


# The Impact of Agricultural product exports on the economic growth of Ethiopia:

**A Thesis Submitted to the Department of Economics**

**Presented in Partial Fulfillment of the Requirements for the Degree of Master of Science (MSc) in Economics**

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## Declaration

I, Yohannes Alene, hereby declare that this research paper, entitled *"The Impact of Agricultural Product Export on the Economic Growth of Ethiopia"* is my original work. It is submitted in partial fulfillment of the requirements for the award of the Master of Science degree in Economics at Addis Ababa University. To the best of my knowledge, this work has not been submitted for the award of any degree or similar qualification at any other institution of higher learning, and all sources and references used have been appropriately acknowledged.

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# Approval of the Thesis by the Examiners

## Addis Ababa University

### College of Business and Economics

#### Department of Economics

This is to certify that the research thesis presented by Yohannes Alene, entitled *"The Impact of Agricultural Product Export on the Economic Growth of Ethiopia"*, submitted in partial fulfillment of the requirements for the award of the Master of Science (MSc) degree in Economics, complies with the regulations of the University and meets the acceptable standards regarding originality and quality.

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# *Abstract*

*This study investigates the impact of agricultural product exports on the economic growth of Ethiopia using annual time series data from 1990 to 2023. The Autoregressive Distributed Lag (ARDL) modeling approach was employed to examine both short-run and long run dynamics between agricultural exports and real gross domestic product (RGDP), while controlling for key macroeconomic variables such as foreign direct investment (FDI), inflation, government expenditure, and gross capital formation. The empirical findings indicate that in the short run, agricultural product exports and gross capital formation have a positive and significant effect on economic growth, suggesting that enhancing export-oriented agricultural activities and capital accumulation can stimulate immediate economic performance. Conversely, FDI, inflation, and government expenditure negatively influence economic growth in the short run, reflecting potential inefficiencies, macroeconomic instability, or crowding-out effects in the Ethiopian context. In the long run, foreign direct investment play a vital role in sustaining economic growth, agricultural product export has inverse relations that highlighting the importance of export diversification and value addition in the agricultural sector. These results have important policy implications, emphasizing the need for supportive measures to strengthen agricultural export competitiveness, improve capital investment efficiency, and maintain macroeconomic stability.*



***Keywords:*** *Agricultural exports, Economic growth, ARDL, Ethiopia, Time series*

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## List of acronyms

ADF: Augmented Dickey-Fuller

AfCFTA: African Continental Free Trade Area

ARDL: Autoregressive distributed lag

CPI: Consumer price index

CSA: Central Statistical Agency

ECM: Error Correction Model

ETB: Ethiopian Birr

FDI: Foreign Direct Investment

GDP: Gross Domestic Product

GTP: Growth and Transformation Plan

IMF: International Monetary Fund

MoFEC: Ministry of Finance and Economic Corporation

MOFED: Ministry of Finance and Economic Development

NBE: National Bank of Ethiopia

RGDP: Real Gross Domestic Product

USD: United States' Dollar

WB: World Bank

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# CHAPTER ONE

# 1. INTRODUCTION

## 1.1 Background of the study

The relationship between agricultural product exports and economic growth has garnered significant scholarly attention due to the vital role agriculture plays in developing and emerging economies. Agriculture often constitutes a substantial portion of gross domestic product (GDP), employment, and income for a large segment of the population, especially in developing countries. Exporting agricultural products can generate foreign exchange earnings, enhance domestic productivity, and stimulate related sectors such as transportation, processing, and retail, thereby fostering overall economic development. Historically, many nations have relied on agricultural exports as a primary driver of economic growth. For instance, countries rich in natural resources or with favorable climatic conditions often experience a positive correlation between agricultural export expansion and economic indicators such as GDP growth, employment rates, and income levels. Moreover, the integration into global markets exposes domestic producers to international standards and demand, encouraging technological advancement, modernization, and increased efficiency within the agricultural sector.

Agriculture remains the backbone of Ethiopia's economy, contributing approximately 32% to the Gross Domestic Product (GDP), employing over 75% of the population, and serving as a primary source of livelihood for the majority of Ethiopians (World Bank, 2022). Despite its significant role, the sector faces numerous challenges, including low productivity, limited access to modern technology, and vulnerability to climate change. To catalyze economic development, Ethiopia has increasingly focused on expanding agricultural exports, aiming to access international markets, generate foreign exchange, and stimulate economic growth.

In recent years, Ethiopia has made concerted efforts to diversify and enhance its agricultural exports, particularly in coffee, flowers, sesame seeds, and livestock products. According to the Ethiopian Ministry of Trade and Industry (2023), agricultural exports accounted for about 45% of the country's total export earnings in 2022, with notable growth observed in sectors like flowers and coffee.

This trend aligns with Ethiopia's Growth and Transformation Plan (GTP II), which emphasizes export-led growth as a strategic objective. Studies suggest that export expansion in agriculture can positively influence economic growth by generating foreign exchange, increasing employment opportunities, and fostering technological advancements (Alemayehu & Tadesse, 2021). However, the extent and nature of this impact is complex, influenced by factors such as infrastructure, trade policies, global market conditions, and domestic productivity levels. Some scholars argue that over-reliance on agricultural exports may expose the economy to external shocks and commodity price volatility.

Given Ethiopia's strategic push towards export-led growth, understanding the relationship between agricultural product exports and overall economic performance is critical. While previous research has examined this linkage, recent data and evolving market dynamics warrant an updated analysis. This study aims to explore the impact of agricultural product exports on Ethiopia's economic growth using recent data from national and international sources, providing insights that can inform policy decisions to optimize the benefits of agricultural exports for sustainable development.

In the world, there is no one nation, which is in a state of autarky and self-sufficient. One country has to trade with many other countries in order to enjoy goods and services with a comparative advantage in its production. This is the case with Ethiopia where a majority of her labor force is employed in the agricultural sector while few others are employed in the manufacturing and service sectors. With the large labor force and other favorable natural conditions, it gives her a comparative advantage in the specialization of agricultural products. Such as coffee, oil seed, pulse, hide and skin, live animal, fruits and vegetables. Ethiopia can enjoy comparative advantage by exporting these products to countries like China, Saudi Arabia, Netherlands, Germany, Switzerland, etc. However, the foreign trade performance of Ethiopia is not still strong. Because few agricultural commodities are highly affected by, weather fluctuation and price instabilities in the global market. On the other hand, her dependencies on imported goods are continued substantial. Thus, the foreign trade sector registered an increase in the trade gap; it is rise to19.7 percent of the country's GDP in 2005-2009 from 10.1 percent in1992-2000 (MOFED, 2010).

Ethiopia's economy has long been dependent on agriculture, which plays a crucial role in providing employment, food security, and export revenues. Despite its significance, the relationship between agricultural product exports and overall economic growth in Ethiopia remains inadequately explored. While agricultural exports have the potential to stimulate economic development by increasing foreign exchange earnings and creating jobs, the actual impact of these exports on GDP growth, rural development, and poverty alleviation is not clearly understood.

## 1.2 Statement of the problem

Ethiopia, endowed with diverse climatic conditions and vast arable land, has emerged as one of Africa's fastest-growing economies, largely driven by its agricultural sector. This study explores the relationship between agricultural product exports and economic growth in Ethiopia, emphasizing how exports contribute to national income, employment, and foreign exchange earnings. Utilizing a combination of econometric analyses and qualitative insights, the research examines agricultural product exports, including coffee, pulses, and oilseeds …and their effects on GDP growth over the past three decades. Findings indicate that agricultural exports significantly enhance economic performance by increasing national revenue and stimulating rural development. However, challenges such as market access, quality control, and infrastructural deficits hinder the full potential of this sector. The study underscores the need for strategic policies to optimize agricultural productivity and promote sustainable export practices, ultimately paving the way for inclusive economic growth. Through a comprehensive understanding of these dynamics, policymakers can better harness agriculture as a driver of economic transformation in Ethiopia.

However, the impact of agricultural exports on economic growth is complex and influenced by various factors including the diversity of export commodities, market stability, price volatility, government policies, infrastructure, and access to technology. In recent years, the global push towards diversification and sustainable development has further emphasized the importance of understanding how agricultural exports influence broader economic outcomes and requires further efforts to get reasonable facts about the issues raised, as a result, scientific research needs to analyze the extent to which agricultural product exports contribute to economic growth, considering both the potential benefits and challenges faced by exporting countries.

By examining empirical evidence across different contexts, this study seeks to provide insights into policy measures that can maximize the positive impacts of agricultural exports while mitigating associated risks. Understanding this dynamic is crucial for policymakers aiming to promote sustainable economic development, improve food security, and reduce poverty through strategic enhancement of agricultural export activities.

**Justification of the Study:** The knowledge of exports is crucial because it is the main creator of employment and affects the growth and development of the Ethiopian economy. The study will be a valuable source of information for policy makers in international trade, as they need such information in formulating policies. Policy makers, economists and other interested groups need information on the precise factors that affect exports, the contribution of exports from different sectors to economic growth (GDP) in all countries because it contributes to poverty reduction and job creation.

## 1.3 Research Questions

i. What is the trend of agricultural product exports in Ethiopia?
ii. What is the impact of agricultural product exports on economic growth in Ethiopia?
iii. What policies have been implemented to promote agricultural exports, and how effective have they been in stimulating economic growth?

## 1.4 Objective of the study

### 1.4.1 General objective

The general objective of the study is to examine the impact of agricultural products export on economic growth in Ethiopia.

### 1.4.2 Specific objectives

The specific objectives of the study are:

- To assess the trend of agricultural export in Ethiopia
- To assess the contribution of agricultural products export on economic growth
- To investigate policy measures and strategies that can enhance the positive impact of agricultural exports on Ethiopia's economic growth
- To analyze the empirical relationship between agricultural product export and economic growth using econometric data

## 1.5 Hypothesis of the study

Based on different theoretical and empirical literature review; this study hypothesizes that there will be a positive and significant relationship between agricultural products export and economic growth in Ethiopia.

## 1.6 Significance of the study

The knowledge of exports is highly important. Because export is the main source of income and foreign exchange earnings. It also contributes a lot to the growth and development of a particular economy. Therefore, this paper will add some information about the impacts of agricultural product export on economic growth in Ethiopia and will provide relevant information about the agricultural products to foreign and local potential investors who want to invest their capital in the sector. The findings of this research will also serve as a reference material to other researchers who want to conduct further study in the area.

## 1.7 Scope of the study

This paper examines the role and impact of agricultural exports on economic growth in Ethiopia by using yearly total exports data from 1990-2023. The scope encompasses an analysis of various agricultural commodities exported by Ethiopia, including coffee, tea, pulses, oilseeds, and other relevant products, over a specified period. The research will focus on key economic indicator GDP growth to assess the contribution of agricultural exports to the country's overall economic performance.

Geographically, the study will consider national level data, with particular attention to agricultural product exports and their roles in income generation and that allows for the identification of trends, patterns, and correlations between export activities and economic growth. Limitations of data availability and the scope of analysis to export oriented agriculture within Ethiopia will be acknowledged. Overall, the study aims to provide insights that can inform policymakers, stakeholders, and development practitioners interested in leveraging agricultural exports to foster sustainable economic growth in Ethiopia.

## 1.8 Organization of the study

The study will be organized in to five chapters. The first chapter deals with introduction. Which includes; background, statement of the problem, objective, hypothesis, significance of the study and scope of the study. The second chapter deals with review of both theoretical and empirical literatures. The third chapter will focus on methodology of the study. The fourth chapter will deals with results and descriptive analysis. The last chapter also contains the conclusion and recommendation.

# CHAPTER TWO

# 2. RELATED LITERATURE REVIEW

This chapter focuses on the related literature review, which is an important in expanding, and building the model specification. Moreover, the bases for formulation of hypothesis testing.

## 2.1. Theoretical literature review

Economic growth is a rise in the ability of an economy to produce goods and services, compared from one year to another. It is conventionally measured as the percent rate of increase in real gross domestic product, or real GDP. Ethiopia's economy is predominantly agrarian, with agriculture accounting for a significant share of gross domestic product (GDP), employment, and export revenues. This literature review explores the theoretical frameworks that explain the relationship between agricultural product exports and economic growth in Ethiopia. It examines various economic theories, empirical findings, and policy implications related to agricultural export performance and growth in the Ethiopian context. Classical economic theories, particularly those proposed by Adam Smith and David Ricardo, emphasize the role of agricultural productivity in economic development. Smith's theory of absolute advantage suggests that countries benefit from specializing in the production of goods they can produce more efficiently. This notion extends to agricultural exports, where Ethiopia's diverse climatic conditions allow for the cultivation of various cash crops such as coffee, flowers, and spices.

Ricardo's theory of comparative advantage further supports the idea that nations should focus on exporting goods for which they have a relative efficiency advantage, potentially leading to increased income from agricultural exports.

### 2.1.1. Theories of economic Growth

Economic theory is a body of knowledge that explains how economies function, focusing on the allocation of resources, production, and consumption. It provides a framework for understanding economic phenomena, interpreting economic behavior, and predicting market trends. Essentially, it is a way of thinking about and modeling economic interactions.

#### 2.1.1.1. Classical theory of economic growth

The Classical Growth Theory says that a country's economic growth will decline due to a rise of population and limited resources. This Theory has an implication of the temporary increase in real GDP per person inevitably leads to a population explosion, which would limit a nation's resources, consequently lowering real GDP. Therefore, the country's economic growth will start to decline. The classical model of growth refuse the importance of potent technical progress could play for the smooth running of an economy. The classical model of growth assumes that total wages do not rise or fall below the subsistence level (Salvador, 2003).

#### 2.1.1.2. The Keynesian theory of economic growth

The Keynesian theory of economic growth assumes households save constant proportion of their income and producers convert these savings into investment. However, unlike other theories of economic growth, the Keynesian theory of economic growth noted that not all savings are transferred into investment. Thus, it is not the level of saving rather level of investment that determines growth. In a special case where all savings are converted into investment, the economy is said to be in the steady state (Salvadori, 2003). Harrod (1936) and Domar (1946) were among the first economists who develop macroeconomic model to formally analyze the problem of growth in the Keynesian framework. They emphasized the relationship between consumption and saving by households and investment decision by entrepreneurs but these behaviors were not theoretically developed.

### 2.1.1.3. Neoclassical growth theories

The Neoclassical Growth Theory is an economic model of growth that shows how a steady economic growth rate results when three economic forces come into play: labor, capital, and technology. The simplest and most popular version of the Neoclassical Growth Model is the Solow-Swan Growth Model. The theory postulates that short-term economic equilibrium is a result of varying amounts of labor and capital that play a vital role in the production process. The theory argues that technological change significantly influences the overall functioning of an economy. Neoclassical growth theory outlines the three factors necessary for a growing economy (Solow, 1957).

### 2.1.1.4. Endogenous growth theories

Endogenous growth theory shows that economic growth is primarily the result of endogenous and not external forces. Endogenous growth theory says that investment in human capital, innovation, and knowledge are an important contributor to economic growth. The theory also focuses on positive externalities and spillover effects of a knowledge based economy, which will lead to economic development. The endogenous growth theory primarily holds that the long run growth rate of an economy depends on policy measures (Lucas, 1998).

## 2.2. Empirical literature review

Ekanayake (1999) assessed the causal relationship between economic growth and export growth by using co-integration and error correction models. The researcher used time series data of eight Asian developing countries from period 1960 to 1997.The results of the study indicate there was a bi-directional causality between economic growth and export growth in all the developing countries included in the analysis except Malaysia.

As cited in (Gilbert, Linyong and Divine, 2013) Dawson (2005) studied the role of agricultural exports to economic growth in less developed countries. The author used a panel data of sixty-two, less developed countries from the period of 1974 to1995. The study provided evidence from less developed countries that supported theory of export led growth. Moreover, show the role of agricultural exports in economic growth.

Victor (2015) analyzed the association between agricultural exports and economic growth in Nigeria using time series data from 1970 to 2012. The study used econometrics methods of johansen co-integration test, Augmented Dickey-fuller (ADF) Unit root test and error correction method (ECM) for empirical analysis. The results of the study indicate that agricultural export has positively to the Nigerian economy.

The association between economic growth and agricultural export in Cameroon, They employs an extended generalized Cobb Douglas production function model, using food and agricultural organization data and World Bank Data from 1975to 2009. The study used economic techniques of Augmented Dickey-Fuller (ADF) Unit root test, Engle and Granger test and error correction All model (ECM) for empirical analysis. The results the study indicate that the agricultural exports have mixed effect on economic growth in Cameroon. Coffee export and banana export has a positive and significant relationship with economic growth. On the other hand, cocoa export was found to have a negative and insignificant effect on economic growth (Gilbert, Linyong and Divine, 2013).

The causal relationship between economic growth and exports in Jordan was done by using the Granger methodology in order to determine the direction of the relationship between the two variables during the period 2000-2012. The study found that there is a causal relationship going from the economic growth to Export, and not vice versa. Based on the outcome of causality tests, the changes in the economic growth help explain the changes that occur in the Export. The study suggested that, the directed effect towards policies that will enhance economic growth such as import substitution industrialization, in order to influence more on exports (Ruba et al. 2014).

Tigist (2015) studied the impact of agricultural export on economic growth of Ethiopia using annual data for the period 1973 to 2013. This study used Unit root tests (ADF and PP tests), a co-integration test (Johansen's procedure and Engle and Granger), Error correction method and Granger-causality tests and the Breusch-Pagan-Godfrey heteroskedasticity test. Agricultural exports trends in Ethiopia have shown increasing patterns over time.

The results of the long run showed a positive and significant association between coffee export and economic growth. Equally, a positive and significant effect is found between oilseed export and economic growth in Ethiopia and a positive but insignificant relationship is found between pulse export and economic growth.

Empirical evidence on the relationship between agricultural product exports and economic growth in Ethiopia presents mixed but generally positive findings. Using time series analyses, Getahun (2014) and Yifru (2015) reported that agricultural exports, particularly coffee, oilseeds, and pulses, exert a significant positive impact on Ethiopia's gross domestic product (GDP) in the long run. Similar results are echoed in cross country studies, which found that agricultural exports contribute to economic growth in low income economies, including Ethiopia, though the magnitude and statistical significance of the relationship vary across models and commodity types (Chanie, 2021; Hailu, 2018). However, other studies caution that the benefits of agricultural export expansion may be offset by potential trade-offs, such as vulnerability to international price fluctuations, terms-of-trade shocks, and adverse effects on domestic food security (Samuel, 2019).

More recent analyses employing autoregressive distributed lag (ARDL) models emphasize that outcomes are highly sensitive to methodological choices, including the study period, the export commodities considered, and the inclusion of control variables such as investment, exchange rate, and labor force (Abate, 2020). Overall, the empirical literature converges on the view that agricultural exports can foster long-run economic growth in Ethiopia, but complementary policies are necessary to ensure sustainable and inclusive development. Ethiopia has long been recognized for its agricultural sector, which plays a pivotal role in the economy. While prior studies have explored the relationship between agricultural product exports and economic growth, they often suffer such notable deficiencies:

Lack of Recent Data: Many studies rely on outdated datasets, failing to capture recent developments in Ethiopia's agricultural sector and global trade dynamics. This is particularly pertinent given the rapid shifts in agricultural practices, international demand, and market conditions.

Limited Scope of Products Considered: Previous studies often focus narrowly on just three agricultural products coffee, pulses, and oilseeds without considering other potentially significant exportable agricultural commodities. This limited scope may overlook important interactions and dependencies among varied agricultural sectors, leading to an incomplete picture of the overall impact of agricultural exports on economic growth.

Neglecting Broader Economic Dynamics: Existing studies frequently fail to account for broader macroeconomic variables that interact with agricultural exports, such as gross capital formation, government expenditure, inflation, and FDI. This oversight can lead to a partial understanding of the true effects of agricultural exports on growth.

## 2.3 Conceptual framework

Most of under developed countries like Ethiopia have only two abundant factors of production labor and land, with little capital. For those countries, the dominance of agriculture is one of the major distinguishing features. In their trade, export tends to be dominated by the primary products. As true for Ethiopia, the balance of payment position is against the developing countries as their export performance is low. The causes of low export performance in Ethiopia start from low investment in export sector in general and the agricultural sector in particular**.**

The main source of export in the country is agricultural commodities and there are different factors, which can affect the competitiveness in international markets and contribution of these commodities to the economic growth.

The main factors are world market price, government policy, level of infrastructure development, availability of financial source and weather condition among others. If the volume and quality of the agricultural product is improved the competitiveness in international market and the share of the international market will increase and the foreign earning generated from agricultural commodities will increase which have high contribution for capital formation and positive impact on economic growth (GDP). The contribution of agricultural export and economic growth has forward and backward relationship.

As the economy grows, it can supply improved agricultural inputs, which incentive agricultural productivity and in turn increase volume and contribution of agricultural product export. In Ethiopia, there is excess and cheap labor force as compared to capital. Due to this, the cost of agricultural product is low and the country can export at low prices. Thus, as the price of Ethiopian export is low, the real exchange rate is low which means the value of Ethiopian birr depreciates. This leads to high demand for Ethiopian export in international markets.

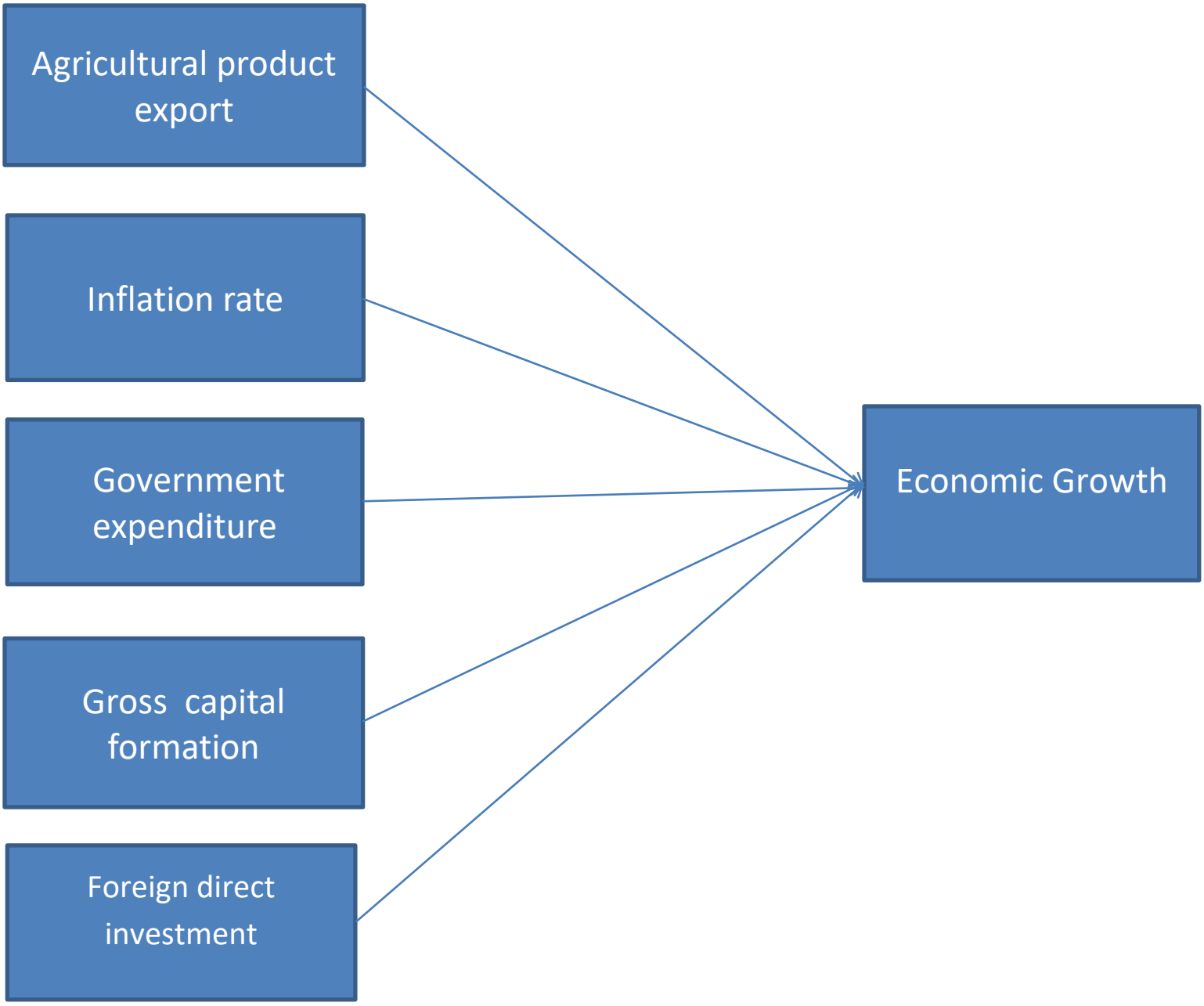



Figure: 2.1 Conceptual framework

Source: own conceptualization

## CHAPTER THREE

# 3. METHODOLOGY

In this chapter, we describe the source and nature of data that captures issues relevant to the study. It comprises of the methodology base on the different work that we have reviewed in the previous chapter. The next step will bring in issues related to the ARDL (autoregressive distributed lag) model. This will equally take into consideration the econometric procedures related to studies using time series data. By using ARDL (autoregressive distributed lag) model, we can describe both stationery and non-stationery variables and their effect on the independent variable in the short run and long run as well. ARDL models are more preferable in many time series contexts because of their flexibility, robustness with mixed data properties, capacity to model short-term and long-term relationships, and suitability for small samples. This makes them a versatile and practical tool for analyzing dynamic economic relationships.

## 3.1 Research design

The research will use both descriptive and econometrics research approach to examine the association of agricultural product export and economic growth in Ethiopia from 1990-2023. Descriptive approach used to depict the trend of agricultural export in Ethiopia and the econometrics approach used to analyses the effect of agricultural product export on economic growth in Ethiopia.

## 3.2. Type and source of data

The study will use Secondary data and time series analysis to describe variables over time. The data will be mainly collected from Central Statistics Agency (CSA), National Bank of Ethiopia (NBE), Ministry of Finance and Economic Development (MOFED).International institutions like International Monetary Fund (IMF) and World Bank (WB) databases are the other source for analyzing the impact of agricultural product export on economic growth. The data covers the period from 1990 to 2023.

## 3.3. Model specification

In this study applied the Solow-Swan production function, an economic model of long-run economic growth set within the framework of neoclassical economics as a base to develop the economic growth model. This model trying to explain long-run economic growth by looking of labor, capital accumulation and technological progress and because of its particularly attractive mathematical characteristics, Solow-Swan shows to be a convenient starting point for various extensions. Therefore, the economy of Ethiopia is labor intensive and the study does not focus on the non-economic variables of the classical growth theory, the following neoclassical production function is used:

$$Y=f(L, K) \quad \ldots\ldots (1)$$

This production function is expanded by adding agricultural export as follows:

$$Y_t = f(Lt, K_t, AGR_t) \quad \ldots\ldots (2)$$

This model can be rewritten by including, government expenditure, inflation and foreign direct investment as control variables as follows:

$$RGDP_t = f(Lt_t, Kt_t, AGR_t, GE_t, INF_t, FDI_t, £_t) \quad \ldots\ldots (3)$$

Whereas $RGDP_t$ is the annual real gross domestic product, Lt is labor, Kt is capital, AGRt is agricultural product export, $GE_t$ is government expenditure, $INF_t$ is the consumer price index (inflation), $FDI_t$ is foreign direct investment and $£_t$ is error term.

In order to compute the growth rate we can derive the formula, from equation 2 and 3, equation 4 is derived by taking natural logarithm on both sides of equation 3 in order to discard the differences in the units of measurements for the variables and to minimize the gap between independent variables and dependent variables. It is used to analyze the impact of agricultural exports on economic growth in Ethiopia from 1990 to 2023.

$$LGDP_t = \beta 0 + \beta 1 LCA_t + \beta 2 LAGR_t + \beta 3 LGE_t + \beta 4 LINF + \beta 5 LFDI_t + £_t \ldots. (4)$$

Where; $LGDP_t$ is natural logarithm of real gross domestic product, $LCA_t$ is natural logarithm of gross domestic fixed capital formation, $LAGR_t$ is natural logarithm of agricultural product export, $LGE_t$ is natural logarithm of government expenditure, $LINF_t$ is natural logarithm of inflation rate, $LFDI_t$ is natural logarithm of foreign direct investment and $£_t$ is error term β0 is the constant term and β1, β2, β3, β4 and β5 are the parameters of independent variables to be estimated. Finally, we can transform this equation to the general autoregressive distributed lag model, which is expressed in the following form.

**Note**: Although labor is considered one of the fundamental factors of production in classical and neoclassical economic growth theories, this study excludes labor force as an explicit explanatory variable because the Ethiopian economy is predominantly labor-intensive, particularly within the agricultural sector. Agriculture remains the backbone of Ethiopia's economy and employs a substantial proportion of the country's population. Since agricultural production activities such as cultivation, harvesting, processing, and transportation rely heavily on human labor, changes in agricultural product exports are assumed to indirectly reflect variations in labor utilization. In this context, agricultural exports embody the productive contribution of labor because higher export performance generally requires increased labor participation across the agricultural value chain. Therefore, the inclusion of agricultural product export in the model is considered sufficient to capture much of labor's economic contribution to real gross domestic product.

Furthermore, the structure of Ethiopia's economy during the study period demonstrates that labor is highly concentrated in low-productivity agricultural activities rather than in advanced industrial or technology-driven sectors. Unlike developed economies where labor productivity significantly differs across sectors and strongly influences growth independently, the Ethiopian labor force is largely characterized by traditional farming practices and subsistence agricultural production. Consequently, labor does not operate as a separate and highly dynamic macroeconomic determinant independent of agricultural output and exports. For this reason, incorporating labor as an additional explanatory variable could create redundancy within the model because its influence is already embodied in agricultural export performance. Thus, omitting labor helps maintain model parsimony while still preserving the theoretical relationship between production factors and economic growth.

General Model Structure

$$yt = B0 + \beta 1x1t + \beta 2x2t + \beta 3x3t + \beta 4x4t + \beta 5x5t + \varepsilon t$$

Where: $yt =$ Dependent variable

$B0 =$ Intercept term

x1, x2, x3, x4 and x5 are independent variables

$\beta 1, \beta 2, \beta 3, \beta 4, \beta 5\ are\ cofficients\ of$ Independent variables

εt: Error term

In our case the general form becomes

$$rgdpt = \beta 0 + \beta 1agret + \beta 2inft + \beta 3get + \beta 4gcft + \beta 5fdit + \varepsilon t$$

Where: β0= Intercept

β1, β2, β3, and β4 = Coefficients of independent variable

$rgdp_t$= real gross domestic product at time t

$agre_t$= agricultural product export at time t

$inf_t$= inflation rate at time t

$ge_t$= government expenditure at time t

$gcf_t$= gross capital formation at time t

$fdi_t$= foreign direct investment at time t

$\varepsilon_t$= Error term at time t

We can transform the above equation to natural logarithm forms and we can deal with growth rate.

$$lnrgdpt = \beta 0 + \beta 1lnagret + \beta 2inft + \beta 3lnget + \beta 4lngcft + \beta 5lnfdit + \varepsilon t$$

Where:

$\beta 0$= Intercept

$\beta 1$, $\beta 2$, $\beta 3$, and $\beta 4$ = Coefficients measuring the elasticity of each independent variable with respect to rgdp

$lnrgdp_t$= Natural logarithm of real gross domestic product at time t

$lnagre_t$= Natural logarithm of agricultural export at time t

$inf_t$= inflation rate at time t

$lnge_t$= Natural logarithm of government expenditure at time t

$lngcf_t$= Natural logarithm of gross capital formation at time t

$lnfdi_t$= Natural logarithm of foreign direct investment at time t

$\varepsilon t$= Error term at time t

In ARDL (Autoregressive Distributed Lag) models, lagged variables are included to capture the dynamic nature of relationships between economic variables over time. Economic effects are rarely instantaneous policy changes, investment decisions, or external shocks often take time to influence the dependent variable. By including lagged values of the dependent and independent variables, the ARDL model accounts for these delayed effects. Lagged dependent variables also capture the inertia or persistence commonly found in macroeconomic series, such as GDP or inflation, where current values are influenced by past values. Including these lags improves model accuracy and helps avoid omitted variable bias, which can lead to incorrect conclusions.

Additionally, the flexibility of ARDL models to assign different lag lengths to each variable makes them particularly useful when working with small datasets or when the variables have different orders of integration I(0) and I(1). Moreover, lagged variables are essential for distinguishing between short-run and long run effects, especially when transforming ARDL models into Error Correction Models (ECMs) in the presence of co-integration.

The general form of the ARDL model with lagged variables can be written as follows:

$yt = \beta 0 + \beta 1yt - 1 + \beta 2yt - 2 + \beta 3x1t + \beta 4x1t - 1 + \beta 5x1t - 2 + \beta 6x2t + \beta 7x2t - 1 + \beta 9x2t - 2 + \beta 8x3t + \beta 9x3t - 1 + \beta 10x3t - 2 + \beta 11x4t + \beta 12x4t - 1 + \beta 13x4t - 2 + \beta 14x5t + \beta 15x5t - 1 + \beta 16x5t - 2 + \varepsilon t$ Where:

yt: Dependent variable at time t

x1t, x2t, x3t, x4t and x5t are independent variables at time t

yt-1 and yt-2 are lagged dependent variables

x1t-1, x1t-2, x2t-1, x2t-2, x3t-1, x3t-2, x4t-1, x4t-2, x5t-1 and x5t-2 are independent lagged variables

β0: Intercept

β1 to β16 are Coefficients

εt: Error term

## 3.4. Definition of variables

In this, study the variables considered as independent and dependent have the following contextual meaning and sign.

**Gross Domestic Product (GDP):** Gross Domestic Product (GDP) refers to the total monetary value of all goods and services produced within the country's borders over a specific period, usually a year. It serves as a critical indicator of the country's economic performance and overall health. Ethiopia's GDP is significantly influenced by its agricultural sector, which employs a large portion of the population and contributes substantially to national income. This sector includes crops, livestock, and agro-processing industries. In recent years, Ethiopia has also seen growth in other sectors, such as manufacturing and services, as part of its efforts to diversify the economy and reduce reliance on agriculture. The Ethiopian government focuses on enhancing GDP through various development strategies aimed at improving infrastructure, attracting foreign investment, and fostering industrialization. Additionally, GDP helps in assessing the effectiveness of policies and initiatives aimed at promoting economic growth, reducing poverty, and improving living standards for the population. It is dependent variable since the study is looking at the relationship between the real GDP and agricultural export in Ethiopia. It is defined as the sum of gross value added by all resident producers in the economy.

**Gross Domestic Capital Formation (GCA)**: Capital formation is a fundamental driver of economic growth. In Ethiopia, increased investment in both public and private sectors has catalyzed economic expansion. The government has actively pursued an ambitious development agenda, including the Growth and Transformation Plans (GTP I and II), which emphasize the importance of infrastructure development, industrialization, and agricultural modernization. Through substantial investments in roads, energy, and telecommunications, Ethiopia has witnessed improved connectivity and access to markets, fostering trade and attracting foreign direct investment (FDI). For instance, the construction of the Grand Ethiopian Renaissance Dam is expected to provide renewable energy and facilitate industrial development, which will significantly boost economic productivity. The rise in capital formation has allowed for the diversification of the economy, reducing reliance on agriculture and promoting manufacturing and services.

Gross fixed capital formation includes land improvements(fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, commercial and industrial buildings. The neoclassical theory, stipulates that an increase in capital as an input in production lead to increases in output.

**Government Expenditure**: refers to the total amount of money spent by the government on goods and services that are used for providing public services, infrastructure, and social programs. Increased government spending in infrastructure (like transportation, energy, and telecommunications) is crucial for improving connectivity and access to markets. In Ethiopia, significant investments in roads and energy generation have been made, which can enhance productivity and stimulate economic activities. Investment in health, education, and other social services can improve human capital. A healthier, more educated workforce is generally more productive, leading to higher economic growth over time. Government projects often create jobs directly (through public employment) and indirectly (by enabling private sector growth). In a developing country like Ethiopia, where unemployment can be a challenge, job creation is essential for economic stability and growth. When the government spends money, it can stimulate demand in the economy. This is particularly important during times of economic downturn when private sector investment may be low. Increased demand can lead to higher production, driving economic growth. Well-targeted government expenditure can create a more favorable investment climate, attracting foreign direct investment (FDI). For example, spending on infrastructure and regulatory improvements can make Ethiopia more attractive to foreign businesses. Appropriate levels of expenditure can help stabilize the economy. However, excessive spending without corresponding revenue can lead to budget deficits, inflation, or debt issues, which can negatively affect economic stability. The effectiveness of government expenditure can be hindered by inefficiencies and corruption. If funds are not used effectively, the intended benefits may not materialize. Ethiopia has faced challenges such as climatic shocks affecting agriculture, which is a significant part of its economy. Reliance on external funding and support can also influence the sustainability of government projects. The government must balance investments in infrastructure with other pressing needs, such as health and education, to encourage sustainable economic growth. In general, government expenditure can significantly influence Ethiopia's economic growth by investing in critical areas necessary for development.

The effectiveness of such spending, however, hinges on proper management, prioritization, and the broader economic context in which these expenditures occur.

**Agricultural Product Export (AGR)**: agricultural product exports are include the export of coffee, oilseed, pulse, meat products, leather and leather products, fruits and vegetables only because of top export of Ethiopia. Export expansion is a significant catalyst in improving productivity growth. Therefore, export expansion helps to concentrate investment in agricultural sectors, which in turn increase the overall total productivity of the economy. Additionally, export growth may also relieve the foreign exchange constrain, allowing capital goods to be imported to boost economic growth.

**Consumer price index:** consumer price index is used as proxy for inflation since our data on the six agricultural exports are in terms of their exchange value over the years. Therefore, in order to calculate the effect of inflation a consumer price index is employed. Consumer price index shows the changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specific intervals such as yearly. Therefore, the expected sign of consumer price index is negative relationship with economic growth.

**Foreign direct investment (FDI):** refers to an investment made by a company or individual in one country in business interests or assets located in another country. This typically involves the investor either establishing business operations or acquiring business assets in the foreign country. FDI is characterized by the long-term interest and significant degree of influence that the investor has over the foreign business entity. FDI is often encouraged by countries because it can lead to job creation, technology transfer, and increased productivity. However, it can also raise concerns about local market competition and the control of strategic assets.

## 3.5. Estimation procedure

This section treats methodological issues related to the estimation of our specified model. In order to explore the short run and long run relationship between agricultural exports and economic growth, we need time series econometrics data.

### 3.5.1 Examination of stationary and non-stationary of variables

In this study, time-series data of macroeconomic nature are used for the estimation of the model and thus the data generating processes exhibit trends and volatility, which could result in a non-stationary issue. Stationary in time-series data refers to a stochastic time series that has three characteristics, as described. First, a variable over time has a constant mean. Thus, the expected value of Y at different times is fixed and has an average value. Hence, the data generating process Y is not a trend. Second, the variance of a variable over time is constant. Hence, the data generating process is not stable. Third, the covariance between any two-time periods is correlated. Further, the correlation value is constant and depends on the difference between the times. Thus, the data generating process of RGDP expresses statistically valid joint distribution of RGDP variable values. If one or more of these criteria is violated, then the data generating process of the time-series data is a non-stationary series (Gujarati, 2004).

#### 3.5.1.1. Unit root test

The usage of ARDL methodology on time series data usually requires that the data be stationary to avoid the problem of spurious regression. A variable is said to be stationary if it is mean, variance and auto covariance remains constant no matter at what point we measure them. A unit root test tests whether a time series variable is non-stationary and possesses a unit root. The null hypothesis is generally defined as the presence of a unit root and the alternative hypothesis is either stationary, trend stationary. A commonly used test that is valid in large samples is the augmented Dickey–Fuller test, which is based on linear regression. Serial correlation can be an issue, in which case the Augmented Dickey-Fuller (ADF) test can be used. A process is said to be stationary when it has a constant and time independent mean, a finite and time independent variance, and the covariance between successive terms is time independent (Dickey and Fuller, 1981).

### 3.5.1.2. Cointegration test

Co-integration means economic variables share the same stochastic trend, so they are combined together in the long-term. Even if they deviate from each other in the short-term, they tend to come back to the trend in the long-term. a necessary condition for the co-integration test is that all the variables should be integrated at the same order or should contain a deterministic trend.

### 3.5.1.3 Error correction model (ECM)

In order to analyze the short run relationships of the model, the error correction model has been used. Error correction term included in the model, explains the speed of adjustment towards the long run equilibrium. Initially, if the variables confirm the existence of co integration, then the Error Correction Model (ECM) will be estimated. Granger and Weiss (1983)and Engle and Granger (1991) pointed out that if two variables are co-integrated in first difference, their relationship can be expressed as the ECM by taking past disequilibrium as explanatory variables for the dynamic behavior of current variables. The ECM method corrects the equilibrium error in one period by the next period (Maddala, 1992).

## 3.6. Diagnostic test

### 3.6.1. Hetroskedasticity test

Hetroskedasticity refers to a situation when the variance of the error terms in the model is not constant violating the normality assumption of the classical linear regression model. In the presence of Hetroskedasticity, OLS estimation still gives biased coefficient estimates, which are not BLUE (best linear unbiased estimators). This implies that if we still use OLS in the presence of Hetroskedasticity, our standard error are inappropriate and hence any inference we make could be misleading.

The existence of Hetroskedasticity can be tested using both graphical and formal methods such as Goldfield, Quandft, Breush-pagan and White's general Hetroskedasticity test (Gujarati, 2004).

### 3.6.2. Multi-colliniarity test

The existence of the problem of multi-co linearity is tested using correlation coefficient test and variance inflation factor (VIF). Furthermore, VIF above 10 shows the existence of multi-co linearity (Guajarati, 2004). Among the assumption of classical linear regression model (CLRM) is that there is no perfect co linearity among some or all- explanatory variables. If the explanatory variables are perfectly linearity related to each other, the problem of multi-co linearity will arises. Without considering, the problem of multi-colliniarity will result in a wrong conclusion because it will create so many problems such as large variance and standard errors of OLS estimators, wider confidence intervals, insignificant ratio, and high R2 and so on. Therefore, it is important to deal with this problem using variance inflation factor (VIF) as a detecting mechanism (Gujarati, 2004). However, this is not mandatory in ARDL (auto regressive distributed model) because the inclusion of lags naturally inflates correlations, but that does not invalidate the model. What matters are co-integration, normality, bound test and hetroskedasticity.

### 3.6.3. Autocorrelation test

Autocorrelation occurs when covariance of errors are not zero, covar ($\varepsilon t$, $\varepsilon t$-1) $\neq 0$ covariance of errors are nonnegative. This is mainly a problem observed in time series data. There are several causes, which gives rise to autocorrelation. These are; Omitted explanatory variables: We know in economics one variable is affected by so many variables. The error term represents the influence of omitted variables and because of that, an error term in one period many have a relation with the error terms in successive periods. Misspecification of the mathematical form of the model: It we have adopted a mathematical form, which differs from the true form of the relationship, then the disturbance term is the must be show serial correlation.

The variance of random term u may be seriously underestimated if the ‘u’s are auto correlated. This study will apply Godfrey LM test to detect autocorrelation between the errors in different times (Maddala, 1992).

## CHAPTER FOUR

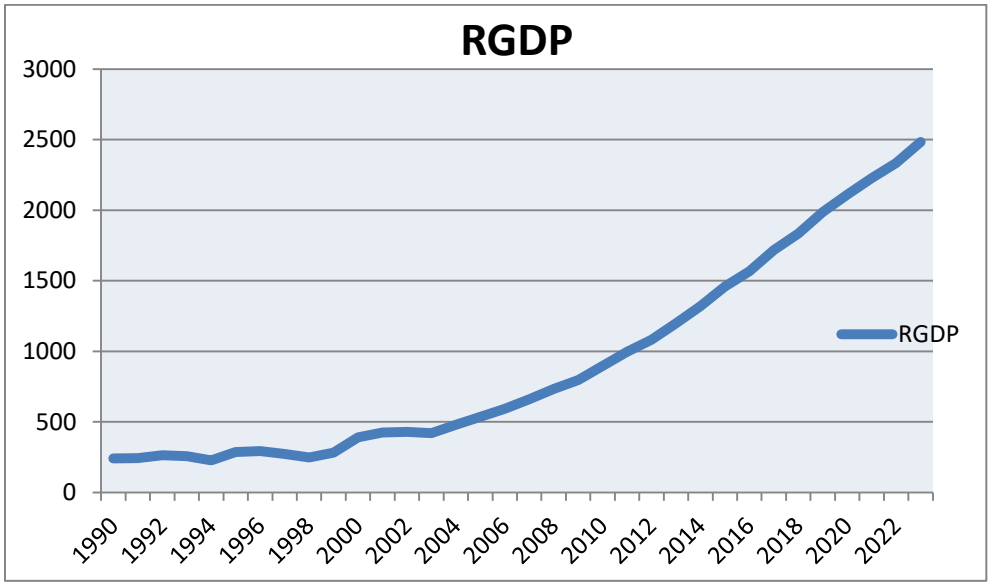
# 4. RESULT AND DISCUSSIONS

This section presents a comprehensive analysis of the trends and impact of agricultural exports on economic growth in Ethiopia over the period 1990 to 2023. The discussion is organized into three main parts. The first part explores the historical trends of agricultural exports and their relationship with macroeconomic performance, highlighting key policy changes, external shocks, and structural transformations that may have influenced the sector. The second part provides an in-depth interpretation of the descriptive and preliminary statistical results, including correlation analysis, summary statistics, and data diagnostics, which lay the foundation for the empirical investigation. The third part presents the findings from the econometric analysis, employing advanced time series techniques such as the ARDL (Autoregressive Distributed Lag) model and Granger causality tests to examine the direction and magnitude of the causal relationship between agricultural exports and real **GDP**. This section also assesses both the short-run dynamics and long-run equilibrium relationships, offering insights into how export performance in the agricultural sector contributes to Ethiopia's broader economic growth trajectory. The analysis aims to provide evidence-based conclusions that can inform policy decisions focused on enhancing export competitiveness and sustaining economic development.

## 4.1 Trends of agricultural exports in Ethiopia

Agriculture remains the backbone of Ethiopia's economy, playing a critical role in employment, livelihoods, and foreign exchange earnings. According to recent data from the Ethiopian Ministry of Trade and Regional Integration (2023), agriculture accounts for approximately **83%** of the country's export earnings. Ethiopia's major agricultural export products today include coffee, oilseeds, pulses, meat, fruits and vegetables, leather and leather goods, flowers, chat, cereals, live animals, cotton, and sugar**.** Among these**,** coffee, oilseeds, pulses, meat products, fruits and vegetables, as well as leather and leather products continue to be the leading contributors to export revenue. These sectors not only support millions of smallholder farmers but also remain central to Ethiopia's trade balance and economic development strategies.

Figure 4.1: Trend of real gross domestic product in Ethiopia in birr from 1990-2023



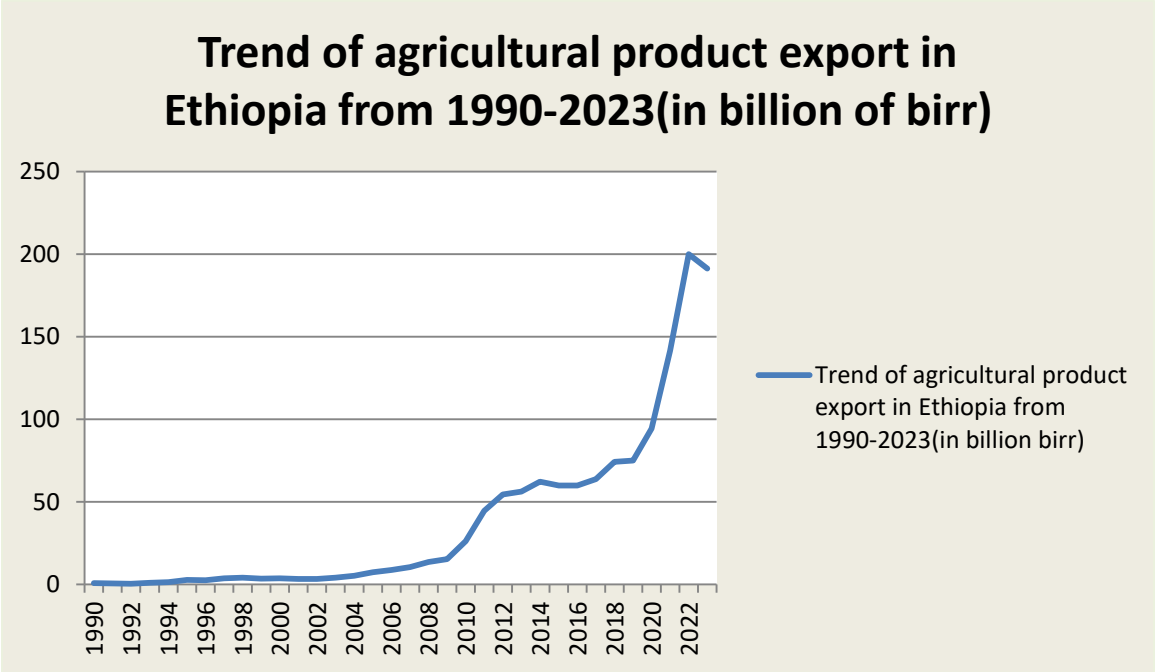

Source: Own computation based on data from NBE

Ethiopia's real gross domestic product (RGDP) has shown a remarkable growth trend over the past three decades, especially following the early 2000s. From the 1990s through the early 2000s, economic growth remained modest, often hampered by political instability, drought, and limited infrastructure. However, beginning in the mid-2000s, Ethiopia experienced one of the fastest-growing economies in Africa. Between 2004 and 2015, the country maintained an average annual RGDP growth rate of around **10%**, driven largely by public infrastructure investment, agricultural expansion, and a rise in services and construction. This period of robust growth significantly reduced poverty and improved access to basic services. However, in more recent years, growth has slowed slightly due to internal conflicts, foreign exchange shortages, and global shocks such as the COVID-19 pandemic and the Russia–Ukraine war.

Despite these challenges, Ethiopia's economy grew by an estimated **6.4% in 2022** and maintained similar momentum in 2023, supported by strong performance in agriculture and services (World Bank, 2023). The long-term trend suggests that while Ethiopia remains

vulnerable to structural and external shocks, its RGDP growth has been consistently positive, reflecting progress in development and economic transformation efforts.

Figure 4.2: Trend of agricultural product export in Ethiopia in birr from 1990-2023




Source: Own computation based on data from NBE

The performance of Ethiopia's agricultural product exports over the past three decades has followed a dynamic and uneven trajectory, reflecting both domestic policy shifts and external economic conditions. From a prolonged period of stagnation in the 1990s to a gradual rise in the 2000s and an extraordinary surge in recent years, the trend reveals how structural challenges, government interventions, and global market forces have shaped the sector's contribution to foreign exchange earnings.

The following analysis breaks down this evolution into three distinct phases early stagnation (1990–2003), gradual rise (2004–2020), and sharp surge (2021–2023) to provide a clearer understanding of Ethiopia's export dynamics and their broader economic implications.

Early Stagnation (1990–2003) the trend of agricultural product export in Ethiopia from 1990 to 2023 indicates that for more than a decade, specifically from 1990 up to the early 2000s, export

performance was very low and nearly stagnant. This period was characterized by limited market access, low productivity in agriculture, and the dominance of subsistence farming. Political transitions and instability during the early 1990s also contributed to weak export growth, as economic policies prioritized stabilization rather than export expansion. The lack of infrastructure, poor transportation networks, and minimal investment in commercial farming further constrained the ability of Ethiopia to benefit from international trade during this period.

Gradual Rise (2004–2020) from the mid-2000s, agricultural exports began to show a noticeable and sustained upward trend. This improvement reflects government efforts to modernize the agricultural sector through commercialization, extension services, and investment in export-oriented crops such as coffee, oilseeds, flowers, and chat. Global demand for Ethiopian coffee, in particular, played a central role in this growth. The graph shows a steady climb between 2004 and 2015, demonstrating Ethiopia's gradual integration into international markets. However, the period between 2016 and 2020 reveals slower growth and mild fluctuations. This stagnation can be linked to domestic challenges such as political unrest, foreign exchange shortages, and global factors such as falling coffee prices. Despite these challenges, exports did not decline drastically but maintained a positive, if modest, growth trajectory.

Sharp Surge (2021–2023) the most striking feature of the graph is the rapid and unprecedented surge in agricultural exports from 2021 onwards. Within just a few years, the value of exports more than doubled, reaching close to 200 billion birr by 2023. This dramatic rise can be explained by multiple factors: global agricultural commodity price increases during the COVID-19 recovery period, supply disruptions due to the Russia–Ukraine war, and the depreciation of the Ethiopian birr, which boosted the competitiveness of Ethiopian products in the global market.

Additionally, stronger emphasis on coffee exports, coupled with expanding horticultural exports, played a significant role in this spike. While this surge highlights the country's capacity to earn substantial foreign exchange from agriculture, it also underscores the vulnerability of the economy to external shocks and price fluctuations, consistent with the Prebisch-Singer hypothesis that commodity-dependent economies face volatile and uncertain export earnings.

## 4.2 Descriptive analysis of the data

**Table 4.1 Descriptive Statistics of Key Variables (1990–2023)**

| Summary statistics | rgdp | agre | inf | ge | gcf | fdi |
|---|---|---|---|---|---|---|
| Mean | 920.4869 | 38.19674 | 12.0092 | 4.021038 | 0.383145 | 1.131361 |
| Median | 626.9694 | 9.571495 | 11.26707 | 3.709822 | 0.337135 | 0.288381 |
| maximum | 2483.725 | 199.995 | 34.66661 | 6.987654 | 1.6538 | 4.259446 |
| minimum | 228.4152 | 0.300267 | -5.75534 | 1.436274 | 0.0021 | 0.00015 |

**Source:** own computation based on data from NBE and WB

Before we proceed to the econometric analysis, the study gives the brief interpretation of statistical analysis. Table 4.1 reports the descriptive statistics and interprets that the average value of real RGDP at market prices is **920.4869** Billion birr. The average value of fixed capital formation is **0.383145** Billion birr. The average value of consumer price index (inflation) is **12.0092** percent and the average value of government expenditure is 4.021038 billion birr. The average value of foreign direct investment is **1.131361 US dollar**. On the other hand, the average value of agricultural product export is **38.19674** billion birr.

From 1990 to 2010, agricultural product**s have** been exported in Ethiopia were below its average export. By 2011, agricultural product export had an increment of **18.41027** birr from its mean export. This could be attributed to many reform programs that have been put in place by the government.

## 4.2 Econometrics analysis

### 4.2.1 Unit root test

First, the regression based on non-stationary time series explains the relation during the study period only. This means that it is impossible to infer about the long run relationship of the variables. In addition, regression of non-stationary time series on the time series stationary time series may lead to spurious regression. In economics, a time series that has a unit root has is known as a random walk, which is an example of non-stationary time series can be stationary by differencing the variables. If the time series is differenced once and the differenced series is integrated of order of one, denoted by I (1). Similarly, if the original time series can be differenced twice before it became stationary the original series is integrated of order two or I (2). In general, if the time series is differenced d times it is integrated of order d or I (d). However, in ARDL model we cannot use above integrated of order one. Among the various method of testing for stationary, augmented ducky-fuller, (ADF) test is used in this study. The Augmented Dickey–Fuller (ADF) unit root test results reveal that the variables in the model exhibit a mixture of stationarity properties, which makes the ARDL bounds testing approach appropriate. The logarithm of real GDP (lrgdp) is found to be stationary at the 5% level when a trend is included, suggesting that the series is integrated of order zero, I(0). Similarly, the logarithm of agricultural product export (lagre) is significant at the 1% level and hence stationary at level. Inflation (inf) rejects the null hypothesis of a unit root at the 5% level, confirming its stationarity at level as well. In contrast, government expenditure (lge) and gross capital formation (lgcf) are non-stationary in levels but become highly stationary after first differencing, implying that they are integrated of order one, I(1). Likewise, foreign direct investment (lfdi) is significant at the 5% level after differencing, also confirming its I(1) nature. These mixed orders of integration, with some variables I(0) and others I(1), but none I(2), satisfy the key precondition for applying the ARDL model.

This ensures that the bounds testing procedure can be validly employed to test for cointegration, and if a long-run relationship exists, the ARDL framework can provide both short-run dynamic adjustments and long-run equilibrium estimates simultaneously.

Table 4.2 ADF test result at level and at order one

```
. dfuller lrgdp,lags(2)trend

Augmented Dickey-Fuller test for unit root

Variable: lrgdp                           Number of obs  = 31
                                          Number of lags =  2

H0: Random walk with or without drift

                                     Dickey-Fuller
                  Test      ──────── critical value ────────
              statistic          1%           5%          10%
──────────────────────────────────────────────────────────────
 Z(t)            -3.547       -4.325       -3.576       -3.226
──────────────────────────────────────────────────────────────
MacKinnon approximate p-value for Z(t) = 0.0347.
```

```
. dfuller lagre,lags(2)trend

Augmented Dickey-Fuller test for unit root

Variable: lagre                           Number of obs  = 31
                                          Number of lags =  2

H0: Random walk with or without drift

                                     Dickey-Fuller
                  Test      ──────── critical value ────────
              statistic          1%           5%          10%
──────────────────────────────────────────────────────────────
 Z(t)            -4.247       -4.325       -3.576       -3.226
──────────────────────────────────────────────────────────────
MacKinnon approximate p-value for Z(t) = 0.0038.
```

```
. dfuller inf,lags(0)

Dickey-Fuller test for unit root          Number of obs  = 33
Variable: inf                             Number of lags =  0

H0: Random walk without drift, d = 0

                                       Dickey-Fuller
                   Test      ──────── critical value ────────
              statistic           1%           5%          10%
──────────────────────────────────────────────────────────────
 Z(t)            -2.952       -3.696       -2.978       -2.620
──────────────────────────────────────────────────────────────
MacKinnon approximate p-value for Z(t) = 0.0397.
```

```
. dfuller dge,lags(0)

Dickey-Fuller test for unit root          Number of obs  = 32
Variable: dge                             Number of lags =  0

H0: Random walk without drift, d = 0

                                       Dickey-Fuller
                   Test      ──────── critical value ────────
              statistic           1%           5%          10%
──────────────────────────────────────────────────────────────
 Z(t)            -5.523       -3.702       -2.980       -2.622
──────────────────────────────────────────────────────────────
MacKinnon approximate p-value for Z(t) = 0.0000.
```

```
. dfuller dgcf,lags(0)

Dickey-Fuller test for unit root          Number of obs  = 32
Variable: dgcf                            Number of lags =  0

H0: Random walk without drift, d = 0

                                       Dickey-Fuller
                   Test      ──────── critical value ────────
              statistic           1%           5%          10%
──────────────────────────────────────────────────────────────
 Z(t)            -6.649       -3.702       -2.980       -2.622
──────────────────────────────────────────────────────────────
MacKinnon approximate p-value for Z(t) = 0.0000.
```

```
. dfuller lfdi,lags(1)

Augmented Dickey-Fuller test for unit root

Variable: lfdi                            Number of obs  = 32
                                          Number of lags =  1

H0: Random walk without drift, d = 0

                                     Dickey-Fuller
                   Test      ──────── critical value ────────
              statistic          1%           5%          10%
──────────────────────────────────────────────────────────────
 Z(t)            -3.194       -3.702       -2.980       -2.622
──────────────────────────────────────────────────────────────
MacKinnon approximate p-value for Z(t) = 0.0204.
```

Since the Augmented Dickey–Fuller test results confirmed that the variables are a mixture of I(0) and I(1), but none are I(2), the data meets the precondition for applying the ARDL bounds testing approach. Having established this, the next step is to determine the appropriate maximum lag length for each variable in the model. Lag length selection is crucial because including too few lags can lead to model misspecification and omitted variable bias, while too many lags may reduce efficiency, especially given the relatively small sample size. To address this, information criteria such as the Akaike Information Criterion (AIC) or the Schwarz Bayesian Criterion (SIC) are used to identify the optimal lag order within a pre-specified maximum lag, often set at two or three for annual data. Once the maximum lag structure is defined, the ARDL model can then be estimated with the chosen lags for both the dependent and independent variables, which provides the basis for conducting the bounds test for cointegration.

Table 4.3 lags length selection

```
.  varsoc lrgdp lagre inf ge gcf lfdi

Lag-order selection criteria

   Sample: 1994 thru 2023                                  Number of obs = 30
```

| Lag | LL | LR | df | p | FPE | AIC | HQIC | SBIC |
|---|---|---|---|---|---|---|---|---|
| 0 | -175.869 | | | | .007428 | 12.1246 | 12.2142 | 12.4048 |
| 1 | -20.0521 | 311.63 | 36 | 0.000 | 2.7e-06 | 4.1368 | 4.76436 | 6.09848 |
| 2 | 39.8294 | 119.76 | 36 | 0.000 | 7.4e-07 | 2.54471 | 3.71017 | 6.18782 |
| 3 | 111.895 | 144.13* | 36 | 0.000 | 1.8e-07 | .14033* | 1.8437* | 5.46488* |
| 4 | . | . | 36 | | .-5.1e-24* | . | . | . |

```
   * optimal lag
   Endogenous: lrgdp lagre inf ge gcf lfdi
    Exogenous: _cons
```

Before estimating the ARDL model, the optimal lag length was determined using the Akaike Information Criterion (AIC). The AIC suggested a lag length of 3, indicating that the model should include up to three lags of the dependent variable (RGDP) as well as up to three lags for each of the independent variables (agricultural product export, inflation, gross capital formation, government expenditure, and foreign direct investment). This selection implies that incorporating three past values of each variable provides the best balance between model fit and parsimony, minimizing information loss while adequately capturing the dynamic relationships among the variables. After specifying the ARDL (3,3,3,3,3,3) model, the next step is to examine whether a long-run relationship exists among the variables using the ARDL Bounds Test. This test determines if the independent variables, including agricultural product export, inflation, gross capital formation, government expenditure, and foreign direct investment, are cointegrated with RGDP. A significant F-statistic exceeding the upper critical bound indicates the presence of a long-run equilibrium relationship. Once cointegration is established, the long-run coefficients can be estimated to assess how each independent variable affects RGDP over time. Subsequently, the short-run dynamics are examined through the Error Correction Model (ECM), which captures both the immediate impact of changes in the independent variables and the speed at which deviations from the long-run equilibrium are corrected. Finally, diagnostic tests are performed to ensure the reliability of the model, including checks for serial correlation, heteroskedasticity, normality of residuals, and overall stability. This comprehensive approach allows for a robust analysis of both the short-run and long run determinants of RGDP.

Due to the relatively small sample size in this study (34 observations), the maximum lag length of 3 suggested by the Akaike Information Criterion (AIC) was not feasible for the bounds (cointegration) test. To ensure the reliability of the test and avoid losing too many degrees of freedom, a smaller lag length of 2 was used for the estimation of the F-statistic and t-statistic in the estat ectest. This adjustment allows for the detection of a long-run relationship among the variables while maintaining sufficient observations for robust inference.

### 4.2.2 Cointegration Test

Table 4.4 Cointegration Test

```
. estat ectest

Pesaran, Shin, and Smith (2001) bounds test

H0: no level relationship                                   F =    11.181
Case 3                                                      t =    -6.581

Finite sample (5 variables, 32 observations, 5 short-run coefficients)

Kripfganz and Schneider (2020) critical values and approximate p-values
```

| | 10% | | 5% | | 1% | | p-value | |
|---|---|---|---|---|---|---|---|---|
| | I(0) | I(1) | I(0) | I(1) | I(0) | I(1) | I(0) | I(1) |
| F | 2.561 | 3.964 | 3.148 | 4.775 | 4.626 | 6.799 | 0.000 | 0.001 |
| t | -2.492 | -3.802 | -2.880 | -4.275 | -3.689 | -5.265 | 0.000 | 0.001 |

The results of the Pesaran, Shin, and Smith (2001) bounds test indicate the presence of a long-run relationship among the variables. The F-statistic for the model is 11.181, and the t-statistic for Case 3 is -6.581. When compared with the finite-sample critical values provided by Kripfganz and Schneider (2020), the F-statistic exceeds the upper bound I(1) critical value at the 1% significance level (6.799), and the associated p-values for both the F- and t-statistics are below 0.01. Since the computed F-statistic is greater than the upper bound and the p-values are highly significant, the null hypothesis of no level relationship is rejected. This confirms that the variables are cointegrated, and a stable long-run equilibrium relationship exists among them. Consequently, it is appropriate to proceed with estimating the long-run coefficients and the associated error correction model for short-run dynamics.

### 4.2.3 Serial correlation test

Table 4.5 **Serial correlation test**

```
. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
```

| lags(*p*) | chi2 | df | Prob > chi2 |
|---|---|---|---|
| 1 | 0.035 | 1 | 0.8515 |

H0: no serial correlation

The Breusch–Godfrey LM test was conducted to check for the presence of serial correlation in the residuals of the estimated model. The test statistic for one lag is 0.035 with a p-value of 0.8515. Since the p-value is much greater than the conventional significance levels (1%, 5%, or 10%), we fail to reject the null hypothesis of no serial correlation. This indicates that the residuals of the model do not exhibit significant autocorrelation, suggesting that the model is correctly specified in terms of capturing the dynamic structure of the data.

### 4.2.4 Hetroskedasticity test

Table 4.6 Heteroskedasticity test

```
. estat hettest

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity
Assumption: Normal error terms
Variable: Fitted values of D.lrgdp

H0: Constant variance

    chi2(1) =   2.85
Prob > chi2 = 0.0913
```

The Breusch–Pagan/Cook–Weisberg test was conducted to examine the presence of heteroskedasticity in the residuals of the model, with the null hypothesis assuming constant variance. The test statistic is 2.85 with a p-value of 0.0913. Since the p-value is greater than the conventional 5% significance level, we fail to reject the null hypothesis.

This indicates that there is no strong evidence of heteroskedasticity in the model, suggesting that the variance of the residuals is approximately constant and that the model satisfies the homoscedasticity assumption.

### 4.2.5 Normality test

Table 4.7 Normality test

```
. sktest res

Skewness and kurtosis tests for normality
                                                   ---- Joint test ----
    Variable |       Obs   Pr(skewness)   Pr(kurtosis)   Adj chi2(2)  Prob>chi2
-------------+--------------------------------------------------------------
         res |        31         0.6343         0.1728          2.26     0.3226
```

The Skewness-Kurtosis test was conducted to assess the normality of the residuals from the estimated model. The test results show that the p-values for skewness and kurtosis are 0.6343 and 0.1728, respectively, and the joint chi-square statistic is 2.26 with a p-value of 0.3226. Since the p-value of the joint test is greater than the conventional 5% significance level, we fail to reject the null hypothesis of normality. This indicates that the residuals are approximately normally distributed, suggesting that the model satisfies the normality assumption.

## Table 4.8 ARDL regression results

```
. ardl lrgdp lagre inf lge lgcf lfdi,maxlags(3)ec

ARDL(3,3,3,1,3,3) regression

Sample:       1993 thru       2023                    Number of obs =     31
                                                      R-squared     = 0.9523
                                                      Adj R-squared = 0.8411
Log likelihood = 80.184117                            Root MSE      = 0.0338
```

| D.lrgdp | Coefficient | Std. err. | t | P>\|t\| | [95% conf. | interval] |
|---|---|---|---|---|---|---|
| ADJ | | | | | | |
| lrgdp | | | | | | |
| L1. | -.6674741 | .1202926 | -5.55 | 0.000 | -.9395949 | -.3953533 |
| LR | | | | | | |
| lagre | -.3825281 | .1335506 | -2.86 | 0.019 | -.6846405 | -.0804156 |
| inf | .0238163 | .007855 | 3.03 | 0.014 | .0060471 | .0415856 |
| lge | 1.702593 | .4842785 | 3.52 | 0.007 | .6070788 | 2.798107 |
| lgcf | -.17247 | .0295804 | -5.83 | 0.000 | -.2393854 | -.1055546 |
| lfdi | .117766 | .0471143 | 2.50 | 0.034 | .0111861 | .224346 |
| SR | | | | | | |
| lrgdp | | | | | | |
| LD. | .3718243 | .1459453 | 2.55 | 0.031 | .0416731 | .7019756 |
| L2D. | .4437722 | .1943533 | 2.28 | 0.048 | .0041144 | .88343 |
| lagre | | | | | | |
| D1. | .5947176 | .0882022 | 6.74 | 0.000 | .3951903 | .794245 |
| LD. | .0050808 | .0469504 | 0.11 | 0.916 | -.1011283 | .11129 |
| L2D. | .1472082 | .0429105 | 3.43 | 0.008 | .0501379 | .2442785 |
| inf | | | | | | |
| D1. | -.0169955 | .0046727 | -3.64 | 0.005 | -.027566 | -.0064251 |
| LD. | -.0039246 | .0029776 | -1.32 | 0.220 | -.0106605 | .0028113 |
| L2D. | -.0052539 | .0019063 | -2.76 | 0.022 | -.0095663 | -.0009416 |
| lge | | | | | | |
| D1. | -1.931117 | .3906195 | -4.94 | 0.001 | -2.814759 | -1.047474 |
| lgcf | | | | | | |
| D1. | .0426119 | .0126065 | 3.38 | 0.008 | .014094 | .0711299 |
| LD. | .0773189 | .0150141 | 5.15 | 0.001 | .0433546 | .1112832 |
| L2D. | .0348799 | .0124832 | 2.79 | 0.021 | .0066408 | .0631189 |
| lfdi | | | | | | |
| D1. | -.1656674 | .0400851 | -4.13 | 0.003 | -.2563463 | -.0749886 |
| LD. | -.0670896 | .0295036 | -2.27 | 0.049 | -.1338314 | -.0003479 |
| L2D. | -.0628347 | .019742 | -3.18 | 0.011 | -.1074944 | -.0181751 |
| _cons | 3.172634 | .6151839 | 5.16 | 0.001 | 1.780991 | 4.564276 |

## 4.3 Interpretation of econometric data

### Short-Run Effects (Immediate Impacts and Significance)

The short-run coefficients capture the immediate response of GDP to changes in explanatory variables. Agricultural exports (Δlagre) have a large positive short-run effect of 0.5947 ($p < 0.001$, 1% significance), showing that a 1% increase in exports raises RGDP by roughly 0.59% in the same period. Inflation (Δinf) has a significant negative effect (-0.0169955, $p = 0.005$, 1% significance), implying that price increases reduce short-term output by about 0.017% per 1% rise. Government expenditure (Δlge) exhibits a strongly negative immediate impact (-1.9311, $p = 0.001$, 1% significance), suggesting that short-term increases in public spending may temporarily disrupt the economy, potentially due to adjustment costs or inefficient allocation. Gross capital formation (Δlgcf) positively affects GDP (0.0426, $p = 0.008$, 1% significance), reflecting the short-term productivity of investment, while foreign direct investment (Δlfdi) has a negative short-run coefficient (-0.1657, $p = 0.003$, 1% significance), indicating potential adjustment costs before FDI inflows translate into economic growth.

In the long run, as all variables are in natural logarithms, so the coefficients can be interpreted as elasticity, meaning the percent change in GDP resulting from a 1% change in each explanatory variable. Agricultural exports (lagre) have a significant negative long-run coefficient of -0.3825 with $p = 0.019$, significant at the 5% level. This suggests that a 1% increase in agricultural exports is associated with a 0.38% decrease in RGDP, reflecting potential structural issues such as diversion of resources from domestic production or consumption toward exports. Inflation (inf) has a small but significant positive long-run elasticity of 0.0238 ($p = 0.014$, 5% significance), indicating that moderate inflation may stimulate long-term economic activity by encouraging nominal spending. Government expenditure (lge) shows a very strong positive long-run effect (1.7026, $p = 0.007$), statistically significant at the 1% level, implying that a 1% increase in public spending raises RGDP by approximately 1.7%, consistent with Keynesian growth theory. Gross capital formation (lgcf) is negative and highly significant (-0.1725, $p < 0.001$), suggesting that inefficiencies or delays in investment may limit its long-term contribution. Foreign direct investment (lfdi) positively affects GDP (0.1178, $p = 0.034$, 5% significance), confirming that FDI inflows support sustainable growth over time.

## Comparison of Short-Run and Long-Run Dynamics

The ARDL results highlight a clear distinction between short-run and long run dynamics. Agricultural exports and investment boost GDP immediately, but agricultural exports negatively affect GDP in the long run, suggesting that long-term structural constraints may limit the benefits of export-led growth. Government expenditure shows a negative short-run impact but a strong positive long-run effect, emphasizing the importance of efficient allocation and implementation of public spending projects. Inflation has contrasting effects: negative in the short run, positive in the long run, indicating that moderate price growth may encourage long-term economic activity, but sudden inflationary shocks reduce output temporarily. FDI also exhibits short-run adjustment costs but contributes positively to GDP over the long term. These findings underscore the need to consider both immediate and sustained effects when designing economic policy.

## Agricultural Exports and Long Run Economic Growth in Ethiopia: A Paradoxical Relationship

Ethiopia is one of the most agrarian economies in Sub-Saharan Africa, with agriculture contributing a significant share of employment, export earnings, and rural livelihoods. For decades, agricultural exports particularly coffee, oilseeds, and pulses have provided the bulk of foreign exchange for the country. From a conventional economic perspective, exports are expected to stimulate real GDP growth by opening markets, generating revenue, and fostering integration into the global economy. However, the Ethiopian experience suggests that the dominance of agricultural exports may also create conditions that constrain long-term growth. Several arguments explain why agricultural product exports may negatively affect Ethiopia's real GDP in the long run.

One of the primary reasons is the low value addition inherent in Ethiopia's agricultural exports. The country exports most of its commodities in raw form, such as unprocessed coffee beans or oilseeds, thereby forfeiting opportunities to capture greater value through processing, branding, and marketing. As a result, the foreign exchange earned is limited compared to the potential value these commodities could generate if transformed domestically.

This reliance on low-value raw exports weakens industrial development, discourages innovation, and constrains the structural transformation necessary for sustainable long-run GDP growth. In the absence of robust agro-industrialization, agricultural exports may become a trap that locks the economy into a cycle of dependence without meaningful advancement.

A second argument is the volatility of global agricultural markets and the persistent challenge of deteriorating terms of trade. Ethiopia's export commodities, particularly coffee, are subject to sharp price fluctuations driven by changes in global supply, demand, and speculative activities. This exposes the economy to unpredictable foreign exchange earnings and creates macroeconomic instability, which discourages investment in other sectors. Moreover, the Prebisch-Singer –Singer hypothesis suggests that over time the relative prices of primary commodities decline compared to manufactured goods. In Ethiopia's case, this means the country must continually export larger volumes of agricultural products to afford the same amount of industrial imports, placing a long-term drag on real GDP growth.

Closely linked to this is the risk of **Dutch disease**, where a heavy reliance on agricultural exports generates foreign exchange inflows that appreciate the real exchange rate. While this may appear positive in the short term, it undermines the competitiveness of other tradable sectors such as manufacturing. Ethiopia's manufacturing sector, which has yet to take off at scale, becomes disadvantaged in global markets, limiting the prospects for economic diversification. This overreliance on primary agricultural exports prevents the economy from shifting toward higher productivity sectors, thereby constraining long-run growth potential.

In addition, Ethiopia's environmental and structural challenges amplify the negative impact of agricultural export dependence. The expansion of land for cash crops destined for export has contributed to deforestation, soil degradation, and water scarcity. These environmental costs reduce the long-term productivity of agriculture itself, undermining the very foundation of the sector. At the same time, prioritizing export crops diverts resources such as land, labor, and finance away from domestic food production. This imbalance worsens food insecurity and contributes to inflationary pressures, which erode household purchasing power and limit the contribution of agricultural exports to broad-based GDP growth.

Finally, Ethiopia's reliance on agricultural exports reflects a broader issue of economic vulnerability and missed opportunities for diversification**.** By concentrating its growth strategy around primary commodity exports, the country remains highly exposed to external shocks such as global price downturns, climate variability, and shifting demand patterns in international markets. This lack of diversification reduces resilience and prevents Ethiopia from harnessing the growth-enhancing potential of manufacturing, technology, and services. In the long run, such structural weaknesses mean that instead of propelling economic growth, agricultural exports may inadvertently constrain the expansion of real GDP.

In conclusion, while agricultural exports remain vital for Ethiopia's foreign exchange and rural livelihoods, their long-run impact on real GDP can be negative if structural constraints remain unresolved. Low value addition, price volatility, deteriorating terms of trade, Dutch disease effects, environmental degradation, and lack of diversification collectively limit the capacity of agricultural exports to drive sustainable growth. For Ethiopia to escape this paradox, agricultural exports must be reoriented toward value addition, supported by a broader economic strategy that emphasizes diversification, industrialization, and environmental sustainability. Without such transformation, dependence on raw agricultural exports is more likely to act as a drag on Ethiopia's long-run economic growth rather than a driver of prosperity.

# CHAPTER FIVE

# 5. CONCLUSION AND POLICY RECOMMENDATIONS

Agricultural exports trends in Ethiopia have shown increasing patterns over time. The results of the long run showed a negative and significant association between agricultural product export and economic growth. The long-run relationship between agricultural product exports and real GDP growth in Ethiopia reveals a paradoxical outcome. Although exports are generally expected to stimulate growth by generating foreign exchange, creating employment, and integrating the economy into global markets, the Ethiopian case demonstrates that such benefits can be limited or even negative if structural weaknesses are not addressed. The heavy dependence on primary agricultural exports such as coffee, sesame, and pulses has locked the country into a low-value export trap where raw commodities dominate foreign exchange earnings but contribute minimally to domestic industrialization and technological upgrading. This dependence exposes the economy to volatile world commodity prices, deteriorating terms of trade, and vulnerability to external shocks, which in turn undermine macroeconomic stability and discourage long-term investment.

Furthermore, the dominance of agricultural exports exacerbates structural imbalances by reducing incentives for economic diversification. When agricultural exports perform well, the inflow of foreign exchange can cause real exchange rate appreciation, weakening the competitiveness of non-agricultural sectors a manifestation of the Dutch disease. As a result, manufacturing and high-value service industries remain underdeveloped, limiting the country's capacity to generate sustainable employment and achieve structural transformation. At the same time, the environmental consequences of expanding export agriculture, such as deforestation, soil degradation, and water scarcity, undermine future productivity and erode the resource base upon which the sector itself depends. In the long run, this cycle creates a growth trap where agricultural export expansion does not translate into sustainable improvements in real GDP.

In essence, Ethiopia's experience highlights the danger of over-relying on agricultural exports as the main engine of growth. Without structural transformation, export diversification, and technological upgrading, the contribution of agricultural exports to real GDP may not only stagnate but also become a constraint to long-term development. Therefore, while the agricultural sector remains critical for poverty reduction, rural livelihoods, and foreign exchange earnings, it cannot serve as the sole or dominant driver of economic growth in the long run. A reorientation of policy towards diversification, value addition, and sustainable resource management is thus imperative.

Generally, the negative long-run impact of agricultural exports suggests that export-oriented policies should be balanced with domestic development strategies to avoid resource diversion. Government spending and FDI are crucial for long-term growth, but short-run adjustment costs must be managed through efficient allocation and project prioritization. Inflation should be carefully monitored, maintaining moderate, stable inflation supports long-term growth while avoiding short-term contractions. Overall, these findings indicate that sustainable economic growth in Ethiopia requires coordinated fiscal policy, investment efficiency, export management, and inflation control, with careful attention to both immediate and sustained effects of macroeconomic variables.

## 5.1 Policy Implications

Based on the above conclusion, several important policy implications emerge for Ethiopia's economic strategy:

1. **Promote Value Addition and Agro-Industrialization**

Ethiopia must shift from exporting raw agricultural commodities towards processed and higher-value agricultural products. For example, instead of exporting unprocessed coffee beans, the country should invest in coffee roasting, packaging, branding, and marketing to capture more of the value chain. Similarly, oilseeds and pulses could be processed domestically into edible oils, flour, or packaged foods. Agro-industrialization will not only raise export earnings but also stimulate linkages with manufacturing, create jobs, and enhance the economy's capacity to generate higher real GDP growth.

2. **Diversify the Export Base Beyond Agriculture**

To reduce vulnerability to agricultural price volatility, Ethiopia should actively promote export diversification into manufacturing and service sectors. The government's industrial parks initiative is a step in this direction, but its success requires complementary investment in infrastructure, skilled labor, and technology transfer. Sectors such as textiles, leather, pharmaceuticals, and ICT services have the potential to expand Ethiopia's export base and reduce overdependence on agriculture. Diversification is essential for insulating the economy from external shocks and achieving sustainable long-run growth.

3. **Stabilize Agricultural Prices and Build Resilience**

Given the high volatility of international agricultural markets, Ethiopia should strengthen domestic mechanisms to stabilize export earnings. This may include establishing commodity stabilization funds, building foreign exchange reserves during boom periods, and using hedging instruments in international markets. Moreover, promoting regional trade within Africa through the African Continental Free Trade Area (AfCFTA) can reduce overreliance on volatile global markets and create more stable demand for Ethiopian products.

4. **Address Structural Bottlenecks in Agriculture**

For agriculture to support long-run growth, Ethiopia must address persistent productivity challenges. Investments in irrigation, rural infrastructure, mechanization, and agricultural research are critical. By raising productivity, farmers can meet both domestic food demand and export needs without sacrificing food security. In addition, land tenure security and access to finance must be strengthened to encourage long-term investment in sustainable farming practices.

5. **Ensure Environmental Sustainability**

Export-driven agriculture must be balanced with environmental conservation. The government should enforce regulations on and use, promote sustainable farming techniques, and encourage reforestation and soil conservation programs. This is vital to prevent resource

depletion and ensure that agricultural production remains viable for future generations. Linking environmental conservation with economic policy will help Ethiopia avoid the long-run decline of agricultural productivity and its negative impact on GDP.

### 6. Enhance Institutional Capacity and Policy Coherence

Ethiopia requires strong institutions to coordinate policies across trade, agriculture, industry, and environment. Weak institutions, policy inconsistency, and governance challenges have historically undermined the effectiveness of economic strategies. Establishing transparent, predictable, and coherent policies will encourage both domestic and foreign investment in value-added sectors. Furthermore, strengthening capacity in trade negotiation and export promotion is necessary to secure better access to international markets.

In conclusion, while agricultural product exports remain an important part of Ethiopia's economy, their long-run contribution to real GDP growth is constrained by structural, institutional, and environmental factors. Unless Ethiopia strategically reforms its export structure through value addition, diversification, and sustainable resource management, reliance on raw agricultural exports may continue to exert a negative influence on long-run growth. Therefore, the central policy priority should be to transform the economy from one that is heavily reliant on low-value primary exports to one that is diversified, industrialized, and resilient. Only through such a transformation, can Ethiopia achieve sustained improvements in real GDP and secure inclusive long-run development.

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# 1. APPENDIX A

```
. ardl lrgdp lagre inf lge lgcf lfdi,maxlags(3)ec

ARDL(3,3,3,1,3,3) regression

Sample:       1993 thru       2023                    Number of obs =     31
                                                      R-squared     = 0.9523
                                                      Adj R-squared = 0.8411
Log likelihood = 80.184117                            Root MSE      = 0.0338
```

| D.lrgdp | Coefficient | Std. err. | t | P>\|t\| | [95% conf. | interval] |
|---|---|---|---|---|---|---|
| ADJ | | | | | | |
| lrgdp | | | | | | |
| L1. | -.6674741 | .1202926 | -5.55 | 0.000 | -.9395949 | -.3953533 |
| LR | | | | | | |
| lagre | -.3825281 | .1335506 | -2.86 | 0.019 | -.6846405 | -.0804156 |
| inf | .0238163 | .007855 | 3.03 | 0.014 | .0060471 | .0415856 |
| lge | 1.702593 | .4842785 | 3.52 | 0.007 | .6070788 | 2.798107 |
| lgcf | -.17247 | .0295804 | -5.83 | 0.000 | -.2393854 | -.1055546 |
| lfdi | .117766 | .0471143 | 2.50 | 0.034 | .0111861 | .224346 |
| SR | | | | | | |
| lrgdp | | | | | | |
| LD. | .3718243 | .1459453 | 2.55 | 0.031 | .0416731 | .7019756 |
| L2D. | .4437722 | .1943533 | 2.28 | 0.048 | .0041144 | .88343 |
| lagre | | | | | | |
| D1. | .5947176 | .0882022 | 6.74 | 0.000 | .3951903 | .794245 |
| LD. | .0050808 | .0469504 | 0.11 | 0.916 | -.1011283 | .11129 |
| L2D. | .1472082 | .0429105 | 3.43 | 0.008 | .0501379 | .2442785 |
| inf | | | | | | |
| D1. | -.0169955 | .0046727 | -3.64 | 0.005 | -.027566 | -.0064251 |
| LD. | -.0039246 | .0029776 | -1.32 | 0.220 | -.0106605 | .0028113 |
| L2D. | -.0052539 | .0019063 | -2.76 | 0.022 | -.0095663 | -.0009416 |
| lge | | | | | | |
| D1. | -1.931117 | .3906195 | -4.94 | 0.001 | -2.814759 | -1.047474 |
| lgcf | | | | | | |
| D1. | .0426119 | .0126065 | 3.38 | 0.008 | .014094 | .0711299 |
| LD. | .0773189 | .0150141 | 5.15 | 0.001 | .0433546 | .1112832 |
| L2D. | .0348799 | .0124832 | 2.79 | 0.021 | .0066408 | .0631189 |
| lfdi | | | | | | |
| D1. | -.1656674 | .0400851 | -4.13 | 0.003 | -.2563463 | -.0749886 |
| LD. | -.0670896 | .0295036 | -2.27 | 0.049 | -.1338314 | -.0003479 |
| L2D. | -.0628347 | .019742 | -3.18 | 0.011 | -.1074944 | -.0181751 |
| _cons | 3.172634 | .6151839 | 5.16 | 0.001 | 1.780991 | 4.564276 |

# APPENDIX B

| year | rgdp | agre | inf | ge | gcf | fdi |
|---|---|---|---|---|---|---|
| 1990 | 242.2481 | 0.685909 | 3.27137 | 1.578772 | 0.19684 | 0.00015 |
| 1991 | 244.4672 | 0.536662 | 19.08429 | 1.436274 | 0.16754 | 0.00016 |
| 1992 | 264.599 | 0.300267 | 15.53223 | 1.652306 | 0.29027 | 0.00017 |
| 1993 | 257.0632 | 0.932413 | 13.37686 | 1.959249 | 0.31469 | 0.0035 |
| 1994 | 228.4152 | 1.404173 | 2.93108 | 2.124893 | 0.35958 | 0.01721 |
| 1995 | 285.6007 | 2.737233 | 12.70637 | 2.321799 | 0.40856 | 0.01414 |
| 1996 | 293.3875 | 2.499515 | 0.23914 | 2.304284 | 0.43065 | 0.02193 |
| 1997 | 272.447 | 3.635399 | 0.20666 | 2.427278 | 0.42821 | 0.28849 |
| 1998 | 248.8191 | 4.019286 | -0.15015 | 2.737868 | 0.44834 | 0.26067 |
| 1999 | 281.521 | 3.43726 | 2.22272 | 2.843979 | 0.44195 | 0.06998 |
| 2000 | 391.6682 | 3.754872 | 6.8 | 2.733198 | 0.50811 | 0.13464 |
| 2001 | 424.1823 | 3.378926 | -5.75534 | 2.81415 | 0.57784 | 0.3494 |
| 2002 | 430.6074 | 3.373308 | -3.62143 | 2.996182 | 0.5205 | 0.255 |
| 2003 | 421.3017 | 4.137208 | 12.76798 | 3.007463 | 0.70593 | 0.465 |
| 2004 | 478.4822 | 5.178465 | 3.91136 | 3.201608 | 0.70719 | 0.5451 |
| 2005 | 535.0333 | 7.331258 | 9.87551 | 3.376768 | 0.83153 | 0.265112 |
| 2006 | 593.0022 | 8.685376 | 11.55235 | 3.571306 | 0.81346 | 0.545257 |
| 2007 | 660.9366 | 10.45762 | 17.22058 | 3.848337 | 0.91086 | 0.222001 |
| 2008 | 732.2421 | 13.64398 | 30.31167 | 4.056539 | 1.00693 | 0.108538 |
| 2009 | 796.6976 | 15.21775 | 24.14642 | 4.267387 | 1.23118 | 0.22146 |
| 2010 | 896.6875 | 26.11531 | 1.44457 | 4.542113 | 1.6538 | 0.288272 |
| 2011 | 996.9218 | 44.52557 | 20.06188 | 4.823639 | 0.0021 | 0.628625 |
| 2012 | 1083.134 | 54.48743 | 33.54141 | 5.036491 | 0.00308 | 0.278563 |
| 2013 | 1197.754 | 56.12359 | 4.90198 | 5.222904 | 0.00337 | 1.343876 |
| 2014 | 1320.688 | 62.24301 | 10.98179 | 5.415571 | 0.00419 | 1.855052 |
| 2015 | 1457.858 | 59.86036 | 10.83654 | 5.637974 | 0.0053 | 2.626518 |
| 2016 | 1568.097 | 59.93857 | 10.39796 | 5.798056 | 0.00586 | 4.142937 |
| 2017 | 1717.127 | 63.68574 | 6.67682 | 5.869876 | 0.00655 | 4.01716 |
| 2018 | 1834.066 | 74.21148 | 12.38228 | 6.023702 | 0.00635 | 3.360419 |
| 2019 | 1987.158 | 74.93242 | 12.86043 | 6.190813 | 0.0071 | 2.548743 |
| 2020 | 2109.18 | 94.36514 | 18.25457 | 6.395273 | 0.00687 | 2.3958 |
| 2021 | 2228.17 | 141.7014 | 21.76327 | 6.661585 | 0.00685 | 4.259446 |
| 2022 | 2333.266 | 199.995 | 34.66661 | 6.85 | 0.00747 | 3.669991 |
| 2023 | 2483.725 | 191.1573 | 32.91307 | 6.987654 | 0.00787 | 3.262966 |