# Journal of
# Economics and
# International Finance

Academic
Journals

# ABOUT JEIF

The **Journal of Economics and International Finance (JEIF)** is published monthly (one volume per year) by Academic Journals.

**Journal of Economics and International Finance (JEIF)** is an open access journal that provides rapid publication (monthly) of articles in all areas of the subject such as econometrics, trade balance, Mercantilism, Perfect competition etc. The Journal welcomes the submission of manuscripts that meet the general criteria of significance and scientific excellence. Papers will be published shortly after acceptance. All articles published in JEIF are peer-reviewed.

**Contact Us**

# Editors

**Prof. Nathalie Jeanne-Marie HILMI**
*Professor of Economics and Finance,*
*International University of Monaco,*
*Hedge Funds Research Institute,*
*98000 Monte-Carlo, Principality of, Monaco.*
*France*

**Prof. Osamah M. Al-Khazali**
*Professor of Finance,*
*School of Business and Management*
*American University of Sharjah,*
*P.O. Box 26666,*
*United Arab Emirates,*

**Dr. Guneratne B Wickremasinghe**
*School of Accounting*
*Faculty of Business and Law*
*Victoria University*
*Melbourne*
*Victoria, 8001.*
*Australia*

**Dr. Meltem Gürünlü**
*Department of Economics and Finance*
*University of Turin,*
*G.Prato,*
*Italy.*

**Prof. Yongrok Choi**
*Department of International Trade,*
*Inha university,*
*Incheon,*
*Korea.*

**Prof. Mohamed Osman Ahmed Bushara**
*Department of Agricultural Economics;*
*FAS; Gezira University; P. O. Box 20; Wad Medani;*
*Sudan.*

**Prof. Anyanwu John Chukwudi**
*Development Research Department*
*African Development Bank*
*15 Avenue du Ghana*
*BP 323, 1002 Tunis Belvedere*
*Tunis*
*Tunisia*

**Prof. S. E. Neaime**
*Department of Economics,*
*Institute of Financial Economics,*
*American University of Beirut,*
*Beirut,*
*Lebanon.*

**Dr. Adrei Vernikov**
*Banking Department,*
*Higher School of Economics*
*P.O. Box 43,*
*Moscow 125057,*
*Russia.*

**Prof. Keith Pilbeam**
*Department of Economics,*
*City University,*
*Northampton Square,*
*London EC1V OHB.*
*UK.*

# Journal of Economics and International Finance

## Table of Contents:  Volume 9 Number 11   December 2017

## ARTICLE

*Full Length Research Paper*

# Birr devaluation and its effect on trade balance of Ethiopia: An empirical analysis

## Fassil Eshetu

Department of Economics, College of Business and Economics, Arba Minch University, Ethiopia.

This study examined the effect of Birr devaluation on trade balance of Ethiopia for the period 1970-2014 using the Vector Error Correction Model. The key results of the present study revealed that Birr devaluation deteriorates the trade balance of Ethiopia in the short run and improves it in the long run. Moreover, the result from the long and short run models showed that real effective exchange rate, money supply, domestic real income and term of trade are the major determinants of the trade balance of Ethiopia both in the short and long run. Besides the short and the long run model, the impulse response function and the descriptive analysis revealed that a J-curve phenomenon exists for the trade balance of Ethiopia. That means, the finding of this study showed that the Marshall-Lerner Condition holds only in the long run. So, the present study revealed that the elasticity, monetary and absorption theories are significant in explaining the trade balance of Ethiopia. The policy implication is that policies that encourage productivity improvements, diversification of the export sectors and expansion of import computing industries are alternative policies for devaluation. Moreover, government may need to be conservative in using devaluation (exchange rate policy) to improve trade balance as it may worsen the situation in the short run. Thus, the country on the process of industrialization, first needs to promote import computing industries and then, once the production gets its way, devaluation would be clear.

**Key words:** Marshal Lerner condition, currency devaluation, J curve phenomenon, co-integration analysis.

## INTRODUCTION

Exchange rate is one of the key barometers of economic performance, indicating output growth, demand conditions, levels and trends in monetary and fiscal policy stance. Exchange rate policy emerged as one of the controversial policy instruments in developing countries in the 1980s, with strong opposition to devaluation for fear of its inflationary impact, among other effects. Due to their vulnerability to external shocks, less developed countries have considered the exchange rate as the central policy issue over the years. The external economic shocks, as argued, contributes to the deterioration of the trade balance, domestic inflationary pressure and the overall competitive position of less developed countries (UNCTAD, 2005).

The legal currency of Ethiopia was issued on 23 July, 1945 by defining the monetary unit as the Ethiopian

dollar. The currency Proclamation of 1945, defined the monetary unit of the country as the Ethiopian dollar with a value of 0.355745 g of fine gold. The linkage with fine gold was in accord with the monetary system established by the Bretton Woods Agreement of 1944 and automatically established the exchange rate between the national currency and other currencies with the same arrangement.

Accordingly, the official exchange rate of Ethiopian currency with US dollar was created, with the official exchange rate of 2.48 birr per United State dollar, on July 23, 1945. After almost two decades, that is, 1 January1964, the Ethiopian birr was slightly devalued to 2.50 birr per US dollar. During the collapse of the Bretton Woods System in 1973, Ethiopian birr was revalued to 2.07 birr per US dollar. Since then, the Ethiopian currency was pegged to the US dollar at the rate of 2.07 birr per dollar until massive devaluation of October 1992 (Degefa, 2001).

In May 1991, the Ethiopian landscape was markedly overwhelmed by major economic and political changes. The military government that terrorized the country for 17 years collapsed and the transitional government of Ethiopia assumed the political power. Under the new reform program, foreign trade and exchange rate regimes were liberalized; prices of inputs and outputs were decoupled from arbitrary government regulation and interference; the financial market was reformed to allow private sector participation in commercial banking, insurance and micro credit services; export tariffs were abolished; export subsidies to domestic, export-oriented firms were eliminated and were replaced by incentives that provided the duty-free importation of raw materials.

Moreover, in October 1992, Ethiopia's national currency was devalued by 142% from its pegged rate of 2.07 per US dollar to 5 per US dollar, showing the first major change on the value of birr. Currency devaluation is designed to improve the external imbalance, boost output growth in general and export growth in particular. Though still fragile and vulnerable to the vagaries of nature and aid money, the export sector in Ethiopia has shown tangible improvements since the country abandoned the fixed exchange rate regime in 1991. For instance, export receipts have increased by 35 fold between 1990/1991 and 2009/2010. The export industry has also shown significant diversification away from its dependence on coffee. In 1991/1992, when the reform package was launched, coffee brought 53% of the country's total export revenue but in 2008/2009, its share declined to 26% while the shares of other goods such as oilseeds, chat, gold, flower, leather and leather products increased substantially. Though much of this diversification is within the same industry, the overall result shows a significant departure from the traditional, mono-crop dominated export sector. However, at worst, the problem is that import is near unresponsive to currency devaluation and its value increases by more

than export value and this lead to further deterioration of the trade balance of Ethiopia. For instance, according to the data from Ethiopian Custom Authority, import spending has increased by 58 fold between 1990/1991 and 2009/2010.

The total export values of Ethiopia during 2012/2003, 2013/2014 and 2014/2015 were 3115.8, 3300.1 and 3019.3 million US dollar, while the total import values during the same periods were 11,460.6, 13,712.3 and 16,458.6 million US dollar, respectively. So, the export earnings of Ethiopia in 2014/2015 reduced by 8.5% as compared to export earnings in 2013/4 and this is mainly due to slowdown in export earnings from oilseeds, gold, chat, pulses, live-animals and electricity. But, total imports in 2014/2015 increased by 20% over last year and this is as a result of a rise in imports of capital goods, consumer goods, semi-finished goods and raw materials. As a result, the trade deficit in merchandise trade during 2014/2015 stood at USD 13.4 billion, widened by 29.1% relative to the preceding fiscal year mainly due to the significant growth in total import bills coupled with low performance in the growth of total export proceeds (NBE, 2015).

Having faced with widening gap between export and import values, lack of diversification, and shortage of foreign currency, Ethiopian government has undertaken a continuous devaluation of its currency, birr. But, the gap between export receipts and import payments has been rising following the massive devaluation of Ethiopian birr by 142% in 1992. It seems, therefore, that birr devaluation has failed to narrow the gap between export receipt and import payment and even leads to further deterioration of the trade balance of Ethiopia.

Study by Agbola (2004) on Ghana Economy, Shahbaz and Abdul (2010) on Pakistan Economy, Aziz (2008) on Bangladesh Economy, El-Ramly and M. Abdel-Haleim (2006) on Egyptian Economy and Ratha (2010) on China economy, found that currency devaluation deteriorates the trade balance of a country. Frank Agbola also found that there is no J-curve phenomenon for the trade balance of Ghana. However, movement of the trade balance in response to change in exchange rate appears to be characterized by an M-curve phenomenon. Similarly, Shahbaz and Abdul (2010) also tested the J-phenomenon for the trade balance of Pakistan and they found that there was no evidence of J-curve phenomenon.

Marial and Ahmad (2005) examined the effect of devaluation of currency on trade balance for three North Africa countries: namely Morocco, Egypt and Tunisia. They found that devaluation improves only the trade balance of Morocco in the long run. Moreover, Oylinlola (2011) examined the effect of devaluation on trade balance of four countries of West African Monetary Zone, namely Gambia, Nigeria, Sierra Leone and Ghana, and he found that devaluation improves only the trade balance of Nigeria in the long run. The study also found

the J-curve phenomenon only for Nigeria.

But, the study by Edward and Wilcox (2003) on South African economy, Kamoto (2006) on Malawi economy, Hailemariam (2011) on Ethiopian economy and Lawrence (2001) on South African economy, found that currency devaluation improves the trade balance of a country.

Loto (2011) examined the Marshall Lerner condition for the trade balance of Nigeria. The study adapted the elasticity approach of the Marshall-Lerner condition to the balance of payment adjustment mechanism. The empirical results showed that devaluation does not improve the trade balance of Nigeria since the sum of demand elasticities for imports and exports is less than unity (0.78). On the contrary, Bahmani-Oskooee (1998) applied the Johansen and Juselius cointegration technique to estimate the trade elasticities for Greece, Korea, Pakistan, Philippines, Singapore and South Africa and found that the Marshall-Lerner condition holds for these countries in the long run.

Thus, despite the colossal effort that Ethiopian government has made to buoy export performance, and curtail imports via its expenditure switching policy (devaluation), there has been a persistent rise in trade deficit of Ethiopia over the past 25 years. In spite of the wide interest in the impact of devaluation on the trade balance of a country, most empirical research on this topic that focused on African countries in general and Ethiopia in particular, has been extremely limited. Taye (1999) applied a macro-simulation approach to a macroeconomic model for Ethiopia. His results indicated that devaluation has a positive impact on the trade balance because of the reduction in imports and stagflationary via its impact on output and employment.

This study therefore, tried to assess devaluation works via supply channel or demand channel by examining the effects of birr devaluation on the trade balance of Ethiopia using econometric approach as opposed to macroeconomic- simulation method that was used by Taye (1999). Taye did not examine the J-curve phenomenon for the trade balance of Ethiopia but this study does.

The overall objective of this study is to test the effect of currency devaluation on the trade balance of Ethiopia for the period 1970-2014 using Vector Error Correction Model (VECM) which was developed by Johansen (1987) and Johansen and Juselius (1990). In line with this general objective, the study also tried to achieve the following specific objectives with the methodology at hand.

1. This study aimed to investigate the effects of Birr devaluation on trade balance of Ethiopia.
2. This study also planned to check whether the J-curve phenomenon exists for the trade balance of Ethiopia
3. In addition, the present study tried to check the relative relevance of the absorption theory, monetary theory and elasticity theory of trade balance in explaining the trade

balance of Ethiopia.

## SURVEY OF THE RELEVANT LITERATURE

Starting from the advent of floating exchange rate in 1973, there has been a heated debate on the effect of devaluation on the trade balance. Several theories have been used to analyze the effects of exchange rate movements on the trade balance in developing countries and these include the structuralists' (elasticity theory), the Keynesian and the monetary theories. The elasticity theory argues that the price effect outweighs the volume effect in the short run while the volume effect dominates the price effect in the long run (Krueger, 1983).

The monetary theory on the other hand, insists that devaluation increases the domestic price and this leads to a fall in real money supply. As a result of the fall in real money supply, imports decreases and trade balance improves. On the other hand, monetary theory also argues that higher money supply leads to trade deficit, whereas lower money supply causes surplus in trade balance. The last but not the least one is the Keynesian theory or absorption approach which assumes that devaluation improves a trade balance of a nation if the substitution towards domestic goods in response to the change in relative price boosts output more than spending (Pilbeam, 1998).

Furthermore, empirics on the impact of currency devaluation on trade balance of devaluating nation in general has shown a contradicting results presented in this chapter. Thus, this section presented the various theories and empirical results on the effect of currency devaluation on trade balance of a nation.

### The elasticity theory trade balance

Whether devaluation improves the trade balance of the devaluating nation depends on the elasticity of foreign demand for the nation's export and the elasticity of domestic demand for imported goods in that nation, according to elasticity approach. Put differently, if the foreign demand for a nation's export is inelastic, then a devaluating nation will not be able to increase its foreign exchange earnings. This is because, even if devaluation has made the nation's export cheaper for the foreigners, the foreign countries' demand for a nation's export has failed to increase. This will not improve the trade balance of devaluating countries.

In the same way, if the devaluating nation's demand for imported foreign goods is inelastic, the level of a nation's import will remain the same as before. However, devaluation has made imports costly to a devaluating nation and this implies that a devaluating nation will now spend more dollars on fixed amount of imports thereby leading to the worsening of the trade balance of the

nation. But, if on the other hand, both the demand for import of a nation and the demand for export of a nation are elastic, devaluation improves the trade balance of a nation. Thus, the success and the failure of devaluation in correcting the disequilibrium in foreign sector depend mainly on the elasticity of demand for export of a nation and elasticity of demand for imported foreign goods.

Moreover, if the export demand is unitary elastic, currency devaluation has no impact on the trade balance situation of a nation. Simply put, if the export and import elasticities are more elastic, devaluation will help reduce the trade balance disequilibrium of a nation but, when these elasticities are lower, devaluation is helpless in correcting the disequilibrium in the foreign sector of a nation. Even worst, it will increase the size of deficit and worsen the trade balance situation of a nation. However, import demands for developing countries like Ethiopia, are inelastic as their imports are primarily composed of capital goods, semi-finished goods, fuels and the like of which, a nation cannot cut their imports. Similarly, small developing countries have in elastic export supply curve as their export is mainly composed of primary agricultural commodities with a longer gestation period (Mannur, 1995).

## The absorption theory of trade balance

Under elasticity approach, devaluation is assumed to work on trade balance via its price effects, so that devaluation directly increase the prices of imports and reduce the price of exports, and leads to improvement in the trade balance of a nation if import and export demand elasticities are large enough. So, under elasticity approach, the effects of currency devaluation are on external variables viz. exports(X) and imports (M) (Keynes, 1936).

However, the Keynesian theory considers macro approach towards the impact of devaluations which considers the income effect. According to this theory, devaluation affects domestic variables viz. consumption, investment and national income and this need to be taken into account in analyzing the effects of devaluation on the balance of payment situation of a nation. The national income equation of an open economy is given as:

$$Y + M = C + I + G + X \qquad (1)$$

Where, $Y, M, C, I, G$ and $X$ are total national incomes (GDP), imports, domestic consumption, investment spending, government purchases and exports, respectively. Furthermore, the left sides of the above equation represents the total supply in an economy which is the sum of the total domestic supply (Y) and total imports (M), whereas the right hand side of the equation shows the way these total supply in an economy are

spent or the total demand viz. consumption, investment, government purchase and exports. The above national income equation can be written as:

$$Y = C + I + G + (X - M) \qquad (2)$$

This equation states that domestic supply (Y) in an open economy is given by domestic absorption plus net exports. That means in an open economy, domestic output level equals domestic spending plus trade balance. By substituting A for domestic spending (C, I and G) and (X-M) by TB, we can drive a trade balance equation for an open economy as follow:

$$TB = Y - A \qquad (3)$$

Where, TB is a trade balance or net export, $A$ is a domestic expenditure or absorption, $Y$ is domestic output level (GDP). This implies that trade balance can be improved if domestic output level exceeds domestic spending. Devaluation, according to this theory, reduces trade deficit if the substitution towards the domestic goods as a result of devaluation increases output more than domestic expenditures. Put differently, devaluation improves a trade balance of a nation only if it raises a nation's income (Y) more than a domestic expenditure or if there is expenditure switching effect in the correct direction and amount. Equation 3 also helps to determine a number of key variables that have effect on imports and exports and hence trade balance of Ethiopia.

## The monetary theory of trade balance

Mundell and Johnson (1960) developed the monetary approach towards the balance of trade and stated that the balance of trade is essentially a monetary phenomenon. According to this theory, balance of trade deficit and surplus is caused by easy and tight monetary policy, respectively. Currency devaluation has an impact on the balance of trade via its impact on the real money supply. This means that, when there is currency devaluation, domestic prices rise and real money supply decreases which will lead to lower imports. However, if devaluation of currency is followed by further rises in the nominal money supply, the initial disequilibrium will re-establish and the positive impact of devaluation will be negated. Therefore, according to the monetary theory of trade balance, devaluation leads to improvement in trade balance of a nation via its demand channel by decreasing imports as long as the money supply remains unchanged (Blanchard, 1993).

The essence of this theory is that the trade deficit and surplus in the balance of payments is denoted as disequilibrium in the money market. So, the trade deficit or surplus or disequilibrium in the money market is a transitory phenomenon which lasts only until government

responds by changing money supply. According the monetary theory, the country's supply of money is given by:

$$H = D + F \qquad (4)$$

Where, H, D and F are the nation's total money supply, domestic components of the nation's monetary base and the foreign components of the nation's monetary base, respectively. This money supply equation can be written as:

$$\Delta NFA = \Delta H - \Delta D \qquad (5)$$

Where $\Delta NFA$, $\Delta H$ and $\Delta D$ denote the change in net foreign assets, total money supply of a nation, and the central bank's extension of domestic credit. The above equation states that the change in the central bank's holding of foreign assets is equal to the change in the stock of high powered money minus the change in the domestic credit. The important point about the above equation is that $\Delta NFA$ is the balance of payment. The domestic component of the nation's monetary base (D) is the domestic credit created by the nation's monetary authority. Thus, the external balance is given by:

$$M - X = Fs - \Delta R \qquad (6)$$

But, $\Delta R$ is a change in international reserve and the same as $\Delta NFA$. Thus, Equation 6 shows that import minus exports is equal to foreign saving (Fs) less than the change in international reserve ($\Delta R$). Therefore, the relationship between trade balance (external balance) and the monetary account can be written as follows from Equations 5 and 6:

$$X - M = (\Delta H - \Delta D) - Fs \qquad (7)$$

Equation 7 shows how the external account and the monetary accounts are related and the monetary theory of trade balance states that change in domestic money supply is negatively related to the trade balance of a country. This means an excess stock of money supply will lead to an out flow of reserves (import increases) or a balance of payment deficit. It is clear from Equation 7 that devaluation improves the trade balance of a nation in line with the monetary theory. If there is disequilibrium in the money market, this will lead to greater import or export which in turn brings equilibrium in the money markets via its impact on the nation's monetary base. This implies that when the money market is in equilibrium, so does the balance of payments. Therefore, the nation's balance of payments surplus/deficit is a temporary and self-correcting phenomenon (Dornbusch, 1990, 1998; Dornbusch and Fischer, 1996).

## The J-curve phenomenon

The J-curve phenomenon predicts that the long run and the short run effects of devaluation on the trade balance are not the same. The time path which the balance of trade follows generates a J-curve phenomenon. The nation's trade balance may worsen sooner after devaluation or depreciation, before improving later. This is mainly due to the tendency of the domestic currency price of imports to rise faster than export price, soon after devaluation, with quantities not changing very much. But, in the long run, there are two volume effects which move in opposite direction. The volume of export should increase and the volume of import should decrease because imports are more expensive. Therefore, in the very short run, the price effect will dominate the volume effect while the volume effect will dominate the price effect in the long run. This is mainly due to the difference in elasticity of demand and supply in the short and long run, with the long-run elasticities generally exceeding the short-run elasticities. This difference between the long and short-run elasticities laid the foundation for the J-curve effect of devaluation (Lindert, 1993).

## RESEARCH METHODOLOGY

### Model specification

In this study, three different theories were used to specify an empirical model which helps to achieve the stated objectives of the study. The absorption, the elasticity and the monetary theories of trade balance were used for the analysis of trade balance of Ethiopia. The trade balance is conventionally measured as the total value of exports less imports. This study, however, uses the ratio of exports to imports values. The merit of this choice is that the unit of measurement is unimportant and the constructed variable can be conveniently interpreted as nominal or real trade balance. As mentioned above, the absorption theory, the elasticity theory and the monetary theory of trade balance were used to analyze the trade balance of Ethiopia. The relative relevance of the above three theories of trade balance in explaining the trade balance of Ethiopia were also tested in the present study together with the response of the trade balance of Ethiopia to birr devaluation. The absorption theory (Keynesian theory) was used to relate exchange rate with trade balance and develop a theoretical frame work for our trade balance model which incorporates the various theories of trade balance. Thus, the theoretical frame work for the trade balance of Ethiopia is given as follows:

$$TB = Y - A = X - M = PxQx\,(Px/E, Y*) - EPmQm\,(EP*m, Y) \qquad (8)$$

Where TB is a trade balance, X is export revenue, M is import expenditure, $P_x$ is export price in home currency, $Q_x$ is quantity of export, E is the nominal exchange rate, Y* is foreign income, $P*_m$ is the price of import in foreign currency, $Q_m$ is the quantity of import and Y is the domestic national income. Therefore, the main determinants of a trade balance of a nation are exchange rates, domestic real income, interest rate, money supply, government expenditure and relative price or term of trade. Thus, the Keynesian/absorption theory asserts that if devaluation is to succeed in eliminating the disequilibrium in the foreign sector or trade deficit, then a nation as a whole must be producing more outputs of goods and services than it is consuming or absorbing by

way of higher consumption and investment expenditures (Pilbeam, 1998).

Therefore, using Equation 1, a comprehensive model that incorporates the synthesis of the various theories of trade balance (the absorption, elasticity and monetary theories) was specified for Ethiopia as follows:

$$LTBt = \beta0 + \beta1LREERt + \beta2LYt + \beta3LGt + \beta4LMSt + \beta5LTOT + \beta5LR + \varepsilon t \quad (9)$$

Where, $LTB_t$ is the log of trade balance which is defined as the ratio of exports value to imports, such that an increase implies an improvement of the trade balance and $LY_t$, $LREER_t$ $LG_t$, $LMS_t$, $LTOT_t$ and $LR_t$ refers to the log of domestic real income, real effective exchange rate, government expenditure, domestic money supply, term of trade and interest rate, respectively. The coefficient of $LREER_t$, $\beta_1$, is of key interest here.

The regression of the trade balance as it appears in Equation 2 on real effective exchange rate[1], domestic real income, money supply, term of trade or relative price and interest rate can be driven from the perspective of three approaches to the balance of trade analysis. The elasticity approach focuses on exchange rate as the determinants of the trade balance and thus the relevant coefficient is $\beta_1$. The monetary approach assumes money supply as the determinants of the trade balance and hence the relevant coefficient to analyze the trade balance of a nation is $\beta_4$. Furthermore, the absorption approach considers domestic real income level as key determinants of the trade balance of a nation (Salvatore, 2001).

In Ethiopian case, an increase in real domestic income ($Y_t$) increase the volumes of imports from the trading partners and hence the estimate of $\beta_2$ is expected to be negative. The coefficient of domestic money supply ($MS_t$), interest rate ($R_t$) and term of trade ($TOT_t$) are expected to be negative in line with economic theories. The coefficient of real effective exchange rate ($REER_t$) in the above model is indeterminate.

**Types and sources of data**

The study exclusively used secondary data for the period 1970-2014. This means, 44 years data were used in this study to estimate our model and answer the basic objectives of the study. The study used annual data because there are no quarterly data for most macroeconomic variables in Ethiopia. The main sources of these data include the National Bank of Ethiopia, World Bank, Ethiopian Economic Association Data Base, Ministry of Finance and Economic Development and UNICTAD.

**Methods of data analysis**

Before carrying out the estimation of the above models, the time series characteristics of all data were examined and vector auto regressive (VAR) model was used. This means, VAR model was used because it implies that all the variables in the model are treated as endogenous. In many time series analysis, one of the most important preliminary steps in regression analysis is to test the

---

[1]Nominal exchange rate is the amount of US dollars that will be obtained for one birr in foreign exchange market or it is merely the price of one currency in terms of other currency. But, the real exchange rate is the nominal exchange rate adjusted for relative prices between the nations under consideration. Similarly, NEER is a trade weighted average of the bilateral nominal exchange rate of all the major trading partners of Ethiopia, whereas the REER is a trade weighted bilateral real exchange rate of all the major trading partners of Ethiopia. Therefore, in this study, a fall in REER and NEER refers to devaluation.

stationarity of the data used in the analysis. The main goal of under taking stationarity test is to get a variable which has a constant mean, variance and covariance. The regression results from the above models may be spurious if trade balance, real effective exchange rate, money supply, real GDP, term of trade and interest rate are all non-stationary. So, test of co-integration to check the existence of long run relationship between all variables in the model has a paramount importance in time series data analysis.

This study used the classical unit root test, namely, the Augmented Dickey-Fuller (ADF) test for the stationarity of the series (Dickey and Fuller, 1979 and 1981). Augmented Dickey-Fuller test is based on the null hypothesis that a unit root exists in the time series (Guajarati, 1995). Using this ADF test, all the variables included in the models were tested for unit roots both at level and at first difference.

As shown in Table 1, all the variables are not stationary at level with lag of zero. Similarly, at lag one and two, all the variables are non-stationary at level. One way of converting non-stationary series into stationary series is to differentiate the data and in this study, the first differences of all variables in the model were tested for unit root and the result showed that all variables are integrated of order one. This means, they are stationary at first difference and thus, the test result from Table 2, revealed that all variables in the model are integrated of order one.

One of the most important steps after stationary test is the determination of the lag length which should be incorporated in the model. Once the optimal lag length is determined for the model, the next step in Johansen's co-integration analysis is to determine the number of co-integrating vector for the model. In this study, a common lag length of two is selected for our trade balance equation using the various information criteria.

Having established that all variables are integrated of the same order, cointegration test is the appropriate method for detecting the existence of long-run relationship. Johansen (1990) and Johansen and Juselius (1990) methodologies was used to test for the existence of long run relationship between various variables in the model (Table 3).

As seen from the result of the test, the maximum Eigenvalue test indicated that the null hypothesis of no cointegration vector is rejected since the test statistic (66.39) is greater than the 95% critical value (46.23). But the null hypothesis of one co-integration vector is not rejected and it can be concluded that there is one cointegrating vector.

**DATA PRESENTATION AND DISCUSSION**

**Descriptive data analysis**

Here deals with the descriptive analysis of the present study. It presents the trend analysis of exchange rate, trade balance, export values, import values and the likes. Ethiopia has been experiencing three distinctive foreign trade policies such as the relatively liberal trade regime, the highly controlled trade regime and the market oriented trade regime corresponding to the Imperial Era, the Derg Era and the current Ethiopian government, respectively. In the imperial era, except for some essential consumer items, imports were free from licensing or other quantitative restrictions and exporters were required to give their foreign exchange to commercial banks at the prevailing official exchange rate and this led to the existence of macroeconomic stability and a relatively liberal trade regime (Befikadu and Kebre,

**Table 1.** The result of unit root tests of variables at level using ADF test.

| Variables | Test of stationarity at first difference using ADF | | | | | |
| | Lag length 0 | | Lag length 1 | | Lag length 2 | |
| | With drift | With drift and trend | With drift | With drift and trend | With drift | With drift and trend |
|---|---|---|---|---|---|---|
| LREER | -1.0284 | -1.6104 | -1.2411 | -2.0645 | -1.0818 | -1.897 |
| LTB | -2.0902 | -3.1191 | -1.5202 | -2.9365 | -1.5202 | -2.390 |
| LMS | -0.51564 | -2.3077 | -0.57471 | -1.8931 | -0.66491 | -1.4576 |
| LY | 0.4726 | 2.031869 | 0.2164 | -2.073618 | 1.6091 | 3.4395 |
| LTOT | -0.4893 | -1.6688 | -0.43849 | -1.5989 | -0.41139 | -1.5380 |
| LG | 0.11094 | -1.6620 | -0.06787 | -2.2881 | -0.047572 | -2.334 |
| LR | -2.7781 | -3.791* | -2.1918 | -2.7363 | -2.0558 | -2.62 |
| Critical value | 1% | | -3.617 and-4.224 without and with trend, respectively | | | |
| | 5% | | -2.942 and -3.535 without and with trend, respectively | | | |

Source: Own computation using Eview Software (2016).

**Table 2.** The result of unit root tests of variables at first difference using ADF test.

| Variable | Test of stationarity at first difference using ADF | | | | | |
| | Lag length 0 | | Lag length 1 | | Lag length 2 | |
| | With drift | With drift and trend | With drift | With drift and trend | With drift | With drift and trend |
|---|---|---|---|---|---|---|
| DLEXR | -4.636** | -4.554** | -4.042** | -3.9895* | -3.7623** | -3.7281* |
| DLTB | -7.1074** | -7.130** | -6.125** | -6.1375** | -5.4357** | -5.436** |
| DLMS | -7.5289** | -7.4061** | -5.7654** | -5.6553** | -4.1236** | -4.0268* |
| DLY | -4.7943** | -5.6316** | -4.8131** | -6.2954** | -2.1945 | -3.3554 |
| DLRP | -6.0814** | -6.217** | -4.213** | -4.3972** | -3.7787** | -4.072** |
| DLG | -4.3995** | -4.359** | -3.5532* | -3.5235 | -3.3192* | -3.2942 |
| DLR | -5.2635** | -5.231** | -5.512** | -5.4357** | -4.0355** | -3.9607* |
| DLG | -8.00** | -7.96** | -5.07** | -5.109** | -4.1376** | -4.216* |
| Critical value | 1% | | -3.623 and -4.232 with out and with trend, respectively. | | | |
| | 5% | | -2.945 and -3.539 without and with trend, respectively. | | | |

**, * denotes rejection of the null hypothesis at 5 and 10% significance level, respectively.
Source: Own computation using Eview Software (2016).

2004).

However, the Derge regime (1974-1991) was characterized by persistent fall in real official exchange rate (2.07 birr per USD) and steadily rising real parallel exchange rates, signifying the over-valuation of the currency. The annual average share of imports and exports as percentage of real GDP (measure of openness) stood at 5% during the period. Moreover, the annual average of the trade deficit of Ethiopia during the period was 845.5 million birr, according to the data from Ethiopian Custom Authority.

Realizing the negative effect of an over-valuation of the birr on the country's trade balance and hence, on output level, the Transitional Government of Ethiopia (TGE) devalued the birr gradually many times with an official exchange rate reaching 22 birr per US dollar in 2016.

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

**Table 3.** Johansen's cointegration test for the trade balance equation.

| Unrestricted cointegration rank test (maximum Eigenvalue) | | | | |
|---|---|---|---|---|
| **Hypothesized** | **Eigenvalue** | **Max-Eigen** | **0.05** | **Probability** |
| **Number of co-integrations** | | **Statistic** | **Critical Value** | |
| None* | 0.794172 | 66.39010 | 46.23142 | 0.0001 |
| At most 1 | 0.574598 | 35.89828 | 40.07757 | 0.1373 |
| At most 2 | 0.503013 | 29.36605 | 33.87687 | 0.1573 |
| At most 3 | 0.345373 | 17.79496 | 27.58434 | 0.5122 |
| At most 4 | 0.257779 | 12.52055 | 21.13162 | 0.4972 |
| At most 5 | 0.109775 | 4.883787 | 14.26460 | 0.7565 |
| At most 6 | 0.065366 | 2.839208 | 3.841466 | 0.0920 |

Source: Own computation using Eview Software (2016).

**Table 4.** Share of the values of imports of Ethiopia for the periods 1970-2014.

| Year | Raw materials | Semi-finished | Fuels | Capital goods | Consumer goods | Others |
|---|---|---|---|---|---|---|
| 1970-75 | 4.38 | 20.12 | 12.35 | 27.75 | 34.69 | 0.71 |
| 1976-80 | 3.83 | 17.25 | 17.13 | 31.17 | 28.84 | 1.79 |
| 1981-85 | 3.40 | 13.37 | 21.18 | 34.64 | 27.21 | 0.20 |
| 1986-90 | 2.83 | 14.51 | 10.68 | 40.21 | 31.44 | 0.33 |
| 1991-95 | 2.00 | 12.45 | 15.36 | 33.43 | 31.76 | 4.99 |
| 1996-00 | 1.93 | 16.78 | 16.93 | 34.16 | 25.95 | 4.25 |
| 2001-05 | 1.38 | 16.58 | 15.88 | 30.98 | 32.66 | 2.52 |
| 2006-14 | 2.50 | 16.44 | 16.71 | 32.41 | 28.86 | 3.07 |
| Total | 2.79 | 16.07 | 15.78 | 32.92 | 30.16 | 2.27 |

Source: Own computation from Ethiopian Custom Authority Data (2016).

has experienced a persistent trade balance deficit.

## Total shares of the imports of Ethiopia

Ethiopia's aggregate imports have shown substantially soar since the demise of the Socialist government in the country in 1991. The nominal value of merchandise imports rose from 429.1 million birr in 1970 to 251.05 billion birr in 2014. Thus, the growth rate of imports, which had averaged 3% annually in the 1980s, during the socialist government, rose to an annual average of 27% between 2000 and 2014.

The data in Table 4 shows the mean share of the various imports of Ethiopia over the indicated ranges of periods. So, Table 4 revealed that the import of capital goods dominated aggregate imports from 1970 to 2014, with 44 years average share of 32.92% followed by consumer goods, semi-finished goods and fuels imports with 44 years average share of 30.16, 16.07 and 15.78%, respectively.

All the same, the share of all imports of Ethiopia did not change significantly over the four decades despite the continuous devaluation of our currency over the last two decades. Thus, it seems that our imports are price inelastic and devaluation failed to cut imports significantly. In sum, over the last four decades, not only the relative shares of Ethiopian imports have remained unchanged significantly, the distributional pattern of imports did not change with the import of capital goods leading and followed by consumer goods. The data also shows that the imports of semi-finished goods and fuels in Ethiopia stood third and fourth, respectively in aggregate imports. The proximate determinant of this outcome is the Agricultural Development Led Industrialization strategies which heavily relied mainly on imported inputs, particularly capital goods. Of course, this meant dependency on imported machinery and equipment that are basic to production in the economy.

## Total shares of the exports of Ethiopia

Exports are important for the process of economic growth. They generate scarce foreign exchange reserves that are necessary to finance imports of goods such as fuels and investment goods which are crucial for the

**Table 5.** Share of the volume of the major exports of Ethiopia for the period 1985-2014.

| Years | Coffee | Oilseeds | Hides and skins | Pulses | Fruits | Flower | Chat | Gold | Other |
|-------|--------|----------|-----------------|--------|--------|--------|------|------|-------|
| 1985-90 | 63.61 | 1.56 | 14.74 | 2.24 | 1.02 | 0.00 | 2.19 | 0.00 | 9.93 |
| 1991-95 | 53.41 | 1.14 | 15.01 | 1.74 | 1.07 | 0.00 | 5.10 | 11.27 | 6.86 |
| 1996-00 | 61.41 | 5.00 | 8.75 | 2.50 | 0.99 | 0.00 | 9.25 | 4.93 | 6.22 |
| 2001-05 | 37.28 | 10.45 | 10.94 | 4.25 | 1.85 | 0.00 | 12.51 | 7.54 | 15.18 |
| 2006-10 | 31.86 | 18.87 | 5.97 | 6.44 | 1.19 | 6.10 | 8.83 | 8.17 | 12.56 |
| 2011-14 | 25.84 | 15.34 | 3.79 | 6.34 | 1.35 | 6.20 | 8.55 | 17.18 | 12.48 |

Source: Own computation from Ethiopian Custom Authority Data (2016).

formation of capital and economic growth. Moreover, exports can also reduce the impact of external shocks on the domestic economy. Ethiopia's domestic exports, which are largely comprised of agricultural commodities, are subject to sharp fluctuations from internal and external disturbances. As in most developing economies, the commodity concentration of Ethiopia's exports has long been regarded as a major factor contributing to the short-term instability of exports.

As can be seen in Table 5, prior to the 1991 financial and economic reforms in Ethiopia, the mean share of coffee in the total export of Ethiopia was 63.61%. However, since then the share of coffee in the total exports of Ethiopia has been falling and this is partly attributed to export diversification via birr devaluation. Needless to say, the share of flowers, oilseeds, pulses and chat were insignificant, less than one percent, before the 1991 economic and financial reforms in Ethiopia. Indeed, their shares in the total imports have shown a significant rise through time since the reform with the continuous devaluation of Ethiopian birr. For instance, as seen in Table 5, the mean share of oilseeds, pulses and flowers was less than one percent before the liberalization of the foreign trade while it was 15.34, 6.34 and 6.20%, respectively between 2011-2014.

Yet, the share of coffee and hides and skins in total exports have been falling over time despite the colossal efforts that the Ethiopian government has made to boost exports via birr devaluation and other incentives. Overall, the fall in the share of these two export items over time is attributed to two factors: birr devaluation which has boosted the exports of other items (diversification) and the variability of their prices in the international markets. The export volume of hides and skins has been falling over time and this indicates that the supply side factors (low production) also affect our export performance.

As shown in Table 5, the share of coffee and hides and skins has been falling over the three decades. The fall in the share of coffee exports is mainly attributed to the result of diversification that new items enter the export sectors (flower) and to some extent, to the variability of its price in international markets. However, the fall in the share of hides and skin exports is mainly attributed to supply side factor that is low domestic production.

## Evolution of the trade balance of Ethiopia through time

Accurate understanding of trade balance response to changes in exchange rate is a crucial factor in the coordination and implementation of trade and exchange rate policies in Ethiopia. The traditional view is that a nominal devaluation of exchange rate improves the trade balance in the long run while making it to worsen in the short run. This is because the change in the exchange rate has two effects on the trade balance, the price effect and volume effect. The price effect works to make imports more expensive and export cheaper for foreign buyers. But, the volume of exports and imports do not adjust instantaneously in the short run, trade balance may initially experience some deterioration in the short run following the currency devaluation. Put differently, the price effect will tend to dominate the volume effect in the short run whereas, the volume effect will dominate in the long run.

As shown in Figure 1, Ethiopia has experienced a long period of unfavorable trade balance deficits which means the external sector is characterized by structural trade deficits. In order to overcome this adverse situation, the government initiated measures to bring about pragmatic changes in the trade balance via its expenditure switching policy such as currency devaluation. It is clear from Figure 1 that Ethiopian had experienced a trade balance surplus only in the two periods, 1972/73 and 1973/4 where the trade ratio( export/import) were 1 and 1.1, respectively. As shown in Figure 1, the trade ratio (export/import) of Ethiopia was rising during the imperial government which persuaded a somewhat liberal foreign trade policy. However, during the Derg regime where a highly controlled foreign trade policy was in place, the trade ratio of Ethiopia was falling during the whole periods which were partly due to the fall in exports as shown in Figure 1. But, following the demise of the socialist government in 1991, the trade ratio[2] started to rise due to the then liberalization policy in Ethiopia.

---

[2] Here in this study, the trade balance is defined as the ratio of exports to imports (trade ratio) and this is done to avoid negative sign in the trade balance since the log of trade balance is used.
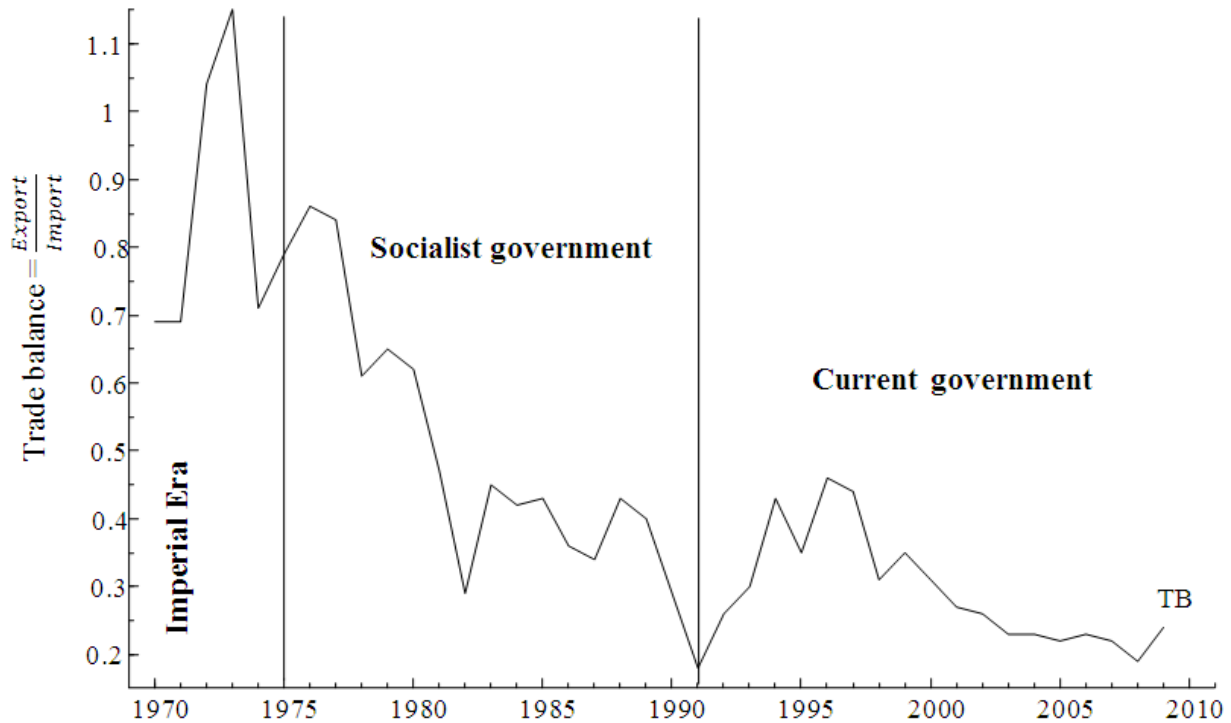
**Figure 1.** Trend of the trade balance of Ethiopia for the period 1970 to 2014.
Source: Computed from Ethiopian Custom Authority Data (2016).

However, Figure 1 shows that the trade balance of Ethiopia was rising (improving) during the Imperial regime before 1975 due to the rise in exports despite our overvalued currency. On the other hand, the trade balance of Ethiopia was falling for the whole period during the socialist (1974-1991) and this continuous fall in the trade balance of Ethiopia during the Derg Era was mainly due to the then highly controlled foreign trade policy which affected the export sector of Ethiopia adversely. As shown in Figure 1, following the liberalization of Ethiopian economy in 1992, there was an increase in the trade balance till 1997. This is mainly due to the rapid rise in the export value in this period.

But, since 1998, the trade balance of Ethiopia has been falling (deterioration) despite the continuous devaluation of the currency and this is attributed to the rise in the import values as shown in Figure 2. But, since 2003, while the REER of Ethiopia has been rising, the imports and the trade deficit of Ethiopia have been rising at higher rate. On the other hand, Ethiopian economy has been growing on average at a rate of more than 11% since 2003 and it seems that some Ethiopia's frequent trade balance deficit have been the results of good opportunities for new capital formation in Ethiopia such as building new roads, expansion of textile industries, power development, irrigation development and expansion of cement factories which all depend on the imports of raw materials from abroad.

Figure 1 shows that Ethiopia has experienced a trade balance surplus only in two periods in 1972 and 1973 and since then the gap between export and import values (trade deficit) has been widening and reached its maximum value during the end of the civil war in 1991. At worse, the import values of Ethiopia has been rising at higher rate despite the continuous devaluation of the currency which gave birth to the continuous deterioration of trade balance. The variation in the trade balance of Ethiopia is mainly explained by the variation in exports as compared to that of imports. Thus, it can be said that the trend of the trade balance of Ethiopia mimics the trend of the export of Ethiopia.

Therefore, according to this visual representation, though devaluation promotes export, it failed to cut imports and even the growth in values of import outweighs that of exports and led to continuous deterioration of the trade balance. Moreover, Figure 2 shows that there has been a continuous variation in exports of Ethiopia during the last two regimes. The implication of this visual representation is that Ethiopia cannot afford to cut its imports as most of its imports are composed of capital goods and fuels which are very important for the development of an economy. Despite the continuous devaluation of birr, there has been a continuous rise in the values of imports and the rise in the values of exports failed to out weight that of imports and at the end of the day, led to the deterioration of the trade
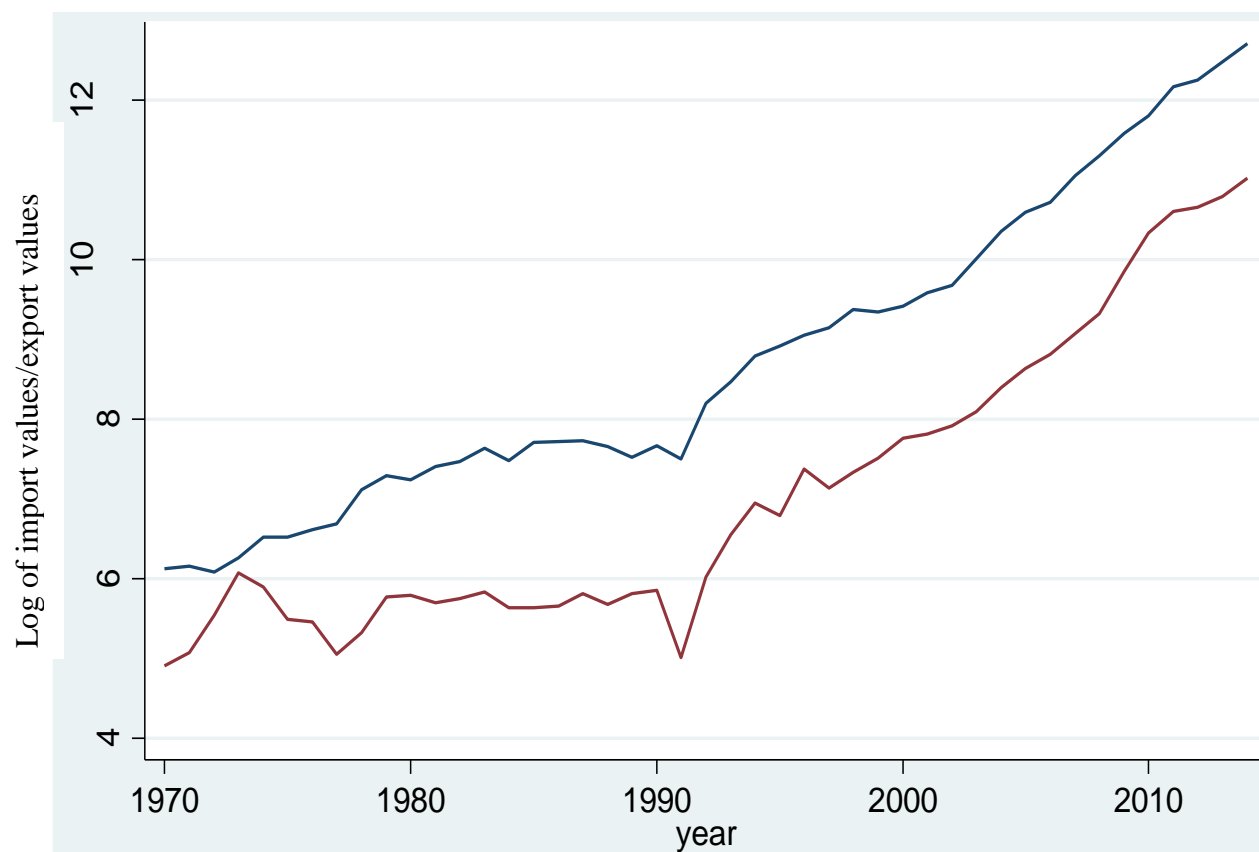
**Figure 2.** Trends of the log of export and import volumes of Ethiopia in millions of birr.
Source: Own Computation (2016).

**Table 6.** Estimation results of the static long run model of the trade balance equation.

| LTB | C | LREER | LMS | LY | LG | LTOT | LR |
|---|---|---|---|---|---|---|---|
| | 5.488 | -0.469 | -0.696 | -2.776 | -1.498 | -0.526 | -1.272 |
| Standard error | 0.092 | 0.122 | 0.187 | 0.154 | 0.130 | 0.248 | |
| t_statistics | -5.114 | -5.686 | -14.885 | -9.752 | -4.029 | -5.135 | |

Source: Own computation (2017).

balance.

**Determinants of the trade balance of Ethiopia**

This study used the vector autoregressive model to assess the relationships between dependent and various independent variables in the model. This is due to the fact that economic theory rarely tells us anything about short-run dynamics and it is rather mainly based on long run equilibrium relations. However, this model allows for a representation which differentiates between long-run equilibrium relations and short-run adjustment processes. Therefore, the major findings of this study which includes the long and short run dynamics along with the impulse

response functions (IRFs) of the trade balance of Ethiopia are presented. This deals with the trade balance regression which helps to examine the effects of devaluation on trade balance of Ethiopia. Impulse response functions (IRFs) and the coefficient of short and long run dynamics were used to check whether the J-curve phenomenon holds or not for trade balance.

**Estimation results of the long run static model**

As shown in Table 6, the maximum Eigenvalue test indicates that there is one co-integrating equation in the model and so, there is one dependent variable (TB) and money supply, real effective exchange rate, real GDP,

government expenditure, interest rate and term of trade are the independent variables. Since the test result showed a single co-integrating vector, there is only one equation with one dependent variable. The dependent variable in the above long run model is the log of the trade balance of Ethiopia and since all the variables entered in log form, their long run coefficients are elasticities.

Table 6 summarizes the estimation results of the long run trade balance model. Fortunately, all the variables in the model: money supply, real GDP, real effective exchange rate, interest rate, government expenditure and term of trade are statistically significant in affecting the trade balance of Ethiopia. The log of REER with a coefficient of -0.469 shows a negative long run relationship between the REER and trade balance. That means, 10% increase or appreciation of Ethiopian birr will lead to 4.69% deterioration in the trade balance or 10% depreciation or decrease of Ethiopian birr will lead to a 4.69% improvement in the trade balance of Ethiopia in the long run.

This result is also consistent with economic theory, more specifically, the elasticities approach to a trade balance adjustment, which states that, following currency depreciation, import prices would rise, leading to decreased demand and a decline in the volume of imports, ultimately leading to an improvement in the trade balance on the import front due to the price effect of imports. On the other hand, if Ethiopian birr appreciates, foreign goods (imports) become cheaper; hence the volume of imports is likely to rise, thus worsening the trade balance in the long run.

The real national income (LY) has also negative impact on the trade balance in line with economic theory and was found to be significant in determining the trade balance. Thus, the main determinants of the trade balance of Ethiopia in the long run are real effective exchange rate, domestic real income (economic growth), money supply, interest rate and the domestic and foreign general price level (TOT) according to this long run model.

The negative sign of the coefficient of real domestic income supports the Keynesian view or absorption approach that increases in domestic real income will encourage citizens to buy more imported goods and thus worsen the trade balance both in the short and long run. This means, higher domestic income will lead to higher demand for foreign goods and thereby deteriorate the trade balance of a country.

The coefficient of domestic money supply is also negative which confirms the monetary approaches to the trade balance of a country. The monetary approach states that a fall in domestic money supply will improve the trade balance, whereas the rise in domestic money supply will worsen the trade balance of a nation. Thus, the coefficient of money supply in our trade balance equation is in agreement with the monetary theory of the

trade balance of a nation.

Moreover, the coefficient of real effective exchange rate is negative and significant implying that the sum of the price elasticity of export and import demand is greater than one or the Marshall- Lerner condition holds in the long run for the trade balance of Ethiopia. Moreover, in line with the elasticity approach, there is strong and significant relationship between exchange rate movement and the trade balance of Ethiopia. Thus, the relative relevance of the various theories of the trade balance in Ethiopian context is also tested and the result revealed that the elasticity approach, monetary approach and the absorption approach are significant in explaining the trade balance of Ethiopia.

In this long run model, all the variables are in log form and this implies that the coefficient of each variable in the model gives its elasticity with respect to the trade balance. Thus, the long run elasticity showed that devaluation improves the trade balance of Ethiopia in the long run. In totality, in the long run, the trade balance of Ethiopia is determined by domestic economic growth, exchange rate, money supply, interest rate and the relative price level.

## Regression results of the short run model

After determining the long run relationship among the variables in the model and their long run coefficients, the next step in Johansen's co-integration analysis is to determine the coefficients of the short run dynamics. The coefficient of short–run dynamics can be obtained by regressing the first difference of the dependent variable on its lag, the lagged error correction term which is derived from the long run static model, the first difference of all exogenous variables and their lags. However, the determination of the coefficient of short run model uses the general to specific model selection technique to obtain vector error correction model (ECM).

So as to obtain the following parsimonious short run model, a testing down procedure was used in which non-significant and wrong signed lags are excluded from our model. The various diagnostic tests also showed that the model is correctly specified. Moreover, the coefficient of vector error correction term (ECM$_{-1}$), which shows the rate at which the trade balance equation adjust to shocks in the system, has a negative sign as expected and statistically significant with 1% level of significance and thus, we can conclude that the model is correct.

In the short run model, coefficient of the first lag of REER is positive and statistically significant at 5% level of significant (Table 7). This means that the trade balance of Ethiopia deteriorates in the short run following birr devaluation. So, coefficient of the log of the first difference of REER is positive and statistically significant in the very short run as can be seen from the error correction model and this may imply that birr devaluation

**Table 7.** Regression results of the short run model or error correction model.

| DLTB | Dependent variable: First difference of log of trade balance (DLTB) | | | |
|---|---|---|---|---|
| | Coefficient | Std. Error | t-Statistic | P-value |
| ECM_1 | -0.509552 | 0.1068 | -4.771098 | 0.0001 |
| DLTB_1 | -0.047453 | 0.141653 | -0.334992 | 0.7404 |
| DLMS_1 | -2.163262 | 0.641466 | -3.372371 | 0.0024 |
| DLMS_2 | -1.135103 | 0.649816 | -1.746808 | 0.0929 |
| DLG_1 | -0.051593 | 0.250816 | -0.205701 | 0.8387 |
| DLG_2 | 0.915098 | 0.296379 | 3.087593 | 0.0049 |
| DLRGDP_1 | -1.22324 | 0.523533 | -2.336511 | 0.0278 |
| DLRGDP_2 | -1.451295 | 0.574451 | -2.526404 | 0.0182 |
| DLREER_1 | 0.837925 | 0.398486 | 2.102772 | 0.0457 |
| DLTOT_1 | 0.130558 | 0.272492 | 0.479124 | 0.636 |
| DLR_1 | 0.671506 | 0.438922 | 1.529901 | 0.1386 |
| Constant | 0.571353 | 0.16794 | 3.402116 | 0.0023 |
| R-squared | | | 0.677334 | |
| Adjusted R-squared | | | 0.483735 | |
| Jarque-Bera | | | 5.9768 probability = 0.050360 | |
| Heteroscedasticity test: Breusch-Pagan-Godfrey | | Prob. Chi-square (21) = 0.7816 | | |
| F-statistic | 3.498639 | | Durbin-Watson stat | 2.194553 |
| Prob(F-statistic) | 0.002791 | | | |

Source: Own computation (2016).

**Table 8.** Description of variables in the model.

| Variable | Description | Variables | Description | Variable | Description |
|---|---|---|---|---|---|
| TB | Trade balance | LTB | Log of TB | DLTB | First difference of LTB |
| MS | Money supply | LMS | Log of MS | DLMS | First difference of LMS |
| G | Government expenditure | LG | Log of G | DLG | First difference of LG |
| TOT | Term of trade | LTOT | Log of TOT | DLTOT | First difference of LTOT |
| Y | Real GDP | LY | Log of Y | DLY | First difference of LY |
| REER | Real effective exchange rate | LREER | Log of REER | DLREER | First difference of LREER |
| R | Interest rate | LR | Log of R | DLR | First difference of LR |

fails to cut import volumes and increase export volumes in the short run. However, the coefficient of the log of REER is negative and statistically significant in the long run model and this implies that Birr devaluation improves the trade balance of Ethiopia in the long run.

This result is in line with study conducted by Adeyemi et al. (2013), Ogbonna (2010), Oyinlola et al. (2013), Abakaliki (2016), Agbola (2004), Shahbaz and Abdul (2010), Aziz (2008), El-Ramly and Abdel-Haleim (2006), Ratha (2010), Shahbaz and Abdul (2010), Marial and Ahmad (2005), Aziz (2008), Oylinlola (2011), Edwards and Wilcox (2003), Kamoto (2006), Hailemariam (2011), Chiloane (2014), Anderson (2010), Lawrence (2001), Loto (2011) and Bahmani-Oskooee (1998).

Furthermore, the various results of the diagnostic test showed that our model is correctly specified. The coefficient of multiple determinations ($R^2$) shows that 67.7% of the variation in the trade balance is due to the explanatory variables included in the model (Table 8). The test summary result as shown above indicates that there is no problem of serial correlation as evidenced from the Durbin-Watson's statistics of 2.19. The test for the existence of heteroscedasticty in the short run model also indicated that there is no problem of heteroscedasticity since the Breusch Pagan test is statistically insignificant. This implies that, the variance of the residual from the short run model is independent of the explanatory variables in the model. However, the result of the test indicated that there is problem of residual non-normality. But, in Johansen's co-integration analysis, normality is not a problem. In addition, the coefficient of error correction term (ECM_{-1}) has a negative sign as expected and statistically significant at 1% level of significance. So, the coefficient of adjustment is 0.5 which implies that if there is disequilibrium, the system adjusts towards the long run equilibrium by 50%
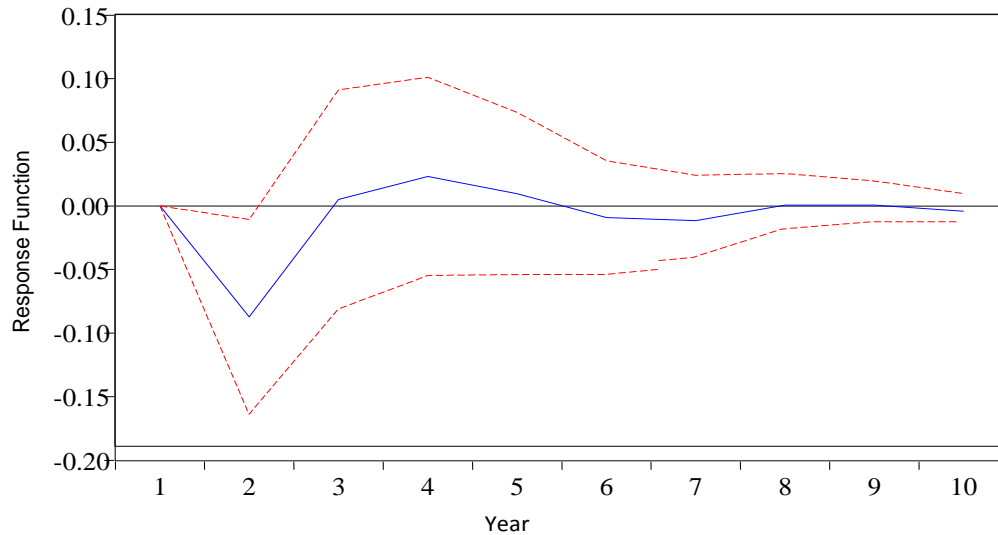
**Figure 3.** The response of DL (TB) to Cholesky one standard error DL (REER) innovation.

each year. That means it takes the system two years to reach its long run equilibrium.

**Impulse response function**

The impulse response functions (IRFs) are used to uncover the dynamic relationship between the dependent variable (TB) and the other independent variables thereby helps to trace the response of the dependent variable to a unit and one time shocks to other variable in the system. Thus, it traces the response of the endogenous variable to a change in any of the innovations in the model and it is a test for identification of the sign and duration of the effect of the shock on the endogenous variable. The impulse response functions plotted below shows a 10-years response of trade balance to an initial and one-time shock in each variable.

Figure 3 shows the response of the trade balance of Ethiopia to 1 standard deviation shock to real effective exchange rate. This implies that devaluation (an increase in REER[3]) deteriorates the trade balance immediately following the devaluation of birr. But, just after two years, it starts to improve the trade balance of Ethiopia. This may be due to the fact that devaluation may not necessarily cut imports in developing countries as they are import dependent. That means, devaluation initially deteriorates the trade balance of Ethiopia and starts to improve the trade balance of a nation in the long run.

The impulse response function is, therefore used to check whether the J curve phenomenon holds or not in Ethiopia using time series data for the periods 1970-2014. Accordingly, Figure 3 revealed that the responses

of the trade balance of Ethiopia follows the J-curve phenomenon and Birr devaluation deteriorates the trade balance of Ethiopia in the short run and improves the trade balance in the long run.

In similar vein, domestic money supply and government expenditure affect negatively and statistically significantly, the trade balance of Ethiopia in the short run. It could be seen that any shocks of the explanatory variable makes the impulse response dies out to zero. This implies that the error correction model (ECM) is stable. Moreover, the direction of the trade balance's response to innovation in money supply and domestic real income is theoretically acceptable in all the cases. Trade balance responded negatively to domestic income and money supply.

Figure 4 shows that, in line with economic theory, an increase in domestic money supply led to a deterioration of the trade balance of Ethiopia in the short run. The result is also consistent with economic theory, more specifically, the monetary approach to the balance of payments.

With regard to domestic real income, as economic theory predicts, the impulse response function also revealed that the domestic real income has negative effect on the trade balance of Ethiopia. The impulse response function showed a negative relationship between domestic real income (Y) and TB in the short run (Figure 5). This means that when the domestic real income increases, domestic consumers will increase their consumption of imported goods. Therefore, the descriptive data analysis, econometric analysis and impulse response function (IRF) revealed that Birr devaluation deteriorates the trade balance of Ethiopia in the short run. Traditional theory predicts that devaluation boosts export performance and curtails import and thereby lead to an improvement in the trade balance and output growth for developing countries.

---

[3]An increase in REER represents overvaluation/appreciation whereas, a decrease in REER refers to devaluation/depreciation.
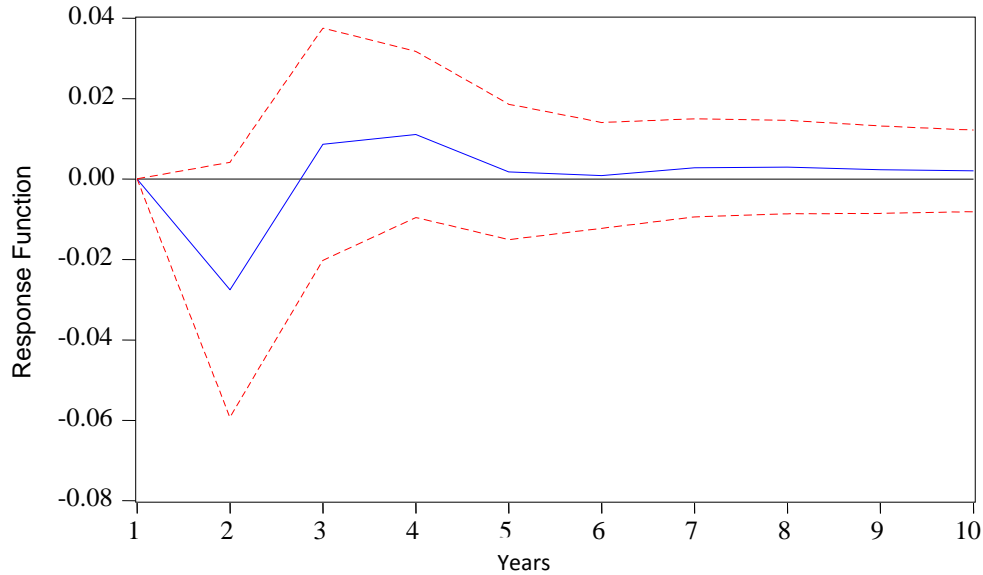
**Figure 4.** Response of DL (TB) to Cholesky one standard error DL (MS) innovation.
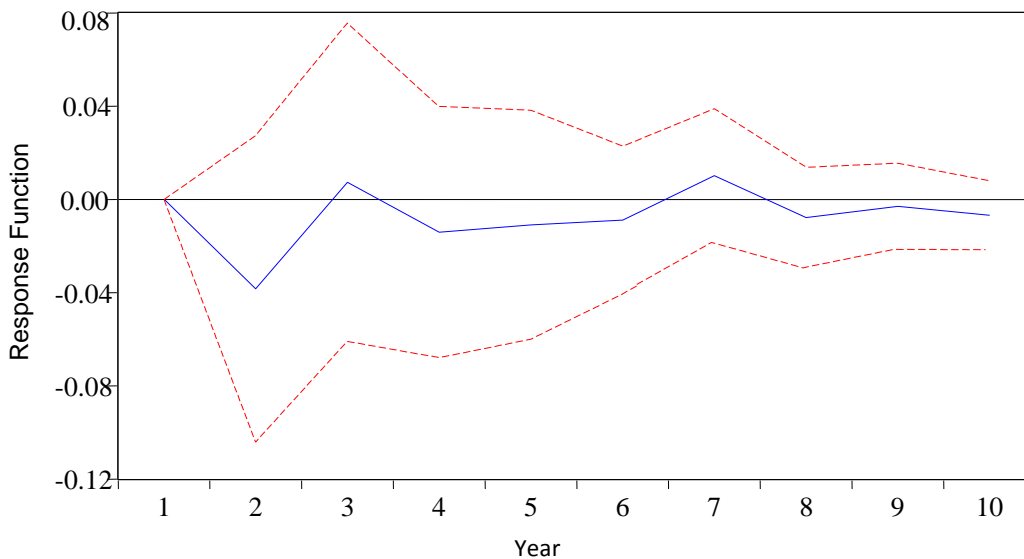


**Figure 5.** Response of DL (TB) to Cholesky one standard error DL(Y) innovation.

But, others argue that devaluation improves the trade balance and buoys output growth only if the country is initially export dependent. If the country is initially import dependent, devaluation worsens the trade balance and leads to lower output growth (Cooper, 1971).

Despite the colossal effort that Ethiopian government has made to improve the external balance (trade balance) and output growth via devaluation, it failed to cut imports as can be seen in trend analysis. This is mainly due to the fact that most of the imports (72% including fuel in 2014) are related to domestic production and therefore, devaluation increases the cost of production.

Therefore, Ethiopia can influence or change its trade balance mainly by affecting its export performance since the imports are less responsive to birr devaluation.

**CONCLUSION AND POLICY IMPLICATIONS**

This study aimed at examining the effect of Birr devaluation on trade balance of Ethiopia for the period of 1970 to 2014 using the Johansen co-integration analysis. Regarding the time series characteristics of the data, all the variables were tested for unit roots using Augmented

Ducky Fuller test and the test result revealed that all the variables are non-stationary at level and become stationary only after first difference. Moreover, since all the variables are non-stationary at level, the long run relationship (co-integration) among the variables was tested using the Johansen approach and the result revealed that there is a long run relationship (co-integration) among the variables. This means that, the analysis of long and short run dynamics is possible for the trade balance model.

The trend analysis, coefficient of long and short run dynamics and the impulse response function (IRF) revealed that birr devaluation deteriorates the trade balance of Ethiopia in the short run and improves it in the long run. This means, devaluation of currency shows a J-curve phenomenon for the trade balance of Ethiopia. In other words, devaluation of Ethiopian birr deteriorates the trade balance of Ethiopia in the short run and improves the trade balance in the long run which means devaluation shows a J-curve phenomenon for the trade balance of Ethiopia. This result is in agreement with the study conducted by Michael (1996) for Ethiopian economy, Frank (2004) for Ghana, Shahbaz and Abdul (2010) for Pakistan economy.

Moreover, the relative relevance of the various theories of trade balance in Ethiopian context was also tested and the result revealed that the elasticity approach, monetary approach and the absorption approach are significant in explaining the trade balance of Ethiopia. According to the study, money supply, real effective exchange rate, domestic real income and term of trade are the major determinants of the trade balance of Ethiopia both in the short run and long run.

Thus, devaluation may not be the optimal approach to improve export performance and curtail imports. This is because devaluation feeds into domestic inflation, as well as increase the cost of imported capital, intermediate and final goods. Policy should rather focus on factors that constrain the export growth. Thus, infrastructure availability and the relative productivity of export supply are the main determinants of exports. Over all, there are two alternative policies to devaluation, to boost export performance of Ethiopia and thereby lead to improvement in trade balance.

## Export productivity and diversification

The first alternative policy for devaluation, to boost Ethiopian export performance is through the rise in export productivity and diversification. Ethiopian government may stimulate export diversification in the area of agriculture, agro-investment and agro-allied industries and mining industries which will improve the country's trade balance and foreign exchange earnings. Some of the potential areas for Ethiopian exports include coffee, hides and skins, oilseeds and pulses, horticulture and floriculture, textiles, sugar, fruits, skilled labor, and electricity.

## Import computing industries

The second alternative policy to devaluation is to give due attention to the import computing industries like chemical industries (fertilizers), cement factories, steel factory and textile factories. This helps to improve Ethiopian trade balance by decreasing dependence on imported goods.

To sum up, policies that encourage productivity improvements and diversification of the export sectors and expansion of import computing industries like, metal industry, cement industry and chemical industry (fertilizers industry) are an alternative policies to devaluation which enhance export growth and curtails import growth and thereby leads to improvements in the country's trade balance, output growth and a downward pressure on domestic price level (inflation). Therefore, Ethiopian government may need to be conservative in using exchange rate policy to improve external balance.

Thus, it seems that devaluation gives with one hand (export) and takes with the other hand (imports), and the effect of devaluation on trade balance, therefore, depends on the net effect. This means that devaluation improves the trade balance and leads to output growth only if the country is initially export dependent. But, if the country is initially import dependent like Ethiopia, devaluation may worsen the situation. Devaluation would have positive impact on the Ethiopian Economy (via the export sector), once the country establishes export oriented firms and international markets. Thus, the country on the process of industrialization first needs to import capital goods which cannot be favored by devaluation. Then, once the production gets its way, devaluation would make a sense.

## CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

## REFERENCES

Adeyemi AO, Paul O, Oluwatomsin M (2013). Estimates the long run effects of exchange rate devaluation on the trade balance of Nigeria. Eur. Sci. J. 9:25.

Anderson A (2010). How Does a Depreciation in the Exchange Rate Affect Trade Over Time? Unpublished thesis, Jönköping University.

Aziz N (2008). The effect of Exchange Rate on Trade Balance of Bangladesh by constructing the Nominal Effective Exchange Rate (NEER) and Real Effective Exchange Rate (REER) for Bangladesh University of Birmingham, UK.

Befikadu D, Kebre M (2004). Post Devaluation Ethiopian Economy: from Stagflation to Stagflation. Paper presented for the 2nd annual Conference of Ethiopian Economy. Addis Ababa, Ethiopia.

Blanchard OJ (1993). Lectures on Macroeconomics. Cambridge London, England, MIT Press.

Chiloane L (2014). The relationship between the exchange rate and the trade balance in South Africa. J. Econ. Financ. Sci. 7(2):299-314.

Cooper R (1971). Currency Devaluation in Developing countries. Essays in International Finance, Princeton, New Jersey: Princeton University Press. P 86.

Degefa D (2001). The Parallel Foreign Exchange Market and Macroeconomic Performance in Ethiopia. Afr. Econ. Res. Consort. P 117.

Dornbusch R (1988). Open Economy Macroeconomics, 2nd ed, New York.

Dornbusch R (1990). Macro economics. (6rd ed.), McGraw Hill.

Dornbusch R, Fischer S (1996). Moderate Inflation, World Bank Economic Review.

Edwards L, Wilcox O (2003). Exchange rate depreciation and the trade balance in South Africa. Prepared for South African National Treasury.

El-Ramly H, Abdel-Haleim SM (2006). The relationship between Exchange Rate changes and Output in the Egyptian Economy Research Paper, The American University in Cairo.

Frank WA (2004). The Impact of Devaluation on the Trade balance of Ghana African Econ. Bus. Rev. 6:2.

Frisch H (1983). Theories of Inflation, Cambridge University Press, Cambridge.

Hailemariam (2011). The Impact of Devaluation on Trade Balance of Ethiopia, Debremarkose University.

Johansen S, Juselius K (1990). Likelihood-Based Inference in Cointegrated Vector Autoregressive Models, University of Oxford, Oxford New York.

Kamoto (2006). The Effects of Devaluation on the Trade Balance of Malawi and South Africa. University of Texas, Arlington.

Keynes (1936). The General Theory of Employment, Interest Rate and Money".London Macmillan.

Krueger A (1983). Exchange Rate Determination. New York: Cambridge University Press.

Lawrence E (2001). The Trade Flows and Exchange Rate in South Africa School of Economics, University of Cape Town.

Lindert P (1993). International Economics.3rd. MacMillan, London.

Longinus R (2004). Exchange Rate Regimes and Inflation in Tanzania" Department of Economics, University of Dares Salaam Tanzania AERC Research Paper 138 African Economic Research Consortium, Nairobi, February.

Longinus R (2010). Exchange Rate Regimes and Inflation in Tanzania. Afr. Econ. Res. Consort. 138:9966-944-32-X

Loto MA (2011). Does Devaluation improve the Trade Balance of Nigeria? (A test of the Marshall-Lerner Condition) J. Econ. Int. Financ. 3(11):624-633.

National Bank Of Ethiopia (NBE) (2015). National Bank of Ethiopia, Annual Reoprt.

Ogbonna BC (2010). Trade balance effect of exchange rate devaluation in Benin Republic: The empirical evidence. Int. J. Soc. Sci. 2(5):138-51.

Pilbeam K (1998). International Finance. 2ed. Palgrave, London.

Ratha A (2010). Does Devaluation work for India?Economic Bulletin. New Delhi: St. Cloud State University, pp. 1-6.

Salvatore D (2001). International Economics. 9th ed. Prentice Hall, New York.

Shahbaz M, Abdul J (2010). The relationship between changes in real Exchange Rate and the Trade Balance Indicators of Pakistan. Int. Rev. Bus. Res. 6:1.

Snowdon (2005). Modern Macroeconomics: Its Origin, Development and Current State. Edward Elgar Publishing Limited, UK.

Sulaiman DM (2010). Determinant of Balance of Trade: Case Study of Pakistan.

Taye HK (1999). The impact of Currency Devaluation on the Macroeconomic Performance of Ethiopia. J. Pol. Model. 215:481-496.

Tony M (2015). The Impact of the real effective exchange rate on South Africa's trade balance. Paper presented at the biennial conference of the Economic Society of South Africa, University of Cape Town, University of Limpopo.

United Nations Conference on Trade and Development (UNCTAD) (2005). Developing Countries in International Trade" United Nations, New York and Geneva.

*Full Length Research Paper*

# Demand-driven determinants and self-reported barriers to financial inclusion in the West African Economic and Monetary Union (WAEMU)

**Tomgouani Lanie**

Department of Economics, University of Kara, Togo.

**"Access to finance for all" has gained attention in the international development agenda in recent years. In the West African Economic and Monetary Union (WAEMU), the issue of financial inclusion is set at the level of priority but in several dimensions of financial inclusion, countries of the union lag behind the Sub-Saharan Africa and Asian benchmark countries. In this paper, factors that are important for financial inclusion in WAEMU are identified and it is investigated whether these factors are correlated with self-reported barriers to financial inclusion using the 2014 Gallup World Poll Survey data. The results indicate that, the variables: Age, sex, employment status, educational attainment and level of income are all determinants of financial inclusion in WAEMU. The results of the relationship between self-reported barriers and individuals' characteristics show that, educational level and income are the main factors that affect the livelihood of reporting a barrier to financial inclusion in WAEMU.**

**Key words:** Personal finance, financial institutions, West African Economic and Monetary Union (WAEMU).

## INTRODUCTION

The process of ensuring that everyone who wants to have access to financial services can do so at affordable prices within an appropriate regulatory framework has become one of the major socioeconomic challenges of the present century for all development actors world-wide. The agreement at the 2013 G20 meeting to go forward with the agenda of financial inclusion and the objective to achieve universal access to finance by 2020 are informative. This is because it is widely recognized that a better access to financial services is crucial for economic growth, and reducing poverty and unequal inclusion in development (Allen et al., 2016; World Bank, 2014). Indeed, broadening and enhancing financial services is likely to empower disadvantaged but talented groups in an economy (Beck and de la Torre, 2006). Financial inclusion eases funds transfer from abroad and so attracts remittances associated with positive implications on the economies of recipient countries (Demirguç-Kunt et al., 2011).

Bruhn and Love (2009) have investigated using difference-in-difference strategy, the impact of the Bank Banco Azteca' financial services expansion in Mexico

(opening simultaneously more than 800 branches in 2002 and focusing on low-income group clients) on entrepreneurship, employment and income. The authors have found that, the expansion of financial services has raised the number of entrepreneurs by 7.6% and an increase of the overall employment and average income by respectively 1.4 and 7%. Kodan and Chhikara (2013) on a sample of 52 countries using a financial inclusion index that encompasses three dimensions of financial inclusion (depth, availability and usage) have found out that, a 1% increase in the financial inclusion index leads to an average increase in the value of human development index (HDI) by 0.142. Moreover, their results revealed that the three dimensions of financial inclusion are negatively associated with poverty.

On the other hand, barriers to a broad access to financial services are likely to increase income gap and generate poverty traps (Beck et al., 2008). Remaining unbanked can irreversibly financially harm individuals' well-being since having an account can ease capital accumulation and wealth creation, determinant for consumption smoothing and the ability to withstand shocks (Rhine and Greene, 2013). Ellis et al. (2010) have shown that, access to financial services in Kenya and Tanzania has enabled households to invest in human capital accumulation, to start or develop a business and to invest in agricultural productivity enhancing activities.

However, broadening access to financial services (for instance expanding banks branches even to remote areas) does not necessarily translate into an effective use of these services since individuals can have access to these services but avoid using them because of socio-cultural reasons or innate characteristics. Moreover, some supply-side barriers to financial inclusion in the context of market failure stem from the banking system rational and prudential practices and so could be considered as leading to optimality (Beck et al., 2008). So, promoting financial inclusion requires understanding how individuals and firms levels characteristics matter for financial inclusion. However, little is known about factors that are determinant for individuals and firms' decisions to participate in the financial mainstream and factors behind individuals and firms-levels financial exclusion (Allen et al., 2016; Beck et al., 2008).

The aim of this paper is to identify individuals-level factors that matter for financial inclusion in the West African Economic and Monetary Union (WAEMU) where financial inclusion is set at the level of priority in the development agenda but in several dimensions of financial inclusion, countries of the union are still lagging behind Sub-Saharan Africa and Asian benchmark countries (IMF[1], 2015) and where no study has identified these factors. The importance given to the issue of financial inclusion in WAEMU is reflected in the setting up of appropriate regulatory and supervisory frames; the

adoption of specific programs such as the regional program PRAFIDE (2005-2009) which aimed at sustaining microfinance and enlarging the access of financial services to the poor segments of population; the action plan for inclusive finance (2007-2012) and different other initiatives in favor of mobile banking development.

Despite these efforts, the proportions of adult population with an account in a formal financial institution in WAEMU are among the lowest in the world (Banque de France, 2014). Access to finance is especially very low[2] for the low income segments of population (less than 5% at the bottom 40% of income distribution have a bank account). The low level of financial inclusion in the WAEMU is in part due to financial services costs perceived as higher by the population and the low level of bank branches in rural areas because of a lack of appropriate infrastructures (Banque de France, 2011). Thus, in order to boost financial inclusion in WAEMU, the central Bank BCEAO has launched free banking for 19 services in the eight (8) countries of the union including the opening and closing of accounts, cash deposits and withdrawals, money transfer from one account to another in the same bank, the set-up of direct debits and standards orders, credit-card payments in the WAEMU zone, cashing a check in the WAEMU banks, cashing remittances at national and international levels, online banking, annual and monthly statements receipts as a first stage for free banking in the union.

Moreover, while in the past efforts to increase access to financial services in WAEMU focused on promoting microfinance through national microfinance strategies, in recent years, national microfinance strategies are being replaced by national financial inclusion strategies (Riquet (CGAP), 2015). These programs and initiatives will be reinforced by the adoption of the regional financial inclusion strategy which is being developed by the central bank BCEAO in collaboration with the WAEMU member countries' ministries of finance with the chief objective to include financially more than 70% of adult population by 2020. Despite these efforts, if the demand-side factors that determine individuals' participation in the financial mainstream are not well understood in the union, addressing some supply-side issues will not necessarily translate into a better access to and use of financial services.

In this paper, we have identified the determinants of financial inclusion and investigated whether these determinants are correlated to self-reported barriers to financial inclusion in WAEMU. The results of the determinants of financial inclusion indicate that, the variables Age, sex, employment status, educational attainment and income of the respondents are all

---

[1] International Monetary Fund, Selected issues in WAEMU, March 2015.

[2] The enterprise surveys in WAEMU countries revealed that, more than half of the respondents have identified access to finance as the major constraint to the development of their businesses (IMF, 2015). Nevertheless, while efforts are being made in targeting small size enterprises, banks are still struggling to reach the low-income population (Riquet (CGAP), 2015).

determinants of financial inclusion in WAEMU. Globally, the educational attainment matter more for financial inclusion in WAEMU; followed by employment status and the level of income. The gender issue and the age of the respondents play relatively a less important role in individuals' participation in the financial mainstream in WAEMU. The results of the relationship between self-reported barriers and individuals' characteristics show that, among those who are excluded from the financial system in WAEMU, educational attainment and income are the main factors that significantly affect the likelihood of reporting specific barrier to financial inclusion.

## LITERATURE REVIEW

Studies on the determinants and barriers to financial inclusion and those relating access to financial services to development outcomes are somewhat budding because of lack of appropriate data for such analyses (Efobi et al., 2014). Nonetheless, since the recent effort on households-level survey data collection in more than 140 countries, there has been a renewed interest in measuring and identifying factors that matter for financial inclusion, especially in developing countries. Broadly, empirical studies differ from one another depending on the availability of data and to a certain extent on the way financial inclusion is measured (demand or supply-sides indicators of financial inclusion used and the corresponding determinants at individuals, firms and country levels).

At macroeconomic level, Beck et al. (2007) attempted (first to our knowledge) to measure financial inclusion (constructing aggregate indicators of financial sector outreach) and investigate its determinants using survey data on over 99 countries. The authors measured the outreach through the number of branches and automated teller machines (ATM) relative to population and area to capture the demographic and geographic penetration of the banking system. In this respect, higher branch and ATM intensity were interpreted as higher possibilities for households and enterprises to have access to financial services and opportunity to use them. Since access to financial services is not similar to the use of these services, the authors have measured the actual use of deposit and credit services by the number of deposits and credits accounts relative to population and the average loan and deposit sizes relative to GDP per capita. They have postulated that higher loan and deposit accounts per capita might indicate that a greater share of population use loan and deposit services whereas lower loan and deposit amounts relative to GDP per capita might indicate their use by small-size costumers.

These indicators allowed investigating empirically, the cross-country variations in financial outreach and checking if factors that drive financial sector depth also determine its outreach. The results indicated that, apart from the fact that the level of creditor right protection is positively correlated with financial sector depth; factors that determine financial outreach and depth are the same. Indeed, there is a positive correlation between variables such as the overall level of economic development, the quality of institutional environment, the degree of credit information sharing, the level of initial endowments and the development of physical infrastructure and the indicators of financial outreach and depth on the one hand and a negative correlation between the cost of enforcing contracts and the degree of government ownership of banks and these indicators on the other hand. While the extent of historical variables such as legal origin and religion in explaining cross-country variations in financial outreach is found to be lower in comparison with financial depth, the nature of the correlation remain the same. Yet, the authors have recognized that, they would have made use of alternative indicators of financial outreach such as the share of households with bank account and the share of firms with bank loans if there were not a dearth of survey data. So, they recommended micro-level data collection for improvements in the analysis of the determinants of financial inclusion[3].

Along the same line, Allen et al. (2016) have pointed out that, some aggregate measures of financial inclusion such as the number of accounts per capita used in Honohan (2008), Kendall et al. (2010) and Demirguç-Kunt et al. (2011) might have under or overestimated the level of financial inclusion in a given economy as it contains individuals with more than one account and foreigners who have an account in the local economy. Moreover, the authors argued that country-level aggregate indicators of financial inclusion do not allow for the understanding of how policy actions can be undertaken across individuals-level characteristics. So, the authors have investigated at microeconomic level, the influence of individuals-level characteristics such as gender, age, education, employment status and income as well as country-level characteristics that shape their decision to own a formal account and use financial services and products and have attempted to understand how barriers to financial inclusion perceived by individuals are correlated with these individuals and country-level characteristics and some policy measures.

Based on survey data in 123 countries of over 124 000 individuals, the authors focused on three indicators of accounts used in their analyses: ownership of an account, use of the account to save and the frequency of use (the number of withdrawals per month) arguing that, these indicators are associated with a ''better enabling environment for accessing financial services''. The

---

[3] Further, the authors have developed new indicators for barriers faced by households and firms in accessing financial services around the world, determined the correlation between these indicators and existing measures of financial sector outreach and have explored their association with bank and country-level determinants of financial inclusion using information on 209 banks from 62 countries (Beck et al., 2008).

relationship between variables is interpreted as significant correlation rather than causation because of the cross-sectional nature of the data. In the relationship between individuals-level characteristics and the ownership of an account, the authors have found that, being in the richest income quintile, older, employed, married, living in urban areas and exceeding elementary education increases the likelihood of owning an account. The same applies to the probability of using an account to save but the results are a little bit different from the likelihood of frequently using an account. In effect, referring to the likelihood of using an account to save, the probability of using it frequently is negatively correlated with gender while the latter does not affect the likelihood of using an account to save.

For the relationship between country-level characteristics and the ownership of an account, higher level of branches or ATMs penetration, legal rights index, political stability rating and tax incentive schemes to encourage savings are positively and significantly related to the likelihood of owning an account whereas high costs of opening and using an account and greater disclosure requirements decrease the probability of owning an account. As in the case of individuals-level characteristics, factors that determine the ownership of an account and the use of an account to save are almost the same. Results of the relationship between barriers to financial inclusion perceived by individuals and their socio-demographic characteristics indicate that, when people are poor, unemployed, less educated and live in rural areas, they are more likely to cite cost as barriers to account ownership whereas men and wealthiest are more likely to be excluded from formal financial system when they do not trust banks. Those who are less educated, rural residents and youth or single adults are more likely to cite lack of documentation as the reason why they do not have an account whereas the poor, elderly, urban residents and unemployed are more likely to report the lack of money as a barrier. Distance is more likely to be perceived by the poor, country people, married and less educated persons as the chief reason of their exclusion.

Clamara et al. (2014) have sought to identify demand-driven factors that influence households and enterprises' likelihood to be financially included or excluded from the formal financial system and investigated how the unbanked self-reported barriers to financial inclusion are related to individuals-level characteristics in Peru. With the 2011 Global Findex Survey data, the authors have constructed a proxy for financial inclusion which is defined as the likelihood for an individual or an enterprise to use financial services, considering that, a household or an enterprise is included in the banking system if he/it has received interest on one or more financial services, has a mortgage loan or has carried out online banking transaction. The dependent variable, proxy of financial inclusion is a binary variable that takes the value 1 if a household or an enterprise fulfills at least one of the three above mentioned conditions and 0 otherwise. Accordingly, probit models are used and estimates are provided at households and enterprises-levels.

Households-level results, consistent with the findings of Allen et al. (2016) indicate that, being a rural resident, a woman or single and more people with a salary in the household (households tend to maintain constant the level of financial inclusion reached since financial products are not used in exclusivity by each household member) reduces households' likelihood to use financial products whereas higher income and educational levels increase it. Income, education and households' residence appear to be the most important determinants of financial inclusion (in terms of the magnitude of their marginal effects) at households' level in Peru. Other variables such as the ownership of a house, having a deficit increase also the likelihood of using financial services whereas living in small towns reduces it. At enterprises-level, higher literacy rate, achieved formalities for legal registration and being a formal enterprise increase enterprises' likelihood to use financial products. Other factors, in particular; geographic factors (living in a small or big town) are not significant.

The results of the barriers to financial inclusion indicate that, excluded households with lower income and education level are more likely to report "distance to formal financial institutions branches" as a chief reason for their exclusion. The elderly on the one hand and youth on the other hand are more likely to respectively report "cost" and "document requirements" as being the barrier for their exclusion with a threshold effect at the age of 53. For the "lack of trust", women have more trust in the banking system in Peru so that they are less likely to perceive lack of trust as a barrier than men. Finally, the results indicate that, poor individuals are more likely to report "lack of money" than the wealthy.

While the results of Clamara et al. (2014) in Peru are informative, the variable proxy of financial inclusion used in the study may underestimate the use of financial services or products for households who fall in more than one of the conditions defined for the variable of interest. Along the same line, Cano et al. (2013) pointed out that, empirical studies sometimes fail to capture the extent of financial inclusion through indicators and so leading to a loss of information. In this respect, to avoid loss of information in the measurement of the level of financial inclusion, Pena et al. (2014) have constructed using multiple correspondence analyses, an indicator of financial inclusion which takes into account the ownership of both credit and savings products. The authors through generalized non-linear method have identified factors that determine individuals-level financial inclusion in Mexico using the 2012 World Bank National Financial Inclusion Survey data. Their focus has been on the level of financial inclusion enjoyed by Mexican households and provided estimates for the joint indicator of credit and

savings as well as for both credit and savings indicators separately. The results indicate that, individuals-level characteristics such as age, position in the household, education and marital status have a significant influence on the level of financial inclusion enjoyed by households with education as the most important variable explaining financial inclusion in Mexico. A threshold of 57.46 years old appears to be the age at which the level of financial inclusion begins to decline with age. Other variables such as the "ability to withstand shocks", "savings" and "waged" have a positive and significant effect on the "aggregate" indicator of financial inclusion whereas living in municipalities influences negatively and significantly the indicator of financial inclusion. The results are almost similar to those of the credit indicator but diverge in the case of savings products indicator.

Instead of constructing an indicator of financial inclusion, as in Allen et al. (2016), Efobi et al. (2014) have considered three indicators of financial inclusion in their investigation of the determinants of access to and use of financial services in Nigeria based on the 2011 World Bank Households Survey data on financial inclusion. The authors have introduced in addition variables such as "financial discipline" and "ICT inclination" as explanatory variables. The introduction of ICT inclination is justified by the attention paid to ICT-based initiatives to promote financial inclusion in Nigeria whereas financial discipline in contrast represents to a certain extent, individuals' innate "capability" to participate into the financial mainstream. Their results have indicated that, education, income and ICT inclination are the main determinants of financial inclusion at individuals-level in Nigeria. Indeed, higher education and income and ICT inclination increase the likelihood of owning an account and using it to save. These variables are also positively and significantly correlated with the frequency of withdrawals. On the other hand, being a woman reduces the probability of owning an account in a formal financial institution in Nigeria. Individuals' age is positively associated with the ownership of an account and its use to save but reaching a certain age reduces the likelihood of owning an account. Finally, financial disciple acts as a pull factor in accounts use to save and the frequency at which individuals use their accounts.

The study by Rhine and Greene (2013) on the determinants of financial inclusion in the United States departs from other studies in their analysis of the dynamic process through which families bank status changes. Indeed, they attempted first to examine how changes in families' attributes and circumstances contribute to changes in their bank status from being banked in one period to becoming unbanked in the following period. Based on the 2004 longitudinal survey of income program participation, the authors have estimated a recursive bivariate probit model in which bank status in the later period is conditioned on the bank status in the initial period. Their findings suggest that, a family shift from the status of banked to unbanked is significantly influenced by declines in family income, by employment lost and by a loss of health insurance coverage. The results indicate also that race and ethnicity, level of education and family income, marital and housing status and geographic location play important roles in whether or not family exit the financial mainstream.

## MATERIALS AND METHODS

### Data

The data for this study are from the World Bank Households Survey on financial inclusion (Gallup World Poll Survey, 2014). In the Gallup World Poll Survey (GWPS), up to 1000 individuals within the age of 15 and more are randomly selected in each WAEMU member country with country wide representation. For the 2014 GWPS, data are available in seven (7) WAEMU member countries namely Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger, Senegal and Togo. Statistics reported in Table 1 indicate that, on average, only 22.87% of adults have reported having a bank account in WAEMU, a figure far from sub-Saharan Africa (SSA) benchmark (34% in 2014). Among these persons, only 9.05% have used their account to save in the past 12 month and 1.91% has withdrawn 3 or more times in a given month. The adults population comprise of 45.18% female and 54.52% male. Most of them have completed only primary education or less (68.88%) whereas few have completed tertiary education or more (1.90%). Across income quintiles, 28.38% are in the richest 20% income group. The rest of these adults are distributed as follows: poorest 20% (15.87%); second 20% (17.02%); middle 20% (17.71%); fourth 20% (21.02%).

In the GWPS, those who do not have an account are asked to report barriers that prevent them from accessing financial services by responding to the following question[4]:

*"Please tell me whether each of the following is the reason why you, personally do not have an account at a bank, credit union, or other financial institution"*. The respondents are allowed to report multiple reasons. Among these reasons, we have: *"(1) They are too far away"; "(2) They are too expensive"; "(3) You don't trust financial institutions"; "(4) Because of religious reasons"; "(5) You don't have enough money to use financial institutions"; "(6) You cannot get one"; " (7) You don't need financial services"*.

The self-reported barriers (1), (2), (3) and (6) seem to stem from market failure and so can be considered as involuntary. On the other hand, the remaining barriers (4; 5 and 7) are voluntary. Table 1 shows that among the involuntary barriers, "affordability" is the chief reason why individuals are excluded. Indeed, the most cited reasons are respectively "cannot get one" (79.08%) and so they perceive that having an account is "too expensive" (25.01%). Affordability is followed by the "outreach" (24.24% have reported "too far away" as the reason why they are excluded) and the "lack of trust" (11.2%). For the voluntary reasons, most of people (61.29%) do not have enough money to use financial services, 13.51% do not need financial services and 6.85% are excluded because of "religious reasons".

### Identification of the determinants of financial inclusion

Measuring financial inclusion is made difficult because there is no

---

**Table 1.** Summary statistics.

| Variables | Measures | Response | Observations | Percent |
|---|---|---|---|---|
| Use of bank services | Have a bank account | Yes | 1603 | 22.87 |
| | | No | 5405 | 77.13 |
| Use of account to save | Saved in the past 12 months | Yes | 0634 | 09.05 |
| | | No | 6374 | 90.95 |
| Frequency of use | 3 or more withdrawals in a month | Yes | 0134 | 01.91 |
| | | No | 6874 | 98.09 |
| Sex | Female | Female | 3187 | 45.48 |
| | Male | Male | 3821 | 54.52 |
| Employment status | Received payment in the past 12 month | Yes | 1078 | 15.38 |
| | | No | 5930 | 84.62 |
| Educational status | Primary | Completed primary or less | 4781 | 68.22 |
| | Secondary | Secondary | 2094 | 29.88 |
| | Tertiary | Completed tertiary or more | 0133 | 01.90 |
| Income | Income quintiles | Poorest 20% | 1112 | 15.87 |
| | | Second 20% | 1193 | 17.02 |
| | | Middle 20% | 1241 | 17.71 |
| | | Fourth 20% | 1473 | 21.02 |
| | | Richest 20% | 1989 | 28.38 |
| Too far away | 1 | Yes | 1699 | 24.24 |
| | 0 | No | 5309 | 75.76 |
| Too expensive | 1 | Yes | 1753 | 25.01 |
| | 0 | No | 5255 | 74.99 |
| Lack trust | 1 | Yes | 0779 | 11.12 |
| | 0 | No | 6229 | 88.88 |
| Religious reason | 1 | Yes | 0480 | 06.85 |
| | 0 | No | 6528 | 93.15 |
| Lack money | 1 | Yes | 4295 | 61.29 |
| | 0 | No | 2713 | 38.71 |
| Cannot get one | 1 | Yes | 1466 | 20.92 |
| | 0 | No | 5542 | 79.08 |
| No need for financial services | 1 | Yes | 0947 | 13.51 |
| | 0 | No | 6061 | 86.49 |

unique definition of it and so there is not yet a consensual measure that captures in detail all dimensions of financial inclusion (Clamara et al., 2014; Kodan and Chikkara, 2013). In this paper, we are more concerned by the extent to which individuals-level characteristics influence the access to and use of financial services. Individuals have an access to the formal financial system if they have a bank account. But what empowers them is the effective use of their accounts. For instance, the use of a bank account to save might be associated with a better access to credit services. So, we consider three dimensions of the use of a bank account following the approach developed by Allen et al. (2016): the ownership of a bank account, the use of an account to save and the frequency of use of an account (frequency of withdrawals).

The dependent variable "Have an account" is a binary variable. Therefore, we make use of a probit model to identify the determinants of ownership of a bank account:

$$y_{1i}^* = \beta_1' x_{1i} + u_{1i}$$
$$y_{1i} = 1 \quad if \quad y_{1i}^* \succ 0 \tag{1}$$
$$y_{1i} = 0 \quad otherwise$$

Where $y_{1i}^*$ is a latent variable; $x_{1i}$ is a vector of individuals-level characteristics; $\beta_1'$ is a vector of parameters to be estimated and $u_{1i}$ is normally distributed error term with zero mean and variance equal to 1; $i$ stands for each individual.

Individuals-level characteristics include "Age" and "Age Squared" (which are both in years), "female" (indicating whether the respondent is female or not), "employed" (indicating whether the respondent is employed or not", "Educational Status" which represents the highest completed level of education: primary, secondary or tertiary education (we create a dummy for each modality); "Income quintiles" representing within-country income quintiles (we generate a dummy for each quintile). Other variables such as "Individuals' residence" (living in urban or rural area) and "marital status" while relevant are not included in the analyses because of data limitation. Equation (1) will be estimated by maximum likelihood.

The variable "use of account to save" is also a binary variable. So a simple probit model can also help in identifying individuals-level characteristics that acts as push or pull factors in their decisions to use their account for saving purpose:

$$y_{2i}^* = \beta_2' x_{2i} + u_{2i}$$
$$y_{2i} = 1 \quad if \quad y_{2i}^* \succ 0 \tag{2}$$
$$y_{2i} = 0 \quad otherwise$$

Where $y_{2i}^*$ is a latent variable; $x_{2i}$ is a vector of above mentioned individuals-level characteristics; $\beta_2'$ is a vector of parameters to be estimated and $u_{2i}$ is normally distributed error term with zero mean and variance equal to 1; $i$ stands for each individual.

In contrast to variables "Have an account" and "use of account to save", the dependent variable "frequency of use" represents the number of withdrawals per month. So, Allen et al. (2016) have defined the "frequency of use" as a dummy variable that takes the value 1 if funds are withdrawn at least three times during a month and 0 otherwise. The model is as follows:

$$y_{3i}^* = \beta_3' x_{3i} + u_{3i}$$
$$y_{3i} = 1 \quad if \quad y_{3i}^* \succ 0 \tag{3}$$
$$y_{3i} = 0 \quad otherwise$$

Where $y_{3i}^*$ is a latent variable; $x_{3i}$ is a vector of the same individuals-level characteristics, $\beta_3'$ is a vector of parameters to be estimated and $u_{3i}$ is normally distributed error term with zero mean and variance equal to 1; $i$ stands for each individual.

It is worth noting that, the dependent variables "use of account to save" and "frequency of use" are observed only for individuals who have a bank account. Since our data contain individuals with and without a bank account, selection problem arises and suggest using Heckman's two-step sample selection procedure in the estimation of Equations 2 and 3. However, in that procedure, the inverse Mills ratio enters in the second stage of estimation only for the case of linear models. Since Equations (2) and (3) are not linear, the selection equation (1) and the probit models are jointly estimated by maximum likelihood[5].

**Relationship between self-reported barriers and individuals-level characteristics**

Our objective here is to understand how individuals-level characteristics are correlated with the above mentioned subjective barriers to financial inclusion. So, we have generated a binary variable ( $y_{5ik}$ ) for each barrier $k$ that takes the value 1 if the barrier is reported by excluded individual $i$ and 0 otherwise. Barriers to financial inclusion are reported by the subsample of individuals who do not have a bank account. So, we have made use of the above mentioned Heckman-type procedure by generating a variable ( $y_{4i}$ ) that takes the value 1 if the respondent does not have a bank account and 0 otherwise as selection equation. So, equations (4) and (5) below are jointly estimated by maximum likelihood:

$$y_{4i}^* = \beta_4' x_{4i} + u_{4i}$$
$$y_{4i} = 1 \quad if \quad y_{4i}^* \succ 0 \tag{4}$$
$$y_{4i} = 0 \quad otherwise$$

$$y_{5ik}^* = \beta_5' x_{5ik} k + u_{5ik}, \quad k \in \{1;...;7\}$$
$$y_{5ik} = 1 \quad if \quad y_{5ik}^* \succ 0, \quad k \in \{1;...;7\} \tag{5}$$
$$y_{5ik} = 0 \quad otherwise, \quad k \in \{1;...;7\}$$

Where $y_{4i}^*$ and $y_{5ik}^*$ are latent variables; $x_{4i}$ and $x_{5ik}$ are vectors of individuals-level characteristics; $\beta_4'$ and $\beta_5'$ are vectors of parameters to be estimated and $u_{4i}$ and $u_{5ik}$ are normally

---

[5]Moreover, we are also aware that, the Heckman' two-step estimator performs poorly when the same variables are included in both selection and outcome equations.

**Table 2.** Correlation matrix of individuals' characteristics and indicators of financial inclusion.

| Variables | Age | Age squared | Education | Income | Female | Employed | Have account | Use account to save | Frequency of use |
|---|---|---|---|---|---|---|---|---|---|
| Age | 1 | | | | | | | | |
| Age squared | 0.975*** | 1 | | | | | | | |
| Education | -0.196*** | -0.193*** | 1 | | | | | | |
| Income quintiles | 0.002*** | -0.013 | 0.226*** | 1 | | | | | |
| Female | -0.075*** | -0.073*** | -0.140*** | -0.026*** | 1 | | | | |
| Employed | -0.019 | -0.049*** | 0.217*** | 0.165*** | -0.150 | 1 | | | |
| Have an account | 0.060*** | 0.021* | 0.304*** | 0.226*** | -0.111*** | 0.273*** | 1 | | |
| Use account to save | 0.063*** | 0.032*** | 0.245*** | 0.208*** | -0.084*** | 0.281*** | 0.524*** | 1 | |
| Frequency of use | 0.029* | 0.016 | 0.124*** | 0.089*** | -0.036*** | 0.163*** | 0.256*** | 0.276*** | 1 |

The superscripts (*), (**) and (***) denote the 10%; 5% and 1% significance levels respectively.

distributed error terms with zero mean and variances equal to 1; $i$ stands for each individual with $k \in \{1;...;7\}$.

## RESULTS

The aim of this paper is to determine the extent to which individuals' characteristics act as push or pull factors in their decisions to use financial services and how self-reported barriers to financial inclusion are associated with these characteristics. We begin by investigating the correlation between variables. The correlation matrixes indicate that there is a significant relationship between individuals' characteristics and the three indicators of financial inclusion on the one hand (Table 2) and between these characteristics and self-reported barriers to financial inclusion on the other hand (Table 3).

### Determinants of financial inclusion

The results of the estimations of the relationship between individuals' characteristics and the three measures of access to and use of financial services are reported in Table 4. Results reported in column 1 of Table 4 shows that the likelihood of owning an account is higher among the aged, men, employed, more educated and richest in WAEMU. Being a woman reduces the likelihood of owning an account by 3.6 percentage points compare to men whereas having completed tertiary education or more increases it by 47.6% points as compared to those who have completed primary education or less. The probabilities of owning an account for individuals who are employed and the richest are respectively 12.2 and 11.7% points higher than their counterparts (unemployed and poorest).

The results of the likelihood of using account to save reported in column 2 of Table 4 are similar to those of owning an account (except for the fact that there is no a

significant difference in the use of account to save between women and men) but to a lesser extent. For example, the probabilities of using an account to save for those who are unemployed and the less educated persons are respectively 7.1 and 12.7% points lower than those who are employed and the most educated persons.

The results of the likelihood of using account frequently reported in column 3 of Table 4 are also similar to those of using account to save (except for the variable ''income quintiles'' where there is no a significant difference in the frequency of use of account among income groups). For example, the likelihood of using account frequently by respondents who have completed tertiary education or more is 5.2% points higher than those who report having completed primary education or less.

In summary, variables such us age, sex, employment status, educational attainment and the level of income considered in this paper are all determinants of financial inclusion in WAEMU. In terms of the extent to which these variables matter for financial inclusion in WAEMU, the educational attainment matter more for financial inclusion, followed by employment status and the level of income. The variables ''sex of the respondents'' and their ''age'' play relatively a less important role in individuals' participation in the financial mainstream in WAEMU. Our results are consistent with the findings of Clamara et al. (2014) in Peru and Pena et al. (2014) in Mexico while the indicators of financial inclusion used in these studies differ from one another.

### Self-reported barriers to financial inclusion

The sample of unbanked has been used to determine whether individuals' characteristics affect the likelihood of reporting a specific barrier of account ownership. The results reported in Table 5 show that, while in Africa most of barriers are associated with Age (Zins and Weill, 2016), in WAEMU, only the likelihood of reporting ''no need for financial services'' decreases significantly with

**Table 3.** Correlation matrix of individuals' characteristics and self-reported barriers to financial inclusion.

| Variables | Age | Age squared | Education | Income | Female | Employed | Too far away | Too expensive | Lack trust | Religious reasons | Lack of money | Cannot get one | Not needed |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | 1 | | | | | | | | | | | | |
| Age squared | 0.975*** | 1 | | | | | | | | | | | |
| Education | -0.196*** | -0.193*** | 1 | | | | | | | | | | |
| Income | 0.002 | -0.013 | 0.226*** | 1 | | | | | | | | | |
| Female | -0.075*** | -0.073*** | -0.140*** | -0.026*** | 1 | | | | | | | | |
| Employed | -0.019*** | -0.049*** | 0.217*** | 0.165*** | -0.150*** | 1 | | | | | | | |
| Too far away | 0.005 | 0.012 | -0.138*** | -0.099 | -0.017*** | -0.082*** | 1 | | | | | | |
| Too expensive | -0.016 | -0.017 | -0.065*** | -0.048*** | -0.010 | -0.046*** | -0.082** | 1 | | | | | |
| Lack of trust | 0.015 | 0.016 | -0.071*** | -0.059*** | -0.007 | -0.025* | 0.181*** | 0.259*** | 1 | | | | |
| Religious reasons | 0.028* | 0.037** | -0.110*** | -0.018 | -0.004 | -0.004 | 0.151*** | 0.126*** | 0.265*** | 1 | | | |
| Lack of money | -0.072*** | -0.049*** | -0.198*** | -0.183*** | 0.072*** | -0.150*** | 0.202*** | 0.201*** | 0.079*** | 0.017 | 1 | | |
| Cannot get one | -0.036*** | -0.016 | -0.108*** | -0.109*** | 0.057*** | -0.082*** | 0.224*** | 0.209*** | 0.108*** | 0.152*** | 0.211*** | 1 | |
| Not needed | 0.017 | 0.026* | -0.100*** | -0.037*** | 0.006 | -0.033 | 0.188*** | 0.219*** | 0.263*** | 0.178*** | 0.097*** | 0.204*** | 1 |

Superscripts (*), (**) and (***) denote 10, 5 and 1% significance levels, respectively. ''Not needed'' stands for '' no need for financial services.

Age. By contrast to the findings of Zins and Weill (2016), women are more likely to report not having enough money as the reason why they are excluded than men in WAEMU. While in the world the employment status is associated with barriers such cost and ''lack of money'' (Allen et al., 2016), in WAEMU, it does not significantly affect the likelihood of reporting a specific barrier to financial inclusion. But, consistent with the findings of Zins and Weill (2016) in Africa, our results indicate that, Educational attainment is negatively associated with all barriers to financial inclusion in WAEMU and suggests that being less educated increases the likelihoods of reporting the above mentioned barriers to financial inclusion. Much in line with Allen et al. (2016), being a poor increases the probability of reporting distance, cost and ''lack of money'' as barriers to account ownership in WAEMU.

## Conclusion

Since access to finance is crucial for economic growth and poverty reduction and remaining unbanked can irreversibly affect individuals' financial well-being, understanding how individuals-level factors and self-reported barriers matter for financial inclusion can help in improving economic policy. In this paper, we have identified individuals' characteristics that matter for financial inclusion and how self-reported barriers are associated with these characteristics in WAEMU where financial inclusion is set at the level of priority in the development agenda but in several dimensions of financial inclusion, countries of the union lag behind the SSA and Asian benchmark countries.

The results of the determinants of financial inclusion indicate that, the variables, Age, Sex, Employment status, Educational attainment and income of the respondents are all determinants of financial inclusion in WAEMU. Globally, the educational attainment matter more for financial inclusion in WAEMU; followed by employment status and the level of income. The sex of the respondents and their age play relatively a less important role in individuals' participation in the financial mainstream in WAEMU. Our results, consistent with the findings of Allen et al. (2016), Clamara et al. (2014), Pena et al. (2014) and Zins and Weill (2016) suggest that, it is the most vulnerable segments of the society (youth, women, unemployed and the poorest) who are

**Table 4.** Relationship between individuals' characteristics and financial inclusion indicators.

| Variables | Have account (1) | Use account to save (2) | Frequency of use (3) |
|---|---|---|---|
| Age | 0.018*** (0.002) | 0.009*** (0.002) | 0.002*** (0.001) |
| Age squared | -0.000*** (0.000) | -0.000*** (0.000) | -0.000** (0.000) |
| Female | -0.036*** (0.010) | -0.006 (0.007) | 0.003 (0.003) |
| Employed | 0.122*** (0.013) | 0.071*** (0.011) | 0.022*** (0.004) |
| Education: Secondary | 0.166*** (0.014) | 0.061*** (0.011) | 0.011*** (0.004) |
| Education: Tertiary | 0.476*** (0.058) | 0.127*** (0.028) | 0.052*** (0.019) |
| Income: Second 20% | -0.019 (0.016) | 0.007 (0.010) | -0.003 (0.006) |
| Income: Middle 20% | 0.021 (0.017) | 0.026** (0.012) | -0.002 (0.006) |
| Income: Fourth 20% | 0.048*** (0.016) | 0.034*** (0.010) | -0.006 (0.005) |
| Income: Richest 20% | 0.117*** (0.017) | 0.081*** (0.014) | 0.009 (0.006) |
| Observations | 7008 | 7008 | 7008 |

Superscripts (**) and (***) denote the 5 and 1% significance levels, respectively.

**Table 5.** Relationship between individuals' characteristics and self-reported barriers to financial inclusion.

| Variables | Too Far Away | Too Expensive | Lack Trust | Religious Reasons | Lack Of Money | Cannot Get One | No Need For Financial Services |
|---|---|---|---|---|---|---|---|
| Age | -0.002 (0.004) | 0.010 (0.006) | 0.002 (0.004) | 0.000 (0.007) | -0.003 (0.005) | -0.005 (0.007) | -0.005** (0.002) |
| Age squared | 0.000 (0.000) | -0.000* (0.000) | -0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) | 0.000** (0.000) |
| Female | -0.041** (0.019) | -0.037* (0.021) | -0.019 (0.015) | -0.006 (0.020) | 0.035* (0.019) | 0.018 (0.021) | -0.005 (0.013) |
| Employed | -0.050 (0.038) | 0.031 (0.059) | 0.031 (0.040) | 0.056 (0.085) | 0.064 (0.041) | -0.009 (0.069) | -0.017 (0.038) |
| Education: Secondary | -0.089*** (0.022) | 0.002 (0.053) | -0.031 (0.024) | -0.065*** (0.011) | -0.017 (0.044) | -0.033 (0.061) | -0.088*** (0.011) |
| Education: Tertiary | -0.256*** (0.022) | -0.146 (0.125) | -0.111*** (0.029) | -0.116 (0.088) | -0.092 (0.197) | -0.085 (0.199) | -0.147*** (0.017) |
| Income: Second 20% | 0.032 (0.022) | 0.079*** (0.024) | 0.022 (0.018) | 0.015 (0.015) | 0.077*** (0.025) | -0.016 (0.026) | 0.028 (0.018) |
| Income: Middle 20% | -0.001 (0.022) | 0.055** (0.025) | 0.004 (0.018) | 0.011 (0.019) | 0.049** (0.023) | -0.029 (0.024) | -0.020 (0.017) |
| Income: Fourth 20% | -0.032 (0.022) | 0.072** (0.030) | -0.017 (0.018) | 0.011 (0.026) | 0.028 (0.024) | -0.041 (0.027) | 0.016 (0.020) |
| Income: Richest 20% | -0.057** (0.026) | 0.028 (0.045) | 0.007 (0.029) | 0.050 (0.075) | -0.029 (0.041) | -0.010 (0.052) | 0.003 (0.029) |
| Observations | 7008 | 7008 | 7008 | 7008 | 7008 | 7008 | 7008 |

Superscripts (*), (**) and (***) denote the 10, 5 and 1% significance levels, respectively.

disadvantaged in the access to and use of financial services in WAEMU. The results of the relationship between self-reported barriers and individuals' characteristics show that, among those who are excluded from the financial system in WAEMU, educational attainment and income are the main factors that significantly affect the likelihood of reporting a specific barrier to financial inclusion.

The results have policy implications. In order to be possible to include financially more than 70% of adult population by 2020 in WAEMU, economic

policy should put emphasis on promoting higher education and providing jobs to unemployed targeting youth, women and the poorest. Moreover, as the "affordability'' is the chief reason of individuals exclusion from the financial system in WAEMU, the actual implementation of the free banking services in WAEMU might be an effective policy in promoting financial inclusion in the union.

But the study does not take into account country-level characteristics such as the institutional quality, legal rules, contract enforcement, political stability found by Allen et al. (2016) as determinant for individual-level financial inclusion because of data constraints. The study does not also take into account the issue of mobile banking which is now widely used in West Africa.

For further research, as the mobile banking raises concern about the individuals' characteristics using it (Zins and Weill, 2016), it will be of interest to investigating individuals-level determinants of mobile banking in WAEMU. Moreover, as the financial system in Africa is dualistic, even some people do not have an account in a formal financial institution, they can be to a certain extent included financially through informal finance. It will be important to look at alternatives sources for people' inclusion in the overall financial system especially what determine the use of the informal finance in WAEMU.

## CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

## REFERENCES

Allen F, Demirguc-kunt A, Klapper L, Peria MM (2016). The Foundations of Financial Inclusion: Understanding Ownership and Use of Formal Accounts. J. Financ. Intermediation 27:1-30.

Banque de France (2015). Les enjeux de l'inclusion financière en Zone franc in La Politique et les Agrégats Monétaires dans les Zones d'Emissions Africaines. Rapport Annuel de la Zone franc.

Beck T, de la Torre A (2006). The Basic Analytics of Access to Financial Services. World Bank Policy Res. P 4026. Available at: http://documents.worldbank.org/curated/en/586361468166156750/The-basic-analytics-of-access-to-financial-services

Beck T, Demirguc-kunt A, Peria MM (2007). Reaching out : Access to and use of banking services across countries. J. Fin. Econ. 85:234-266.

Beck T, Demirguç-Kunt A, Peria MM (2008). Banking Services for Everyone ? Barriers to Bank Access and Use around the World. World Bank Econ. Rev. pp. 397-430.

Bruhn M, Love I (2009). The Economic Impact of Banking the Unbanked. Evidence from Mexico. The World Bank Policy Research Working Paper. 4981 (June 2009).

Clamara N, Pena X, Tuesta D (2014). Factors that Matter for Financial Inclusion : Evidence from Peru. BBVA Research Working Paper, 14/09. Available at: http://socialprotectionet.org/sites/default/files/factors_that.pdf

Demirgüç-kunt A, López E, Soledad M, Pería M, Woodruff C (2011). Remittances and Banking Sector Breadth and Depth : Evidence from Mexico. J. Dev. Econ. 95(2): 229-241.

Efobi U, Beecroft I, Osabuohien E (2014). Access to and use of bank services in Nigeria : Micro-econometric evidence. Rev. Dev. Financ. 4(2):104-114.

Ellis K, Lemma A, Rud J (2010). Financial inclusion, household investment and growth in Kenya and Tanzania''. ODI Project Briefings. 43:(43). Available at: www.odi.org.uk

Honohan P (2008). Cross-country Variation in Household Access to Financial Services. J. Bank. Financ. 32(11): 2493-2500.

Kodan ASK, Chhikara KS (2013). A Theoretical and Quantitative Analysis of Financial Inclusion and Economic Growth. Manag. Labour. Stud. 38(1 & 2):103-133.

Kendall J, Mylenko N, Ponce A (2010). Measuring Financial Access around the World, World Bank Policy Res. pp. 5352.The World Bank. Available at: http://www.cgap.org/financialindicators

Pena X, Hoyo C, Tuesta D (2014). Determinants of financial inclusion in Mexico based on the 2012 National Financial Inclusion Survey (ENIF). BBVA Research Working Paper, 14/15 (June). Available at: www.bbvaresearch.com

Rhine SLW, Greene WH (2013). Factors That Contribute to Becoming Unbanked. J. Consum. Aff. 47(1):27-45.

Riquet C (2015). 20 Years of Financial Inclusion Progress in WAEMU, More to Come !, (December). Consultative Group to Assist the Poor.

Riquet C, Mbengue DM (2013). Deepening Financial Inclusion In West Africa, The Consultative Group to Assist the Poor (January).

World Bank (2014). Global Financial Development Report: Financial Inclusion. 1818 H Street NW, Washington DC 20433, the World Bank.

Zins A, Weill L (2016). The Determinants of Financial Inclusion in Africa. Rev. Dev. Financ. 6:46-57.

# Journal of
# Economics and
# International Finance

## Related Journals Published by Academic Journals

- Journal of Hospitality Management and Tourism
- African Journal of Business Management
- Journal of Accounting and Taxation
- International Journal of Sociology and Anthropology
- Journal of Public Administration and Policy Research
- African Journal of Marketing Management