

Exploring the Relationship between Trade Liberalization and Ethiopian Economic Growth

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Abstract

Theoretical and empirical economic literature has shown that the economic growth of countries is related to both liberalization and international trade integration. The main purpose of this study is to apply this knowledge to the Ethiopian case and estimate the impact of trade liberalization on Ethiopian economic growth. The study has employed an Error Correction Model (ECM) for the time series data ranging from 1980 to 2016 to examine the economic effect of trade liberalization on the Ethiopian economy. To examine the structural break resulting from regime change, the model incorporated a dummy variable and the inclusion of the dummy variable reveals about the significant impact of policy change.

The empirical results show that there are both short-term and long-term relationships between liberalization and economic growth. More specifically, trade openness has had a positive and significant impact on the economic growth of Ethiopia. Therefore, the government of Ethiopia should integrate and open the economy. Furthermore, it should design a more open trade policy so as to reap the benefits associated with integrating a country's economy with that of the world.

Key word: Co-integration; Economic Growth; Ethiopia; ECM; Trade Liberalization; Trade Openness

JEL Classification: F1, F4, F6, O4

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1. Introduction

In history, trade was considered as the engine of economic growth for all nations (Echekoba, 2015); Edwards and Henry, 1991). Trade transforms economic growth of developing countries through technological innovation from developed nations and contributes to better resource allocation. In the past many years, there has been an impressive economic growth in some countries and a fluctuating economy in others, and as a result, there is little evidence of convergence. International trade plays a crucial role in the sense that there are both dynamic and static gains from trade though trade theories do not say anything about the fairness of those gains from trade.

World trade policies are getting deregulated from time to time after the World War II starting from 1947 when 23 nations signed the General Agreement on Tariffs and Trades (GATT). The fundamental objective was lowering tariffs significantly and removing other restrictions. In addition to this, GATT was replaced by the World Trade Organization after the eighth ministerial conference held in Uruguay. Between the formation of GATT and its replacement by WTO, which was a period of 50 years, there have been eight different ministerial conferences, all of which aimed at avoiding tariff as well as non-tariff barriers. This was basically considered as a huge step forward towards trade liberalization. Moreover, the world's leading financial institutions - IMF and the World Bank - are also the main actors of trade liberalization in the sense that developing countries are supposed to adopt structural adjustment programs in which deregulation of trade policies and other domestic policies were the core principles to get loans.

It is articulated in the WTO website that "...the rules and regulations of trade among any member nation are undertaken at the World Trade Organization with the main objective of insuring smooth, foreseeable and free trade flows. Most of the negotiations and trade-related treaties signed at this organization are approved and authorised by the parliaments of the member states in the WTO".

Tariff levels in industrialised countries have come down dramatically. Tariff levels in developing countries have also been reduced, although they still have not been eliminated totally. Non-tariff barriers to trade, such as quotas, licenses

and technical specifications, are also being gradually decreased, but rather more slowly than tariffs. From a policy perspective, the continuing efforts to liberalize international trade on a multilateral basis, first under GATT and now under the World Trade Organization headship, have supported market access well, and rates of growth of international current account dealings are much above universal economic growth. From an empirical point of view, however, the trade-growth connection is still in discussion, both from a methodological approach and concerning the scope and significance of the estimated effects (IMF, 2007).

The continuous removal of trade barriers has made transaction of goods and services less costly where those goods and services produced in one nation will be consumed or used as intermediate goods in other third nations. Those removals basically include the dismantling of tariff (such as duties, surcharges, and export subsidies) as well as non-tariff barriers (such as licensing regulations, quotas, and arbitrary standards). Most developing countries made a trade reform with the main objective of improving the living standards of their own people and enhancing the efficiency of market functions. This would in turn attract foreign-direct investment, which indirectly helps to get factor allocations and capital accumulation to hit economic growth (World Economic and Social Survey, 2010).

Ethiopia also started implementing the structural trade policy adjustment and reform imposed by the International Monetary Fund and the World Bank beginning from the 1980's. This structural adjustment program was boldly recommended by the two organizations (World Bank and IMF) to open foreign trade competition and decrease barriers of trade as a long-term strategy of economic growth and development globally.

As it is briefly explained by Tadele and Alemayehu (2004), poverty reduction, macroeconomic stability, and rapid and sustainable economic growth were the main objectives of the Ethiopian government to implement a variety of policy reforms and liberalize trade. Throughout this process in Ethiopia, tariffs have been cut, licensing bureaucracy has been shortened by using an online registration system, quota constraints have been relaxed, control over foreign

exchange has been minimized, control over interest rates has been relaxed, and privatization began with private banking authorization.

The main purpose of trade liberalization since the mid-1980s was to encourage economic growth by capturing the static and dynamic gains from trade through technological transfer and innovation, proper allocation of resources, creating more competition among nations, and increasing the inflow of investment and capital accumulation (Babatunde, 2009; Greenaway et al. 2002; Felix, 2003; Lill and Ronald, 2008; Yimer, 2012; and Burhan A., (Manni and Afzal, 2012) Grossman and Helpman (1980) and Mkubwa, Mtengwa, and Babiker, (2014), are among those who have argued about the greater opportunity to grasp and absorb technological advancement spawned from the developed nations which is the benefit from a positive relationship between trade liberalization and economic growth. Others, as described in the works of Winters (2004), have concluded that trade liberalization and economic growth are inversely related in the case of developing countries, specifically in Africa.

In developing nations like Ethiopia, the economy is mainly dependent on primary agricultural products and the main source of foreign currency earnings is agriculture, including coffee and oil seeds (Yetsedaw, 2014). In this regard, integrating a country's economy with the rest of the world can bring about sustainable growth and decrease the dependability on primary products. The issue of making the economic open to the international market may trigger trade performance better than making it closed it allows the country to attract foreign direct investment (FDI); it creates market access for domestically produced goods; it makes technological transfer from other nations possible through trade, specially by importing machineries and skill-demanding materials; and it also creates employment opportunities.

It is advocated by Krueger et al. (2003) that poverty will be reduced to the minimum level when the economy in developing countries is more liberalized and integrated with that of the rest of the world. Popularizing the positive impact of trade openness to poverty, Romian.W and Welch. H (2003) argued that over the period 1950-1998, countries that have liberalized their trade regimes have experienced, on average, increase on annual growth rates by 1.5% compared to pre-liberalized times. Furthermore, the works of Dowrick and

Galley (2004) showed that technological progress can be increased through liberalized trade, which in turn results in higher productivity. The researchers additionally elucidated expanded output pushes towards economic growth by means of letting domestic producers practice specialization and economies of scale based on the availability of resources. For example, Ethiopia is endowed with the most organic varieties of coffee that have unique aroma and other organic agricultural products such as oil seeds. This requires that we have to do more on value addition.

The economic impact of trade liberalization on economic growth has been an area of research in the last many years. Most of the research has revealed a positive relationship between economic growth and trade liberalization. Mkubwa and Babiker (2014), Echekeba and Okonkwo (2015), Babula (2009), and Babula and Andersen (2009) have concluded that there exists a positive and significant relationship between liberalization and growth. There are still a few researches that conclude a negative economic impact of liberalization, justifying it with the ‘infant industry’ argument. That is, most manufacturing industries are small and medium enterprises whose financial and production capacity is limited. Therefore, in times of liberalization, such enterprises will face strong competition from external companies, and this will immediately liquidate or demolish them. However, supporters of free trade are against the ‘infant industry’ argument contending that infant industries that are being protected by the government have not grown and they always want a long-lasting protection from external competition. If this is the case, the hypothesis of the study is that there is a long-run relationship between economic growth and trade liberalization and that relationship is positive.

To my knowledge, few studies have been undertaken on the impact of trade liberalization on the economic growth of Ethiopia. Furthermore, studies conducted so far have attempted to investigate the impact of trade liberalization on manufacturing industries using methodologies different from the current one.

As a result, this study aimed to explore the relationship between trade liberalization and economic growth. After identifying the impact of trade liberalization on economic growth by including current data for selected variables, the study forwards some possible recommendations for policy

makers. Thus, in this paper, an updated review and synthesis of the empirical literature on exploring the relationship between trade liberalization and economic growth of Ethiopia between 1980 and 2016 has been made.

Hence, the study has attempted to address the following questions:

- Does trade openness have any influence on the Ethiopian economy?
- How are trade liberalization and economic growth linked in the case of Ethiopia?

2. A Review of the Theoretical and Empirical Literature

Adam Smith was the first economist who studied the relationship between international trade and economic growth using the concept of ‘absolute advantage’. Following him, there have been a large number of economic researches conducted raising very powerful questions on the impact of free trade policies on the economy of both developed and developing countries. According to Adam Smith (1776), specialization and labour division are considered as the main determinants of wellbeing and economic growth. Besides, the theory of comparative advantage of David Ricardo has showed that two countries engaged in trade can mutually benefit from trade and specialization. He called this model a “win-win approach”. It is believed that trade enhances production and consumption efficiency and thus welfare will surge in the countries participating in trade.

In contrast to the above conclusions, no positive relationship is found between trade openness and economic growth of countries. It instead showed that technological progress exogenously determines the factors that affect the long-term economic growth. Therefore, the long-term economic growth is not affected by the degree of economic integration with the rest of the world. Trade openness only has a transitional effect on the steady state and long-term welfare gains, not on the economy of countries.

According to Lill Anderson and Ronald Babula (2008), the conventional trade theory associates international trade with a re-allocation of resources within the national borders determined by exogenous differences across countries. This re-allocation of resources generates efficiency gains that increase the level of

aggregate national income. In the same fashion, as suggested by the endogenous growth theories, the more a country opens its economy to the rest of the world, the greater the economic growth will be because of the fact that it increases the scale of a spill-over effect of technology from industrialized economies. Moreover, trade liberalization may encourage the growth and development of the economy of countries that have a capacity to adopt and imitate the knowledge transferred through the globalization channels such as market and foreign direct investment. But it does not mean that trade liberalization is the only driving factor and that it affects growth positively. In some circumstances, it can also affect the economy of others inversely (Frankel and Romer, 1999).

Some scholars (Utkulu, 2004; Vasquez, 2002; Winter, 2002) give counter arguments on the benefits of trade liberalization with evidence of the maize market failure of Zambia and the cotton trade problem of Zimbabwe, which reduced growth by putting the local industries out of market. It is clear that, given the tools of the endogenous growth theory, any policy choice can be shown to have growth effects through its effect on the accumulation or allocation of physical or human capital.

The theoretical literature on the relationship between trade and economic growth tells us about the long-term benefits of trade on economic growth. As an example, Baro and Martin (1995) contested that opening an economy encourages the growth performance in the long run by disseminating knowledge, familiarizing advanced level machinery-oriented items, and creating a spill-over effect through foreign direct investment.

On the contrary, Redding (1999) pointed out that trade openness impedes economic growth through comparative disadvantage in the growth of productivity in specialized sectors where the country has not diversified the production and trade activities to prevent specific product shocks in the economy. In addition to this, Rodrik (1997) supports the idea of Redding, pointing out the shortcomings of trade openness for the development of any nation as it may not be compatible with the local institutional and political stability. He also explains how globalization transforms employment relationships and how it causes income inequality within and between nations

and over the traditional norms that the society had before opening the economy for integration.

Burhan *et al.* (2014) have investigated the impact of trade liberalization on economic growth in Tanzania using time series data, covering the period from 1970 to 2010 by sub-dividing it into two different categories that show the period of closed economy (1970-1985) and the period of open economy (1985 - 2010). They tried to identify the impact of trade liberalization on the performance of the economy by applying an OLS technique for the two periods separately. The study found a positive and significant impact of trade openness on economic growth. The study also indicates that the positive impact was higher during the closed economy regime than the open economy period in Tanzania.

Olaifa *et al.* (2013) studied the relationship between trade liberalization and economic growth using yearly data from 1970 to 2012, built on conventional trade theory, to investigate whether there had been a long-term relationship between trade liberalization and economic growth and evaluate the impact of the structural change employed in the free trade regime. The study supported the international trade theory with evidence of a positive and significant impact of trade openness on economic growth after the country adopted the structural adjustment program undertaken in 1986 with the implementation of the free trade agreement. The study concluded that the country had benefited from the economic integration and recommended creating an enabling environment for economic growth by, for example, developing better infrastructure, giving financial support to export sectors, and putting in place a strong institutional structure for sustainable growth.

Edwards and Henry (1991) contended that open and outward-oriented economies had a better performance than closed economies due to the promises of trade liberalization, which resulted in a moderate growth rate in export and had a positive impact on aggregate growth by permitting higher capacity utilization and more efficient resource allocation and technological diffusion. The research finding pointed out that human capital formation tends to increase the positive impact of trade openness on economic growth.

Greenaway, Morgan and Wright (1997) assessed a group of countries which had liberalized in the post-1985 period using a panel estimation technique. They looked at the situation before and after, with and without liberalizing, based on the implementation of the restructuring program. Based on a “core” new growth theory using a cross-country time series data, they found deterioration on economic growth for a particular sample on average.

Seid Yimer (2012), empirically investigated the impacts of trade liberalization on economic growth and poverty reduction in Ethiopia using the Dynamic Computable General Equilibrium Simulation Model simulated alternative policies scenarios showing full and indiscriminating liberalization, gradual and rationalized liberalization, instantaneous tariff liberalization and found a positive relationship between trade liberalization and economic growth in the long run.

Ronald B., *et al.* (2009) reviewed the most cited empirical analysis that focuses on the linkage between international trade and economic growth, the link between trade and productivity growth and concluded that there is the impact of trade liberalization on the growth of the economy is positive, but they expressed their concern on the problems of measurement error and endogeneity which handles most empirical analyses. They also have a caveat in relation to the ability of the developing countries to gain a productivity growth by opening the economy to the rest of the world. Their finding concludes by stating that investing on human capital to achieve property rights and creating a strong institutional framework while opening the economy has a positive impact for the economic growth of a country.

Olugbenga A. and Oluwole O. (1998), examine the possible effects of liberalization arising from policy amendments on export and investment in 12 sub-Saharan African countries by expanding the Balassa (1978) and Feder (1983) augmented-production-function growth model for the inclusion of export and investment using vector auto-regression error correction method. They found that 10 out of a sample of 12 countries registered a positive economic growth from the change in trade policies of outward-looking strategies of export expansion.

Jeffery and Andrew (1991) empirically estimated the sub-Saharan African countries' future-based sources of slow economic growth as a more optimistic view. Following the approach of Robert J. Barro (1991), they used the countries' gradual adjustment from the current income level to the steady state level of per capita income using some selected variables through a panel data analysis. Their finding suggested that the major reasons for the stagnant economic growth - apart from landlocked geographical features and lack of openness for international markets - were poor economic policies and political instabilities. The authors used the Sala and Martin Cobb Douglas production function and included some policy variables such as higher rates of central government savings as a share of GDP associated with a faster economic growth.

The causality relationship among trade liberalization, human capital and economic growth has been empirically assessed by Chaudhry et al. (2010). They used the annual data from 1972 to 2007 based on the neoclassical theory. The study employed the Granger causality co-integration method and confirmed the short-term and long-term relationship between the engaged variables. They also explain the direction of causality to be from liberalizing trade to accumulating human capital with technological advancement, and this in turn leads to economic growth. Their results showed that all the variables were statistically significant and give evidence of a 3.06 percent GDP growth due to a 1 percent increase of trade openness in Pakistan.

Ethiopia, which is in the process of becoming a member of the World Trade Organization, has been adopting structural adjustment and other trade and transformation policies since 1992 and working to integrate itself with the global community. It gives priority to trade liberalization and working on industrialization to expand its export practice from primary agricultural to manufacturing products. Therefore, as described in the above theoretical and empirical reviews, there is no clear-cut conclusion on whether trade liberalization has a positive correlation with growth under all circumstances. The aim of this paper is to investigate empirically the relationship between trade liberalization and economic growth.

3. Research Methodology and Data Source

The study is based on secondary sources of time series data covering from 1980 to 2016 collected from the National Bank of Ethiopia, Ministry of Finance and Economic Development, the World Bank and others. The collected data is checked for stationarity issues first and analysed using an econometric model, i. e. vector error correction model (VECM). Therefore, the more open the economy, the higher the economic performance will be. The variables that are used in the study are trade openness (as a proxy for trade liberalization), active population from the age of 15 to 64 (as a proxy of labour force), expenditure on education (as a proxy to human capital), consumer price index and real gross domestic product (as a proxy of economic growth).

RGDP is considered to be the proxy for economic growth in many analyses and the case for this study is not different from the tradition. Moreover, gross capital formation, active labour force, expenditure on education, openness (the ratio of import and export to GDP) and foreign direct investment are the selected variables to determine the economic growth of Ethiopia.

The study has used a secondary data of 36 years ranging from 1980 to 2016 collected from national and international data bases including the National Bank of Ethiopia, the Ministry of Trade, the Ministry of Finance and Economic Corporation, the World Bank and others.

3.1 Model Specification

This study adopted methodological approaches used by Chaudhry (2009) and Muhammad (2012) both of which are based on the original neo-classical model known as the Solow-Swan Model² or the Solow Model of economic growth. A Cobb-Douglas production function with constant returns to scale with respect to capital, labour and total factor productivity of the following formula is used to examine the relationship between trade liberalization and economic growth.

² Solow-Swan Model is named after the two famous economists Robert Solow and Trevor Swan

$$Y_t = F(K_t, LAB_t, TFP_t) \quad 3.1$$

Where, Y_t , K_t , L_t and A_t represents total output, physical capital, labour force and total factor product at time t, respectively. Total factor productivity (TFP) here is considered as any variable other than labour and capital that affects the economic growth or national output of a country. Total factor productivity (TFP) is the portion of output not explained by the amount of inputs (labour and capital, in this case) used in production. As such, its level is determined by how efficiently and intensely the inputs are utilized in production.

The above expression of production function can be rewritten as:

$$Y_t = TFP_t K_t^\alpha LAB_t^\beta \quad 3.2$$

Note that: $0 < \alpha < 1$ and $0 < \beta < 1$

The author extended the Cobb-Douglas production function by assuming that total factor productivity (TFP) is determined by level of international trade, skilled human power, and inflation. Liberalization offers the opportunity for the sector to compete internationally, contributing to GDP growth and generating foreign exchange. Liberalization or further "opening up" of respective economies to foreign economy is considered as an option to foster a country's economic growth by creating market access to domestically produced goods and services, new technology, and knowledge, which in turn create the opportunity to produce new products and new employment opportunities through FDI. As evidence, the fastest growing developing economies including India (Swami Nathan, 2015) today have achieved rapid economic growth in the past several years or decades, in part from having "liberalized" their economies to foreign capital.

Many countries nowadays, particularly those in the third world, arguably have no choice but to also "liberalize" their economies in order to remain competitive in attracting and retaining both their domestic and foreign investments.

Furthermore, trade is contributing to economic growth by efficiently allocating internal and external resources, shifting technological advancements from

developed countries to developing economies, and exploiting innovations of developed countries, i.e. learning by doing effects³.

When the general prices rise, the entire economy is affected. Rising prices impact the cost of living, the cost of doing business, borrowing money, mortgages, corporate and government bond yields, and every other facet of the economy. On the other hand, there are arguments that rising rates of inflation are typically one of the first signs that an economy is overheating.

Education or human capital

Expressing the TFP as a function of trade openness, consumer price index, expenditure on education and other external variables gives us the following equation.

$$TFP_t = F(TO_t, CPI_t, EDUEXP_t) \quad 3.3$$

Where: TFP_t is the Total Factor Productivity at time t

TO_t is trade openness measures as the ratio of trade (import and export) to GDP at time t

CPI_t is the consumer price index at time t

$EDUEXP_t$ is real expenditure on education at period t

Expression 3.3 can be rewritten as follows:

$$TFP_t = \delta \cdot TO_t^\gamma \cdot CPI_t^\mu \cdot EDUEXP_t^\rho \quad 3.4$$

Where: δ is time invariant constant

$$0 < \delta < 1, 0 < \mu < 1 \text{ and } 0 < \rho < 1$$

Substituting expression 3.4 by expression 3.2 gives us:

$$Y_t = \delta \cdot TO_t^\gamma \cdot CPI_t^\mu \cdot EDUEXP_t^\rho \cdot K_t^\alpha \cdot LAB_t^\beta \quad 3.5$$

³ *Learning by doing* implies that greater investments in certain sectors increase the experience of firms, workers, managers in the production process, making the production process itself more productive.

Taking natural logs (Ln) on both sides of the equation (3.5) gives an estimable linear function:

$$\ln Y_t = \beta_0 + \beta_1 \ln TO_t + \beta_2 \ln CPI_t + \beta_3 \ln EDUEXP_t + \beta_4 \ln K_t + \beta_5 \ln LAB_t + \varepsilon_t \quad 3.6$$

Where: β_0 is log of the constant δ , $\ln Y_t$ is log of real GDP, $\ln TO_t$ is log of trade openness, $\ln CPI_t$ is log of consumer price index, $\ln EDUEXP_t$ is log of expenditure on education, $\ln K_t$ is log of physical capital, $\ln LAB_t$ is log of labour force, DD is dummy variable, ε_t is error term which is assumed to be independent of all the explanatory variables and $\beta_1 - \beta_6$ are coefficients of the variables to be estimated, showing the magnitudes of the relationship in either side.

According to equation 3.6, an econometric model of the selected variables which is estimated in this study (with dummy) is given as:

$$\ln RGDP_t = \beta_0 + \beta_1 \ln TO_t + \beta_2 \ln CPI_t + \beta_3 \ln EDUEXP_t + \beta_4 \ln K_t + \beta_5 \ln LAB_t + \beta_6 DD + \varepsilon_t \quad 3.7$$

Table 3.1: Variable description and expected sign

Variables	Description of variables	Expected sign
RGDP (dependent variable)	Is a macroeconomic measure of the value of economic output adjusted for price changes (i.e. inflation or deflation) and is used as a proxy for economic growth of Ethiopia in this study	Positive
Trade openness	Refers to the level which countries allow to have or have trade with other countries or the degree of international exposition	Positive/negative
Consumer Price Index	Overall weighted average price level	Negative
Expenditure on education	Commonly used as a proxy for human capital measured by the educational attainment (Barro and Lee, 1993)	Positive
Physical	Refers to a factor of production such as	Positive

Capital	machinery and buildings. Accumulated physical capital is mostly measured by the share of investment to GDP.	
Labour	Labour force is the actual number of people available for work including both the employed and unemployed aged 15 to 64 years old.	Positive
DD	Dummy for regime change (1 for EPRDF regime and 0 for Dergue period)	Positive

4. Results and Discussion

4.1 Stationarity test⁴

When there is a stationary process, the mean, the variance, and auto covariance stay unchanged regardless of the period in which we measure, and it is known as ‘time invariant’ because the variables depend only on the lags between the two consecutive periods (Verbeek, 2004).

Augmented Dickey-Fuller test is used to detect the stationarity of the variable, and the importance of testing stationarity is equivalent to checking the unit root. The null hypothesis ‘Variables are not stationary (have a unit root)’ is tested against the alternative hypothesis ‘Variables are stationary’. In case of testing variables in their level and at their first difference, the ADF test is performed without constant and with constant and trend.

As it is evidently shown in the table below, the augmented Dickey-Fuller test validates the existence of unit root for all variables at their level; however, variables become stationary at the first difference of the logarithmic transformation. Furthermore, an ADF test was conducted at the first difference of each variable. The null hypothesis of non-stationarity is rejected at all levels of significance (1%, 5% and 10%) as shown in the table annexed.

⁴It is known that there is a unit root for the macro level data, so, it is a prerequisite to check the stationarity using an augmented Dickey-Fuller method of testing and all the variables were found to be non-stationary at their level but become stationary after the first difference I (1).

Table 4.1: Stationarity test of variables at level and at first difference with constant, with constant and trend

Variable	Level	With constant and trend	First Difference	With constant and trend
	With constant		With constant	
LGDP	3.190805	-0.700254	-4.323757	-5.666394
LK	0.441513	-1.976243	-7.652076	-8.074921
LLAB	-2.669344	-2.910175	-7.962737	-8.624342
LCPI	1.133028	-1.003691	-5.276088	-5.537620
LEDUEXP	0.867190	-1.496545	-5.083109	-5.198854
LTO	1.023376	-2.713992	-3.278028	-3.534596
1% critical value	-3.626784	-4.234972	-3.632900	-4.243644
5% critical value	-2.945842	-3.540328	-2.948404	-3.544284
10% critical value	-2.611531	-3.202445	-2.612874	-3.204699

Source: Own computation from Eviews 7.

4.2 Co-integration test

It is possible to investigate those variables that are not stationary in level which could have a continuing relationship, and at the same time the variables become co-integrated.

Co-integration analysis is undertaken to examine the existence of a long-term relationship between growth rate of real gross domestic product and the explanatory variables, using Johansen's (1991) maximum likelihood co-integration method. Provided that there is evidence of co-integration between the variables, the model specification will lead to Error Correction Model (ECM) for each dependent variable or Vector Error Correction Model (VECM) for equation series with more than one dependent variable which is concerned with preserving information about both forms of co-variation. In other words, co-integration testing can become a basis to determine equation estimation to see whether variables have long-term relationship or not.

Johansson co-integration test is suitable for such types of study to understand whether there has been long-term relationship among the variables since the numbers of variables in the equation are more than two. The trace and max

Eigen value test statistics results show that there is a significant long-term relationship between liberalization and economic growth. Zero maximum rank confirms the null hypothesis, which says there is no co-integration between the variables RGDP*, K, LAB, CPI, EDUEXP and TO. With a comparison, the trace statistics and maximum Eigen value the study fall to accept the hypotheses of no co-integration between the variables interest.

As briefly discussed in the previous section, Johansson co-integration test is a preferable technique for such types of model in order to know whether there exists a long-term relationship between variables of interest. As it is indicated in Table 4.2, the rank of the test being zero implies the null hypothesis of no integration alongside with an alternative hypothesis of there being at least one co-integration. Based on the results of the Max-Eigen value statistics and trace statistics, there is one co-integration result at 1% level of significance, which leads to the rejection of the null hypothesis and proves the existence of a long-term relationship between variables.

Table 4.2: Co-integration analysis using Johansen test (Critical values based on MacKinnon-Haug-Michelis (1999))

Data Trend	None	None	Linear	Linear	Quadratic
Test Type	No Intercept No Trend	Intercept No Trend	Intercept No Trend	Intercept Trend	Intercept Trend
Trace	2	1	0	0	0
Max-Eig	0	1	0	0	0

Source: own computation from Eviews 7

4.3 Error correction model

Engle and Granger's (1987) proposition explains that when sets of variables are being co-integrated, there occurs a binding error-correction demonstration of the time series process. Thus, when the dependent and explanatory variables are both integrated of order one and have co-integration, we can use error correction illustration. The coefficient of the error correction term is defined as the speed of adjustment that indicates how the disequilibrium that occurred in the short-term adjusts itself in the long term.

The long-term equation and interpretation is as follows (see the annex for the details):

$$\text{LnRGDPt}^* = \text{LnLABt} + 0.49\text{LnKt} + 0.69\text{TOt} - 0.18\text{EDUEXPt} + 0.2\text{LnCPIt} + 0.19\text{DD}$$

(0.153)*** (0.118)*** (0.291)** (0.073)** (0.158) (0.093)**

The main explanatory variable - trade liberalization - represented by trade openness has a positive and significant impact on economic growth at 5 percent level of significance. This result is in line with prior expectations and major literatures such as Babatunde (2009), Greenaway et al. (2002), Olaifa (2003), who found a positive relationship between trade liberalization and economic growth.

The country imports capital goods from the rest of the world; these capital and intermediate inputs, in turn, are used for further production of goods and services in the entire economy -GDP. Similarly, the country's export has also a significant contribution to foreign exchange earnings, enhancing competitiveness, boosting the quality of products and the like. Statistically, a unit increase/decrease in the openness of the country leads to about 1.3-unit increase/decrease (positive change) in the country's economic growth. Economic interpretation of the result is that, a unit Birr injection on trade openness has a higher multiplier effect on the general economy by Birr 1.3.

The other important variable to determine the economic growth of the country is gross capital formation or investment. Not surprisingly, as gross capital formation comprises more than 35 percent of the country's economy, it has a positive and statistically significant impact on economic growth and this is consistent with the results of Eberechukwu U. (2013). To be specific, a unit percentage change in gross capital formation leads to 0.56 percentage change in the country's economic growth. This finding reveals the importance of gross capital formation (investment) to a country's economic performance. As investment is the main component of aggregate demand, its increment usually leads to an increase in economic growth. Especially in a country like Ethiopia where GDP is far from potential output, a change in investment has a significant impact on the entire economy.

In line with the neoclassical theory of economic growth, active labour force has also a positive and statistically significant impact on the country's economy. According to ILO (2016), more than half of the country's population is active labour force with a relatively better employment rate. Usually labour force is considered as an important element of factors of production. Especially in Ethiopia where capital is relatively scarce and labour is abundant, the bulk of the labour force is engaged in the production of goods and services. The country's economic policies are designed to exploit this comparative advantage of production input. The subsistence agricultural sector is almost entirely labour-dependent with limited technological practices. Similarly, the industrial sector of the country is emphasising on labour intensive sectors like agro-processing and textile industries. Thus, this research revealed that a unit percentage change in active labour force leads to around 0.98 percentage change of economic growth in the same direction.

The impact of macroeconomic stability, proxy by CPI, has a positive but insignificant impact on the economic growth of the country, which is against prior expectation. In fact, the coefficient of inflation on economic growth function is inconclusive. Some found positive while others found negative results. Lower and moderate level of inflation is usually considered as an incentive for producers and, hence, important to boosting production. On the contrary, a higher level of inflation is detrimental to consumption and production; thus, the sustainability of economic growth is questionable. During the sample period, Ethiopia sustained a relatively moderate inflation; that is why CPI has a positive but insignificant impact on economic growth.

Contrary to prior expectation and theoretical agreement, government expenditure on education is statistically significant at one percent level of significance. But it is impossible to interpret a negative coefficient of government expenditure on education. One argument would be the deteriorating level of quality of education with the result that education on expenditure would snatch the scarce resource from other productive sectors.

Finally, dummy variable for regime change has a significant coefficient, implying the existing structural break as a result of government change between EPRDF and Dergue. A regime changes during 1991 has a significant impact on

economic growth with 0.18 percent. This mainly resulted from change in policy and ideology of the government.

The outcome of the above regression is based on several classical assumptions including, but not limited to, stability of the model, there being no serial correlation, homoscedasticity and normality. Therefore, it is mandatory to check whether these assumptions are met or not. With regard to stability of the model, the author deployed Chow forecast test and found that the model is stable at 5 percent level of significance. The other important assumption is the error term is not serially correlated. To check this assumption, Durbin-Watson statistics is used in this research. For the rejection of the null hypothesis (the error term is serially correlated), the DW statistics should be around 2. According to the model of this research, it is 1.9 and exactly satisfies the condition of no serial correlation in the model's error term. Harvey test of homoscedasticity revealed that there is constant variance in the regression. The other central assumption to linear regression model is normality. If the error term is not normally distributed, it is not possible to make decision based on conventional t and f statistics. Therefore, the author deployed Histogram Normality test and revealed the error term is normally distributed. As a result, decision making (rejecting and accepting null hypothesis) based on standard t-test and f-test tables is sound in this model (the results for diagnostic tests are attached in the annex).

The Error Correction Model (ECM) in the short-term

The ECM derived from the regression results and the estimated short-term coefficients are:

$$\text{DLnRGDP}_t^* = -0.1898 + 0.125\text{DLnRGDP}_{t-1}^* + 0.31\text{DLnLAB}_t + 0.20\text{DLnK}_t + 0.19\text{TO}_t + 0.04\text{EDUEXP}_t + 0.026\text{DLnCPI}_t$$

(0.166) (0.156) * (0.584) *** (0.047) ** (0.039) (0.08)

*** Values in parenthesis are standard errors.

The last step is to run the ECM, since there is a confirmation of the presence of long-term relationship amongst variables. As it is indicated below in Table 4.3, the short-term dynamic relationship and the set of short-term coefficients in the ECM, which relates the changes in real gross domestic product to changes in explanatory variables and the error term in the lagged periods. Hence the lagged difference terms capture the short-term changes in the corresponding

logarithmic transformed variables. ECT-1 has a negative sign coefficient, which is found to be significant at 5 percent. The coefficient of ECT-1 is the speed of adjustment to the temporary disequilibrium or deviation from the equilibrium. In this study the speed of adjustment is about 18.98%, which implies that the disequilibrium is adjusted by 18.98% yearly. Thus, the speed of adjustment is relatively slow and requires some years to be fully adjusted. As it is illustrated below in the summary table, lagged RGDP has a positive effect on the current year GDP with a significance level of 5%. Changes in active population and trade openness also have a positive impact on the economic growth but they are both statistically insignificant.

5. Conclusion and Recommendation

This paper aimed at analysing whether or not there is a long-term relationship between trade liberalization and economic growth and at finding out the impacts of liberalization, both in the long-term and short-term dynamics, for Ethiopia using a time series data of 1980-2016. The Johansen co-integration methodology was employed and the result from the co-integration analysis confirms the long-term relationships among the variables.

This study indicated that trade liberalisation in general positively affects economic growth in Ethiopia. As all variables are integrated of order one and there exists a co-integration relationship, ECM was a more appropriate model. It was found that trade liberalization is one of the significant variables to determine economic growth in Ethiopia. Its multiplier effect is very high in the long run. As the country becomes more open, it is possible to reap the benefits of international trade by importing capital and intermediate goods as well as finding bulk market for domestically produced goods and services in the international market.

In line with neoclassical growth theories, labour and capital are also significant variables with a positive sign. As labour and capital are the basic factors of production, there is no wonder that their impact is positive and significant. In a country where more than 50 percent of the population is an active labour force with relatively better employment rate, it can be considered as an engine for economic growth. Similarly, the more than 35 percent share of investment to

GDP attained is the proof to the significant contribution of investment to the country's economic growth.

But government expenditure on education is contrary to prior expectation and is difficult to justify under normal circumstances. This may be due to low quality of education though access to education is expanding continuously. Higher government expenditure on education with low quality cannot bring about change significant enough to meet its objective. The other macroeconomic variable expected to affect economic growth is consumer price index used as a measurement of macroeconomic stability. The findings revealed that CPI has an insignificant impact on economic growth but with a positive coefficient.

Based on the findings of the research, the following policy implications are drawn. Since trade liberalization is the most significant variable, both in the long- and short-term to affect economic growth, the government should promote and enhance openness more in the international market. By doing so, the country could reap the benefits of international trade, including competitiveness, quality improvement and technology transfers. Several mechanisms to boost trade liberalizations should be implemented. These include minimizing tariffs, quota, policy restrictions, and customs clearance procedures. The government also needs to enlarge the engagement of active labour force on the production of goods and services by creating more jobs. In a country where labour force is relatively abundant, economic policies should be directed towards utilizing these inputs. Finally, to attain and maintain a sustainable economic growth, the government should give more support to both domestic and foreign investment by improving the institutional capacity to deliver service because creating a conducive business environment is vital for attracting investors. Avoiding the bottlenecks on establishing investment would have a significant contribution to enlarge investment and, hence, economic growth.

Finally, the government of Ethiopia should further push towards the membership of regional integrations and the World Trade Organization. It has been about two decades since the country showed interest⁵ to investigate the cost and benefit of WTO membership and more than a decade since the country

⁵ Received observer status since 1997 and

formally applied⁶ for membership. However, due to the many domestic economic and trade policies that are incompatible with the basic WTO agreements, the accession process has taken so many years. The noticeable challenge that the policy makers are facing this time is the internal policy on financial and telecommunication service that is operational. This research does not recommend to totally open to international competitions, but at least there should be a mechanism to facilitate the accession by, for example, opening joint ventures in cooperation with domestic entities.

⁶ Formally applied for membership and started accession process in January 2003

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Annexes

Annex 1: Statistical Summary

	GDPR	GDPR_1	K	LAB	CPI	EDUEXPR	TO
Mean	26.11413	26.07784	24.67533	17.23865	3.318038	1.865944	0.139900
Median	25.92127	25.91401	24.48598	17.25380	3.143811	0.816536	0.075038
Maximum	27.42053	27.34764	26.46461	17.69393	5.037008	8.202546	0.644234
Minimum	25.39816	25.39816	23.50002	16.53428	2.201614	0.176296	0.016054
Std. Dev.	0.614544	0.581667	0.849843	0.338740	0.841544	2.198331	0.166470
Skewness	0.763704	0.788527	0.679725	-0.370813	0.654534	1.552467	1.544596
Kurtosis	2.298106	2.375228	2.428971	2.066481	2.397328	4.344993	4.329968
Jarque-Bera	4.356178	4.316163	3.351860	2.191428	3.201845	17.65151	17.43921
Probability	0.113258	0.115547	0.187134	0.334301	0.201710	0.000147	0.000163
Sum	966.2226	938.8021	912.9873	637.8300	122.7674	69.03992	5.176313
Sum Sq. Dev.	13.59589	11.84179	26.00037	4.130816	25.49505	173.9757	0.997636
Observations	37	36	37	37	37	37	37

Source: Own computation using Eviews 7

Annex 2: Stationarity test of variables at level and at first difference with constant, with constant and trend.

Variable	Level With constant	With constant and trend	First Difference With constant	With constant and trend
LGDP	3.190805	-0.700254	-4.323757	-5.666394
LK	0.441513	-1.976243	-7.652076	-8.074921
LLAB	-2.669344	-2.910175	-7.962737	-8.624342
LCPI	1.133028	-1.003691	-5.276088	-5.537620
LEDUEXP	0.867190	-1.496545	-5.083109	-5.198854
LTO	1.023376	-2.713992	-3.278028	-3.534596
1%	-3.626784	-4.234972	-3.632900	-4.243644
5%	-2.945842	-3.540328	-2.948404	-3.544284
10%	-2.611531	-3.202445	-2.612874	-3.204699

Source: Own computation using Eviews 7

Annex 3: Co-integration analysis using Johansen test

Dependent Variable: D(LRGDP)

Method: Least Squares

Date: 09/10/17 Time: 17:37

Sample (adjusted): 1982 2016

Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DRGDP	0.049744	0.039011	1.275113	0.2127
DRGDP-1	0.125169	0.166846	0.750207	0.4594
DK	0.200461	0.047539	4.216793	0.0002
DLAB	0.312373	0.156241	1.999303	0.0554
D CPI	0.001925	0.080390	0.023945	0.9811
EDUEXP	0.049744	0.039011	1.275113	0.2127
TO	0.191672	0.096886	1.978330	0.0634
R-squared	0.405665	Mean dependent var		0.055725
Adjusted R-squared	0.278308	S.D. dependent var		0.060970
S.E. of regression	0.051796	Akaike info criterion		-2.906160
Sum squared resid	0.075118	Schwarz criterion		-2.595091
Log likelihood	57.85780	Hannan-Quinn criter.		-2.798779
Durbin-Watson stat	2.182881			

Source: Own computation using Eviews 7

Annex 4: Estimation Result for the long run

Dependent Variable: LGDPRM

Method: Least Squares

Date: 10/02/17 Time: 17:51

Sample: 1980 2016

Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LKR	0.485771	0.118259	4.107671	0.0003
LLF	1.000033	0.152718	6.548231	0.0000
TORM	0.688467	0.290792	2.367554	0.0294
LED	-0.182430	0.073228	-2.491266	0.0183
LCPI	0.198534	0.158297	1.254187	0.2191
DD	0.184943	0.092723	1.994577	0.0549
R-squared	0.972480	Mean dependent var		26.11413
Adjusted R-squared	0.968041	S.D. dependent var		0.614544
S.E. of regression	0.109862	Akaike info criterion		-1.431797
Sum squared resid	0.374157	Schwarz criterion		-1.170567
Log likelihood	32.48824	Hannan-Quinn criter.		-1.339701
Durbin-Watson stat	1.788855			

Source: Own computation using Eviews

Annex 5: Estimation Result for the short-term ECM

Dependent Variable: D(LRGDP)

Method: Least Squares

Date: 09/21/17 Time: 17:37

Sample (adjusted): 1982 2016

Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LnK)	0.200461	0.047539	4.216793	0.0002
D(LnLAB)	0.312373	0.156241	1.999303	0.0554
D(LCPI)	0.001925	0.080390	0.023945	0.9811
D(TO)	0.191672	0.096886	1.978330	0.0634
D(EDUEXP)	0.049744	0.039011	1.275113	0.2127
D(L GDPR _1)	0.125169	0.166846	0.750207	0.4594
ECM	- 0.189856	0.083766	-2.266499	0.0313
R-squared	0.405665	Mean dependent var		0.055725
Adjusted R-squared	0.278308	S.D. dependent var		0.060970
S.E. of regression	0.051796	Akaike info criterion		-2.906160
Sum squared resid	0.075118	Schwarz criterion		-2.595091
Log likelihood	57.85780	Hannan-Quinn criter.		-2.798779
Durbin-Watson stat	2.182881			

Source: Own computation using Eviews 7

Annex 6: Heteroskedasticity Test: Harvey

Heteroskedasticity Test: Harvey

F-statistic	0.822587	Prob. F(5,31)	0.5432
Obs*R-squared	4.333975	Prob. Chi-Square(5)	0.5024
Scaled explained SS	2.567025	Prob. Chi-Square(5)	0.7664

Source: Own computation from Eviews 7.

Annex 7: Normality test

Series: Residuals

Sample 1980 – 2016

Observation 37

Skewness	0.163074
Kurtosis	1.363163
Jarkue-Bera	2.025807
Probablity	0.363163

Source: Own computation from Eviews 7

Annex 8: Stability test

Chow Forecast Test

Equation: UNTITLED

Specification: LGDPRM LKR LLF TORM LED LCPI

	Value	df	Probability
F-statistic	1.048708	(17, 15)	0.4670
Likelihood ratio	28.97961	17	0.0347

Source: Own computation from Eviews 7