***	(8.577)**	(8.254)**	I(0)
FDI/GDP	(2.228)	(3.092)	(7.094)**	(6.988)**	I(1)
DR	(1.550)	(2.638)	(5.371)**	(5.279)**	I(1)
LnM2/GDP	(2.936)***	(2.207)	(4.890)**	(5.163)**	I(1)
FB/GDP	(3.599)**	(4.237)**	(9.900)**	(10.714)**	I(0)
LnREER	(1.235)	(1.651)	(4.677)**	(4.579)**	I(1)
LnOPPEN	(0.407)	(1.886)	(4.252)**	(4.176)**	I(1)
LnTOT	(5.854)**	(4.860)**	(5.118)**	(5.261)**	I(0)
RGDPgr	(4.120)**	(6.148)**	(25.578)**	(25.239)**	I(0)
LnRI	(1.361)	(1.158)	(2.934)***	(2.913)	I(1)

### Appendix 3 Regression Result for the Test of Long Run Relationship

Dependent Variable: CAB\_GDP

Method: ARDL

Date: 05/07/17 Time: 10:31

Sample (adjusted): 1982 2015

Included observations: 34 after adjustments

Maximum dependent lags: 2 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (2 lags, automatic): FDI\_GDP DR LNM2\_GDP

FB\_GDP LNREER LNOPPEN LNTOT RGDPGR LNRI

Fixed regressors: C

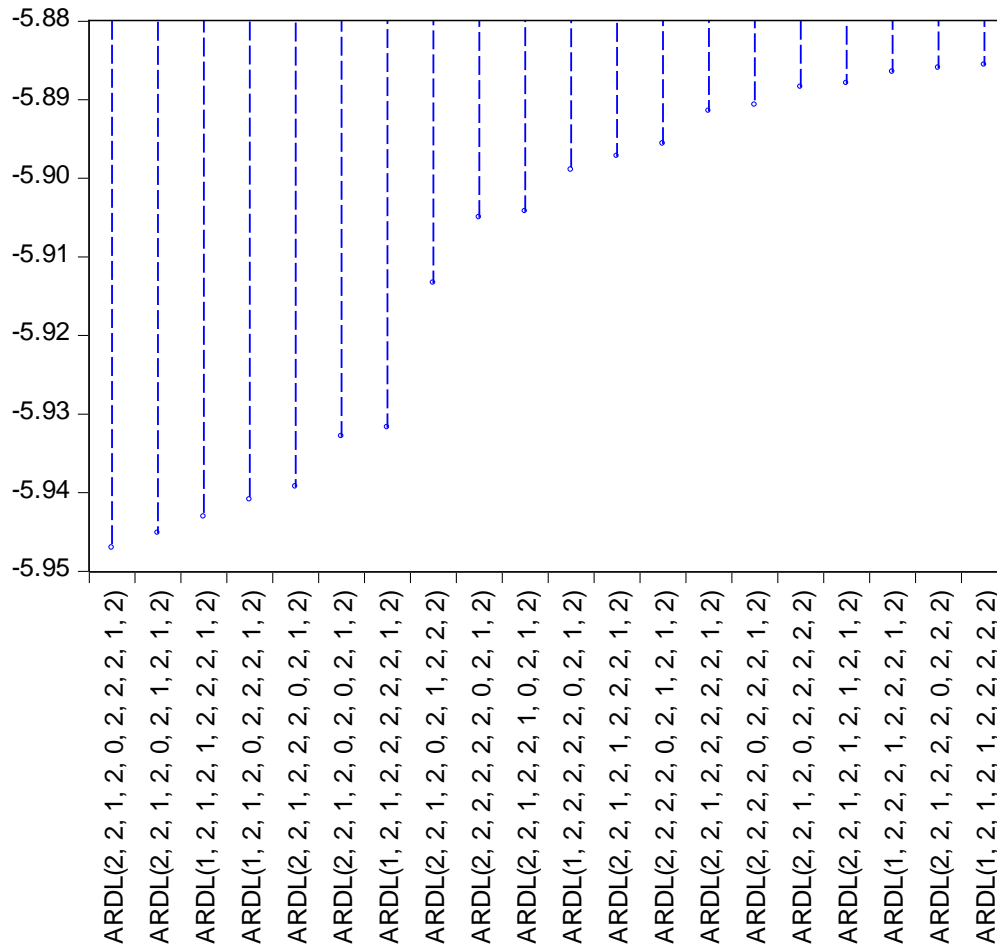
Number of models evaluated: 39366

Selected Model: ARDL(2, 2, 1, 2, 0, 2, 2, 2, 1, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
CAB_GDP(-1)	-0.225446	0.177623	-1.269237	0.2400
CAB_GDP(-2)	0.174522	0.238204	0.732658	0.4847
FDI_GDP	0.518691	0.351113	1.477277	0.1779
FDI_GDP(-1)	-0.178625	0.353008	-0.506008	0.6265
FDI_GDP(-2)	-1.251213	0.402667	-3.107311	0.0145
DR	-0.002791	0.001028	-2.714807	0.0265
DR(-1)	0.003538	0.000874	4.049396	0.0037
LN2M2_GDP	-0.165562	0.075421	-2.195165	0.0594
LN2M2_GDP(-1)	0.019172	0.085617	0.223931	0.8284
LN2M2_GDP(-2)	0.185617	0.086563	2.144310	0.0643
FB_GDP	-0.879187	0.370756	-2.371339	0.0452
LNREER	-0.011904	0.049830	-0.238889	0.8172
LNREER(-1)	0.069837	0.044839	1.557494	0.1580
LNREER(-2)	0.066638	0.034915	1.908567	0.0927
LNOPPEN	0.001352	0.028227	0.047901	0.9630
LNOPPEN(-1)	0.035437	0.033582	1.055246	0.3221
LNOPPEN(-2)	-0.020842	0.029463	-0.707382	0.4994
LNTOT	-0.036904	0.015429	-2.391925	0.0437
LNTOT(-1)	0.038690	0.018880	2.049185	0.0746
LNTOT(-2)	-0.034834	0.014420	-2.415598	0.0421
RGDPGR	-0.001677	0.000898	-1.868075	0.0987
RGDPGR(-1)	-0.003260	0.001069	-3.049074	0.0158
LNRI	0.093935	0.051737	1.815627	0.1070
LNRI(-1)	0.006141	0.064104	0.095799	0.9260
LNRI(-2)	-0.143306	0.072071	-1.988389	0.0820
C	-1.453993	1.415433	-1.027242	0.3344
R-squared	0.967645	Mean dependent var	-0.072134	
Adjusted R-squared	0.866535	S.D. dependent var	0.032493	
S.E. of regression	0.011871	Akaike info criterion	-5.947023	
Sum squared resid	0.001127	Schwarz criterion	-4.779806	
Log likelihood	127.0994	Hannan-Quinn criter.	-5.548969	
F-statistic	9.570248	Durbin-Watson stat	2.317414	
Prob(F-statistic)	0.001283			

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

Akaike Information Criteria (top 20 models)



#### Appendix 4

ARDL Bounds Test

Date: 05/07/17 Time: 10:36

Sample: 1982 2015

Included observations: 34

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	3.438767	9

#### Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	1.88	2.99
5%	2.14	3.3
2.5%	2.37	3.6
1%	2.65	3.97

## Appendix 5

### Diagnostic Test Results for Long Run Model

#### A .serial correlation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	4.176025	Prob. F(2,6)	0.0731
Obs*R-squared	19.78600	Prob. Chi-Square(2)	0.0001

#### B. heteroskedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.058651	Prob. F(25,8)	0.5010
Obs*R-squared	26.10823	Prob. Chi-Square(25)	0.4018
Scaled explained SS	1.727302	Prob. Chi-Square(25)	1.0000

#### C. functional form

Ramsey RESET Test

Equation: UNTITLED

Specification: CAB\_GDP CAB\_GDP(-1) CAB\_GDP(-2) FDI\_GDP  
FDI\_GDP(-1) FDI\_GDP(-2) DR DR(-1) LNM2\_GDP LNM2\_GDP(-1)  
LNM2\_GDP(-2) FB\_GDP LNREER LNREER(-1) LNREER(-2)  
LNOPPEN LNOPPEN(-1) LNOPPEN(-2) LNTOT LNTOT(-1) LNTOT(-2)  
RGDPGR RGDPGR(-1) LNRI LNRI(-1) LNRI(-2) C

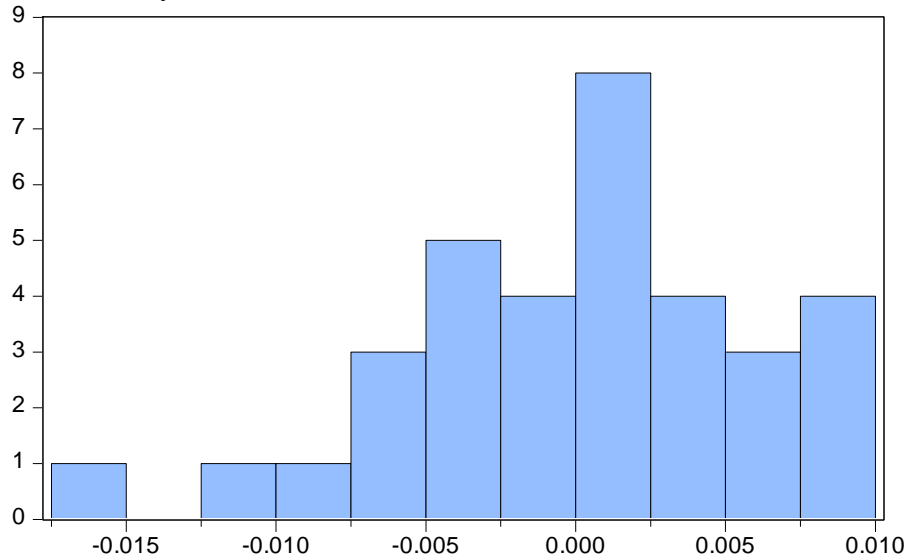
Omitted Variables: Powers of fitted values from 2 to 3

	Value	df	Probability
F-statistic	0.200172	(2, 6)	0.8238

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	7.05E-05	2	3.53E-05
Restricted SSR	0.001127	8	0.000141
Unrestricted SSR	0.001057	6	0.000176

d. Normality



Series: Residuals	
Sample 1982 2015	
Observations 34	
Mean	6.33e-18
Median	0.000800
Maximum	0.009307
Minimum	-0.016266
Std. Dev.	0.005845
Skewness	-0.663123
Kurtosis	3.390004
Jarque-Bera	2.707296
Probability	0.258296

**Appendix 6**

Long Run Auto Regressive Distributed Lag Estimation Result  
 Dependent Variable: CAB\_GDP

Selected Model:  
 ARDL(2, 2, 1, 2, 0, 2,  
 2, 2, 1, 2)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI_GDP	-0.866997	0.752590	-1.152017	0.2826
DR	0.000711	0.001006	0.706390	0.5000
LNLM2_GDP	0.037327	0.049385	0.755838	0.4714
FB_GDP	-0.836586	0.358499	-2.333580	0.0479
LNREER	0.118535	0.044734	2.649777	0.0293
LNOPPEN	0.015175	0.025229	0.601472	0.5642
LNTOT	-0.031447	0.013391	-2.348345	0.0468
RGDPGR	-0.004698	0.001969	-2.386274	0.0441
LNRI	-0.041135	0.046372	-0.887075	0.4009
C	-1.383538	1.031749	-1.340964	0.2168

## Appendix 7

### Pair wise Granger Causality Tests

Date: 05/09/17 Time: 14:14

Sample: 1980 2015

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
FDI_GDP does not Granger Cause CAB_GDP	34	8.75065	0.0011
CAB_GDP does not Granger Cause FDI_GDP		0.92061	0.4096
DR does not Granger Cause CAB_GDP	34	8.85896	0.0010
CAB_GDP does not Granger Cause DR		1.25814	0.2992
LN2M2_GDP does not Granger Cause CAB_GDP	34	0.43733	0.6499
CAB_GDP does not Granger Cause LN2M2_GDP		3.29311	0.0514
FB_GDP does not Granger Cause CAB_GDP	34	0.75258	0.4801
CAB_GDP does not Granger Cause FB_GDP		3.82770	0.0335
LNREER does not Granger Cause CAB_GDP	34	3.29440	0.0514
CAB_GDP does not Granger Cause LNREER		0.14722	0.8637
LNOPEN does not Granger Cause CAB_GDP	34	1.88602	0.1698
CAB_GDP does not Granger Cause LNOPEN		0.46460	0.6330
LNTOT does not Granger Cause CAB_GDP	34	0.53994	0.5885
CAB_GDP does not Granger Cause LNTOT		0.02592	0.9744
RGDPGR does not Granger Cause CAB_GDP	34	1.89289	0.1688
CAB_GDP does not Granger Cause RGDPGR		7.48621	0.0024
LNRI does not Granger Cause CAB_GDP	34	3.03000	0.0638
CAB_GDP does not Granger Cause LNRI		0.01154	0.9885

## Declaration

I, the undersigned, declare that this project paper is my original work and has not been presented for Masters Degree in any other university, and that all sources of materials used here have been duly acknowledged.

Declared by:

Name: Tesfalem Fitwi

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Confirmed by (Advisor)

Name: Girma Estiphanos (PhD)

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Place and date of submission: Addis Ababa/Jun 2017