ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

DETERMINANT OF EXPORT PERFORMANCE: CASE OF AGRO PROCESSING INDUSTRIES IN ETHIOPIA USING TIME SERIES ANALYSIS

GETACHEW ANDUALEM MOLLA

ADVISOR: BERHANU DENU (PhD)

MARCH, 2023

ADDIS ABABA UNIVERSITY

ADDIS ABABA, ETHIOPIAN

ADDIS ABABA UNIVERSITY

SCHOOL OF COMMERCE

DETERMINANT OF EXPORT PERFORMANCE: CASE OF AGRO PROCESSING INDUSTRIES IN ETHIOPIA USING TIME SERIES ANALYSIS

By

GETACHEW ANDUALEM MOLLA

A THESIS PROPOSAL SUBMITTED TO THE DEVELOPMENT ECONOMICS PROGRAM, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN DEVELOPMENT ECONOMICS.

ADVISOR: BERHANU DENU (PhD)

ADDIS ABABA UNIVERSITY

ADDIS ABABA, ETHIOPIAN

MARCH, 2023

APPROVAL

Addis Ababa University

School of Commerce

Graduate Studies

Economics program unit

Name: Getachew Andualem Molla

Degree: Master of Science in Development Economics

Thesis title: Determinant of Export Performance of Agro Processing Industries in Ethiopia

Approved by Board of Examiners

---------- ----------

Advisor signature

---------- ----------

Internal examiner signature

---------- ----------

External examiner signature

Statement of Certification

This is to certify that Getachew Andualem Molla has carried out his research work on the topic entitled Determinant of Export Performance of Agro Processing Industries in Ethiopia is his original work and is suitable for submission for the award of Master of Science in Development Economics.

Advisor: Berhanu Denu (PhD)

Addis Ababa University

March, 2023

Statement of Declaration

I, Getachew Andualem, hereby declare that the thesis entitled Determinant of Export Performance of Agro Processing Industries in Ethiopia is the outcome of my own effort and study and that all sources of materials used for the study have been duly acknowledged. This study has not been submitted for any degree in this University or any other University. It is offered for the partial fulfillment of the degree Master of Science in Development Economics.

Declared by:

Name: Getachew Andualem signature _____

Acknowledgments

First of all, I would like to praise my almighty God for his support, protection and blessing since the beginning of my study up to this time.

Next, I would like to express my deepest gratitude and respect to my advisor, Berhanu Denu (PhD), for his intellectual richness since the beginning of my paper and invaluable comments and corrections.

I would like to forward my profound thanks, deep love and respect to all my family mainly to my mother (Yitayish), father (Andualem), sisters and brothers for their continuous support, heartfelt love and encouragement in all aspect of my life.

I owe thanks and love to all my friends. I have got all your support and encouragement throughout my study. I also have special thanks to my friends, classmates and colleagues for their assistance on data processing on software for my study.

ABSTRACT

Globalization forces countries to take their comparative advantage in the global market. Export plays a vital role in economic development of a nation as well as for the development of the particular exporting companies. Although, the benefits derived from export of agro processing products in an increasingly globalized marketplace are enormous, but for many industries, exporting agro processing is constrained by numerous challenges. The purpose of the study was to investigate the major determinants of the export performance of the four selected commodities of Ethiopia namely: leather & leather products, meat and meat products and fruits & vegetables and beverage products. The paper empirically examined the export performance and its major determinant factors in the Ethiopian context using time series data for the period 1991 - 2021 using a secondary data. To analyze the relationship between the export commodities and their determinants, gross domestic products (GDP), foreign direct investment(FDI),real effective exchange rate (REER) and trade openness (TOP) ,inflation and infrastructure (road) were used, VAR model that was applied and estimating by ordinary least square (OLS) regression analysis with Time series data. *The result from econometric analysis revealed that the infrastructure (paved road in kilometer) is the only variable significantly and positively affects the export of the selected commodities. Similarly, GDP positively and significantly affects the export performance of leather & leather products and fruit & vegetable products .Foreign direct investment (FDI) has positive and significant effect on the export of meat, fruit & vegetable and beverage products. While trade openness (TOP) has negative coefficient and significant effect on the export of leather & leather products, meat and beverage products, but it has positive and statistical significant with on the export of fruit& vegetable products. Since all the export commodities were positively impacted by infrastructure (road), increasing quality and coverage of road development would bring a vital outcome for increasing the export performance of the agro processing commodities, which can be regarded as the key finding for the research. From the result, the study concluded that the export performance of the agro processing industries in Ethiopia have been affected by the independent macroeconomic variables. In general, due its potential the export of the agro processing product is increasing time to time. This is due to the fact that the government has prioritized the sector and as a result the agro processing sector is growing. But still there are various external and internal microeconomic and macroeconomic factors that are adversely affecting the export performance of the sector.*

Keywords: Ethiopia; Agro processing; Export performance; OLS model; Time series data.

TABLE OF CONTENTS

ABSTRACT……vii

ACKNOWLEDGMENT..... vi

ACRONYMS……... **x**

LIST OF TABLES……xi

LIST OF FIGURES…….……..xi

CHAPTER ONE

1. Introduction…….....1

1.1.Background of the study……...1

1.2. Statement of the problem……3

1.3. Research Question…….…..7

1.4. Objectives of the study……7

1.4.1. General objective……..7

1.4.2.SpecificObjectives…….7

1.5. Research Hypothesis ……..……..……...7

1.6. Significance of the Study……8

1.7. Scope and Limitation of the study…….....8

1.8. Organization of the thesis……....9

1.9 Limitation 9

CHAPTER TWO

2. Review of Related Literature……..….10

2.1 Theoretical Literature Review……10

2.1.1 Factors affecting export performance 14

2.1.1.1 Gross domestic product and export performance……..……..…...14

2.1.1.2 Foreign direct investment and export performance……14

2.1.1.3 Trade openness and export performance…….……..……..16

2.1.1.4 Exchange rate and export performance……...….17

2.1.1.5 Infrastructure and export performance……..…….…..19

2.1.1.6 Inflation and export performance……..…….…….20

2.2 Ethiopian Agricultural Export……...……..……..…..….21

2.2.1 Export Diversification Polices in Historical Perspective……...…..21

2.2.2 Overall Export Performance…….24

2.3 Empirical Literature Review…….……...……...26

2.4 Conceptual Framework …….…….....29

CHAPTER THREE

3. Research Methodology…….……...….30

3.1 Introduction …….…..….30

3.2 Research Approach……..…….....30

3.3 Research Design……..……...……..30

3.4 Data sources and Types……...……..…31

3.5 Data Collection Methods …….…….31

3.6 Data Analysis…….……...……31

3.7 Econometric Model Specification……..……31

3.8 Definition of Terms and Explanation of Variables…….……..……33

3.9 Stationary and Non-Stationary Series…….……..36

3.9.1 Test for unit roots……...……..…...37

3.9.2 Co integration and error correction model……..…….……..38

3.10 Ethical consideration …….39

CHAPTER FOUR

4. RESULTS AND DISCUSSION……..……40

4.1 Descriptive statistics results …….…….……40

4.1.1 Trends of agro processing industries export in Ethiopia……40

4.1.1.1 Trends in leather and leather products export performance …….…….……..40

4.1.1.2 Trends in meat and meat products export performance…….……..41

4.1.1.3 Trends in fruit and vegetable products export performance…….41

4.1.1.4 Trends in beverage products export performance…….…..42

4.1.2 Statistical summary of the variables…….……..43

4.2 Stationarity test ……44

4.3 Econometric results for the export of selected commodities ……....46

4.3.1 Determination of the optimal lag length for the models…….46

4.3.2 Co integration and the error correction model ……..47

4.3.3 Long run estimation results for the export of selected commodities summary……..…50

4.3.3.1 Long run estimation for the export of leather and leather products…….51

4.3.3.2 Long run estimation for the export of meat products …….…….53

4.3.3.3 Long run estimation for the export of fruit and vegetable products ……..….55

4.3.3.4 Long run estimation for the export of beverage products ……...57

4.3.4 Short run estimation results for the export of selected commodities summary…….58

4.3.4.1 Short run error correction model for the export of leather and leather products…..…59

4.3.4.2 Short run error correction model for the export of meat products…..……..61

4.3.4.3 Short run error correction model for the export of fruit and vegetables products...….62

4.3.4.4 Short run error correction model for the export of beverage products…….63

4.4 Heteroskedasticity test…….....64

4.5 Auto correlation test……...……64

4.6 Stability test …….……..66

4.7 Normality test…….……67

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATION……...69

5.1 Conclusion…….…….69

5.2 Recommendation…….…….……..71

5.3 Directions for future research …….……..….72

References……74

Appendixes' ……...……..…….84

ACRONYMS

ARDL	Autoregressive Distributed Lag Model
ATA	Agricultural Transformation Agency
COMESA	Common Market for East and Southern Africa
CSA	Central Statistics Agency
EFY	Ethiopian Fiscal Year
EIC	Ethiopian Investment Commission
ETB	Ethiopian Birr
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
IMF	International Monetary Fund
LDCs	Least Developed Countries
MACE	Mahindra Consulting Engineers Limited
MDG	Millennium Development Goal
MoI	Ministry of Industry
NBE	National Bank of Ethiopia
NEER	Nominal Effective Exchange Rate
NEPAD	New Partnership for Africa's Development
OLS	Ordinary Least Squares
REER	Real Effective Exchange Rate
SME	Small and Medium Enterprises
SPSS	Statistical Package for Social Sciences
SSA	Sub-Saharan African
TOP	Trade openness

TOT	Terms of Trade
UNCTAD	United Nations Conference on Trade and Development
USA	United States of America
USD	United States Dollar
VAR	Vector Auto Regression
WB	World Bank
WDI	World Development Indicators

LIST OF TABLES

Table 4.1.2 Descriptive statistics summary……..……...……..…43
Table 4.2 ADF test for stationarity test……..…….……..……...…....45
Table 4.3.2.1 Johansen co-integration test (model 1)……..…..……....48
Table 4.3.2.2 Johansen co-integration test (model 2)……...……49
Table 4.3.2.3 Johansen co-integration test (model 3)……..……49
Table 4.3.2.4 Johansen co-integration test (model 4)……...50
Table 4.3.3 Long run regression result of the export of selected commodities summary...…51
Table 4.3.3.1 Long run estimation for the export of leather and leather products……...…51
Table 4.3.3.2 Long run estimation for the export of meat and meat products……...…..53
Table 4.3.3.3 Long run estimation for the export of fruit and vegetables products…...…….56
Table 4.3.3.4 Long run estimation for the export of beverage products……..……57
Table 4.3.4 Short run regression result of the export of selected commodities summary…...58
Table 4.3.4.1 Short run error correction model (model 1)…….……..59
Table 4.3.4.2 Short run error correction model (model 2) ……..61
Table 4.3.4.3 Short run error correction model (model 3) …….…….62
Table 4.3.4.4 Short run error correction model (model 4) …….…….63

LIST OF FIGURES

Fig. 1 Conceptual framework……..…..…..……29
Fig.2 Trends in export of leather and leather products export in Ethiopia …….40
Fig.3 Trends in export of meat and meat products export in Ethiopia …….41
Fig.4 Trends in export of fruit and vegetables products export in Ethiopia …….……...42
Fig.5 Trends in export of beverage products export in Ethiopia ……..……42

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

Countries differ in their resource endowments and technological levels in the production of products and services in this planet (Allaro, 2015). Differences in resource endowments and production processes, on the other hand, will result in a difference in factor prices between countries, which will result in a difference in product pricing. As a result, as predicted by classical trade theories, product prices are the cause of international trade (Smith, 1776). International trade, moreover, would raise global productivity and welfare by increasing resource allocation efficiency and specialization (Narayan, 2019).

Export is regarded as one of the most essential growth boosters. The economics literature backs up the idea that development requires economic growth in order to alleviate poverty, and that greater access to global markets is perceived as a necessary condition for more rapid growth. The agricultural sector's prospects, as evidenced by its considerable share in GDP, have a significant impact on economic development in most Sub-Saharan African countries. Its productivity rise does help to alleviate poverty in areas where agriculture still employs the majority of the workforce. The agricultural industry, which employs more than half of the overall workforce in SSA, plays a critical role in employment (World Bank, 2016).

The situation of European and American farmers, on the other hand, is vastly different from that of African farmers. This means that their governments heavily subsidize these growers. As a result, these heavily supported European and American farmers stifle African farmers' ability to compete in both local and agricultural export markets, leaving African farmers unable to compete in the global market (MACE, 2014).

Despite the fact that developing countries share in worldwide trade has risen from 25% to 33%, Africa's average proportion of international trade has remained below 3%. Similarly, despite the fact that Ethiopia has a huge potential for agricultural and horticultural products due to its broad geographical area and diverse climates and temperatures, Ethiopia's average share of foreign trade has remained below 0.03 percent (World Bank, 2016).

In terms of agricultural trade, records reveal that SSA's proportion of global agricultural exports fell from 8% in the early 1960s to 2% in the early 2000s, and the country went from

being a net food exporter to a net food importer (Blade et al., 2004). According to the agricultural trade balance, there is a growing reliance on agricultural imports, with imported food increasingly displacing traditional food. Imports of agricultural products are increasing at a quicker rate than exports of agricultural products (Obwona and Chirwa 2018).

The present Ethiopian government, on the other hand, has taken a variety of policy initiatives to address the export sector's problems. The Ethiopian government has taken measures such as simplifying export licensing, currency devaluation, a 70% loan for export-related investment, a preferential interest rate scheme that is 3.5% lower than the interest rate on non-export activity loans, and foreign exchange retention of 10% of earnings (Bekele & Mersha, 2019). Despite these incentives, the disparity between Ethiopian imports and exports has widened during the previous two decades. Exports, for example, increased in value from USD 482 million in 2000 to USD 2,785 million in 2016. Imports, on the other hand, have surged in value from USD 1,392 million in 2000 to USD 16,244 million in 2016. This means that the main reason for Ethiopia's trade balance worsening is the lower increase of export value compared to import value growth (NBE, 2018).

Agriculture is still at the heart of the government's structural reform and poverty-reduction programs. It generates 35% of GDP and 90% of exports, employs 80% of the labor force and supplies, and produces 70% of the raw materials utilized by local industry. The vast amount of uncultivated arable land (only 11.7 million of 51.3 million hectares are already under cultivation) gives a significant opportunity to boost agricultural output. However, gaining access to this area will necessitate a major investment in vital infrastructure, such as roads and electricity (NBE, 2018).

Food and beverage sub sector comprise for around 52 percent of manufactured items, with agro-industries accounting for the biggest part. SMEs, as well as publicly and privately owned larger firms, employ 60,110 people in the sector. Because Ethiopia's economy is so closely linked to agriculture, agribusiness growth is critical. The strong ties to the rest of the economy, as well as the use of abundant agricultural goods as inputs, create a favorable environment for agribusiness development. In 2010/11, of 686 food-processing companies, 482 were operating under capacity, and 251 of the latter reported that their performance was affected mainly by raw material shortages. The newly created Industry Parks at Burie, Bulbula, and Yirgalem integrated agro industrial parks are among the many agro processing industries working in Ethiopia today(MACE ,2014).

In general, despite Ethiopia's comparative advantage in terms of relative cheap labor and a pleasant climate for these major agricultural commodities, the country's agricultural export performance, like that of other SSA nations, is not sufficient, as Alwang and Siegel (1994) pointed out. Agricultural export performance of the country in general and agro processing export in particular is influenced or determined by a number of factors. Price policy instruments such as real exchange rate depreciation and institutional factors, for example, have a major impact on the country's agricultural export (Mouze, 2005).

The question arises then which specific factors affect the export performance of agro processing industries under the conditions and circumstances in Ethiopia? Therefore, this research will focus on identifying factors that significantly affect the export performance of these industries.

1.2 Statement of the Problem

African countries have a tremendous potential to expand the merchandise export of agro industrial products, for which there is growing demand in the international market. Exporting agro-industrial products has two key advantages: first, it can help African countries acquire modern technology in return for the mechanization of agriculture; second, continuous expansion of agro-industrial exports can help African countries eliminate poverty. However, manufacturing in African countries has generally focused on the home market and, to a lesser extent, the regional market.Africa's global trade exports are still limited. Africa accounts for less than 1% of world exports, according to UNIDO's 2019 report. One of the most commonly mentioned reasons is that many African countries are unable to meet market expectations and requirements, either in terms of quantity due to a lack of technology and know-how, or in terms of quality due to supply-side constraints and nontariff trade barriers. Agricultural goods and other primary products are Africa's main export products, but food insecurity and falling agro-industrial goods prices have impeded agricultural goods and other primary product export development.)UNIDO,2019).

In SSA (Sub-Saharan African) countries, agricultural export is one of the most important growth accelerators. The economics literature backs up the idea that development necessitates economic growth in order to alleviate poverty, and that greater access to global markets has seen as a prerequisite for faster growth. Ethiopian agricultural exports, like those of many other developing countries, have been limited to a few key products, primarily agricultural commodities (Tulu, 2020).

Investments in agro industries are known to have significant multiplier effects through both their backward and forward linkages along the value chains. The demand for agricultural

commodities for processing offers job opportunities not only on the farm, but also in the delivery of agricultural inputs including seeds, fertilizers, feeds, and veterinary treatments. Furthermore, the processing of agricultural products necessitates a variety of services such as packaging, shipping, storage, and distribution, all of which generate revenue in these connected industries (MACE, 2014).

Ethiopia's agricultural sector faces the following challenges: Land holdings that are disorganized and fragmented; Absence of an integrated channel to link 'farm gate to food plate'; Weak infrastructure, limited support services to farmers; Inability to tap the growing domestic & international markets; and lack of coordination of value chain actors. Ethiopia has a competitive advantage in several crops such as oil seeds and cotton, and horticultural crops such as fruits and vegetables that is often lost due to poor linkages with agro-industry and limited knowledge of efficient farming practices. The fragmented nature of the agricultural sector further compounds the inefficiencies inherent in the current market (Gebissa, 2021).

Although food-processing industries are present in Ethiopia, they are currently restricted in production by the availability of raw materials**.** The restriction on raw material is related mainly to access, but also to the quality of the produce, which results in inefficient handling chains, post-harvest losses and higher prices. By converting agro-export from primary, unprocessed items to processed products, which will underpin economic growth for this sector and the country as a whole, investment and development in the agro industrial sector would enhance the economy. The absence of suitable infrastructure is the biggest impediment to this anticipated agro-industrial expansion. Ethiopia can expedite its economic development and meet its industrial development goals by developing agro-industries (MACE, 2014).

Currently, the agro-processing industry in Ethiopia is not well advanced, there is a relatively low degree of value addition to agricultural commodities, and there are few linkages with marketing and financial services, partly due to the small firm sizes and under-developed processes, which lead to many of these firms operating below capacity due to different factors. Given its propensity to generate higher demand for the goods of other industries through backward or forward linkages, agro-role processing in development could be critical. The relationship between agricultural and industry appears to be poor, and manufacturing value additions remain modest. Given the rising demand for primary goods from this sector, agro-processing, an integrated type of agricultural growth, is likely to have the greatest impact on agricultural productivity. Furthermore, the infrastructure (e.g. road and

transportation facilities, power, etc.) is critical for boosting agro-processing growth could also be critical for expanded agriculture growth (MACE, 2014).

According to the World Bank (2009), Ethiopian manufactured agricultural exports account for only 9.0 percent of total agricultural exports (implying primary agricultural commodity to be 91 percent). Ethiopian agriculture continues to be a significant source of economic growth, accounting for 35 percent of the country's GDP and employing 80 percent of the population. It is also extending its leadership role in agricultural export performance, generating more than 90% of the country's 2.91 billion USD in the 2016/17 fiscal year. Despite its importance to the national economy and people's livelihoods, agricultural export success was hampered by quality issues.

Furthermore, the contribution of agriculture to overall export earnings risen steadily from around 63 percent in 2002/3 to 82 percent in 2008/9, though it slightly declined to 71 percent in 2010/11, before increasing to 73 percent from 2014/15 to 2016/17. In contrast, the share of non-agricultural items (merchandise and gold) remained relatively stable throughout the same period, with a slight increase from 2008/9 to 2016/17(National Bank of Ethiopia, 2016/17).

Even while agricultural exports have improved in recent years, they are still insufficient in light of the country's comparative advantages in agricultural exporting a variety of agricultural goods in both raw and processed forms (Zelalem, 2019). According to the International Monetary Fund (IMF), Ethiopia has a tiny export base, with the fifth lowest export-to-GDP ratio in the world in 2015 and a high concentration of primary products. This raises two risks

a. Ethiopia lacks the export diversification needed to boost growth by spreading risk and lowering aggregate output volatility; and Ethiopia lacks the export diversification needed to boost growth through a broad base of production technologies, spreading risk and decreasing aggregate output volatility.
b. Global price volatility and weather-related shocks make primary products vulnerable. To promote resilient growth, the GTP II and now 10-year strategic plan aimed to improve both the volume and diversification of agricultural exports.

Overvaluation of the country's real exchange rate, according to the World Bank Report Consistent, has contributed to low export performance. According to an IMF analysis, the country's real exchange rate was overvalued by roughly 30% in 2009/10 and 2010/11. This has had an impact on the country's agricultural export performance, as well as the type of

export items, which are predominantly made up of "unprocessed and undifferentiated" agricultural products, making it vulnerable to price changes in the international market.

Many experts and IMF officially advices, monetary and fiscal policy should aim to keep inflation low and the exchange rate policy should support a nominal exchange rate that is competitive. Accordingly, Ethiopia's Central Bank devalued the Ethiopian birr by 15 percent on October 2017, its first such move in seven years to boost the lagging exports. Still there is no a clear-cut reason for the poor performance of Ethiopia agricultural export performance.

So far, there have only been a few studies, such as Wondaferahu (2013) Determinants of Ethiopian Export Performance. Tigist (2015) investigated the impact of specific agricultural exports in Ethiopia. Samuel (2012) investigated the elements that influence agricultural export.

Yet as far as the researcher reading there is no/limited/ comprehensive empirical study which determine factors affecting agro processing export performance that includes all important variables like Real Effective Exchange Rate, Gross Domestic Product (GDP), inflation, FDI, infrastructure and trade openness.

Different researchers have tried to identify the major factors affecting agricultural export performance in Ethiopia. However, there are many economic variables including which were not addresses in their studies on agro processing industries. Most studies focus on primary agricultural products (unprocessed) but did not cover the agro processing industries in combined form at national level and this study uses time series data for 30 years, so it helps to fill data gaps for agro processing industries and bases for further research in the area. Therefore, this study tries to fill this gap and empirically analyze the selected macroeconomic determinants of Agro processing export performance specifically on, leather and leather products, meat products, fruit & vegetable and beverage industries in Ethiopia.

1.3 Research Questions

Ethiopia's agro-processing export is influenced by a variety of macroeconomic factors. Therefore, this study focuses on the macroeconomic determinants of agro processing export, which includes Real Effective Exchange Rate, Gross Domestic Product (GDP), inflation, FDI (foreign direct investment), infrastructure and trade openness; for this reason, the following questions should be address.

- What is the level of performance of agro processing export?
- What are the major agro processing export determinants in Ethiopia?
- To what extent these macroeconomic variables affect the performance of agro processing export in Ethiopia?
- Is there a long-term and short-term relationship between agro processing and the variable in question?

1.4 Research Objective

1.4.1 General Objective

The general objective of the study is to examine factors that influence the export performance of agro processing industries in Ethiopia.

1.4.2 Specific Objectives

- ✓ To investigating the relative importance of major factors that determine agro processing export performance of the country.
- ✓ To assess trend of the agro processing export performance of Ethiopia over time.
- ✓ To identify the macroeconomic variables those have long run and short run relationships with agro processing export performance.

1.5 Research Hypothesis

The expected results or hypothesis on the impact of explanatory variables on determinants of agro processing export in Ethiopia must be included in the study. As a result, the following alternative hypotheses were developed in this study:

H1: The macroeconomics (explanatory) variables have a positive effect on the export performance of agro processing industries in Ethiopia.

H2: The agro processing export performance of Ethiopia has a progressive trend over time.

H3: All macroeconomic variables have long run and short run relationships with agro processing export performance.

1.6 Significance of the Study

This study suggests and tackles the underlying issues that influence agro processing companies export performance. The study's findings will help that agro processing industries export performance will increase, and that investors and the government will profit more from the study in terms of securing hard currency.

Furthermore, the findings of this study will expect to have significant implication for academics as well as corporate research and development programs in companies. Considering that, there is very little and fragmented research in this area, this study help academicians had better understand the impact of variables like Real Effective Exchange Rate, Gross Domestic Product (GDP), inflation, FDI, infrastructure and trade openness. The results also provide guidance to managers in the agro processing Companies. Furthermore, the result will be crucial in terms of serving as a baseline for future research.

1.7 Scope and Limitation of the study

This research is limited to factors that influence Ethiopian agro-processing enterprises' export performance only under the global market. The researcher identifies export performance indicators for agro processing enterprises in Ethiopia and determines which element has the most important to effect on their export performance in the export market.

Of course, agro processing companies that produce for the domestic market have a lot of potential for increasing overall agro processing company performance and developing the country's economy. However, this study does not focus on the company’s performance of the domestic market. The study mainly focuses on the agro processing companies engaged in leather and leather products, meat products, fruit & vegetable and beverage industries in export market.

This study is limited to such independent variables as Real Effective Exchange Rate, Gross Domestic Product (GDP), inflation, FDI, infrastructure and trade openness that are supposed to impact on export performance.

It takes a long time and a lot of money to undertake the research that involves the entire government and private agro processing industries in the country. Not only that, the production areas of agro processing companies is found dispersedly in the country. Therefore, this paper is limited only secondary data to the agro processing manufacturing companies that contribute to enhance the export market. The other limitation is that the researcher is not

exposed to such kind of investigation before so there is lack of experience in organizing information in a logical and systematic manner.

1.8 Organization of the Study

The rest of study was divided into five chapters: the first chapter is an introduction that includes background, the research problem, research objectives, scope, and other basic issues; the second chapter is a literature review that includes related theoretical, empirical, and conceptual literature reviews. The third chapter deals with the Methodology of the study that includes, Research Design, Data Source, Model specification and methods of data collection and Methods of Data Analysis described in detail in chapter three. The fourth chapter presents analysis and presentation. This section of the research paper concerned on analysis and interpretation, which shows and explains the descriptive analysis, descriptive statistics, goodness test, among identified variables. Finally, in chapter five, the main findings of the study will summarize (conclusion) and recommendations.

1.9 Limitation

The study focused on selected agro processing commodities, i.e leather and leather products, meat , fruit & vegetable and beverage industries in the country though there are many other agro processing factories. This will limit the finding only to those selected agro processing commodities companies and no all agro processing companies.

The study relies only on secondary data, even though the primary data were necessary to investigate in detail by adding other independent variables, budget and time were a problem and hence stick to the secondary data.

CHAPTER TWO

2. Review of Literature

Literature studies on the research concepts and theories about factors affecting the export performance of Ethiopian agro processing industries are reviewed here. This chapter starts by introducing theoretical review on export performance, and then clearly describes factors affecting the export performance of agro processing industries. In addition, based on previous related literatures, the empirical and conceptual framework of the study was formulated. Scanning the current literature on the subject is essential for accurately defining the problem, crystallizing its objectives, and establishing an effective approach to fulfill those objectives. This not only aids in determining the course of a study project, but it also broadens one's mental horizon and perspective on its implications. The literature on export performance of agro processing companies is relatively scarce and in the recent years, no comprehensive study has been undertaken on export performance factors as a tool for global marketing and its effectiveness. A few studies which are available in reference to selected products and countries over a period of time have been discussed.

2.1 Theoretical Literature Review

Trade, in general, and export, in particular, have contributed positively to economic growth. In his classical theory, early economist Adam Smith highlighted how opening up a large market for export increases productive capabilities, employment, real production, and capital in the economy (Adam smith, 1776).Following Adam smith, Ricardo (1877) suggested that, the composition of trade is determined by the international difference in relative output ratio factor or comparative advantage. The neoclassical theory, on the other hand, suggests that export contributes significantly to a country's economic growth by fostering specialization, assisting in the realization of comparative advantage, maximizing the benefits of economies of scale, and increasing the rate of investment and technological change.

In addition, in 1817, David Ricardo had a comparative advantage over the new trade theories. According to the theory of comparative advantage, even if a nation has an absolute disadvantage in the production of both commodities, there is still a basis for trade between two nations if the nation with the absolute disadvantage specializes in the production of the commodity in which its absolute disadvantage is the smallest. The commodity in which its absolute disadvantage is smallest is the commodity of the country’s comparative advantage.

Hence, the nation will specialize in the production and agricultural export of that commodity (Salvatore, 2009).

The Heckscher-Ohlin model, which was popularized in 1933, analyzes inequalities in resource endowments among nations as a basis for trade. The approach emphasizes a nation's natural resources because they are endowed differently in terms of types and amount. Agricultural exports consist of a commodity whose production requires the extensive use of a nation's limited and costly inputs, while importing a commodity whose production requires the intensive use of a nation's limited and costly inputs. Therefore, according to the Heckscher-Ohlin theory, if a nation is labor abundant, it should specialize in the export of the commodity that is labor intensive. Again, if a nation is classified as capital abundant, it should specialize in the Agricultural export of the commodity whose production utilizes capital-intensive techniques (Salvatore, 2013).

Because of the critical importance of exporting in national economies, several studies have focused on export performance. The majority of study focuses on the links between performance and organizational or environmental factors; less research has been done on the specific elements that may impede exporting (Hossein, 2012). Export performance is critical for developing-country businesses that see the global market as a source of growth, survival, or competitiveness (Matanda and Freeman, 2009).

One of the most important markers of a company's success is its export performance. Over the last few decades, research into export performance has exploded (Sousa, Martnez-López, and Coelho, 2008). Despite the fact that various research have been undertaken to understand export performance and its antecedents, no universally recognized paradigm exists. Export success is the result of a company's activity in international markets (Papadopoulos and Martn, 2010). The results of a company's foreign activity can also be defined as export performance. From this perspective, export performance is the extent to which the firm achieves its objectives when exporting a product to a foreign market (Navarro et al., 2010).

Because there is currently no consensus, there is no reference framework and the findings are scattered. The lack of standardization in research designs and terminology, the fact that the bulk of studies are individual initiatives rather than coordinated efforts, and each study has its own frame of reference all contribute to this reality (Katsikeasetal., 2000).

Another element that contributes to this controversy is the fact that the dimensions of export performance have different degrees of importance for both the country and investors, also

employees and customers (Sousa, 2004), and the objectives of the management, i.e., whether it is short- or long-term oriented (Walker and Ruekert, 1987).

Export performance was defined by Aaby and Slater (1989) as a country's or firm's relative success in selling domestically produced items in other countries. It is also viewed as a barometer of a country's global competitiveness. In a broader sense, export performance refers to a mix of criteria such as gaining access to international markets, growing market share and price competitiveness, diversifying export items, and establishing a brand.

According to UNCTAD (2004), external and internal factors are the most common determinants of export performance. External variables include market access conditions, a country's location in relation to international markets, and other factors that affect foreign countries' import circumstances. Supply-side constraints are referred to as internal forces. Supply circumstances are critical in determining an economy's export potential, and countries with superior supply are likely to export more. Access to raw materials and cost factors have an impact on supply capacity. Economic policies and the institutional framework, in addition to resource endowment, have an impact on the country's supply capacity.

Cavusgil and Zou (1994, p.3) define export performance "as a strategic response by management to the interplay of internal and external forces". Furthermore, these authors establish it as the extent to which a firm's objectives, both economic and strategic, with respect to exporting a product into a foreign market, are achieved through planning and execution of marketing strategy.

According to Fungaza (2004), the amount of agricultural export a country produces (supply capacity) is determined by the size of the agricultural exporting industry (measured by the varieties of the product produced), producer pricing (producer price), and domestic transportation costs.

Fungaza (2004) similarly emphasizes the impact of country size on agricultural export volume. The Gross Domestic Product (GDP) and population of a country are both measured by the GDP. Country size refers to the size of a country's agricultural export market for a certain commodity. If the Gross Domestic Product of the importing country is high enough, it will have an impact on the overall amount of imports it will make. The higher the GDP, the more probable it is to import more of a particular commodity. The price of agricultural exports is proportional to the size of a country. Because the price represents the costs that go into the production and agricultural export of a commodity, the higher a country's Gross Domestic Product is, the more likely it is to affect the price of a commodity that it

agricultural exports. These costs are closely related to the exporting country's institutions and policies.

Redding and Venables (2004), on the other hand, suggest that supply capacity and overseas market access are mutually exclusive. If the export sector grows, more factors of production will be required. The price of labor (wage rate) rises as the demand for elements of production such as labor rises. This rise in production costs will be reflected in the producer price. The lesser the demand for a country's agricultural exports, the higher the producer price, thus the negative link between foreign market access and supply capacity. Increased international market access will result in a less-than-proportional increase in export volume and, as a result, lesser supply capacity. This also means that supply capacity is inelastic in terms of access to international markets (Redding and Venables, 2004).

Though numerous methodologies have been employed, there is no consensus on how to measure export performance (Cavusgil& Zou 1994; Schlegelmilch& Ross 1987; Walter &Samiee 1990). Order of frequency, export intensity (export fraction of sales), sales volume, export market share, and export profit contribution were the most commonly employed measures in the previous studies evaluated. Return on investment, export satisfaction, perceived success, perceived export growth, perceived profitability, and perceived market share were also discovered, but each was employed in only one study. These performance indicators have been categorized in a number of ways. Sales, profitability, and change were the three areas of export performance measures in the Shoham (1998) study. Cavusgil and Zou (1994) used a composite measure that included four components: strategic goals achieved, perceived success of the export venture, annual percentage change in sales growth over five years, and overall profitability over five years, whereas Matthyessens and Pauwels (1996) divided export performance variables into financial, non-financial, and composite scales.

Most researchers accept the multidimensionality of export performance, but there is disagreement about which indicators should be used to measure the variable. Most researchers consider two different dimensions; economic (objective) and strategic (subjective). Objective and subjective indicators are thought to be complementary in nature, and it is recommended that they be used in tandem to present a more complete view of export performance (Stoian, Rialp and Rialp, 2011). Because of the multidimensionality of export success, it's difficult to compare and contrast the results of different studies (Sousa, 2004). The development and subsequent validation of measures for diverse export performance characteristics, as well as the usage of several metrics, are required for capturing the complete

story of a firm's export performance in order to provide a trustworthy assessment (Solberg and Olsson, 2010).

Overall, it can be assumed that export performance is a unique notion for each conceptualization; operationalization and metrics definition are adapted to the situation under investigation. According to reviews on the subject of export performance, the authors view it as a complex, multifaceted phenomenon with three primary dimensions: effectiveness, efficiency, and adaptability (Katsikeas et al., 2000; Oliveira et al., 2012; and Walker and Ruekert, 1987). To summarize, a large number of publications use at least one of three characteristics, effectiveness, efficiency, and adaptability, to evaluate export performance, even if only implicitly.

2.1.1 Factors Affecting Export Performance

2.1.1.1 Gross Domestic Product and Export Performance

As mercantilism and classical theories describe, export is a critical component of international trade and economic growth. The Heckscher Ohilin theory hypothesis proposed that export is a crucial driver in closing the gap between rich and poor. Furthermore, according to Helpman (1984), export aids in the transmission of technology and information, accelerating economic progress. Different factors might influence the export results. Demand and supply factors can be separated into two categories.

Another well-known economic model for export and the economy is the Keynesian expenditure approach. According to this perspective, aggregate demand in the economy is heavily influenced by household personal consumption expenditure, investment spending, government spending, and net export, which is the difference between export and import. Higher export means more final products and services are produced in a given year. The opposite is true, in that the better a country's economy is, the more likely it is to export to other countries.

The paradox of abundance argument, on the other hand, claims that a country might occasionally focus too strongly on exporting only one attractive non-value-added export, neglecting the rest of its economy and lowering GDP.

2.1.1.2 Foreign Direct Investment and Export Performance

The link between FDI and export performance can be traced and hypothesized by applying the flying-geese model, the product lifecycle theory and the new growth theory. The migratory image provided by the flying-geese model depicts Japan as the main country in

Asia's industrialization, with other countries trailing behind and following the Japanese model. It portrays a country's changing competitiveness over time by focusing on dynamic changes in the endowment of components like labor, capital, and entrepreneurship (Tung, 2006).

The flying-geese kind of FDI had a dominating role in the establishment of new sectors in Far East Asia and ASEAN nations (Ozawa, 2010). Labor cost and trade openness are critical aspects in the FG model because they may be utilized as a comparative advantage tool to stimulate trade. To attain their profit aim, MNCs have relocated from higher-cost home nations to lower-cost countries, according to this model.

Similarly, there are dynamic changes in the industrial structure in these nations, such as the transition from the textile to the chemical industries, and subsequently to the steel and car sectors, which leads to industry shifts between countries in search of cost advantages. The changing location of FDI reveals the catching up process of industrialization.

According to the flying-geese model, rising FDI increases the host country's export performance by motivating the host country's factor endowment for cheaper production and bringing technology, money, and knowledge; this stimulates local firm exporting ability.

Ethiopia owning abundant and cheap labor attracted FDI in labor intensive industries and light manufacturing industries in the last 10 years (van der Pols, 2015). Increase the inflow of FDI in the textile and garment industries ended until the Ethiopia cost advantage on the factor endowment turn down.

The Product Lifecycle Theory stresses how the manufacturing process evolves over time. According to this view, manufacturing has four stages: invention, expansion, maturity, and decline. The same companies that develop a product for domestic use will invest in developing a product for international consumption. When product standardization and market saturation lead to price rivalry and cost pressures, the theory explains why a growing number of multinational companies (MNCs) in advanced nations migrate to developing countries. MNCs and other enterprises tend to manufacture new inventive products for domestic consumption and export without FDI in the early stage of manufacturing. Companies at this level of development begin to seek FDI and are more likely to form joint ventures with domestic industries to establish production. The major focus of the product at this stage is cost reduction, and the flow of investment has switched from high-cost regions to low-cost countries. However, at this level, the MNC's work serves the local market as well as the rest of the globe (Charles W. L. Hill, 2011).

The new growth model views FDI as a source of technical innovation that is a byproduct of economic activity that helps recipient nations boost productivity. This technical advancement and productivity raise the return on investment in the production function, which contributes to economic growth (Shan, 1998).

Knowledge transfer is supposed to be aided by FDI by enhancing the host country's existing pool of knowledge through labor training, skill development, and the introduction of alternative management methods and organizational configurations. Due to competitive pressure and information transfer, local enterprises are required to enhance their innovation (Mello, 1999). According to the new growth hypothesis, FDI that incorporates knowledge transfer boosts a firm's capacity to export inside the host nation.

Fast-growing economies may not be able to sustain rapid growth solely with domestic capital, necessitating a strong need to attract Foreign Direct Investment (FDI), particularly in sectors that contribute the most to economic growth, such as the textile sector, where domestic capital may not be sufficient to expand production capacity and modernize the entire system (Chaudhary, 2011). Developing nations like India may get complacent when it comes to recruiting and absorbing FDI, particularly in the textile sector, where the demand for sophisticated machinery is well established.

It is concluded that FDI supports exports by increasing domestic capital for exports, assisting in the transfer of knowledge and new items for export, allowing access to new and big international markets, and offering training and managerial skills to the local workforce. However, other critics argue that FDI reduces or replaces local savings and investment, transfers technologies that are unsuitable for the host country's factor proportions, largely targets the host country's domestic market and does not promote exports, and so on (Zhang, 2006). Therefore the impact of FDI on export performance can be hypothesized as that FDI has either positive or negative impact on the export performance.

2.1.1.3 Trade Openness and Export Performance

As it is stipulated in the works of Zakaria (2014),, one of the pronounced characteristics of the world economy over the last sixty years, particularly in the last three decades, has been that developing countries have experienced rapid trade liberalization either unilaterally or as part of multilateral initiatives with the World Bank, WTO, and IMF (The major donors' aid policy had changed, and developing countries were supposed to include opening of their economy to external competition in their long-term growth and development strategies while implementing the Structural Adjustment Programs). The most common changes are the

streamlining of import processes, the reduction or elimination of quantitative limits, and the rationalization of tariff systems (Cherkos, 2017). These trade liberalization changes have significant ramifications for developing nations' exports, imports, and trade balance. Many developing nations are still hesitant to liberalize their economies since it will worsen their trade balance by increasing imports more than exports.

The elasticity method, the absorption approach, and the monetary approach are the three primary techniques established in the theoretical literature to investigate the impact of trade liberalization on an economy's trade balance. The fundamental goal of the elasticity method is to investigate the impact of trade liberalization on export and import pricing elasticities. The justification for looking at the link between trade liberalization and exports is that reducing or eliminating trade policy distortions decreases anti-export bias, which increases export competitiveness.

Some scholars such as (Taneja, 2012, Kongmanilaa& Takahashi, 2016) strongly acknowledge that the more open an economy is to the outside world, the better its foreign exchange gains from export will be. The consequence is that a country must diversify its trading partners in order to integrate into the global economy.

2.1.1.4 Exchange rate and export performance

The exchange rate is the rate at which one currency purchases other currency. In other words, it is the purchasing power of one currency in terms of another currency. It is also the external value of one currency. The rise in exchange rate against another currency is called as appreciation and the fall is called as depreciation.

The rate of exchange has a direct concern on export volumes and value of exports. A strong local foreign currency harms all exports, including the manufactured goods industry. The exchange rate is particularly relevant since many nations' success in export-led growth has been attributed to government interventions to ensure competitive actual exchange rates. For quick expansion of export performance, a certain level of macroeconomic stability, low inflation, and a competitive actual exchange rate are usually required (Zhang &Hathcote, 2008).

According to Elbadawi and Helleiner (2004) exchange rate can promote the export growth and the comparative advantage. According to the comparative advantage paradigm, variations in resource endowment and technology are important variables in shaping a country's trading pattern. Although it is well recognized that this model is based on perfectly competitive market assumptions, economic decisions based on perfectly competitive assumptions are not

always the best for a country, especially in the long run. As a result, government policy interventions to promote a socially optimal production and trade pattern are defensible on efficiency grounds. A real exchange rate policy, because of government intervention, is an important macroeconomic policy instrument that governments may employ to affect the country's trade. Despite the lack of theoretical agreement on the usefulness of manipulating the Real Exchange Rate to reconfigure a country's competitive advantage and boost exports, the exchange rate is a crucial instrument and determinant of export.

Rodrik (2009) argues that the real undervaluation boosts exports and growth by lowering the foreign currency value of extra transaction expenses. Similarly, Edwards and Alves (2006) found that when currency rates depreciate, export prices rise because local exporters are price-takers in the foreign market. Because labor-intensive industries, such as the textile and garment industries, tend to be particularly sensitive to changes in exchange rates, textile and apparel makers in developing nations lose earnings and potentially go out of business as a result of rising exchange rates in global commerce (Kaplinsky& Morris, 2008).

The elasticity technique attempts to forecast the impact of policy changes on the Balance of Payments. This method, for example, shows how exchange rates will influence the balance. Furthermore, the elasticity method argues that devaluation can enhance the Balance Of Payments if the BOP is in equilibrium. Devaluation, on the other hand, requires a rise in the overall price elasticity of local and international demand for imports. When a country devalues its currency, the Balance Of Payments improves under ideal circumstances. The Marshall- Lerner condition describes this ideal state.

Marshall-Lerner Condition states that Currency depreciation will gradually enhance the balance of payments. However, in order to achieve this increase in the BOP, the total demand elasticity for imports and exports must rise. When a country's currency is devalued, the cost of exports falls. In principle, this will boost demand for certain exports. However, in order for greater demand to arise, exported items must be elastic.

Contrary to popular belief, when the exchange rate is manipulated to control export outcomes, wage costs fall in foreign currency terms, more items are produced at home, and this replaces or increases import replacement output rather than encouraging export (Krugman, 1999). Furthermore, labor costs and the number of employees have a greater impact on the impacts of exchange rates on textile and apparel (Gerard, Byron, &Yochanan, 2006).

2.1.1.5 Infrastructure and Export Performance

The political economy of policy reform, institutional development, and supply restrictions related to infrastructure are all factors in Africa's low export performance. The relative importance of trade expenses (particularly infrastructure) as a determinant of trade has increased as tariff and non-tariff barriers (NTBs) have been reduced. Poor service delivery has hampered businesses in most African countries due to inconsistent transportation, power, and water, as well as insufficient telecommunications networks (Collier and Gunning, 1999).

Specifically, African goods' high transit costs have become a significantly more restrictive trade barrier than tariffs in key countries. Tariffs in Canada, the European Union, Japan and the United States vary from averages of 3 to 7 per cent on goods originating in Africa .Transit expenses paid by landlocked African countries, on the other hand, are nearly three times higher than average tariffs. Swaziland has the lowest transit expenses at less than 5%, while Chad and Malawi have the most at 50%. Border delays account for a large portion of transit costs (Mbekeani, 2007).

Garland (2017) describes that a country's infrastructure has a variety of effects on enterprises. Infrastructure is a resource management system that is required for a society or business to function. Infrastructure might be classed as hard or soft, according to her. Transportation, telecommunications, energy, water supply, and sanitation are examples of hard infrastructure that are required to run a country. Education, banking, government, emergency, and healthcare systems are examples of soft infrastructure that help a country sustain its health, economic, and social standards. Hard infrastructure is of primary concern to businesses since it has a direct impact; however, soft infrastructure has a secondary influence and is equally significant.

Almost all Ethiopian exports pass through the port of Djibouti. Trucks filled with 20ft or 40ft containers are the primary mode of transport. The port of Djibouti can only ship 20ft or 40ft containers. For many elements of daily operations, businesses rely on a network of infrastructure. Gaining new clients and keeping current ones requires consistent customer engagement. The lack of roads and highways in underdeveloped countries can be a tough and costly barrier to overcome. Planes, cargo ships, and boats are used by businesses to transfer goods throughout the country. To keep transportation costs low, some companies even operate separate facilities. Road infrastructure and highways are already in place in developed countries. For these countries, the issue becomes one of road quality. Many products are given in digital format to clients (Garland, 2017).

Physical infrastructure, both in terms of quantity and quality, is projected to play a significant effect in export performance. Infrastructure, foreign direct investment (FDI), and macroeconomic stability are all important components of supply capacity in the early stages of the export sector's development. These factors have a substantial impact on export performance at all levels (UNCTAD, 2004).

Infrastructure development is critical to a country's ability to produce and transport things. "Much of the commodity market integration in the Atlantic economy after the 1860s was due to the decline in transit costs between markets", argue O'Rourke and Williamson (1999). In most African countries, particularly landlocked and small island countries, poor infrastructures are a major hindrance to commerce, competitiveness, and long-term development. The importance of infrastructure on trade costs has been highlighted in recent literature. The relevance of transportation costs and infrastructure in explaining trade and market access has been studied in the literature. Many historical studies have focused on trade cost reductions, particularly those resulting from endogenous changes in commercial policy and exogenous changes in transportation technology (O'Rourke and Williamson, 1999).

Transportation and infrastructure improvements can have a significant positive impact on export performance. Infrastructure is quantitatively essential in determining transportation costs, according to Limao and Venables (2001). Poor infrastructure, they believe, accounts for 40% of expected transit costs for coastal countries and up to 60% for landlocked countries. Demetriades and Mamuneas (1999) have analyzed that infrastructure may encourage specialization and long-term growth, as well as influence commerce by lowering resource costs. It necessitates diverting resources away from the final product in order to boost economic growth through higher specialization.

2.1.1.6 **Inflation and Export Performance**

Inflation is defined as an increase in prices in the economy. A more precise definition of inflation is a continuous rise in an economy's overall price level. Inflation is defined as an increase in the cost of living due to an increase in the price of goods and services. The annual percentage change in the general price level is measured by the inflation rate. Inflation is measured by consumer prices (monthly %). Inflation as measured by the consumer price index reflects the percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals.

According to the aggregate demand curve, when the price level is higher, the real GDP demanded is lower. One of the explanations given is a consequence of the Mundell-Fleming model: "As the price level drops, interest rates fall, domestic investment in foreign countries increases, the real exchange rate depreciates, net agricultural export s increases, and aggregate demand increases." As a result, it appears that rising inflation means more imports and less agricultural exports. Increased inflation, on the other hand, should cause the exchange rate to rise (currency depreciation). Agricultural exports should increase and (conversely) imports should fall if you can trade foreign currency for more home currency.

Inflation has a substantial positive long-run association with overall agricultural exports, according to Asian Journal of Economics, Business and Accounting (2017).

2.2 Ethiopian Agro processing Export

Both foreign demand and local supply were recognized as factors of export levels in the Second Five-Year Development Plan. Although external demand was blamed for the poor export performance, local production obstacles were blamed for the inability to achieve the expected structural change in favor of industrial items to a greater level (Imperial Government of Ethiopia, 1962)."The loss in exportable agricultural products has harmed the foreign exchange situation of the country," according to a Transitional Government of Ethiopia economic strategy document and prior foolish policies were blamed for such a failure in agricultural production to a greater extent (Transitional Government of Ethiopia, 1991).

A log-linear export supply model, specified by the volume index of exports as a function of real GDP, unit value index of exports deflated by implicit GDP deflator, the export weighted real effective exchange rate, the ratio of export taxes to exports, and the private consumption/GDP ratio, was added to the World Bank's (1987) analysis of the constraints to Ethiopia's export growth. The results showed that export taxes and private consumption factors had a statistically significant impact, with estimated elasticity values of -0.29 and -3.78 for the two variables, respectively. Their model is not consistent with recent trade theories, which hypothesized the existence of simultaneity between prices and quantities.

2.2.1 Export Diversification Polices in Historical Perspective

Pre-1974/75

The foreign trade sector was managed by largely open market regulations throughout this time, with the private sector (mostly foreign capital) accounting for the majority of export

and import activities. Despite the fact that import substitution was the country's major trade policy, concern about export diversification began, at least formally, with the First Five-Year Development Plan (1957-1961), which acknowledged the economic instability caused by reliance on two or three products.

The number of the country's exports, the balance of payments position, and the level of budgetary revenue are all dependent on price movements and the extent of demand for the three primary export commodities: coffee, hides and skins, and oil seeds, as stated in the plan. As a result, it calls for a more diversified export structure that takes advantage of the diverse livestock, agro-industry products such as sugar, canned meat, leather, and minerals, in order to achieve average annual export growth of 9% and an 11 percent share of national income from exports (Imperial Government of Ethiopia, 1962).

The Second Five Year Development Plan (1962-1966) placed great emphasis on structural change and export diversification to achieve higher level of foreign exchange earnings (Imperial Government of Ethiopia, 1962). The plan envisaged to reduce agricultural products export share from 93.6 percent in 1961 to 72.3 percent in 1966 while that of manufactured products expected to pick-up from 5.2 percent to 24.2 percent during the same period.

The goal was to achieve an average annual export growth rate of 11% by establishing government foreign trade corporations, revising existing customs tariffs to protect domestic products and stimulate exports, directing credit, premium, and subsidy policies toward the development of production and promotion of exports, concluding a series of bi-lateral and multilateral economic agreements, and improving participation at international trade fairs.

The third five-year development plan was concerned with geographic diversification of conventional exports such as coffee, animal products, and oilseeds, as well as the development of non-agricultural exports (1968-1973). The goal was to lower primary agricultural exports' share of overall exports from 86 percent in 1967 to 75 percent in 1973, according to the plan (Imperial Government of Ethiopia, 1968).

1974/75-1990/91

The export objectives of the dergue regime's ten-year perspective plan were to increase foreign exchange profits, reduce the country's export industry's reliance on limited export markets, increase the number and character of manufactured exports, and socialize the export sector(Socialist Ethiopia's Provisional Military Government, 1985).

The agendas of the prospective plan were to emphasize the role of state-owned export firms, geographic diversification of exports towards communist nations and adjacent African countries, and, to a greater extent, diversification towards manufactured products. During the plan period, an average annual export growth rate of 15.4% was predicted, with state export businesses account for 90% of all export activity.

According to 1994 plan, agricultural exports (coffee, hides and skins, pulses, and oil seeds) as a group, as well as coffee, were predicted to drop from 78.1 percent and 55.1 percent in 1985 to 60.1 percent and 39.9 percent. Slow-moving traditional exports (live animals, meat products, fruits and vegetables, spices, sugar and molasses, natural gum, chat, and other items) were expected to increase from 21.8 percent in 1985 to 57.6 percent in 1994. New export products such as copper, potash, marble, soda ash, cement, ceramics and leather products were planned to be forwarded to the international market starting from the second half of the perspective plan.

Post- 1990/91

Ethiopia's Transitional Government's economic policy recognized the necessity of boosting and diversifying the country's exports in order to alleviate foreign currency shortages while following a free market-based economic path (Transitional Government of Ethiopia, 1991). The government wanted to increase exports and foreign exchange revenues by reducing the government's influence in the international trade sector and enabling enough private capital participation in the export business. Measures such as providing fiscal incentives to exporters, replacing quantitative limits with tariffs, boosting export-oriented investment, reducing administrative and bureaucratic procedures, and encouraging the use of trade data were highlighted to this purpose (IMF, 1991).

In October 1992, the World Bank and the International Monetary Fund (IMF) initiated a structural adjustment program whose primary goal in the exchange and trade system was to improve incentives for diversified export output and divert foreign exchange flows away from parallel markets.

A slow of policy measures aimed at encouraging export growth and diversification have been approved as part of the new economic policy and its accompanying structural adjustment program. The export licensing process was simplified, and the bureaucratic trade licensing system was mostly abandoned. The Birr was depreciated by around 59%, and the foreign exchange market was liberalized in stages. As of December 1992, all export taxes (except coffee) and subsidies to government owned exporting enterprises were abolished, and as of

April 2001, exporters were exempt from the 6.5 percent coffee export tax if their coffee export price was less than 105 US cents per pound for washed coffee and less than 70 US cents per pound for unwashed coffee. A Trade Duty Incentives Scheme for Exports was implemented. Since 1999, an export credit guarantee scheme has been in place to make it easier for exporters to obtain bank financing, allowing them to take advantage of legitimate export orders and increasing their competitiveness in the worldwide market. To stimulate exporters, a foreign exchange withholding program was implemented. A legal framework was established for the registration of external loans and credit from suppliers or overseas partners.

2.2.2 Overall Export Performance

The overall performance of the export sector was unsatisfactory during 1970/71 – 2001/02 as evidenced by the lower export/GDP ratio and the declining share of exports in import financing.

The export/GDP ratio has decreased from 7.1 percent in 1970/71 to 6.8 percent in 1974/75 to 1990/91, and 6.7 percent in 1991/92 to 2001/02. In addition, the share of export financing in import financing (Export/Import ratio) has decreased from an average of 88.5 percent in 1970/71 to 54.2 percent in 1974/75 to 1990/91 and 32.8 percent in 1991/92 to 2001/02.

Coffee was the most important export commodity over the 32-year period, accounting for an average of 58.6 percent of the country's total exports. Non-coffee exports were led by hides and skins, which accounted for 12.3 percent of total exports, followed by oilseeds (4.73 percent), pulses (4.54 percent), and chat (4.54 percent) (4.23 percent). On average, Germany, the United States, Japan, Saudi Arabia, Djibouti, and Italy accounted for 17.7%, 17 percent, 10.3%, 7.91 percent, 7.78 percent, and 7.43 percent of Ethiopian exports, respectively.

Agriculture plays a vital role in Ethiopia's political, economic, and social growth, according to the ATA report for 2017/18. It contributes 34 percent of the country's GDP and 71 percent of employment, making it one of the most important sectors of the Ethiopian economy. Crop production accounts for 72 percent of overall agricultural GDP, with livestock accounting for 20% and other areas accounting for 8.6%. Cereals (wheat, maize, teff, sorghum, and millet) account for the majority of agricultural production as major staples. Smallholder farmers produced 32 million tons of grains in the 2009 EFY season alone.

According to NBE (2016/17) total merchandise export (including electricity) increased by 1.4 percent year-on-year due to higher export earnings from coffee (22.2 percent), pulses (20.5

percent), chat (4.0 percent), fruit and vegetables (4.5 percent), meat & meat product (2.3 percent), electricity (133.0 percent) and other export items (33.4 percent). Thus, the ratio of merchandise export to GDP declined to 3.6 percent from 4.1 percent a year ago

Due to a 1.6 percent drop in agricultural export volume, agricultural export earnings from leather and leather products fell by 1.1 percent. Despite a 0.5% increase in the worldwide pricing. As a result, leather and leather products accounted for 3.9 percent of overall export earnings. Receipts from meat & meat products showed a 2.3 percent annual growth mainly because of a 3.2 percent increase in export volume despite a 0.8 percent decline in price. As a result, the share of meat & meat products in total merchandise export earnings stood at 3.4 percent.

Fruit and vegetable export revenues increased by 4.5 percent compared to the same period previous year, owing to a 6.9% increase in export volume and a 2.2 percent drop in international price. During the study period, fruits and vegetables accounted for 1.9 percent of overall merchandise export earnings.

Ethiopia's huge tracts of rich land, diverse climate, generally enough rainfall and enormous labor pool give it great agricultural potential. Ethiopian agriculture, despite its promise, has remained underdeveloped. The agricultural sector has done poorly due to drought, which has plagued the country since the early 1970s, a poor economic base (low productivity, insufficient infrastructure, and low level of technology), and overpopulation. According to the World Bank, agricultural productivity decreased by 2.1 percent each year between 1980 and 1987, while population increased by 2.4 percent per year.

In general, despite its immense benefits to the country's economy, the agricultural industry has faced numerous problems and obstacles. For example, during the imperial period, a number of factors slowed the development of the agricultural sector, including tenancy and land reform issues, the government's neglect of the agricultural sector (agriculture received less than 2% of budget allocations despite the fact that agriculture employed the vast majority of the population), low productivity, and a lack of technological development.

Agricultural productivity continued to deteriorate throughout the Derg government, just as it had during the imperial administration. Agricultural production climbed at an average annual rate of 0.6 percent between 1973 and 1980, but subsequently fell at an average annual rate of 2.1 percent between 1980 and 1987, according to the World Bank. During the same period (1973–87), the population grew at a 2.6 percent yearly rate (2.4percent for 1980-87).

2.3 Empirical Literature Review

Some of the empirical literature on export in general, agro processing (agricultural) in particular are present here.

Shane (2008) used a similar approach to Tura (2002) to look at factors that influenced the growth of agricultural exports in the United States of America (USA) from 1970 to 2006, though the weighted real GDP was calculated by only subtracting exports from the importing country and did not include relative prices. The data found that the importing country's real GDP was the most important factor influencing the growth of US agricultural exports. A 1% rise in the importing country's real income resulted in a 0.75 percent increase in the volume of agricultural exports from the United States, implying that agricultural exports from the United States are inelastic in relation to the income of the trading partner. As a result, he came to the conclusion that the importing country's real income is the most important factor influencing agricultural exports. On the other hand, he discovered that the real exchange rate and the volume of agricultural exports have a negative and significant relationship. The increase in agricultural exports from the United States was 0.51 percent due to a 1% fall in the exchange rate versus the currencies of trading partners. Helga (2005) discovered that the exporting country's GDP has no effect on its exports.

Sharma (2001) used annual time series data to study the determinants of Indian exports using a simultaneous equation approach. Relative pricing, exchange rates, and domestic relative prices were the key variables used. Even though it is not specific on agro processing, according to his results, a drop in export prices increased demand for Indian exports, whereas an appreciation of the Indian rupee versus key trading partner currencies reduced the volume of Indian agricultural exports.

Foreign direct investment and infrastructure development, on the other hand, had no impact on India's exports. Kannan (2013), on the other hand, discovered that global price and global population had a positive and considerable impact on India's agricultural export volume. Tien (2009) also discovered that the rate of increase of Vietnam's agricultural exports was positively correlated with the rate of growth of the country's GDP, despite the fact that the GDP coefficient was smaller than one, meaning that exports were inelastic in relation to GDP.

Abolagba and et al. (2010) used Ordinary Least Squares regression (OLS) to assess the determinants of Nigeria's two agricultural exports, cocoa and rubber, from 1970 to 2005 in a study to analyze the determinants of agricultural exports in Nigeria, specifically cocoa and

rubber. The data suggested that domestic or supply-side factors were the most important predictors of agricultural export growth for both crops. Local rubber output, interest rate, domestic producer price, and domestic consumption were all major predictors of rubber agricultural export in Nigeria, according to the author. The actual exchange rate was found to have a considerable impact on rubber export quantities on the demand side. Only supply-side factors such as domestic consumption and rainfall were found to have a favorable impact on agricultural export volumes in the case of cocoa.

Various authors conducted empirical analyses of agricultural exports and economic growth in Nigeria. Using time series data from 1980 to 2010, Oluwanseun et al. (2013) investigated the presence of a long run relationship between agricultural exports and economic growth. The researchers used unit root tests and the Johansen maximum likelihood test of co-integration to find that there is a long run equilibrium relationship between agricultural exports and economic growth, and that the relationship is elastic, meaning that a unit increase in agricultural exports would result in a more than comparable increase in Nigeria's Real Gross Domestic Product.

Ekiranet al. (2014) used a multivariate Johansen co-integration analysis to look at the relationship between agricultural exports and economic growth from 1980 to 2012, and discovered that agricultural exports are long-run predictors of economic expansion. According to the report, Nigeria's government should focus its efforts on improving agricultural exports as part of the country's economic development.

Tewelde Medhin and Mbai (2013), employed an expanded gravity model using variables such as Namibia's Gross Domestic Product, Gross Domestic Product per capita, exchange rates, and dummy variables if the trading partner was a member of a regional organization. The study's goal was to find new markets for Namibia's fresh beef, goat, and sheep agricultural exports. Their data demonstrated that in Southern and West Africa, Gross Domestic Product per capita was positively connected and significant for fresh beef. Fresh beef was found to be important in all cases, however goat and sheep meat was only found to be important in East Africa. In Asian markets, per capita income was found to be significant and highly elastic, making these markets attractive Agricultural export destinations.

Nega (2013) identified some major determinants of Ethiopian export performance for a period of twenty-five years, from 1974 to 2011. The results of the econometric analysis revealed that the explanatory variables, terms of trade, trade openness, gross domestic product, real effective exchange rate, domestic credit, and capital expenditure over a period,

significantly influenced Ethiopian export performance. Terms of trade became small and negative in sign in the short run, which was unexpected. In the long term, capital expenditures were likewise modest. Other variables, aside from these two, were discovered to have a substantial impact on the country's export success. Out of the variables that had a substantial impact on export in the long and short run, terms of trade, trade openness, and real gross domestic product, all had a positive impact on export, as expected.

Mulualem (2006) employed the Ordinary Least Squares (OLS) estimate method using annual data from 1970 to 2004 in his research of the drivers of manufacturing performance in Ethiopia. The model's findings revealed that the investment to GDP ratio, total factor productivity, and foreign income all had a positive and significant impact on Ethiopian manufacturing exports, but the real effective exchange rate had a negligible impact on exports.

Abule (2012), reports on his research into the influence of exchange rate variability and its components on three of Ethiopia's most important primary agricultural exports: coffee, oilseeds, and flowers. To evaluate the impact, the researchers used time series data from 1992 to 2010 and used the Autoregressive Distributed Lag Model (ARDL) model. The findings found that coffee and oilseed exports had a negative association with exchange rate variability, but flower exports have none. Furthermore, the country's Terms of Trade (TOT) were found to be negative and significant for oilseeds and flowers but insignificant for coffee, showing that the country's TOT is deteriorating. The change in export of coffee and oilseeds is found to be modest but negative, meaning that the change in export of these goods is declining with time. In general, the country's currency rate volatility has resulted in decreasing terms of trade and an exploitative flow of resources out of the country.

2.4 Conceptual Framework of the Study

The purpose of a conceptual framework is to explain, forecast, and understand phenomena, as well as to challenge and extend current knowledge within the bounds of crucial bounding assumptions in many circumstances. The conceptual framework discusses and introduces the theory that explains why the research problem under investigation occurs. As a result, a conceptual model of agro processing enterprises has been built to demonstrate the impact of various factors on the companies' export performance. The following model attempts to demonstrate the impact of several factors on agro processing companies' export success in Ethiopia.

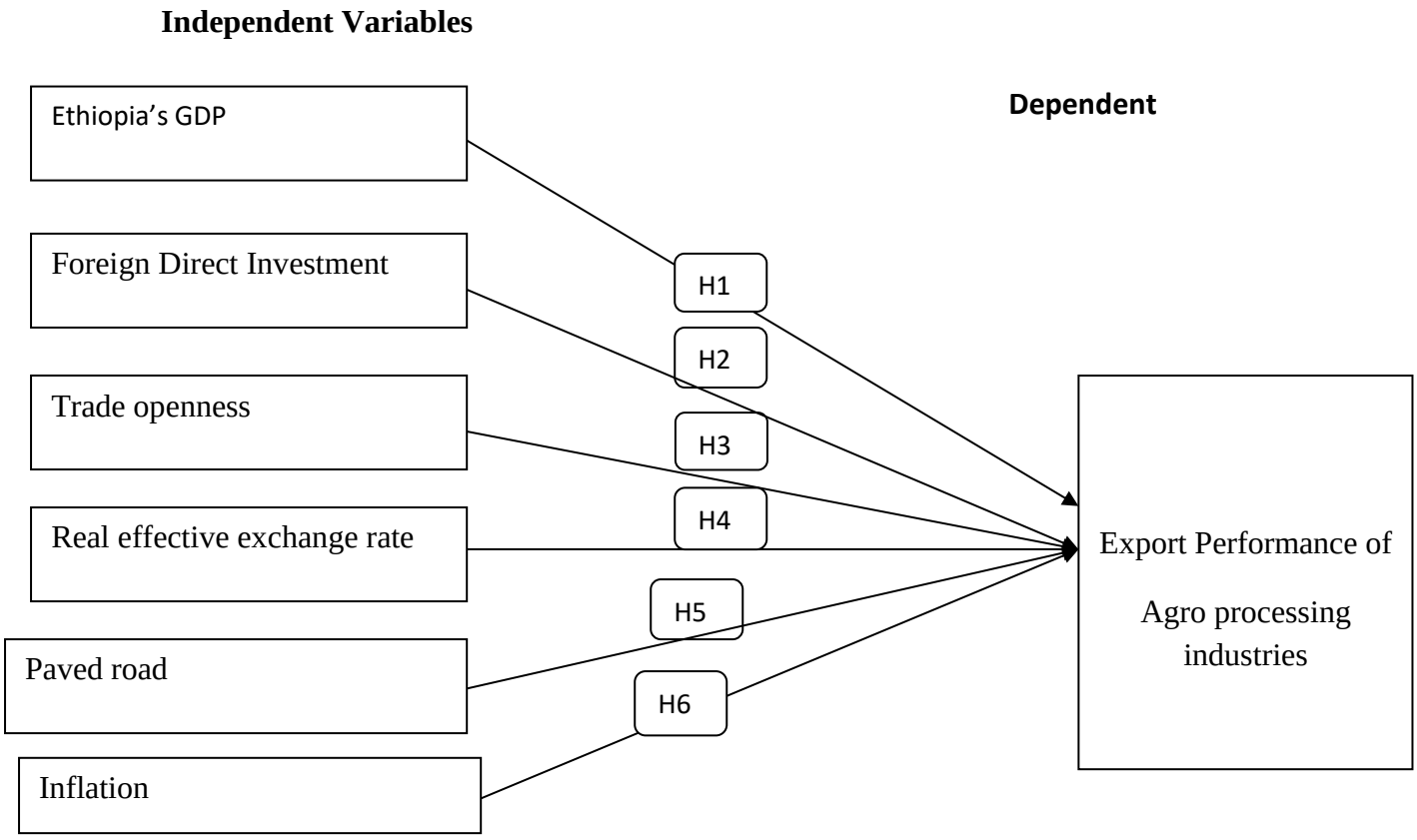


Fig. 1 Conceptual framework-Analytical Model of Research (Stoian & et al, 2011)

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, explain how research is designed and provides discussion of the methodology adopted to achieve the desired outcomes and is organized as follows. It describes the research approach, research design/type, source of the data, data collection method, method of data analysis, and research ethics followed. It is intended to give a clear direction to the researcher and readers on how the study will do.

3.2 Research Approach

There are three basic types of research approaches; quantitative, qualitative, and mixed approach. Quantitative research approach is based on the philosophy of post positivism worldview. It is also reductionist in that the intent is to reduce the ideas into a small, discrete set of ideas to test, such as the variables that constitute hypotheses and research questions. In addition, quantitative approach uses statistical methods in describing patterns of behavior and generalizing findings from samples to population of interest, and employs strategies of inquiry such as experiments and surveys (Creswell 2003).

Hence, by taking the research objectives and questions into considerations, quantitative research approach was used. A quantitative research approach will use, as it is suitable to test relationships using the hypothesis and research questions (Zikmund, 2003).

Therefore, this follows the quantitative research to generalize the export market from factors that affect the export performances.

3.3 Research Design

The research design is the overall strategy that the researcher choose to integrate the different components of the study in a coherent and logical way, thereby, ensuring the research will effectively address the research problem;. It constitutes the blueprint for the collection, measurement and analysis of data.

To achieve the objective of the study, the researcher use explanatory research design to examine those factors affecting export performance in Ethiopian economy using time serious data, and the relationship between each independent and dependent variables.

3.4 Data Sources and Types

The study was persistence on secondary data sources. When a close look was make at the time-series estimates of Ethiopia's major macroeconomic variables, it shows that different sources report different values for the same variables. In order to avert this problem and ensure the consistency as well as comparatively of results annually published time- series data was collected from the published annual reports of the NBE (National Bank of Ethiopia),Ethiopian Ministry of Revenue ,Central Statistics Agency (CSA), Ministry of Industry(MoI),Ethiopian Investment Commission(EIC),World Bank database of World Development Indicators (WDI). The study covering the period from 1991 to 2021.

3.5 Data Collection Methods

The study uses secondary sources and methods of collection include visiting the respective government institutions physically, by sending an e-mail request to get a data and accessing the online data on the website.

3.6 Data Analysis

The Method of analysis for this research was used quantitative time series data. Descriptive statistics and inferential statistics were employed to evaluate the relationship between the independent variables i.e. (Real Effective Exchange Rate, Gross Domestic Product (GDP), Inflation, FDI, Infrastructure and trade openness) with the dependent variable (export performance). For the econometric analysis, estimating by ordinary least square (OLS) regression analysis with Time series data used and E-views software version 10 is used to estimate the parameters of the variables.

3.7 Econometric Model Specification

Hence, the study signifies Ethiopia’s agro processing export performance as a function of Real Effective Exchange Rate, Gross Domestic Product (GDP), Inflation, FDI, Infrastructure (paved road) and Trade Openness. Vector auto regression (VAR) is a statistical model used to capture the relationship between multiple quantities as they change over time. VAR is a type of stochastic process model. VAR models generalize the single-variable (univariate) autoregressive model by allowing for multivariate time series. So why used this model because, each variable (Time Series) is modeled as a function of the past values, that is the predictors are nothing but the lags (time delayed value) of the series. Thus VAR model that was applied and estimating by ordinary least square (OLS) regression analysis with Time series data, which is expressed as follows:

EX = f (GDP,FDI,TOP,INF,REER, INFR)

Next, we convert into equation forms

$EX_t = \beta_0 + \beta_1 GDP_t + \beta_2 FDI_t + \beta_3 TOP_t + \beta_4 INF_t + \beta_5 REER_t + \beta_6 INFR_t + \varepsilon_t$

Thus to determine Ethiopia's ago processing export performance, a log-linear form model will use incorporating the supply related variables. The model is adopted from Samuel Tekeste (2012) in estimating determinants of agricultural export in Ethiopia , Wondaferahu Mulugeta (2013) in estimating determinants of agricultural export performance in Ethiopia and Tulu Belay, (2020), Determinants of Agricultural Export in Ethiopia was used similar co integration and error correction models. In contrast, however, the model includes Effective Exchange Rate, Gross Domestic Product (GDP), Inflation, FDI, Infrastructure and Trade Openness particularly on agro processing companies. Therefore, the regression equation is given by:

$LnEX_t = \beta_0 + \beta_1 lnGDP_t + \beta_2 lnFDI_t + \beta_3 lnTOP_t + \beta_4 ln\ INF_t + \beta_5 lnREER_t + \beta_6 ln\ INFR_t + \varepsilon_t$

But the agro processing companies grouped in four products (i.e. leather and leather products, meat products, fruit and vegetable products and beverage products). So, the regression equations are;

$LnEXLEATHER_t = \beta_0 + \beta_1 lnGDP_t + \beta_2 lnFDI_t + \beta_3 lnTOP_t + \beta_4 ln\ INF_t + \beta_5 lnREER_t + \beta_6 ln\ INFR_t + \varepsilon_t$----------1(model 1).

$LnEXMEAT_t = \beta_0 + \beta_1 lnGDP_t + \beta_2 lnFDI_t + \beta_3 lnTOP_t + \beta_4 ln\ INF_t + \beta_5 lnREER_t + \beta_6 ln\ INFR_t + \varepsilon_t$----------2(model 2).

$LnEXFRUIT_t = \beta_0 + \beta_1 lnGDP_t + \beta_2 lnFDI_t + \beta_3 lnTOP_t + \beta_4 ln\ INF_t + \beta_5 lnREER_t + \beta_6 ln\ INFR_t + \varepsilon_t$----------3(model 3).

$LnEXBVERAGE_t = \beta_0 + \beta_1 lnGDP_t + \beta_2 lnFDI_t + \beta_3 lnTOP_t + \beta_4 ln\ INF_t + \beta_5 lnREER_t + \beta_6 ln\ INFR_t + \varepsilon_t$----------4(model 4).

Where;

EX_t = Agro processing export earnings at time t in log linear form is the dependent variable.

$LnEXLEATHER_t$ = Leather and leather products export at t in log linear form is the dependent variable.

LnEXMEATt = Meat products export at t in log linear form is the dependent variable.

LnEXFRUITt = Fruit and vegetable products export at t in log linear form is the dependent variable

LnEXBVERAGEt = Beverage products export at t in log linear form is the dependent variable

GDP= Gross Domestic Product
FDI= Foreign Direct Investment
TOP = Trade Openness

INF = Inflation

REER = Real Effective Exchange Rate in log linear form (which is found by trade weighted Birr/foreign currency*foreign price index/domestic price index)

INFR= Infrastructure

Bo = an intercept of the model
ε = Error terms

3.8 Definition of Terms and Explanation of Variables, Measurement and Hypothesis

Definition of Terms

Agro-Processing is the process or action taken by manufacturers of converting primary (raw) agricultural products into consumable commodities and suitable for human use. The agro processing industry consists of various subsectors including: meat processing, dairy products, fruit and vegetable processing, grain mill products, sugar mills and refineries, wine, fruit juices, beer, cocoa, chocolate and sugar confectionery, bakery products, prepared animal feeds, tea and coffee processing and packing, tobacco, essential oils and leather(MACE,2014).

Export Performance is the relative success or failure of the efforts of a firm or nation to sell domestically produced goods and services in other nations.
Export is commerce, exchange of goods that must be transported from one place to another.

Explanation of Variables

Gross Domestic Product (GDP)

The primary determinant in understanding exports is the size of the exporting and importing countries, which is represented by GDP or population of the country. The capacity to supply exporting commodities is said to be reflected in the home economy's GDP. A high GDP level suggests a high level of output in the exporting country and can be taken as a proxy for the range of product kinds offered, increasing export availability.

Generally, a higher level of GDP in importing countries indicates a higher level of production and that increases the availability of goods to be imported, thus, the related coefficient is expected to be positive.According to the classic gravity model, economic size has a beneficial impact on trade (Evenett and Keller, 1998). The demand side conditions are controlled by the GDP of an importing country. Importing countries' economies become more affordable for imports as their income rises.

H1: Gross Domestic Product (GDP) has a positive effect on the export performance of agro processing industries in Ethiopia.

Foreign Direct Investment

Following the liberalization procedures that began in the early 1990s, most nations opened their markets and have used structural adjustment programs and other policy measures to encourage foreign investment in a wide variety of sectors. In many nations, FDI is thought to be one of the most important predictors of export success since it helps to expand the export structure.

FDI is widely believed to boost host country exports by increasing domestic capital for exports, assisting in the transfer of knowledge and new items for export, facilitating access to new and big international markets, and offering training and managerial skills to the local workforce (UNCTAD, 2002).

H2: FDI (foreign direct investment) has a positive and significant effect on the export performance of agro processing industries in Ethiopia.

Trade Openness

The total of imports and exports normalized by GDP is known as trade openness. As the definition suggests, openness can have an impact on agricultural exports because it encourages effective resource allocation, factor accumulation, technological diffusion, and

knowledge spillovers. Asia has been a display of economic performance, according to Kuroda (2006), where an external trade policy plays a vital role (Trejos and Barboza, 2015). Other theories for the Singer-Prebisch thesis, on the other hand, argue that trade openness may be detrimental to growth (Tekin, 2012). Spilimbergo (2000), presents a model in which trade between an advanced country and a less developed country can reduce long term growth rates in the developed country.

Trade openness (TOP) is calculated as the sum of import and export over GDP as shown below. $TOP =$ Import +Export/GDP

H3: There is a positive relationship between trade openness and the export performance of agro processing industries in Ethiopia.

Real effective exchange rate (REER)

The exchange rate is the price of one currency in terms of another. Exchange rates are important in international trade because they allow for the calculation of relative pricing of goods and services produced in different nations, allowing for price comparisons between them. Depreciations and appreciations are two terms used to explain changes in exchange rates. There are two indicators that can be used to track changes in exchange rates. The nominal effective exchange rate (NEER) and the real effective exchange rate (REER) are the two exchange rates. The real effective exchange rate (REER) is the real effective exchange rate (a measure of a currency's value versus a weighted average of many foreign currencies) divided by a price deflator or cost index. An increase in REER shows that exports are becoming more expensive while imports are becoming cheaper, indicating a loss in trade competitiveness.

The REER is measured by:$REER_t = NEER_t * (P^*t/Pt)$

Where:

NEERt: the nominal exchange rate, P*t: foreign price level index ,Pt: Domestic price level index

H4: Real Effective Exchange Rate has positive influence on agro processing export.

Infrastructure

Infrastructure is one of the most important non-price variables affecting or constraining agricultural exports, particularly in LDCs. Infrastructure facilities are at the forefront of the factors that improve production and agricultural export supply of commodities. Its growth is crucial to a country's ability to produce and transport goods. In most African countries,

particularly landlocked and small island countries; poor infrastructure is a serious hindrance to trade, competitiveness, and long-term development. It diminishes the return on trade and economic activities and obstructs a country's growth possibilities.

H5: Infrastructure has a positive and significant effect on the export performance of agro processing industries in Ethiopia.

Inflation

Inflation is defined as an increase in the price of goods and services in the economy. A more precise definition of inflation is a steady rise in an economy's overall price level. Inflation is also defined as an increase in the cost of living due to an increase in the price of goods and services. The annual percentage change in the general price level is measured by the rate of inflation. Consumer prices are used to calculate inflation (monthly percent). The consumer price index, which measures inflation, reflects the percentage change in the cost to the average consumer of acquiring a basket of goods and services that can be set or updated at regular intervals. When the price level is greater, the real GDP required is lower, according to the aggregate demand curve. "As the price level falls, interest rates fall, domestic investment in foreign countries increases, the real currency rate depreciates, net agricultural export increases, and aggregate demand increases," according to the aggregate demand explanation. As a result, it appears that rising inflation means more imports and less agricultural exports. Increased inflation, on the other hand, should cause the exchange rate to rise (currency depreciation). If we can trade foreign currency for more domestic currency, then agricultural exports should increase and (conversely) imports should decrease.

H6: inflation has a positive and significant effect on the export performance of agro processing industries in Ethiopia.

3.9 Stationary and Non-Stationary Series

The stationarity of the variables is one of a number of assumptions that underpin the traditional classical methods of estimate employed in applied econometric work. If the mean and variance of a variable remain constant throughout time and the covariance between two periods depends solely on the interval between the periods and not the actual period at which this covariance is taken into account, the variable is said to be covariance (weakly) stationary. According to Madala (1992), a time series is said to be strictly stationary if the joint distribution of any set of N observations Y1, Y2-----Yt is the same as the joint distribution of Y1+k, Y2+k, …Y t+ k for all N and K. The distribution of Yt is independent of time and thus

it is not only the mean and the variance that is constant but also all higher values of t are independent of t.

In time series analysis, non-stationary series are typically encountered. Non-stationary processes rarely revert to a stable value, as contrast to stationary processes, which fluctuate around their mean. If a non-stationary time series is regressed on one or more non-stationary time series, the results are prone to spurious regression problems.

A non-stationary series has a variable mean over time, and its variance rises as the sample size grows. Therefore, determining whether a series is stationary or not is the first step in any econometric analysis. Incorrect (spurious) regression is produced when relationships with non-stationary variables are estimated using classical estimating methods.

In this case, the findings indicate that the variables in the regression model have statistically significant relationships between the variables, but all that can be seen is evidence of contemporary correlations rather than substantial causal relationships (Harris, 1995).

Hence, the non-stationary (trend) in variables needs to be removed first before getting into any econometric work. A variable's trend is perfectly predictable if it is trend deterministic, and it can either be eliminated by regressing the variable on time (with the residuals from such a regression forming a new variable that is trend-free and stationary) or it can be captured by including a deterministic time trend as one of the repressors in the model. On the other hand, if the tendency is stochastic rather than deterministic, it is not entirely predictable. To eliminate the trend and make the variable stationary in this situation, the variable must be differentiated. If a variable needs to be differentiated once in order for it to become stationary, it is said to be integrated of order one, denoted I (1).A level stationary series is said to be integrated of order zero i.e. I (0). In general if the series need to be differenced d times before it becomes stationary, it is said to be integrated of order d denoted I (d).

Hence, it is necessary to check whether the variables included in the model are stationary or not before going to the next step which is regression analysis.

3.9.1 Tests for Unit Roots

In order to determine whether time-series data is stationary, testing for unit roots is crucial. To test if the series, used have unit-roots the researcher applies a test based on the work of Dickey and Fuller (1981). There are several ways of testing for the presence of unit root. The most common and popular one in econometric work is the Dickey and Fuller (DF) test either because of its simplicity or its more general nature Harris (1995). Hence, the emphasis here

will be on using the Dickey and Fuller (1981) approach to testing the null hypothesis that a series contains a unit root (i.e. it is non-stationary) against the alternative of stationarity.

The DF test is based on the presumption that the auto regressive process of order one (AR (1)), which generates data for the variable under test, is a random walk. However, if the variable exhibits higher order auto regressive behavior, the error term will be auto correlated, making the DF distribution useless. The Augmented Dickey-Fuller (ADF) test solves this problem by considering a higher order and augmenting the random walk equation with some more lags.). When the error term is not white noise, an alternative but modified form of the Dickey-Fuller test is utilized, called the Augmented Dickey-Fuller test. When determining stationarity, a variable is said to be integrated of order zero if it becomes stationary at level (0). Additionally, the variable is said to be integrated of order one I if it is stationary at its first difference (1).Similar to this, a variable is integrated of order n, I (n), if it can be changed into a stationary series by differencing it n times (Verbeck, 2004).

3.9.2 Co integration and the Error Correction Model (ECM)

First differences are the most effective way to depict many macroeconomic time series since they are not stationary at levels. The next step is co-integration when the order of integration of the non-stationary variables has been established and it has been determined that the variables are non-stationary. A linear combination of these variables could make the time series stationary even while the individual time series are not stationary (i.e. they may be co integrated). These variables have a stable relationship and cannot deviate "too far" from one another if they are jointly integrated. In contrast, lack of co integration suggests that such variables have no long run link, in principle they can wonder arbitrarily far away from each other (Rao, 1994).

The problem of integrating short-run dynamics with long-run equilibrium is addressed by the co-integration theory. If there is a stationary, linear combination of two I (1) series, then combination is said to be co-integrated. Assuming Yt and Xt are both I(1), Yt and Xt are said to be co-integrated if there exists a β exists such that Yt - β Xt is I(1).In that case, the regression equation $Yt = \beta Xt + Ut$ makes sense because Yt and Xt don’t drift too far apart from each other over time (Madala, 1992). In general, if Xt and Yt are co-integrated, that means there is a long-run relationship between them and furthermore, the short run dynamics can be described by the error correction model (ECM).

Co-integration can be tested and the link between co-integrated variables can be estimated using two common ways. These are the Johansen's maximum likelihood technique and the Engle and Granger (1987) two-step procedure method.

To ascertain whether the variables are co-integrated or not, the residuals from the long-run relationship are examined for stationary behavior in the Engle Granger approach. The residuals' order of integration might be ascertained by running the DF test on them. The ADF test can be used in its place if the residuals do not seem to be white noise (stationary series).

The Engle-Granger method of testing for co-integration has a number of drawbacks. First, compared to other tests, the co-integration test is probably more powerful. Second, its finite estimations of the long-run connection may be biased, and third, ordinary t-statistics cannot be used to infer the importance of the long-run model's parameters (Harris, 1995).In addition to the above the test procedure assumes that there is only one co integration vector, when in fact there could be more, that is any linear combination of these vectors is obtained when estimating a single equation.

The Johansen co-integration test takes care of the above shortcomings by assuming that there are multiple co integrating vectors. The Johansen procedure is a multivariate generalization of the Dickey-Fuller test (Enders, 1995).

The co-integration in multiple equations can be examined by Johansen (1981) and Johansen Juselius (1990) approach. Johansen procedure of co-integration gives two statistics. These are the value of LR test based on the maximum Eigen – value and on the trace value of the stochastic matrix. The Johansen test uses the likelihood ratio to test for co-integration. Up to (r-1) co-integrating relationships may exist between a set of r variables. The hypothesis of co-integration is accepted if the number of co- integrating relationships is greater than or equal to one.

The decision rule compares the likelihood ratio to the critical value for a hypothesized number of co-integrating relationships. The co-integration hypothesis is accepted if the likelihood ratio is greater than the critical value; otherwise, it is rejected.

3.10 Ethical Consideration

It is known that research need certain level of ethical consideration. One of the most important should be absolutely no distortion in reporting and confidentiality the data collected during the study. Ask in formal letter to collect the data and properly inform about the purpose of the research. It is also crucial to acknowledge all the sources used in the study.

CHAPTER FOUR

4. RESULTS AND DISCUSSIONS

This chapter presents the results of the export performance of agro processing companies in Ethiopia from the period 1991 to 2021.It is composed of two main sections. Section one gives a brief interpretation of statistical analysis before providing the compressive econometric analysis for each objective. Section two presents the results of econometric analysis (Unit roots, Co-integration, Error correction method and Granger-causality test) for each objective used to test the causal linkage between dependent and independent variables. E-views software version 10 was used for data analysis. The results of analysis and discussions of what the results represent with respect to the objectives of the study presented in this chapter.

4.1 descriptive statistics results

4.1.1 Trends of agro processing industries exports in Ethiopia

4.1.1.1 Trends in leather and leather products export performance

More than 75 domestic and foreign leather and leather product factories have invested in Ethiopia. Export of leather, which was US $ 23 million in 2013 reaches US $ 133 million in 2018(EIC,2018).As can be seen from the ffigure below, the export value of leather and leather products is increasing from 1991 to 2006, and also it shows an increasing and decreasing trend from 2007 to 2018. However, it shows that the export income of leather and leather products is decreasing from 2019 to 2021. The reason mentioned is the global market slowdown due to the global covid-19 pandemic.

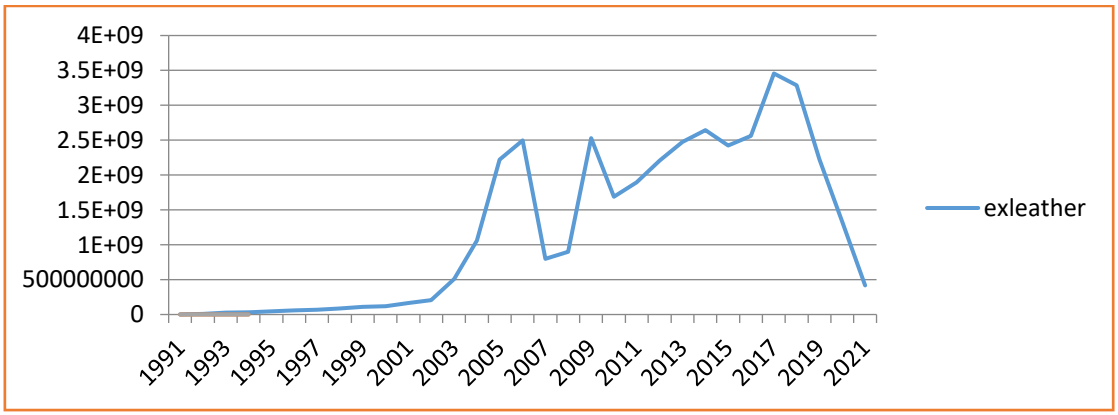


Figure 2: Trend in leather and leather products exports in Ethiopia in ETB from 1991/99-2021

Source: Author's calculation based on data from ECA.

4.1.1.2 Trends in meat and meat products export performance

As the graph bellow shows, the export value of meat and meat products showed very little growth from 1991 to 2000. The reasons for these are the low competitiveness of domestic exporters in terms of quality and price, the lack of quality raw materials and the lack of foreign direct investment, etc. . However, in the period from 2009 to 2021, due to the fact that the government has made various supports and inceentives and the US tax-free opportunity has been facilitated, and the producers are gradually increasing their ability to be competitive in terms of quality and price, the export of meat and meat products shows a tendency to increase.

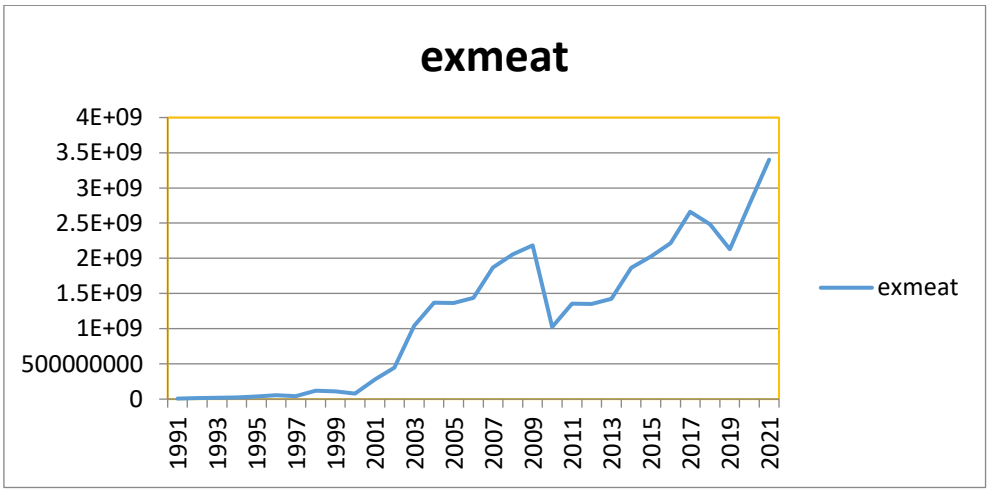


Figure 3: Trend in meat and meat products exports in Ethiopia in ETB from 1991/99-2021

Source: Author's calculation based on data from ECA.

4.1.1.3 Trends in fruit and vegetable products export performance

As we can understand the graph bellow, the fruit and vegetable export value from 1991 to 2003 shows export values has been increased in a small amount. From 2004 to 2008 on the other hand export increases at increasing rate and reaches at maximum value and then gradual decreasing as the graph shows bellow. However, the government of Ethiopia established different strategies and increase it support from time to time and also the exporters enhanced their competitiveness the export of fruit and vegetables were increased from 2010 to 2021 as the graph explained.

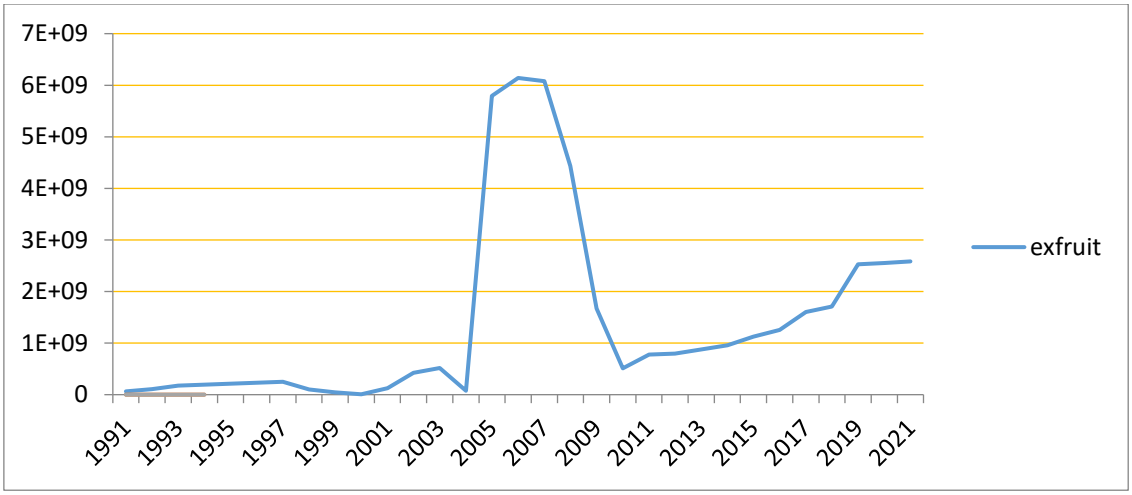


Figure 3: Trend in fruit and vegetable products exports in Ethiopia in ETB from 1991/99-2021

Source: Author's calculation based on data from ECA.

4.1.1.4 Trends in beverage products export performance

As can be seen from the graph, it reveals that the export of beverage products was the lowest export revenue from 1991 to 1998. On the other hand, it can be seen from the graph that in 1999, the export of value beverage products reached a high level. However, it decreased back in 2000, and from 2002 to 2021, it shows a trend of increasing and decreasing, but in general, it can be seen from the graph that there is an increasing trend of exports of beverage products.

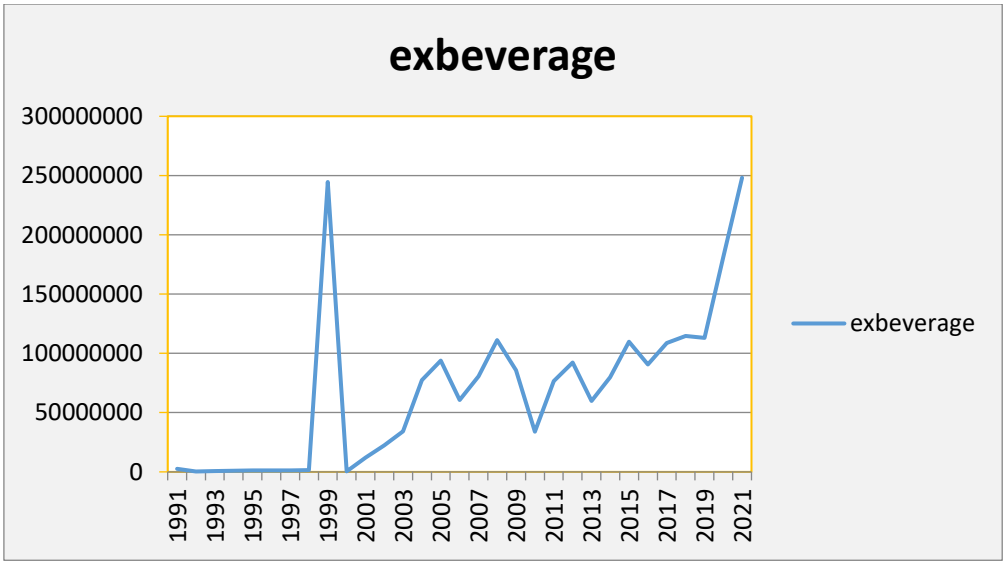


Figure 4: Trend in beverage products exports in Ethiopia in ETB from 1991/99-2021

Source: Author's calculation based on data from ECA.

4.1.2 Statistical Summary of Variables

As part of the empirical analysis, descriptive statistical summary is carried out before proceeding into to the main econometrics analysis, which is an OLS regression. The parameters for the variables included in the required model of factors affecting the export performance of the agro processing sector are summarized in the table below, as can be seen. These parameters include mean, median, minimum, maximum, skewness, standard deviation, and others.

According to the table, the average export value of meat for the previous years (1991-2021) was 20.04 percent with maximum and minimum value of 21.95 percent and 15.82 percent respectively.Similarly, the average export value of leather Ethiopia is found to be about 20.00 percent for the period of time under consideration with the maximum achievement of 21.96 percent and minimum value 14.67 percent. See the following table for the detail.

Table 4.1.2: Summary Statistics, using the observations 1991 – 2021

Variable	mean	median	maximum	Minimum
logexmeat	20.03524	21.03688	21.94749	15.82457
logexleather	20.00039	20.89087	21.96332	14.67239
logexfuit	20.20033	20.54547	22.53821	15.78745
logexbeverage	17.03090	18.17960	19.32956	12.76564
logfdi	21.09220	22.18988	25.26105	15.94216
loggdp	27.30447	27.29424	28.43696	26.23999
loginflation	2.158434	2.341806	4.010963	-2.302585
logreer	2.468863	2.283880	3.663980	0.727549
logroad	10.07792	10.18398	10.85981	8.266601
logtop	-1.817013	-1.565204	0.779325	-3.506558

Variable	Std.Dev.	skewness	kurtosis	Jarque.Bera	probability	sum	Sum sq.dev.
logexmeat	1.977684	-0.923014	2.223490	4.679253	0.096364	560.9866	105.6033
logexleather	2.034917	-1.009281	2.924828	4.760286	0.092537	560.0110	111.8040
logexfuit	1.690956	-0.619066	2.863944	1.810063	0.404529	565.6093	77.20201
logexbeverage	2.177490	-0.893009	2.090536	4.68485	0.096016	476.8651	128.0195
logfdi	2.999366	-0.456754	1.742113	2.819571	0.244196	590.5816	242.8973
loggdp	0.724632	0.078103	1.602968	2.305450	0.315775	764.5251	14.17749
loginflation	1.215362	-1.736016	7.6167704	38.93045	0.000	60.40815	39.88181
logreer	0.732806	-0.308523	2.752869	0.515456	0.772805	69.12816	14.49914
logroad	0.648087	-1.216424	3.938128	7.931968	0.018949	282.1817	11.34045
logtop	1.125074	0.391435	2876663	0.732781	0.693232	-50.87635	34.17639

Source: author calculation using E-views 10 software

4.2 Stationarity Test

Before running the OLS regression on the determinants, all the variables included in the model need to be checked for their stationarity. In most cases, economic variables are non-stationary at their level. However, in few circumstances, those time series data set can be stationary if a growth is being used. According to A.H. Studenmund (2014), any time series whose it's mean and variance do not change with time is stationary series. Time series are said to as stationary time series if neither the mean nor the variance change over time and the correlation coefficient between a variable and its lagged variables relies on the lag lengths. Otherwise, the series is non-stationary if one of the aforementioned criteria is broken, that is, if either the mean or variance fluctuates over time. If a non-stationary variable is being regressed on another non- stationary dependent variable, the result will lead us to a spurious regression (M. Verbeek, 2004) where inferences based on such regression are confusing and estimators are false estimators.

It is advised to perform a non-stationary test, also known as a unit root test, to determine whether the variables included in our model are stationary or non-stationary and to ensure that the regression result we obtained is valid. This method is indicated by A.H. Studenmund (2014).

Henceforth, after having all variables included in the specified model being stationary, the problem of spurious regression will not be our stress. Traditionally, sketching a time series

plot of variables can be used to identify if it is stationary or non-stationary by simply having a look if it is trending up, trending down or not. To evaluate the variables' stationarity, the researcher used the ADF test; as a result, all the variables were discovered to be non-stationary at their level after being transformed into logarithmic form.

Therefore regressing the non-stationary variables on a non-stationary variables will not help us to investigate the determinants of export performance. Differencing the variables is the remedy to convert them in to stationary data. Variables should be continuously differenced until they are found to be stationary. In line with this, all the variables have become stationary after differencing them once. The following table presents the detailed ADF test of stationarity.

Table 4.2. ADF Test for Stationarity test of the variables

ADF-Test	logexmeat		logexleather		logexfuit		logexbeverage		logfdi	
	Level	1 st difference	Level	1 st difference	Level	1 st difference	Level	1 st difference	Level	1 st difference
Without constant	0.9962	0.0000	0.7535	0.0008	0.7942	0.0000	0.9238	0.0000	0.8578	0.0000
With constant	0.1638	0.0000	0.3281	0.0191	0.2203	0.0000	0.5122	0.0000	0.3975	0.0000
With constant & trend	0.7831	0.0001	0.9540	0.0111	0.1901	0.0000	0.3065	0.0000	0.5570	0.0002
ADF-Test	loggdp		loginflation		logreer		logroad		logtop	
	Level	1 st difference	Level	1 st difference	Level	1 st difference	Level	1 st difference	Level	1 st difference
Without constant	1.000	0.2221	0.5035	0.0000	0.9568	0.0025	0.2840	0.0088	0.3098	0.0000
With constant	0.9989	0.0000	0.0037	0.0000	0.6223	0.0076	0.9991	0.0000	0.1790	0.0001
With constant & trend	0.2653	0.0002	0.0036	0.0002	0.0109	0.0352	0.9998	0.0000	0.2414	0.0008

Source: author calculation using E-views 10 software

The result of ADF test at level of first difference showed in Table above clearly shows that all variables are stationary at first difference (the null hypothesis of a unit root is rejected for

all variables with a constant term). Hence, they are regarded as integrated of order one or I(1).Because, if a time serious is differentiated at once and the differentiated series is stationary, then the original serious is termed as integrated of order one (Gujarati, 2004).

4.3 Econometric results for the export of selected commodities (leather,meat,fruit & vegetable and beverage products)

4.3.1 Determining the optimal lag length for the models

The selection criteria for lag length were used to establish the lag length for the model. The definition of the lag length p is a crucial factor in the implementation of the ADF test. As can be seen from the output below, criteria determined that 1 was the best lag length for all variables because it provided the lowest value for each of the assessed information criterion in LR, FPE, AIC, SC, and HQ. For all of the models mentioned in the paper, the lag length is 1.

VAR Lag Order Selection Criteria for model 1

Endogenous variables: LOGEXLEATHER LOGGDP LOGFDI LOGREER LOGTOP LOGINFLATION LOGROAD

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-147.0769	NA	0.000532	12.32615	12.66744	12.42081
1	18.79662	225.5880*	5.45e-08*	2.976270*	5.706552*	3.733534*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

VAR Lag Order Selection Criteria model 2
Endogenous variables: LOGEXMEAT LOGGDP LOGFDI LOGREER LOGTOP LOGINFLATION LOGROAD

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-147.8754	NA	0.000567	12.39003	12.73132	12.48469
1	28.34268	239.6566*	2.54e-08*	2.212586*	4.942868*	2.969850*

* indicates lag order selected by the criterion

VAR Lag Order Selection Criteria for model 3
Endogenous variables: LOGEXFRUIT LOGGDP LOGFDI LOGREER LOGTOP LOGINFLATION LOGROAD

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-163.7283	NA	0.002016	13.65827	13.99955	13.75293
1	-5.882708	214.6701*	3.92e-07*	4.950617*	7.680898*	5.707881*

* indicates lag order selected by the criterion

VAR Lag Order Selection Criteria for model 4
Endogenous variables: LOGBEVERAGE LOGGDP LOGFDI LOGREER LOGINFLATION LOGTOP LOGROAD

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-164.6070	NA	0.002163	13.72856	14.06985	13.82322
1	-11.74346	207.8944*	6.27e-07*	5.419477*	8.149759*	6.176741*

* indicates lag order selected by the criterion

4.3.2 Co integration and the Error Correction Model (ECM)

Many macroeconomic time series are not stationary at levels and are most adequately represented by first differences. Once the order of integration of the non-stationary variables has been determined and of variables is found to be non-stationary the next step is Co-integration. A linear combination of these variables could make the time series stationary even while the individual time series are not stationary, (i.e. they may be co integrated). These variables have a stable relationship and cannot deviate "too far" from one another if they are jointly integrated. In contrast, lack of co integration suggests that such variables have no long run link, in principle they can wonder arbitrarily far away from each other (Rao, 1994).

In this scenario all variables are stationary in first difference, that is they are I (1) series (integrated of order one).There are two common methods for testing I (1) co-integration and estimating the relationship among co-integrated variables. These are the Engle - Granger co integration test and the Johansen's co integration test. Performing a co integration test is necessary to establish a long run relationship between dependent and independent variables. Hence, in this study the Johansen’s co integration test was applied.

The hypothesis stated as;

H_0=no co integration question

H_1=H_0 is not true

Table 4.3.2.1: Johansen co-integration test (model 1)

Hypothesized No. of CE(s)	Eigen values	Trace Statistics			Maximum Eigen values		
		Johansen's Test	Critical Value (0.05)	Prob**	Johansen's Test	Critical Value (0.05)	Prob**
None *	0.991766	316.1620	125.6154	0.0000	105.5878	46.23142	0.0000
At most 1 *	0.966595	210.5742	95.75366	0.0000	74.77880	40.07757	0.0000
At most 2 *	0.953813	135.7954	69.81889	0.0000	67.65102	33.87687	0.0000
At most 3 *	0.770956	68.14437	47.85613	0.0002	32.42450	27.58434	0.0110
At most 4	0.567807	35.71987	29.79707	0.0092	18.45545	21.13162	0.1137
At most 5	0.362794	17.26442	15.49471	0.0268	9.914563	14.26460	0.2176
At most 6 *	0.284007	7.349859	3.841466	0.0067	7.349859	3.841466	0.0067

Note: * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values.

The maximum Eigen and trace statistics values was greater than critical value at 0.05 reveals that co-integrating vectors for both trace test and Maximum-Eigen value test. Thus, the above table shows that the null hypothesis of no co-integration is rejected at the conventional level 5% and this indicated the existence of one co-integrating relationship. The study concludes that there exists a relationship among the proposed variables in the long run (i.e. Trace test and maximum Eigen value test indicates that there are 5 co-integrating vector at level of 5%). All the variables are co-integrated of order one having the long run relationship.

Co-integration regression has so far only directly addressed the model's long-run characteristics while ignoring its short-run dynamics. A good time series model should, of course, reflect both the short-run dynamics and the long-run equilibrium at the same time.

Finally, the Johansen (1988) Vector Error Correction Model (VECM) has been estimated, no matter how the long run parameters were obtained. To maintain parameter consistency, diagnosis tests on the estimating approach should be performed at each stage of the reduction process.

Table 4.3.2.2: Johansen co-integration Test (**model 2**)

Hypothesized No. of CE(s)	Eigen values	Trace Statistics			Maximum Eigen values		
		Johansen's Test	Critical Value (0.05)	Prob**	Johansen's Test	Critical Value (0.05)	Prob**
None *	0.845960	113.5232	95.75366	0.0017	54.24565	40.07757	0.0007
At most 1	0.516240	59.27754	69.81889	0.2582	21.05880	33.87687	0.6797
At most 2	0.494223	38.21874	47.85613	0.2926	19.76811	27.58434	0.3574
At most 3	0.360386	18.45063	29.79707	0.5329	12.95982	21.13162	0.4559
At most 4	0.147616	5.490812	15.49471	0.7547	4.631814	14.26460	0.7874
At most 5	0.029186	0.858998	3.841466	0.3540	0.858998	3.841466	0.3540

Note: * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values

The maximum Eigen and trace statistics values was greater than critical value at 0.05 reveals that co-integrating vectors for both trace test and Maximum-Eigen value test. Thus, the above table shows that the null hypothesis of no co-integration is rejected at the conventional level 5% and this indicated the existence of one co-integrating relationship. The study concludes that there exists a relationship among the proposed variables in the long run (i.e. Trace test and maximum Eigen value test indicates that there are 5 co-integrating vector at level of 5%). All the variables are co-integrated of order one having the long run relationship.

Table 4.3.2.3: Johansen co-integration Test (**model 3**)

Hypothesized No. of CE(s)	Eigen values	Trace Statistics			Maximum Eigen values		
		Johansen's Test	Critical Value (0.05)	Prob**	Johansen's Test	Critical Value (0.05)	Prob**
None *	0.884634	174.6538	95.75366	0.0000	62.62968	40.07757	0.0000
At most 1 *	0.778228	112.0241	69.81889	0.0000	43.67700	33.87687	0.0025
At most 2 *	0.623468	68.34711	47.85613	0.0002	28.32582	27.58434	0.0401
At most 3 *	0.502838	40.02130	29.79707	0.0024	20.26636	21.13162	0.0657
At most 4 *	0.449198	19.75493	15.49471	0.0107	17.29500	14.26460	0.0161
At most 5	0.081327	2.459932	3.841466	0.1168	2.459932	3.841466	0.1168

Note: * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values

Table 4.3.2.4: Johansen co-integration Test (**model 4**)

Hypothesized No. of CE(s)	Eigen values	Trace Statistics			Maximum Eigen values		
		Johansen's Test	Critical Value (0.05)	Prob**	Johansen's Test	Critical Value (0.05)	Prob**
None *	0.580571	76.81563	69.81889	0.0124	35.19698	33.87687	0.0318
At most 1 *	0.536556	51.61865	47.85613	0.0212	32.30300	27.58434	0.0052
At most 2	0.504510	29.31564	29.79707	0.0567	20.36403	21.13162	0.0637
At most 3	0.250326	8.951614	15.49471	0.3699	8.355391	14.26460	0.3437
At most 4	0.020349	0.596223	3.841466	0.4400	0.596223	3.841466	0.4400

Note: * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values

Thus, the above tables shows that the null hypothesis of no co-integration is rejected at the conventional level 5% and this indicated the existence of one co-integrating relationship. The study concludes that there exists a relationship among the proposed variables in the long run (i.e. Trace test and maximum Eigen value test indicates that there are 5 co-integrating vector at level of 5%). All the variables are co-integrated of order one having the long run relationship.

4.3.3 Long run estimation results for the export of selected commodities summary

The next step is to estimate the long-term relationship between Ethiopian leather and leather products export performance and its determinants using the OLS estimation method after the co-integration test has been done and its presence is confirmed. The result shows in table 4.3.3 below;

variables	Model 1		Model 2		Model 3		Model 4	
	coefficient	P-value	coefficient	P-value	coefficient	P-value	coefficient	P-value
C	-80.06251	0.0000	2.453373	0.0174	-35.42135	0.0384	7.820091	0.0063
LOGGDP	3.064883	0.0000			1.770511	0.0018		
LOGFDI			0.148549	0.0406	-0.041619	0.0451	0.522459	0.0000
LOGINFLATION	-0.074194	0.0521	0.167059	0.0572	0.330474	0.0127	0.441818	0.0548
LOGREER			2.078679	.00014				
LOGROAD	1.600388	0.0000	0.883451	0.0564	0.740871	0.0110	0.330940	0.0031
LOGTOP	-0.225307	0.0082	-0.034660	0.8439	0.006510	0.0573	-0.314287	0.0232

Source: author calculation using E-views 10 software

The detail explanation of the above table was explained below for each model.

4.3.3.1 Long run estimation for leather and leather product export

The export performance of leather and leather products explained by independent variable such as GDP, FDI, TOP, REER, inflation and road as stated chapter 1 as model 1, but due to multi collinearity problem FDI and REEER variables dropped from the model to conduct the OLS analysis. The result shows in table 4.3.3.1 below;

Variables	**Coefficient**	**Std error**	**t-Statistic**	**P-value**
C	-80.06251	7.300239	-10.96711	0.0000
LOGGDP	3.064883	0.219858	13.94031	0.0000
LOGINFLATION	-0.074194	0.122947	-0.603465	0.0521
LOGROAD	1.600388	0.247069	6.477486	0.0000
LOGTOP	-0.225307	0.134822	-1.671148	0.0082

- R- squared = 0.898738
- Adjusted R- squared = 0.881128
- F-statistic = 51.03361
- Prob(F-statistic)= 0.00000
- Durbin-Waston(DW) = 1.521732 and Observation = 30

The coefficient of determination R2 is a measure of how good a prediction of the dependent variable we can make by knowing the independent variables. Accordingly, 89.9% of the variation accounted for the dependent variable is due to the combined effect of the independent variables. But, sometimes R2 tends to somewhat over-estimate the success of the model when applied to real world. Therefore, adjusted R2 is preferred over R2 in order to assess our model's performance in the real world. As a result, 88.1% of the variation in export performance can be explained by the regression of all predictor factors.

In the estimation of long-run model, inflation and trade openness (TOP) shows negative coefficient and has less significant effect in a long run on performance of leather & leather products export. However. Gross domestic product (GDP), and infrastructure (paved road) have positive and significantly affect the performance of Ethiopian leather & leather products export and showed expected signs.

As it can see from table above inflation rate and trade openness have negative coefficient but Gross domestic product (GDP), and infrastructure (paved road) have positive and significantly affect leather ad leather products export performance in the long run. Gross domestic product is the most important factor determining the export of leather and leather products. It is positively and significantly related with the dependent variable, export of leather & leather product in the long run. As the result in the above table reveals that a 1 % increase in the GDP will lead to 3.065 % increase the export of leather and leather products the country in the long run. An increase in GDP is expected to enhance the performance of a country in the international market. It implies that the overall economic development is moving on an upward scale, this includes the growth of export and this result is consistent with Nega (2013) and Abdul G., et al (2014).

Similarly, infrastructure (paved road) has a great role for the export performance of leather and leather products the country in the long run. The result indicates a 1% increase in the development of road in kilometer will lead to 1.60% increase the export performance leather & leather products in the long run. This result is similar to Tulu (2020) on the paper the determinant of agricultural export in Ethiopia. According to theoretical knowledge, a country's export performance is largely determined by its infrastructure, particularly the construction of its road network.

On other hand, inflation and trade openness (TOP) have negative coefficient and less significant effect in a long run on performance of leather & leather products export. The analysis shows a 1% increase in the inflation and trade openness will lead to 0.07% and

0.23% respectively decrease the export performance leather & leather products in the long run.

Exports will suffer if inflation persists for a number of years due to structural changes in the economy. Although attempts to hasten economic development often result in inflation, sometimes with a special focus on certain sectors and objectives, it is likely to cause investment to be diverted away from longer-term projects in favor of procedures that produce immediate returns. Additionally, real estate speculation, which frequently serves as a hedge against inflation, encourages investment in residential construction. Import restrictions are typically implemented in order to safeguard the balance of payments when there is an increasing demand for imports while exports are typically declining. Such restrictions, which are often more severe for imports of non-essential goods than for imports of essential goods, offer protection for the emergence or growth of industrial sectors that are producing at high costs. However, neither residential construction nor expensive manufacturing produces goods that can be exported. The export industries are also relatively unfavorable for investment (Gertrud Lovasy, 1962).There are benefits to being more open to international trade. Lower pricing and a greater selection of goods are two ways that countries may profit from international trade. However, there are concerns that more openness may worsen instability, for example, because the nation is more vulnerable to outside shocks.

Having already obtained the long-run model and estimated the coefficients, the next step will be estimation of coefficients of the short-run dynamics that have important policy implications.

4.3.3.2 Long run estimation meat and meat product export

The export performance of meat and meat products explained by independent variable such as GDP, FDI, TOP, REER, inflation and road as stated chapter 1 as model 2, but due to multi co linearity problem GDP variable dropped from the model to conduct the OLS analysis. The result shows in table 4.3.3.2 below,

Variables	Coefficient	Std error	t-Statistic	P-value
C	2.453373	3.735811	0.656718	0.0174
LOGFDI	0.148549	0.129054	1.151054	0.0406
LOGINFLATION	0.167059	0.144085	1.159451	0.0572
LOGREER	2.078679	0.577741	3.597943	0.0014
LOGROAD	0.883451	0.441526	2.000905	0.0564
LOGTOP	-0.034660	0.174206	-0.198961	0.8439

- R- squared = 0.836377
- Adjusted R- squared = 0.803652

- F-statistic = 25.55799
- Prob(F-statistic)= 0.00000
- Durbin-Waston (DW) = 1.687097
- Observation = 30

The coefficient of determination R2 is a measure of how good a prediction of the dependent variable we can make by knowing the independent variables. Accordingly, 83.6% of the variation accounted for the dependent variable is due to the combined effect of the independent variables. However, sometimes R2 tends to somewhat over-estimate the success of the model when applied to real world. Therefore, adjusted R2 is preferred over R2 in order to assess our model's performance in the real world. As a result, 80.4% of the variation in export performance can be explained by the regression of all predictor factors.

In the estimation of long run model, foreign direct investment, inflation, real effect exchange rate and infrastructure (paved road in km) shows positive coefficient and significant effect in long run on the export performance of meat product. But, trade openness (TOP) has negative coefficient and not statistical significant in the long run on performance of meat products export. The analysis shows a 1% increase in the foreign direct investment, inflation, real effect exchange rate and infrastructure (paved road in km) will lead 0.148%, 0.167%, 2.09% and 0.883% increase the export of meat in the long run respectively. But, a 1% increase in the trade openness will lead -0.0346% decreases the export performance of meat and meat products in the long run but not statistical significant. In regards to foreign direct investment, the result is found to be positive and significant. The reason is that most FDI's in Ethiopian agriculture are directed to meat processing ,leather and leather products and agricultural sectors to tape these potentials. As a result FDIs contribute export earnings, job creation and technology transfer. This result is similar with Noah (2018), on the paper determinates of agricultural export trade.

Theoretically, FDI and trade theories have gone through numerous stages of development. The neoclassical Heckscher-Ohlin-Samuelson and Mundell models served as the foundation for theoretical models of FDI and trade (Kojima, 1975; Varian, 1992). These models analyze free trade and foreign direct investment (FDI) between two nations, assuming that they have unequal resources or factor endowments, the same production technology, are subject to perfect competition and free trade, and produce the same or homogeneous goods.

Trade and FDI theory of processed foods currently focuses on industrial organization theory, such as imperfect competition, economies of scale, and product differentiation. This theory of

trade and FDI is a collection of theories regarding ownership, location, and internalization, which were originally introduced by Dunning in 1981.

The process of FDI is viewed as a global capital transfer between two nations. These neoclassical theories came to the conclusion that trade flows between nations decrease when inequalities in country factor endowments get smaller as international factors become mobile. In this situation, FDI will eventually replace trade exports. Hymer (1976) argued that multinational enterprises have become institutions that transfer intangible assets, such as knowledge, technology, and brand names, into markets in other countries. As these intangible assets flow into another country, they attract movement on factors of production, which increase trade flows. In this case, FDI and trade/export/ have a complementary relationship, where both trade and FDI increase.

With regard to inflation, different scholars stated that inflation has inverse relation with export. But in this paper as the result shows above it has a positive relation with the export of meat products. As a support of this result, Gertrud Lovasy (1962) explained on the paper; inflation and exports in the primary producing countries. The adverse effect of internal inflation on exports may be modified, offset, or aggravated as the case may be by changes in world prices. Thus, the effect has been intensified since the mid-1950 by a general weakening of prices on world markets. In some instances, however, rising demand for particular commodities, whose production can be increased only gradually, has raised prices on world markets sufficiently to encourage exports even from countries with a high rate of inflation. In a number of primary producing countries a proportion of exports originate from foreign-owned enterprises, largely in value adding on the agricultural commodities, which produce almost exclusively for export. As a rule, the overhead costs of these enterprises, which are not affected by internal inflation, are substantial in proportion to current expenditure. Moreover, part of the latter is incurred abroad, and imports of material and equipment by foreign enterprises are often exempt from restrictions that apply to domestic enterprises. Finally, profit margins are high, as a rule. The result is that, in such instances, inflationary price increases, which affect only part and often a small part of the cost of production, usually do not affect the volume of exports.

4.3.3.3 Long run estimation for fruit and vegetable product export

The export performance of fruit and vegetable products explained by independent variable such as GDP, FDI, TOP, REER, inflation and road as stated chapter 1 as model 3, but due to

multi collinearity problem REEER variable dropped from the model to conduct the OLS analysis. The result shows in table 4.3.3.3 below;

Variables	Coefficient	Std error	t-Statistic	P-value
C	-35.42135	32.39959	-1.093266	0.0384
LOGFDI	-0.041619	0.242500	-0.171623	0.0451
LOGINFLATION	0.330474	0.206269	1.602150	0.0127
LOGROAD	0.740871	0.716478	1.034046	0.0110
LOGTOP	0.006510	0.226772	0.028709	0.0573
LOGGDP	1.770511	1.136496	1.557868	0.0018

- R- squared = 0.788078
- Adjusted R- squared = 0.733693
- F-statistic = 5.594963
- Prob(F-statistic)= 0.001359
- Durbin-Waston(DW) = 1.033887
- Observation = 30

The coefficient of determination R2 is a measure of how good a prediction of the dependent variable we can make by knowing the independent variables. Accordingly, 78.8% of the variation accounted for the dependent variable is due to the combined effect of the independent variables. Nevertheless, sometimes R2 tends to somewhat over-estimate the success of the model when applied to real world. Therefore, adjusted R2 is preferred over R2 in order to assess our model's performance in the real world. As a result, 73.4% of the variation in export performance can be explained by the regression of all predictor factors.

In the estimation of long run model, inflation, infrastructure (paved road in km), trade openness and gross domestic product shows positive coefficient and significant effect in long run on the export performance of fruit and vegetable product. But, foreign direct investment has negative coefficient and less significant effect in the long run on performance of fruit and vegetable products export. The analysis shows a 1% increase in the inflation, infrastructure (paved road in km), trade openness and gross domestic product will lead 0.33%, 0.74%, 0.01% and 1.77% increase the export of fruit and vegetable in the long run respectively. But, a 1% increase in the foreign direct investment will lead -0.04% decreases the export performance of fruit and vegetable products in the long run.

The long-run impact of GDP on export performance is found to be positive and is highly significant. The positive response of the export to a change in real GDP (improvement in

exports as a result of a rise in real national income) is a widely accepted opinion among both academicians and practitioners. It consistent with the result of other researches such as Teamrat(2020).Given the country's natural resources and the chances provided by the government, the performance of the industry might significantly improve, according to the Ethiopian Investment Agency study (2012). Additionally, there is an increasing demand for high-quality, pre-packaged vegetables.

However, fruit processing in Ethiopia is primarily restricted to the extraction of fresh juice, which is then sold in local markets; hence, increasing the sector's focus on value addition will help it operate better Zelealem (2019).Foreign direct investment has negative and significant effect on the export performance of fruit and vegetables of the country. As discussed in different, FDI has been quite controversial in promoting export performance of developing countries. According to Pfaffermayr (1996), FDI has a positive effect on promoting export while on the other hand Majeed et al, (2006), FDI has insignificant or weak effect on promoting export. Other researches including Jeon1992, found a negative association between FDI and export growth. Highlighted in such studies, the effect of FDI depends on the motive for such investment.

4.3.3.4 Long run estimation for the export of beverage products

The export performance of beverage products explained by independent variable such as GDP, FDI, TOP, REER, inflation and road as stated chapter 1 as model 4, but due to multi collinearity problem GDP and REEER variables dropped from the model to conduct the OLS analysis. The result shows in table 4.3.3.4 below;

Variables	Coefficient	Std error	t-Statistic	P-value
C	7.820091	4.673706	1.673210	0.0063
LOGFDI	0.522459	0.089494	5.837932	0.0000
LOGINFLATION	0.441818	0.229147	1.928103	0.0548
LOGROAD	0.330940	0.444411	-0.744672	0.0031
LOGTOP	-0.314287	0.251848	-1.247925	0.0232

- R- squared = 0.641364
- Adjusted R- squared = 0.586190
- F-statistic = 11.62425
- Prob(F-statistic)= 0.000015
- Durbin-Waston(DW) = 1.547670 and observation = 30

The coefficient of determination R2 is a measure of how good a prediction of the dependent variable we can make by knowing the independent variables. The result show 64.14% of the dependent variable is explained by the independent variables. But, sometimes R2 tends to somewhat over-estimate the success of the model when applied to real world. Therefore, adjusted R2 is preferred over R2 in order to assess our model's performance in the real world. As a result, 58.62% of the variation in export performance can be explained by the regression of all predictor factors. In the estimation of long-run model, foreign direct investment, inflation and infrastructure (paved road) shows positive coefficient and significant effect in a long run on performance of beverage products export. However, trade openness has negative and significant effect on the export performance of beverage products.

As it can see from table above a 1% increase in the foreign direct investment, inflation rate and infrastructure (paved road) will lead to 0.52%, 0.44% and 0.33% respectively, increase the export of beverage products the country in the long run. In contrast, a 1% increase in the trade openness will lead to -0.31% decreases the export performance of beverage product in the long run.

4.3.4 Short run estimation results for the export of selected commodities summary

Hence, an error correction model was estimated that incorporates the short term interactions and the speed of adjustment towards long run equilibrium. So the error correction model has been estimated using the OLS technique and the results are summarized in table 4.3.4 below

variables	Model 1		Model 2		Model 3		Model 4	
	coefficient	P-value	coefficient	P-value	coefficient	P-value	coefficient	P-value
C	0.194270	0.0030	2.240366	0.0582	0.533712	0.0412	0.178825	0.0277
D(LOGGDP)	0.474023	0.0372						
D(LOGFDI)			0.121396	0.0472	-0.312133	0.0585	0.032180	0.0180
D(LOGINFLATION)	-0.029222	0.0451	0.132648	0.0338	0.194414	0.0511	0.561435	0.0068
D(LOGREER)			2.219388	0.0025	0.795720	0.0053		
D(LOGROAD)	0.911449	0.0285	0.935842	0.0561	0.019257	0.0382	0.467772	0.0509
D(LOGTOP)	0.052483	0.6697	0.014568	0.0338	-4.702463	0.0016	0.026125	0.0330
RESID01(-1)	-0.414583	0.0466	-0.421313	0.0276	-0.946649	0.0161	-0.086236	0.0451

Source: author calculation using E-views 10 software

The detail explanation of the above table was explained below for each model.

4.3.4 .1 The short run error correction model for leather products

The error correction model has been estimated using the OLS technique and the results are summarized in table 4.3.4.1 below.

Variables	Coefficient	Std error	t-Statistic	P-value
C	0.194270	0.184543	1.052708	0.0030
D(LOGGDP)	0.474023	2.281408	0.207777	0.0372
D(LOGINFLATION)	-0.029222	0.062651	-0.466428	0.0451
D(LOGROAD)	0.911449	0.391126	2.330324	0.0285
D(LOGTOP)	0.052483	0.121545	0.431803	0.6697
DECM	-0.414583	0.197564	-2.098472	0.0466

- Observation = 30
- R-squared = 0.570641
- Adjusted R-squared = 0.318691
- F-statistic= 1.781123
- Prob (F-statistic) = 0.045903
- Durbin-Watson stat = 1.197222

The results of various diagnostic tests, including the Breush-Pagan-Godfrey test for heteroskedasticity, the Breush-Godfrey LM Test for serial correlation, the Jarque-Bera test for normality, and others that are listed and discussed in annexes, are reported. All tests did not find any issues with serial correlation, hetroskedasticity, non-normality, or model misspecification.

On the other hand from the estimation results of the short run error correction model in table 4.3.4.1 above, the coefficient of the error correction term is significant with expected negative sign and with the magnitude (-0.4145). Its magnitude indicates that deviation from the long run equilibrium is adjusted fairly quickly where 41.5% of the disequilibrium is removed each period. The result of R2 is also 0.57(57%). Which reveals that of Ethiopian leather and leather products export performance is caused by the explanatory variables included in the model, while 43% is by other variables which were not included in the short run model. Furthermore, F-statistic is significant with a probability of 0.045 which implies that the model fit.

Furthermore, coefficients of the short run model show that gross domestic product, inflation, infrastructure(kilometers of paved road),trade openness are significant; indicating that the variables significantly affect the leather and leather products export performance of Ethiopia in the short run. Like in the case of long run, gross domestic product and road have positive

sign and inflation has negative sign all variables are statistically significant. But, trade openness have positive sign and statistically insignificant.

The result shows that a 1% increase in gross domestic product will lead to 0.47% increase in the leather and leather products export in the short run. When we come to trade openness, its coefficient is significant and positive in sign as expected. It shows that an improvement by 1% in trade openness will lead to 0.05% increase in the total leather and leather products export of the country. The other important explanatory variable is kilometers of paved roads which is a proxy of infrastructural facilities. The result shows that an increase in the kilometers of paved roads by 1% will increase the leather and leather product export by magnitude of 0.91%. As it was widely discussed in the previous chapter, infrastructural facility especially the expansion of paved roads is the key determinant of country's export performance. On the other hand, a 1% increase in inflation will lead to -0.03% decrease in the leather and leather products export of the country in the short run. In general, short-term inflation less impact on Ethiopia's agricultural export performance. Trade openness is insignificant.

In addition, inflation is inversely related with the export of leather and leather products in the short run. The initial effect of inflation is an increase in prices on the domestic market, which makes selling on that market more profitable than exporting. Returns from the latter will not fluctuate in accordance with local pricing because export prices are essentially "given" for the majority of countries that produce primary commodities and can't be drastically changed in reaction to growing production costs. For the majority of export goods, however, changes in supply from individual exporting countries have little effect on world prices. Differences between world and domestic prices will affect exports through the diversion of either goods or factors of production to the domestic market; even if no such diversion takes place, exports will be affected through cost increases and the reduction or elimination of profits on export sales. For various commodities, the effects will differ; they will be most noticeable and immediate for those whose domestic demand responds strongly to increases in monetary income as well as those whose supply cannot be easily increased, meaning that increased demand is satisfied at the expense of exports rather than by an increase in output Gertrud Lovasy (1962).

4.3.4.2 The short run error correction model meat product export

The error correction model has been estimated using the OLS technique and the results are summarized in table 4.3.4.2 below.

Variables	Coefficient	Std error	t-Statistic	P-value
C	2.240366	4.079538	0.549171	0.0582
D(LOGFDI)	0.121396	0.131977	0.919824	0.0472
D(LOGINFLATION)	0.132648	0.146255	0.906962	0.0338
D(LOGREER)	2.219388	0.652881	3.399375	0.0025
D(LOGROAD)	0.935842	0.465177	2.011798	0.0561
D(LOGTOP)	0.014568	0.173365	-0.084031	0.0338
RESID01(-1)	-0.421313	0.266526	1.580758	0.0276

- R- squared = 0.825502
- Adjusted R- squared = 0.779981
- F-statistic = 0.467717
- Prob(F-statistic)= 0.00000
- Durbin-Waston(DW) = 1.126884
- Observation = 30

The results of various diagnostic tests, including the Breush-Pagan-Godfrey test for heteroskedasticity, the Breush-Godfrey LM Test for serial correlation, the Jarque-Bera test for normality, and others that are listed and discussed in annexes, are reported. All tests did not find any issues with serial correlation, hetroskedasticity, non-normality, or model misspecification.

On the other hand from the estimation results of the short run error correction model in table 4.4.4 above, the coefficient of the error correction term is significant with expected negative sign and with the magnitude (-0.4213). Its magnitude indicates that deviation from the long run equilibrium is adjusted fairly quickly where 42.1% of the disequilibrium is removed each period. The result of R2 is also 0.825(82.5%). Which reveals that of Ethiopian meat products export performance is caused by the explanatory variables included in the model, while 17.5% is by other variables which were not included in the short run model. Furthermore, F-statistic is significant with a probability of 0.0000 which implies that the model fit.

Furthermore, coefficients of the short run model show that all the independent variables (foreign direct investment, inflation, real effect exchange rate and infrastructure (paved road in km) and trade openness shows positive coefficient and significant effect in short run on the export performance of meat product.

The result shows that a 1% increase in the foreign direct investment, inflation, real effect exchange rate, road development in kilo meter and trade openness will lead to 0.125% ,

0.133% ,2.219%, 0.936% and 0.015% increase in the export of meat products in the short run respectively.

4.3.4.3 The short run error correction model for fruit and vegetable product export

The error correction model has been estimated using the OLS technique and the results are summarized in table 4.3.4.3 below.

Variables	Coefficient	Std error	t-Statistic	P-value
C	0.533712	0.350236	1.523863	0.0412
D(LOGFDI)	-0.312133	0.169489	-1.841612	0.0585
D(LOGINFLATION)	0.194414	0.130915	1.485038	0.0511
D(LOGREER)	0.795720	0.758894	1.048526	0.0053
D(LOGROAD)	0.019257	0.245727	-0.078369	0.0382
D(LOGTOP)	-4.702463	4.174375	-1.126507	0.0016
RESID01(-1)	-0.946649	0.364522	2.596958	0.0161

- R- squared = 0.764673
- Adjusted R- squared = 0.598935
- F-statistic = 2.200303
- Prob(F-statistic)= 0.000043
- Durbin-Waston(DW) = 2.185675
- Observation = 30

The estimation results of the short run error correction model in table 4.3.4.3 above, the coefficient of the error correction term is significant with expected negative sign and with the magnitude (-0.9466). Its large magnitude indicates that deviation from the long run equilibrium is adjusted fairly quickly where 94.6% of the disequilibrium is removed each period. The result of R2 is also 0.764(76.4%). Which reveals that of fruit and vegetable products export performance is caused by the explanatory variables included in the model, while 23.6% is by other variables which were not included in the short run model. Furthermore, F-statistic is significant with a probability of 0.0004 which implies that the model fit.

As indicated in the above table the coefficients of the short run model confirms that the independent variables; inflation, real effect exchange rate and infrastructure (paved road in km) shows positive coefficient and significant effect in short run on the export performance

of fruit and vegetable products. However, foreign direct investment and trade openness shows negative coefficient and significant effect in the short run on the export of fruit and vegetable products.

The result shows that a 1% increase in the inflation, real effect exchange rate, road development in kilo meter will lead to 0.194% , 0.795% and ,0.019% increase in the export of fruit and vegetable products in the short run respectively. But, a 1% increase in the foreign direct investment and trade openness will lead to -0.312% and -4.702% decrease in the export of fruit and vegetable products in the short run respectively.

4.3.4.4 The short run error correction model for beverage export

The error correction model has been estimated using the OLS technique and the results are summarized in table 4.3.4.4 below.

Variables	Coefficient	Std error	t-Statistic	P-value
C	0.178825	0.300802	0.594493	0.0.0277
D(LOGFDI)	0.032180	0.248506	0.129495	0.0180
D(LOGINFLATION)	0.561435	0.189429	2.963831	0.0068
D(LOGROAD)	0.467772	1.162331	0.402443	0.0509
D(LOGTOP)	0.026125	0.361612	0.072247	0.0330
RESID01(-1)	-0.086236	0.542782	-0.158878	0.0451

- R- squared = 0.580160
- Adjusted R- squared = 0.430193
- F-statistic = 1.868144
- Prob(F-statistic)= 0.00591
- Durbin-Waston(DW) = 2.799991
- Observation = 30

The estimation results of the short run error correction model in table -- above, the coefficient of the error correction term is significant with expected negative sign and with the magnitude (-0.08624). Its magnitude indicates that deviation from the long run equilibrium is adjusted fairly quickly where 8.64% of the disequilibrium is removed each period. The result of R2 is also 0.58(58%). Which reveals that of Ethiopian beverage export performance is caused by the explanatory variables included in the model, while the remaining is by other variables which were not included in the short run model. Furthermore, F-statistic is significant with a probability of 0.0054 which implies that the model fit.

As the result reveals that the coefficients of the short run model confirms that all the independent variables(foreign direct investment, inflation, infrastructure (paved road in km) and trade openness) shows positive coefficient and significant effect in short run on the export performance of beverage products.

Furthermore, the result shows that a 1% increase in the foreign direct investment, inflation, road development in kilometer and trade openness will lead to 0.032%, 0.561%, 0.467% and 0.026% increase in the export of beverage products in the short run respectively.

4.7 Heteroskedasticity test result

This test is conducted in order to ascertain that the disturbance or the errors has the same variance such that OLS estimators are BLUE, that is the coefficient estimates are efficient, consistent and unbiased. In order to detect heteroskedasticity, there are different techniques that can be used. In this study Breusch-Pagan-Godfrey, Harvey and white tests applied in the models to assess the stability of the variance for both models.

The hypothesis is stated as follows for both models:

H_0 = no heteroskedasticity and

The null hypothesis is tested against the alternative hypothesis for both models:

H_1 = there is heteroskedasticity

The null hypothesis, which in this case is a hypothesis for value of export model will not be rejected in favor of the alternative hypothesis if the probability F-statistics of the white heteroskedasticity test is significant at five percent. All the result shows the prob. chi-square is greater than 0.05 and it confirmed the absence of heteroscedasticity problem.The level of the F-statistics is statistically significant with the level for Harvey, Breusch-Pagan-Godfrey, and White, as can be seen from the result. Since the alternative hypothesis would be accepted in cases where the likelihood of the F- Statistics is significant at 5%, the F-statistics results for all tests clearly demonstrate that there is no heteroscedasticity problem in the model. This suggests that the null hypothesis has not been successfully rejected (detail in annex 2).

4.8 Auto correlation test result

This is done to verify that the error terms' covariance with time is 0. In other words, it's employed to verify whether the mistake terms are temporally uncorrelated. In order to control serial correlation and ensure that the regression is random (as opposed to stochastic) and uncorrelated.

Autocorrelation can be evaluated in two different ways. The Breusch-Godfrey test and the Durbin-Watson test are examples of this. The earlier test, which uses a joint test for autocorrelation to assess the relationship between the residual and multiple of its lag values, is a more generic test of auto correlation. While the later test is to test existence of autocorrelation for first order, autocorrelation that means it tests only for a relationship between an error and its immediately previous value. Accordingly, let's see the result of both tests.

The null hypothesis of no autocorrelation is stated as follows for both models:

H_0 = no autocorrelation and

The null hypothesis is tested against the alternative hypothesis for both models:

H_1 = there is autocorrelation

Based on the result from Breusch-Godfrey serial correlation F-and X2 (LM) version test are presented in below and the conclusion for the test for all models, the null hypothesis of no autocorrelation should not be rejected since the p – values for all models are above 0.05. To strengthen the result, the DW test also illustrates that there is no autocorrelation for both models that means all values between 1.5 to 2 as shown below. Therefore, the error terms are uncorrelated over time.

Leather and leather product correlation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.025299	Prob. F(2,22)	0.1558
Obs*R-squared	4.820178	Prob. Chi-Square(2)	0.0898
Durbin-Watson stat	1.850965		

Meat product correlation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.538271	Prob. F(2,20)	0.2391
Obs*R-squared	3.999571	Prob. Chi-Square(2)	0.1354
Durbin-Watson stat	1.846176		

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.636899	Prob. F(2,20)	0.0963
Obs*R-squared	6.259999	Prob. Chi-Square(2)	0.0637
Durbin-Watson stat	2.019833		

Fruit&vegetable product correlation

Beverage product correlation

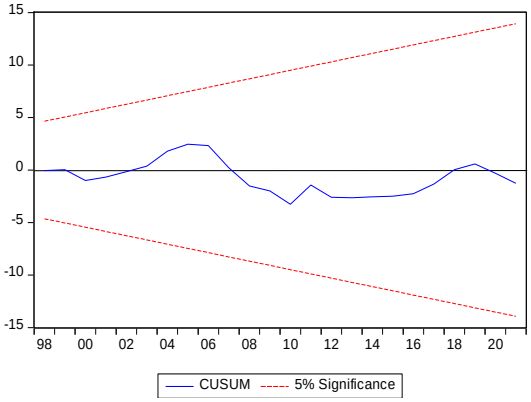
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.104888	Prob. F(2,22)	0.9009
Obs*R-squared	0.292802	Prob. Chi-Square(2)	0.8638

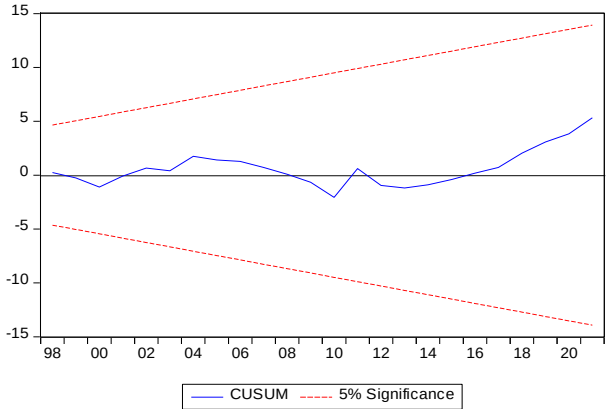
Durbin-Watson stat 2.030879

4.9 Stability test

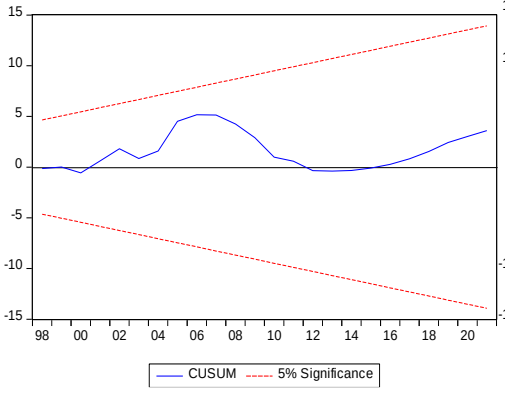
The stability of the long run and short run coefficients was investigated using cumulative sum (CUSUM) analysis. As can be seen from the image below, tests are plotted against the critical bond of 5% significance level, and the CUSUM plots stay within the 5% significance level's bounds. Thus, we failed to reject the null hypothesis (H_0 = models is stable and H_1 = no stability in the models, as evidenced by the outcomes presented below for each of the models we employed).



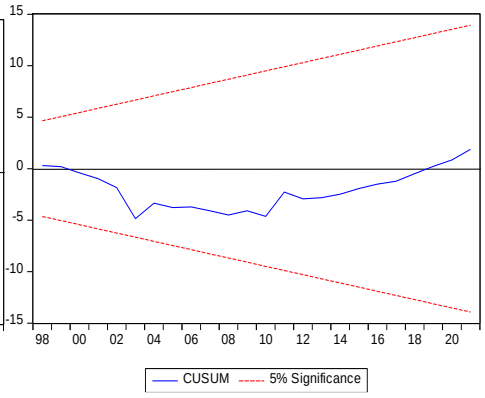
Stability test for leather



stability test for meat



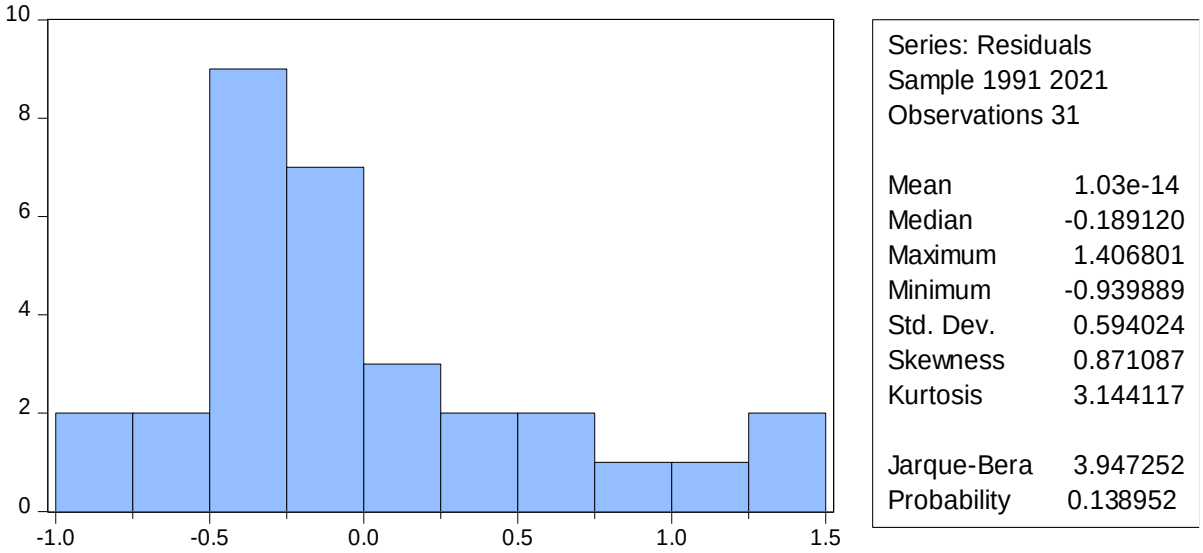
Stability test for fruits& vegetables



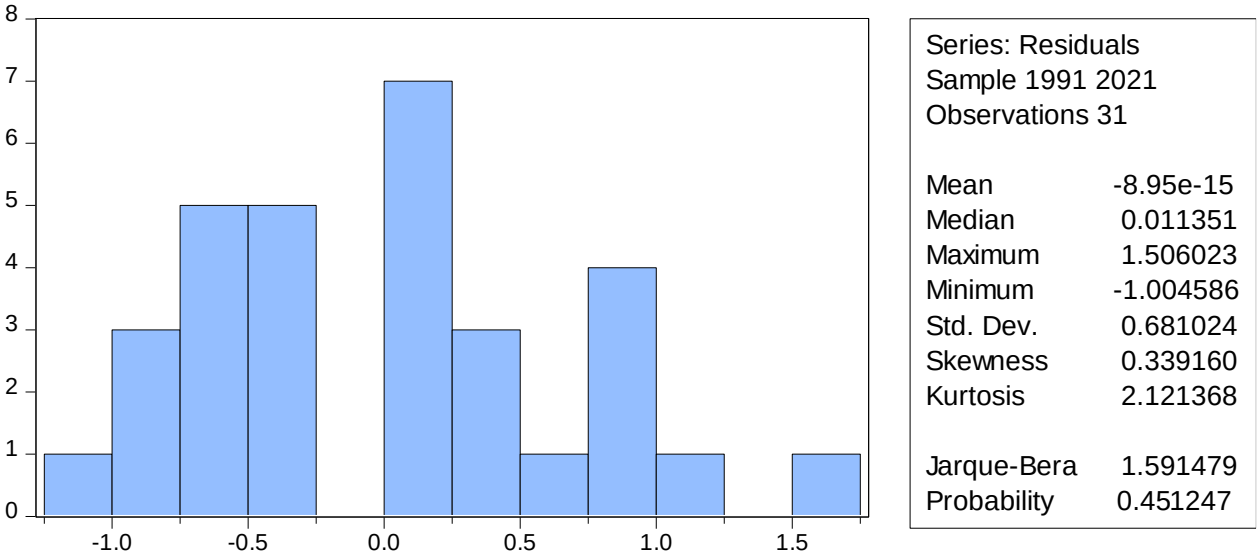
stability test for beverage

4.10 Normality test

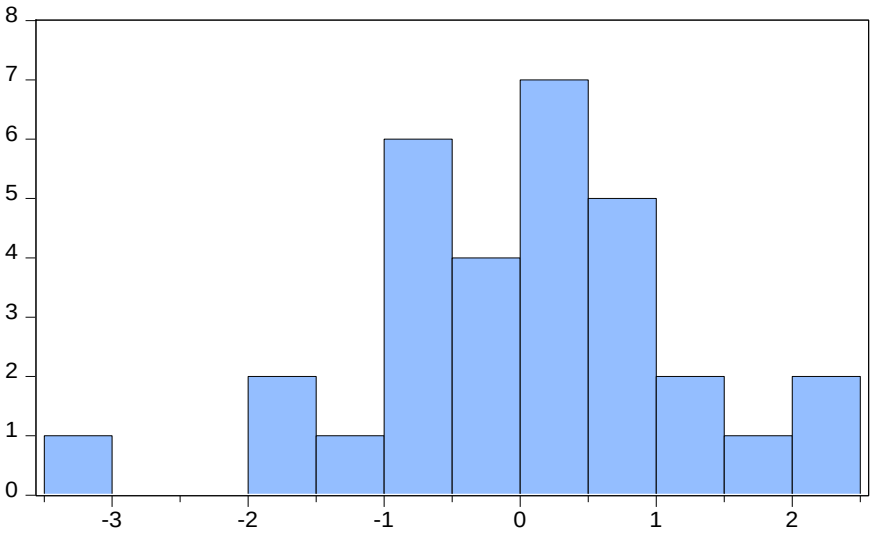
The Jargue- Bera test with probability confirms that the residuals in the model are normally distributed with significance level for leather and leather product (0.138952), meat and meat product (0.451247), fruits & vegetables (0.592022) and beverage (0.061889) respectively.



Normality test for leather and leather product

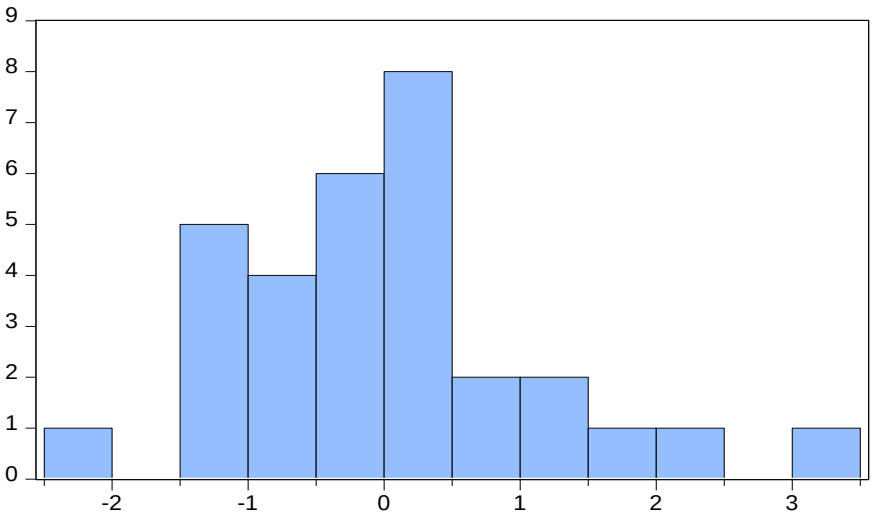


Normality test for meat product



Series: Residuals	
Sample 1991 2021	
Observations 31	
Mean	-3.78e-15
Median	0.075483
Maximum	2.256166
Minimum	-3.082971
Std. Dev.	1.113312
Skewness	-0.305326
Kurtosis	3.662409
Jarque-Bera	1.048423
Probability	0.592022

Normality test for fruits and vegetables product



Series: Residuals	
Sample 1991 2021	
Observations 31	
Mean	-1.75e-14
Median	-0.043453
Maximum	3.321362
Minimum	-2.353759
Std. Dev.	1.106372
Skewness	0.741008
Kurtosis	4.453232
Jarque-Bera	5.564827
Probability	0.061889

Normality test for beverage product

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This study was focused on examining the influence of gross domestic product(GDP), foreign direct investment (FDI),real effect exchange rate(REER),trade openness(TOP),inflation and infrastructure(road) on the export performance agro processing industries(leather & leather products, meat, fruits & vegetables and beverage). To achieve these objectives a conceptual model was formulated by reviewing previous related literatures, hypotheses were developed, tested and the following conclusions were reached.

The study was conducted using secondary data collected from different sources for the period of 30 years (1991 to 2021). The study investigated the determinants of the four selected export commodities of Ethiopia, by using time series data and the data collected from Ethiopian ministry of finance , National bank of Ethiopia (NBE), Ethiopian Customs commission (ECC), Central Statistics Agency (CSA),Ethiopian road authority .

For the meaningful interpretation of data, appropriate percentages and averages were worked out in the descriptive analysis. The performance of agro processing (leather, meat, fruit and beverage) products export over the period was used VAR model that was applied and estimating by ordinary least square (OLS) regression analysis with Time series data.

In order to get a reliable result, data was checked by different tests including, normality, multi-co linearity, correlation, heteroskedacity, co integration and error correction method, etc. and finally, multiple regression analysis was carried out using OLS estimation procedure in order to find out factors affecting the exports of agro processing industries in Ethiopia.

As per the finding, gross domestic product (GDP) and infrastructure (road) have positive and significant effect on the export performance leather and leather products. But, inflation and trade openness have negative and significant effect on the export performance of leather and leather products. Thus, export performance was mainly determined by gross domestic product (GDP), trade openness (TOP), inflation and infrastructure (road), other things remain constant. With the same fashion, foreign direct investment (FDI), real effect exchange rate (REER), inflation and infrastructure (road) have positive and significant effect on the export performance of meat and meat products in the country .But trade openness (TOP) has negative and statistical significant on the export of meat products. Thus, the export

performance of meat and meat products mainly determined by the independent variables under consideration, ceteris paribus. As the analysis shows gross domestic product (GDP), , trade openness (TOP), inflation and infrastructure (road) have positive and significant effect on the export performance of fruit and vegetable product in the nation and mainly determined by these variable, but foreign direct investment (FDI) has negative and statistical significant on the export performance of fruit & vegetable products, other thing being constant. Finally, foreign direct investment (FDI), inflation and infrastructure (road) have positive and significant effect on the export performance beverage products, but trade openness (TOP) has negative and statistical significant on the export performance of beverage products.

The key findings in this paper was infrastructure particularly paved road has a great role for the export performance on leather and leather products, meat & meat products, fruit and vegetable and beverage products in Ethiopia and the result shows positive and significantly affect the export performance.

Ethiopia's agro processing sector has a lot of potential, but it has not been developed for performance on a global scale. We have the capability to domestically produce and be a component of the production of agricultural goods for both domestic and international markets. The Ethiopian government has chosen the agro processing sector as one of its top priority subsectors for industrializing the nation's traditional agricultural-based economy.

Currently, the Government of Ethiopia (GoE) expects the industrial sector to play an important role in GDP growth, job creation, foreign exchange earnings, and small and medium-sized enterprise (SME) development over the coming years.

Apart from the findings, the overall goal of the Government’s Industrial Development Strategy (IDS) is to bring about the accelerated structural transformation of the economy through enhancing industrialization, raising the share of the industrial sector of GDP from the current 13 per cent to 27 per cent by 2025, and the GDP share of the manufacturing sub-sector from the current 4 per cent to 18 per cent by 2025. The development of agro-industries presents Ethiopia with an opportunity to accelerate economic development and achieve its industrial development goals. If addressed correctly, agro-industries can help fulfill the potential of agriculture and advance industrialization in the country. Recognizing this opportunity, the GoE is spearheading the development of integrated agro-industrial parks (IAIPs) and accompanying rural transformation centers (RTCs) with the intention of better integrating agricultural value chain actors. The overall objectives of IAIPs are to: drive the

structural transformation of the Ethiopian economy; to reduce rural poverty; and to create a better environment for increased investment in agro-food and allied sectors.

In general, the agro processing sector is among the prioritized sector of the government, the export level of agro processing industry is found increasing from time to time. The researcher has concluded that due its potential the export of the agro processing product is increasing time to time. This is due to the fact that the government has prioritized the sector and as a result the agro processing sector is growing. But still there are various external and internal microeconomic and macroeconomic factors that are adversely affecting the export performance of the sector. For example: due to poor infrastructure development, lack foreign currency, inflation, poor linkage and coordination between various stakeholders and others are the bottle necks for the export performance of agro processing industries in Ethiopia.

5.2 Recommendation

Agro processing industries in Ethiopian have huge potential. The nation has vast arable land that can provide agricultural commodities as a raw material for the industry to process (value addition).However, up to now a very small portion of this potential has been exploited. This is because of poor linkage between agriculture and industry, lack of infrastructure development, lack of inputs for the industries (in terms of quality and quantity), lack of foreign currency for exporter, inflation, etc. Failures in tackling these problems and constraints using systematic and interconnected approach will not support companies to be competent in the global market. This study identified important macro variables that require proper attention. Based on the findings and conclusions made, the following main recommendations are made:

- It would be better for the government and all stakeholders to work with equal commitment and sense of urgency to strengthen the supply and value chain of the agro processing industries and to improve the competitiveness of the companies on the international market and to increase the share of export the agro processing sector. For effective supporting, coordinating and handling of proper export led strategies, ministry of industry and ministry of agriculture to fill the demand and supply sides have a great role to strengthen the companies under question together with the joint effort of stakeholders (banks, investment commission, electric utility, other government organization, non-governmental organization (NGOs), etc.).
- When establishing and implementing macro-level export policies to improve export performance, policymakers who are responsible for developing and implementing

export promotion support programs must focus on integrated support for the agro processing exporters.

- In addition, the government of Ethiopia also needs to empower ministry of industry and the institutes under the ministry to exercise practical power so that it would bring all governmental and non-governmental stakeholders efforts to the required level. It is also recommended that for the agro processing companies accomplish their international duties successfully, stakeholders should communicate and support each other for mutual benefit. In order to assist this sector and enhance the export performance of the agro processing companies, the government must also compile and put into practice the finest experiences of successful countries as a benchmark.
- The government should give due attention for the effect of macroeconomic variables on the export performance of agro processing industries by revising existing policies and strategies to maximize the untapped agricultural potential for export earnings and economic growth.
- Government support is required for businesses that are expanding capacity specifically for their industry. This can be accomplished by attracting genuine, highly qualified foreign subject-matter experts to contribute their knowledge.
- The agro processing exporter industries should rather to be committed to improve productivity and production to competent by quality and price in the global market. And also develop different marketing strategies to challenge the challenge and learn from other best performer companies domestic and international firms.
- The last but not the least, the government should follow holistic and sustainable approach to support the agro processing sector such as providing adequate infrastructure (power, road, water, telecom, etc),strengthen forward and backward linkages, strong cooperation and collaboration between different stakeholders', capacitating value chain actors and implementing institutions, and others take in to due attention to speed up structural transformation the economy as well as national development.

5.3 Directions for Future Research

The findings of this study should augment top level management understanding on how to identify such export performance influencing factors as gross domestic product, foreign direct investment, trade openness, real effect exchange rate, inflation and infrastructure (road) to improve export market performance of agro processing companies. This study has the following future research directions:

- First, the findings help policy makers to understand the effect of macroeconomic variables on the export of agro processing industries and it is significant for intervention.
- Second, further research should be undertaken to identify factors associated with macroeconomic variables (GDP,FDI,REER,TOP, inflation) and infrastructure(road) that have impact on export performance so as to strengthen the firms overall performance. Infrastructure development and attracting foreign investment the government of Ethiopia in general ,the concerned ministry should be updated as the nation's commitment to the outside world gains support, and shallow policy and regulation should be loosened when significant investment is planned for future growth and development.

REFERENCES

Aaby, N-E., & Slater, S. (1989). Management influences on export performance: a review of the empirical literature 1978-1988. Review. 6(4), 7-25.

Abdul G., et al (2014). Determinants of leather exports from Pakistan: a time series analysis, Institute of Business Management Sciences, Faculty of Social Sciences, University of Agriculture, Faisalabad, Pakistan. Volume5, Number2, pp 77-86.

Abolagba, E. O., Onyekwere, N. C., Agbonkpolor, B. N., & Umar, H. Y. (2010). Determinants of agricultural exports. *Journal of Human Ecology*, *29*(3), 181-184.

Abule Mehare (2012). Evaluation of effect of exchange rate variability on export of Ethiopia's agricultural products: case of coffee, flower and oil seeds.

Agosin, M. R. (2007). *Export diversification and growth in emerging economies* (Vol. 233, pp. 559-562). Working paper.

Ali A. G., &Elbadawi, I. A. (2004). Explaining Sudan's economic growth performance.

Allaro, H. B. (2011). Export performance of oilseeds and its determinants in Ethiopia.

Allaro, H. B. (2015). Export performance of oilseed and its determinants in Ethiopia. Journal of Cereals and Oil seeds, 2(1), 1–15. https://doi. Org /10.5923/ j. economics. 20110101.01.

Allaro,H.B. (2011). The Effect of Export-Led Growth Strategy on the Ethiopian Economy. American Journal of Economics, 2(3), 50-56.

Bekele, W. T., &Mersha, F. G. (2019). A dynamic panel gravity model application on the determinant factors of Ethiopia's coffee export performance. *Annals of Data Science*, *6*(4), 787-806.

Berhanu Lakew (2003). Prospects for Export Diversification in Ethiopia, NBE Staff Working Paper ERD/SWP/007/2003

Bougheas, Demetriades&Mamuneas (1999) .Infrastructure, Specialization, Economic Growth.

Cavusgi, S. T., and Zou, S. (1994). Marketing strategy performance relationship: An investigation of the empirical link in export market ventures. Journal of marketing. 58(1), 1-21.

Chaudhary, K., & Sharma, M. (2011). Performance of Indian public sector banks and private sector banks: A comparative study. International journal of innovation, management and technology, 2(3), 249.

Cherkos, M. (2017). Economic Analysis of the impact of Globalization to the Economic Growth of Ethiopia: A Co-Integration Analysis: University of Antwerp, Belgium.

Collier, Paul and Willem Gunning (1999). Explaining African Economic Performance. Journal of Economic Literature, Vol. XXXVII, March.

Crawford, G., &Abdulai, A. G. (2009). The World Bank and Ghana's poverty reduction strategies: strengthening the State or consolidating neoliberalism?. *Labour, Capital and Society/Travail, capital etsociété*, 82-115.

Creswell, J. W. (2003). A framework for design. *Research design: Qualitative, quantitative, and mixed methods approaches*, 9-11.

Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). An expanded typology for classifying mixed methods research into designs. *A. Tashakkori y C. Teddlie, Handbook of mixed methods in social and behavioral research*, 209-240.

D. Salvatore, (2009).“Nobels on the Future of the World Economy,” Special Issue of the Journal of Policy Modeling (with the participation of R. Fogel, L. Klein, R. Mundell, E. Phelps, and M. Spence).

Dunning, J. H. (1981). A note on intra-industry foreign direct investment. *PSL Quarterly Review*, *34*(139).

Dunning, J. H., & Rugman, A. M. (1985). The influence of Hymer's dissertation on the theory of foreign direct investment. *The American Economic Review*, *75*(2), 228-232.

Edwards, L., & Alves, P. (2006). South Africa’s export performance: Determinants of export supply. South African Journal of Economics, 74(3), 473-500.

Elbadawi, I. A. (2004). The World Bank, HadiSalehiEsfahani, and Ibrahim A. Elbadawi. 2004.“The Politics of Sustaining Growth in the Arab World: Getting Democracy Right.”. Lecture and Working Paper Series No. 2.

Ethiopian investment commission (2018).Annual report on export performance of manufacturing industries in Ethiopia.

Evenett, S. J., & Keller, W. (1998). On theories explaining the success of the gravity equation (No. w6529).

Evenett, S.J. and Keller, W. (1998). "On the Theories Explaining the Success of the Gravity Equation" in NBER Working Paper, No. 6529, and Cambridge, MA: National Bureau Economic Research.

F. Gerard Adams, Byron Gangnes, and YochananShachmurove (2004).Why Is China So Competitive? Measuring and Explaining China's Competitiveness. Northeastern University; University of Hawaii at Manoa (Visiting Singapore Management University); and City University of New York Paper No. 07-2004

Fugazza, M. M. (2004). "Export Performance and Its Determinants: Supply and Demand Constraints", Policy Issues in International Trade and Commodities Study Series Vol.1, No.26, Geneva, Swaziland.

Garland, Wendy A. (2017). The Impact of a Country's Infrastructure on Businesses. Available at:https://study.com/academy/lesson/the-impact-of-a-countrys-infrastructure businesses. html[Accessed 25 Dec. 2017].

Gebissa Yigezu Wendimu | (2021) The challenges and prospects of Ethiopian agriculture, Cogent Food & Agriculture, 7:1, 1923619, DOI: 10.1080/23311932.2021.1923619

Gertrud Lovasy (1962).Inflation and exports in primary producing countries:IMF staff working paper ,volume 9 No.1

Goldstein, M., and M. Khan. (1985). "Income and Price Effects in Foreign Trade." In R. Jones and P. Kenen., Handbook of International Economics 2. Amsterdam: Elsevier.

Guloglu, B., &Tekin, R. B. (2012). A panel causality analysis of the relationship among research and development, innovation, and economic growth in high-income OECD countries. *Eurasian Economic Review*, *2*(1), 32-47.

Heckscher, E. (1919). The effect of foreign trade on the distribution of income. EkonomiskTidskrift, 13, 497–512.

Helpman, Elhanan. (1984). A simple theory of international trade with multinational corporations. Journal of Political Economy 92(3): 451-471.

Hill, C. W., & Jones, G. R. (2011). Essentials of strategic management. Cengage Learning.

Hill, C. W., & Jones, G. R. (2011). Essentials of strategic management:Theory& cases: An integrated approach.

Hossein, S. (2012). Export barriers and Export Performance: Empirical Evidence from the Commercial Relationship between Greece and Iran. South-Eastern Europe Journal of Economics 1 (2012) 53-66.

Imperial government of Ethiopia (1962). The second five years of development plan (1962-1967) Addis Ababa.

Imperial government of Ethiopia (1962).The first five years development plan (1957-61), Addis Ababa.

Imperial Government of Ethiopia (1968). The third five years of development plan (1968-1973) Addis Ababa.

International Monetary Fund (1992). Annual Report of the Executive Board for the Financial Year Ended April 30, 1992 Washington, D.C.

International monetary fund (IMF) (2015).Annual report on the goals and policies aimed at reducing poverty and strengthening inclusive growth by 2030.Tackling challenges together.

Jeon. Y. (1992). The determinants of Korean foreign direct investment in manufacturing industries. Weltwirtschaftliches Archive. 128:527-541.

Kaplinsky, R., & Morris, M. (2008). Do the Asian drivers undermine export-oriented industrialization in SSA?. World Development, 36(2), 254-273.

Katsikeas, C. S., Leonidou, L. C., & Morgan, N. A. (2000). Firm-Level Export Performance Assessment: Review, Evaluation, and Development. Journal of the Academy of Marketing Science, 28(4), 493-511.

Katsikeas, C. S., Leonidou, L. C., & Morgan, N. A. (2000). Firm-level Export Performance Assessment: Review, Evaluation, and Development. Journal of the Academy of Marketing Science, 28(4), 493-511.

Kojima, K. (1975). International trade and foreign investment: substitutes or complements. *Hitotsubashi Journal of Economics*, *16*(1), 1-12.

Kristjánsdóttir, Helga (2005). *A gravity model for exports from Iceland*. CAM, Centre for Applied Micro econometrics.

Krugman, P.R., & Obstfeld, M. (1999). International economics: Theory and policy.Boston, MA: Pearson Education

Limao, N., &Venables, A. J. (2001). Infrastructure, geographical disadvantage, transport costs, and trade. The world bank economic review, 15(3), 451-479.

Liu, B. J., Lu, A. Y., & Tung, A. C. (2006). Export outsourcing: Cost disadvantage and reputation advantage. Available at SSRN 876891.

MACE (2014). Ethiopian Integrated Agro Industrial park Feasibility study document: Mahindra Consulting Engineers Limited.

Madsen, T., (1987). Empirical export performance studies: a review of conceptualizations and findings. In S. T. Cavusgil (Ed.). Advances in international marketing, Vol. 2:177-198. Greenwich, CT: JAI Press Inc

Majeed TM, and Ahmad R. (2006). Determinants of exports in developing countries. The Pakistan Development Review, Pakistan Institute of Development Economics. 45(4):12651276.

MariosObwona and Ephraim Chirw. (2018). Impact of Asian drivers on SSA agriculture and food security; Issues and Challenges. Retrieved from, http://aecafrica.org

Matanda, J. And Freeman, S. (2009). Effect of perceived environmental uncertainty on exporter importer inter-organizational relationships and export performance improvement. International Business Review, 18, 89-107.

Matousa, Todob and Mojoc. (2013). Agriculture in Ethiopia, Retrieved from https://infomineco.com/agriculture-in-ethiopia.

Matthyssens, P., &Pauwels, P. (1996). Assessing export performance measurement. In S. T. Cavusgil, & C. Axinn (Eds.), Advances in international marketing (pp. 85-114.). Greenwich, CT: JAI Press Inc.

Mbekeani, Kennedy K. (2007). The Role of Infrastructure in Determining Export Competitiveness: Framework Paper.

Mello, A. S., & Parsons, J. E. (1998). Going public and the ownership structure of the firm. Journal of financial economics, 49(1), 79-109.

Mouz Mulugeta (2005).”Determinants of agricultural export in Ethiopia”

Muduli, K., Govindan, K., Barve, A., Kannan, D., &Geng, Y. (2013). Role of behavioural factors in green supply chain management implementation in Indian mining industries. *Resources, conservation and recycling*, *76*, 50-60.

Mulualem Eshetu (2006). Manufacturing Export: Performance and Determinants in Ethiopia,Birritu No. 103, National Bank of Ethiopia.

Narayan, J., John, D., &Ramadas, N. (2019). Malnutrition in India: status and government initiatives. *Journal of public health policy*, *40*(1), 126-141.

National Bank of Ethiopia (2017). Statistical Data Series Available at:https: /www.nbe.gov.et/ statistics/ Statistical%20data%20series.html [Accessed 15 Febrauary 2018]

National Bank of Ethiopia (NBE)(2018/19), Annual Report, p. 1-144, Retrieved from www.google.com, retrieved on May 30, 2020.

Navarro, A., Losada, F., Ruzo, E., and Diez, J.A. (2010). Implications of perceived competitive advantages, adaptation of marketing tactics and export commitment on export performance", Journal of World Business, 45, 49-58.

Nega Muhabaw (2013). What Determines the Export Performance of Ethiopia? A Time Series Analysis, Addis Ababa University

Noah Alemu (2018). Determinates of Agricultural Export Trade: A Case of Sesame Export from Ethiopia.

O'Rourke, Kevin H. and Jeffrey G. Williamson. (1999). Globalization and History: The Evolution of a Nineteenth-Century Atlantic Economy, Cambridge, Massachusetts and London: The MIT Press.

Oliveira, J. S., Cadogan, J. W., &Souchon.A (2012). "Level of analysis in export 61 performance research" International Marketing Review, 29(1): 114–127.

Oluwaseun Gbaiya (2013). Agricultural export and economic growth in Nigeria.

Organisation for Economic Co-operation and Development Staff. (2002). Education at a glance: OECD indicators 2002. Paris: OECD.

Ozawa, T. (2011). The role of multinationals in sparking industrialization: From" infant industry protection" to" FDI-led industrial take-off".

Papadopoulos, N., and Martín Martín, O. (2010) .Toward a model of the relationship between internationalization and export performance .International Business Review, 19, 388-406.

Pfaffermayr M. (1996). Foreign outward direct investment and exports in Austrian manufacturing: substitutes or complements? WeltwirtschaflichesArchive.132(2):501-522.

Ramnath, S., Rock, S., & Shane, P. (2008). The financial analyst forecasting literature: taxonomy with suggestions for further research. *International Journal of Forecasting*, *24*(1), 34-75.

Redding S. and A. Venables, (2004). "Geography and Export Performance: External Market Access and Internal Supply Capacity", Chapter 3, in Baldwin, R and Winters, A, Challenges to Globalization: Analyzing the Economics, CEPR-NBER conference volume, NBER and Chicago University Press

Rodríguez-Navarro, S. (2009). Insights into SAGA function during gene expression. EMBO reports, 10(8), 843-850.

Salvatici, L. (2013). "The Gravity Model in International Trade"AGRODEP Technical Note2 pp.321[Online]Availableat:http://www.agrodep.org/sites/default/files/Technical_notes/AGRODEP-TN-04-2_1.pdf (Accessed: 15 August 2017).

Samuel-Fitwi, B., Wuertz, S., Schroeder, J. P., & Schulz, C. (2012). Sustainability assessment tools to support aquaculture development. *Journal of Cleaner Production*, *32*, 183-192.

Schlegelmilch, B. B., & Ross, A.G. (1987).The Influence of Managerial Characteristics on Different Measures of Export Success. Journal of Marketing Management. 3(2), 145-58.

Sharma VM, et al. (2001). Quantitative target display: a method to screen yeast mutants conferring quantitative phenotypes by 'mutant DNA fingerprints'. Nucleic Acids Res 29(17):E86-6

Shoham, A. (1998). Export performance: a conceptualization and empirical assessment. Journal of International Marketing, 6(3), 59-81.

Siegel, P. B., Alwang, J., & Johnson, T. G. (1994). Toward an improved portfolio variance measure of regional economic stability. *Review of Regional Studies*, *24*(1), 71-86.

Smith, A. (1937). *The wealth of nations [1776]* (Vol. 11937).

Solberg, C.A., and Olsson, U.H.(2010). Management orientation and export performance: The case of Norwegian ICT companies. Baltic Journal of Management, 5, 1, 28-50.

Sousa, C. M. (2004). Export performance measurement: an evaluation of the empirical research in the literature. Academy of marketing science review, 2004.

Sousa, C.M.P. (2004). Export performance measurement: An evaluation of the empirical research in the literature", Academy of Marketing Science Review, 8, 9, 1–22.

Sousa, C.M.P., Martínez-López, F.J., and Coelho, F. (2008).The determinants of export performance: A review of the research in the literature between 1998 and 2005.International Journal of Management Review. 10, 4, 343-374.

Spilimbergo, A. (2000). Growth and trade: The north can lose. *Journal of Economic Growth*, *5*(2), 131-146.

Stoian, M.C., Rialp, A., and Rialp, J.(2011) Export performance under the microscope: A glance through Spanish lenses. International Business Review, 20, 117-135.

Takahashi, M. (2016). Foreign Investment, Tax Policies and Economic Development. Collection of Essays on Osaka Sangyo University, 17(3), (pp.117-127).

Taneja, P. (2012). The Rise of China and India. In Handbook on International Political Economy (pp. 73-88).

Teamrat Kahssay Gebremariam& Sun Ying JuanSapena (Reviewing editor) (2022). The foreign direct investment-Export performance nexus: An ARDL based empirical evidence from Ethiopia, Cogent Economics & Finance.

Tekeste, S. (2012). Determinants of Agricultural Export in Ethiopia. *Unpublished MA Thesis, Addis Ababa University*.

Tekin, R. B. (2012). Economic growth, exports and foreign direct investment in Least Developed Countries: A panel Granger causality analysis. *Economic modelling*, *29*(3), 868-878.

Teweldemedhin, M. Y., &Mbai, S. (2013). Factors determining red meat trade to the Asian and African markets: Its implication to the Namibian red meat industry. *Journal of Development and Agricultural Economics*, *5*(9), 351-364.

TigistYifru (2015), impact of agricultural exports on economic growth in Ethiopia: the case of coffee, oilseed and pulses, Egerton University.

Todaro, M. P. (1992). Human Development Report 1992:p 359-363

Trejos, S., &Barboza, G. (2015). Dynamic estimation of the relationship between trade openness and output growth in Asia. *Journal of Asian Economics*, *36*, 110-125.

Tulu Belay, (2020), Determinants of Agricultural Export in Ethiopia.

Tura, D., &Robards, K. (2002). Sample handling strategies for the determination of biophenolsin food and plants. Journal of chromatography A, 975(1), 71-93.

UNCTAD (2002), Transitional corporation and export competitiveness. World Investment Report [Online] Available at: http://unctad.org/en/docs/wir2002_en.pdf [Accessed: June 2017].

UNCTAD (2004). Export performance and its determinants: Supply and Demand constraints. New York and Geneva: UN Publication.

UNCTAD (2004). Export performance and its determinants: Supply and Demand constraints. New York and Geneva: UN Publication.

Varian, H. R., & Varian, H. R. (1992). *Microeconomic analysis* (Vol. 3). New York: Norton.

Walker Jr, O. C., &Ruekert, R. W. (1987). Marketing's role in the implementation of business strategies: a critical review and conceptual framework. *Journal of marketing*, *51*(3), 15-33.

Walker, O. C., &Ruekert, R. W. (1987), "Marketing's Role in the Implementation of Business Strategies: A Critical Review and Conceptual Framework" Journal of Marketing 51(3): 15–33.

Weldemichael, AwetTewelde (2013) and Moore, B. C. (2016).Third World Colonialism and Strategies of Liberation: Eritrea and East Timor Compared. *Africa Today*, *62*(4), 65-68.

Wendaferahu Mulugeta (2013). "Determinants of Ethiopian Export performance." Jimma University, Ethiopia.

World Bank (2009). 'World Development Indicators 2009'. Washington, DC: World Bank.

World Bank Group. (2016). *World development report 2016: digital dividends*. World Bank Publications.

World Bank(1987). World development report, Oxford University press

Zakaria, M. (2014). Effects of Trade Liberalization On Exports, Imports And Trade Balance In Pakistan: A Time Series Analysis: COMSATS Institute of Information Technology, Islamabad, Pakistan PRAGUE ECONOMIC PAPERS.

Zelealem M. (2019). Determinants of Ethiopian Export: An Evidence from Five Commodities Using Time Series Analysis.

Zhang, K.H (2006). How FDI Does Affect a Host Country's Export Performance? The case of China, Department of Economics, Illinois State University.

Zhang, Q., &Hathcote, J.M. (2008). Factors influencing apparel imports from China.Clothing and Textiles Research Journal, 26(1), 23-40. doi: 10.1177/0887302X07305922

Zikmund, W. G., Babin, B., Carr, J., &Griffen, M. (2003). Basic data analysis: Descriptive statistics. *Health Economics Research Method*, *2*.

Zou, S.; and Stan, S. (1998), the determinants of export performance: a review of the empirical literature between 1987 and 1997, International Marketing Review, Volume 15 Number 5 pp. 333-356.

Annex 1
Long run and short run analysis results

Dependent Variable: LOGEXLEATHER long run
Method: Least Squares
Date: 12/25/22 Time: 10:24
Sample: 1991 2021
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-80.06251	7.300239	-10.96711	0.0000
LOGGDP	3.064883	0.219858	13.94031	0.0000
LOGINFLATION	-0.074195	0.122947	-0.603465	0.0521
LOGROAD	1.600388	0.247069	6.477486	0.0000
LOGTOP	-0.225307	0.134822	-1.671148	0.0082

R-squared	0.898738	Mean dependent var	19.87179
Adjusted R-squared	0.881128	S.D. dependent var	1.978452
S.E. of regression	0.661262	Akaike info criterion	2.157356
Sum squared resid	11.36894	Schwarz criterion	2.388644
Log likelihood	-28.43902	Hannan-Quinn criter.	2.232750
F-statistic	51.03361	Durbin-Watson stat	1.521732
Prob(F-statistic)	0.000000		

Dependent Variable: D(LOGEXLEATHER) short run
Method: Least Squares
Date: 12/25/22 Time: 10:28
Sample (adjusted): 1992 2021
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.194270	0.184543	1.052708	0.0030
D(LOGGDP)	0.474023	2.281408	0.207777	0.0372
D(LOGINFLATION)	-0.029222	0.062651	-0.466428	0.0451
D(LOGROAD)	0.911449	0.391126	2.330324	0.0285
D(LOGTOP)	0.052483	0.121545	0.431803	0.6697
RESID01(-1)	-0.414583	0.197564	-2.098472	0.0466

R-squared	0.570641	Mean dependent var	0.172565
Adjusted R-squared	0.318691	S.D. dependent var	0.560531
S.E. of regression	0.526216	Akaike info criterion	1.730645
Sum squared resid	6.645666	Schwarz criterion	2.010884
Log likelihood	-19.95967	Hannan-Quinn criter.	1.820296
F-statistic	1.781123	Durbin-Watson stat	1.197222
Prob(F-statistic)	0.045903		

Dependent Variable: LOGEXMEAT long run
Method: Least Squares
Date: 12/25/22 Time: 11:54
Sample: 1991 2021
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.453373	3.735811	0.656718	0.0174
LOGFDI	0.148549	0.129054	1.151054	0.0406
LOGINFLATION	0.167059	0.144085	1.159451	0.0572
LOGREER	2.078679	0.577741	3.597943	0.0014
LOGROAD	0.883451	0.441526	2.000905	0.0564
LOGTOP	-0.034660	0.174206	-0.198961	0.8439

R-squared	0.836377	Mean dependent var	19.94185
Adjusted R-squared	0.803652	S.D. dependent var	1.918788
S.E. of regression	0.850237	Akaike info criterion	2.685383
Sum squared resid	18.07259	Schwarz criterion	2.962929
Log likelihood	-35.62344	Hannan-Quinn criter.	2.775856
F-statistic	25.55799	Durbin-Watson stat	1.687097
Prob(F-statistic)	0.000000		

Dependent Variable: LOGEXMEAT short run
Method: Least Squares
Date: 12/25/22 Time: 12:52
Sample (adjusted): 1992 2021
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.240366	4.079538	0.549171	0.0582
D(LOGFDI)	0.121396	0.131977	0.919824	0.0472
D(LOGINFLATION)	0.132648	0.146255	0.906962	0.0338
D(LOGREER)	2.219388	0.652881	3.399375	0.0025
D(LOGROAD)	0.935842	0.465177	2.011798	0.0561
D(LOGTOP)	0.014568	0.173365	-0.084031	0.0338
RESID01(-1)	-0.421313	0.266526	1.580758	0.0276

R-squared	0.825502	Mean dependent var	20.07909
Adjusted R-squared	0.779981	S.D. dependent var	1.790158
S.E. of regression	0.839695	Akaike info criterion	2.689408
Sum squared resid	16.21702	Schwarz criterion	3.016354
Log likelihood	-33.34112	Hannan-Quinn criter.	2.794001
F-statistic	0.467717	Durbin-Watson stat	1.126884
Prob(F-statistic)	0.000000		

Dependent Variable: LOGEXFRUIT long run
Method: Least Squares
Date: 12/25/22 Time: 13:28
Sample: 1991 2021
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-35.42135	32.39959	-1.093266	0.0384
LOGFDI	-0.041619	0.242500	-0.171623	0.0451
LOGINFLATION	0.330474	0.206269	1.602150	0.0127
LOGROAD	0.740871	0.716478	1.034046	0.0110
LOGTOP	0.006510	0.226772	0.028709	0.0573
LOGGDP	1.770511	1.136496	1.557868	0.0018

R-squared	0.788078	Mean dependent var	20.10834
Adjusted R-squared	0.333693	S.D. dependent var	1.637143
S.E. of regression	1.232005	Akaike info criterion	3.427148
Sum squared resid	37.94590	Schwarz criterion	3.704694
Log likelihood	-47.12080	Hannan-Quinn criter.	3.517621
F-statistic	5.594963	Durbin-Watson stat	1.033887
Prob(F-statistic)	0.001359		

Dependent Variable: D(LOGEXFRUIT) short run
Method: Least Squares
Date: 12/25/22 Time: 13:31
Sample (adjusted): 1992 2021
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.533712	0.350236	1.523863	0.0412
D(LOGFDI)	-0.312133	0.169489	-1.841612	0.0585
D(LOGINFLATION)	0.194414	0.130915	1.485038	0.0511
D(LOGROAD)	0.795720	0.758894	1.048526	0.0053
D(LOGTOP)	0.019257	0.245727	-0.078369	0.0382
D(LOGGDP)	-4.702463	4.174375	-1.126507	0.0016
RESID01	-0.946649	0.364522	2.596958	0.0161

R-squared	0.764673	Mean dependent var	0.123293
Adjusted R-squared	0.598935	S.D. dependent var	1.180355
S.E. of regression	1.056444	Akaike info criterion	3.148657
Sum squared resid	25.66969	Schwarz criterion	3.475603
Log likelihood	-40.22986	Hannan-Quinn criter.	3.253250
F-statistic	2.200303	Durbin-Watson stat	2.185675
Prob(F-statistic)	0.080043		

Dependent Variable: LOGEXBEVERAGE long run
Method: Least Squares
Date: 12/25/22 Time: 13:36
Sample: 1991 2021
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.820091	4.673706	1.673210	0.0063
LOGFDI	0.522459	0.089494	5.837932	0.0000
LOGINFLATION	0.441818	0.229147	1.928103	0.0548
LOGROAD	0.330940	0.444411	-0.744672	0.0031
LOGTOP	-0.314287	0.251848	-1.247925	0.0232

R-squared	0.641364	Mean dependent var	16.90906
Adjusted R-squared	0.586190	S.D. dependent var	2.135456
S.E. of regression	1.373698	Akaike info criterion	3.619580
Sum squared resid	49.06322	Schwarz criterion	3.850868
Log likelihood	-51.10349	Hannan-Quinn criter.	3.694974
F-statistic	11.62425	Durbin-Watson stat	1.547670
Prob(F-statistic)	0.000015		

Dependent Variable: D(LOGEXBEVERAGE) short run
Method: Least Squares
Date: 12/25/22 Time: 13:40
Sample (adjusted): 1992 2021
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.178825	0.300802	0.594493	0.0077
D(LOGFDI)	0.032180	0.248506	0.129495	0.0180
D(LOGINFLATION)	0.561435	0.189429	2.963831	0.0068
D(LOGROAD)	0.467772	1.162331	0.402443	0.0509
D(LOGTOP)	0.026125	0.361612	0.072247	0.0330
RESID01(-1)	-0.086236	0.542782	-0.158878	0.0451

R-squared	0.580160	Mean dependent var	0.152612
Adjusted R-squared	0.430193	S.D. dependent var	1.695307
S.E. of regression	1.581102	Akaike info criterion	3.930977
Sum squared resid	59.99718	Schwarz criterion	4.211217
Log likelihood	-52.96466	Hannan-Quinn criter.	4.020628
F-statistic	1.868144	Durbin-Watson stat	2.799991
Prob(F-statistic)	0.00591		

Annex 2

Heteroskedasticity Test Results

Export of leather and leather products

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.778044	Prob. F(6,24)	0.5951
Obs*R-squared	5.047957	Prob. Chi-Square(6)	0.5377
Scaled explained SS	3.243645	Prob. Chi-Square(6)	0.7777

Heteroskedasticity Test: Harvey

F-statistic	0.837577	Prob. F(6,24)	0.5532
Obs*R-squared	5.367334	Prob. Chi-Square(6)	0.4976
Scaled explained SS	5.292423	Prob. Chi-Square(6)	0.5069

Heteroskedasticity Test: White

F-statistic	0.832482	Prob. F(26,4)	0.6660
Obs*R-squared	26.16466	Prob. Chi-Square(26)	0.4541
Scaled explained SS	16.81252	Prob. Chi-Square(26)	0.9146

Export of meat& meat products

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.620645	Prob. F(6,24)	0.7119
Obs*R-squared	4.163920	Prob. Chi-Square(6)	0.6545
Scaled explained SS	1.399329	Prob. Chi-Square(6)	0.9659

Heteroskedasticity Test: Harvey

F-statistic	2.087911	Prob. F(6,24)	0.0925
Obs*R-squared	10.63177	Prob. Chi-Square(6)	0.1004
Scaled explained SS	15.85729	Prob. Chi-Square(6)	0.0145

Heteroskedasticity Test: White

F-statistic	4.970723	Prob. F(26,4)	0.0646
Obs*R-squared	30.06934	Prob. Chi-Square(26)	0.2647
Scaled explained SS	10.10511	Prob. Chi-Square(26)	0.9978

Export of fruit and vegetable products

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.114288	Prob. F(6,24)	0.3834
Obs*R-squared	6.754203	Prob. Chi-Square(6)	0.3442
Scaled explained SS	5.389121	Prob. Chi-Square(6)	0.4950

Heteroskedasticity Test: Harvey

F-statistic	1.743849	Prob. F(6,24)	0.1539
Obs*R-squared	9.411688	Prob. Chi-Square(6)	0.1517
Scaled explained SS	8.108817	Prob. Chi-Square(6)	0.2302

Heteroskedasticity Test: White

F-statistic	7.724670	Prob. F(26,4)	0.0297
Obs*R-squared	30.39465	Prob. Chi-Square(26)	0.2516
Scaled explained SS	24.25163	Prob. Chi-Square(26)	0.5616

Export of beverage products

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.512037	Prob. F(6,24)	0.2167
Obs*R-squared	8.503781	Prob. Chi-Square(6)	0.2035
Scaled explained SS	8.800491	Prob. Chi-Square(6)	0.1851

Heteroskedasticity Test: Harvey

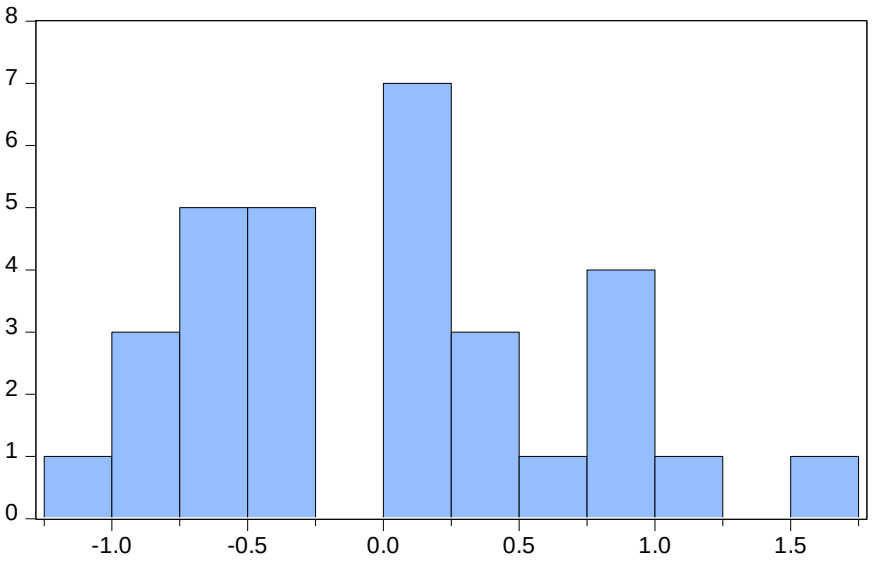
F-statistic	1.761094	Prob. F(6,24)	0.1501
Obs*R-squared	9.476309	Prob. Chi-Square(6)	0.1485
Scaled explained SS	12.19737	Prob. Chi-Square(6)	0.0577

Heteroskedasticity Test: White

F-statistic	0.785361	Prob. F(26,4)	0.6942
Obs*R-squared	25.92207	Prob. Chi-Square(26)	0.4674
Scaled explained SS	26.82653	Prob. Chi-Square(26)	0.4185

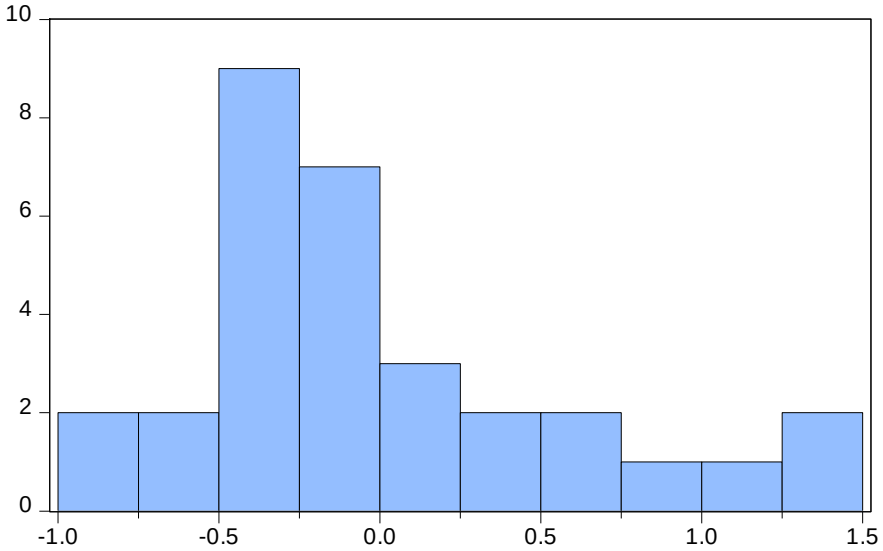
Annex 3

Normality test



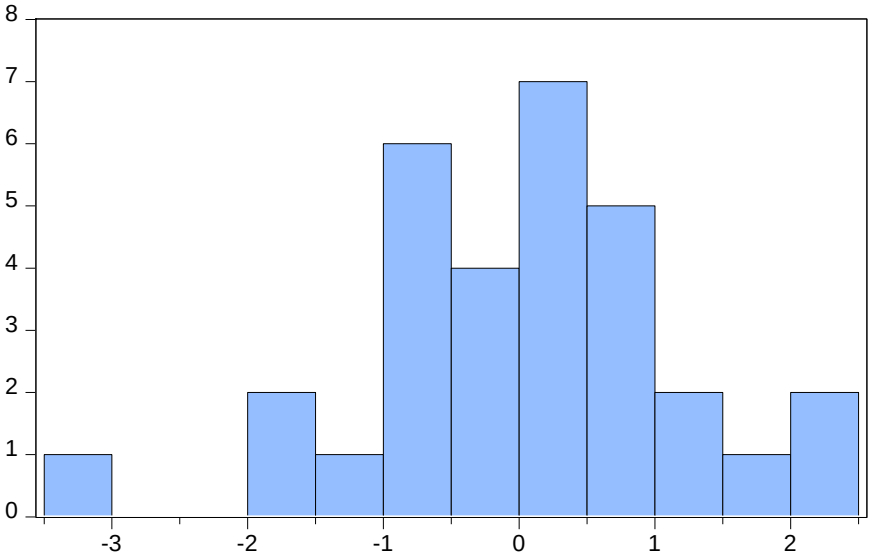
Series: Residuals	
Sample 1991 2021	
Observations 31	
Mean	-8.95e-15
Median	0.011351
Maximum	1.506023
Minimum	-1.004586
Std. Dev.	0.681024
Skewness	0.339160
Kurtosis	2.121368
Jarque-Bera	1.591479
Probability	0.451247

Meat and meat products



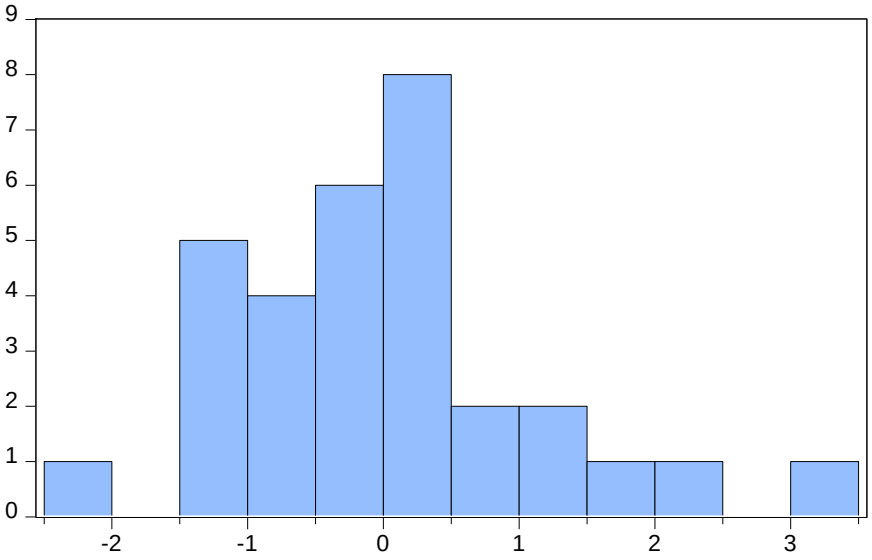
Series: Residuals	
Sample 1991 2021	
Observations 31	
Mean	1.03e-14
Median	-0.189120
Maximum	1.406801
Minimum	-0.939889
Std. Dev.	0.594024
Skewness	0.871087
Kurtosis	3.144117
Jarque-Bera	3.947252
Probability	0.138952

Leather and leather products



Series: Residuals	
Sample 1991 2021	
Observations 31	
Mean	-3.78e-15
Median	0.075483
Maximum	2.256166
Minimum	-3.082971
Std. Dev.	1.113312
Skewness	-0.305326
Kurtosis	3.662409
Jarque-Bera	1.048423
Probability	0.592022

Fruit and vegetable products

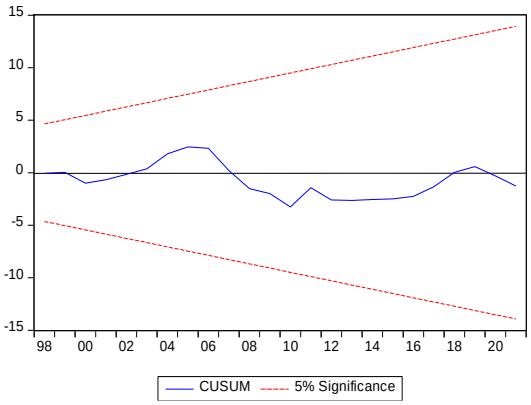


Series: Residuals	
Sample 1991 2021	
Observations 31	
Mean	-1.75e-14
Median	-0.043453
Maximum	3.321362
Minimum	-2.353759
Std. Dev.	1.106372
Skewness	0.741008
Kurtosis	4.453232
Jarque-Bera	5.564827
Probability	0.061889

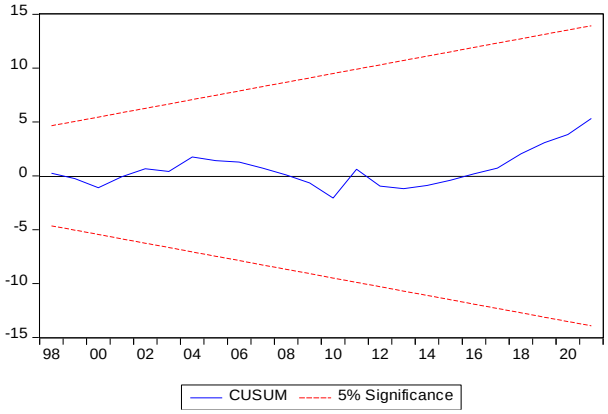
Beverage products

Annex 4

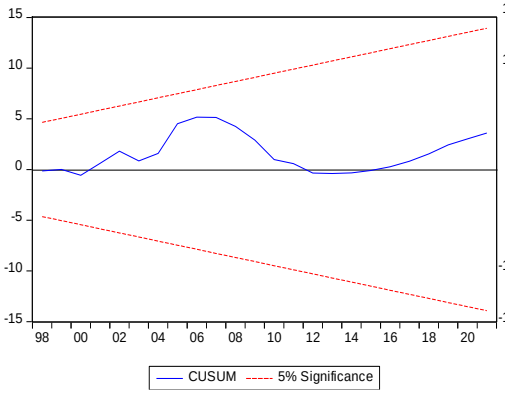
Stability test



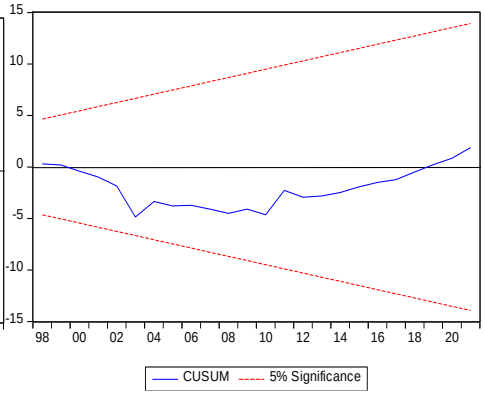
Stability test for leather



stability test for meat



Stability test for fruits& vegetables



stability test for beverage