ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

SCHOOL OF COMMERCE

LOGISTICS AND SUPPLY CHAIN MANAGEMENT UNIT

EFFECT OF LOGISTIC PERFORMANCE ON INTERNATIONAL TRADE PERFORMANCE: THE CASE OF ETHIOPIAN MAJOR EXPORT GOODS

BY

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ADVISOR

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JUNE, 2020

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A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF ADDIS ABABAUNIVERSITY, COLLEGE OF BUSINESS AND ECONOMICS SCHOOL OF COMMERCE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER IN LOGISTIC AND SUPPLY CHAIN MANAGEMENT

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Approved by Board of Examiners

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External Examiner	Signature and date

DECLARATION

I the undersigned, declare that, this thesis is my original work and has not been presented for a degree in any other University, and that all the sources of materials used for the thesis have been duly acknowledged.

Signed by: -

Name: ASHENAFI TADEGEW

Signature: _____

Date: _____

CONFIRMATION

This is to approve that the study made by Asenafi Tadegew, entitled: The effect of logistic performance on international trade performance in the case of Ethiopian major export goods,, and submitted in partial fulfillment of the requirements for the Degree of Masters of Arts in Logistics and Supply Chain Management complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Signed by: -

Advisor: TARIKU JEBENA (PHD)_____

Signature: _____

Date : _____

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ACRONYMS

CCI Concurrent Competitiveness Index

DBR Doing Business Report

EU European Union

FDI Foreign Direct Investment

GATT General Agency of Tariff and Trade

GC Global Competitiveness

GCI Global Competitive Index

GDP Growth Domestic products

GDR Growth Domestic Reports

GNP Growth National products

ITF International Transport Forum

LLC Land Locked Countries

LLDC Land Locked Developing Countries

LPI Logistic Performance Index

MNCs ultinational Companies

MTO Multimodal transport operator

NIC Newly industrialized countries

OECD Organization for Economic Cooperation and Development

UNCTAD United Nations Conference on Trade and Development

USD United State Dollar

WB World Bank

WEF World Economic Forum

WILS World Institute of Logistic Solution

WTO World Trade Organizations

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ABSTRACT

Trade is the most important way of economic growth for any country. The continuous growth in world trade depends on the efficiency of trade support structures such as the logistics services. However, for most African countries, inadequate infrastructure and poor transport network make it difficult for their manufacturers to participation in new global outsourcing and just in time production or ensure reliability or flexibility in the supply of the goods. While, logistic systems are strongly connected to trade gain growing importance to describe the competitiveness of countries in a globalized world. An increase in world trade simultaneously requires a progress in transport technologies and qualitative logistics are a necessary condition for foreign investors to operate efficiently. The aim of this paper is to examine the contribution of logistics for export trade of major export goods of Ethiopia and to show the importance of logistics for an enhancement in investment and trade. The analysis also has extended by investigating if the specific dimensions of logistics performance (logistics specificities) matter for international traders. An empirical approach was designed where secondary data is used to perform a panel data analysis. The panel consists of multi-year data for ten Ethiopian export trade partner countries over the years 2007-2016. The Logistics Performance Index includes six different variables such as infrastructure, quality of logistics service, customs, international shipment, track and trace and timeliness. Furthermore distance between sample country, GDP and populations were considered as control variables. The panel data analysis allows measuring the concrete impact of each variable on trade. The researcher used explanatory research design, and adopts a quantitative longitudinal research approach. Then inferential statistics was used to make inference the effect of explanatory variables on dependent variable (Export trade). Finally based on the findings result the researcher have been reached conclusions and gives recommendations in which area of logistics an improvement could be necessary. The results show that there is a statistically significant relation between logistics and trade. Customs clearance, Transport infrastructure, especially the quality of roads and ports, and timeliness were found to be the most important factor affecting exports and imports. The study was able to show that an increased logistics capability of country leads to an increase in trade volumes. The findings from the panel data analysis identified four out of six logistics variables those show a significant positive effect on Ethiopian major export goods. In general the researcher concluded that the study overall hypothesis could be accepted as logistics influences the trade performance of a country. Hereafter, the paper fills the gap in literature by showing the need of a high quality logistic sector and gives incentives in which area of logistics an improvement could be necessary. Finally, A recommendation for decision makers, policy makers, and concerned bodies has been forwarded to give an emphasize for the urgent need of improvement on the logistic performance in order to boost the country export performance as well as to be competent in international trade market.

Keywords: Trade performance, Logistics Performance Index, Custom, Transport, Shipment

CHAPTER-ONE

INTRODUCTION

1.1 Background of the Study

Economic development is one of the main objectives of every society in the world and economic growth is fundamental to economic development. The economics literature supports the argument that development requires economic growth to alleviate poverty, and greater access to world markets is perceived as a necessary condition for more rapid growth. However, there are many variables that contribute to economic growth; trade is the most important way of economic growth for any country. Mainly, international trade is one aspect where a nation economy participates in world trade as a supplier of its products to the rest of the world and a consumer of products from the rest of the world. It has been increasingly recognized that given the limited size of domestic market and the dependence on the import of intermediate and capital goods, expanding export capacity and increasing international competitiveness are vital factors for rapid growth and development

While, many theories of economic development advocated import substitution in order to increase productivity and diversity of the production structure (Brook Debebe, 1999). But today, the emphasis has shifted to improving export performance, since export is considered as one of the very important accelerators of a nation's economic growth. As a result, today's theories of economic development emphasize improving export performance as a vital component to international competitiveness and rapid growth and development. Accordingly, many developing countries have working to increase their share in international trade. For example Bacchetta (2007) explained that many developing countries gradually increased their share in international trade from just less than one quarter to about one third. Asia and particularly China account for most of the change, which has been facilitated by diversification of exports. The same writer also explained that while developing Asia's share in total world exports increased from 11.7% in 1985 to 21.5% in 2005, Africa's share decreased from 4.3% to 2.9% over the same period. This shown poor performance of Africa's export in international trade share.

Different reasons have been forwarded for the main reasons for Africa's poor export performance. However, there is no common agreement on the salient factors; different

researchers put different findings for instance, Ciuriak and Preville, (2010) stipulate complex process of exporting and importing, sluggish and expensive transport, lack of seamless transport and cumbersome customs procedure. Ernest, (2008) also generalizes that landlocked developing countries face higher restrictive freight cost than tariff barriers. Contrarily, Connecting to Compete report of 2012- 2018 indicates that countries having coastal access but registering poor Logistics Performance Index (LPI). This indicate that, one of the key factors that have been identified as undermining international competitiveness for such developing country including Ethiopia is poor trade logistics practice.

Logistics may be the best source of competitive advantage for a firm because it is less easily duplicated than other elements of the marketing mix: product, price and promotion. Consider, for example, forming close, integration and coordination with carriers or logistics service providers can give the firm a distinct competitive advantage in speed to the customer, reliability, availability, or other customer service factors.

Hence, efficient logistics is an important determinant of a country's competitiveness as it is for the firm. The international logistic system may suffer from insufficient cross-country coordination of the network, such as non-integrated time schedules, customs delays, incompatible standards, insufficient flow of information about delays. Logistics services help to solve these problems. For example, they assist clients to save costs by concentrating cargo flows, reducing the ratio of empty voyages and favoring the sharing of information across transport operators (WTO 2004). Thereby, traders can gain competitive advantage over the compotators. As stated by Arvis et.al, (2018), logistics is an elevated priority for many member countries of the International Transport Forum. Because facilitating trade and transport is at the core of stimulating economic development, several countries have developed comprehensive national logistics strategies. Well-functioning domestic and international logistics is a precondition of national competitiveness, since, logistics affects trade performance of a country in terms of cost, time, reliability and predictability and customer services, which further affect overall competitiveness of the export in the international market other things being constant. In general, increasing logistics performance efficiency help to deliver the products to markets at

competitive quality and prices. Efficient logistics don't just reduce costs of transport and transit time, but also decrease the cost of production. If logistics services are inefficient, firms are likely to maintain higher inventories at each stage of the production chain, requiring additional working capital (bigger warehouses to store larger inventories) (WTO 2004).

Arvis et al. (2014) recognize logistics efficiency as one of the most important elements of a country's competitiveness. Furthermore, sophisticated logistics systems are considered to be the triggers for foreign investments as well as international trade. Overall, logistics is a necessity for international trade as logistics enables trade exchange through facilitating flow of goods and services including related information between trading partners involved in the supply chain over the world. According to Verhetsel et al. (2015) it is logistics that allows global trade through its developments in transportation and information technology. Performing logistics at a low level may isolate a country from the world markets. Consequently, the implementation of logistic systems that work has a major impact on all countries which are trading together.

As stated by the World Bank (2010), both trade policy and logistics must take into account their impact on trade competitiveness. In recent years, this task has been aided by the publication of the Logistics Performance Index (LPI), which has provided valuable information on the situation in each country. This index makes it possible to establish comparisons and overcome the obstacles that restrict economic development. It is becoming increasingly necessary to identify the shortfalls that exist in logistics performance that affect export and import capacity, which is why trade facilitation measures are becoming so important (Jane, 2011). The term "trade facilitation" has received considerable attention from researchers over the past few decades. The WTO defines it as the "simplification and harmonisation of international trade procedures", the latter being understood as the necessary activities,practices and formalities to submit, gather and process the information required in international goods trade. Although many other definitions exist, they all agree that trade facilitation focuses on the quality of the trade environment and its impact on trade operations. All of the above highlights the close relationship between trade facilitation

and logistics (Hollweng and Wong, 2009), terms which refer to the regulatory restrictions and performance of the logistics sector, respectively.

International trade is one aspect where the Ethiopia participates in world trade as a supplier of its products to the rest of the world and a consumer of products from the rest of the world. Ethiopia is considered to have various advantages for the international trade competitiveness as well as for the development of the export sector, Ethiopia has achieved one of the highest economic growth rates in the world over the past few years, and international financial institutions and the national government generally expect that the economy will continue to expand strongly. since there is` abundant and capable labor force, low wage rates, a wide range of whether and soil conditions, preferential access to some of the major world markets including Europe, USA, and the Common Markets for Eastern and Southern African states (COMESA). Whereas, the export structure of Ethiopia has also been characterized by greater concentration on few primary goods such as coffee, hides and skins, and oilseeds and pulses which demand instant delivery and cost efficiency, logistical efficiency in terms of cost, time, reliability and predictability are very crucial.

In the nation's case, the higher annual economic growth in Ethiopia also has yielded an increase in Import-Export trade with the outside world.Ethiopia has made progress in ranking under the World Bank's doing business methodology for starting a business. The 2019 World Bank's Ease of Doing Business report (EODB) ranked Ethiopia 159th out of 190 countries; an improvement of two positions from that of 2018. Although, over the past 15 years, Ethiopia's trade has been growing; the value of exports increased 5.49% from $403 million in 2001 to $2,616 million in 2016. Conversely imports increased 8.06% over the period, from $1,811 million to $16,408 million. On average, export value grew annually by 13.2%, whereas import value grew by 15.8%. During this period, the trade imbalance climbed from $1,408 million to $13,793 million, almost 10 times its value in 2001. The export-to-import ratio, which captures the capacity of export earnings to cover imports, dropped from 22% in 2001 to 16% in 2016. Likewise, in the same period the foreign currency reserves were covered less than two months of imports(IMF, 2016).

Government showed strong determination to create conducive business environment, raise efficiency and competitiveness of industry, trade and investment. Within this

broader framework, the GTP II foresees strong manufacturing export performance as the sector is key to further boosting economic growth, improve terms of trade, and acquiring foreign exchange earnings that is essential to meet import needs of the country and broadly meet the financing requirements of the successive transformative plans. Export values have been growing on average by about 22% annually in the past decade. In 2011/12, the value of total export was $3.2 billion and the total import bill was $11.0 billion resulting a trade deficit of $7.9 billion. Ethiopia's trade deficit has been widening largely due to the substantial growth in imports and less than commensurate growth in exports.

Ethiopian exports is predominated by agricultural products such as coffee, oilseeds, Chat, leather and leather products, pulses, cut flower, fruits and vegetables, live animals that contribute to approximately 70% of total exports. Nonetheless, Ethiopia's merchandise export can only finance about one-fourth of the total import bill. Meanwhile, capital goods, petroleum products and semi-finished goods imports accounted for over 60% of the total value of imports.

While the export sector holds promising potential and is witnessing progress over the past years, challenges remain. While, majority of merchandise exports are low value-added agricultural products and unprocessed agricultural goods which have minimal impact on substantially increasing export earnings, and bringing in the required technology development in the domestic economy. Hence, price volatility in world agricultural markets have a serious impact on the value of merchandise exports. Moreover, the sector is faced with supply side constraints related to inadequate infrastructure (roads, telecom, electricity), high cost of transportation, limited participation in the regional and multilateral trading systems and insufficient knowledge about international trade as well as complex export/import procedures requiring 8 documents as compared to world minimum which is 2 in France for each case (Ciuriak and Preville, 2010), the long time it takes to export even standard containers 60 days (Arvis et.al, (2018). Ethiopian TL performance index is low even as compared to countries with similar economic development (Arvis et.al, 2018). according to Arvis et.al, (2018), report on easiest countries to do business and Trade Logistics performance, Ethiopia is ranked 131rd out of 167 countries and 159th out of 183 countries respectively. Due to this logistics related problems, that most of

Ethiopian export goods are not able to be competitive in the international market like China, India and Italy export markets, since the existing trade logistics system of Ethiopia is characterized by inefficient, time taking and complex.

1.2 Statement of the Problem

Reliable logistics is crucial to integrate global value chains and reap the benefit of trade opportunities for growth and poverty reduction. Trade is the most important way of economic growth for any country. The northeast African country, still one of the world least developed, and needs improving their economic growth and its strategic development plans to join the ranks of middle-income states.

Government of Ethiopia showed strong determination to create conducive business environment, raise efficiency and competitiveness of industry, trade and investment. Nonetheless, Ethiopia's trade deficit has been widening largely due to the substantial growth in imports and less than commensurate growth in exports. The export-to-import ratio, which captures the capacity of export earnings to cover imports, dropped from 22% in 2001 to 16% in 2016. Likewise, in the same period the foreign currency reserves were covered less than two months of imports (IMF, 2016). Goods exports are exhibiting their worst performance in a decade. Export of goods declined by 2.5 percent in 2012/13 and by a further 7.6 percent in the first half of 2013/14, exceeding the drop observed in 2008/09 during the global financial crisis. Over the previous three years, export growth had averaged 30 percent per year (and about20 percent annually since 2004). Ethiopia's development model is partly inspired by the East Asian experience that realized high economic growth through the development of new export sectors and government-led development investments. However, the country's exports measured in percent of GDP falls short of reaching the heights seen in Korea, China, or Vietnam during their development periods (World Bank 2012a).

Though, the export sector holds promising potential and is witnessing progress over the past years, challenges remain. While, majority of merchandise exports are low value-added agricultural products and unprocessed agricultural goods which have minimal impact on substantially increasing export earnings, and bringing in the required technology development in the domestic economy. Moreover, the sector is faced with supply side constraints related to inadequate infrastructure (roads, telecom, electricity), high cost of transportation, limited participation in the regional and

multilateral trading systems and insufficient knowledge about international trade. In addition, complex export/import procedures requiring 8 documents as compared to world minimum which is 2 in France for each case (Ciuriak and Preville, 2010), the long time it takes to export even standard containers 60 days (Arvis et.al, (2018). Ethiopian Logistics performance index is low even as compared to countries with similar economic development (Arvis et.al, 2018). according to Arvis et.al, (2018), report on easiest countries to do business and Trade Logistics performance, Ethiopia is ranked 131rd out of 167 countries and 159th out of 183 countries respectively.

Due to this logistics related problems, that most of Ethiopian export goods are not able to be competitive in the international market like China, India and Italy export markets, since the existing trade logistics system of Ethiopia is characterized by inefficient, time taking and complex. Despite, there is no common agreement on the effect of the logistic performance on export trade; different researchers put different findings for instance, Ciuriak and Preville, (2010) stipulate complex process of exporting and importing, sluggish and expensive transport, lack of seamless transport and cumbersome customs procedure which leads to high trade cost and low trade performance.

To some up, the main contributing factors are due to poor logistic systems in both transit countries and in national economies. Poor logistics services such as limited co-ordination among countries on border procedures; inefficiency of customs clearance process at the ports; fragmented and poor quality of transportation related infrastructure; costly and infrequent shipping (with long and indirect shipping routes); delays in tracking and tracing consignments; delays in terminal handling and clearance of goods; absence of cool storage facilities at ports; and the inability to certify product quality; amongst others; can cause significant hindrance to international trade.

Even though there is a study done by previous researchers on Ethiopian logistics practices, they are highly focused alone the transportation part of logistics and ignored logistics integral role in supporting commercial activities as well as its effect on international trade performance. Hence, the rationality of the paper is to fills the gap via complementing past studies on logistics-trade relationship, sheds some new light on the importance of a high quality logistics achievements in facilitating and

enhancing international trade from a macro-economic perspective. Therefore, the purpose of this paper is to empirically examine the effect of logistics performance on international trade performance, specifically in major export goods of Ethiopia as well as to test the degree of these effects, thereby gives recommendations in which area of logistics an improvement could be necessary.

1.3 Research Question

1. How the counters' logistics performances trends develop over time?
2. To what extent does the overall logistic performance affects the export trade performance of Ethiopian major export goods?
3. Which specific logistics performance (each logistics performance indicator) has more influence on Ethiopian major export goods?

1.4 Objective of the study

1.4.1 General objectives of the Study

The general objective of this research is to investigate the logistic service performance effect on international trade performance the case of Ethiopian major export goods.

1.4.2 Specific objectives of the Study

The specific objectives that are desire to be achieved through this study are:

1. To analyze the counters' logistics performance trend over time
2. To examine the extent of the logistic performance effects on export trade performance of Ethiopian major export goods.
3. To investigating which specific logistics performance (each logistics performance indicator) has more influence on Ethiopian major export goods.

1.5 Significance of the Study

The study will have a great significance for a broad and diverse audience those involving in export trade logistic operation including: logistic providers and trade facilitators institutions, exporter and potential investors, practitioners, policy makers and researchers,

The involving parties in logistic operation will be benefited since the outcome of the study helps them to easily understand the gap on their logistics operation and take

corrective actions that can enhance their capacity to compete with best export trade logistic companies in the world. It will also help exporter to identify, evaluate and monitor the key areas which can help them to maintain their pace and speed of their export trade competitiveness.

The government policy makers will benefit also from the outcome since it will assist them in examining the current policies towards the footwear sectors and improve them accordingly.

The findings of this study can also provide prospective investors with a realistic idea and informational base of what to expect when operating in the international trade business of Ethiopia. Additionally, this study will serve as a point of reference for further research by academicians.

In general, well-developed cross-border logistics enhance a cost effective, efficient and user-friendly service, which promotes a background of competitive international trade. The overall goal of this work is to contribute ideas that can serve towards the realization of an efficient and sustainable trade logistic service thereby, improving competitiveness of the overall export operation of Ethiopia.

1.6 Scope and Delimitation of the Study

Due to resource and time constraints, and remoteness of some of the target participant entity under the study, the scope of this research will solely delaminate to the below major boundaries of the subject matter;

The scope of the research is limited to export trade logistics particularly focusing on, major Ethiopia export goods from agricultural products: such as coffee, oilseeds, Chat, leather and leather products, pulses, cut flower, live animals This is because Ethiopian exports is predominated by agricultural products that contribute to approximately 70% of total exports. Thus, the selected products receive similar attention and priority from government of the country.

Geographical coverage: will be international trade partners of Ethiopia which are indicated in sampling section. Regarding time scope, panel data over the period of 2007-2016 will be covered.

1.7 Limitations of the Study

Regardless of the nature of the study, every research is subject to different limitations. Hence, the study is limited only to the competitive measurement variables that are indexed in the LPI. As the study is time serious in nature, the possibility of recorded biases resulting in under or over reporting and misreporting of events is likely. However, the study model included a number of logistical variables in order to measure the logistic performance, the selection was limited in order to capture a complete picture of logistics. Nevertheless it was necessary to operationalize logistics with measurable values which excluded some other aspects of logistics systems such as a soft infrastructure that enables an efficient information flow. This aspect was not considered in this paper due to the lack of access of valid data. Another issue was the accessibility of the LPI when selecting the time frame of this analysis. As the LPI does not exist for a long time, our time frame may be too short in order to identify significant trends which are shown in our case by only small effects of logistics variables expressed by marginal trends.

In addition, due to the in availability of every couple years LPI data particularly the absence of 2018 LPI data for Ethiopia, the study specifies only those have available data within the past 10years. This may not indicate the real image of the entire world. Due to time and cost constraints, the study also has taken a report of the 10 major trade partners of Ethiopian major export goods LPI scored countries data. Including all export and import products may lead the researcher to a wrong generalization on the trade logistics performance due to huge gap of policy priority and support that exporters receive from government. Therefore, findings of this research cannot be generalized over importing trade logistics of Ethiopia.

1.8 Definition of terms

Logistics: the process of planning, implementing, and controlling procedures for the efficient and effective transportation and storage of goods including services, and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements.

Logistics Performance Indicators (LPI): refers to the pro-competitive business and benchmarking tools to promote efficient, effective, reliable and sustainable transport

logistics and infrastructure systems. These tackle congestion, to improve efficiency and promote alternative modes of transport.

Competitiveness: the ability of a country (a firm/or an entity) to offer products and services that meet local and international quality standards, worth domestic and global market prices and provide adequate returns on the resources used in producing them (Boansi 2013), (kniya) In this sense, the competitiveness of an enterprise is a matter of strategic importance and. Global institutions and organizations dealing with competitiveness evaluate it and compile competitiveness rankings of economies or businesses; they define this category for their needs and compile criteria and methods for competitiveness measuring.

International trade: the exchange of goods and services across international borders or territories.

Globalization: in general terms are the process of broadening and extending the inter-relationships between international trade, foreign direct investment and portfolio flows. The consequence of globalization is creating a global marketplace for goods and services that is largely indifferent to national borders and governmental influence. And also the issues include capital flows, information and knowledge flows, uniformity in culture and other issues in the globe (J. Stiglitz, 2006).

1.9 Organization of the thesis

The paper is organized with five chapters. The first chapter covers the introduction part that addresses the background information concerning the logistic performance and its impact on international trade competitiveness, problem and basic questions the research, the general and specific objectives of the research, the significance and scope of the research, and finally the limitations of the research.

Following this introductory chapter, the second chapter comes; it will describe the basic and relevant literatures related to subject matter of the study that are done previously by other researchers. In the third chapter the research report covers the type of research design used, the analysis of the data, the sampling techniques, and methods of data collection to be applied. The fourth chapter focuses on the data

analysis and major findings of the study. The last chapter provides the conclusion and recommendations so as to solve the observed gaps from finding result.

HAPTER-TWO

LITERATURE REVIEW

2.1 Introduction

The literature of the study covers an explanation about the basic definition, concepts and theories which provide general understanding for logistics, international trade as well as the relationship between Export trade logistic performance and competitiveness. The review also discussed on empirical finding related to the current conducted area of study concerning the major factors affecting the logistics service performance and its impact on the country's export trade logistic performance in different countries export tread practice. The theoretical and empirical literatures has presented in separate section and the literature gap will identify from the reviewed literature finally the conceptual framework have formulated to show the relationship between the variables,

2.2 Theoretical Review

2.2.1 Definitions of Logistics

Logistics can be defined as the flow of materials, information, and money between consumers and suppliers (Frazelle, 2002). Similarly, Waters (2003, 5) describes logistics as 'the function responsible for the flow of materials from suppliers into an organization, through operations within an organization, and then out to customers'.

Logistics can also be defined as the process of strategically managing the procurement, movement and storage of materials, parts and finished inventory through the organization and its marketing channels in such a way that current and future profitability are maximized through the cost effective fulfillment of orders (Christopher, 2005). On the other hand, logistics is defined in the Council of Supply Chain Management Professionals' Supply Chain Management Terms and Glossary (2010) as:' The process of planning, implementing, and controlling procedures for the efficient and effective transportation and storage of goods including services, and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements.' Therefore, with these definitions in mind, logistics can be defined as: the management of the flow of goods from production through to after sales service, including: transportation, warehousing,

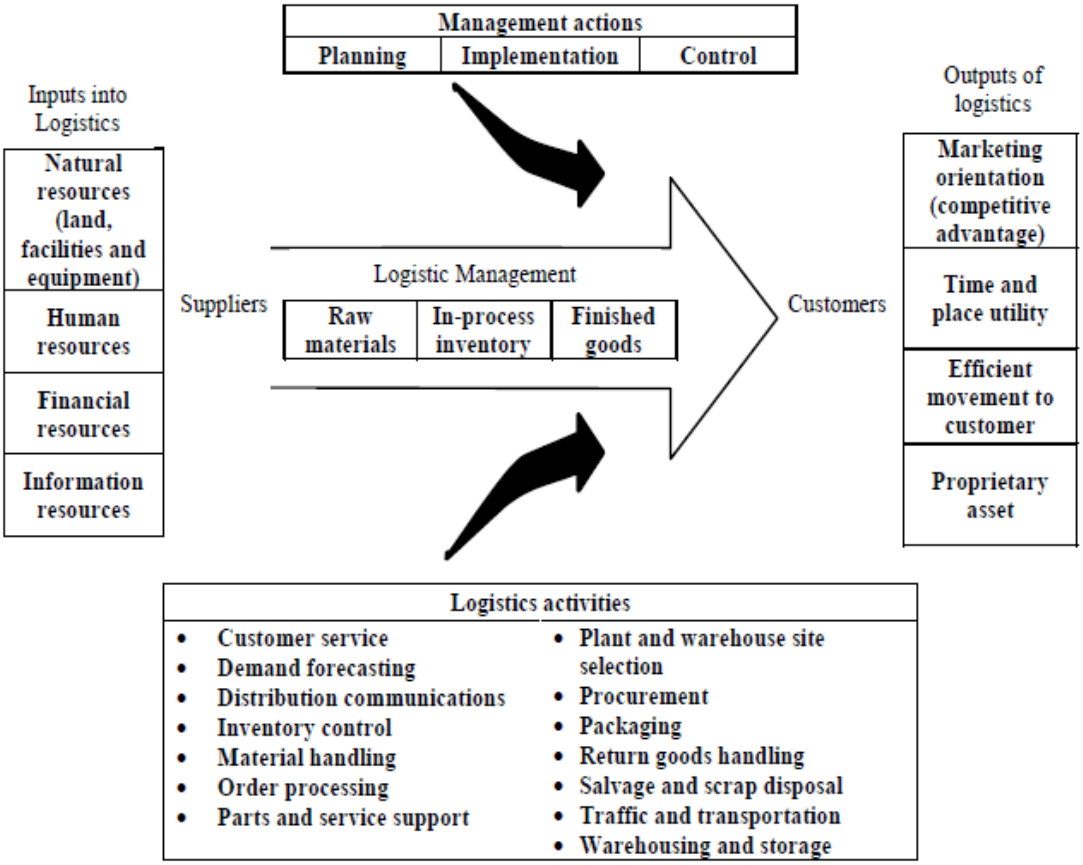
inventory management, packaging, etc. At the same time, logistics can be defined as having the right type of product or service at the right place, at the right time and in the right condition, however, our expectations for a firm or company are directly related to logistics. The customer expectations define the purpose of a logistics system; it ensures that the right goods, in the right quantities, in the right condition, are delivered to the right place, at the right time, for the right cost. In logistics, these are called as the six rights (USAID 2011).

2.2.2 Components and Processes of Logistics

Logistics is not confined to manufacturing operations alone. It is relevant to enterprises, including government, institutions such as hospitals and schools, and service organizations such as retailers, banks, and financial service organizations. Examples from these sectors will be used throughout some main books of the field to illustrate the relevance of logistics principles to a variety of operations.

Some of the many activities encompassed under the logistics umbrella are given in Figure 1, which illustrates that logistics is dependent upon natural, human, financial, and information resources of inputs. Suppliers provide raw materials which logistics manage in the form of raw materials, in process inventory and finished goods. The fundamental goal of international logistics is processing, warehousing and transport (Vallee&Dircksen 2011). However, the value chain for logistics as follows (NSDC 2010):

Fig 1: Components of Logistics Management

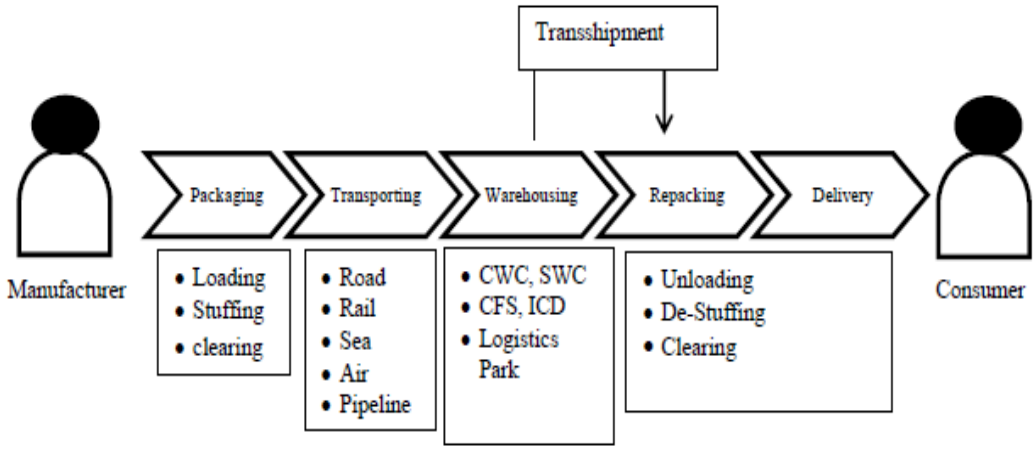


Source: (Lambert, Stock &Ellram 1998).

Goods that are received from the manufacturers are loaded and stuffed into containers of right size. The goods are then transported by the appropriate mode of transportation (land transport, transport via pipelines, water transport, and air transport) (The Economist 2012).

The transported goods are brought to a warehouse and stored safely. Warehousing requires planning of resources, assets, processes, and accurate demand forecasting supported by scalable infrastructure to be profitable (KPMG 2009). The goods are then re-packed in the format suitable to be sent to the customer, and then finally delivered to the customer (Figure 2).

Fig 2: Value Chain: Logistics



Source: (NSDC 2010).

Logistics is a critical component that is essential and relevant across agriculture, manufacturing and service sectors and which has to be optimally managed for smooth functioning of sourcing, production and distribution operations. Additionally, logistics cost accounts for a major component of the input cost in all sectors, more so in the case of sectors such as cement, steel, automobiles, retail, fast-moving customer goods (FMGC), pharmaceuticals etc.

With rising competition in the sectors that use logistics services, it has become even more important to enhance the efficiency of the system and use the cost-benefit in increasing the company's competitiveness. Besides, with the globalization enclosure all over the world, a larger number of multi-national companies (MNCs) are sourcing, manufacturing and distributing goods on global scale, and thus need more complex supply chains to be managed.

Given such developments, the Transportation, Logistics, Warehousing and Packaging Sector is expected to become a more specialized and niche expertise area where high premium will be charged for increased quality and quantity of services delivered by logistic service provider.

By tracing the flow of a product from the procurement of raw materials through manufacture of the end product to the customer, one can gain a broad view of logistics processes. In this context, a distinction can be drawn among the phases of;

- Procurement Logistics

- Production Logistics
- Distribution Logistics
- Spare-parts Logistics
- Reverse Logistics

All types of value chain can be performed in every step of the logistics process. As a result, there are warehouses both in procurement as well as in production and distribution (DHL 2008).

❖ **Layers to Logistics Services**

There are five main inter-related layers of logistics services that involve increasing levels of service and supply chain integration:

1. First Party Logistics (1PL)

It concerns beneficial cargo owners who are the shippers (such as a manufacturing firm delivering to customers) or the consignee (such as a retailer picking up cargo from a supplier). They dictate the origin (supply) and the destination (demand) of the cargo with distribution being an entirely internal process assumed by the firm. With globalization and the related outsourcing and off shoring of manufacturing, distribution services that used to be assumed internally tend be contracted to external service providers.

2. Second Party Logistics (2PL)

It concerns the carriers that provide transport service over a specific segment of a transport chain. It could involve a maritime shipping company, a rail operator or a trucking company that are hired to pull cargo from an origin (e.g. a distribution center) to a destination (e.g. a port terminal).

3. Third Party Logistics (3PL)

It concerns freight forwarders that could have stakes in a specific transport segment and its physical assets, but who offer comprehensive freight distribution services along transport chains. These services can involve warehousing, trans loading, terminal operations and even forms of light manufacturing such as packaging and labeling (Rodriguen.d.). A 3PL thus tries to organize the tasks related to physical

distribution, so that parts and finished goods can be carried from their origin to their destination. It provides multiple logistics services for its clients and customers (Langley, Allen& Dale 2004).

4. Fourth Party Logistics (4PL)

4PL Creates value by redesigning everything from the business perspective to processes as it manages logistics for carries, forwarders or warehouses (Deloitte 2013). This often involves agreements (subcontracting) with 3PLs and 2PLs (Rodriguen.d.). 4PL (also sometimes called a lead logistics provider) is a non-asset based company (i.e. they don't own their own trucks or warehouse facilities) that provide logistics consulting services to fully manage, design, and build supply chains. While the logistics and supply chain industry continues to be confused about the exact role and definition of 4PLs, emerging few categories of logistics consulting and management firms are emerging that are invaluable in managing large scale, complexsupply chain functions from the top and overseeing innovative technology solutions (Logistics List 2011).

5. Fifth Party Logistics (5PL)

A fifth party logistics provider (5PL) will aggregate the demands of the 3PL and others into bulk volume for negotiating more favorable rates with airlines and shipping companies. Non asset based, it will work seamlessly across all disciplines (logisticsmgt 2011). These are firms who are mainly logistics service providers that plan, organize and implement logistics solutions on behalf of a contracting party by using the appropriate technologies as needed (Deloitte 2013).

2.2.3 The Role of Logistics Performance

Today, logistics is an important part of the business economic system and major global economic activity. The logistics cost are estimated to be between 9-20 % of the GDP. The global logistics industry has registered significant growth in the last decade wherein the big driver has been the emergence on Third Party Logistics (3PL) and Fourth Party Logistics (4PL) players in the industry who are expected to play much more important role in the years to come. Concerning logistics practices Lambert & Stock (2001) argues that good logistics practices can create a competitive advantage. More specifically they claim that best logistics practice plays an important role in

three critical elements of the marketing concept. These elements are customer satisfaction; integrated effort and company profit (Lambert & Stock, 2001 as cited in Anna and Konrad, 2008). Beside, logistics is a source of employment. Many of the operations related to logistics are manpower intensive (KPMG 2009). Logistics operations tend to be relatively more labor intensive in developing countries than in developed ones, due to differences in production technology (WTO & OECD 2013). Thanks to efficiency logistics, farmers can access entirely new markets, either in different regions, or, potentially, internationally.

Generally, the above arguments indicated that good logistics practice is increasingly recognized as the key enabler, which allows a company to gain and maintain its competitive advantage and ensure maximum customer satisfaction.

2.2.4 The Economic Impacts of Logistics Activities

As it is mentioned before, logistics plays a key role in the economy today, and the market volume of logistics has already reached a substantial level in many economies as a result (DHL 2008). Economic impacts of logistics can be analyzed as follows:

The logistic activity accelerates economic growth and productivity growth and decreases poverty. There is now overwhelming evidence that trade liberalization is associated with faster productivity growth among the firms of developing countries. It is assumed that increased trade due to broad-based liberalization can, under the right circumstances, promote economic and social development through increased productivity and decreased poverty. In such a case, logistics sector has a crucial role to play in the process (WTO & OECD 2013). Since, Logistics is one of the major expenditures for business, thereby affecting and being affected by other economic activities.

Logistics supports the movement and flow of many economic transactions; it is an important activity in facilitating the sale of virtually all goods and services. Efficient logistics is an important determinant of a country's competitiveness as it is for the firm. The international transport system may suffer from insufficient cross-country coordination of the network, such as non-integrated time schedules, customs delays, incompatible standards, insufficient flow of information about delays. Logistics services help to solve these problems. For example, they assist clients to save costs by

concentrating cargo flows, reducing the ratio of empty voyages and favoring the sharing of information across transport operators (WTO 2004).

In general, increasing logistics performance efficiency help to deliver the products to markets at competitive quality and prices. Efficient logistics don't just reduce costs of transport and transit time, but also decrease the cost of production. If logistics services are inefficient, firms are likely to maintain higher inventories at each stage of the production chain, requiring additional working capital (bigger warehouses to store larger inventories) (WTO 2004). Greater efficiency logistics means that socially important goods, such as basic foodstuffs, can be moved within countries more quickly and lower cost.

2.2.5 Trade Theory

The theoretical framework of trade theories is preferable to a review of theories and empirical findings. Integrating theories with practices in fact helps to better understand how and why nations trade with each other. The literature review has two major parts: the first part deals with theoretical literature of trade, the second part deals with Ethiopia's export practices.

The main reason that explains why countries trade with each other is related with economics. Basically, it is the difference in resource endowments of nations that make necessary international trade. In support of this idea.Ayele Kuris (2006, pp. 70-71), states: "The main reason that countries trade with one another rather than run completely independent economies is that the earth's resources are not equally distributed across its surface." According to Dwivedi (2002, pp. 507-508), the uneven distribution of resource endowments fuels international trade. Dwivedi further explained his argument as "While some countries are better endowed with natural resources. Like, vast fertile and cultivable land, large mineral deposits, water and forest resources, some others are better equipped with capital and technology. "In addition, Jeannet and Hennessey (2001, p.38) suggested that: "Few individuals in the world are totally self- sufficient"; hence resources are transferred to fill the sufficiency gap. Briefly, one can infer that nation's trade with each other for the same reasons that individuals do; and the basic reasons are the uneven distribution of resources all over the world, and no nation is self- sufficient in producing and satisfying its people. Moreover, according to Dwivedi (2002, p. 508), what is more

important is the gain from trade. A number of scholars have presented their arguments and explanations about the rationale behind why nations trade with each other, and in this process of arguments and explanations, new ideas arisen about new ways to deal with the existing events, challenges, resources and perspectives.

2.2.5.1 Mercantilism

Several literatures assert that mercantilism was the first theory (some call it belief) of international trade, that emerged in England in the mid-16th century. This theory of international trade states that it is in a country's best interest to export more than it imports. According to Hill (1998, p.126), the mercantilist doctrine advocates government intervention through policies to maximize exports by subsidizing exports and to minimize imports by using tariffs and quotas to limit imports. This results in a management of balance of trade surplus.

On the other hand, the classical economist David Hume identified an inherent inconsistency with the belief of mercantilism in 1752. Hill (1998, p.126) states, according to Hume, that if one country exports more than it imports, the resulting inflow would swell the domestic money supply and generate inflation to the exporting country. On the reverse side, the outflow would have the opposite effect for the importing country. That is, the importing country's money supply would contract and its prices would fall.

Hume concluded his argument that in the long- run, no country could sustain a surplus on the balance of trade. The flaw with mercantilism, as pointed out by Hill, was that it viewed trade as a zero sum game (a situation in which a gain by one country results in a loss by another). Nonetheless, it is believed that mercantilism is still alive today; even recently, the trade strategy of many nations is designed to simultaneously boost exports and limit imports. According to Hill (1998), for example, Japan is a neo-mercantilist nation because its government, while publicly supporting free trade, simultaneously seeks to protect certain segments of its economy from more efficient foreign competition. Extending the explanation, Hill affirms that it was left to Adam Smith and David Ricardo to show the shortsightedness of this approach and to demonstrate that trade is a positive sum game (a situation in which all countries can benefit, even if some benefit more than others do).

2.2.5.2 Adam Smith's Theory of Absolute Advantage

The classical economist Adam Smith in his theory of absolute advantage provided the earliest evidence of the gain arising from foreign trade. Hill (1998, p.127), explained that absolute advantage refers to the situation in which one country is more efficient at producing a product than any other country. Jeannet and Hennessey (2001, p. 42) tried to explain the theory of absolute advantage as 'While there are many variables that may be listed as the primary determinants of international trade, productivity differences rank high on the list". Hence, Smith's theory of absolute advantage states that a country tends to specialize in the production of commodities in which it has absolute advantage in cost of production. In support of this idea, Dwivedi (2002, p. 508) also elaborates the concept of Smith's absolute advantage as "It may be possible for all countries to produce all the commodities they need, in spite of resource constraints. Nevertheless, the cost of production of goods for which a country is deficient in its resource endowments would be exorbitantly high. It is, therefore, advantageous for a country to specialize in the production of commodities, which it can produce most efficiently."

However, according to Jeannet and Hennessey (2002, p. 43), it is not possible to conclude that absolute differences in production capabilities are necessary for trade to occur. That leads to the emergence of the theory of comparative advantage.

2.2.5.3 David Ricardo's Theory of Comparative Advantage

Ricardo took Smith's theory one-step further by exploring what if one country has an absolute advantage or an absolute disadvantage. However, according to Jeannet and Hennessey (2002, p. 43), the theory of comparative advantage measures a products' cost of production, not in monetary terms, but in terms of the foregone opportunity to produce something else. It focuses on trade-offs. David Ricardo's theory of comparative advantage is explained by Hill (1998, p. 131), as a situation in which a country specializes in the production of those goods that it produces most efficiently and to buy from other countries those goods that it produces less efficiently, even if this means buying goods from other countries that it could produce more efficiently itself. In addition, Dwivedi (2002, p. 59) describes Ricardo's theory of comparative advantage, as "it is possible to have a gainful trade between two countries even if one country has absolute advantage in the production of both the commodities and the

other absolute disadvantage in the production of both the commodities. ”David Ricardo’s theory of comparative advantage has been criticized since based on such grounds as the assumption of labor homogeneity all over the world, labor being the only factor of production, the demand side being ignored, and so on. According to Michael Porter, as stated by Jeannet and Hennessey (2001, p. 45), “…while the theory of comparative advantage has appeal, it is limited just to the factors of production on land, labor, natural resources, and capital.” According to Jeannet and Hennessey (2001, p. 46), the theory of comparative advantage suggests that it is the relative rather than the absolute differences in productivity that can form a determining basis for international trade. However, these two authors claim that this theory gives little insight into the source of the relative productivity. The notion of comparative advantage requires that nations make intensive use of those factors they possess in abundance. They should export those goods in which they have a comparative advantage and import those goods in which they have comparative disadvantage. From this, it can be inferred that Ricardo’s theory stresses comparative advantage arises from differences in productivity or differences in the cost of production is the basis for international trade.

2.2.5.4 The Heckscher-Ohlin Theory of Trade

This theory is also referred to as “the factor endowment theory of trade or the modern theory of trade.” The theory tries to address why some nations enjoy comparative advantage in the production of some goods and how this comparative advantage forms the basis for international trade. More specifically, Hill (1998, p. 63) states that the Heckscher-Ohlin theory tries to answer the following questions, which were not addressed by the Ricardian theory of comparative advantage:

1. Why does a nation have comparative advantage in the production of a commodity and a comparative disadvantage in the production of another commodity?
2. Why the production possibility curves of any two nations differ?

According to Hill (1998, p.151), the Heckscher-Ohlin theory argues that the pattern of international trade is determined by differences in factor endowments. It predicts that countries will export those goods that make intensive use of locally abundant factors, and will import goods that make intensive use of factors that are locally scarce.

The Leontief Paradox

The Heckscher-Ohlin theory has been one of the most influential theoretical ideas in international economics. Most economists prefer the Heckscher-Ohlin theory to Ricardo's theory because it makes fewer simplifying assumptions, and it has been subjected to many empirical tests.

Beginning with a famous study published in 1953 by Wassily Leontief (winner of the Nobel Prize in economics in 1973), many of these tests have raised questions about the validity of the Heckscher-Ohlin theory. Using the Heckscher-Ohlin theory, Leontief postulated that since the United States was relatively abundant in capital compared to other nations, it would be an exporter of capital-intensive goods and an importer of labor- intensive goods.

To his surprise, however, he found that US exports were less capital-intensive than US imports. Since this result was a variance with the prediction of the theory, it has become known as the Leontief paradox.

2.2.5.5 The Product Life-Cycle Theory

Raymond Vernon initially proposed this theory in the mid 1960s. The theory suggests that trade patterns are influenced by where a new product is introduced first (Hill, p. 151). According to Jeannet and Hennessey (2001, p.48), whereas the Heckscher-Ohlin theory argues that the pattern of international trade is determined by differences in factor endowments, the product life cycle theory focuses on the role of technology, economies of scale, transportation costs and changing input requirements. In addition, the Hecksher-Ohlin theory predicts that countries will export those goods that make intensive use of locally abundant factors and will import goods that make intensive use of factors that are locally scarce. On the other hand, the product lifecycle theory suggests that trade patterns are influenced by where a new product is introduced. On the other hand, some scholars claim that the product life cycle theory seems to be less predictive in an increasingly integrated global economy.

2.2.5.6 The New Trade Theory

This theory argues that in those industries where the existence of substantial economies of scale implies that the world market will profitably support only a few

firms. Countries may predominate in the export of certain products simply because they had a firm that was a first mover in that industry. First mover advantages can be explained as economic and strategic advantages that accrue to early entrants in an industry. According to Hill (1998, p.141), the new trade theory is at a variance with the Heckscher-Ohlin theory where as it is not at a variance with the theory of comparative advantage. Since economies of scale result in an increase in the efficiency of resource utilization, and hence, in productivity, the new trade theory identifies an important source of comparative advantage. Consistent with this theory, a recent study suggested that first mover advantages are important factors in explaining the dominance of firms from certain nations in certain industries. Hill (1998, p.142) argues that the most contentious implication of the new trade theory is the argument that it generates for government intervention and strategic trade policy. The new trade theory stresses the role of luck, entrepreneurship and innovation in giving a firm first mover advantages.

2.2.5.7 Porter's Theory of National Competitive Advantage

Michael Porter focused on why some nations succeed and others fail in international competition. More specifically, Porter explains why a nation achieves international success in a particular industry (Hill,2005, pp. 142- 150). Michael Porter in his theory of national competitive advantage identifies four broad attributes of a nation that shape the environment in which local firms compete, and that these attributes promote or impede the creation of competitive advantage. Porter identified the four attributes as factor endowments (such as skilled labor or the infrastructure), demand conditions (nature of local demand for the product), related and supporting industries and firm strategy, structure, and rivalry (the conditions in how companies are created, organized and managed and the nature of domestic rivalry). Michael Porter also maintains that two additional variables can influence the national demand in two important ways: chance and government. Chance events such as major innovation create discontinuities that can unfreeze or reshape industry structure and provide the opportunity for one nation's firms to support another's government by its choice of policies, detracting from or improving national advantage. For example, regulation can alter home demand conditions, antitrust policies can influence the intensity of rivalry within an industry, and government investment in education can change factor endowments.

The Ricardian theory of trade indicates that countries producing as per their comparative advantage would benefit more from trade. This benefit comes from the differences in the productivity of labor in different countries making some countries efficient in the production of one good and other countries in other goods. This theory of course assumes only one factor of production that is perfectly mobile across sectors (Krugman and Obstfeld, 2003).

The specific factors model improves on the Ricardian theory to explain why countries tend to protect some sectors from international trade claiming that factors are not easily substitutable among sectors. This, therefore, means that while trade benefits the factors of production engaged in the export sector it hurts those factors engaged in the production of import competing sectors. This means trade will have implications on distribution of income (ibid).

Another theory relating causes of trade with resources is the Heckscher –Ohlin theory of trade. This theory states that countries should produce and export those products whose factors of production are abundantly available. Similar to the specific factors model the owners of abundant resources benefit and owners of the less abundant resource lose. Because this model assumes the shifting of resources to produce the different goods this would result in the convergence of factor process also known as factor price equalization in the model (Thompson, 2006).

Intra-industry trade is another theory explaining the motives of countries to trade. This theory asserts that countries don't specialize in the production and export of certain goods. Rather they export and import goods of the same type in the same industry. This as explained by Krugman (2003) is due to increasing returns to scale and imperfect competition. This assertion goes in contrast to the neo-classical analysis of constant returns to scale and perfect competition assumptions to analyze trade. Prebisch and Singer (1950) studied the long-term behavior of terms of trade of primary products. They assert that in the long-term the prices of primary products in international markets decline thereby worsening the terms of trade for developing countries depending on primary exports. This implies an inward looking approach contrary to the classical theory of trade. This theory implies that instead of specializing in the sector with comparative advantage or resource abundance, they should diversify their production in favor of non-primary goods. This notion has been

a subject of debate regarding trade and still remains so. There have been a number of empirical studies that try to prove or disprove this hypothesis (Sarkar, 1994).

2.2.6 The Logistic Performance Impact on International Trade

Globalization in general terms are the process of broadening and extending the inter-relationships between international trade, foreign direct investment and portfolio flows. The consequence of globalization is creating a global marketplace for goods and services that is largely indifferent to national borders and governmental influence. Globalization since the 1960s have altered the production, export and employment structure of the world economy; but, many barriers to full integration still remained. Although analysts seem to differ on the policy implications of globalization, most would concur that the post-1980s episode is likely to herald more rapid international economic integration than previous episodes. Rapid technological change particularly the revolution in computing and communications technologies coupled with falls in barriers to international trade such as through the implementation of the Uruguay Round Agreements and economic liberalization in developing countries, have driven it. Also, other The World Trade Organization (WTO) agreements and regional treaties forced domestic markets to open up in that regard a means of communication and transportation like telecommunications, road, railway, marina and air transports widely support the organization agreement agenda.

Currently the most modern and dynamic industries are transnational in scope since they are the result of an integrated system of global trade and production. Therefore, the development options for many developing countries depending on a significant degree, on the kind of export roles they assume in the global economy and their ability to proceed to more sophisticated, high-value industrial niches.

2.2.7 Logistics Performance Index and Its Components

The global logistics industry is characterized by high costs of operations, low margins, shortage of talent, and infrastructural bottlenecks alongside increasing demand from clients for providing one-stop solutions to all their needs and for investing in progressive technology. All these factors further decreases the margins involved in this industry and fasten the process of consolidation in the industry through acquisitions, mergers and alliances (NSDC 2010). Generally, the IMF report

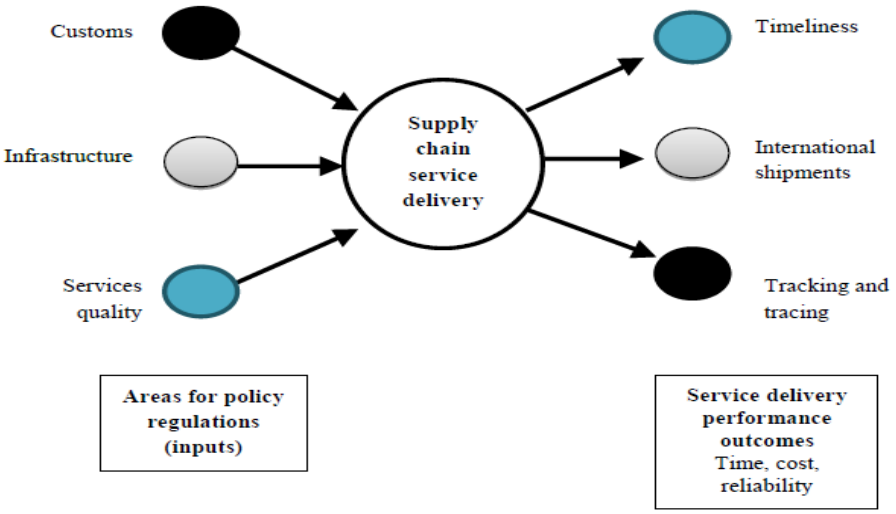
(2013), logistics costs average about 12 percent of the world's gross domestic product. The report noted that for many firms, after the cost of goods sold, logistics represents the highest cost of doing business. Accordingly, the importance of efficient logistics is now widely accepted by policymakers worldwide. Trade and commerce are moved within and across borders by private operators. The efficiency of those supply chain logistics performance is what the Logistics Performance Index (LPI) and its components measure. This performance depends heavily on the policy environment: measured by individual countries or regional economic groups in infrastructure provision, regulation and development of services or facilitation of trade through more friendly procedures at the border contribute substantially to logistics performance (WTO 2014).

The LPI survey was carried out through The World Bank's partnership with the International Association of Freight Forwarders (FIATA), the Global Express Association(GEA), AND THE Global Facilitation Partnership for Transportation and Trade (GFP) (The World Bank 2002). The Logistics Performance Index (LPI) analyzes countries in six components:

1. The efficiency of customs and border management clearance.
2. The quality of trade and transport infrastructure.
3. The ease of arranging competitively priced shipments.
4. The competence and quality of logistics services.
5. The ability to track and trace consignments.
6. The frequency with which shipments reach consignees within schedule or expected delivery times.

International LPI based on the assessment of foreign operators located in the country's major partners, and weighs the average of the six components above (World Bank 2002).

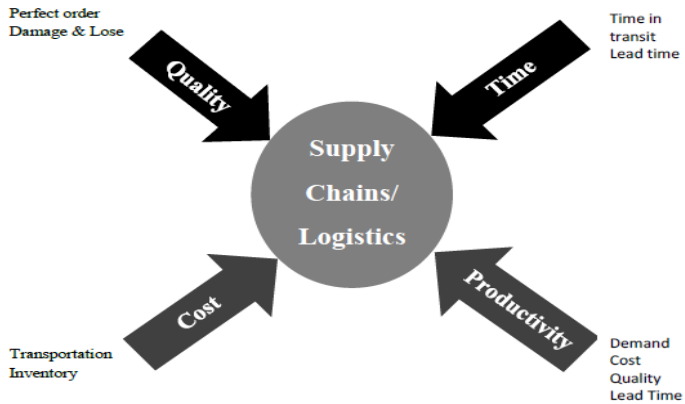
Fig 3: Input and Outcome LPI Indicators



Source: (WTO 2012).

The components were chosen based on recent theoretical and empirical research and on the practical experience of logistics professionals involved in international freight forwarding (WTO 2012). LPI survey has been made 4 times so far, in 2007, 2010, 2012 and 2014. Based on a worldwide survey of global freight forwarders and express carriers, the LPI is a benchmarking tool developed by the World Bank that measures performance along the logistics supply chain within a country. Allowing for comparisons across 160 countries, the index can help countries identify challenges and opportunities and improve their logistics performance (WTO 2014). The index ranges from 1 to 5, with a higher score representing better performance (The World Bank 2014).

Fig 4: Logistics Performance Drivers



Source: (WTO 2012).

2.3 Empirical Review

According to Brooks (2008) trade networks demand superior logistics services and centers that minimize financial and time costs while ensuring reliable delivery of goods, thereby facilitating better improvements for both; in general efficient transportation infrastructures lower transaction costs, raise value added, and increase potential profitability. The cost of transportation globally is 15-16% of the logistics cost, in Asia a 10% reduction in transport costs would boost trade by about 3–4%. Afro Consult (2010) showed that in Africa, East Africa has the highest transport cost in the world. For instance, the logistics cost proportion in 2003 was about 15% of import value compared to 5.4% for the world average. The situation of landlocked countries, such as Ethiopia was 16% of the foreign trade values in 2008 where in that much cost was consumed by transport and transit costs which were nearly double of the coastal countries on average at the time.

Many research studies deal with measuring competitiveness from different perspectives (e.g. Simionescu et al., 2017; Bánociová and Martinková, 2017; Simionescu, 2016; Calabrese et al., 2013; Vigoda-Gadot et al., 2008). Some of them assess competitiveness of countries in relation to selected factors, where research confrontational and interpretational lines play an interesting role.For instance, Odehnal et al. (2012) measure the competitiveness of Ukraine regions. For the purpose of their analyses, they chose several socioeconomic indicators from various industries. They used factor analysis and its results to arrive at the conclusion that out of four analyzed entry variables, one explained nearly half of the data source. Further, the following factors were analyzed: economic development factor, industry development factor, migration and employment rate factor, job market factor, and development factor. Önsel et al. (2008) in their study, examine the competitiveness of countries, while declaring the fact that the gross domestic product as an indicator has many limitations in terms of a correct grouping of countries via cluster analysis. Accordingly, 178 criteria were set within 11 sections, while three main indicators were measured: the so-called macroeconomic index, index of public institutions, and technological index. The results of their analysis are clusters of countries based on their level of competitiveness and a draft list of criteria for further analysis conducted by applying neural networks. The final country groups reflect the most commonly used indicator which is the gross domestic product.

E.Sandberg and M.Abrahamsson explore how to generate sustainable competitive advantage in the best two Swedish practice-companies that successfully exploit logistics as a source of competitive advantage. By using a theoretical framework based on the resource results from review of a firm, the research elaborates the link between operational and dynamic logistics capabilities and sustainable competitive advantage. The study identified the five dynamic capabilities, namely managerial knowledge and presence, cross-functional teamwork, control, learning and supply chain relationships. Those all are vital for the continuous development of the bundling of logistics process and Information Technology (IT) systems.

Agosinet. Al. (2009) used 40 years data on 130 countries to estimate the determinants of export diversification. They use two-step GMM estimation on three groups of explanatory variables. The first group of variables includes reform related ones like trade openness and financial sector developments. The second group of variables includes structural determinants of exports like factor endowments and distance. The third group consists of macro-economic factors that affect exports like exchange rate volatility, terms of trade, interaction of human capital with terms of trade. They find that trade openness encourages specialization and therefore is negatively related to export diversification. On the other hand, financial development and higher schooling have a positive relation while exchange rate overvaluation and terms of trade improvement have a negative impact. This study is robust as it explores a number of measures and methods to estimate the determinants.

Ülenginet al. (2002) assesses competitiveness based on the evaluation of the World Competitiveness Index by the International Institute for Management Development. One of its components is gross domestic product. The research by Rozmahelet al. (2014) also has a significantly different research character when measuring competitiveness. Emphasis is put on the evaluation of the European Union member countries‟ infrastructure. The authors of the research primarily focus on EU‟s new members even though the analysis is performed using the data of all member countries, or potential future members in the given time period. The research implies that disparities between countries are gradually eliminated over time.

2.4 Summary of Literature and Research Gaps

Although the typical trade theory and empirical literatures reviewed above, and the previous section has addressed several issues relating to trade and its connectedness to nations economic growth and development; studies empirically examining the direct effect of logistics on international trade is still rare. Much of the studies connecting logistics to trade are industry based as reviewed in section above. This has also constrained the direct linkage of the findings of several of the studies to the conceptual framework as discussed above. The analytical framework and analysis that follows below is expected to make some connection on the importance of logistics with the conceptual framework.

As Arvis et al. (2014) recognized logistics is one of the most important elements of a country's competitiveness. Furthermore, sophisticated logistics systems are considered to be the triggers for foreign investments as well as international trade. Overall, logistics is a necessity for international trade as logistics enables trade exchange through transportation between countries. According to Verhetselet al. (2015) it is logistics that allows global trade through its developments in transportation and information technology. Performing logistics at a low level may isolate a country from the world markets. Consequently, the implementation of logistic systems that work has a major impact on all countries which are trading together.

From the above reviewed related literature the researcher recognized the knowledge contribution of existing study and the gap remain uncovered. To sum up, in this dynamic and fast growing world economy, holding strong ground of trade competitiveness is essential and one way of having this comparative advantage is through establishing a well-established and efficient logistic system so as to minimize logistic costs. In addition to these, in developing countries, the need to improve logistics performance in order to increase trade flows is increasing overtime since it is becoming one of the most important factors in determining the volume of trade between countries. Ethiopia as being a developing and land locked country; its logistics system is characterized by poor logistics management system and performance which further hampers the countries competitiveness in the global market.

Therefore, the paper adapted the comprehensive review of trade theories provided Blonigen and Wilson (2013) including, the comparative advantage theory, the new trade theory and recent advances in trade theory. Past literature has extensively addressed the long-term influence of trade on economic growth and development of nations. Finally, the researcher expected to add incremental knowledge as an input for future researchers on the field of logistics performance and international trade.

2.5 Conceptual Framework, Hypotheses and Measures

The conceptual framework of this study follows the well-established international trade theory. Almost two centuries ago, the theory of comparative advantage based on David Riccardo's work (Riccardo, 1870) postulated that countries can engage in mutually beneficial trade with each other and specialize their production in goods for which their opportunity cost of production (relative to the other country) is lowest. This theory has been generalized and extended from the initial two-good setting to a multiproduct setting (for example, Dornbusch, Fischer and Samuelson, 1977) and multi-country contexts (for example, Eaton and Kortam, 2002). Building on the theory of comparative advantage, Swedish economist, Eli Heckscher and Bertil Ohlin (his student) provided an alternative model to the Riccardo's (1870) model, widely known as the Heckscher-Ohlin (H-O) model where relative autarky price differences arise from differing factor endowments in countries and differing intensities with which sectors use these factors of production. In essence, the H-O theorem postulated that a country will export the good that uses relatively intensively the factor of production which is relatively abundant in a country.

Given the increased levels of trade of the 20th century between countries with similar characteristics which made it somewhat difficult to explain by comparative advantage, Paul Robin Krugman explained the patterns of international trade and the locality of economic activity in different countries which led to the development of new trade theory (Krugman, 1979). The Krugman (1979) model has two core elements. The first is that the production sector in each country is characterized by monopolistic firms with economies of scale. The second is that utility increases as more variation of a product is available for consumption. The recent advance in trade theory is the focus on micro foundations and effects of trade, that is, the understanding of agents who make decision to engage in international trade. In a

general equilibrium framework, Melitz (2003) introduces the extension of the new trade theory. Yip (2012) provides a good review of the importance of new trade theory in analyzing bilateral trade. Blonigen and Wilson (2013) provided a comprehensive review of trade theories, including, the comparative advantage theory, the new trade theory and recent advances in trade theory. Past literature has extensively addressed the long-term influence of trade on economic growth and development of nations, for example, Greenaway, Morgan and Wright (2002); Yanikkaya (2003); Santos-Paulino (2005); Kneller, Morgan and Kanchanahatakij (2008); Chang, Kattani and Loayza (2009); and Gani and Scrimgeour (2016).

This study will examine whether logistical factors can explain a country's attractiveness as trading partner or as international competitiveness has so far been under researched. Consequently it is the goal of this paper to focus on the analysis of the relationship between logistics and trade flows and examines the question which logistical factors describe the quality of a country's logistics capability (LC). LC is thereby operationalized by the logistics performance index (LPI). The basic hypothesis of this paper states that a good LC positively affects the import and export volume. By doing so, this paper closes the identified research gap. In addition, the paper offers an alternative approach to look at logistics from a macro-economic perspective. Very often, only fractions of logistics are examined in order to explain the LC.

In this paper, an empirical approach is applied by a panel analysis of the LC of selected partner countries. This allows getting conclusions on the statistically significant influence of logistics on international trade performance. Furthermore, important practical implications can be derived as the results will allow identifying those areas in which infrastructure investments are useful. These then make those countries more attractive for trade partner as their frame conditions are improved.

In order to address the objective of the study, thus the researcher will estimate a gravity model to identify the determinants of Ethiopian export performance, assigning special importance to the weighting of logistics and how this variable has developed since 2007.

In accordance with the objective of this research, the core variable of interest is Logistics and includes an overall measure of logistics performance (LP-O) as well as

measures of logistics specificities. Since, the study also focuses on analyzing the importance of each LPI component in trade flows, the components of the LPI are markedly correlated means it is not feasible to estimate one single equation including all the components, as doing so would lead to multicollinearity and erroneous results. Given the positive effect of LP-O on exports and imports, the empirical analysis was extended further to test if some of the specific aspects of logistics (logistics specificities) mattered for trade. The effects of six disaggregated measures of logistics have been tested for exports and imports.

These are: the ability to track and trace consignments (LP-C); competence and quality of logistics services (LP-S); ease of arranging competitively priced shipments (LP-ST); efficiency of customs clearance process (LP-CC); frequency with which shipments reach consignee within scheduled or expected time (LP-F); and quality of trade and transport related infrastructure (LP-I). These six measures of logistics specificities will be test too in several specifications one at a time to avoid the multicollinearity effect (the variable overlapping effect).

To sum up, the analytical examinations of the assumed relationships will perform in three steps: First, The six measures of logistics specificities has been tested in several specifications one at a time to avoid the multicollinearity effect (the variable overlapping effect) using Correlation Matrix. Next, analyze the logistical data separately in order to obtain specific information on a country's overall logistic performance indicators (OLPI). Given the positive effect of OLPI on exports and imports, the empirical analysis was extended further to test if some of the specific aspects of logistics (logistics specificities) mattered for trade. Third, the effects of six disaggregated measures of logistics have been tested for exports and imports. Furthermore this makes it possible to see which areas offer improvements as well as developments over time are made visible. Overall, this step allows the identification of strengths and weaknesses of the examination unit in regards to the LPI, Finally, the study have been performed a panel data analysis and worked out individual timely effects of the logistical indicators on trade volumes as well as the size of these effects.

2.6 Hypothesis of the study

Consequently it is the goal of this paper to focus on the analysis of the relationship between countries' logistics performance and export trade performance level and test whether the specific logistical factors describe the export trade performance of a

country. In accordance, the basic hypothesis of this paper expects that a good Logistic performance positively affects the international trade volume. Accordingly, Based on literatures reviewed above, the following hypotheses have been formulated and have been checked in this study:

H1. Overall LPI components of exporter and importer have statistically significant positive effect on export trade flows of Ethiopia.

H2. The efficiency of customs and border management clearance of exporter and importer has statistically significant positive effect on export trade in trade flows of Ethiopia

H3. The quality of trade and transport infrastructure of exporter and importer has statistically significant positive effect on export trade in trade flows of Ethiopia

H4. The ease of arranging competitively priced shipments of exporter and importer has statistically significant positive effect on export trade in trade flows of Ethiopia

H5. The competence and quality of logistics services of exporter and importer has statistically significant positive effect on export trade in trade flows of Ethiopia

H6. The ability to track and trace consignments of exporter and importer has statistically significant positive effect on export trade in trade flows of Ethiopia

H7. The frequency with which shipments reach consignees within schedule or expected delivery times of exporter and importer has statistically significant positive effect on export trade in trade flows of Ethiopia

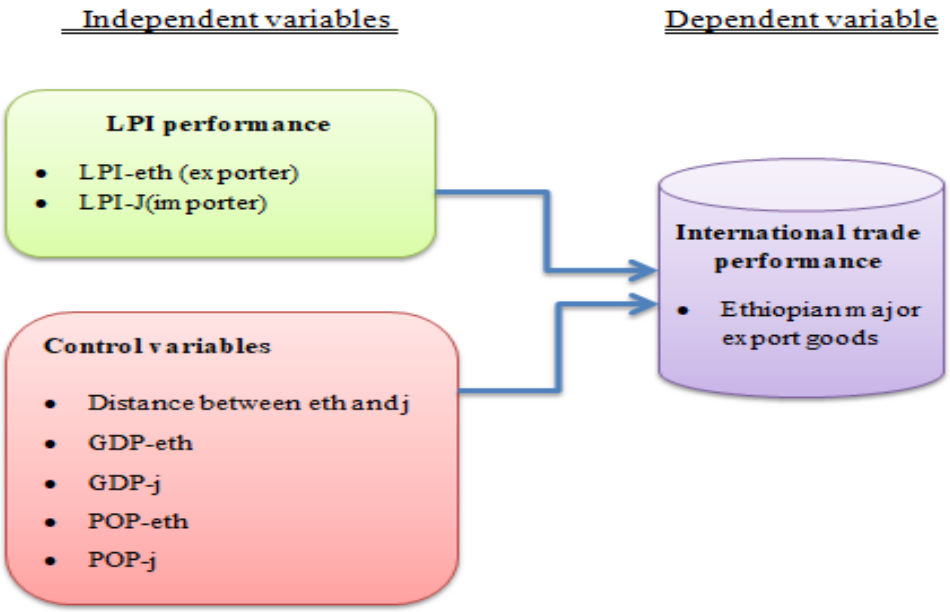
H8. The effect of distance between countries have negative and statistically significant on export trade performance of Ethiopia

H9. The GDP of exporting and importing countries will have positive and statistically significant effect on export trade performance of Ethiopia

H10. the population size of the exporting country(Ethiopia) will have negative effect on export trade performance of Ethiopia

H11. The population size of the importer population will have positive effect on export trade performance of Ethiopia

Fig 4: **conceptual framework**



Source: self-constructed

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Description of the Study Area

The preceding chapter has indicated the literature on the logistic service performance and its impact on international trade competitiveness. Both theoretical and empirical reviews were made and indicated the deficient of empirical studies in Ethiopia regarding export trade logistic performance and its impact on export trade competitiveness.

This chapter looks at the research methodology. The research methodology was the systematic, theoretical analysis of the procedures applied to a field of study (Kothari, 2004). It describes the research philosophy, research design, empirical model, target population, sample design, data collection instruments, data collection procedure, data validity, data reliability data analysis and presentation and diagnostic tests. While, the general objective of this research is to investigate the Ethiopian logistic performance and to scrutinize the significance level of its impact on international trade competitiveness in the case of Ethiopian major export goods with the aim of identifying the gaps. To meet this objective, the following research methodology was followed in the course of conducting the research.

3.2 Research Approach

The study used quantitative approaches, a quantitative approach is one in which the investigatory primarily uses postpositive claims for developing knowledge, employs strategies of inquiry to provide data that can answer the research questions or achieve the research objectives. In fact, there are many types of research approaches, depending on the types of data that the researcher wants to collect and analyze, such as experiment, survey, case study, action research and grounded theory. However, this study employed case study because there is a wide scope of competencies to be evaluated within a serious of time in this research. These determines a long interaction time, which in turns to aimed at attracting a wider sample group with a given time interval.

3.3 Research Design

The research purpose was to investigate and analyze impacts and hence, the researcher used explanatory research design since it emphasize on studying a situation or a problem in order to explain the relationships between variables.

This study also, adopted a quantitative longitudinal research design. A longitudinal study follows the same sample over time and makes repeated observations (Forgues, Bernard and Vandangeon-Derumez, 2011). Measurements are taken on each variable over two or more distinct time periods. This allows the researcher to measure change in variables over time. Since it is a series of data points indexed in time order. Most commonly, a time series is a sequence taken at successive equally spaced points in time.

3.4 Population and Sample

To evaluate the impact of logistic performance on international trade with its implications for export trade flow, the study have used panel data over the period of 2007-2016 and ten countries those major trading partners of Ethiopia (China, Japan, Germany, Saudi Arabia, United Arab Emirates, United Kingdom, Italy, and Sudan). The countries are chosen purposively on the basis of their importance in exports and their share in Ethiopia's trade as well as availability of data on the variables for the model estimation which the World Bank publishes the LPI. Major destinations for Ethiopia's exports in 2017/2016 were: Asia 39.8% (of which China accounted for 22.3%), Europe 28.7% and Africa 20.9%. In FY 2017/2018, the United States was Ethiopia's leading export market representing 9.9% of total exports, registering a 2% increase from the previous year (Comtrade database, United Nations 2018).

3.5 Data Sources and Types

The researcher used secondary sources of data. Data for logistic performance sourced from the World Bank report which are conducts the LPI data survey every two years and available for the years 2007, 2010, 2012, 2014, and 2016. Data for exports trade in tons has obtained from International Trade Commodity (ITC) statistics while GDP per capita was obtained from World Development Indicators database of the World Bank.

3.6 Data Collection Procedures

In order to assess the logistic performance and international trade with its implications for export trade, the LPI, data have been collected from the official Websites of the World Bank and associated organizations. However, countries of unfiled or missing data have not considered.

As regards the explanatory variables, distance between countries expressed in kilometers has been calculated as the straight-line distance between capitals, which acts as an initial estimation in view of the difficulty involved in locating producer regions that are often spread across the territory of exporting and importing countries. GDP (in dollars) and population data have been obtained from the United Nations database and the LPI for exporters and importers come from the World Bank.

Additional information also collected from different sources includes the international organizations policy and standards documents and international organizations annual reports (World Bank report, WTO, OECD, and UNCTAD), organizations internal reports, publications, newspapers, journals, documents from respective government offices etc.

3.7 Data Analysis

After data have been collected, data processing was carried out. The raw data were converted into suitable form for analysis and interpretation. This has achieved through sequences of activities including editing, coding, entry, and tabulation. The objective has to check the completeness, internal consistency and appropriateness of the data to each of the variables. Statistical analysis has been carried out by using Eview Software (v. 11).

The study has taken into account the performance of as both the independent and dependent variables are measurable. The inferential statistics has been used to made inference based on the findings regarding the effect and relationship between the dependent and independent variables indicated above. This was done by establishing a regression model. In addition, gravity model have been applied to indicate the relationship between trade and logistic service performance. To this end multiple linear regressions were used to measure the relative weighting of the independent variables considered here on a dependent variable and test the hypothesis. Using the

(β) weighting, this regression model calculates how many standard deviation units are changed in the dependent variables for each standard deviation unit of change in each of the independent variables

3.7.1 Selection of logistical indicators

The logistics performance (LPI) is the weighted average of the country scores on the six key dimensions:

1. Efficiency of the clearance process (i.e.; speed, simplicity and predictability of formalities) by border control agencies, including customs.
2. Quality of trade and transport related infrastructure (e.g., ports, railroads, roads, information technology);
3. Ease of arranging competitively priced shipments;
4. Competence and quality of logistics services (e.g., transport operators, customs brokers);
5. Ability to track and trace consignments;
6. Timeliness of shipments in reaching destination within the scheduled or expected delivery time.

The theoretical framework to study the influence of logistics on trade flows is based on gravity equations. Several studies have provided theoretical foundations for the gravity model and contributed to its popularity. These studies show that estimates can be derived from different theoretical frameworks, such as the Ricardian, Heckscher–Ohlin, and increasing returns to scale models.

Accordingly, Gravity models began to obtain sound theoretical groundings from the 1970s onwards after being applied to various contexts in economics (Anderson, 1979; Bergstrand, 1985, 1989; Helpman and Krugman, 1985; Deardoff, 1995; Evenett and Keller, 1998; Anderson and van Wincoop, 2003). Theoretical foundations for estimating gravity equations were also enhanced in Anderson and van Wincoop (2003, 2004). Their model incorporates firms with varying productivity so that only the more productive firms find it profitable to export, and the profitability of exports varies by destination, as exports are higher to countries with higher demand and lower variable and fixed export costs. An analogy of Newton's gravitational attraction, the basic model considers that bilateral trade flows depend positively on the income of

the two economies and negatively on the distance that separates them, apart from including other dummy variables that capture the qualitative effects that influence the exports of a country (language, border, etc.).

Returning to the objective of the study, the researcher has estimated a gravity model to identify the determinants of Ethiopian export, assigning special importance to the weighting of logistics and how this variable has developed since 2007. More specifically, the gravity equation has been as follows:

Log (EXijt) = 0+ β1 Log (Di)+ β2 Log (GDPi) +β3 Log (GDPj) + β4 Log (Pi) + β5 Log (Pj) +β6 Log (LPIi) + β7 Log (LPIj) + uij……(1)

Where: Xij: Quantity country i exports to country j

Dij: Distance between country I and country j

GDPi: GDP of country i

GDPj: GDP of country j

Pi: Population of country i

POPj: Population of country j

LPI: Logistic Performance Index for country i

LPIj: Logistic Performance Index for country j

According to equation (1), exports depend on economic, geographic and demographic variables together with logistics variables. The effect of distance between countries (β1) should be negative and statistically significant, because proximity promotes trade. Theoretically, the GDP coefficients of both the exporter and also the importer (β2 and β3) will be positive and statistically significant. The reason for this is that the larger an economy is, regardless of whether the country is buying or selling, the more exports and imports can be expected. Furthermore, the population coefficient for the exporting country (β4)could be positive or negative depending on whether the most populated country exports less due to absorbing domestic production, or exports more due to technological and logistics variables associated to the level of economic development predominating. At the same time, the sign of the importer population coefficient (β 5) is also ambiguous for the same reasons as those stated above.

In accordance with the objective of this research, we include the exporter and importer LPI in the gravity model. Both variables have coefficients ($\beta 6$ and $\beta 7$) that represent the importance of trade facilitation in export flows. Consequently, a positive sign is expected in both cases.

The study also focuses on analyzing the importance of each LPI component in trade flows. The fact that the components of the LPI are markedly correlated means it is not feasible to estimate one single equation including all the components, as doing so would lead to multicollinearity and erroneous results. Therefore, regressions similar to equation (1) have been estimated, including each index component separately. As a result, the following equations have been formulated:

Log (Xij)=β0+ β1 Log (Di)+ β2 Log (GDPi) +β3 Log (GDPj) + β4 Log (Pi) + β5 Log (Pj) +β6 Log (Customs i) + β7 Log (Customs j) + uij……(2)

Log (Xij)=β0+ β1 Log (Di)+ β2 Log (GDPi) +β3 Log (GDPj) + β4 Log (Pi) + β5 Log (Pj) +β6 Log (Infrastructure i) + β7 Log (Infrastructure j) + uij……(3)

Log (Xij)=β0+ β1 Log (Di)+ β2 Log (GDPi) +β3 Log (GDPj) + β4 Log (Pi) + β5 Log (Pj) +β6 Log (International shipments i) + β7 Log (International shipments j) + uij……(4)

Log β0+ β1 Log (Di)+β2 Log (GDPi) +β3 Log (GDPj) + β4 Log (Pi) + β5 Log (Pj) +β6 Log (Competence i) + β7 Log (Competence j) + uij..…… ……(5)

Log (Xij)=β0+ β1 Log (Di)+ β2 Log (GDPi) +β3 Log (GDPj) + β4 Log (Pi) + β5 Log (Pj) +β6 Log (Tracking i) + β7 Log (Tracking j) + uij……..……..……(6)

Log (EXij)=β0+ β1 Log (Di)+ β2 Log (GDPi) +β3 Log (GDPj) + β4 Log (Pi) +β5 Log (Pj) + β6 Log (Timelinessi) + β7 Log (Timelinessi) + uij ……..……(7)

Each component is initially expected to display a significant and positive sign, such that higher values of these variables favor international trade. By comparing the results of the estimation, it will be able to ascertain which component has the greatest impact on trade flows and also the changes it has undergone over the period dating from 2007 to 2016.

3.7.2 Ethical Consideration

The published data will have collect from popular source and authorized by designated body and also it have to subject to diagnostic and specification tests. There are also commensurate implications for forecasts and for other inferences that may be drawn from the fitted model

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION OF FINDINGS

4.1 Introduction

In this chapter the data collected was organized into a systematic format to enable analysis. The raw data has converted into suitable form for analysis and interpretation. This has achieved through sequences of activities including editing, coding, entry, and tabulation. The objective has to check the completeness, internal consistency and appropriateness of the data to each of the variables. Statistical analysis has been carried out by using Eview Software (v. 11). The purpose of this chapter was to empirically examine the quantitative effect of logistic performance determinants and its impact on export trade flow, over the multiple periods of five years ranging from 2007-2016.The researcher also analyzed the data in line with the three specific objectives of the study.

The analytical examination of the assumed relationships was performed in three section: First, the researcher analyzed the logistical data separately with respect to the 1st research objectives which indicated the country's logistic performance measurements pattern over the sample period next to the six logistics specificities has been tested to avoid the multicollinearity effect (the variable overlapping effect) using Correlation Matrix. Overall, this step allows the identification of strengths and weaknesses of the examination unit in regards to the logistics performance. Next, examined the overall logistics performance with the Ethiopian export performance data and final section, has investigated which specific logistic performance indicators has significant effect on Ethiopian major export goods more by the use of the pooled data model.

4.2 Test for Multicollinearity

In order to measure the correlation between explanatory variables and to avoid the double effect of independent variables, a correlation matrix has been computed.

Table 4.1: Correlation Matrix

Correlation Probability	EX	D01	GDPETH	GDPJ	POPETH	POPJ	OLPETH	OLPJ
EX	1.000000							
Pro	-----							
D01	0.167253	1.000000						
Pro	0.2457	-----						
GDPETH	0.599886	-2.44E-18	1.000000					
Pro	0.0000	1.0000	-----					
GDPJ	0.520501	0.392258	0.113886	1.000000				
Pro	0.0001	0.0048	0.4310	-----				
POPETH	0.619772	2.61E-31	0.991582	0.118677	1.000000			
Pro	0.0000	1.0000	0.0000	0.4117	-----			
POPJ	0.418049	0.441616	0.008936	0.836719	0.009040	1.000000		
Pro	0.0025	0.0013	0.9509	0.0000	0.9503	-----		
OLPETH	0.269260	-1.39E-18	0.301789	0.058892	0.336801	0.003058	.000000	
Pro	0.0586	1.0000	0.0332	0.6846	0.0168	0.9832	-----	
OLPJ	0.113472	0.538467	0.059332	0.026280	0.049549	-0.010358	0.012065	1.00000
Pro	0.4327	0.0001	0.6823	0.8562	0.7326	0.9431	0.9337	-----

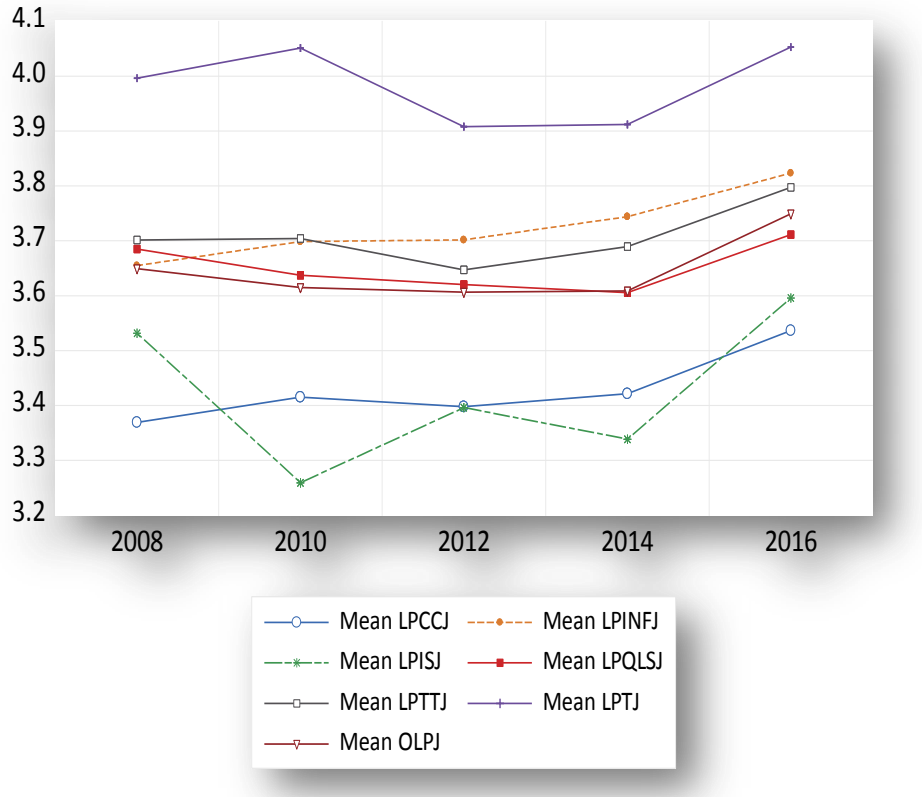
Source: Authors own generate using: EViews 11.

As indicated by table 4.1above, there is no evidence of multicollinearity among explanatory variables. According to Hailer et al. (2006) correlation coefficient below 0.9 may not cause serious multicollinearity problem

4.3 The counters' overall logistics performance trend over time

The diagrams below show whether a high logistic performance leads to increase export volume. Thereby the researcher used the aggregated trade flows on the y-axis and LPI indices on the x-axis. Third, we performed a pooled data analysis by considering the control variables and worked out individual timely effects of the logistical indicators on Ethiopian export volumes as well as the size of these effects. The next figure shows the timely development of the LPI categories.

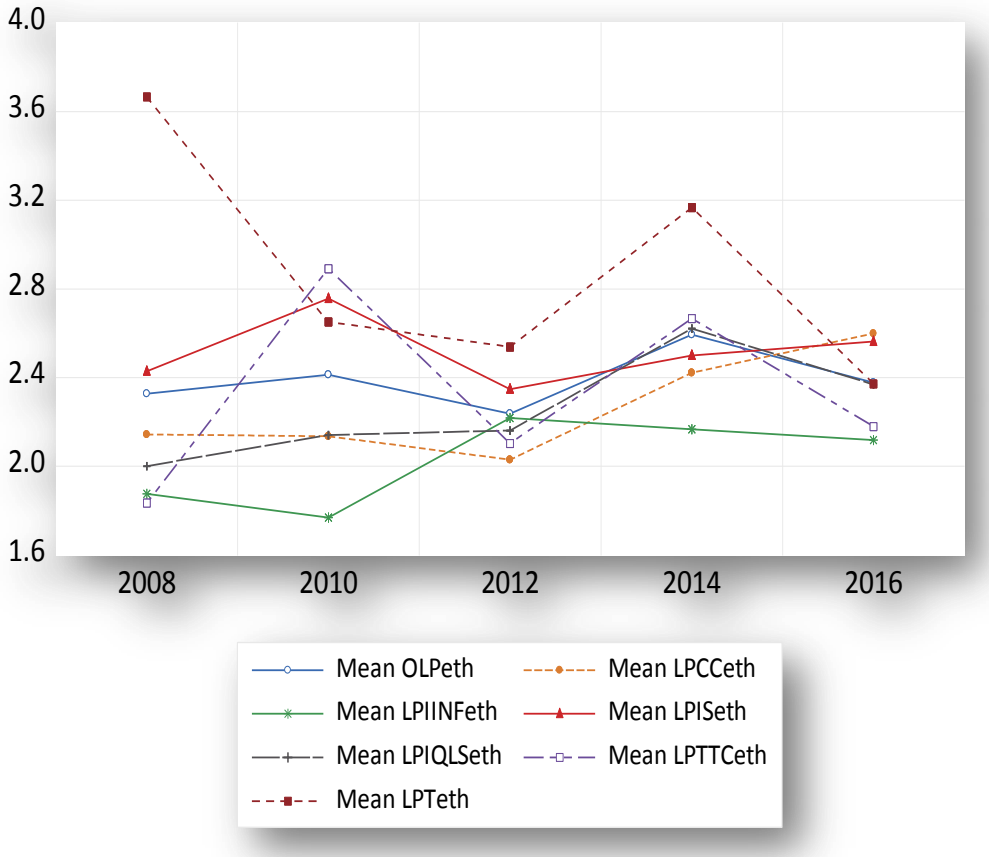
Figer.5: partner countries (J) logistic performance measurements pattern over the sample period



Source: Authors own generate using: EViews 11.

The above presented value were the average score based on the data collected for ten partner countries and shows the average performance of LPI mean. As the study result reviled, the category 'timeliness' (LPTj)gets the best results. This indicator describes the frequency in which receivers get their deliveries within a given time window. In 2007 and 2016, this category scores a value of above 4.0. In contrast, the worst scenarios was 'customs clearance (LPCCj), international shipment (LPISJ)' with score value of between 3.2 and 3.6 However, these categories showed the highest improvement rates for the period of 2016. The rest including overall OLPI evaluation have shown slight improvements over time with a range mean score value between. 3.6to 3.8. Here, for all indicators positive development was visible. The remaining categories of LPI (infrastructure, track and trace, and quality of logistic service were ranked in a medium position and also showed slight improvements in the evaluation over time too.

Figer.6: Ethiopian logistic performance measurements pattern over the sample period



Source: Authors own generate using: EViews 11.

The above presented value were the average score based on the data collected for Ethiopia and shows the average performance of LPI mean. As the study result reviled, the category 'timeliness' (LPTeth) gets the best results. This indicator describes the frequency in which receivers get their deliveries within a given time window. In 2007 and 2016, this category scores a value of above 3.6. In contrast, the worst scenarios was 'infrastructure (LPINFeth)' with score value of between 1.6 and 2.1 However, these categories showed the highest improvement rates for the period of 2012. The rest including overall OLPI evaluation have shown slight improvements over time with a range mean score value between. 2.2to 2.8. Here, for all indicators positive development was visible. The remaining categories of LPI (track and trace, customs clearance, international shipment and quality of logistic service were ranked in a medium position and also showed slight improvements in the evaluation over time too.

This implies the performance each LPI score of Ethiopia were able to observe similar patterns and mediocre results which is relatively positive improvements. These results however are typical for developing countries show improvement potentials in all areas.

4.4 The effect of logistics performance on export trade Variables

This part has been examine the appropriateness of the alternatives models using panel data method and performs the regressions with Eviews-program in advance. Thereby, fixed effects (FE), random effects (RE) techniques and pooled model has been test the suitability of these techniques for explaining the Ethiopian exports. These three methods differ in the way how individual specific effects are treated. In FE model it is assumed that the individual specific effect is correlated with the individual variables. Therefore there is some variable that haven't taken into account, but as it correlates with the ones that do use, there won't be omitted variable bias. In RE model individual specific effect is not correlated with the individual variable so over time there are changes within one group which the variables can't explain.

Since this study deals with the flows of trade between Ethiopia and 10 its main trading partners. Perhaps, the pooled model was more appropriate model than the fixed effect and the random effect specification. Furthermore, the study also applies

the Hausman test and waldtesto check the appropriateness of each model. However, one problem with a fixed effects model is that variables that do not change over time cannot be estimated directly because the inherent transformation wipes out such variables. Due to this fact, the empirical analysis adopts the cross-sectional estimation of the data using pooled model, and the estimation phase combines cross-country and time-series data involving eleven countries including Ethiopia and five-time periods (2007, 2010, 2012, 2014 and 2016).

Next section has been performed all three models regression for Ethiopian's exports to 10 partner countries. the FE method were used to only study the impact of time-variant variables and therefore it was not give results for time-invariant effects, it might still give some interesting results for the time variant variables. When the fixed effects model is applied in the case, it assumes that the individual specific effects are correlated with its observed variables and it gets the following results.

The estimation results for the pooled, fixed and random effects models are presented in Table 4.2 below. The results in the second column of Table 4.2 were those of the pooled data model. The difficult with this model is that it does not allow for heterogeneity of countries, and no country specific effects are estimated. It assumes that all countries are homogenous. The pooled model is the restricted model with the assumption of a single intercept (ij $\alpha = \alpha$) and same parameters over time and across trading partners. The unrestricted model allows an intercept and other parameters to vary across trading partners. The result of the Ftest shows that the null hypothesis of equality of the individual effects is rejected. This implies that a model with individual effects must be selected.

The third column presents the results of the fixed effects model. The fixed effects model introduces heterogeneity by estimating country specific effects. The F-test was performed to check the pool ability of the data.

Finally, the results in column 4 table 4.2 are those of the random effects model. The random effects model also acknowledges heterogeneity in the cross section, but it differs from the fixed effects model in the sense that it assumes that the effects are generated by a specific distribution. It assumes differences in the cross section but does not model each effect explicitly. It avoids the loss of degrees of freedom which

occurs in fixed effects. The LM test for random effects again rejects the null of no cross section heterogeneity in favor of the random effect specification.

The Hausman specification test is used to test the null hypothesis that the repressor's and individual effects are not correlated in order to discriminate between the fixed effects model and random effects model. If the null hypothesis is accepted the random effect will be preferred, but if the null hypothesis is rejected the fixed effects model will be preferred. The result of the Hausman test shows (see annex 10) that the null is rejected, indicating that the country specific effects are correlated with regressed'. This implies that the fixed effect model might be appropriate since random effects estimates are not consistent.

Table 4.2: computation of Models between pooled, Fixed and Random Effects

Variables	Pooled model	Fixed effects model	Random effects model
C	166.2329** (2.092663)		-33.85382 (-0.145003)
LOG(DI)	-0.355864*** (-3.255114)	-------	--------
LOG(GDPETH)	4.821702*** (3.302049)	3.415287	1.293362 (.304557)
LOG(GDPJ)	-0.011352 (-0.469354)	0.023035	0.246215 (0.747683)
LOG(POPETH)	-17.14568** (-2.237273)	-9.553845	1.221226 (0.055100)
LOG(POPJ)	0.230631*** (4.777203)	0.0608294	0.726782 (0.523183)
LOG(OLPETH)	1.550435** (2.346842)	1.035100	0.227807 (0.121938)
LOG(OLPJ)	0.659487** (2.207838)	-1.107766	-2.513621 (-1.239719)

Notes: ***/**/* significant at 1%/5%/10% level. T-statistics are in parentheses.

Source: Authors own estimates: EViews 11.

The study present the regression results in the annex part, so that matter none of the individual time variables were statistically significant. It probably suggests that the year or time effect is not significant. This might suggest that perhaps the Gravity

dependent functions have not changed much over time. Even some of the year effects were omitted from the Time Effect model. This part of the study was indicated in Table from annex 1to 4, at the annex part. Thus the pooled effect model estimation has chosen for the selected models to get the explanatory variables effect on the Trade Models.

4.4.1 The effect of overall logistics performance on export trade performance

As the results of the pooled effect model in Table 4.3 below, show that an increase in the GDP of the Ethiopia leads to an increase in partner countries j exports of major goods. This is consistent with the theoretical expectation. In contrary, the coefficient of partners' countries (J) GDP has a negative and insignificant coefficient. This indicates that an increase in GDPj has no a significant impact on the exports of Ethiopian's major goods.

The population of Ethiopia has a significant negative effect on the export of major goods. The negative coefficient implies that Ethiopia exports less when it grows. However, population of the importing country has a significant positive effect on the export of the major goods. The sign of coefficient of the population is consistent with the theoretical expectation. population coefficient for the exporting country (POPi) could be positive or negative depending on whether the most populated country exports less due to absorbing domestic production, or exports more due to technological and logistics variables associated to the level of economic development predominating. At the same time, the sign of the importer population coefficient (POPj) is also ambiguous for the same reasons as those stated above.

The distance variable in Table 4.3 below, is significant even at 1 % level and has anticipated negative sign which indicates that Ethiopian major export goods to trade more with its immediate neighboring countries. The coefficient value is -0.355864 which indicates that when distance between Ethiopia and country j increases by 1%, the export trade between the two countries decreases about 0.36%.the results of the effects of LP-O on exports volume of Ethiopia. The fit of the models was as expected with lower values given the use of the pooled data. The parameter estimates obtained are corrected for cross-sectional hetroskadasticity. A number of variables produced statistically significant effect. In Tables 4.3; the asterisks, ***; **; and; *; indicate

that the coefficient is statistically significant at the 1, 5, and 10 percent levels, respectively. The t-statistics are in parentheses while (---) indicates that the corresponding variable was not estimated. In all the Tables 4.3 below, N indicates the number of observations and rho is the cross-section rho.

Table 4.3 The effect of overall logistics performance(LP-O) on export trade Variables

Expletory variables of export	**Expected effects**	**Log-linear pooled model**
C	(+)	166.2329** (2.092663)
LOG(DI)	(-)	-0.355864*** (-3.255114)
LOG(GDPETH)	(+/-)	4.821702*** (3.302049)
LOG(GDPJ)	(+/-)	-0.011352 (-0.469354)
LOG(POPETH)	(+/-)	-17.14568** (-2.237273)
LOG(POPJ)	(+)	0.230631*** (4.777203)
LOG(OLPETH)	(+/-)	1.550435** (2.346842)
LOG(OLPJ)	(+)	0.659487** (2.207838)
N		550
F-statistics		-504.4880
Adjusted R2		0.602409
Rho		0.0000

Source: Authors own generate using: EViews 11.

The core variable of interest is OLPI. The result in Table 4.3 shows that the sign on both coefficients (OLPeth and OLPj) were as expected, positive and statistically significant at the 5 percent level for the estimation equation. The statistically positive correlation of both parameters of OLPeth with exports leads to the conclusion that the logistics is an important determinant of international trade as improved trade related logistics can facilitate more trade. This is an important empirical finding in terms of trade facilitation. This finding is consistent with similar arguments raised in earlier studies such as Devlin and Yee (2005) and Lakshman et al. (2001). In estimating equation (1), many standard variables hypothesized to determine trade, other than OLPij, were also controlled for the export and importing countries. As identify from

the above estimation results the overall logistical variables (OLPI) as well as some of the control variable except the partner countries significantly impact export volumes. OLPI variables refer to the overall LPI show a significant influence ($p<0.5$) showing the important role of logistic performance in exports equations as represented in equation (1). This implies that a country needs to be capable to organize competitive logistic service for being a good exporter.

4.4.2 The effect of each logistics indicators on Ethiopian major export goods

Given the positive effect of LP-O on exports and imports, the empirical analysis was extended further to test if some of the specific aspects of logistics (logistics specificities) mattered for export trade. The effects of six disaggregated measures of logistics were tested for Ethiopian major export goods. These were: the ability to track and trace consignments (LP-TT); competence and quality of logistics services (LP-QLS); ease of arranging competitively priced international shipments (LP-IS); efficiency of customs clearance process (LP-CC); frequency with which shipments reach consignee within scheduled or expected time (LP-T); and quality of trade and transport related infrastructure (LP-INF). These six measures of logistics specificities were tested in several specifications one at a time to avoid the multicollinearity effect (the variable overlapping effect).

Table 4.4 below presents the regression results of the effect of each logistic indicator on Ethiopian major export goods. The asterisks, ***; **; and; *; indicate that the coefficient is statistically significant at the 1, 5, and 10 percent levels, respectively. The t-statistics are in parentheses while (---) indicates that the corresponding variable was not estimated. In all the Tables 4.3 below, N indicates the number of observations and rho is the cross-section rho.

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Table 4.4: the effect of each logistic specificities on Ethiopian major export goods

variables	Logistic performance indicators Specific components					
	LPI-CC	LPI-INF	LPI-IS	LPI-QLS	LPI-TT	LPI-T
C	-1020.36 *** (-9.524577)	1333.27 *** (11.24533)	1169.681 *** (11.58045)	79.83059 (1.154305)	336.1097 *** (5.185993)	56.27533 (0.848583)
LOG(DI)	-0.468767 *** (-4.589721)	-0.488747 *** (-5.264755)	-0.31344 *** (-3.917397)	-0.397761 *** (-3.401015)	-0.315519 *** (-3.19409)	-0.285822 *** (-3.049009)
LOG(GDPETH)	-15.68953 *** (-8.315615)	28.11209 *** (12.15116)	23.57535 *** (12.56371)	3.176668 ** (2.514362)	7.785439 *** (6.526404)	2.394182 * (1.936281)
LOG(GDPJ)	-0.000882 (-0.041055)	-0.002543 (-0.120004)	-0.007073 (-0.328619)	-0.011181 (-0.463974)	-0.027978 (-1.306262)	-0.005621 (-0.243245)
LOG(POPETH)	95.99826 *** (9.378827)	-131.2143 *** (-11.36412)	-114.7104 *** (-11.72135)	-8.680784 (-1.306511)	-33.29792 *** (-5.336935)	-5.868403 (-0.916523)
LOG POPj	0.253493 *** (5.819152)	0.247676 5.912487	0.213838 *** (5.361678)	0.240221 (4.832349)	0.238928 *** (5.483381)	0.20794 *** (4.521609)
LOG LPI-CCeth	-7.971391 *** (-12.25258)	-----	----	----	----	----
LOG LPI-CCj	0.919928 *** (3.7307)	----	----	----	----	----
LOG LPI-INFeth	----	-9.448036 *** (-12.35349)	----	----	----	----
LOG LPI-INFj	----	0.92018 *** (4.667578)	----	----	----	----
LOG LPI-ISeth	----	----	9.936588 *** (13.61841)	----	----	----
LOG LPI-ISj	----	----	0.656657 *** (2.646186)	----	----	----
LOG LPI-QLSeth	----	----	----	0.482291 (0.983612)	----	----
LOG LPI-QLSj	----	----	----	0.769606 ** (2.472109)	----	----
LOG LPI-TTeth	----	----	----	----	1.904645 * (12.18057)	----
LOG LPI-TTj	----	----	----	_____	0.410739 *** (1.651124)	----
LOG LPI-Teth	----	----	----	----	----	-1.394708 *** (-6.578292)
LOG LPI-Tj	----	----	----	----	----	0.607386 ** (2.02205)
N	550	550	550	550	550	550
	0.689659	0.692594	0.700182	0.600458	0.682560	0.630265
	175.2890	177.7019	184.1584	118.8677	169.6373	134.6927

The results in Table 4.4 revealed positive and statistically significant effect of all logistics specificities on exports performance except LPI-INFeth and LPI-Teth. The

distance variable is the cost of transport between the bilateral trading countries as stated in Table 4.4 significant at 1 % level and has anticipated negative sign which indicates that Ethiopia tends to trade more with its immediate neighboring countries. The coefficient value is -0.468767 which indicates that when distance between Ethiopia and country j increases by 1%, the bilateral trade between the two countries decreases by 46.88%. Gross domestic product GDPj on the other hand revealed unexpected sign. For example, the coefficient of GDPeth and GDPj is negative despite being significant and in significant for respective countries (eth and j). This negative relationship between GDP and export might be justified in such a way that when GDP of the country increases, domestic absorption will definitely increase for exporter countries. If domestic absorption increases, obviously export will decrease. In general as it can be seen from t-ratios and probabilities all other variables significantly affected the major export goods performance of the country.

As the above pooled data estimation reviled that many of the logistical variables as well as some of the control variable significantly impact export volumes of the country. All of the six logistical variables refer to the efficiency of customs and border management clearance, the quality of trade and transport infrastructure, the ease of arranging competitively priced shipments, the competence and quality of logistics services, the ability to track and trace consignments, the frequency with which shipments reach consignees within schedule or expected delivery times, show a strongly significant influence ($p<.01$) showing the important role of each specific logistic performance in exports performance. This, imply that a country needs to be capable to organize competitive logistic service for being a good exporter.

The results of various model estimation such as Fixed effect, Random effect and pooled model for overall and specific logistic performance, and export trade analysis attached at annex part (Annex 1,2,3,4,5,6,7,8 and 9 respectively) diagnostic tests such as Hausman specification test is used for heteroskedasticity (Annex 10), Breush-Godfrey LM Test for serial correlation (Annex 12), and The study row LPI and control variable (Annex 13 and 14 respectively) were attached on un end matter of the paper.

CHAPTER FIVE

SUMMARY OF MAJOR FINDING, CONCLUSION AND RECOMANDATIONS

This paper aims to assess the logistic performance and international trade with its implications major export goods of Ethiopia. The study also provides the following key insights and lessons: logistic performance and international trade are one of the most expedient economic factors in pushing economies to transition and integration. The objectives of this paper has to provide justification based on LPI, trends and Gravity model analysis of trade flow and the evaluations has been applied on both exporting and importing countries for the sample period of (2007-2016).

5.1 Summary of the study finding

This paper examined the effects of logistics performance in international trade in the case of major export goods of Ethiopia using cross-country export and LPI data for a ten sample of countries as for the sample period.

In the FE regression for exports the distance between countries has been omitted. Even though, the other observed explanatory variables except OLPI of importing country have a positive coefficient, all of them seem to be totally insignificant. Likewise, in the RE regression the results exclude the distance variable and all of them seems to be totally insignificant too. The most significant difference also for RE regression is in the coefficients of POPeth has negative sin as expected however it seems to have no explanatory power.

In contrast, the findings from pooled model revealed correlation of overall logistics performance including control variables of distance and population size of exports and imports countries shows statistically significant with expected sign. In the estimations, the pooled data model can be said to the fit the observations well, instead of the FE and RE models. As the determination coefficient R2 recorded values of more than 0.6 in both cases. Whereas, the variables GDP for partners countries used are insignificant and display the unexpected signs in accordance with the initial hypotheses. More specifically, the coefficient of distance was negative, indicating the geographical proximity boosts trade between countries and the indicators of wealth register positive signs for exporter (Ethiopia), which implies that countries trade more the larger their GDP. Ethiopian population seems to be negatively correlated with the

exports whereas the GDPj appears to be totally insignificant with a coefficient close to zero.

In the case of the focal explanatory variables of this study, the logistic performance induces which is LPI for both the importer and exporter display positive and strong significant coefficients, which show the importance of logistics performance for Ethiopian major goods exports. The study also extended the analysis by examining six measures of logistics specificities on Ethiopian major export goods, providing strong confirmation of positive and statistically significant correlation of all the six of the logistics specificities with partner's side as well. Whereas, In terms of exporting side (Ethiopia) two of the six measures of logistics specificities were found to be negative and statistically significantly correlated with exports.

5.2 Conclusion

The purpose of this paper was to identify the relationship between logistics and trade flows. This is an important issue as logistics can help to strengthen the trade performance of a country. The researcher developed a frame of references in order to test these relationships. The results showed which logistics areas require improvements in order to allow countries a better access to world markets. In the above estimated pooled OLS model when the efficiency of customs and border management clearance, the ability to track and trace consignments, the ease of arranging competitively priced shipments and the competence and quality of logistics services as well as two of control variables referring distance between countries and population of Ethiopia, have shown the expected sign as anticipated with strongly negative significance level and the study hypothesis being accepted. In contrast, the quality of trade and transport infrastructure and the frequency with which shipments reach consignees within schedule or expected delivery times from exporting side (Ethiopia) as well as Gross domestic product of partner countries revealed unexpected sign thus the study hypothesis being rejected. For example, the coefficient of GDPj is negative and being insignificant.

The study results also show that the analyzed countries have enough room for improvements to the logistics sector as logistics infrastructures on a low to medium level. The study was able to show that an increased logistics capability of country leads to an increase in trade volumes. The findings from the panel data analysis

identified a major influence of logistics on Ethiopian major export goods as four out of six logistics variables show a significant positive effect on these volumes. In general the researcher can overall conclude that the study basic hypothesis can be accepted as logistics influences the trade performance of a country.

5.3 Recommendation

Based on the findings of the study and conclusions drawn from them, the following possible and reasonable recommendations are suggested for actions to be undertaken by each stakeholder at different levels. A recommendation for decision makers, policy makers, and concerned bodies is to think about the potential benefits that an improvement of the transport infrastructure, especially roads and water ways, can have. Adopting a new reform and automation on the area of Customs process, police and procedure, helps to accelerate regulatory harmonization with the trade partner's and the implementation of modern techniques with regard to international cooperation, bilateral trade agreements on Police and Customs cooperation and mutual assistance, including protocols on exchanges of pre-shipment information. These techniques help to reduce, the economic disadvantage of low-income countries to overcome, trade barriers.

As the results of the panel data analysis did not show a specific interrelation between the two logistics performance indicators which are the quality of trade and transport infrastructure and the frequency with which shipments reach consignees within schedule or expected delivery times from exporting side (Ethiopia) as well as one of the control variables, Gross domestic product of partner countries revealed unexpected sign hence, the researchers propose to test this relationship in future studies. As well as, based on the research finding, improvement in LPI will have significant effect at reducing cost of trade flows, to do this the availability of LPI data for all countries are one of a very problematic. However, further study shall be conducted on the relevance and availability of all countries data to materialize the world information.

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Annex 1 Fixed effect Least Squares estimation model

Dependent Variable: LOG(EX)
Method: Panel Least Squares
Date: 06/06/20 Time: 15:13
Sample (adjusted): 2008 2016
Periods included: 5
Cross-sections included: 10
Total panel (balanced) observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-33.85382	233.4694	-0.145003	0.8856
LOG(GDPETH)	1.293362	4.246704	0.304557	0.7626
LOG(GDPJ)	0.246215	0.329304	0.747683	0.4598
LOG(POPETH)	1.221226	22.16387	0.055100	0.9564
LOG(POPJ)	0.726782	1.389153	0.523183	0.6042
LOG(OLPETH)	0.227807	1.868218	0.121938	0.9037
LOG(OLPJ)	-2.513621	2.027573	-1.239719	0.2236

Effects Specification

Cross-section fixed (dummy variables)

Root MSE	0.395293	R-squared	0.832713
Mean dependent var	17.19600	Adjusted R-squared	0.758911
S.D. dependent var	0.976282	S.E. of regression	0.479363
Akaike info criterion	1.621619	Sum squared resid	7.812815
Schwarz criterion	2.233467	Log likelihood	-24.54048
Hannan-Quinn criter.	1.854614	F-statistic	11.28294
Durbin-Watson stat	2.202190	Prob(F-statistic)	0.000000

Source: Authors own generate using: EViews 11.

Annex .2: Random effect Least Squares estimation model

Cross-section random effects test equation:
Dependent Variable: LOG(EX)
Method: Panel Least Squares
Date: 06/06/20 Time: 15:16
Sample (adjusted): 2007 2016
Periods included: 5
Cross-sections included: 10
Total panel (balanced) observations: 50
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-33.85382	233.4694	-0.145003	0.8856
LOG(DI)	NA	NA	NA	NA
LOG(GDPETH)	1.293362	4.246704	0.304557	0.7626
LOG(GDPJ)	0.246215	0.329304	0.747683	0.4598
LOG(POPETH)	1.221226	22.16387	0.055100	0.9564
LOG(POPJ)	0.726782	1.389153	0.523183	0.6042
LOG(OLPETH)	0.227807	1.868218	0.121938	0.9037
LOG(OLPJ)	-2.513621	2.027573	-1.239719	0.2236

Effects Specification

Cross-section fixed (dummy variables)

Root MSE	0.395293	R-squared	0.832713
Mean dependent var	17.19600	Adjusted R-squared	0.758911
S.D. dependent var	0.976282	S.E. of regression	0.479363
Akaike info criterion	1.621619	Sum squared resid	7.812815
Schwarz criterion	2.233467	Log likelihood	-24.54048
Hannan-Quinn criter.	1.854614	F-statistic	11.28294
Durbin-Watson stat	2.202190	Prob(F-statistic)	0.000000

Source: Authors own generate using: EViews 11.

Annex .3: Pooled Least Squares estimation model for overall LPI

Dependent Variable: LOG(EX)
Method: Pooled Least Squares
Date: 06/06/20 Time: 15:11
Sample (adjusted): 2008 2016
Included observations: 50 after adjustments
Cross-sections included: 11
Total pool (balanced) observations: 550

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	166.2329	79.43607	2.092663	0.0368
LOG(DI)	-0.355864	0.109325	-3.255114	0.0012
LOG(GDPETH)	4.821702	1.460215	3.302049	0.0010
LOG(GDPJ)	-0.011352	0.024187	-0.469354	0.6390
LOG(POPETH)	-17.14568	7.663650	-2.237273	0.0257
LOG(POPJ)	0.230631	0.048277	4.777203	0.0000
LOG(OLPETH)	1.550435	0.660647	2.346842	0.0193
LOG(OLPJ)	0.659487	0.298702	2.207838	0.0277

Root MSE	0.605508	R-squared	0.607479
Mean dependent var	17.19600	Adjusted R-squared	0.602409
S.D. dependent var	0.967349	S.E. of regression	0.609960
Akaike info criterion	1.863593	Sum squared resid	201.6519
Schwarz criterion	1.926282	Log likelihood	-504.4880
Hannan-Quinn criter.	1.888091	F-statistic	119.8310
Durbin-Watson stat	1.143453	Prob(F-statistic)	0.000000

Source: Authors own generate using: EViews 11.

Annex .4: Pooled Least Squares estimation model for LPI-CC

Dependent Variable: LOG(EX)
Method: Pooled Least Squares
Date: 06/06/20 Time: 14:26
Sample (adjusted): 2008 2016
Included observations: 50 after adjustments
Cross-sections included: 11
Total pool (balanced) observations: 550

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1020.360	107.1292	-9.524577	0.0000
LOG(DI)	-0.468767	0.102134	-4.589721	0.0000
LOG(GDPETH)	-15.68953	1.886755	-8.315615	0.0000
LOG(GDPJ)	-0.000882	0.021484	-0.041055	0.9673
LOG(POPETH)	95.99826	10.23564	9.378827	0.0000
LOG(POPJ)	0.253493	0.043562	5.819152	0.0000
LOG(LPCCETH)	-7.971391	0.650589	-12.25258	0.0000
LOG(LPCCJ)	0.919928	0.246583	3.730700	0.0002

Root MSE	0.534960	R-squared	0.693616
Mean dependent var	17.19600	Adjusted R-squared	0.689659
S.D. dependent var	0.967349	S.E. of regression	0.538893
Akaike info criterion	1.615841	Sum squared resid	157.4001
Schwarz criterion	1.678530	Log likelihood	-436.3561
Hannan-Quinn criter.	1.640339	F-statistic	175.2890
Durbin-Watson stat	0.940504	Prob(F-statistic)	0.000000

Annex .5: Pooled Least Squares estimation model for LPI-INF

Dependent Variable: LOG(EX)
Method: Pooled Least Squares
Date: 06/06/20 Time: 14:27
Sample (adjusted): 2008 2016
Included observations: 50 after adjustments
Cross-sections included: 11
Total pool (balanced) observations: 550

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1333.270	118.5621	11.24533	0.0000
LOG(DI)	-0.488747	0.092834	-5.264755	0.0000
LOG(GDPETH)	28.11209	2.313531	12.15116	0.0000
LOG(GDPJ)	-0.002543	0.021187	-0.120004	0.9045
LOG(POPETH)	-131.2143	11.54636	-11.36412	0.0000
LOG(POPJ)	0.247676	0.041890	5.912487	0.0000
LOG(LPIINFETH)	-9.448036	0.764807	-12.35349	0.0000
LOG(LPINFJ)	0.920180	0.197143	4.667578	0.0000

Root MSE	0.532424	R-squared	0.696514
Mean dependent var	17.19600	Adjusted R-squared	0.692594
S.D. dependent var	0.967349	S.E. of regression	0.536339
Akaike info criterion	1.606338	Sum squared resid	155.9115
Schwarz criterion	1.669028	Log likelihood	-433.7430
Hannan-Quinn criter.	1.630836	F-statistic	177.7019
Durbin-Watson stat	0.943764	Prob(F-statistic)	0.000000

Source: Authors own generate using: EViews 11.

Annex .6: Pooled Least Squares estimation model for LPI-IS

Dependent Variable: LOG(EX)
Method: Pooled Least Squares
Date: 06/06/20 Time: 14:31
Sample (adjusted): 2007 2016
Included observations: 50 after adjustments
Cross-sections included: 11
Total pool (balanced) observations: 550

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1169.681	101.0047	11.58045	0.0000
LOG(DI)	-0.313440	0.080012	-3.917397	0.0001
LOG(GDPETH)	23.57535	1.876465	12.56371	0.0000
LOG(GDPJ)	-0.007073	0.021522	-0.328619	0.7426
LOG(POPETH)	-114.7104	9.786446	-11.72135	0.0000
LOG(POPJ)	0.213838	0.039883	5.361678	0.0000
LOG(LPISETH)	9.936588	0.729644	13.61841	0.0000
LOG(LPISJ)	0.656657	0.248152	2.646186	0.0084

Root MSE	0.525812	R-squared	0.704004
Mean dependent var	17.19600	Adjusted R-squared	0.700182
S.D. dependent var	0.967349	S.E. of regression	0.529679
Akaike info criterion	1.581346	Sum squared resid	152.0633
Schwarz criterion	1.644036	Log likelihood	-426.8702
Hannan-Quinn criter.	1.605844	F-statistic	184.1584
Durbin-Watson stat	0.786425	Prob(F-statistic)	0.000000

Source: Authors own generate using: EViews 11.

Annex .7: Pooled Least Squares estimation model for LPI-QLS

Dependent Variable: LOG(EX)
Method: Pooled Least Squares
Date: 06/06/20 Time: 14:33
Sample (adjusted): 2008 2016
Included observations: 50 after adjustments
Cross-sections included: 11
Total pool (balanced) observations: 550

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	79.83059	69.15903	1.154305	0.2489
LOG(DI)	-0.397761	0.116954	-3.401015	0.0007
LOG(GDPETH)	3.176668	1.263409	2.514362	0.0122
LOG(GDPJ)	-0.011181	0.024098	-0.463974	0.6429
LOG(POPETH)	-8.680784	6.644249	-1.306511	0.1919
LOG(POPJ)	0.240221	0.049711	4.832349	0.0000
LOG(LPIQLSETH)	0.482291	0.490326	0.983612	0.3257
LOG(LPQLSJ)	0.769606	0.311316	2.472109	0.0137

Root MSE	0.606992	R-squared	0.605552
Mean dependent var	17.19600	Adjusted R-squared	0.600458
S.D. dependent var	0.967349	S.E. of regression	0.611455
Akaike info criterion	1.868488	Sum squared resid	202.6415
Schwarz criterion	1.931178	Log likelihood	-505.8343

Hannan-Quinn criter.	1.892986	F-statistic	118.8677
Durbin-Watson stat	1.168276	Prob(F-statistic)	0.000000

Source: Authors own generate using: EViews 11.

Annex .8: Pooled Least Squares estimation model for LPI-TT

Dependent Variable: LOG(EX)
Method: Pooled Least Squares
Date: 06/06/20 Time: 14:35
Sample (adjusted): 2008 2016
Included observations: 50 after adjustments
Cross-sections included: 11
Total pool (balanced) observations: 550

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	336.1097	64.81106	5.185993	0.0000
LOG(DI)	-0.315519	0.098782	-3.194090	0.0015
LOG(GDPETH)	7.785439	1.192914	6.526404	0.0000
LOG(GDPJ)	-0.027978	0.021418	-1.306262	0.1920
LOG(POPETH)	-33.29792	6.239147	-5.336935	0.0000
LOG(POPJ)	0.238928	0.043573	5.483381	0.0000
LOG(LPTTCETH)	1.904645	0.156367	12.18057	0.0000
LOG(LPTTJ)	0.410739	0.248763	1.651124	0.0993

Root MSE	0.541044	R-squared	0.686608
Mean dependent var	17.19600	Adjusted R-squared	0.682560
S.D. dependent var	0.967349	S.E. of regression	0.545022
Akaike info criterion	1.638458	Sum squared resid	161.0007
Schwarz criterion	1.701148	Log likelihood	-442.5760
Hannan-Quinn criter.	1.662956	F-statistic	169.6373
Durbin-Watson stat	0.858602	Prob(F-statistic)	0.000000

Source: Authors own generate using: EViews 11.

Annex .9: Pooled Least Squares estimation model for LPI-T

Dependent Variable: LOG(EX)
Method: Pooled Least Squares
Date: 06/06/20 Time: 14:36
Sample (adjusted): 2008 2016
Included observations: 50 after adjustments
Cross-sections included: 11
Total pool (balanced) observations: 550

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	56.27533	66.31682	0.848583	0.3965
LOG(DI)	-0.285822	0.093743	-3.049009	0.0024
LOG(GDPETH)	2.394182	1.236485	1.936281	0.0534
LOG(GDPJ)	-0.005621	0.023110	-0.243245	0.8079
LOG(POPETH)	-5.868403	6.402899	-0.916523	0.3598

LOG(POPJ)	0.207940	0.045988	4.521609	0.0000
LOG(LPTETH)	-1.394708	0.212017	-6.578292	0.0000
LOG(LPTJ)	0.607386	0.300381	2.022050	0.0437

Root MSE	0.583911	R-squared	0.634980
Mean dependent var	17.19600	Adjusted R-squared	0.630265
S.D. dependent var	0.967349	S.E. of regression	0.588205
Akaike info criterion	1.790955	Sum squared resid	187.5237
Schwarz criterion	1.853645	Log likelihood	-484.5127
Hannan-Quinn criter.	1.815453	F-statistic	134.6927
Durbin-Watson stat	1.144246	Prob(F-statistic)	0.000000

Source: Authors own generate using: EViews 11.

Annex.10: Correlated Random Effects - Hausman Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	6	1.0000

* Cross-section test variance is invalid. Hausman statistic set to zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LOG(GDPETH)	1.293362	3.415287	2.410736	0.1717
LOG(GDPJ)	0.246215	0.023035	0.087005	0.4493
LOG(POPETH)	1.221226	-9.553845	59.350224	0.1619
LOG(POPJ)	0.726782	0.060829	1.840367	0.6235
LOG(OLPETH)	0.227807	1.035100	0.366356	0.1823
LOG(OLPJ)	-2.513621	-1.107766	1.707769	0.2820

Cross-section random effects test equation:
Dependent Variable: LOG(EX)
Method: Panel Least Squares
Date: 06/06/20 Time: 15:16
Sample (adjusted): 2007 2016
Periods included: 5
Cross-sections included: 10
Total panel (balanced) observations: 50
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-33.85382	233.4694	-0.145003	0.8856
LOG(DI)	NA	NA	NA	NA
LOG(GDPETH)	1.293362	4.246704	0.304557	0.7626
LOG(GDPJ)	0.246215	0.329304	0.747683	0.4598
LOG(POPETH)	1.221226	22.16387	0.055100	0.9564
LOG(POPJ)	0.726782	1.389153	0.523183	0.6042
LOG(OLPETH)	0.227807	1.868218	0.121938	0.9037
LOG(OLPJ)	-2.513621	2.027573	-1.239719	0.2236

Effects Specification			
Cross-section fixed (dummy variables)			
Root MSE	0.395293	R-squared	0.832713
Mean dependent var	17.19600	Adjusted R-squared	0.758911
S.D. dependent var	0.976282	S.E. of regression	0.479363
Akaike info criterion	1.621619	Sum squared resid	7.812815
Schwarz criterion	2.233467	Log likelihood	-24.54048
Hannan-Quinn criter.	1.854614	F-statistic	11.28294
Durbin-Watson stat	2.202190	Prob(F-statistic)	0.000000

Source: Authors own generate using: EViews 11.

Annex .11: Test for Equality of Means between Series

Test for Equality of Means Between Series
Date: 06/06/20 Time: 17:13
Sample: 2007 2016
Included observations: 55

Method	df	Value	Probability
Anova F-test	(7, 432)	36.32856	0.0000
Welch F-test*	(7, 162)	4434.882	0.0000

*Test allows for unequal cell variances

Analysis of Variance

Source of Variation	df	Sum of Sq.	Mean Sq.
Between	7	1.89E+20	2.69E+19
Within	432	3.20E+20	7.42E+17
Total	439	5.09E+20	1.16E+18

Category Statistics

Variable	Count	Mean	Std. Dev.	Std. Err. of Mean
EX	55	3.85E-45	3.59E-45	4.84E-46
DI	55	5722.125	3341.090	450.5124
GDPETH	55	43378000	18144511	2446605.
GDPJ	55	1.99E+09	2.44E+09	3.28E+08
POPETH	55	920411.8	79366.05	10701.72
POPJ	55	1940308.	3747170.	505268.3
OLPETH	55	2.389350	0.119078	0.016057
OLPJ	55	3.531449	0.627387	0.084597
All	440	2.54E+08	1.08E+09	51329849

Annex .12: Row data of the study for control variables

ISOCODE	CUNTRY	YEAR	EXPO	DI	GDPij	POPij
ETH	Ethiopia	2007			19701000	803174.3
ETH	Ethiopia	2008			26839000	825663.2
ETH	Ethiopia	2009			32464000	848781.7
ETH	Ethiopia	2010			29917000	872547.6
ETH	Ethiopia	2011			31958000	896978.9
ETH	Ethiopia	2012			42221000	922094.4
ETH	Ethiopia	2013			46544000	947913
ETH	Ethiopia	2014			54165000	974454.6
ETH	Ethiopia	2015			63081000	1001739
ETH	Ethiopia	2016			70886000	1029788
ETH	Ethiopia	2017			75745000	1058622
ETH	Ethiopia	2018			80289000	1092000
CPR	China,P.Rep.	2007	5387345	8315.89	3.57E+09	13074594
CPR	China,P.Rep.	2008	20487502	8315.89	4.6E+09	13139967
CPR	China,P.Rep.	2009	36583960	8315.89	5.12E+09	13205667
CPR	China,P.Rep.	2010	64797686	8315.89	6.07E+09	13271695
CPR	China,P.Rep.	2011	98074876	8315.89	7.52E+09	13338054
CPR	China,P.Rep.	2012	85281697	8315.89	8.57E+09	13404744
CPR	China,P.Rep.	2013	1.45E+08	8315.89	9.64E+09	13471768
CPR	China,P.Rep.	2014	1.48E+08	8315.89	1.05E+10	13539127
CPR	China,P.Rep.	2015	1.36E+08	8315.89	1.12E+10	13606822
CPR	China,P.Rep.	2016	1.14E+08	8315.89	1.12E+10	13674856
CPR	China,P.Rep.	2017	1.64E+08	8315.89	1.21E+10	13743231
CPR	China,P.Rep.	2018	1.13E+08	8315.89	1.34E+10	13927000
GER	Germany	2007	12967989	5350.172	2.66E+09	829000
GER	Germany	2008	14475506	5350.172	2.93E+09	829000
GER	Germany	2009	33219696	5350.172	2.7E+09	829000
GER	Germany	2010	82993632	5350.172	2.65E+09	829000
GER	Germany	2011	92055601	5350.172	2.86E+09	829000
GER	Germany	2012	76873432	5350.172	2.69E+09	829000
GER	Germany	2013	68356761	5350.172	2.81E+09	829000
GER	Germany	2014	84543736	5350.172	2.86E+09	829000
GER	Germany	2015	71201971	5350.172	2.44E+09	829000
GER	Germany	2016	88328733	5350.172	2.47E+09	829000
GER	Germany	2017	1.23E+08	5350.172	2.59E+09	829000
GER	Germany	2018	87614788	5350.172	2.78E+09	829000
ITA	Italy	2007	6174621	4523.222	3.43E+09	581057.1
ITA	Italy	2008	6441279	4523.222	3.74E+09	582800.3
ITA	Italy	2009	7777504	4523.222	3.41E+09	584548.7

ITA	Italy	2010	27494373	4523.222	3.4E+09	586302.3
ITA	Italy	2011	24063608	4523.222	3.75E+09	588061.2
ITA	Italy	2012	21685628	4523.222	3.53E+09	589825.4
ITA	Italy	2013	22798524	4523.222	3.73E+09	591594.9
ITA	Italy	2014	21892820	4523.222	3.89E+09	593369.6
ITA	Italy	2015	20386841	4523.222	3.36E+09	595149.8
ITA	Italy	2016	30188682	4523.222	3.47E+09	596935.2
ITA	Italy	2017	38772490	4523.222	3.66E+09	598726
ITA	Italy	2018	33594646	4523.222	3.95E+09	604000
JAP	Japan	2007	7958458	8392.397	2.21E+09	1265000
JAP	Japan	2008	701870.4	8392.397	2.4E+09	1265000
JAP	Japan	2009	4016936	8392.397	2.19E+09	1265000
JAP	Japan	2010	10114648	8392.397	2.13E+09	1265000
JAP	Japan	2011	13772374	8392.397	2.28E+09	1265000
JAP	Japan	2012	29592491	8392.397	2.07E+09	1265000
JAP	Japan	2013	24923666	8392.397	2.13E+09	1265000
JAP	Japan	2014	39508058	8392.397	2.16E+09	1265000
JAP	Japan	2015	25589721	8392.397	1.83E+09	1265000
JAP	Japan	2016	50026301	8392.397	1.87E+09	1265000
JAP	Japan	2017	62057370	8392.397	1.95E+09	1265000
JAP	Japan	2018	95134770	8392.397	2.08E+09	1265000
NETH	Netherlands	2007	7845065	5673.129	31958000	163505.8
NETH	Netherlands	2008	13333255	5673.129	35895000	164159.8
NETH	Netherlands	2009	26648038	5673.129	37022000	164816.4
NETH	Netherlands	2010	42955702	5673.129	40000000	165475.7
NETH	Netherlands	2011	64402693	5673.129	41672000	166137.6
NETH	Netherlands	2012	55444846	5673.129	50422000	166802.2
NETH	Netherlands	2013	71311913	5673.129	55125000	167469.4
NETH	Netherlands	2014	72177653	5673.129	61547000	168139.2
NETH	Netherlands	2015	78178370	5673.129	64236000	168811.8
NETH	Netherlands	2016	93586976	5673.129	69190000	169487.1
NETH	Netherlands	2017	1.31E+08	5673.129	78689000	170165
NETH	Netherlands	2018	1.64E+08	5673.129	87928000	172000
SA	Saudi Arabia	2007	9244509	1939.82	1.39E+09	249438.5
SA	Saudi Arabia	2008	12169997	1939.82	1.78E+09	256173.3
SA	Saudi Arabia	2009	20539197	1939.82	1.31E+09	263090
SA	Saudi Arabia	2010	35858918	1939.82	1.64E+09	270193.4
SA	Saudi Arabia	2011	61440241	1939.82	2.05E+09	277488.7
SA	Saudi Arabia	2012	50412950	1939.82	2.19E+09	284980.8
SA	Saudi Arabia	2013	67170326	1939.82	2.29E+09	292675.3
SA	Saudi Arabia	2014	81186955	1939.82	2.06E+09	300577.6

SA	Saudi Arabia	2015	76859852	1939.82	1.36E+09	308693.2
SA	Saudi Arabia	2016	98565040	1939.82	1.28E+09	317027.9
SA	Saudi Arabia	2017	1.3E+08	1939.82	1.58E+09	325587.6
SA	Saudi Arabia	2018	1.43E+08	1939.82	1.66E+09	337000
SUD	Sudan	2007	4701940	1185.095	4.16E+08	77294.67
SUD	Sudan	2008	7487833	1185.095	5.2E+08	79768.1
SUD	Sudan	2009	19342244	1185.095	4.29E+08	82320.68
SUD	Sudan	2010	36628804	1185.095	5.28E+08	84954.94
SUD	Sudan	2011	52113257	1185.095	6.71E+08	87673.5
SUD	Sudan	2012	30654275	1185.095	7.36E+08	90479.06
SUD	Sudan	2013	29606834	1185.095	7.47E+08	93374.38
SUD	Sudan	2014	33159272	1185.095	7.56E+08	96362.37
SUD	Sudan	2015	28139129	1185.095	6.54E+08	99445.96
SUD	Sudan	2016	22026234	1185.095	6.45E+08	102628.2
SUD	Sudan	2017	70227531	1185.095	6.89E+08	105912.3
SUD	Sudan	2018	54680886	1185.095	7.87E+08	110000
UAR	United Arab Emirates	2007	4766288	2488.73	15463400	47231.67
UAR	United Arab Emirates	2008	6268214	2488.73	15321600	50160.03
UAR	United Arab Emirates	2009	12912583	2488.73	15179800	53269.96
UAR	United Arab Emirates	2010	19496054	2488.73	15038000	56572.69
UAR	United Arab Emirates	2011	22961633	2488.73	17186000	60080.2
UAR	United Arab Emirates	2012	26243664	2488.73	11267000	63805.17
UAR	United Arab Emirates	2013	28749759	2488.73	14947000	67761.09
UAR	United Arab Emirates	2014	39564740	2488.73	15105000	71962.28
UAR	United Arab Emirates	2015	35093583	2488.73	14558000	76423.94
UAR	United Arab Emirates	2016	60362534	2488.73	3443000	81162.23
UAR	United Arab Emirates	2017	75430070	2488.73	3438000	86194.29
UAR	United Arab Emirates	2018	1.03E+08	2488.73	4583000	96000
UK	United Kingdom	2007	2906470	5901.137	2.58E+08	618474.2
UK	United Kingdom	2008	6500934	5901.137	3.15E+08	622803.5
UK	United Kingdom	2009	7285067	5901.137	2.54E+08	627163.1
UK	United Kingdom	2010	14830467	5901.137	2.9E+08	631553.3
UK	United Kingdom	2011	16956768	5901.137	3.51E+08	635974.2
UK	United Kingdom	2012	15731247	5901.137	3.75E+08	640426
UK	United Kingdom	2013	19761643	5901.137	3.9E+08	644909
UK	United Kingdom	2014	14105738	5901.137	4.03E+08	649423.3
UK	United Kingdom	2015	17032701	5901.137	3.58E+08	653969.3
UK	United Kingdom	2016	28903750	5901.137	3.57E+08	658547.1
UK	United Kingdom	2017	30239408	5901.137	3.78E+08	663156.9
UK	United Kingdom	2018	32562449	5901.137	4.14E+08	665000
USA	United States	2007	8461234	13451.66	3.09E+09	2983876

U.S.A.	United States	2008	6527724	13451.66	2.93E+09	3007747
U.S.A.	United States	2009	13002079	13451.66	2.4E+09	3031809
U.S.A.	United States	2010	31256588	13451.66	2.46E+09	3056063
U.S.A.	United States	2011	26521730	13451.66	2.64E+09	3080512
U.S.A.	United States	2012	37614369	13451.66	2.68E+09	3105156
U.S.A.	United States	2013	48300290	13451.66	2.76E+09	3129997
U.S.A.	United States	2014	70687419	13451.66	3.04E+09	3155037
U.S.A.	United States	2015	69305545	13451.66	2.9E+09	3180277
U.S.A.	United States	2016	96705974	13451.66	2.67E+09	3205720
U.S.A.	United States	2017	1.74E+08	13451.66	2.64E+09	3231365
U.S.A.	United States	2018	1.51E+08	13451.66	2.83E+09	3272000

Source: Authors own generate for distance between countries, Data for exports trade in volume has obtained from International Trade Commodity (ITC) statistics and GDP and population was obtained from World Development Indicators database of the World Bank.

Annex .13: Row data of the study for LPI

ISO CODE	CUNTRY	YEAR	OLPI	LPICUS	LPIINF	LPIINTSHIP	LPI QUA LOGSERV	LPITRAK TRAC	LPITIM
ETH	Ethiopia	2007	2.327	2.143	1.875	2.429	2.000	1.833	3.667
ETH	Ethiopia	2008	0.000						
ETH	Ethiopia	2009	0.000						
ETH	Ethiopia	2010	2.413	2.134	1.768	2.756	2.141	2.891	2.650
ETH	Ethiopia	2011	0.000						
ETH	Ethiopia	2012	2.237	2.029	2.217	2.347	2.160	2.103	2.537
ETH	Ethiopia	2013	0.000						
ETH	Ethiopia	2014	2.594	2.421	2.167	2.500	2.621	2.667	3.167
ETH	Ethiopia	2015	0.000						
ETH	Ethiopia	2016	2.377	2.599	2.118	2.563	2.368	2.178	2.371
ETH	Ethiopia	2017	0.000						
ETH	Ethiopia	2018	0.000						
CPR	China,P.Rep.	2007	3.322	2.993	3.203	3.313	3.400	3.375	3.677
CPR	China,P.Rep.	2008							
CPR	China,P.Rep.	2009							
CPR	China,P.Rep.	2010	3.489	3.162	3.540	3.310	3.491	3.553	3.915
CPR	China,P.Rep.	2011	0.000						
CPR	China,P.Rep.	2012	3.517	3.255	3.614	3.463	3.472	3.516	3.797
CPR	China,P.Rep.	2013	0.000						
CPR	China,P.Rep.	2014	3.531	3.205	3.669	3.503	3.460	3.503	3.867
CPR	China,P.Rep.	2015	0.000						
CPR	China,P.Rep.	2016	3.661	3.319	3.752	3.705	3.620	3.677	3.896
CPR	China,P.Rep.	2017	0.000						
CPR	China,P.Rep.	2018	3.605	3.286	3.753	3.536	3.595	3.648	3.840

GER	Germany	2007	4.099	3.883	4.191	3.910	4.207	4.119	4.327
GER	Germany	2008	0.000						
GER	Germany	2009	0.000						
GER	Germany	2010	4.114	4.003	4.336	3.656	4.138	4.184	4.483
GER	Germany	2011	0.000						
GER	Germany	2012	4.033	3.872	4.258	3.671	4.094	4.050	4.318
GER	Germany	2013	0.000						
GER	Germany	2014	4.122	4.098	4.323	3.744	4.123	4.168	4.361
GER	Germany	2015	0.000						
GER	Germany	2016	4.226	4.123	4.439	3.857	4.279	4.265	4.453
GER	Germany	2017	0.000						
GER	Germany	2018	4.201	4.092	4.374	3.859	4.311	4.239	4.392
ITA	Italy	2007	3.575	3.187	3.519	3.567	3.629	3.657	3.930
ITA	Italy	2008	0.000						
ITA	Italy	2009	0.000						
ITA	Italy	2010	3.644	3.382	3.720	3.206	3.740	3.834	4.081
ITA	Italy	2011	0.000						
ITA	Italy	2012	3.671	3.343	3.738	3.534	3.650	3.731	4.047
ITA	Italy	2013	0.000						
ITA	Italy	2014	3.691	3.356	3.776	3.538	3.625	3.835	4.049
ITA	Italy	2015	0.000						
ITA	Italy	2016	3.755	3.453	3.791	3.651	3.765	3.858	4.033
ITA	Italy	2017	0.000						
ITA	Italy	2018	3.739	3.472	3.853	3.512	3.655	3.855	4.127
JAP	Japan	2007	4.024	3.786	4.106	3.766	4.120	4.076	4.345
JAP	Japan	2008	0.000						
JAP	Japan	2009	0.000						
JAP	Japan	2010	3.966	3.785	4.188	3.549	3.996	4.129	4.261
JAP	Japan	2011	0.000						
JAP	Japan	2012	3.933	3.720	4.106	3.611	3.974	4.034	4.211
JAP	Japan	2013	0.000						
JAP	Japan	2014	3.915	3.781	4.155	3.518	3.932	3.952	4.239
JAP	Japan	2015	0.000						
JAP	Japan	2016	3.970	3.848	4.097	3.695	3.990	4.030	4.207
JAP	Japan	2017	0.000						
JAP	Japan	2018	4.026	3.994	4.248	3.592	4.088	4.049	4.254
NETH	Netherlands	2007	4.178	3.992	4.290	4.049	4.250	4.136	4.382
NETH	Netherlands	2008	0.000						
NETH	Netherlands	2009	0.000						
NETH	Netherlands	2010	4.069	3.982	4.249	3.606	4.155	4.121	4.408
NETH	Netherlands	2011	0.000						
NETH	Netherlands	2012	4.022	3.846	4.148	3.862	4.048	4.117	4.146
NETH	Netherlands	2013	0.000						

NETH	Netherlands	2014	4.048	3.964	4.230	3.641	4.127	4.073	4.337
NETH	Netherlands	2015	0.000						
NETH	Netherlands	2016	4.188	4.123	4.290	3.944	4.215	4.172	4.413
NETH	Netherlands	2017	0.000						
NETH	Netherlands	2018	4.019	3.918	4.208	3.682	4.088	4.025	4.253
SA	Saudi Arabia	2007	3.019	2.721	2.954	2.932	2.879	3.018	3.655
SA	Saudi Arabia	2008	0.000						
SA	Saudi Arabia	2009	0.000						
SA	Saudi Arabia	2010	3.221	2.912	3.266	2.799	3.332	3.316	3.780
SA	Saudi Arabia	2011	0.000						
SA	Saudi Arabia	2012	3.178	2.788	3.216	3.102	2.995	3.214	3.756
SA	Saudi Arabia	2013	0.000						
SA	Saudi Arabia	2014	3.148	2.856	3.342	2.932	3.112	3.149	3.555
SA	Saudi Arabia	2015	0.000						
SA	Saudi Arabia	2016	3.156	2.691	3.235	3.228	3.002	3.250	3.533
SA	Saudi Arabia	2017	0.000						
SA	Saudi Arabia	2018	3.011	2.661	3.107	2.985	2.860	3.172	3.300
SUD	Sudan	2007	2.711	2.357	2.357	2.667	2.833	2.917	3.167
SUD	Sudan	2008	0.000						
SUD	Sudan	2009	0.000						
SUD	Sudan	2010	2.206	2.016	1.778	2.111	2.149	2.022	3.089
SUD	Sudan	2011	0.000						
SUD	Sudan	2012	2.103	2.136	2.011	1.935	2.333	1.889	2.310
SUD	Sudan	2013	0.000						
SUD	Sudan	2014	2.161	1.867	1.898	2.231	2.180	2.416	2.330
SUD	Sudan	2015	0.000						
SUD	Sudan	2016	2.530	2.234	2.202	2.568	2.361	2.485	3.276
SUD	Sudan	2017	0.000						
SUD	Sudan	2018	2.428	2.136	2.182	2.582	2.505	2.505	2.616
UAR	United Arab Emirates	2007	3.728	3.516	3.804	3.679	3.667	3.608	4.120
UAR	United Arab Emirates	2008	0.000						
UAR	United Arab Emirates	2009	0.000						
UAR	United Arab Emirates	2010	3.630	3.489	3.808	3.481	3.533	3.581	3.935
UAR	United Arab Emirates	2011	0.000						
UAR	United Arab Emirates	2012	3.778	3.615	3.837	3.592	3.741	3.813	4.097
UAR	United Arab Emirates	2013	0.000						
UAR	United Arab	2014	3.539	3.420	3.704	3.201	3.497	3.574	3.916

	Emirates								
UAR	United Arab Emirates	2015	0.000						
UAR	United Arab Emirates	2016	3.942	3.835	4.069	3.894	3.822	3.909	4.134
UAR	United Arab Emirates	2017	0.000						
UAR	United Arab Emirates	2018	3.956	3.631	4.021	3.847	3.919	3.960	4.376
UK	United Kingdom	2007	3.993	3.739	4.049	3.852	4.020	4.100	4.248
UK	United Kingdom	2008	0.000						
UK	United Kingdom	2009	0.000						
UK	United Kingdom	2010	3.954	3.740	3.947	3.664	3.923	4.133	4.374
UK	United Kingdom	2011	0.000						
UK	United Kingdom	2012	3.898	3.731	3.948	3.626	3.932	3.998	4.192
UK	United Kingdom	2013	0.000						
UK	United Kingdom	2014	4.015	3.939	4.158	3.630	4.029	4.084	4.329
UK	United Kingdom	2015	0.000						
UK	United Kingdom	2016	4.070	3.984	4.206	3.766	4.045	4.130	4.335
UK	United Kingdom	2017	0.000						
UK	United Kingdom	2018	3.987	3.772	4.033	3.672	4.050	4.108	4.330
USA	United States	2007	3.844	3.519	4.071	3.582	3.845	4.009	4.114
U.S.A.	United States	2008	0.000						
U.S.A.	United States	2009	0.000						
U.S.A.	United States	2010	3.856	3.681	4.152	3.207	3.915	4.169	4.185
U.S.A.	United States	2011	0.000						
U.S.A.	United States	2012	3.930	3.672	4.139	3.562	3.965	4.110	4.205
U.S.A.	United States	2013	0.000						
U.S.A.	United States	2014	3.918	3.729	4.185	3.448	3.970	4.138	4.136
U.S.A.	United States	2015	0.000						
U.S.A.	United States	2016	3.992	3.752	4.152	3.650	4.014	4.200	4.251
U.S.A.	United States	2017	0.000						
U.S.A.	United States	2018	3.885	3.775	4.045	3.506	3.874	4.092	4.084

Source: World development indicator report (2019)