

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

**The Impact of Trade Liberalization on the Balance of Payments
of Ethiopia**

BY

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Approved By:

Signature

Declaration

I, the undersigned, declare that this project work is my original work and has not been presented, in part or whole, in any other university or college. All sources of the materials used for this project work have been duly acknowledged.

Name Adiam Hagos Hailemicheal

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Date May 26th, 2011

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Abstract

The study started up with the objective to investigate the impact of trade liberalization on the

balance of payments. In this endeavor, time series econometrics was applied to examine the relationship between trade liberalization and the balance of payments of Ethiopia. OLS was used to obtain the long run relationship between the variables after checking the stationarity of the variables under consideration. The existence of long run relationship was also tested by conducting an Augmented Dicky Fuller (ADF) test on the error term from the regression run to obtain the long run relationship. Furthermore, the adjustment of the short run fluctuations to the long run equilibrium was found using an Error Correction Model (ECM). The result of the regression was that the coefficient of the lagged error term was found to be statistically significant. The short run disequilibrium was found to adjust itself in less than a year. In addition different tests were conducted to test for the existence of hetroskedasticity, misspecification and autocorrelation along with tests for the existence of ARCH. The results of the tests showed that none of these problems that would have made the results of the regression unreliable exist. The results of the study showed that, the trade liberalization measures adopted by Ethiopia have led to the deterioration of the balance of payments. The other indicator that was adopted to capture the effect of trade liberalization on the balance of payments was the ratio of foreign trade tax revenue to value of total international trade. The result of the regression was that there was a statistically insignificant relationship between the variables.

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1. INTRODUCTION

1.1. Background

The failure of the import substitution policies that dominated the economic policies of countries in 1950s-1970 is what is believed to cause the shift to trade liberalization as a front runner trade policy. The argument supporting this shift was the need to reduce government's role in determining resource allocation. Moreover, the promotion of exports can be made through import liberalization by amending the underlying incentive structure of the economy. (Shafaeddin, 2008)

Programs of economic liberalization, part of which is trade liberalization, have been launched by many of the countries of the world. In 2000, 73 percent of the countries of the world, representing 46 percent of its population were open to international trade as opposed to the case in 1960 which was 22 percent of countries of the world representing 21 percent of its population as defined by Sachs and Warner (1995). (Wacziarg, 2008)

The reforming countries could be classified into to three. The first set of countries includes the Asian countries that continued using their own dynamic trade and industry reforms in 1960s. The second group consists of African countries that adopted trade liberalization reforms in 1970s due to the pressure from International Financial Institutions. The third group is composed of countries from Latin America that adopted trade liberalization reforms in early 1980s as a result of the pressure from International Financial Institutions. However, they intensively continued with the reform process in the 1990s without being necessarily under the pressure of the institutions. Nonetheless, the arguments behind and the contents of the reform programs were similar to those designed by the international financial institutions that were later referred to as the "Washington Consensus" which had universal and uniform trade liberalization as part of it. The term "Universal" referred to the fact that developing countries had to adopt the same trade policy - trade liberalization – without keeping into account the levels of

development and industrial capacities. Similarly the term “Uniform” implied that all sectors and industries were to be subject to identical tariff rates. (Shafaeddin, 2008)

Although trade liberalization may enable countries to enhance their economic growth by capturing the static and dynamic gains from trade through improving the efficiency of allocation of resources; raising competition; increasing the flow of knowledge and investment, and hence, a faster rate of capital accumulation and technical progress, it may have a drawback on the balance of payments since import controls protect it even if they reduce economic efficiency. Trade liberalization improves the growth of imports and exports. However, its final effect on the balance of payments depends on which one outweighs and the level of prices of traded goods. (Santos-Paulino, 2004)

Accordingly, the innate conflict between reducing import restrictions and achieving balance of payments objectives, at least in the short run, is one of the main reasons for objections against trade reforms. This is because a reduction in the level of protection may worsen trade balance making the viability of such policy for countries that face foreign exchange or borrowing constraint debatable. A significant deficit, consisting of a large loss of foreign exchange reserves, is likely to cancel out the liberalization attempt. However, unless there is such a loss, even with other economic hardships, liberalizations are likely to be sustained. (Ostry, 1991)

The impact of trade liberalization on the trade balance and the current account of the balance of payments of countries are ambiguous regardless of the framework of balance of payments adjustment theory used. Therefore, the final effect doesn't depend on the theory and, hence, it is an empirical matter. (Santos-Paulino, 2004)

Based on the extended Sachs and Warner (1995) liberalization dates, Ethiopia adopted trade liberalization in 1996. The condition for a country to be considered to have liberalized trade is to continually fulfill the 5 conditions of liberalization dummy by Sachs and Warner (1995) which are average tariff rates below 40%, non tariff barriers covering less than 40% of trade, a black market rate that is less than 20% below the

official rate, no state monopoly on major exports and a non – socialist country. (Wacziarg, 2008)

According to Ostry (1991), the impact of trade liberalization measures on the current account depends on the structure of the economy. The author developed a theoretical framework that took into account different economic circumstances under which trade liberalization policies could be imposed and what the resulting outcome could be on the trade balance. The author's conclusion was that trade liberalization policies do not necessarily lead to deterioration of the current account and, hence, the balance of payments.

Similarly, Kahn (1985) used a Dynamic Computable General Equilibrium model to examine the transitional macroeconomic effects of change in the balance of trade and capital flow. The conclusion of the study was that the final outcome depended on the structure of the economy. The authors also added that for trade liberalization to help improve the balance of payments it must be accompanied by active domestic macroeconomic management.

On the other hand, a study by Santos – Paulino(2004) used panel, cross-section and time series data from 22 countries with the objective to examine the performance of the balance of payments of these countries under the influence of trade liberalization policies. The resulting outcome using least squares and Generalized Method of Moments (GMM) was that imports grew at a larger rate than exports under lower trade restrictions leading to a deterioration of the balance of payments.

Given these results, it is vital to investigate the performance of the balance of payments of Ethiopia before and after the year in which trade liberalization measures were fully implemented (1996) according to the extended Sachs and Warren (1995) trade liberalization dates. As far as the information of the author of this study is concerned, no such study has been conducted to investigate the case in Ethiopia, hence, the research endeavor.

1.2. Objectives of the Study

The general objective of this study is to investigate the impact of trade liberalization on the balance of payments of Ethiopia.

The specific objectives of the study are:

1. To investigate the pure effect of implementation of trade liberalization policies on the balance of payments
2. To examine whether the effect of trade liberalization is manifested through its impact on foreign trade tax revenue in affecting balance of payments in Ethiopia

1.3. Methodology

1.3.1. Data

Time series data is used to analyze the relationship between trade liberalization and balance of payment. The data set is composed of data obtained from different Institutions such as UNCTAD, World Bank, Ministry of Finance and Economic Development (MoFED), UN Comtrade, National Bank of Ethiopia and COMESA. The data will be covering the time period from 1981 – 2008 G.C.

1.3.2. Method

In the interest of fulfilling the objectives of the study, econometric methods relevant for time series data analysis are applied. The Error Correction Model (ECM) is implemented to find out how the short term fluctuations adjust to the long run equilibrium after the existence of a long run relationship was checked using cointegration test. Different statistical tests are conducted to check for stationarity of variables, statistical significance of model coefficients, misspecification errors, hetroskedasticity and autocorrelation. The statistical package STATA 11 is used to make the analysis.

1.4. Significance of the study

The author of the study has found it vital to investigate the impact of trade liberalization on the balance of payments of Ethiopia given the fact that there is a wide room for ambiguity if analysis is purely theoretical. There is a need to support the theoretical arguments with empirical findings, which is why this study is being conducted. Since the country has been in continuous balance of payments deficits, it is important to single out the impact of trade liberalization and make the necessary amendments to the country's trade policies.

1.5. Organization of the Paper

Following this section of the study, the theoretical framework required to investigate the impact of trade liberalization on the balance of payments will be built. In addition, the empirical evidence that exists regarding the relationship between the two variables is reviewed in order to make the model to be specified as empirically sound as possible. The model of the study is specified after the theoretical framework is built and the empirical evidences are reviewed in this same section. Afterwards, the section in which all the empirical analysis is dealt with will follow. Finally, the study will be wrapped up by the section that discusses the conclusion and recommendation.

2. THEORETICAL FRAMEWORK AND EMPIRICAL EVIDENCE

This section reviews the literature that is used to build the ground work for the model adopted to examine the impact of trade liberalization on the balance of payments of the Ethiopian economy. The theoretical framework will be built from different aspects of trade liberalization in addition to the studies that provide empirical evidence on the relationship between trade reforms and the balance of payments.

In the following section, studies that deal with the theory of trade liberalization will be reviewed followed by the section that evaluates the research works that specifically deal with the relationship between the policy of trade liberalization and balance of payments. In the third subsection empirical evidence on the relationship between the two variables will be reviewed. Lastly the model that will be used for the analysis will be specified.

2.1. The Theory of Trade Liberalization

The theory of trade liberalization includes two alternative arguments regarding the effectiveness of trade liberalization policies. The first one is the neo-liberal line of argument which resulted from the down sides of the protectionist policies adopted by most of the developing countries after the end of the Second World War. The second line of argument is neo-structuralist which accepts some of the criticisms against the protectionist policies adopted by developing countries but is skeptic about the wholesale trade liberalization policies that are advocated by the World Bank and International Monetary Fund as consistent with long term growth. In the following subsection the literature supporting both arguments will be reviewed.

2.1.1. Neo – Liberal Arguments for Trade Liberalization

According to Jenkins (1997) the neo liberal argument for trade liberalization came into picture as a response to failures of the protectionist policies adopted by the developing nations. The policies led to inefficient allocation of resources which resulted from the distortion of the structure of the economy from the optimum which would not have been the case with free trade. Furthermore, the large extent of protection adopted by the developing countries discouraged competition which in turn reduced the need for new technology and hence led to production stagnation. In addition, the structure of the economy which is inclined to domestic production, the high costs of imported inputs and the overvalued exchange rate caused an anti export bias. Last but not least, the protectionist policies brought expansion of rent seeking activities where a considerable part of the profit of firms is obtained from protection.

The economists in support of the neo – liberal view towards trade liberalization argue that trade liberalization is the right policy to solve the problems that had resulted from the inward looking policies adopted by most of the developing countries in the 1950's.

Milner (1990) argues that trade reforms raise the attractiveness of exports to producers. In addition, such reforms also stimulate their competitiveness in the international trade by removing anti-export bias.

Similarly, Nishimizu and Robinson (1984) argue that greater competition leads to better utilization of resources. This results in higher growth of productivity due to the easier access to imported inputs which lead to a more complete utilization of productive capacity. Furthermore, the increase in competition from imports would force them to improve their productivity and, therefore, achieve greater economies of scale.

Furthermore, Dornbusch (1992) claims that exports would increase as a result of greater access to imported intermediate inputs after the liberalization of trade. Importing appropriate intermediate goods can enable a country to easily export labor intensive

products such as assembly services, without which the value – added opportunity is lost along with the chance to graduate over time from assembly services to tasks with higher value – added.

In addition, Jenkins (1997) argues that trade liberalization reduces the unproductive rent – seeking activities that are associated with the intervention of government and improves the distribution of income by increasing labor intensive activities that would in turn increase employment.

Although all of the neo-liberal economists accept outward oriented trade policies, they have differences on how the policies should be implemented. Some of the economists recommend the ‘big bang’ implementation method where all of the policies are launched at once. While the other set of economists think that a gradual approach should be adopted when it comes to implementation.

2.1.2. Neo-Structuralist Arguments for Trade Liberalization

Although they agree with the criticisms against the protectionist policies of the Latin American countries, the neo-structuralist economists argue that developing countries must adopt policies that protect strategic industries in a way that achieves the dynamic comparative advantage rather than the wholesale policies advocated by the World Bank and the International Monetary Fund which promotes low and uniform tariff rates.

According to Pack (1991), the argument for infant industry protection is strengthened by the gains of productivity obtained through learning. The positive aspects of intervention are normally reflected through dynamic analysis than static which is what is used to explain the infant industry argument. Furthermore, the Prebisch-Singer hypothesis of deteriorating terms of trade which brings out the case where the developing countries may lose in terms of overall economic gains due to a decline in the terms of trade even if their exports are growing fast which only makes sense in a dynamic setting is another case for the neo structuralist argument.

Similarly, Devarajan and Rodrik (1989) argue that even though the theoretical argument for the static case of trade liberalization is convincing, it tends to have a weaker theoretical groundwork when its dynamic aspects are taken into account. The inclusion of increasing returns to scale or imperfect competition may lead to a result where trade liberalization causes losses instead of gains depending on which sector expands and which sector contracts.

Moreover, as Amsden (1989) argues, trade liberalization restructures the international division of labor which in turn will cause the countries that are lagging behind to lag even more behind. The low productivity of the developing countries causes them to lie on an absolute disadvantage with the developed countries.

In addition, Edwards and Ostry (1992) argue that an equilibrium real appreciation or depreciation may result from deterioration in the terms of trade depending on the values of a variety of elasticities. The authors, therefore, concluded that this indicates for the possibility of obtaining unorthodox results in economies with capital controls which is the case for many of the developing countries.

Generally, the neo-structuralist economists claim that trade liberalization policies must be withheld until the strategic industries are strong enough to be forced to compete in the international market. However, it must also be kept in mind that developing an internationally competitive industry may conflict with other forms of liberalization such as freeing international capital flow or liberalizing the financial market. This may cause governments to intervene in the flow of capital and the financial market.

2.2. Trade Liberalization and Balance of Payments

Ostry (1991) regarded the model of Saving – Investment as the one that is mostly used by researchers to understand the relationship between changes in the level of tariff and the trade balance. The argument behind the adoption of the Saving – Investment model is that, the reaction of the current account to the change in the level of tariffs depends on

how the change affects the saving – investment differential given the fact that the saving – investment differential is equivalent to the current account. This is where the importance of the intertemporal effect of trade liberalization comes in. Before the implementation of the policy, one must take into account how the changes in the level of tariff rates affect the current account.

Paulino and Thirlwall (2004) argue that the final effect of trade liberalization is theoretically ambiguous regardless of the balance of payments theory adopted. The elasticity approach to the balance of payments, which is based on a partial equilibrium framework, shows that the final effect of this policy depends on the extent to which import and export duties change and the price elasticities of imports and exports. Similarly, the absorption approach, which is based on a general equilibrium framework shows that the final result of trade liberalization depends on how real income is affected relative to real absorption. In this case, the increment in real income may not improve the balance of payments if the propensity to absorb is greater than one. The monetary approach to the balance of payments also shows that the final effect depends on certain conditions. The final outcome of the trade liberalization policy depends on how it affects money demand relative to money supply. The authors, therefore, conclude that the final outcome of a trade liberalization on the performance of the balance of payments is an empirical issue rather than theoretical.

Furthermore, Dornbusch (1992) stated that there is a need for a country to either be in a position to have a major real depreciation of exchange rates politically, or to have access to foreign exchange for a substantial period of time for a trade liberalization policy to be effective given the balance of payments problems faced by many of the developing countries. This is because a fall in real wages must be offset by the improvement in the standard of living which results from reduced protection for real depreciation not to cause a problem. The author argues that unless these conditions are fulfilled a gradual approach to liberalization must be adopted.

Paulino and Thirlwall (2004) argue that the impact of trade liberalization on the trade balance and the balance of payments has implications on the 'sequencing' of the exports and imports liberalization. The authors recommended that the goal of the policy must be to liberalize in such a way as to keep the current account of the balance of payments in equilibrium, or at least at a level sustainable through long-term capital inflows without the need for deflation, if foreign exchange shortages are to be avoided. The authors further argued that balancing the growth of imports and exports in the right way in the trade liberalization process can be as important as getting the sequencing right between internal and external financial liberalization.

Ocampo and Tylor (1998) brought into attention how the benefits from trade liberalization could be offset by the rise in domestic interest rate along with a strong exchange rate. In many cases over the past decades both the current and the capital account of the balance of payments have been deregulated at the same time. This makes the exchange rate to float in response to the financial market rather than the changes in the current account. The resulting rise in domestic interest rate and the strong exchange rate lead to a balance of payments crisis in the medium term.

Ostry (1991) obtained the result that there is no tendency for developing countries' current account to respond to the changes in tariff rates in a systematic way. The author used a theoretical approach to investigate whether the neo liberal argument that trade liberalization improves the current account actually works for developing countries. The policy implication the author came up with was that under the condition that the initial level of protection and the structure of the economy is different the economies of developing countries are not expected to respond to trade liberalization in a predetermined way. Therefore, what happens to the current account after such changes is an empirical matter and cannot be preset on theoretical grounds.

2.3. Empirical Evidence

Khan and Zahler (1985) examined the effects of specific types of external shocks and an expansionary fiscal policy on key macroeconomic variables due to the opening up of the economy both in the short run and in the long run. The authors conducted simulation experiments using a general equilibrium model on non – oil exporting developing countries. They agreed with the fact that the simulation experiments are not completely realistic neither in the sense of being applicable to any particular country or in reproducing the actual shocks that were rocking the economies of the developing countries and should be considered as providing hypothetical scenarios. The result of the study was that with the opening up of the economy the rate of inflation and domestic interest rate tend to approach their corresponding international values. However, the authors also found that there was a decline in the rate of interest, a decline in output and employment, a worsening of the current account, a loss of international reserves, and a significant build up of foreign debt along with the appreciation of the real exchange rate to a new equilibrium level.

Paulino and Thirlwall (2004) obtained the result that the pure effect of such policies was to worsen both the trade balance and the current account even if the impact was much larger on the trade balance than the current account of the balance of payments. The authors used least squares and the general method of moments to investigate how trade liberalization measures affect the trade balance and the current account of the balance of payments. The authors conducted the research on countries from Africa, Latin America and Asia and found the impact of liberalization to be the same across all of the regions which is a deterioration of the trade balance and the current account of the balance of payments due to the adoption of trade liberalization policies. However, the extent of the impact of trade liberalization on the trade balance and on the current account was found to depend on the level of protection the country had initially. The negative effect

on the trade balance and the current account of the balance of payments were found to be greater on the relatively highly protected countries.

Similarly Lopez (2005) emphasizes the importance of the balance between the exports and imports and the position of the current account of the balance of payments for the effectiveness of trade liberalization policies in bringing about growth. This is because these factors are the ones that affect the creditworthiness of the country. The authors came up with this conclusion after conducting the study on Mexico using an Autoregressive Distributed Lag Model based the theoretical ground work on Thirlwall's Balance of Payments Constrained Model. The result obtained was consistent with the hypothesis that the slowdown in the growth of the Mexican economy in the year 1985/86 was due to the increase in the income elasticity of demand for imports and an insufficient rise in the growth of exports which caused the balance of payments constraints in Mexico even more binding.

However, both Paulino and Thirlwall (2004) and Lopez (2005) have the same caveat. The authors of both studies used the current account and the trade balance to generalize about the impact of trade liberalization on the balance of payments. However, the authors did not give explanation on why the capital accounts of the balance of payments were not incorporated in their analysis. Therefore, it would be an important area of improvement to make the analysis using complete data on balance of payments rather than the using only the trade balance or the current account components of the balance of payments.

2.4. Model Specification

To capture the partial effect of trade liberalization on the balance of payments different variables are included in the model. The ratio of foreign trade revenue to the total value of international trade, i.e, the sum of value of imports and exports, is used to represent trade liberalization. In the Ethiopian context, the government removed taxes on exports

starting from 2004. In addition, the amount of money collected from export duties was much smaller than the amount collected from imports throughout the study period. Therefore, this study finds negligible need to treat export taxes and import taxes separately and, hence, the total foreign trade tax collected will be used for analysis.

The growth of world income, the growth of domestic income, changes in relative prices and terms of trade variables will be controlled for in the analysis. This is because an alteration in the prices of exports and imports changes the monetary value of trade flows, independently of liberalization. This also allows one to capture the nominal and real effects separately. In addition, a pure trade liberalization effect can be captured by an independent trade liberalization dummy. The nominal term of trade is also included in the model to control for changes in monetary value of trade flows.

The model to be estimated is:

$$BOP_t = \alpha + \beta_1 W_t + \beta_2 Y_t + \beta_3 DFTT_t + \beta_4 TOT_t + \beta_5 Lib + U_t$$

Where :

BOP = Balance of Payments

W = Growth of world income

Y = Growth of domestic income

DFTT = Ratio of foreign trade tax revenue to value of total international trade

TOT = Terms of trade

Lib = Liberalization dummy

U = Error term

t = time

3. EMPIRICAL ANALYSIS

Multivariate time series models enable one to estimate the dynamic effects of the explanatory variables on the dependent variable. However, to undertake estimation or testing procedures it is important to make sure that the variables are stationary. This is because regressing a non stationary dependent variable on non stationary independent variables results in spurious regression from which estimates and test statistics obtained would be misleading. However, there is an exception to this problem where if non stationary series happen to have a linear relationship that is stationary they are destined to have a long run relationship to which there is an error correction mechanism that leads the variables to their long run equilibrium. (Verbeek, 2004)

In this section, the regression results of long run relationship and short run error correction adjustments will be discussed. The first thing to do before running any of the regression is to check for the stationarity of the variables under study. After checking whether the variables are stationary or not, we proceed to the regression of the variables and test for the existence of the cointegration among the variables which indicates for the long run relationship among the variables. If there is found to be a long run relationship an error correction model will be regressed to check how much of the fluctuations is adjusted to equilibrium per period.

3.1. Test for Stationarity

A series is said to be stationary if the time origin doesn't affect its properties, i.e. the joint probability distribution not affected by a shift along the time axis. The distribution of Y_t is the same as any other value of the series Y_{t-k} for any k that does not depend on time. This condition is what is called strict stationarity. However, what one will be concerned with is the means, variances and covariances of the series which is found

sufficient to impose that these moments are independent of time rather than the entire distribution. This is what is called weak stationarity. (Verbeek, 2004)

An autoregressive process such as $Y_t = \alpha + \beta Y_{t-1} + \varepsilon_t$ is said to be stationary if $-1 < \beta < 1$. If, however, $\beta = 1$ there is said to be a unit root which causes the process to be non stationary. Therefore, to test for stationarity one conducts a Dicky - Fuller test where the null hypothesis is:

$H_0 : \beta = 1$ (a unit root)

Against the alternative hypothesis:

$H_1 : \beta < 1$ (stationary)

The test statistic to be compared with the tabulated DF critical values is:

$$DF = (\hat{\beta} - 1) / Se(\hat{\beta})$$

However, the critical values from the standard t – ratio shouldn't be used to check for significance levels as it doesn't have a t – distribution not even asymptotically. This is because the nonstationarity of the series invalidates the standard results. Instead, critical values are taken from the appropriate distribution which is under the null hypothesis of non stationarity is non standard.

Accordingly, a stationarity test was conducted on the variables that are under study. The result obtained is described in table 1 below.

Table 1: Augmented Dicky Fuller Test for Stationarity

Variable	ADF Test statistics		Critical Values		
	I(0)	I(1)	1%	5%	10%
Log(Balance of payments) _t	-5.264***		-3.763	-2.994	-2.628
Log (Growth of domestic income) _t	-4.120***		-3.763	-2.994	-2.628
Log (Growth of world income)	-2.968*		-3.763	-2.994	-2.628
Log (Terms of Trade) _t	-1.236	-5.954***	-3.763	-2.994	-2.628
Log(foreign trade taxes ratio) _t	-2.995**		-3.763	-2.994	-2.628
*** significant at 1% significance level ** significant at 5% significance level *significant at 10% significance level					

As can be observed from the above table, logarithm of balance of payments and logarithm of growth of domestic income are stationary at 1% significance level. The logarithm of foreign trade taxes ratio is also found to be stationary at 5% significance level while logarithm of growth of world income is stationary at 10% significance level. Terms of trade was not found to be stationary at level, however, it was found to be stationary at 1% significance level after taking its first difference.

The next step is to check for the existence of a long run relationship among the variables. This is done by examining whether any linear combination of the series are

taken from a stationary distribution. In such a case the series are said to be cointegrated, in which case the model under consideration can be used to make conclusions about long run relationships. This will be dealt with in the following sub section.

3.2. Long – Run Model for Balance of Payments

The existence of a long run relationship between the variables depends on whether there is a linear relationship between the variables that is stationary. Technically, this requires for there to be a linear relationship among the dependent variable and the independent variables that is integrated of order zero, that is, there needs to be a β such that $Y_t - \beta X_t$ is $I(0)$. In such a case Y_t and X_t are said to be cointegrated or that they share a common trend. (Verbeek, 2004)

Even though the ordinary asymptotic theory is non standard, β can be consistently estimated from regressing Y_t upon X_t using OLS. The estimator of β is found to be super consistent because it converges to β at a much faster rate than the ordinary asymptotics. (Verbeek, 2004)

The existence of cointegration and, hence, an error correction mechanism can be tested by performing an Augmented Dicky Fuller test on the residual from the regression of the dependent variable on the independent variables. If one rejects the null hypothesis that there exists a unit root then the distribution of the error term is stationary which, therefore, indicates that there exists long run equilibrium and an error correction mechanism that adjusts the short run fluctuations into the long run equilibrium.

Accordingly, a regression was run to find out whether there exists a long run relationship between the dependent variable and independent variables of this study. Table 2 shows the results of the regression.

Table 2: Estimation Results of the Long Run Model

Dependent Variable: Logarithm of Balance of Payments

Variable	Coefficient	t - value	p- value
Log (Growth of domestic income) _t	-0.019	-0.12	0.91
Log (Growth of world income)	-0.239	-1.42	0.17
Log (Terms of Trade) _t	-1.965	-2.17**	0.04
Log (foreign trade taxes ratio) _t	-0.565	-0.59	0.56
Liberalization Dummy	-0.733	-2.06**	0.05

** Significant at 5% significance level

The ADF test statistic obtained for the residual error term from the above regression is shown in Table 3.

Table 3: Augmented Dicky Fuller Test Statistics for The Residual Error Term

	Test statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-6.548***	-3.736	-2.994	-2.628

*** Significant at 1% significance level

As can be observed from Table 3, the error term from the regression of the logarithm of balance of payments on the other explanatory variables is stationary indicating the existence of co integration, hence, a long run relationship between the variables.

Although, the logarithm of foreign trade taxes ratio has an insignificant impact on the logarithm of balance of payments the trade liberalization dummy shows that there is a

significant relationship between the liberalization of trade in Ethiopia in 1996 and the logarithm of the balance of payments. As the sign shows liberalization has led to a deterioration of the balance of payments. On the other hand, the fact that the logarithm of foreign trade taxes ratio doesn't have a statistically significant impact on the logarithm of balance of payments may be because trade liberalization is applied more on non tariff barriers than on taxes on both imports and exports.

Terms of trade has a statistically significant impact on the balance of payments. However, the sign of the relationship is not as expected. The result shows that a 1% improvement in the terms of trade deteriorates the balance of payments by 1.96%. This may be because terms of trade affects other components of the balance of payments negatively even if it improves the trade balance or the current account. If the capital account, for example, deteriorates more than the improvement in the current account or the trade balance then such a result could be obtained.

3.3. Short Run Adjustments to the Long Run Equilibrium – An Error Correction Representation

The Granger representation theorem (Granger, 1983; Engle and Granger, 1987) states that there exists an error correction mechanism if a set of variables are found to be cointegrated. To find out how much of the disequilibrium is corrected every period, one needs to obtain the first difference of all of the variables and the lagged value of the residuals from the regression conducted to obtain the long run relationship between the dependent and the independent variables. Afterwards, the differenced value of the dependent variable should be regressed on the differenced value of the other variables along with the lagged value of the residual error term. (Verbeek, 2004)

The econometric representation of the model is described as follows:

$$\Delta Y_t = \pi_1 \Delta X_t - \gamma (Y_{t-1} - \alpha - \beta X_{t-1}) + \varepsilon_t$$

Where the term $(Y_{t-1} - \alpha - \beta X_{t-1})$ is equivalent to e_{t-1} .

The coefficient of the lagged error term indicates the percentage of adjustment to the long run equilibrium from the short run disequilibrium per period.

Following the same procedure the error correction model of this study was examined. The results of the regression are presented in Table 4 below.

Table 4: Estimation Results of the Error Correction Model

Dependent Variable: $\Delta \text{Log} (\text{Balance of Payments})_t$

Variable	Coefficient	t - value	p- value
$\Delta \text{Log} (\text{Growth of domestic income})_t$.031	0.26	0.79
$\Delta \text{Log} (\text{Growth of world income})$	-.128	-0.96	0.35
$\Delta \text{Log} (\text{Terms of Trade})_t$.996	0.87	0.40
$\Delta \text{Log} (\text{foreign trade taxes ratio})_t$.117	0.13	0.89
Liberalization Dummy	-.162	0.63	0.54
e_{t-1}	-1.32	-5.81***	0.00
F (6, 20) = 7.38			0.00
Number of Observations			27

*** Significant at 1 % significance level

As can be observed from the above table there is a statistically significant error – correction term where the short term fluctuations adjust to the long run equilibrium at a 132% per annum. This indicates that the fluctuations take less than a year to go back to their initial level of equilibrium.

To check for misspecification, heteroskedasticity and serial correlation different tests were conducted. The type of tests and the corresponding result for the tests are presented as follows.

Misspecification tests: to test for the existence of misspecification in the model, a Ramsey Regression Equation Specification Error Test (RESET) was conducted using the powers of the fitted values of the dependent variable.

The null hypothesis of the test was as follows:

H_0 : Model has no omitted variables

The result obtained after the test was conducted is shown in Table 5

Table 5: Ramsey's RESET Test Result

F (3, 17)	0.5
Prob > F	0.68

As the above table shows, the null hypothesis cannot be rejected even at 10% significance level. This indicates that the model doesn't suffer from omitted variable bias which is an important requirement to rely on the results obtained from the error correction model.

Test for heteroskedasticity: heteroskedasticity refers to the existence of a variance of the error term that is not constant. Under the situation where there is heteroskedasticity the results from the regression cannot be relied upon because it may result from spurious regression. To test for heteroskedasticity Breusch – Pagan / Cook – Weisber test for heteroskedasticity was undertaken using the fitted values of first difference of the logarithm of balance of payments.

The null hypothesis of the Breusch – Pagan / Cook – Weisber test is:

Ho: Constant Variance

The result obtained after the test was conducted is shown in Table 6

Table 6: Breusch - Pagan / Cook - Weisberg Test for Heteroskedasticity

F (1, 25)	2.3
Prob > F	0.14

Table 3.6 shows that the null hypothesis cannot be rejected even at 10% significant level indicating that the error correction model does not suffer from heteroskedasticity which is an important condition to make conclusions using the information obtained from the model.

Test for Autoregressive Conditional Heteroskedasticity (ARCH): the concept of Autoregressive Conditional Heteroskedasticity says that the variance of the error term at a given time depends upon the squared error terms from the previous period. Even though the existence of the ARCH effect doesn't invalidate OLS estimation, it does imply that more efficient non linear estimators exist. (Verbeek, 2004)

The existence of ARCH effects can be tested using the Lagrange Multiplier test for autoregressive conditional heteroskedasticity.

The hypothesis of the Lagrange Multiplier test for ARCH is:

Ho : No ARCH effects

Against the alternative

Ha : ARCH (p) disturbance

The result obtained after the test was conducted is shown in Table 7 below.

Table 7: Lagrange Multiplier Test for the Existence of ARCH effects

Lags (p)	Chi ²	df	Prob > Chai ²
1	0.073	1	0.7871

The result of the test indicates that the null hypothesis that there exists no autoregressive conditional heteroskedasticity effect is failed to be rejected. This implies that OLS is the most efficient estimator and, therefore, there is no need to resort to other non linear estimators.

Tests for autocorrelation: as it is the case for heteroskedasticity, existence of high autocorrelation is an indicator of spurious regression from which a reliable conclusion cannot be made. Therefore, it is important to make sure that the level autocorrelation is as small as possible so that one can make use of the estimates with confidence. To check whether there is a significant level of autocorrelation in the error correction model for this study Durbin’s alternative test for autocorrelation and Bruesch – Godfrey Lagrange Multiplier tests are conducted.

The null hypothesis for Durbin’s Alternative test for autocorrelation is

Ho : No serial correlation

The result obtained after the test was conducted is described in Table 8

Table 8: Durbin's Alternative Test for Autocorrelation

Lags (p)	F	df	Prob > F
3	1.974	(3, 14)	1.642

Similarly the null hypothesis for the Bruesch – Godfrey Lagrange Multiplier test is:

Ho : No serial correlation

The result obtained after the test was conducted is described in Table 9

Table 9: Bruesch - Godfrey Lagrange Multiplier Test for Autocorrelation

Lags (p)	F	df	Prob > F
3	2.414	(3, 17)	0.102

The result shows that both of the auto correlation tests indicate that there isn't a high level of serial correlation. Therefore, one can make the appropriate use of the result from the error correction model of this study with out the fear of spurious regression.

In conclusion, all of the tests for the existence of misspecification, heteroskedasticity and autocorrelation show that none of these problems significantly exist. Therefore, the error correction term of the model is a reliable estimate.

4. CONCLUSION AND POLICY IMPLICATION

The existing literatures on the impact of trade liberalization on the balance of payments tilt towards the argument that trade liberalization measures have an ambiguous effect on the balance of payments. Ostry (1991), Kahn (1985) and Santos – Paulino(2004) all argued that the consequences of trade liberalization measures on the balance of payments are ambiguous. This gave rise to the need to investigate how trade liberalization actually affects the balance of payments of Ethiopia.

This study started up with the objective to investigate the impact of trade liberalization on the balance of payments. In this endeavor, time series econometrics was applied to examine the relationship between trade liberalization and the balance of payments of Ethiopia. OLS was used to obtain the long run relationship between the variables after checking the stationary of the variables under consideration. The existence of long run relationship was also tested by conducting an Augmented Dicky Fuller (ADF) test on the error term from the regression run to obtain the long run relationship. The error term was found to be stationary indicating the existence of a cointegration, i.e., long run relationship between the variables. Furthermore, the adjustment of the short run fluctuations to the long run equilibrium was found using an Error Correction Model (ECM) where the first difference of the dependent variable was regressed on the first difference of all the explanatory variables and the lagged value of the error term saved from the regression run to obtain the long run relationship. The result of the regression was that the coefficient of the lagged error term was found to be statistically significant even at 1% significance level. The short run disequilibrium was found to adjust itself in less than a year. In addition different tests were conducted to test for the existence of heteroskedasticity, misspecification and autocorrelation along with the test conducted to check whether there are other nonlinear estimators that were more efficient than the OLS estimator. The results of the tests showed that none of these problems that would have made the results of the regression unreliable exist.

The results of the study showed that, the trade liberalization measures adopted by Ethiopia have led to the deterioration of the balance of payments. This was demonstrated by the negative but statistically significant coefficient of the liberalization dummy variable used to capture the pure effects of trade liberalization on the balance of payments. The other indicator that was adopted to capture the effect of trade liberalization on the balance of payments was the ratio of foreign trade tax revenue to value of total international trade. The result of the regression was that there was a statistically insignificant relationship between the variables.

The implication of this result is that the government must come up with ways to reduce the negative effects of trade liberalization on the balance of payments.

One way of reducing the negative effects of trade liberalization is to select some industries that are strategic to the economy and protect these industries rather than allowing a full-fledged removal of trade barriers. This goes inline with the infant industry argument which recommends protecting those new industries that have the potential to be internationally competitive when they reach the optimum size.

The other action that the government can take to reduce the negative implication that trade liberalization has on the balance of payments is to accompany the trade liberalization efforts with active domestic macroeconomic management. Furthermore, liberalization policies must be conducted in such a way that both the current account and the balance of payments are kept in equilibrium or at least at a level sustainable through long term capital inflows to avoid foreign exchange shortages.

Therefore, the government of Ethiopia must incorporate some protection measures into its trade policies so that the benefits from trade liberalization are reaped while the industries that are found to be strategic are protected which will in turn bring inflow of foreign exchange. Furthermore, the appropriate domestic macroeconomic policies must be adopted to obtain the benefits from trade liberalization with out worsening the balance of payments of the country.

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ANNEX I

Annex I
Data Set Used for Empirical Analysis

Year	Log(BOP)	Log (Growth of Domestic GDP)	Log (Growth of World GDP)	Log (Terms of Trade)	Log (Foreign Trade Taxes)	Liberalization dummy
1981	8.047286	4.292683	1.281153	4.796469	1.770733	0
1982	7.955495	4.999433	-0.642328	4.796469	1.7031	0
1983	7.976733	3.309332	1.251839	4.796469	1.983559	0
1984	8.037802	0.8205116	1.367736	4.796469	1.807849	0
1985	8.11582	4.990775	1.350963	4.796469	2.033649	0
1986	7.991727	5.179668	2.939269	4.796469	1.998628	0
1987	7.869669	4.297256	2.736483	4.796469	1.998617	0
1988	7.998672	4.336132	2.591454	4.796469	1.748312	0
1989	7.80417	4.643812	1.800814	4.796469	1.687365	0
1990	7.961649	3.852498	2.137786	4.796469	1.777876	0
1991	7.853294	3.842123	1.819003	4.779207	1.623056	0
1992	7.824366	5.091054	2.09281	4.834395	1.844623	0
1993	8.434442	4.459501	1.213896	4.666728	1.557836	0
1994	8.303579	4.73282	2.078713	4.726343	1.755388	0
1995	7.910151	5.026223	2.469222	5.017549	1.709523	0
1996	6.101887	4.685802	1.290683	4.741527	1.746971	1
1997	8.072592	4.146821	0.219173	4.841509	1.804346	1
1998	7.88239	4.716394	-0.225303	5.008123	1.863948	1
1999	6.117657	4.765203	1.679933	4.834413	1.749872	1
2000	7.699208	4.857504	1.463468	4.60517	1.582939	1
2001	8.601736	4.453925	0.037832	4.57407	1.713264	1
2002	8.635882	4.06705	1.76052	4.468831	1.728505	1
2003	8.507971	5.078664	2.636788	4.403085	1.650065	1
2004	7.660444	5.119905	2.651113	4.246095	1.908814	1
2005	8.476642	5.069882	2.29254	4.322909	1.997564	1
2006	8.22815	5.066659	2.298746	4.371511	1.913683	1
2007	6.335409	5.073255	2.643759	4.358642	1.878373	1
2008	8.912177	5.055903	2.462643	4.417843	2.090922	1

