**ADDIS ABABA UNIVERSITY**
**SCHOOL OF GRADUATE STUDIES**
**DEPARTMENT OF ECONOMICS**

**THE DETERMINANTS OF EXPORT PERFORMANCE IN ETHIOPIA: A PANEL DATA ANALYSIS**

**By**
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**Addis Ababa, Ethiopia**

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## THE DETERMINATS OF EXPORT PERFORMANCE IN ETHIOPIA: A PANEL DATA ANALYSIS


**A Master Thesis Submitted to the School of Graduate Studies Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Masters of Science in Economics (International Economics)**


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# ACKNOWLEGMENT

# *Abstract*

*The paper examines the effect of demand and supply side factors on Ethiopia's export performance. Thus the supply side factors are responsible for poor export performance in the country. The study employed a panel data analysis to empirically analyze these determinants in Ethiopia'sfor the period 2007 to 2017. A sample of ten major trading partners was selected to analyze the determinants of total export. Based the Hausman test fixed effect is appropriate to estimate the model for Ethiopia's export performance. Using fixed model we found that from the supply side factors GDP, LPI, FDI and REER have insignificant effect for Ethiopia's export performance while(CPI) institutional quality significantly affects the export performance. Whereas on the demand side the per capita income of the trading partner and trade openness significantly affect the export performance. Thus study concludes that in recent years supply side factors become insignificant for the country export performance and due emphasis should be given for supply capacity to improve the export sector.*

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# List of Acronyms

| | |
|---|---|
| **AGOA** | African Growth and opportunity Act s |
| **CLRM**: | Classical Linear Regression Model |
| **CPI**: | Corruption Perception Index |
| **EBA**: | Everything but Arms |
| **EPA**: | Economic partnership Agreement |
| **FDI**: | Foreign Direct Investment |
| **GATT**: | General Agreement on Tariff and Trade |
| **GDP**: | Gross Domestic Product |
| **IMF**: | International Monetary Fund |
| **LDC**: | Least Developing Country |
| **LL**: | Levin Lin- Chu |
| **LM**: | Lagrange Multiplier |
| **LPI**: | Logistics Performance index |
| **MFN**: | Most Favored Nation |
| **MOT**: | Ministry of Trade |
| **NTB**: | Non Tariff Barrier |
| **REER**: | Real Effective Exchange Rate |
| **SSA**: | Sub-Saharan Africa |
| **UNCTAD**: | United Nation Conference on Trade and Development |
| **UNDP**: | United Nation Development Program |
| **WB**: | World Bank |
| **WDI**: | World Development Indicator |
| **WTO**: | World Trade Organization |

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background of the Study

International trade has become a basis of economic success in many countries of the world. It enables countries to obtain the benefits of specialization, such as increases in output of goods and services, which they do not produce or do not produce in sufficient quantities, increases in foreign exchange earnings and increase competition among producing nations thereby improving efficiency in production. The more countries participate on international trade, the greater their competitive advantage. That's because they gain expertise in producing the goods and also gain knowledge on how to sell the product to foreign markets.Hence, high participation on international trade helps to achieve higher and better economic growth. This can be confirmed by the remarkable success of the four East Asian Tiger economies. (South Korea, Hong Kong, Singapore and Taiwan). Palley (2011).

Exports play a very important role in the process of economic development by influencing the level of economic growth, employment and the balance of payment. Hence, expanding export capacity and international competitiveness are essential for rapid economic growth and development. Many developing countries have attempted to increase the share in international trade. For the last three decades developing countries have gradually increased their share in global trade form just one quarter to about one third with a greatest share accounted by East Asian countries, particularly china which has been facilitated by diversification of export.(Fugazza, 2004).

However, Africa plays only a marginal role in world trade. Its share of global exports in the world market is fell further to 2.4 percent in 2016 with Sub-Saharan Africa accounting for just 1.7 present.Poor domestic policies as well as restrictive policies of developed countries has attributed for low level of Africa's share in the world market. Biggs (2007).Being an underdeveloped economy that heavily depend on agriculture, the structure of Ethiopian export is dominated by few agricultural products. However, the share of this agricultural export in the world market is still low around 0.0013percent in 2016/17.(WTO,2017).

Following the fall of Derg regime, the EPRDF regime has undertaken different policy reforms. Since the launching of the new policy reform (1992) in collaboration with International Monetary Fund (IMF) and World Bank (WB) under the free market economy has undertaken structural adjustment program (SAP) and trade liberalization which aimed at promoting exports through diversification of the country's export items. A number of policy reform embodied in the economic liberalization program such as devaluation of domestic currency and liberalization of foreign exchange transaction, abolishing of all export taxes(except on coffee) and subsidies, liberalization of foreign trade, introduction of export incentive scheme such as duty draw back scheme on items imported to produce exportable goods and foreign exchange retention account, pre-shipment and post shipment credit guarantee schemes ,deregulation of domestic prices and promulgation of a liberalized investment law with different incentive.(Alemayehu, 2007)

Despite the different policy reforms, the export sector of the country still plays a significant role in the growth performance of the country as can be observed from two main angles. Firstly, the export items of the country have been concentrated to only few commodities. According to MOT data, although coffee is still the dominant export item, since 2001/02 its contribution to the total export earning has declined from 37.1 percent to 31 percent on average for the period 2007/08 to 2017/18 which is less within same regime. On the other hand the share of non coffee agricultural export and major manufacturing export increase to 69 percent. Secondly, the share of export in the national economy measured by gross domestic product (GDP) is around 12 percent which is low as compared to those of other Sub-Saharan Africa countries near 30 percent of GDP.

Regarding the composition of export items, the exported product is limited to only few primary commodities such as coffee, livestock products (leather, live animals and meat), oil seeds and pulses, fruits, vegetables and flowers, textiles, natural gum, spices and mineral products.As export is concentrated in few primary commodities, there has been series short run and long run economic risk being experienced in Ethiopia in recent times. The short term economic risk are felt to the economy through volatility and instability of foreign exchange earnings which could have adverse macroeconomic effect on growth, employment, investment plan, import and export capacity, foreign exchange cash flow, inflation and other. In the long run declining terms of trade trends may worsen the short run effects.

Having the above information, the export sector of Ethiopia is low as compared to African countries with similar feature of economic structure. Since the country is growing rapidly, needs to pay more attention to improve its export. In addition a lot of changes are occurred in the economy in recent years that encourage further research in the area to identify the determinants of export performance.

## 1.2 Statement of the Problem

In principle it is believed that both import and export trade is equally important. A country must import the required input, capital goods and appropriate technologies to broaden its production base and export capacity. While export trade is crucial to fill the foreign exchange gap of the country to increase the import capacity which have a great contribution to investment for different sectors and help to reduce the dependence on foreign aid.

Like most of the Sub-Saharan African countries and other developing countries, the Ethiopian economy is dependent on the export of primary and low value added products. The country is characterized by shortage of foreign exchange as a result of declining exports, particularly from primary commodity exports, which constitute significant part of the total export earnings. However, the total export earnings of the country  has grew  from  402 million us dollar in 2001/02 to  1.2  billion  in 2007/08  and 2.7 billion in 2012/13.But in the recent past thetotal export earning has declining and stagnated. The country trade deficit continues to raise from 12.5 percent per year between 2004/05 to 2010/11 to 17.3 percent in 2016/17 largely due to the considerable growth in imports and lower exports. The declining price for primary agricultural commodities in the world market has serious impact on the value and volume of export. Even a substantial export volume growth could not compensate for this slowdown. Yet,the manufacturing exports are low value added agricultural products and unprocessed agricultural goods which have smallest impact on substantially increasing the export earning and bringing the required economic growth. Following this, the government of Ethiopia devalued the Ethiopian birr by 15 percent to boost the lagging exports.

However, according to Morrissey and Mold, (2007) African exporters respond to declining world prices by increasing the volume of exports to maintain a target revenue level. Yet, in order to increase the volume, the sector is constrained by internal and external factors.   The internal

factor is related to supply side constraint such as infrastructure and institutional barriers to trade costs followed by an overvalued exchange rate has been experienced with poor export performance. Besides the ability of the country to increase export (supply capacity) is constrained by structural rigidities in production capacity (Fugazaa, 2004).According to Kandiero and Randa,(2004) for a given level of access to international market, countries with better supply condition are expected to export more .

Ethiopia's exportable goods is dominated by primary agricultural products and semi processed agricultural products have limited access to international markets. Moreover the countries are facing declining price of primary commodities in the world market. However the countries focus was on how to solve the supply side constraint without paying much more attention to the demand side. Thus the performance of the export sector is also affected by drawbacks in accessing the foreign market such as due to tradepolicies of the foreign market such as tariff and non-tariff measures (entry barrier), the size of the foreign market and international transport costs are among the major constraint in accessing foreign market.According to IMF and WB (2002) if greater market access is granted by industrial countries to Africa's product, real incomes in SSA would increase by USD 6 per person and reduces the number of people living in poverty by as much as 13%.

Due to the above constraints Ethiopia has not fully benefited from its export potential and available market access opportunities. Yet to increase the volume and value of the export it requires good trade policies. In this regard, although there have been some studies on the export performance of the country they are not updated. Identifying the elements that significantly affect export performance should facilitate the design of policies to improve performance and ultimately the overall economic growth. Furthermore strengthening export performance through improved competitiveness can maximize its earnings from its existing, largely agriculture export base.

Thus the objective of this paper is to examine factors that determine export performance using the gravity model of trade for the period 2007 to 2017 to come up with recent changes and consistent information that inform responsible bodies for deciding a right decision in policy formulation and it is necessary to determine those factors that affect the export performance in order to draw up a sound policy lesson.

**1.3 Objective of the Study**

**1.3.1 General Objective**

➢  The main objective of this paper is to explain theoretically and asses empirically both supply and demand side factors affecting export performance of Ethiopia.

**1.3.2 Specific Objective**

➢ Examining the  structure of the  total export  within the period
➢ Assessment of the total export  performance
➢ To suggest a possible recommendation on how to improve the sector

**1.4 Significance of the Study**

Identifying the elements that significantly affect the export performance should facilitate the design of policies to improve the sector and the overall economic growth.Furthermore, strengthening export performance through improved competitiveness can maximize the foreign exchange earnings of the country. Therefore it is important to identify major factors and challenge of the country's export. Beside it is believed that the paper provides policy maker on how to boost the export sector in the country and economic growth.

**1.5 Scope and Limitation of the Study**

The scope of the study was limited to see the impact of infrastructure, Gross Domestic Product(GDP), foreign direct investment net inflow (FDI), Real effective Exchange Rate (REER),institutional quality CPI), Per Capita income of the Major destination of county i at time t, trade Policy. Infrastructure investment proxy by Logistics Performance Index (LPI) assesses the type and quality of the physical infrastructure including roads, telecommunication and ports. Institutional quality proxy by the public sector corruption perception index (CPI). Landlocked dummy (1 for landlocked 0 if not).

Furthermore the study uses eleven years data (started from 2007) was that in order to include new trading partners for Ethiopia. This makes the study up to date as much as possible. The reason behind choosing the top ten major trading partners is that they have significant role in Ethiopia's export earning while the rest have little importance. The data problem on bilateral exports is at a commodity level and the intention of the study to examine the total export

performance (groups together primary, mineral and manufacturing products) of the country and the study was not conclusive enough in terms of the exports of services

## 1.6 Organization of the Study

The study was organized under five chapters. The first chapter provides the general overview of the study .The general information included in this chapter: background of the study, statement of the problem, objective of the study, significance of the study, scope and limitation of the study as well as organization of the study. The second chapter briefly discussed related literature on the determinants of export, structure of export and assessment of performance of the export. The third chapter presented data and methodology, the fourth chapter provided result and discussion. The final chapter included conclusion and recommendation.

# CHAPTER TWO

# LITURATURE RIEVIEW

## 2.1. Theoretical Literature

### 2.1.1 Theoretical Models for Export Determination

Theoretically identifying the export performance of a country under the assumption of imperfectly substitutable goods and service, which having different quality, type and country of origin describe the realistic of export of goods and services.  King(1997) identifies different models used to explain the link between a given country's export to the rest of the world and most researchers apply to see the export performance of the country. These are the export demand model, export determination model and two- regime model.

#### 2.1.1.1 Export Demand Model

The export demand model is the simplest way of analyzing the demand side determinants of export performance of a country by assuming the supply side to be perfectly elastic. According to King(1997) the supply side either has an idle productive capacity or the economy exhibit increasing returns to scale. It also assumes that the price elasticity of  supply of exports tend to be infinity but the assumption of increasing returns to scale or the assumption of  full productive capacity does not suit the export sector of Ethiopia's export. In most developing countries most of the constraint comes from supply side factors. In addition export is highly inelastic for the commodities exported by developing countries like Ethiopia. Since the model works highly on the restrictive assumption, it cannot be taken for the establishment of the model for export performance of developing countries. Because of this the study limit from using the export demand models.

#### 2.1.1.2 Export Determination Model

The export determination model is based on the combination of export demand and export supply models that would be estimated as single equation using Ordinary Least Square(OLS). According to King (1997) the domestic demand is consider as a potential explanatory variable which helps to analyze the implication of the domestic activity over export of the country. Therefore domestic demand changes as a result of income changes.  If income increase as a

result of domestic demand it brings different changes like increase the number of people employed, increase profitability and expand capacity to produce the goods and sales the products to international market. Thus the impact of domestic demand profitability is related to exports. So theoretically including domestic demand profitability indicator in the supply equation of the export determination model is assumed to capture the supply side variables on the total export performance of the country.

### 2.1.1.3 Two Regime Model

This model are constructed on the assumption that either exporters are simply a collection of homogenous firms and or environment which they operate may exhibit fundamentally change from time to time. The exports of Ethiopia is primary commodities with little product diversification. In addition for centuries, the countries were engaged in trading of unprocessed primary commodities and the country is static in production and trade for long period. Thus the model is not fitted to explain the export sector of Ethiopia

### 2.1.2 Determinants of Export

Ethiopian export is dominated by few raw or semi processed agricultural products which have been the main contributors to the country foreign exchange earnings. This feature is expected to continue without significant change due to the overall underdevelopment of the country's economy. Generally Ethiopian export trade is constrained by two major factors; internal supply side and external market condition (Love and Turner, 2001; Redding and Vennebales, 2003; Fugazza, 2004, UNCTAD, 2005 and 2007).

### 2.1.2.1 Supply Side Factors Affecting Export

Supply side constraints are receiving an increasing attention as a constraint on lifting the export performance of most developing countries. This is one of the reason why developing country especially LDC are often unable to take up opportunities for trade under the preferential trade agreement. The major supply side factors that affect the export performance include the domestic physical infrastructure, macroeconomic environment proxy by real effective exchange rate, foreign direct investment and institution al quality proxy by corruption perception index.

### 2.1.2.1.1. Domestic Physical Infrastructure

It is believed that infrastructure plays a key role in facilitating trade, particularly with recent trade liberalization. Investment in infrastructure is vital without its upkeep and development, the costs to trade and economic competitiveness will rise. Physical infrastructure such as roads, telecommunication and access to energy contribute a lot to the export sector development as well as growth of supply capacity. Most African countries are characterized by poor transport infrastructure, which is a major obstacle to trade, competitiveness and sustainable development (UNCTAD, 2005). Due to poor internal transport infrastructure African transport costs are high making their exports expensive and uncompetitive and reducing foreign earnings from exports (UNCTAD, 2003; Matthee, Grater and Krugell, 2007). LimãoandVenables (2001) finds that the relatively low level of African trade flows is largely due to poor infrastructure. Therefore, improvements in transportation services and infrastructure can lead to improvements in export performance (Fugazza, 2004).

It has been shown that infrastructure affects trade via altering transport costs (Limão and Venables, 2001; Edwards and Odendaal, 2008). The cost of transporting goods from producers to users affects the volume, direction and pattern of trade. The cost of transportation is in turn influenced by a wide range of fundamental determinants. These include geographical features of the countries, the quantity and quality of the transport infrastructure that support transportation service. In this context, Edwards and Odendaal (2008)argue that infrastructure directly affects transport costs by determining the type of transport used(for example, the type and quality of roads determines the maximum size of trucks) and delivery time for the goods.

### 2.1.2.1.2 Macroeconomic Environment

The macroeconomic environment reflected by real exchange rate, implies the underlying relative movement of prices at home and abroad, proves to have a significant effect on the export performance of one country .The real exchange rate can be an important element in determining export growth, diversification and international competitiveness of goods produced in a country (UNCTAD, 2005). It is a key variable that requires close government supervision for the pursuit of productive gains to maintain external competitiveness. (Biggs, 2007).

Real exchange rate has a significant effect on a country's export performance (Sekkat and Vaoudakis, 1999; Mouna and Reza, 2001). Exports generate scarce foreign exchange reserves that are necessary to finance essential imports required for domestic production. The increase in export earning can also improve the balance of payment of a country.

A stable exchange rate is helpful to export expansion as well as (Mouna and Reza, 2001). The real exchange rate is often exposed to uncompetitive in low income countries by poor economic management and instability in financial markets. Thus adjusting the real exchange rate to a more realistic level means that enhancing the economy to export more and can lead to an increase in the production of export products. (De Rosa and Green, 1991; Oyejide, 2007)

The effect of exchange rate on exports depends on the price elasticity of export supply because the real exchange rate incorporate the price effect on exports. Thus the higher the price elasticity, the more competition face a particular country in the world market. In general manufacturing products have a higher price elasticity than primary products which causes manufacturing products to respond perfectly to changes in the exchange rate. In empirical literature for example (Sharma, 2001; Ahmad, 2005;Love and Turner, 2001; Edwards and Alves, 2005;Morissey and Mold, 2007;Yisak,2009; Menji, 2007) conducted the effect of exchange rate on export diversification, performance and growth. Despite mixed results in empirical works, its depreciation (appreciation) is supposed to stimulate (depress) exports from a particular country.

### 2.1.2.1.3. Foreign Direct Investment

Foreign direct investment (FDI) is another important factor affecting the export supply capacity of a country (UNCTAD, 2010). Foreign Direct Investment (FDI) can play a significant role in promoting economic development in low-income countries by serving as a mechanism through which superior technology and managerial know-how are transferred to such countries and to facilitate exporting activities generated by the FDI flows (Oyejide and Ademola, 2007).Most of the FDI specialists think that FDI had a positive impact on economic growth in the receiving countries by increasing capital stock. FDI can contribute to a more efficient use of existing resources and absorb unemployed resources and thus increase a country's output and productivity (De Gregorio, 1992; Seetanah and Khadaroo, 2007). Thus whether FDI has been contribute to export growth depends on the nature of the policy regime. Sharma (2000).

Like the theoretical views, the existing empirical studies on the role of FDI in export performance also report mixed findings. According to UNCTAD (1995, 200b), FDI can be expected to contribute to the enhancing of the country competitiveness on international market by transferring technological knowhow and increase the technological content of the export. Some of the empirical studies indicate that FDI shows a positive effect on the export performance of host countries. (Fugazza, 2004; UNCTAD, 2005; Morrissey and Mold, 2007). In contrast, others show negative relationship between FDI and exports. (Horst, 1972; Jeon, 1992; Ancharaz, 2003; Gu, Awokuse and Yuan, 2008).  Finally, Lall and Mohammad (1983) and Sharma (2000) do not see any statistically significant impact of FDI on exports. In Ethiopia case Yisak,( 2009) and Menji,(2010) not found any statistically significant impact of FDI on export.

### 2.1.2.1.4 Institutional Quality

Institutional quality is another major supply side constraint for poor performance of export. Institutional factors such as widespread corruption, inefficient bureaucracy, and high risk of expropriation of private property by government can create uncertainty among producers and discourage them from investing and innovating over the long term. This can limit the ability of producers to improve the quality of their exports in the future.

The quality of institutions affects the investment climate, which in turn affects the supply capacity of the economy (World Bank, 2004a; Munemo, Bandyopadhyay and Basistha, 2007). Poor institutional environment (i.e. higher corruption, less efficient bureaucracy and less secure property rights) is associated with poor export quality which in turn lower trade. Moreover, bad institutions reduce aggregate productivity. In relation to this, Méon and Sekkat (2006) argue that countries whose institutions result in low productivity will likely have difficulties in exporting and trading abroad.

According to Carmingani and Chowdhury (2007) institutional constraints in the Sub Saharan Africa countries were found to be the major constraining factors for poor performance of export of primary commodities.

### 2.1.2.2 Foreign Market Access Conditions

Foreign market potential of one country is the other major factor that determines export performance. Many literatures has shown that foreign market access given equal attention to

supply capacity for the country's external sector development.(Redding and Venables, 2003; Fugazza, 2004).Foreign market access is influenced by various elements. The first is the trade policies of the trading partner (market access or entry condition such as tariff and non-tariff barrier) . The second is strongly related to distance which are expected to play an important role Finally geography the structural component (whether it is landlocked or coastal) are among the major factor affecting the foreign market access of one country. Recent studies as well as reports by UNCTAD provide muchattention for market access.

### 2.1.2.2.1 Trade Policy of Trading Partner

The trade policies of the trading partners (tariff and non-tariff barrier) is one of the major factor that determine the export performance of a country. The world economy become liberalized since 1950 under the support of the World Trade Organization (WTO) the former General Agreement on Tariffs and Trade (GATT) (Thirlwall, 2000).Due to these and other trade negotiations, access to international markets has improved (Thirlwall, 2000; Fugazza, 2004). However, it is likely that there is still much to gain from further improvements in market access conditions (Fugazza, 2004).

This days non tariff barriers (NTBs) have also become increasingly important (UNIDO, 2002; UNCTAD, 2005). NTBs are related to the application of discretionary measures by importing country that products from the exporting country must have to fulfil the criteria such as technical standards, health and safety requirements and regulations (UNIDO, 2002). These barriers have had serious implications for developing countries in terms of high compliance costs and potential or actual trade losses. (UNCTAD, 2005). According to Biggs (2007) suchmarket access undermines incentives in low income countries to move into higher productivity and production of non traditional export.

Non Tariff Barrier(NTBs) affect LDC exports more than other developing country exports. For example, NTBs like environment related trade barriers affect 41% of merchandise exports of LDCs but only 21% of other developing country exports. (UNCTAD, 2007). In this regard, Whilson and Otsuki (2004) examine the impact of standards and technical regulation on the firms propensity (measured with overall market share) using 619 firms from 17 developing countries. Their result shows that testing procedures reduced export by 9 percent , difficulty in

getting information reduce the export by 18 percent and the inspection time taken by the importing country reduced their export by 3 percent. Mold (2005) estimated the potential loss of Africa's trade through the imposition of higher quality standards and phytosanitary controls and indicated that the potential loss for LDCs could run into millions of dollars. In relation to this, Kirchbach and Mimouni (2003) also note that LDCs are the most exposed toNTBs and show that while 40 percent of LDC exports are subject to NTBs, the figure for developing and transition economies is only 14 percent .

The exported commodities of Sub Saharan African countries fall under different market access schemes such as Most Favoured Nation (MFN), The Generalized System of Preference (GSP) , Everything But Arms (EBA) and African Growth Opportunity Act(AGOA)in order to ensure better access to their markets without asking for a reciprocal treatment in exchange (Kirchbach and Mimouni, 2003), with the objective of raising beneficiaries' export earnings (Paul, 2003). Even though, to some extent, the restrictive effects of tariff and non-tariff measures are mitigated by these preferential access schemes for poorer countries, these schemes are still affected by the existence of tariff peaks and tariff escalation (IMF and World Bank, 2001), and strict rules of origin (Paul, 2003; Mold, 2005).

A study undertaken by IMF and WB,(2001) shows that tariff peaks and escalation in sensitive products such as textile and clothing, agricultural products, food products, wood products,paper and pulp excessively affect the products exported by developing countries and inhibit the diversification export towards value added products. Due to these conditions, preference schemes for poorer countries have not proven to be very effective in increasing market access for targeted countries. Paul (2003) has shown that the direct impact of EBA on LDC exports has not so far been significant. The benefits of AGOA for Africa would be about five times greater if exporting countries were not subject to the restrictive rules of origin imposed by the United States. . Mattoo, Roy and Subramanian (2002).

In this regard, UNCTAD (2005) notes that the most important actions among other thing  include removing  tariff and non-tariff barriers, escalation facing items of export interest to developing countries' agricultural and non-agricultural exports. In addition to this undertaking commercially meaningful reform in agriculture, including substantial improvement in market access for

developing countries, export subsidies , substantial reduction in trade distorting domestic policies and liberalizing of services sectors helps to improve the market access of the developing country.

**2.1.2.2.2 Distance**

Distance is the other major factor that have an effect on foreign market access of one country (UNCTAD, 2005). It is an important factor in international trade relations. As distance increase, trade volumes decreases (Venables, 2001; Matthee, Grater and Krugell, 2007). For countries located far from their export markets, the effect of transport costs on trade would be high.

International transportation costs are, amongst many, of the factors that shapes the trade patterns between countries. High international transport costs can price a country out of export markets (Mbekeani, 2007) and are a key determinant of a country's ability to participate fully in the world economy and in particular to increase exports (Limão and Venables, 2001). Today, transport costs represent a significant barrier to African exports (Amjadi and Yeats, 1995; Biggs, 2007; Matthee, Grater and Krugell, 2007; Edwards and Odendaal, 2008) and account for a large component of the final cost of the export product (Biggs, 2007; Mbekeani, 2007).

Distance from economic activity increases transport costs and accounts for the poor export performance of many developing countries situated far from the major markets (Venables, 2005; Matthee, Grater and Krugell, 2007).

Other geographical characteristics include having a common border (neighbours trade more) and country area (large countries trade less); islands trade more, but landlocked countries trade less. Limao and Venables (2001) calculate that landlocked countries trade about 60% less than their coastal counterparts with otherwise similar characteristics and Clarke,Dollar and Micco (2004) report a difference of approximately one third.

In addition to the above supply and demand side factors the size of importing and exporting countries determines the total export. The size of the exporting and importing countries are the basic determinants in explaining export. Generally countries are expected to trade more as they increase in size. The size of the economy measured either by the population size or GDP. However it is believed that the GDP of one country could reflect the capacity of one countryto supply more in international market.

**2.1.3 Overview of The Structure of Ethiopia's Export**

Ethiopia is one of the emerging countries its economic growth and development is closely linked with the development of agricultural sector. As of 2017, the sector accounts for almost 35.8 percent of GDP, 81 percent of exports, and 72.7 percent of the labor force. The objective of the overview is to review the structure of Ethiopia's major export during the three different regime

The structure of Ethiopian export is dominated by primary products that account a lion share of the country's export earnings while the share of non agricultural products in total merchandise export is almost insignificant. For the past decade coffee accounted to about 80 to 90 percent of the merchandise export earnings of the country. Among the major export products coffee continues its domination over the other export item. The share of coffee is about 54.85 percent, 60.55 percent and 43.4 percent for the periods of 1963/64-1973/74, 1974/75-1990/91 and 1991/92-2017/18 respectively. The smallest share of coffee in the total export was 24.5 percent 1974/75 which is due to the problem of political instability and the largest share was 79.3 percent in 1978/79. This is due to the government's development campaign efforts. On average for the periods of 1991/92-2017/18 it accounts 43.4 percent which less compared to the 60.55 percent of the 1974/75-1990/91 of Dergue regime. Hides and skin constitute a share of 11.1 percent, 10.8 percent, and 8.2 percent for the same period. Which less compared 11.1 percent of imperial regime and 10.8 percent of Dergue regime.

The share of oil seeds and pulses was 18.75percent, 7.15 percent and 13.41 percent for the periods of 1963/64-1973/74, 1974/75-1990/91 and 1991/92-2017/18 respectively. The share of oilseed and pulses decline during Dergue regime and current regime respectively but it is high compare to Dergue regime. The share of Chat was 2.3 percent for the period 1963/64 – 1990/91 before EPRDF regime and 8.48 percent during 1991/92-2017/18 which is high compare to imperial and Dergue regime.

Using the commodity concentration index (Hirshman concentration index) for major commodities coffee, hides and skin, oilseed pulses fruit and vegetable and chat for the period 2007/08 – 2017/18 accounts averaged 75.4 percent or 0.75 indicating that the export sector is still concentrated only to few commodities. This shows that the export sector of Ethiopia is less

diversified and dependent on a single export commodity (coffee) for its foreign exchange earnings. (See table 2.1)

**Table 2.1 Share and Structure of Major Exports(% to total)**

| Product | Imperial Regime | | | DergueRegime | | | EPRDF regime | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1960/61- 1966/67* | *1967/68- 1973/74* | *1960/61-1973/74* | *1974/75-1983/84* | *1984/85-1990/91* | *1974/75-1990/91* | *1991/92-1996/97* | *1998/99-2003/04* | *2004/05-2009/10* | *2010/11-2017/18* | *1991/92-2017/18* |
| Coffee | 56.2 | 53.5 | 54.85 | 61.3 | 59.8 | 60.55 | 63.1 | 47.0 | 33.15 | 30.35 | 43.4 |
| Hides and Skin | 11.3 | 10.9 | 11.1 | 10.6 | 11.0 | 10.8 | 12.2 | 11.3 | 6.13 | 3.25 | 8.22 |
| Oil seed and pulse | 18.8 | 18.7 | 18.75 | 10.8 | 3.5 | 7.15 | 3.3 | 8.4 | 24.33 | 17.62 | 13.41 |
| Chat | 3.5 | 1.1 | 2.3 | 1.9 | 2.7 | 2.3 | 6.3 | 12.2 | 9.32 | 7.3 | 8.48 |
| Other | 10.2 | 15.8 | 13 | 15.4 | 23 | 19.2 | 15.1 | 21.1 | 27.07 | 41.48 | 26.18 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: Computed Based on Raw Data obtained from Ethiopian Revenues and Customs Authority (ERCA)

### 2.1.3.1 Share of Exports in GDP

In assessing the export performance of a country it is important to consider the share in the overall GDP. If the share is high, it can be said that the country is largely involved in export trade and is benefiting a lot from it. If it is low, this may mean that the country is less involved in the export or it does not earn sufficient revenue from what it exports. The figure below shows the percentage share of earnings from exports in the total GDP of Ethiopia.

**Fig 2.1.**Share Exports **to GDP**
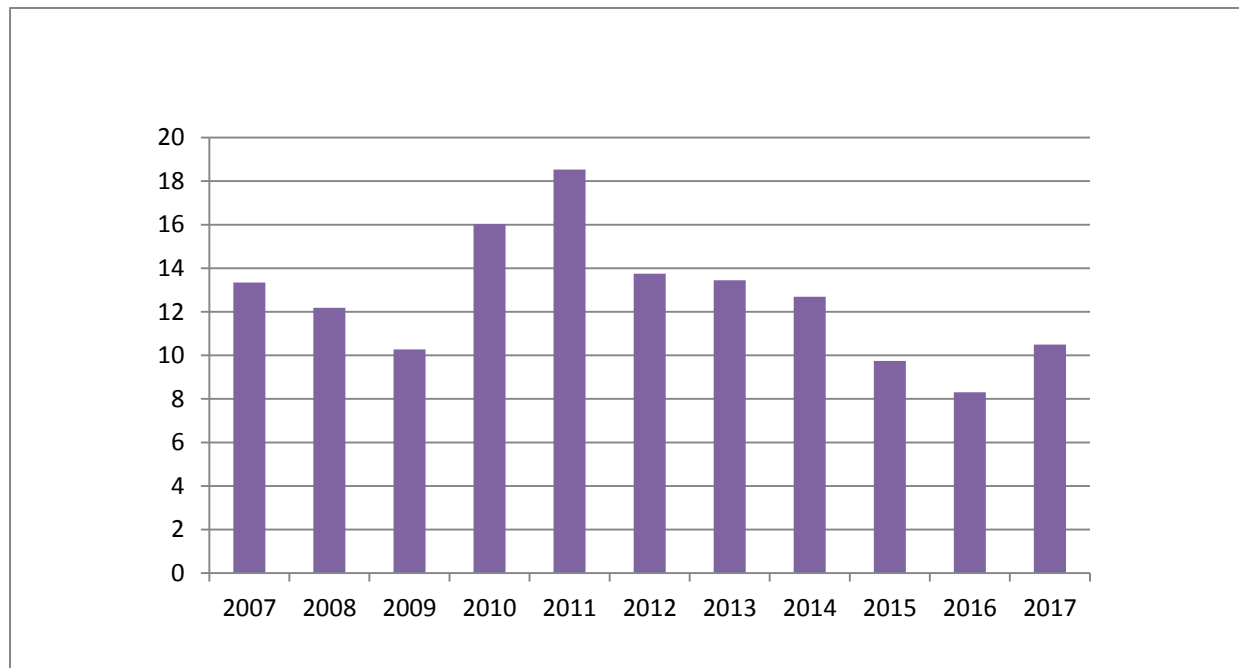


The average value of the share of Ethiopia export to GDP during that period was 12.61 percent with a minimum of 8.30 percent in 2015/2016 and a maximum of 18.53 percent in 2011. During 2015/2016 the share of export to GDP is low    due to a fall in global commodity prices is the main reason.

## 2.1.3.2 Major Export Commodities of Ethiopia

Generally, the fact that Ethiopia's export is mainly dependent on few primary commodities has worsened the vulnerability of receipt instability from merchandise export. The export receipt from five commodities, namely coffee, vegetable products, oilseeds and Pulses, Chat precious and semi precious metals and meat has accounted the lion share that any effect on these dominant commodities' price could adversely affect the export revenue.

The importance of the export products in the country's overall export can be observed from their contribution in terms of volume of export and their share in the total export earnings. The following table indicates the respective share of export earnings.

During the study period 2007- 2017, coffee has been the largest export earningitem of Ethiopia's export; both in terms export volume (quantity) and export earnings. However, its share has tended to fall during recent years accompanied with slight diversification towards other export

products.   Vegetables and fruits, Oilseedand pulses, hides and skins, chat, meat and meat products, live animals, and gold constitute the other major export products of the country.

**Table 2.2Major export commodities in Ethiopia from 2007-2017**

| The Top 10 Exported Item(Consolidated) | Share of  Export Earnings | | | | | | | | | | | Aver |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2007-2017 |
| Coffee not roasted or decaffeinated | 36.3 | 35.86 | 23.66 | 31.23 | 33.93 | 33.22 | 24.56 | 27.53 | 29.74 | 28.95 | 33.64 | 30.78 |
| Oil seeds & pulses | 12.62 | 16.15 | 23.72 | 14.82 | 14.10 | 17.81 | 19.78 | 22.40 | 16.73 | 19.76 | 15.59 | 17.58 |
| Vegetable | 8.38 | 13.97 | 18.17 | 17.55 | 15.93 | 17.57 | 20.85 | 19.02 | 18.40 | 20.14 | 18.81 | 17.16 |
| Chat | 6.94 | 7.75 | 9.31 | 7.09 | 7.32 | 6.73 | 7.24 | 6.67 | 8.06 | 8.26 | 7.75 | 7.55 |
| Gold | 4.70 | 5.01 | 5.75 | 7.90 | 5.07 | 6.64 | 6.41 | 5.44 | 5.79 | 4.49 | 4.39 | 5.59 |
| Meat products | 1.07 | 1.76 | 1.61 | 2.13 | 2.95 | 2.65 | 2.80 | 2.71 | 3.53 | 3.58 | 3.39 | 2.56 |
| Raw hides &skins | 7.31 | 5.68 | 2.64 | 2.88 | 4.69 | 3.08 | 3.90 | 3.01 | 3.24 | 2.58 | 2.61 | 3.78 |
| Live animals | 3.18 | 2.90 | 3.83 | 5.68 | 7.28 | 6.54 | 6.98 | 5.68 | 5.95 | 3.47 | 2.16 | 4.87 |
| Textile and apparel | 0.91 | 1.12 | 2.64 | 1.35 | 0.46 | 0.51 | 1.08 | 1.1 | 1.44 | 2.2 | 3.55 | 1.48 |
| Other | 18.59 | 9.8 | 8.67 | 9.37 | 8.27 | 5.25 | 6.40 | 6.44 | 7.12 | 6.57 | 8.11 | 8.59 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

*Source: Own Calculation of Data from ERCA*

In terms of the composition of exports coffee continues to dominate the export earnings of the country around 30.78 percent on average. During the study period oilseeds and pulses and vegetablescan be ranked as the second and third item for the export earning of the country around 17.58 and 17.16 percent respectively on average. The export earnings of other non coffee exports also increasing  among these chat  7.75 percent ,  gold  5.59 percent, meat products 2.56,hides and skin 3.78 percent ,live animals 4.87 percent and textiles around 1.48 percent on average.

### 2.1.3.3 Major Destinations of Ethiopia's Exports

As illustrated in Figure 2.2 during the period under the study, on average China has been the major destination of Ethiopia export items which account for 10.87 percent of Ethiopia export. Other major destination in the period and in order of importance include Somalia 9.16 percent, Germany 8.92 percent, Saudi Arabia 6.89 percent, Netherland 6.13 ,USA 5.79 percent,

Switzerland, 5.29 percent ,United Arab Emirates 3.62 percent, Djibouti 3.35 percent and Japan 2.87 percent. These countries which overall constituted the top ten destination of Ethiopia's export accounted about 63.78 percent of the total export that the country has made during 2007 to 2017 based on simple average.

**Fig 2.2 Top Ten Destination of Ethiopia's Export During 2007-2017**
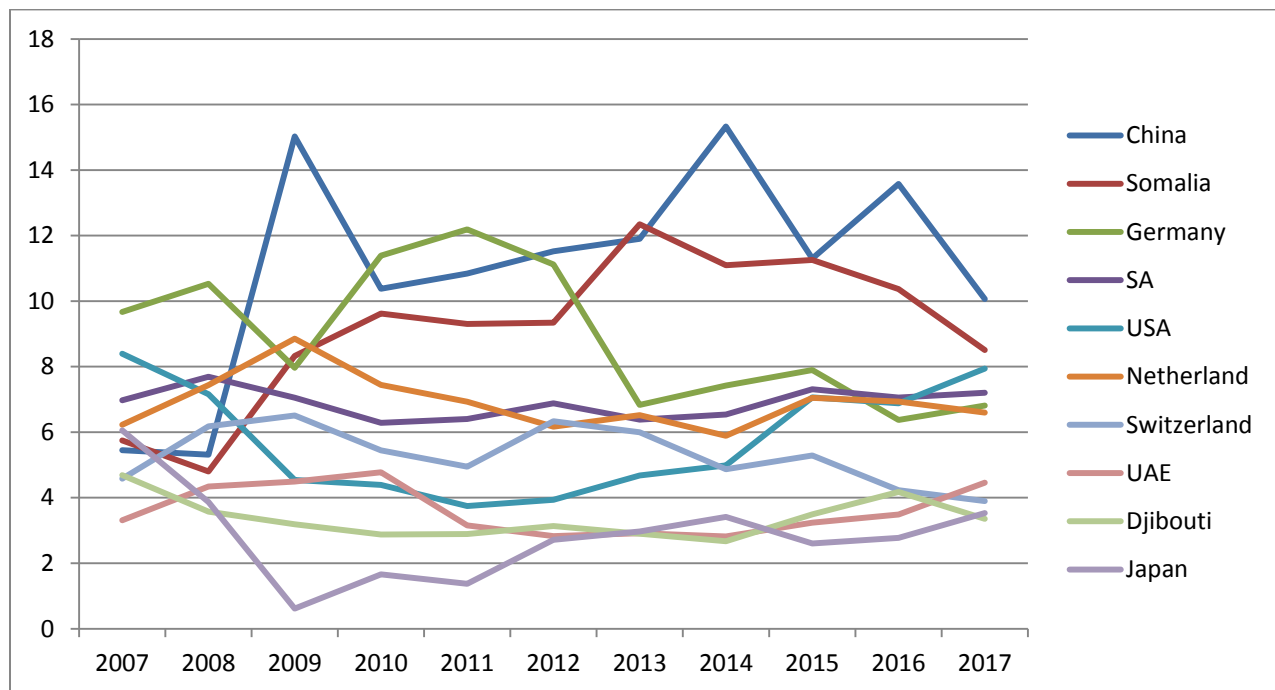


## 2.2Empirical Literature

Wide ranges of empirical studies carried out to analyze the determinants of bilateral trade flows of African countries as well as the performance of regional trade blocks in Africa, using the gravity model framework.Many of these works have tried to examine the trade potential, trade determinants, trade direction and trade enhancing impacts.

Alemayehu (2009) investigated the nature of the potential for intra-Africa trade and hence the prospects for advancing regional economic integration. His study used the gravity model on panel data of African countries and their major trade partners around the world (2000 to 2006). The estimated coefficients of the model were used to simulate the potential for intra-Africa trade. According to his finding the existence of a potential for intra-Africa trade (about 63% weighted average for Central and Western Africa region, and some 60% for Eastern and Southern Africa region).

More recently, Africa-China trade potential was assessed by Matias (2010), by applying a combination of methodologies i.e.stochastic frontier gravity approach and trade complementarily index. For the former case, the study utilized a panel data of Chinese exports to the African countries over the period 2001–2008. Matias (2010) estimated using a stochastic gravity model, incorporating random disturbance and inefficiency terms. The estimated model was then used to calculate trade efficiency and potential of China with 52African countries. Accordingly, China has realized on average only 13% of its export potential with African countries. Seychelles, Sao Tome and Principe, Comoros, Central Africa Republic, Chad and Equatorial Guinea are partners with which China had the lowest trade efficiency (high export potential).

Using a gravity framework Mulugeta (2009) investigated the determinants of Ethiopia's export and import flows. Based on the panel dataset of major trade partners, estimation was done with fixed effects model. The finding was that income and distance variables, infrastructure as well as institutional qualities were among the basic determinants. Hussein (2008) analyzed the impact of COMESA membership and other factors on the flow of Ethiopia's exports. The study takes in to account the flow of annual exports to twenty destinations over the period 1981–2006. He used a Tobit specification with random effects to estimate the gravity model. Estimation results demonstrate that most traditional variables are significant, while the impact of COMESA membership to create or divert exports was negligible. The latter finding seems consistent with what Alemayehu and Haile (2007) have found regional groupings in Africa had insignificant effect on the flow of bilateral trade.

Yishak, (2009) employed a gravity model using 30 Ethiopia's trading partners for the period 1995–2007. The model was estimated by applying the Generalized Two Stages Least Squares technique. Ethiopia's exports were assumed to depend on its GDP, importer's GDP, FDI, internal transport infrastructure, real exchange rate, foreign trade policy index, institutional quality index and the weighted distance between Ethiopia and her trading partners. Growth in domestic national income, good institutional quality and internal transport infrastructure were found to significantly determine Ethiopia's export performance. With respect to foreign market access conditions, the results indicated that distance and import barriers imposed by Ethiopia's trading partners do play an important role in determining the volume of Ethiopian exports.

Gebrehiwot (2011) utilised a dynamic gravity approach on a panel dataset of sample countries and estimated by GMM estimators to analyze the trade pattern of Ethiopia. He concluded that all the traditional gravity variables (GDP's and distance) are significant with expected signs. On the study it was found that considerable part of the country's potential trade has remained unrealized. The magnitude of trade potential was found the highest with Asian, European and the African countries as a continent.

Semunigus, (2015)empirically examined Ethiopia's bilateral trade performance using the gravity trade model for twelve key trading partners and IGAD member countries.Ethiopia's exports were assumed to depend on the size of Ethiopia's economy (GDP), distance between Addis Ababa and the centers of key trading partners, per capita income of trading partners, real effective exchange rate and common border. The study shows thata 1 % change in the Ethiopia's gross domestic product leads to 1.4 % increase in its exports to major trading partners. While a 1%increase in nautical miles (across countries) resulted in a decline of 2.4% in Ethiopia's exports. The study also show that 1%change in per capita income of major trading partners leads to 1.8%growth in Ethiopia's exports to these countries. As the per capita income of these countries increases, their demand for goods concomitantly increases and the import of these countries rises benefiting Ethiopia which is one of their trading partners.

Yeshineh,(2016) employed the augmented gravity model to analyse Ethiopia's trade with its main trading partners using the panel data estimation technique. Estimations of the gravity model for export, import and total trade (sum of exports and imports) are carried on. The estimated results show that the major determinants of Ethiopia's exports are: size of the economies (GDP's of Ethiopia and that of partner), partner countries' openness of economies, economic similarity and per capita GDP differential of the countries. All these factors affected Ethiopia's export positively except similarity indicator. The exchange rate, on the other hand, has no effect on Ethiopia's export trade.

To sum up most of the reviewed literature emphasized on the determinants of the performance of Ethiopia's total trade. In fact in recent times, the need to increase trade performance has been indispensable for a country to grow but for countries like Ethiopia strengthening the export sector is fundamental to fill the foreign exchange gap of the country.

# CHAPTER THREE

## 3. DATA DESCRIPTION AND METHODOLOGY

### 3.1 Source and Nature of Data

**Data Source**: to attain the above objectives this study utilizes secondary data which collected from different sources depending of the availability of data and interest of the study. The research paper uses balanced panel data for the period 2007 to 2017 for ten major trading partner countries based on its relevance. All monetary values are measured in dollar at the current price. Distance in miles between the capital cities are from the website http://www.indo.com/distance/

### 3.2 Model Specification

#### 3.2.1 Gravity Model of International Trade

In its basic formulation, the gravity model explains bilateral trade flow in analogy to Newton Law of Gravity which states that the attraction of two countries "masses" (measured in terms of GDP or population) reduced by distance (which is a proxy to transport costs). (Rahman,2006). Gravity model is a very popular econometrics model and extensively used in international trade because of its considerable empirical robustness and explanatory power. Since their introduction in the 1960's, gravity models has been used for assessing trade policy implications and, particularly recently, for analyzing the country's performance in the bilateral trade flows based on the economic sizes often using GDP measurements and distance between two units.

The model was first introduced in economics world by Walter Isard in 1954. However, Tinbergen (1962) was the first to systematically model how the international flow of goods can be determined by economic sizes of trading partners and the distance between them. The intuitive model for trade between two countries (*i* and *j*) takes the form of.

$$\text{Xij} = K * \frac{Yi^{\alpha} Yj^{\beta}}{Dij^{\theta}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Where *Xij* is the total value of exports that country i obtained by exporting goods from country j. *Yi and Yj* is the economic size approximated by gross domestic product and *Di* is the physical

distance between country i and country j. K is the gravitational constant, while α, β and θ are parameters, and a priori signs of α and β are positive while θ is negative.

Despite early criticism of Tinbergen's (1962) original application of the gravity model in terms of its lack of theoretical underpinning, recent developments in trade theory have strengthened the theoretical basis for the gravity model, confirming its usefulness in empirical testing of bilateral trade flows (Baldwin and Taglioni, 2006). In fact Anderson (1979) derives the theoretical foundation based on the constant elasticity of substitution (CES) preference and goods that are differentiated based on their origin. Subsequent works by (Krugman and Helpman, 1985Bergstrand 1989; Deardoff, 1995) have greatly contributed to the establishments of theoretical basis for the gravity model by showing that the gravity model is derived from different international model. (Sohn, 2001).

Anderson(1979), Krugman and Helpman (1985) tried to identify the relationship between bilateral trade flows and the product of the two countries GDP by utilizing the differentiated product model, Deardoff (1995) has shown that the gravity model can be derived from monopolistic competition or Heckscher - Ohlin structure to explain specialization.

Standard gravity models assume that the volume of trade between two countries is positively related to the size of these economies as measured by GDP and negatively related to the trade costs between them. A number of variables are normally used to capture trade costs. These include whether a country is landlocked or an island economy, the distance between the exporter and importer, as well as various 'dummy'variables that indicate whether the country pair belongs to a regional trade agreement, or shares a common language, border or colonial heritage with its trade partner. The methodology will argue the 'standard' gravity model with policy variables that proxy the institutional environment and assesses their relative importance in determining export performance.

## 3.3 Theoretical Framework for Modeling Export Performance

The theoretical framework in this study is based on the work of Redding and Venables,(2003) ,Fugazza,(2004) and UNCTAD (2005) constant elasticity of substitution(CES) utility function which entail the elasticity of substitutions between any pair of products is the same (elasticity of demand is identical across varieties). In that case the range of products produced in each country

i and the demand for differentiated products by country j is modeled by constant utility function as:-

$$U_j=[\sum n_i X_{ij}^{(\delta-1)/\delta}]^{\delta/(\delta-1)}) \delta>1 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Where $U_j$ is the utility function of country j; $\delta$ represent the elasticity of substitution between any pair of products; $n_i$ refers to the varieties of products produced in country I; $X_{ij}$ is the consumption in country j of a single product from a variety of the set.

In this framework, the demand in country j for each variety of products given by;

$$X_{ij}=P_{ij}^{-\delta}E_jG_j^{(\delta-1)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Where $G_j=[\sum n_i P_{ij}^{(1-\delta)}]^{1/(\delta-1)}$ refers to the price index defined over the prices of individual varities($P_{ij}$) produced in i and sold in j; $E_j$ is country's j total expenditure on differentiated products. It is assumed that the producer price $P_i$ is the same for all varities produced in country i. Transport cost , which reflect the cost of getting a goods from country i to country j are set proportional to producer price. This cost include the cost of getting this product from country i to country j($t_i$ and $t_j$) respectively and the cost of getting the product to and from the border($T_{ij}$). While intra country cost($t_i$ and $t_j$) would reflect the internal geography , infrastructure and inter country cost ($T_{ij}$) would reflect external geography and policy barrier. Hence, $P_{ij}=P_it_iT_{ij}t_j$ refers to the cost of delivery of a product from country i to market j. Thus the value of total exports of country i to country j , therefore takes the form

$$n_ip_ix_{ij}=n_ip_i^{1-\delta}(t_iT_{ij}t_j)^{1-\delta}E_j G_j^{1-\delta} \ldots\ldots\ldots\ldots\ldots\ldots\ldots..(3)$$

Equation 3 converted to bilateral trade flows by supporting the gravity model. This equation can be written as

$$n_ip_ix_{ij}= [n_i (p_i t_i )^{1-\delta}](T_{ij})^{1-\delta}[E_j (G_{j/} t_j )^{\delta-1} \ldots\ldots\ldots\ldots\ldots(4)$$

The right hand side of equation 4 contains both importer and exporter country characteristics. The term $n_i (p_i t_i)^{1-\delta}$ reflect the supply capacity of the exporting country. The middle term $(T_{ij})^{1-\delta}$ represent the external geography and policy barriers. The last term $E_j (G_{j/} t_j )^{\delta-1}$ refers to market condition of country j, it depends on total expenditure of country j ,internal transport cost and the

number of competing varieties and their price expressed in the price index. Thus representing SC as supply capacity, so it becomes

$$SC= n_i (p_i t_i)^{1-\delta}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(5)$$

MA indicates the market access condition and become

$$MA= E_j (G_{j/} t_j)^{\delta-1}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.(6)$$

Thus from equation 4 bilateral trade flows is a product of exporter supply capacity and importer market condition and the term $T_{ij}$ represent the bilateral trade costs between them

$$n_i p_i \sum x_{ij}= [SC] (T_{ij})^{1-\delta}[MA]\ldots\ldots\ldots\ldots\ldots\ldots\ldots(7)$$

Thus considering the total country's export performance, the total values of export at the country level can be expressed as

$$X_i=SC_i * FMA_j\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.(8)$$

Where $X_i= n_i p_i \sum x_{ij}$ and $FMA= \sum(T_{ij})^{1-\delta}MA$

Based on the above theoretical model it is possible to distinguish between foreign market access and supply capacity determinates ofEthiopia's export performance using bilateral trade information between Ethiopia and its major trading partner. Thus the value of total exports of Ethiopia to all destination is given by:

$$X_{ij}= f(SC_i,FMA_{ij})\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(9)$$

Where $X_{ij}$ is the total values of exports from Ethiopia (Country i) to its major trading partner (country j), $SC_i$ is Ethiopia's supply Capacity and $FMA_{ij}$ represent the market access condition for Ethiopian exports by Ethiopia's trading partner. In the literature review the determinates of country's export performance is discussed and integrated in to this model.

The supply capacity of Ethiopia's export isdepends on the domestic physicalinfrastructure captured through the logistics performance index(LPI),the real effective exchange rate, the technological environment captured through FDI and corruption perception index as a proxy to institutional quality .

$$SC_i = f(GDP_i, LPI_i, REER_i, FDI_i, CPI_i) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (10)$$

For a given point in time theforeign market access variable is given by

$$FMA_{ij} = f(GDP_j, \sum(T_{ij})^{1-\delta}), \text{ where } \sum(T_{ij})^{1-\delta} = f(DIST_{ij}, FTP_j)$$

Foreign market access contains the importing country's j characteristics such as economic size, per capita income and factors related to trade costs such as international transport costs proxied by distance (DIST), foreign trade policy (FTP) barriers ( tariff and NTB's) major trading partners proxided by trade openness of major trading partner and geographical characteristics whether the country is landlocked or not .

$$FMA_{ij} = f(PCY_j, OPEN_j, DIST_{ij}, LNDLCDummy,) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (11)$$

Thus, the general model to analyze Ethiopia's export performance over time is specified as:

$$\ln X_{ij} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln LPI_{it} + \beta_3 \ln PCY_{jt} + \beta_4 \ln FDI_{it} + \beta_5 \ln REER_{it} + \beta_6 \ln OPREN_{jt}$$
$$+ \beta_7 \ln CPI_{it} + \beta_8 DIST_{ijt} + \beta_9 LDLCDummy + + \varepsilon_{ijt} \dots\dots\dots\dots\dots (12)$$

## 3.4 Definition of the Variables

1. **Export (Xijt):** The total values of Ethiopian exports to each of the ten trading partners.(In USD million) at time t.

2. **Gross Domestic product (GDPit):** thesize of the exporting countries which is reflected by the GDP or population is the basic determinants in explain export since exports should be affected by the growth in domestic income. The GDP of the domestic economy is believed to reflect the capacity to supply exporting goods. A high level of GDP reflect a high level of production in exporting country .Thus the variables are expected to have positive sign.

3. **Infrastructure (LPIit):** It is believed that infrastructure plays a key role in facilitating trade .In this study logistics performance index represent the quality of trade and transport related infrastructure of Ethiopia at time t such as ports, railroads, roads, information technology at If countries with a better quality of infrastructure are expected to supply more thus the variables are expected to be positive.

4. **Percapita Income ofTrading Partner (PCYjt)**: represent the per capita income of the trading partners of Ethiopia (country j) at time t.The per capita GDP is a variable that is indicative of the consumers income level determining the purchasing power of the consumers

in the trading partner (country j). It is expected that $\beta 3 > 0$, to confirm that the higher the income of consumers the more goods they can purchase, ceteris paribus

5. **Foreign Direct Investment (FDIit)**: FDIit represents foreign direct investment stock in Ethiopia (in USD million) at time t. It is one way of increasing the economic capacity of a nation, which implies that successive attraction of foreign direct investment would result into enlargement of the exporting capacity. Thus the expected sign of $\beta 4 > 0$.

6. **Real Exchange Rate (REERijt);** is the real bilateral exchange rate between Ethiopiaand her trading partner j at time t. It is believed that appreciation/depreciation of exchange rate could have suppress /encourage exports. Thus in this study the expected sign of exchange rate either be positive or negative.

7. **Openness (OPENjt)**: Degree of openness of an economy determines the countries freedom to pursue economic policies of its choice and the exposure of the country to international economy. It is a measure of the extent to which an economy depends on trade with other countries or regions i.e the ratio of the sum of total imports and exports to GDP. Thus the trade policies of the trading partner country j at time t are captured through degree of openness. The expected sign of openness will be either positive or negative.

8. **Institutional Quality ($IQ_{it}$):-**The quality of institutions affects the investment climate, which in turn affects the supply capacity of the economy. In this study the quality of institutions is captured through theperceived level of public sector corruption index at time t. The index uses a scale of 0 to 100. Where 0 is highly corrupt and 100 is very clean.A country with better institutional quality have better supply capacity for export. Thus the variable is expected to be positive.

9. **Distance (DISTijt):** It is the distance between the two nations, which means the geographic distance between Ethiopia and the trade partner nations. Thus, having long distance between Ethiopia and its trading partner would directly result into high cost of transportation and then there will be reduction in the demand of foreigners to our products, which implies this variable is expected to have negative effect on the export. Data on the distance between Ethiopia and her trade partners are collected based on the distance between Addis Ababa and capital at Ethiopia's trading partners. These data are available from www.indo.com/distance.

10. **Landlocked (LDDummyijt):** Due to the remoteness, landlocked countries are dependent on neighboring transit countries for their external trade and suffer from high transaction cost.

Ethiopia is a landlocked country dependent on neighboring transit countries for their export trade and suffers from high transaction costs which discourages and reduce the country's export.

## 3.4 Techniques of Estimation

It is important to know the nature of the data in order to determine techniques of estimating the model. For having this we start to checking the stationary of the variables, diagnostics test (i.e.test of assumption of classical linear regression model) such as test of normality, multicolliniarity, hetrosecedesesity and autocorrelation assumption. Finally based on the Hausman test fixed and random effect model selected and estimation result will explain according to STATA output.

# CHAPTER FOUR

## 4. RESULT AND DISCUSSION

The determinants of export are identified and the models are developed based on the economic theory in methodological part of this study. The organized data were estimated based on the panel model which includes both cross sectional and time series observation for ten major trading partner over the period 2007 to 2017. In this chapter the organized data were presented and important correlation and regression results were discussed. Accordingly, first fixed versus random effect model test was made and this help to identify which model is appropriate for the data, second the classical linear regression model/CLRM test or diagnostic test were made, correlation analysis between variables and the descriptive statistics of dependent and independent variables were followed. The results of fixed effect panel data regression model and detail discussion were presented.

### 4.1 Hausman Specification Test

The specification test devised by Hausman(1978) is used to test the orthogonally of the random effects and the regressor's and choose between random and fixed effects which was based on the null hypothesis in favor of random effect model estimator. When the test is made it is important to see the p-value because the decision was made on the basis of this value, accordingly the p-value is higher than 0.05 percent (it is insignificant) hence random effect is preferable or where as p-value is lower than 0.05(it is significant) fixed effect is preferable. (Gujirati,2004).

Table 4.1 Test for choosing fixed versus random Effect model.

| Test for model one: H0: RE model is appropriate. H1:FE model is appropriate | | | | |
|---|---|---|---|---|
| Test Summary | Chi-sq (statistics $X^2$) | Chi-sqdf | Prob. | Appropriate Model |
| Cross-Section Model | 34.28 | 7 | 0.0000(*) | Fixed Model is Appropriate |

*Source:- own computation using STATA result. The * indicate that reject the null hypothesis of random effects model is appropriate than the fixed effect model at 1 % level of significance.*

From the above table this study uses fixed effect estimation model. Because if p-value for the test is less than 5 % we can reject the null hypothesis of random effects model is appropriate

indicating that that the fixed effect specification model is preferred. So the cross section fixed effect model is appropriate for the specified model.

## 4.2 Panel Unit Root Test

Panel unit root test emerged from time series unit root testing. The major difference to time series test of unit root is that we have to consider the asymptotic behavior of both time series dimension T and cross section dimension N. using STATA we can implement a variety of tests for unit roots or stationarity in panel datasets using the command xtunitroot. The Levin- Lin-Chu (2002), Harris-Tzavalis (1999), Breitung(2000, Breitung and Das,2005),Im-Pesaran- Shin (2003), and Fisher Type (Choi 2001) test have the null hypothesis that all panels have contain a unit root. The Hardi(2000) Lagrange Multiplier(LM) test has the null hypothesis that all the panels are (trend) stationary. Options allow you to include fixed effects and time trends in the model of data-generating process.

The assorted test make different asymptotic assumption regarding the number of panels in your data set and the number of time periods in each panel. The majority of the test assume you have a balanced panel data set, but the Im-Persaran and Fisher-Type tests allow for unbalanced panels. In this study we use the summary for all variables using STATA .the result (Annex 3) shows that we reject the null hypothesis of the variables non stationary or presence of panel unit root

## 4.3 Testing Assumption of Classical Linear Regression Model (CLRM)

After choosing whether the fixed or random effect is appropriate for the study, the next step was testing for the assumption of CLRM. This was important to make sure that the data and the model fit with classical linear regression model assumption. Hence the assumption of CLRM was tested to know whether the data and the model for this study was fit or not with the assumption.

### 4.3.1 Test for Normality Assumption

One of the assumption of CLRM is that whether the disturbance term are normally distributed or not. Accordingly the test were applied either graphical or numerical method. The graphical method include stem- and- leaf plot,scatterplot,box-plot, histogram, probability-probability (P-P) plot and quantile- quantile(Q-Q) plot. While the numerical method include tests like the Sharpiro

–Wilk, Sharpiro- Francia and Skewness and Kurthosis test. If the residuals are normally distributed, the histograms should be bell shaped and skewed around the mean. Skewness measure the extent to which the distribution is symmetry around the mean. While kurthosis measure the extent to which how large the tail of the distribution are. The result of Skewness and Kurthosis test for normality (Annex 4) shows that the calculated p value for all variable in the specified model is close to zero and hence we reject the null hypothesis of normality, which states the variables are not normally distributed at one percent level of significance. Using the Sharpiro –Wilk and Sharpiro- Franciatest for normal data (Annex 4) also shows that p value for all variable in the specified model is close to zero and hence we reject the null hypothesis of normality, which states the variables are not normally distributed except on the landlocked.

### 4.3.2 Test for Multicollinearity Assumption

A Correlation is the extent to which a certain variable is related to the other. The multicollinearity test is conducted to identify the correlation between the explanatory variable and helps to avoid the double effect on independent variable. The problem of multicollinearity arises when certain explanatory variables are highly correlated.

If there is mullticollinearity in the model, the estimated coefficient possess large standard error (in relation to the coefficient themselves) which means the coefficient can not be estimated with great precessions and accuracy.(Gujirati,2004). To alleviate this problem one or more correlated variable are dropped from the model. (Verbeek, 2000).Cooper and Schindler (2009) and Hailer (2006) suggested that multicollinearity problem should be corrected when the correlation extent to be above 0.8 and 0.9 respectively. Hair et al(2006) correlation coefficient below 0.9 may not cause serious multicollinearity problem. In this study to check the presence of multicollinearity in the model we have used the variance covariance matrix presented in the annex 5.

### 4.3.3 Test for Hetroscedasiticity Assumption

The hetroscedasiticity assumption is one of the CLRM assumption and it is assumed that if the variance of the error term is not constant it is said to be hetroscedasiticic. Assuming the homoscedasicity disturbances, when the presence of hetroscedasiticity will result in consistent estimates of the regression coeffiecient, but this estimates will not be efficient. The loss of efficiency will lead to biased standard error and hence the inference from the estimate becomes

invalid. In this study the BreushPagan(1980) test for hetroscedasicity is used . Under this test, the null hypothesis is the error term is homoscedasicity while the alternative hypothesis is hetroscedasicity of the error term. The BreushPagan test can be computed by multiplying the $R^2$ of an auxillary regression obtained from regressing the square of the residual on the explanatory variables by N(T-1). The resulting test statistic would have a chi-square distribution with J degree of freedom where J represent the number of explanatory variables used in the regression.

Table 4.2Hetroscedasiticity Test Result

| H0:Homoscedasitic residual<br>H1:Hetroscedasiticity | | |
|---|---|---|
| Model | Chi^2(9) | Prob> Chi^2 |
| LnExp | 8.64 | 0.5663 |

From results of Breush Pagan –Godfrey test if the p value is less than 5 % indicating that presence of hetroscedasiticity. The null is homoscedasitic (constant variance). Thus from the above table we accept the null hypothesis of homoscedasitic (constant variance).

### 4.3.4 Test for Autocorrelation

The covariance between two consecutive error terms i.eCov(ui.uj)=0 we can say that the error term is subject to autocorrelation(Veerbek,200). This is the other assumption made by the CLRM where the covariance between the error term over time (or cross-sectionally, for the type of data) is zero. In other words, it is assumed that the error term is uncorrelated with one another. If the errors are correlated with one another, it is stated that they are auto correlated or that they are serially correlated. The most common test of this include Durbin-Wastontest,Pasaran CD test and Breusch Godfrey test.

In this study Woodrige test of autocorrelation for panel data and the Durbin-Waston (DW) statistics were used to test the presence of autocorrelation. The null hypothesis is that the panel data are no first order autocorrelation while the alternative is the not. The resulting test statistic shows that p- values is zero implying that data have first order autocorrelation so we can reject

the null hypothesis. Hence in order to solve the first order autocorrelation, lagged values of residual are used to remove the individual effect.

## 4.4 Result and Discussion

After analyzing the various econometric issue that has taken in to consideration, the estimation technique which result in consistent and unbiased estimates is selected. In this study a fixed effect estimation technique is chosen because the estimation technique yields efficient and consistent result.

The regression result have their own implication, and hence the coefficient indicates each variable's level of influence on the dependent variable which may has a coefficient of positive or negative results.

In order to see the implication of both demand and supply side factors of the export performance the study uses fixed effect model. As table annex 7 shows a number of variable are found to be statistically significant with their estimated sign. As per the STATA output, the most important determinant of the export performance in Ethiopia are the per capita income of the trading partner, degree of openness and corruption perception index. The estimated equation of the real values of export canbe written as:-

*lnExp= 0.5343lnGDPit +0.1354lnLPIit+0.0046lnFDIit+0.0214lnREERijt+1.7446lnCPIit*
*(0.23)        (0.22)              (0.91)     (0.58)          (0.00)*
*+0.9202lnPCIjt  +0.9662lnOPENjt*
*(0.00)                (0.00)*

Regarding supply side variables all the variables except corruption perception index (CPI) are found to be statistically insignificant. GDP affect export positively but insignificant which means GDP has no contribution to the sector. This is may be due to crowding out effect. Infrastructure (LPI) have positive contribution to the export sector but it is insignificant this may be due the type and quality of the prevailing infrastructure. FDI have positive and insignificant effect on export. This is may be due to the fact that many of the countries agricultural and manufacturing projects are oriented to the domestic market.The effect of REER is positive but insignificant which contradicted to Semunigus(2015) and similar to Yishak (2009). This may be due to the fact that depreciation of real exchange rate is little to enhance the countries competitiveness in

international market. This is because of the fact that Ethiopia export agricultural products which is not dynamic and responsive to world price.

The variable institutional quality (CPI) entered with positive sign at 5 % level of significance. The positive coefficient of the variable indicates that, Ethiopia export's depends on the quality of institution (perceived level of corruption). Holding other things constant, a 1% improvement of Ethiopia's institutional quality would result a 1.74 percent of exports to its trading partner.

The result also shows that on the demand side the degree of openness would have positive and significant effect on the export performance of Ethiopia. A 1 % improvement in trade policy (openness) of the trading partner would increase Ethiopia's export tothese countries by 0.97percent. As the per capita income of the trading partner increase by 1 percent, Ethiopia export to these countries would increase by 0.92 percent. As the per capita income of these countries increase, their demand for goods and the import of this countries rise since Ethiopia is one of their major trading partner.

# CHAPTER FIVE

## 5. CONCLUSION AND RECOMMENDATION

### 5.1 Conclusion

Despite thedifferent measures undertaken by the current government, Ethiopia's share in the world market is still very low accounted 0.013 percent in 2016. (WTO, 2017). This study has attempted to identify the factors that contribute for poor export performance of Ethiopia. The study is based on the work of Redding and Venebales,(2003), Fugazza,(2004) and UNCTAD(2005) in order to decompose export performance of individual countries in to supply capacity and foreign market access condition. In order to achieve the above objective an econometric gravity model of bilateral trade flows between Ethiopia and its trading partners has been  specified and tested using annual data of Ethiopia and its major trading partner. The paper used the total value of export ( in millionUSD) is used as dependent variable and nine independent/explanatory variables are selected as supply and demand side factors. After checking the basic econometric issue the fixed estimation technique were preferred as it is a consistent and efficient estimator.

The result from the empirical analysis indicates that from the supply side factors only institutional quality (corruption perception index) found to be statistically significant. The other supply side factors such as infrastructure (LPI), GDP, FDI and REER are found to be statistically insignificant. LPI affects export positively but insignificant due to the type and the quality of the infrastructure available in the country. GDP affect the export sector positively but insignificant due to crowding out effect. REER is insignificant for export performance due to the fact that depreciation of currencies would have little impact on the countries international competitiveness.

The foreign market access condition also play a significant role in Ethiopia's export performance. The result suggest that the per capita income(PCY)and trade policy of the trading partner degree of openness (OPEN) would have positive and significant effect on Ethiopia's exports.

Many studies indicate that both supply capacity and market access condition would have given equal emphasis as long as the foreign market access condition affects the country's export.

**5.2 Policy Implications**

Thus these findings carry out some policy implication

➢ Many studies indicate that GDP is the major source for increasing the capacity of exports. But in this study GDP has insignificant effect on Ethiopia's export. This may be due to crowding out effect in the sense that many of the government projects enjoy the priority in the allocation of foreign currency limited private sector investment in accessing the foreign currency in different sectors that adds to GDP. Thus there should be a system that fairly allocate the foreign currency of a country.

➢ It is believed that depreciation of a countries' real exchange rate will cause a gain in international competitiveness of one country. In this study depreciation of exchange rate would not affect the competitiveness of Ethiopia's export in international market. This is because Ethiopia exports are primary agricultural goods which is not dynamic and responsive to world price Thus in order to be competitive enough through guaranteed and sustainable way it is required to diversify the exportable goods.

➢ A number of countries suggest that FDI strongly contributes for the export sector. But In this study, the estimated result indicate that FDI has insignificant effect on Ethiopia export performance. In order to benefited from FDI the country should open the door for export oriented investment as many of the local projects are oriented to the domestic market. As FDI can help in the diversification of export by incorporating new technology to the production system. Hence good policy environment is vital in order to attract export oriented investment.

➢ It is believed that infrastructure plays a key role in facilitating trade. In this study, infrastructure has insignificant effect on Ethiopia export performance. This is due to the type and quality of the existing infrastructures. Hence infrastructural investment should be the main concern of the government in any economic activity. Moreover there should be good policy in the design and implementation of infrastructure to take in to account quality and type of infrastructure.

➢ Institutional quality have positive and significant effect to Ethiopia's export performance. Thus, it is appropriate for the country to further improve the institutional quality to benefit from exports. Moreover, there should be good policy that monitor the quality of the institution in the country.

➢ Finally the study suggest that, it is necessary for policy makers to take care about the supply condition for the development of the export sector. This is because the market access condition has positive and significant effect with the existing supply capacity .

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**ANNEXES**

**Annex 1 : List of Countries in the Sample**

1. **China**

2. **Somalia**

3. **Germany**

4. **SA**

5. **USA**

6. **Netherland**

7. **Switzerland**

8. **UAE**

9. **Djibouti**

10. **Japan**

## Annex 2  Hausman Test
## Hausman fixed random

```
. hausman fixed random
```

|  | ——— Coefficients ——— | | | |
|  | (b) | (B) | (b-B) | sqrt(diag(V_b-V_B)) |
|  | fixed | random | Difference | S.E. |
|---|---|---|---|---|
| lnlpi | .135496 | -12.25766 | 5.122167 | 4.68368 |
| lngdp | .5343181 | .9168266 | -.3825085 | .3621783 |
| lnfdi | .0046707 | .0342096 | -.0295389 | . |
| lnpci | .9202643 | .2288057 | .6914585 | .2000784 |
| lnreer | .0214971 | -.0030579 | .0245549 | . |
| lnopen | .966223 | .5567712 | .4094518 | .1525939 |
| lncpi | 1.744629 | -1.018214 | 2.762843 | .5160035 |

```
                       b = consistent under Ho and Ha; obtained from xtreg
        B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

            chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                    =        34.28
            Prob>chi2 =      0.0000
            (V_b-V_B is not positive definite)
```

41

## Annex 3 Panel Unit root Test

```
. xtunitroot llc lnexp, trend


Levin-Lin-Chu unit-root test for lnexp
──────────────────────────────────────

Ho: Panels contain unit roots                Number of panels  =      11
Ha: Panels are stationary                    Number of periods =      11


AR parameter: Common                         Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Included


ADF regressions: 1 lag
LR variance:    Bartlett kernel, 7.00 lags average (chosen by LLC)
─────────────────────────────────────────────────────────────────────
                   Statistic       p-value
─────────────────────────────────────────────────────────────────────
 Unadjusted t          -8.8207
 Adjusted t*           -5.8185         0.0000
─────────────────────────────────────────────────────────────────────


. xtunitroot llc lnlpi, trend


Levin-Lin-Chu unit-root test for lnlpi
──────────────────────────────────────

Ho: Panels contain unit roots                Number of panels  =      11
Ha: Panels are stationary                    Number of periods =      11


AR parameter: Common                         Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Included


ADF regressions: 1 lag
LR variance:    Bartlett kernel, 7.00 lags average (chosen by LLC)
─────────────────────────────────────────────────────────────────────
                   Statistic       p-value
─────────────────────────────────────────────────────────────────────
 Unadjusted t          -7.1150
 Adjusted t*           -2.2986         0.0108
─────────────────────────────────────────────────────────────────────
```

```
. xtunitroot llc lngdp, trend

Levin-Lin-Chu unit-root test for lngdp
────────────────────────────────────────

Ho: Panels contain unit roots          Number of panels  =     11
Ha: Panels are stationary              Number of periods =     11

AR parameter: Common                   Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
─────────────────────────────────────────────────────────────────────
                  Statistic       p-value
─────────────────────────────────────────────────────────────────────
 Unadjusted t        -5.7729
 Adjusted t*         -4.4175        0.0000
─────────────────────────────────────────────────────────────────────

. xtunitroot llc lnfdi, trend

Levin-Lin-Chu unit-root test for lnfdi
────────────────────────────────────────

Ho: Panels contain unit roots          Number of panels  =     11
Ha: Panels are stationary              Number of periods =     11

AR parameter: Common                   Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
─────────────────────────────────────────────────────────────────────
                  Statistic       p-value
─────────────────────────────────────────────────────────────────────
 Unadjusted t       -10.5042
 Adjusted t*         -5.1817        0.0000
─────────────────────────────────────────────────────────────────────
```

```
. xtunitroot llc lnpci, trend

Levin-Lin-Chu unit-root test for lnpci
───────────────────────────────────────
Ho: Panels contain unit roots          Number of panels  =     11
Ha: Panels are stationary              Number of periods =     11

AR parameter: Common                   Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
─────────────────────────────────────────────────────────────────
                    Statistic      p-value
─────────────────────────────────────────────────────────────────
 Unadjusted t        -11.0538
 Adjusted t*          -8.2137        0.0000
─────────────────────────────────────────────────────────────────



. xtunitroot llc lnreer, noconstant

Levin-Lin-Chu unit-root test for lnreer
───────────────────────────────────────
Ho: Panels contain unit roots          Number of panels  =     11
Ha: Panels are stationary              Number of periods =     11

AR parameter: Common                   Asymptotics: root(N)/T -> 0
Panel means:  Not included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
─────────────────────────────────────────────────────────────────
                    Statistic      p-value
─────────────────────────────────────────────────────────────────
 Unadjusted t        -2.5772        0.0050
 Adjusted t*         -2.4675        0.0068
─────────────────────────────────────────────────────────────────
```

```
. xtunitroot llc lnopen, trend

Levin-Lin-Chu unit-root test for lnopen
─────────────────────────────────────

Ho: Panels contain unit roots           Number of panels  =      11
Ha: Panels are stationary               Number of periods =      11

AR parameter: Common                    Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
────────────────────────────────────────────────────────────────────
                   Statistic      p-value
────────────────────────────────────────────────────────────────────
 Unadjusted t      -43.9917
 Adjusted t*       -43.7279          0.0000
────────────────────────────────────────────────────────────────────



. xtunitroot llc lncpi, trend

Levin-Lin-Chu unit-root test for lncpi
─────────────────────────────────────

Ho: Panels contain unit roots       Number of panels  =    11
Ha: Panels are stationary           Number of periods =    11

AR parameter: Common                Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
─────────────────────────────────────────────────────────────
                 Statistic    p-value
─────────────────────────────────────────────────────────────
 Unadjusted t    -17.4728
 Adjusted t*      -9.6655       0.0000
─────────────────────────────────────────────────────────────
```

## Annex 4 Normality Test

```
. swilk lnexp lnlpi lngdp lnfdi lnpci lnreer lnopen lndist lncpi ldlc


                    Shapiro-Wilk W test for normal data


    Variable |    Obs       W        V        z     Prob>z
 ────────────┼──────────────────────────────────────────────
       lnexp |    121    0.85740   13.818    5.886   0.00000
       lnlpi |    121    0.51282   47.210    8.640   0.00000
       lngdp |    121    0.65373   33.555    7.874   0.00000
       lnfdi |    121    0.91746    7.999    4.660   0.00000
       lnpci |    121    0.80057   19.326    6.638   0.00000
      lnreer |    121    0.89643   10.036    5.169   0.00000
      lnopen |    121    0.96483    3.408    2.748   0.00300
      lndist |    121    0.71384   27.730    7.447   0.00000
       lncpi |    121    0.74969   24.256    7.147   0.00000
        ldlc |    121    0.95115    4.734    3.485   0.00025
```

## Annex 5   Multicollinearity Test

```
. corr lnexp lnlpi lngdp lnfdi lnpci lnreer lnopen lndist lncpi ldlc
(obs=121)
```

|         | lnexp   | lnlpi   | lngdp   | lnfdi   | lnpci   | lnreer  | lnopen  | lndist  | lncpi   |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| lnexp   | 1.0000  |         |         |         |         |         |         |         |         |
| lnlpi   | 0.1568  | 1.0000  |         |         |         |         |         |         |         |
| lngdp   | 0.0910  | 0.9872  | 1.0000  |         |         |         |         |         |         |
| lnfdi   | -0.1142 | 0.6489  | 0.7351  | 1.0000  |         |         |         |         |         |
| lnpci   | -0.5012 | 0.4822  | 0.5671  | 0.7412  | 1.0000  |         |         |         |         |
| lnreer  | 0.0363  | 0.4702  | 0.5164  | 0.7036  | 0.6429  | 1.0000  |         |         |         |
| lnopen  | -0.2291 | -0.5613 | -0.5959 | -0.2982 | -0.0350 | -0.0609 | 1.0000  |         |         |
| lndist  | -0.7281 | 0.3266  | 0.4167  | 0.6283  | 0.7504  | 0.2833  | -0.0472 | 1.0000  |         |
| lncpi   | -0.2862 | 0.2885  | 0.3872  | 0.6454  | 0.8599  | 0.6364  | -0.0105 | 0.4264  | 1.0000  |
| ldlc    | -0.5341 | -0.0722 | -0.0150 | 0.1469  | 0.1624  | -0.2089 | 0.0133  | 0.5626  | -0.0674 |

|      | ldlc   |
|------|--------|
| ldlc | 1.0000 |

## Annex 6. Hetrorscedasicity Test

```
. estat hettest lnexp, rhs mtest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
```

| Variable | chi2 | df | p | |
|---|---|---|---|---|
| lnexp | 2.56 | 1 | 0.1098 | # |
| lnlpi | 0.10 | 1 | 0.7562 | # |
| lngdp | 0.22 | 1 | 0.6374 | # |
| lnfdi | 1.28 | 1 | 0.2586 | # |
| lnpci | 0.59 | 1 | 0.4431 | # |
| lnreer | 2.08 | 1 | 0.1488 | # |
| lnopen | 0.02 | 1 | 0.8937 | # |
| lndist | 0.21 | 1 | 0.6429 | # |
| lncpi | 2.43 | 1 | 0.1194 | # |
| ldlc | 1.42 | 1 | 0.2333 | # |
| simultaneous | 8.64 | 10 | 0.5663 | |

*# unadjusted p-values*

## Annex 7 Estimation Result for Total Export

```
. xtreg lnexp lnlpi lngdp lnfdi lnpci lnreer lnopen lndist lncpi ldlc, fe
note: lndist omitted because of collinearity
note: ldlc omitted because of collinearity
```

```
Fixed-effects (within) regression              Number of obs      =        121
Group variable: counrtycode                    Number of groups   =         11

R-sq:  within  = 0.3441                        Obs per group: min =         11
       between = 0.2388                                       avg =       11.0
       overall = 0.1911                                       max =         11

                                               F(7,103)           =       7.72
corr(u_i, Xb)  = -0.9763                        Prob > F           =     0.0000
```

| lnexp | Coef. | Std. Err. | t | P>|t| | [95% Conf. Interval] | |
|-------|-------|-----------|---|-------|----------------------|---|
| lnlpi | .135496 | 5.881323 | -1.21 | 0.228 | -18.79971 | 4.528721 |
| lngdp | .5343181 | .4447655 | 1.20 | 0.232 | -.3477692 | 1.416406 |
| lnfdi | .0046707 | .0423642 | 0.11 | 0.912 | -.0793487 | .0886901 |
| lnpci | .9202643 | .2546425 | 3.61 | 0.000 | .4152409 | 1.425288 |
| lnreer | .0214971 | .0397138 | 0.54 | 0.589 | -.0572658 | .10026 |
| lnopen | .966223 | .297743 | 3.25 | 0.002 | .37572 | 1.556726 |
| lndist | 0 | (omitted) | | | | |
| lncpi | 1.744629 | .6233178 | 2.80 | 0.006 | .5084255 | 2.980833 |
| ldlc | 0 | (omitted) | | | | |
| _cons | 1.474207 | 10.07241 | 0.15 | 0.884 | -18.50204 | 21.45045 |

```
    sigma_u │  4.1236119
    sigma_e │  .33279372
        rho │  .99352894   (fraction of variance due to u_i)
```

```
F test that all u_i=0:     F(10, 103) =    20.79          Prob > F = 0.0000
```

# Declaration

I the undersigned declared that this thesis is my special work, has not been for degree in any other university and that all sources of materials are used for the thesis have been dully acknowledge.

Declared by:

Name: Tigist Alemu

Signature:

Date: June 11, 2018

Confirmed By:

Name: Girma Estifanos(PhD)

Signature:

Date: