Research on Humanities and Social Sciences
ISSN 2224-5766 (Paper) ISSN 2225-0484 (Online)
Vol.8, No.23, 2018

Analysis on the Determinants of Trade Balance in Ethiopia a Time Series Analysis (1981-2017)

Habtu Nibret
Lecturer, Department of Economics, Dembi Dolo University, Ethiopia

Abstract
Trade balance is one core component of gross domestic products of countries especially in the present times in which every nation have liberalization of their economies. It may be in surplus or deficit depending on the trading and economic power of the nation. For instance Ethiopia has running a negative trade balance for the previous three decades, implies that export of the country could not cover the import expenditure. There are different factors which result into having as such circumstance. This study tried to identify the main determinants of the trade balance in Ethiopia by considering ratio of export and import as an approximation to trade balance. The study investigates the determinants of trade balance in Ethiopia from 1981-2017. The Autoregressive Distributed Lag under Bounds test approach to cointegration was used for the estimation. Further, the study employed the variance decomposition and impulse response functions to investigate the dynamic simulations of the variables included in the estimated model. The results show evidence of an equilibrium long-run relationship (cointegration).
Keywords: Trade balance, ARDL, Ethiopia

1 INTRODUCTION

"Nations of the world differ in their resource endowments and level of technologies uses in the production of goods and services. The engagement of nations in the external trade depends upon a nation's specialization in the production and exchanges of goods and services in which they have comparative advantages'', which in turn constructs a room for improvement of realized the importance of specialization and trade in his Wealth of Nations (Hailegiorgis, 2011)

In the recent year, international trade becomes more important in every economy and there are many problems that all the multinational enterprises must face. The global economy was faced with the influence of natural disasters, financial uncertainty and civil conflict. Especially, Earthquake in Japan 2010 and flooding in Thailand 2011 were affects on global supply chain. There was an expected reduction of trade after this crisis. Besides that, there was an impact of fears of sovereign default in the euro area weighted heavily at the end of the year. At this time, there was civil war in Libya that decreases the supplies of oil and contributed to sharply higher price. All of these factors together produce below average growth in world trade in 2011 (World Trade Organization report, 2012).

Initially, a trade deficit is not a bad thing. It raises the standard of living of a country's residents, since they now have availability of a wider variety of goods and services for more competitive price. It can lower the threat of inflation, since the products are priced lower. A trade deficit can also show that the country's residents are feeling confident, and wealthy, enough to buy more than the country produces. Obviously, trade deficit is occurs when a country cannot produce all it needs. However, the true causes run a little deeper than that.

Deep rooted structural problems, weak policy frameworks and institutions, protection at home and abroad (IMF and World Bank, 2001), and the structure of African exports, which is characterized by dependence on primary commodities (UNCTAD, 2008) are considered as the reasons for Africa's poor export performance. Like other African countries, Ethiopia has faced these problems for a long time .For instance, in 1983 the Provisional Government of Socialist Ethiopia noted that the basic constraints for Ethiopian exports include the low volume of exportable products, the limited degree of diversification of exports, which are made up mainly of unprocessed primary products, frequent economic crisis which substantially reduce the demand for and prices of primary products, artificial trade barriers by trading partners etc. Moreover, after the downfall of the Dreg regime, the transitional Government of Ethiopia stated that it is essential to increase and diversify exports. In response to the problem, Ethiopia has taken different measures such as export financing incentive schemes, export trade duty incentive scheme and duty free importation scheme to those wholly, engaged in supplying their products to foreign markets (Yishak, 2009).

Generally, Even if different trade strategies have been used in the past, including import replacement/protection for infant Industries during the Imperial period, state-managed trade during the military government era, and a more market-oriented liberalized approach supported by much trade-related technical assistance in the most recent period. Ethiopia's track record on using trade for development is not exactly encouraging. Nonetheless, Ethiopia has a low share of trade in GDP, its exports continue to have limited diversification, and its trade deficit has widened significantly, leaving the country dependent on financial assistance to pay its import bill (Ciurak and Previle, 2010). For instance, the share of export in import financing

(export/import) declined from 64% in 1981 to 24 % in 2017. Therefore, Ethiopia's trade balance with its major trading partners calls for concern because such a wide and growing gap between the value of exports and imports of a country means that the country continues to need other sources of financing to its import demand such as foreign aid and credit; and needs other sources at an increasing rate (MOFA, 2007).

Some researcher can conducts on the study area but some important determinant of trade balance cannot incorporate in the model and they use only some limited independent variables (factors) which are not sufficient for conclusion. But the researcher tries to fill the gap by incorporating some important determinants of trade balance which are not incorporate before and also the researcher will try to conclude by taking more determinants raised before. And also knowledge gap related with the previous study they used the dependent variable (trade balance) is the difference between export revenues minus import revenues. But the researcher use dependent variable (trade balance) as the ratio of real exports revenue and real imports revenue of goods and services. Objective of the study is quite different from the previous study.

Given all the above, this study tried to assess the relationship between exchange rate and trade balance in Ethiopia by providing an empirical test of the Marshall-Lerner condition and the J-Curve effect, the nature and strengths of the relationships between Ethiopian trade balance and its Macro determinants, how Ethiopian's trade balance responds to innovations (shocks) in its determinants.

2 LITERATURE REVIEW

2.1 The Exchange rate and the Marshall-Lerner condition

Exchange rate has an impact on the trade balance. One way of ascertaining this link can be discussed in terms of the Marshall-Lerner condition. The elasticity of demand for exports and imports are not only important in determining the terms of trade for a country, impact on quotas and tariffs, and impact on economic growth but also plays a key role in assessing how a devaluation (depreciation) aids in improving or worsening the trade balance position of an economy. Currency devaluation is mainly aimed at altering relative prices in countless ways that will encourage exports and discourage imports. Devaluation is the deliberate increase in the domestic currency as against a foreign currency, hence raising the domestic price of imports. In relation to the increasing levels of domestic prices its effect is however solely dependent on the demand elasticity. Specifically, at a higher demand elasticity ($e > 1$), then devaluation will cause a relatively large decline in the volume of imports in the domestic economy, and will achieve its intended effect. On the contrary, if the demand elasticity is low ($e < 1$), though devaluation will cause some level of decline in imports, the volume of the reduction might not be enough to offset the rise in domestic currency price. Hence, to achieve an intended effect thus, improving the trade balance the demand elasticity has to be relatively high.

2.2.2 The Exchange rate and the J-curve Effect

The relationship between the real exchange rate and the trade balance can also be discussed in terms of the J-curve effect. Following the Marshall-Lerner condition is the J-curve effect. The intuition behind the J-curve effect is that, a worsening trade balance resulting from a depreciation of a particular currency may be temporary. Likewise, exchange rate instabilities may only be a problem in the short-run. Since the second half of the 1980's the J-curve effect has served as an important theory in explaining the temporary problem caused in the trade balance resulting from depreciation in the currency.

Generally, individuals take some time to adjust their preferences towards substitute goods. Economists believe that this is due to the fact that, in the short-run demand is more inelastic as compared to the long-run. This is particularly strong for the import elasticity demand, because the import demand curve is derived from the difference between the domestic supply curve and demand curve of the product; with both demand and supply being more inelastic in the short-run than in the long-run, the difference between the demand and supply is more inelastic in the short-run. This implies that, when there is depreciation in a currency, causing a consequent increase in prices of import residents of that particular country may continue to buy foreign goods because they have not adjusted preferences towards locally produced substitutes (an inelastic demand curve) and also because local substitutes might have not been produced (a domestic inelastic supply curve). Imports can therefore fully decline only after consumers have decided to adjust their preferences by purchasing locally produced goods which are available at the time. Likewise, domestic exports also expand resulting from depreciation if only domestic production increases in order to produce more for export and also if foreign consumers patronize these products.

3 RESEARCH METHDOLOGY

3.1 Data Type and Date Source

The study uses the annual (secondary) time series data covering the period from 1981-2017. This period has chosen because data to be used in the trade balance function has been available. All the data has drawn from the National Bank of Ethiopia (NBE) and Ministry of Finance and Economic Development (MoFED).

3.2 Data Analysis

After the data has collected following the researcher analyzed by using regression method of analysis. The study adopts ARDL model in order to assess the short run and long-run relationship between the dependent and independent variables. Multiple regression analysis was also applied to test the association of variables and the extent of variance in the dependent variable as a result of a unit change in independent variables.

3.3 Specification of the Model

The study adopts the imperfect substitute model of international trade of Goldstein and Khan (1985), Rose and Yellen (1989) and Rose, (1991) where a reduced form of trade balance is developed.

The imperfect substitute model of Goldstein and Khan (1985) and Rose and Yellen (1989, 1991) does not fully capture certain key factors that might affect the trade balance of a developing country like Ethiopia. In view of this, the baseline model of the study is modified to capture key variables that would significantly influence Ethiopia's trade balance. Various studies (Saruni, 2007; Duasa, 2007; Waliullah et al, 2010; Mohammad, 2010 and Shawa and Shen, 2013) have shown that money supply, domestic expenditure, and domestic prices of goods are significant drivers of trade balance in developing countries. Secondly in order to avoid aggregation bias the domestic expenditure variable of the study is substitutes with the major components of domestic expenditure to assess their distinct impact on Ethiopia's trade balance. To sum, according to the World Bank Institute (2010) domestic expenditures which consist of household consumption expenditure and government consumption expenditure are the major components of domestic output.

Therefore in order to assess their distinct impact on the Ethiopia's trade balance they are captured in the baseline model in-place of domestic output. Again, Ethiopia like many developing countries is an agrarian economy hence its export sector is highly dominated by agricultural products. Several studies such as, Thungsuwan and Thompson (2003), Vohra (2006) and Konya and Singh (2009) have ascertained that the growth in the agricultural sector is a major factor affecting the trade balance of most developing countries. Given this, equation specified as:

$TB=\beta_0+\beta 1 lnREEX+\beta 2 lnGC+\beta 3 lnHC+\beta 4 lnMS+B5 lnI+\beta 6 OP+\beta 7 Ag+Ú_t$..... (3.1)

Where; TB=Trade balance, MS=Money supply, HC=Household consumption Expenditure, GE=Government consumption Expenditure, OP=Trade Openness, REEX=Real Effective Exchange Rate, Ag=Agricultural Growth Rate, I= investment and β represents parameters to be estimated, ln represents natural log, t is the time period considered for the study, Ú represents the Gaussian white noise.

3.4 Estimation Strategy

Regarding the estimation strategy, the researcher follows three steps: i) the test of stationarity of the individual series in the regression model or otherwise to determine the order of integration of the variables, ii) the test of the existence of a stable long-run equilibrium relationship among the variables in the model and iii) the estimation of the parameters of the model in equation 3.1.

4 ANALYSES OF DATA AND DISCUSSION OF EMPIRICAL RESULTS

4.1 Unit Root Test Results

In analyzing the determinants of Ethiopian's trade balance, the study first tests for the presence of unit root in the series before proceeding to cointegration analysis. In order to ensure that there is a strong no evidence of unit root or otherwise having stationerity in individual series; the study employs the Augmented Dickey-Fuller (ADF) tests.

Table 4.2 Augmented Dickey-Fuller test

	Stationary at Level		Stationary at First Difference	
Variable	constant	Constant and trend	constant	Constant and trend
TB	-2.124477	-3431679	-6.201106***	-6.134624***
lnREER	-1.535153	-1.460243	-5.596716***	-4.797656***
lnGC	-1.212971	-0.636476	-4.908613***	-5.273612***
lnHC	- 2.602219	-0.225639	-5.717197***	-7.181957***
lnI	-1.349897	-1.079814	-7.034775***	-7.984215***
lnMS	-2.128175	-0.177578	-4.25930**	-4.585349**
AG	-5.558973***	-5.901295***	____	____

Not e: *** and ** denotes significance at 1% and 5% respectively
Source: *Author's own construction*

The ADF test result (see Table 4.1) shows that, for the model with only constant and no trend, Agricultural Growth (Ag) is integrated of order zero, at 1% level of significant thus I(0) level of significance. At first difference and with regards to the same model (constant and no trend), trade balance (TB),real effective exchange rate (lnREER), government consumption expenditure (lnGC), household consumption expenditure (lnHC), investment(lnI) and trade openness (OP)are integrated of order one [I(1)] at 1 %level of significant and money supply (lnMS) is integrated of order one [I(1)] at 5% level of significant.

Again, for the model with both constant and trend at the levels Ag is integrated order zero, I (0) at 1% significance level. At first difference; TB, lnREER, lnI, lnGC, lnHC and OP are significant at 1% hence are integrated of order one, I (1) and lnMS are significant at 5 % hence are integrated of order one. The results obtained in Augmented Dickey Fuller tests (ADF tests) show mix results in terms of the order of integration of the variables. In other words the underlying series of the variables in the study are integrated of order zero I(0) and order one I(1) hence offering support for the use of ARDL bounds test to cointegration. This implies that all the variables were found to be mean reverting.

4.2 Cointegration Test Results

In order to determine the possible presence of cointegration thus a long-run equilibrium among the variables included in equation 3.1 the study adopts the bounds testing approach within the ARDL framework to test for cointegration. The results are presented in Table 4.2.

The ARDL model (1, 2, 0, 0, 2, 0, 0, 0) selection was based on the Schwarz information criterion (SIC). The result in Table 4.2 shows that there exists a stable long-run relationship among the variables included in equation 3.1. The computed F-statistics of the bound test 5.407 is larger than the upper bound critical value of 5.25 at 1% level of significance. In this case the null hypothesis of no cointegration is rejected implying that there is a stable long-run equilibrium relationship among the variables (cointegration) in equation 3.1. This implies that there is a long-run relationship among the variables included in estimated model.

Table 4. 3: Results of Cointegration relationship (Bound test)

Critical Values		
Computed F-statistic	99% Lower Bound	99% Upper Bound
5.407 ***	3.599	5.25

Note: *** means that the null hypothesis of no long-run equilibrium (no cointegration) is rejected at 1% level of significance.
Source: *Author's own construction*

4.3 Long-run Relationship between Exchange rate and Trade Balances in Ethiopia

We have established in the previous section that a long-run (cointegration) relationship exists and short-run coefficients in order to achieve the first two objectives of the study. The results are presented in Table 4.3.

The first objective was set to provide an empirical test of the Marshall-Lerner condition and the J-curve effect. Empirically, in order to ascertain the presence of the Marshall-Lerner condition, there are necessary and

sufficient conditions that must be met. These include, i) the long-run coefficient of the exchange rate variable should be positive and statistically significant and ii) the value of the coefficient, which measures the elasticity, should be more than one (Bahamani-Oskooee, 2001; Duasa, 2007; Petrovic and Gligoric, 2010; Tran and Dinh 2014). In the same vein, the empirical conditions needed to ascertain the existence of the J-curve effect are that i) the coefficient of the exchange rate variable should first be negative and statistically significant in the short-run and ii) the long-run coefficient, measuring the elasticity should be positive, greater than one and statistically significant (Singh, 2004; Petrovic and Gligoric, 2010; Tutueanu, 2015). The Marshall-Lerner condition as earlier discussed is a long-run phenomenon hence can only be tested from the long-run results whereas the J-curve effect both the long-run and short-run results are required.

The results show that, in the long-run there is a negative relationship between exchange rate and the trade balance. It shows that a one percent increase in the exchange rate (i.e. a depreciation) worsen the trade balance in the long-run. Specifically, a one percent increase in the exchange rate will worsen trade balance by 30.9 percen in the long-run. Even though the variable we obtain is significant, the result obtained shows a negative relationship between the exchange rate and the trade balance in the long-run result.this shows that there is the absence of the Marshall-Lerner condition. In the same vein, since the long-run coefficient of the exchange rate variable though negative and significant, it can be concluded that there is absence of the J-curve pattern. In both cases neither conditions of the long-run are satisfied.

Table 4. 4 Estimated Long-run
ARDL (1, 2, 0, 0, 2, 0, 0, 0) selected based on SIC Dependent Variable: TB

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OP	-0.875444	0.254333	-3.442120	0.0023
LNREER	-0.309963	0.081652	-3.796129	0.0010
LNMS	-0.192467	0.063578	-3.027231	0.0062
LNI	0.351905	0.087344	4.028947	0.0006
LNHC	-0.096477	0.121987	0.790879	0.0375
LNGC	-0.155692	0.053870	-2.890123	0.0085
AG	0.008476	0.123356	-0.068709	0.9458
C	0.846673	0.714117	1.185623	0.2484

Source: *Author's own construction*

4.4 Long-run Relationship between Macroeconomic Variable determinants and Trade Balance in Ethiopia

The second objective was set to determine the impact of other macroeconomic variables including, money supply, household consumption expenditure, government consumption expenditure, investment, trade openness and agricultural growth rate. To achieve this, the aforementioned variables were included in equation 3.1.

Money supply has a negative and significant relationship with the trade balance in the long-run. The result shows that a one percent increase in money supply causes a decline in the trade balance. More, specifically in the long-run a unit increase in the money supply causes deterioration of trade balance by approximately 19.2 percent.

The coefficient of household consumption expenditure has a negative and statistically significant relationship with the trade balance in the long-run. That is, in the long-run a one percent increase in household consumption expenditure causes deterioration in the country's trade balance. Specifically, a one percent increase in individuals' consumption expenditure causes approximately deterioration in Ethiopia's trade balance by 9.6 percent at 5 % level of significance.

Regarding the long-run coefficient of government consumption expenditure, the result shows a negative and significant relationship between government consumption expenditure and the trade balance. This implies that a one percent increase in government consumption expenditure leads to deterioration in the trade balance by approximately 15.56 percent at one percent significance level in the long-run.

The coefficient of the Trade Openness indicated a negative relationship with the trade balance in the long-run and it affects significantly. A one percent increase in Trade Openness causes deteriorate of Ethiopia's trade balance by 0.873 percent in the long-run at 1% level of significant.

Regarding the long-run coefficient of investment, the result shows a positive and significant relationship between investment and the trade balance. This implies that a one percent increase in investment leads to improvement in the trade balance by approximately 35.1 units at one percent significance level in the long-run.

The coefficient of the agricultural growth rate indicated a positive relationship with the trade balance in the long-run. A one percent increases in the growth rate of the agricultural sector causes an improvement in Ethiopia's trade balance by 0.0084 percent in the long-run. Though the sign of the coefficient confirms the a-prior expected sign, the result is not statistically significant. Logically, since Ethiopian is an agrarian economy with its export sector highly dominated by agricultural products, growth in the agricultural sector should result in a significant improvement in its trade balance. The insignificance results can be attributed to the fact that as

compared to other countries, the Ethiopia's agricultural sector is still at the verge or approaches of experiencing immense growth. In addition, the positive and insignificant results obtained might be because, unlike the advanced countries that indulge or satisfied in agriculture, Ethiopia's agricultural sector lacks advanced technologies and in effect causes stagnation in it growth rate.

4.5 Short-run Relationship between Macroeconomic determinants and Trade Balance in Ethiopia

The previous section has analyzed the long-run (cointegration) relationship among the variables included in equation 3.1. In this section, and in order to achieve the first two objectives, focuses on the short-run relationship among variables included in equation 3.1. To achieve this equation the error correction model was estimated. The results are presented in Table 4.4.

As shown in Table 4.4.The short run result shows a statistically significant negative coefficient of exchange rate to the trade balance. Specifically, a one percent increase in exchange rate in the short run leads to 7.5 percent deterioration in Ethiopia's trade balance at 1% significance level. The results imply that an increase in the exchange rate leads to a deterioration of the trade balance in the short-run. The short-run result satisfies the first condition of the J-curve effect as earlier stated though the long-run result earlier discussed then the result shows that the J-curve effect is not fully supported in the case of Ethiopia. Hence the absence of the J-curve effect can be concluded.

Table 5.4 Estimated Short -run

ARDL (1, 2, 0, 0, 2, 0, 0, 0**) selected based on SIC Dependent Variable**: TB

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(OP)	-0.087439	0.205803	-0.424869	0.6751
D(OP(-1))	0.824185	0.218069	3.779476	0.0010
D(LNI)	-0.001392	0.026661	-0.052202	0.9588
D(LNI(-1))	-0.214644	0.038097	-5.634128	0.0000
CointEq(-1)*	-0.794818	0.097581	-8.145172	0.0000

Source*: Author's own construction*

The results show that the coefficient of trade openness causes deteriorations on Ethiopia's trade balance in the short run. A one percent increase in trade openness causes trade balance decrease by 0.081 percent but it have statistically insignificant effect on Ethiopian trade balance and its lag D(OP(-1)) has a positive relationship between trade openness and trade balance in Ethiopia. A one percent increase in trade openness causes 0.824 percent increase in trade balance.

The results show that the coefficient of investment causes deterioration Ethiopian trade balance in the short run. A one percent increase in investment leads to deteriorate Ethiopian trade balance by 0.13 percent but it's statistically insignificant. The lag D (LNI(-1)) coefficient of investment shows that investment can be deteriorate trade balance in the short run and statistically significant.

Finally from economic intuition, the error correction term (ECT-1) in the ECM measures is the speed at which an endogenous variable adjusts to shocks in an explanatory variable in order to converge to its long run equilibrium. The estimated ECT-1 coefficient must be negative and statistically significant at one percent error level. The negative and significant coefficient of the ECT-1 confirms the cointegration results discussed in section 4.4. The ECT-1 explains the extent to which exchange rate, household consumption expenditure, government consumption expenditure, money supply, trade openness and agricultural growth rate returns to the equilibrium in the long-run after a short-run shock. The result shows a high speed of adjustment of convergence to the long run equilibrium every year after a short run shock. In other words, the coefficient -0.794 indicates high rate of convergence to equilibrium, which implies that the deviation from long-term equilibrium is corrected by 79.4 percent over each year.

4.6 Ethiopian's trade balance responds to innovations (shocks)

In order to achieve the third objective, we study the VDF and IRF. To do this we examine the forecast error variance in one variable explained by its own innovations (shocks) or innovations in other variables, and trace the directional response of one variable to a one standard-deviation in shocks in other variables. The study conducts the generalized VDF and generalized IRF within an unrestricted VAR model as proposed by Koop et al (1996) and Pesaran and Shin (1998). Discussions on the VDF are first presented after which discussions on IRF are also presented.

From an estimated VAR model and in order to convey a sense of dynamics, Table 4.5 presents the VDF of the variables included in equation 3.1 in a ten year horizon. From a quick look at the results presented in Table 4.5, it is evident that within the ten year horizon, the forecast error variance of trade balance is as a result of its own shocks.

In terms of innovations in the explanatory variables, innovations in investment contributed the most to the forecast error variance of trade balance as compared to the other variables over the horizon. In the same vain

innovations in, real effective exchange rate, money supply, agricultural growth rate, household consumption expenditure, government consumption expenditure and trade openness contributed sequentially to the forecast error variance of trade balance over the specified time horizon.

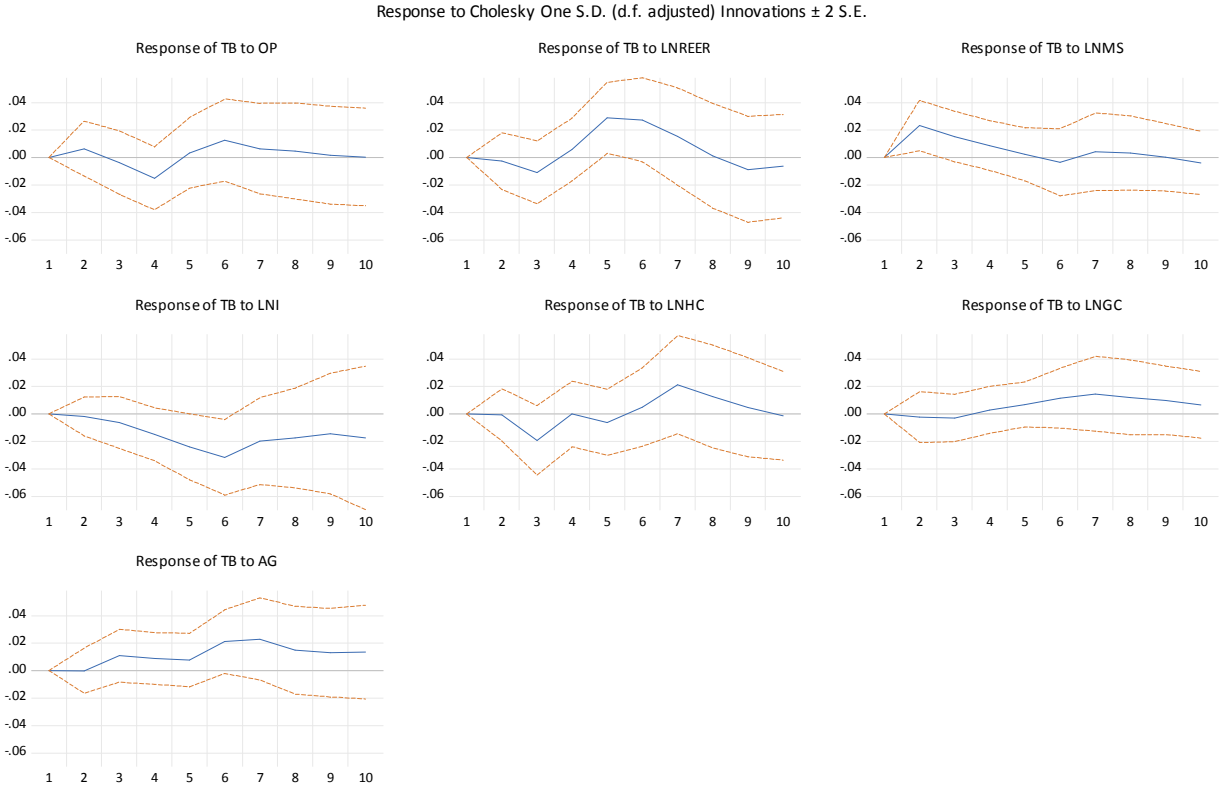
Table 4.5 Variance Decomposition Result

Period	S.E.	TB	OP	LNREER	LNMS	LNI	LNHC	LNGC	AG
1	0.044734	100	0	0	0	0	0	0	0
2	0.052685	78.33946	1.525721	0.248437	19.57655	0.111219	0.012899	0.184228	0.001482
3	0.060613	59.29011	1.520449	3.332148	21.12074	1.111686	10.0813	0.380696	3.162874
4	0.066031	50.94136	6.487366	3.587907	19.57585	5.939556	8.494636	0.539812	4.433517
5	0.077011	37.56602	4.967396	16.69965	14.48061	13.95111	6.865177	1.222831	4.247207
6	0.093086	28.23738	5.291998	20.12252	10.04298	20.92945	4.991242	2.366035	8.0184
7	0.10431	25.54994	4.597964	18.19552	8.159327	20.22471	8.168698	3.886521	11.21731
8	0.109354	25.00714	4.37331	16.56961	7.520666	20.92443	8.795053	4.766299	12.04349
9	0.11228	24.33787	4.172029	16.30654	7.134215	21.45552	8.536557	5.304353	12.75292
10	0.115145	23.66541	3.968017	15.7928	6.905594	22.66419	8.130818	5.386031	13.48715
Cholesky Ordering: TB OP LNREER LNMS LNI LNHC LNGC AG									

From the above explanations, it is clear that the VDF substantiate that the significant role played by investment, real effective exchange rate, money supply, agricultural growth rate, household consumption expenditure, government consumption expenditure and trade openness in accounting for fluctuations in forecast error variance of Ethiopia's trade balance over the time horizon within the sample period considered. In terms of explanatory power, innovations in trade openness explained very little of the forecast error variance of trade balance as compared to other variables. The implication is that trade openness contributed very little to trends in Ethiopia's trade balance over the sample period. Nevertheless the portion of trade balance variations accounted for by most of the explanatory variables increased continuously over the time horizon of which the percentage of forecast error variance in trade balance is highly accounted for by innovations in investment followed by real effective exchange rate as it maintains the highest percentage than the other variables. This also implies that changes in the country's trade balance are highly attributed to shocks from investment and real effective exchange rate.

Furthermore the results of the IRF are presented. Figure 1 show plots of the generalized IRF of trade balance with respect to innovations in trade openness, real effective exchange rate, money supply, investment, household consumption expenditure, government consumption expenditure and agricultural growth rate as proposed by Pesaran and Shin (1998) and Koop et al (1996) within a ten-year horizon. This approach reveals insight into the dynamic relationships between the variables as it portrays the response of a variable to an unexpected shock in another variable over a specified time horizon. The horizontal axis in each graph shows the number of years after the impulse has been initialized while the vertical axis shows the responses of the appropriate variable.

Figure 1 Impulse Response Function



Source: *Author's own construction*

As evident in the first plane of figure 1innovations from real effective exchange rate caused an improvement in trade balance from shows improvement first reach maximum and later decline which contradict the j-curve conditions. There real effective exchange rate causes worsening of trade balance in Ethiopia. This might explain why the long-run impact of exchange rate, though negative and significant and also a clear indication why the J-curve effect is not fully satisfied statistically.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion

The research set out to analyse the determinants of trade balance in Ethiopia from 1981- 2017. In order to achieve this, the study tests for the presence or absence of the Marshall-Lerner condition and the J-curve effect. It further examines the impact of other macro-economic variables on the country's trade balance. Finally the study analyses the innovations (shock) of the variables included in the estimations. In other words, it investigates how innovations in the explanatory variables and own shocks contribute to the forecast error variance of Ethiopia trade balance and also traces the directional response of the Ethiopia trade balance to a one standard-deviation in own shocks or shocks in explanatory variables. The study employed the ARDL bounds test to cointegration as its estimation strategy. It also employs the VDF and IRF to analyse the dynamic simulations of the variables.

The study finds evidence of both long-run relationship and short-run dynamics among the variables understudy, thus trade balance, real effective exchange rate, trade openness, money supply, investment, government consumption expenditure, household consumption expenditure and agricultural growth rate. It found the absence of the Marshall-Lerner condition and J-curve effect in Ethiopia. Again, the VDF showed that investment followed by real effective exchange rate highly contributed to the forecast error variance of trade balance and trade openness contributed least to the forecast error variance of trade balance in Ethiopian trade balance. The absence of the J-curve effect was further confirmed by the IRF position.

5.2 Recommendations

Ethiopia is still faced with negative trade imbalances especially in the post-liberalization era. Given this, urgent measures need to be considered in order to improve upon it to hasten growth and development in the economy. From the results obtained it can be noted that, depreciation in the Ethiopia birr is not an appropriate step to help improve upon the country's trade balance position. In strong economies like the industrialized countries, market forces can operate on their own to produce self-correcting forces in case of any currency depreciation hence

control the trade balance. Unlike these industrialized countries, for developing countries like Ethiopia, self-correcting measures cannot work in terms of controlling the trade balance. Therefore, in relation to this, the most appropriate step to control the country's trade balance is to combine liberalization with proper exchange rate management measures. Other measures of currency stabilization could be adopted to improve the trade balance as a stable exchange rate would enable producers of tradable goods make long-term investment plans.

Appropriate action related to its trade openness by levying tariffs and quotas impose from goods come from abroad in order to increase price and limit imports. Government also provides subsidies to domestic industries and creates competitive advantages to domestic producers in order to compute with foreign producers. In addition to tariff and quotas rationing the available foreign exchange that is allowing foreign exchange only for necessary products (like machinery that used for further production) is also another mechanism used to minimize the country's trade deficit.

Policies aimed at stabilizing money supply in the economy should be adopted. Monetary policy authorities can adopt contractionary monetary policies rather than expansionary ones as this will to help control the real money balances of individuals and hence their expenditure patterns to further help improve the country's trade balance position.

Policies to divert household consumption expenditures to domestic goods can also be adopted through the promotion of various made-in Ethiopia goods. In the same vein, import substitution policies for major import goods such as cars, petroleum products and electronic equipments can also be adopted. Create awareness among the people to change their attitude towards domestic products which is highly in favor of foreign product goods. This may help reduce government and household expenditure paths and as such reduce imports relatively. In effect, these will not only aid improve upon the country's trade balance position but will also touch on some key macro-economic variables such as unemployment and in effect aid in growth and development of the country. In addition, policies to improve upon the standards of domestic products should be implemented in order to meet the standard, taste and preference of the Ethiopian consumer, and those abroad.

Police regarding to investment government can create favorable investment condition for investor like favorable climate for investment such as related to land lease, borrowing interest rate, infrastructure and stability to improve trade balance and also hasten economic growth.

Again, chunk of government consumption expenditure should mainly be diverted into productive and investment ventures such as the export sector to aid increase volumes of exports rather than spending in non-productive sectors that do not generate any income. Government policies aimed at establishing companies (either solely owned or public private partnerships) purposely for the production of export-oriented and import substitution goods in order to meet export demand and domestic demand.

Considering the fact that the export sector is mainly dominated by agricultural products, policies to improve upon the growth rate in the agricultural sector can be enforced. Policy makers can invest in newly improved agro-technologies and agro-machines to aid farmers increase production, hence output volumes. Again, various technologies on how to process major agricultural products into finished goods before exports can be considered as this will help to diversify the country's export goods. Policies that enhance the diversification and facilitate the shift towards the export of semi processed and manufactured goods are essential.

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Appendix

1. Data set used in the model

year	AG	LNGC	LNHC	LNI	LNMS	LNREER	OP	TB
1981	0.046159	9.481253	11.32398	9.993342	7.627155	5.134032	0.219537	0.640062
1982	-0.01181	9.558408	11.32931	10.00222	7.773847	5.228967	0.215048	0.549443
1983	-0.03624	9.743375	11.41287	9.98193	7.87679	5.275049	0.199733	0.573801
1984	0.135964	9.712444	11.30567	10.24005	8.019777	5.343291	0.241107	0.548203
1985	-0.12543	9.487554	11.29692	9.684511	8.126725	5.538121	0.194096	0.507553
1986	-0.20886	9.611314	11.31182	10.20552	8.255569	5.412539	0.213429	0.546704
1987	0.160239	9.738253	11.45764	10.28703	8.394212	5.268889	0.197258	0.507566
1988	0.187589	9.877885	11.35789	10.55705	8.478182	5.214936	0.193846	0.502595
1989	-0.02765	9.954042	11.39273	10.21106	8.563829	5.262172	0.190036	0.620733
1990	0.010291	9.98169	11.4491	10.10709	8.649098	5.349486	0.160582	0.628602
1991	0.053093	9.792222	11.50659	9.887577	8.811086	5.640132	0.145166	0.442945
1992	0.05168	9.267964	11.55037	9.72642	8.982461	5.770194	0.122418	0.421676
1993	-0.02736	9.422938	11.62824	10.27597	9.10619	4.957235	0.203582	0.491677
1994	0.06065	9.492235	11.64507	10.35675	9.223918	4.956531	0.264738	0.529215
1995	-0.03651	9.60804	11.65946	10.4901	9.358648	4.868303	0.305327	0.616148
1996	0.033893	9.648905	11.77427	10.61782	9.575567	4.758749	0.290606	0.569856
1997	0.146754	9.67105	11.81434	10.67047	9.658533	4.668145	0.336265	0.635916
1998	0.03606	9.901166	11.76162	10.66478	9.714069	4.652054	0.331476	0.627562
1999	-0.11144	10.25313	11.83037	10.71072	9.828495	4.639572	0.346162	0.487777
2000	0.038031	10.54705	11.83227	10.69638	9.872992	4.634729	0.363398	0.502092
2001	0.021977	10.42691	11.9422	10.83588	10.00685	4.615121	0.360123	0.505707
2002	0.096119	10.45467	12.00659	10.96447	10.10709	4.610158	0.396059	0.473763
2003	-0.01874	10.3321	12.02706	10.85995	10.21545	4.62791	0.411478	0.485786
2004	-0.10494	10.43245	12.05843	11.16469	10.31195	4.635699	0.468904	0.471872
2005	0.16908	10.49257	12.25551	11.16646	10.45322	4.628887	0.510565	0.425582
2006	0.1354	10.58038	12.37649	11.32844	10.60192	4.630838	0.508646	0.378551
2007	0.108982	10.53828	12.45581	11.30647	10.74457	4.685828	0.451946	0.39671
2008	0.094476	10.57225	12.60815	11.41956	10.94468	4.816241	0.426878	0.369847
2009	0.075132	10.55771	12.69731	11.51983	11.12994	4.847332	0.396712	0.365924

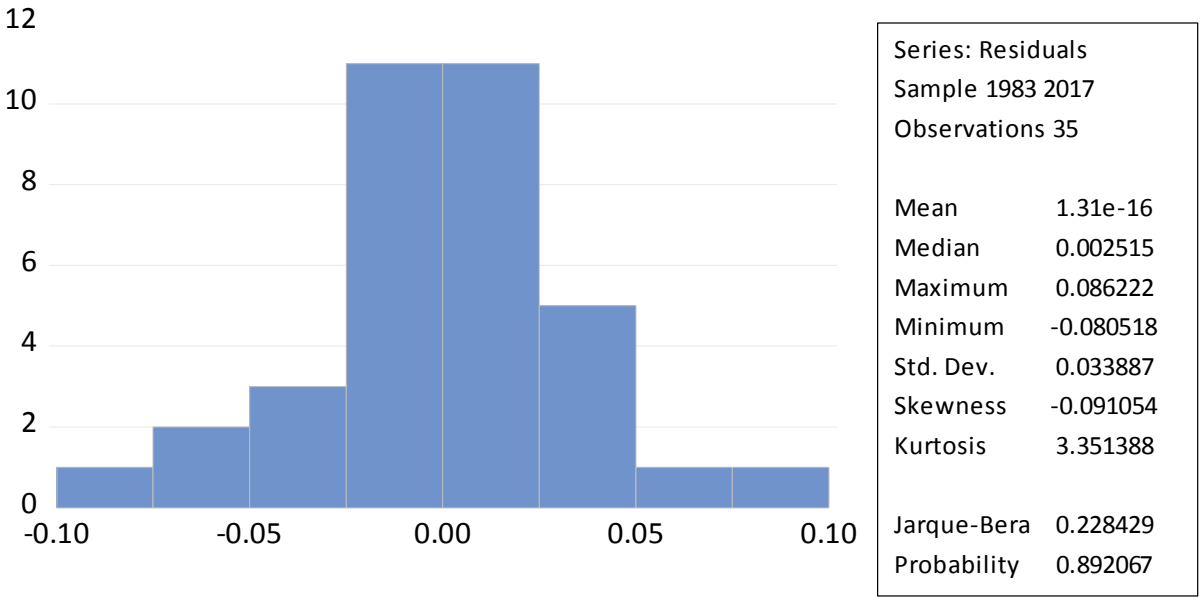
year	AG	LNGC	LNHC	LNI	LNMS	LNREER	OP	TB
2010	0.063719	10.64163	12.82574	11.72089	11.32067	4.695925	0.47107	0.412986
2011	0.076254	10.88082	12.82957	12.016	11.5563	4.672829	0.482329	0.528968
2012	0.089576	10.74637	12.91292	12.24341	11.88709	4.859037	0.453979	0.435252
2013	0.049221	10.9227	13.02727	12.25918	12.15161	4.85203	0.414718	0.430668
2014	0.070985	11.05271	13.07986	12.46525	12.36867	4.862135	0.407407	0.400063
2015	0.054467	11.12571	13.16175	12.60115	12.60395	4.964242	0.396561	0.309094
2016	0.063948	12.0675	13.83755	13.2805	12.82484	5.070789	0.355063	0.288407
2017	0.023093	12.25323	13.89211	13.40428	13.00643	5.146913	0.314506	0.326342

Dependent Variable: TB
Method: ARDL
Date: 07/23/18 Time: 22:06
Sample (adjusted): 1983 2017
Included observations: 35 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Schwarz criterion (SIC)
Dynamic regressors (2 lags, automatic): OP LNREER LNMS LNI LNHC LNGC AG
Fixed regressors: C
Number of models evalulated: 4374
Selected Model: ARDL(1, 2, 0, 0, 2, 0, 0, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
TB(-1)	0.205182	0.148410	1.382534	0.1807
OP	-0.087439	0.323091	-0.270634	0.7892
OP(-1)	0.215806	0.392894	0.549272	0.5884
OP(-2)	-0.824185	0.303677	-2.714015	0.0127
LNREER	-0.246364	0.058215	-4.231955	0.0003
LNMS	-0.152976	0.041803	-3.659468	0.0014
LNI	-0.001392	0.050675	-0.027464	0.9783
LNI(-1)	0.066448	0.050529	1.315047	0.2020
LNI(-2)	0.214644	0.068731	3.122970	0.0050
LNHC	-0.076682	0.090699	0.845450	0.0070
LNGC	-0.123747	0.040221	-3.076674	0.0055
AG	-0.006737	0.097943	-0.068780	0.9458
C	0.672951	0.630186	1.067861	0.2972

R-squared	0.867978	Mean dependent var	0.479033
Adjusted R-squared	0.795965	S.D. dependent var	0.093264
S.E. of regression	0.042128	Akaike info criterion	-3.217671
Sum squared resid	0.039044	Schwarz criterion	-2.639971
Log likelihood	69.30925	Hannan-Quinn criter.	-3.018249
F-statistic	12.05320	Durbin-Watson stat	1.969966
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.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Median 0.002515
Maximum 0.086222
Minimum -0.080518
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Kurtosis 3.351388
Jarque-Bera 0.228429
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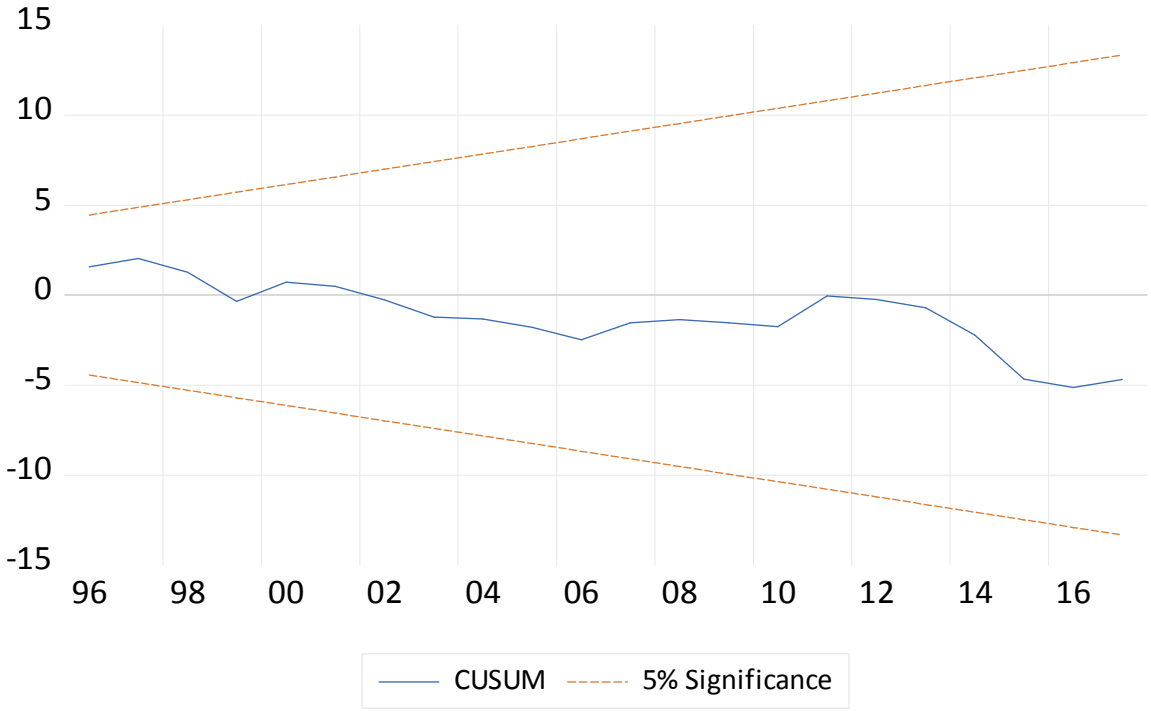
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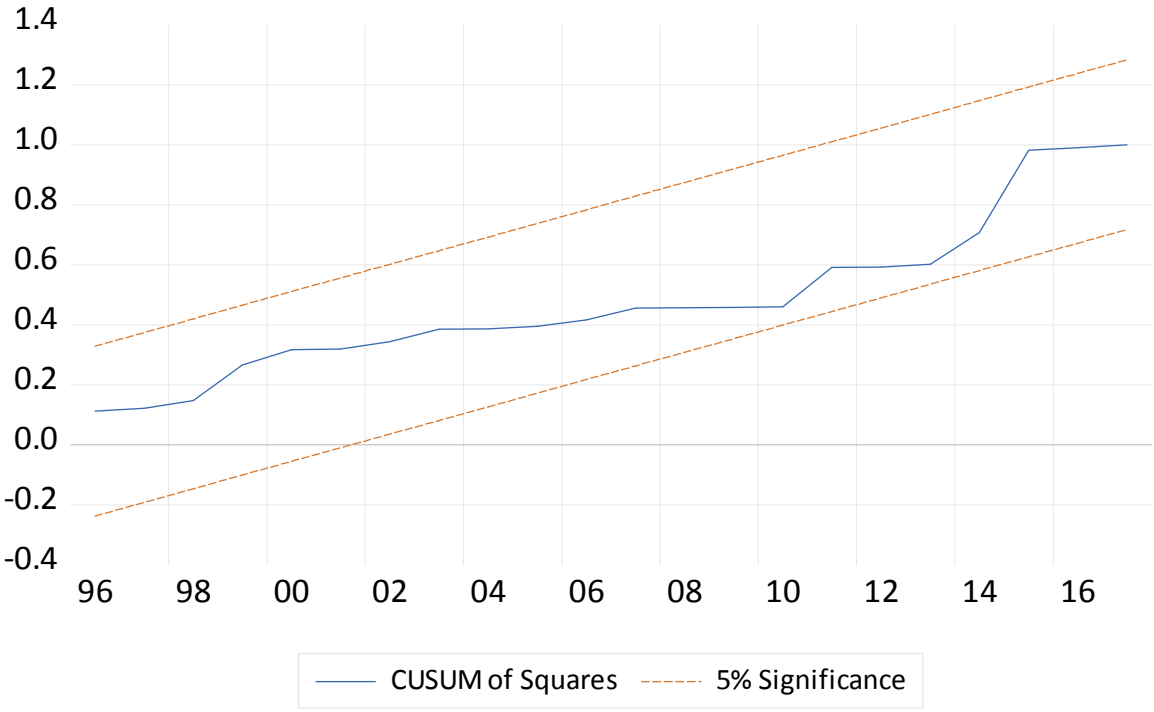
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