The Effects of Currency Devaluation on Coffee and Khat Export Performance in Ethiopia: Evidence from Vector Error Correction Model and Johansen Co-integration Test.

A Thesis Submitted to the School of Graduate Studies of Jimma University in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Science in Industrial Economics

By:

ABDELKAF ELIAS

JIMMA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

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Under the Guidance of

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And

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CERTIFICATE

This is to certify that the thesis entitled with *"The effect of currency devaluation on Coffee and Khat export performance in Ethiopia*", submitted to Jimma University for the award of the Degree of Master of science in industrial economics and is a record of valuable thesis work carried out by Mr Abdelkaf Elias, under our guidance and supervision.

Therefore, we hereby declare that no part of this thesis has been submitted to any other college or university institutions for the award of any degree of qualification.

Main Adviser's Name	signature	Date
_____	_____	_____
Co-Advisor's Name	Signature	Date
_____	_____	_____

DECLARATION

I hereby declare that this thesis entitled "*The effect of currency devaluation on coffee and khat export performance in Ethiopia,*" has been carried out by me under the honest guidance and supervision of Amsalu, D (Ass Prof.) and Shabu Abdulbari (MSc).

This thesis is original and has not been submitted for the award of degree or diploma in any university or institutions.

Researcher's Name	Signature	Date
_____	_____	_____

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Acronyms and abbreviations

ADF: Augmented Dickey-Fuller

AFDB: African Development Bank

BOP: Balance of Payment

DF: Dickey –Fuller

GDP: Growth Domestic Product

IMF: International Monetary Fund

LDCs: Least Developed Countries

MoFEC: Ministry of Finance and Economic Commerce

REER: Real Effective Exchange Rate

CSA: Central Statistical Agency

EPRDF: Ethiopian People's Revolutionary and Democratic Front

ETB: Ethiopian Birr

FDI: Foreign Direct Investment

GATT: general agreement on tariff and trade

MOFED: Ministry of Finance and Economic Development

NBE: National Bank of Ethiopia

NTB: Non trade Barriers

PPP: purchasing power parity

RGDP: Real Gross Domestic Product

SAP: Structural Adjustment program

UNCTAD: United Nations Conference on Trade and Development

USD: United States Dollar

VAR: Vector Auto Regressive

VECM: Vector Error Correction Model

Abstract

Devaluation of currency has been stipulated and utilized increasingly as a stabilization device in developing countries, as part of International institutions' programme. To improve the export performance of agriculture and earnings, the Ethiopian government employed devaluation policy. However, devaluation of currency has an ambiguous effect on export performance in Ethiopia. Therefore, the prime objective of the study was to investigate the effect of domestic currency devaluation on coffee and khat export performance in Ethiopian by employing time series data for the period 1987-2020. With the help of Johansen's co-integration and vector error correction modelling methods to attain the research objectives, the impact of real effective exchange rate on coffee and khat was assessed in the long-run as well as in the short-run. The study found that real effective exchange rate has positive and significant relationship with value coffee and khat in the long run. Which implies the decrease /devaluation in the value of domestic currency promotes exports of coffee and khat in the long run. Other variables like foreign direct investment with the expected positive sign and real gross domestic product with negative sign are also found to be statistically significant in explaining export in the long-run. The study revealed that foreign direct investment and foreign real income, which shows the demand side influencing factor, had significantly influenced the export performance of coffee and khat in Ethiopia in the short run. The findings of this paper suggest that policy intervention in the form of depreciating domestic currency aimed at improving the country's exports should be sector-targeted, and that such a policy intervention could be effective in improving the export performance when the effect of inflation on output is controlled.

Keywords: *Real effective Exchange rate, Devaluation, Export, Coffee, Khat, Johansen co-integration, VECM*

CHAPTER ONE
INTRODUCTION

1.1 Background of the study

Every nation has three economic goals to attain both in the short and in the long run, these are achieving economic growth, creating more employment and having no or minimum inflation simultaneously. In order to achieve these goals and make their countries better off, countries use monetary and fiscal policies as a strategy and let their nation's aggregate demand curve to shift either to the right- or left-hand side. Fiscal policy is all about letting the government to collect taxes and spend it on public sectors like infrastructures, education and so on and which mainly focuses only on the domestic economy whereas, monetary policy deals with both domestic and international economy. Meaning, the government can use monetary policy and the exchange rate policy of devaluation in order to affect the domestic and international markets respectively. (Fratzscher et al. 2014)

By wide agreement, many less developed countries have "over-valued" currencies. Yet most countries are reluctant to devalue their currencies even when the signs of over-valuation are right and unmistakable. A variety of reasons are given for not devaluing, but most of them reduce to three basic objections. First reason is that devaluation will not in fact improve the devaluing country's payments position. Then devaluation might work if given a chance, but it will unleash forces in the economy that will eventually undercut its benefits and those of other economic policies. The last reason is in that although devaluation works, it will be politically disastrous to those officials who are responsible for undertaking it (Cooper, 2005).

Despite these sources of resistance, in many countries, especially the developing ones, the weakening of their currency or the decrease or depreciation of their own currency in terms of foreign currencies has become a central growth issue. Many development organizations like International Monetary Fund (IMF) support the idea of devaluation of currency as one means of economic growth besides the financial aid and loans to their member countries for the development of domestic firms. It will increase competitiveness of firms and increase the production of domestic products and output. However, some researchers focusing on developing

countries (Krugman & Taylor, 1978), shed light on the negative effect of devaluation on output. Despite ambiguous results from empirical studies devaluation of currency has been used as a growth strategy by many developing countries

Ethiopia, which is one of the sub-Saharan countries, is listed as the least developed countries in the world. Many factors explain the weak economic development of the country. Policies like building up institutions, privatization of the public sector and devaluation of the currency were used in the last twenty years in order to create a sustainable economic development. The devaluation of the Ethiopian Birr (ETB) per US dollar officially began during the EPRDF regime. Previously the country used to have a fixed exchange rate with a rate of 2.07 Birr per US dollar. Some researchers held during the 1970 and 1980 the birr was overvalued leading to a trade deficit and also public budget deficit**.** Kidane (1994) said that, the overvaluation of currency was the result of the problem in the management. This overvaluation of currency highly discouraged the export as well as domestic production by making the price of imported goods cheap. In addition, there was shortage of exchange rate and only few people had the chance to enter the market.

As a result of the overvaluation and scarcity of the foreign currency, the unofficial or parallel exchange rate began to spread in the country. In mid-1980 the unofficial rate reached 6 or 7 birr per US where the official rate was still 2.07 birr per US dollar. Taking this into account the transitional government of Ethiopia decided to devaluate the currency to 5 birr per US dollar in 1992. The devaluation of exchange rate was expected to increase output by encouraging the export sector as well as increase domestic production (Taye, 1999). After the devaluation in 1992 the exchange rate is changed from fixed to flexible rate in order to control overvaluation through a gradual depreciation of domestic currency every year. The gap between the unofficial and official rate also decreased compared to the period when the exchange rate was fixed. However, during the fiscal year 2007/08 the rate of depreciation against other foreign currencies increased compared to the previous years. One in the 2009/10 and September 2010/2011 the Ethiopian Birr was depreciated to 23.7% and 16.5% respectively against the US dollar. This huge devaluation was expected to "decrease overvaluation and increase competitiveness"(IMF, 2010).

The increase in depreciation rate was expected to encourage the export sector. The higher increase in export rate, the better the rate of growth of the economy. The export of goods and services was 11% of the GDP in 2009 and yet the trade balance is negative. The world financial crisis where the major importing countries decreased their import quota might have a negative role in the decrease of the export as well as low growth since export is one part of the GDP (NBE, 2010).On October 10, 2017, the National Bank of Ethiopia (NBE) devalued the Birr by15 percent as pressures on the foreign exchange intensified. According to the Government, the devaluation was undertaken to encourage exports and overcome the foreign exchange shortage. Exports, which with remittances constitute Ethiopia's main source of foreign exchange, have seriously underperformed in recent years (as compared to the Government's objective in its Development Plan).

This paper would aim to investigate the effect of currency devaluation on the export performance of coffee and khat Ethiopia and which is peroxide by the total export value of coffee and khat as dependent variable and currency devaluation as independent variable with the intervention of real gross domestic product, German real gross domestic product proxy of foreign income and foreign direct investment and to achieve the objective, the researcher would have employed the past 34-year of secondary data from various sources. According to the report of various national bank of Ethiopia and central statistical authority of Ethiopia, the major export destination for Ethiopian Coffee is German. Coffee is one of major export commodity in Ethiopia and it takes the lion share in terms of export earning in Ethiopia.

1.2 Statement of the problem

In theory, it is well documented that currency devaluation has been used as one of the policy tools for enhancing exports and improve international market competitiveness. According to BjØrnskov (2015), depreciation of the local currency makes local products less expensive in the world market and the country to be more competitive internationally. Especially, since the breakdown of the Bretton Woods Agreement in 1973, and the advent of floating exchange rates, there has been renewed interest to study on the effect of devaluation on the trade balance in general and export performance in particular among both developed and developing countries (Bjørnskov, 2015).

Economists often agreed that devaluation to be a tool for improving the export sector of an economy. According to the traditional views, devaluation has expansionary effect on output and aggregate demand. In contrast to this view (traditional view), some argue that devaluation would affect the supply side of the economy by increasing the cost of imported inputs used in production, further high costs of input resulting in a decline of the aggregate supply in the economy (Lencho, 2013).

Based on NBE (2017), to achieve positive trade balance and international trade competitiveness the government has perused three major devaluations since 1992. One was taken by the newly Ethiopian People's Revolutionary Democratic Front (EPRDF) in 1992, where the official rate of exchange of the country jumped from 2.07 Birr/dollar to 5 birr/dollar; this 142% devaluation rate is the highest in the Ethiopian history. The other in September 2010; during that time the rate jumped from 13.6 Birr/dollars to 16.3 Birr/dollars amounting to 16.7 per cent. The official devaluation of Birr against US dollar increased by 15% in November 2017, which moved up the exchange rate from 23.3 Birr per dollar to 27 Birr per dollar.

Ethiopia devalued its currencies substantially in 1992, 2010 and 2017 still now. But the outcome is not stable. The effect of exchange rate on export performance which clearly indicates that both empirical and theoretical studies could not exactly show the relationship between exchange rate changes and export performance further on balance of payment but the government of Ethiopia is still devaluing birr. Ethiopia is exporting price inelastic agricultural products. Thus, devaluation may not lead to a significant rise in the volume of export. Previously, there are a variety of studies and arguments on effect of currency devaluation or depreciation on different economic variables. The conventional belief of currency devaluation impact on export performance as well as trade balance shows that devaluation improves trade by lowering export price.

However, the results of studies and claims from economists indicate that there is no agreement of view on the negative or positive impact of devaluation on the economy and particularly on export. Taye (1999) found that devaluation of currency might improve the export performance. Umer (2015) showed in her research that the devaluation of ETB in the short term can have a

positive effect on the export of the nation but does not reduce imports. The study investigated by Ali (2011) the effect of devaluation on major export goods /product of Ethiopia in case of hides and skins, he claims that the real exchange rate is not the only factor determining the level of exports of hides and skins and his analysis indicates that there is no clear indication that the change in the real exchange rate affects the export of hides and skins positively. He indicates that the devaluation has a time-varying effect.

According to Bonsa (2017) devaluation of ETB might not help to improve the export earnings or performance, since the demand for export is not the only a problem of Ethiopian export but also the supply side. He further argues that if the export demand rises because of the devaluation of the ETB, the supply for increased demand will not be easily achieved, because agricultural products dominate Ethiopian export sector. He also argues that devaluation is most likely to cause inflation due to increased import prices and raise the cost of inputs, thus aggravates the trade deficit.

The writer of this paper claims that those previous empirical works on the Ethiopian case have some methodological short comings. For example, Umer (2015) didn't show tests of data unit root test/ stationery which helps to decide which statistical model to use rather the investigator employed an OLS method simply without a reasonable justification. Lencho (2013) had assured stationery of data at levels and long run relationships of variables but inappropriately employed an OLS method of estimation. Therefore, the present study addresses such issues in the existing literature.

Ethiopia has experienced devaluation for a long time of period in order to improve its export performance in particular and trade balance in general, but instead of improving its export earnings and trade balance, the country remain in trade deficit in general and low export performance in particular. The goods and services that a country imports more than its export and thus the earning from international trade remain poor and un-satisfactory. However, our government used currency devaluation as policy instrument to improve export performance. This phenomenon motivates the researcher to investigate the effect of currency devaluation on coffee and khat export performance in Ethiopia.

In addition to above motivation, study would have used the co-integrated Vector Auto-Regresive method of analysis for the time span that ranges from 1987-2020 G.C which differs from some of the previous study. Further, this study would have included real GDP of Germany (Ethiopia's major good export destination) to see the demand side factor on the export performance of coffee and khat in Ethiopia. It is the proxy for foreign national income as the influencing factors which affect the export performance of major commodities but ignored by previous researchers. There are various factors that affect the performance of export, but most researchers examine supply side factors in their analysis. This is another gap that the researcher wants to bridge in the existing literature. This study also interested to observe the effect of recent devaluation of 2017/18 on major commodity (coffee and khat) of Ethiopia.

1.3 Objective of the Study

1.3.1 General Objectives

The general objective of the study is to investigate the effect of currency devaluation on coffee and khat export performance in Ethiopia.

1.3.2 Specific Objectives

The specific objectives of the study are:

- To assess the trends of coffee and khat export performance after currency devaluation policy in Ethiopia.
- To investigate empirically the short run effect of currency devaluation or change in exchange rate of Birr on coffee and khat export performance in Ethiopia.
- To identify empirically the long run effect of currency devaluation policy or change in exchange rate of Birr on coffee and khat export performance of Ethiopia.
- To investigate the direction of causality between REER and TEV in Ethiopia.

1.4 Hypothesis of the Study

In line with the above specific objectives the following four hypotheses have been tested in order to know whether there is a significant relationship between dependent and independent variables with the role of the intervening variables.

- H0: There is no statistically significant relationship between exchange rate devaluation and volume and value of coffee and khat export performance in Ethiopia.
- H0: There is no statistically significant short run relationship between currency devaluation and export performance of coffee and khat in Ethiopia.
- H0: There is no statistically significant long run relationship between currency devaluation and coffee and khat export performance in Ethiopia.
- H0: There is no Granger causality between currency devaluation and export performance of coffee and khat.

1.5 Significance of the study

This study is very significant as it contributes to the literature and would assist policy makers and economists in decision making as regarding currency devaluation. The Ethiopian government has been implementing devaluation as the policy instrument to overcome the problem of economic growth. The study has been conducted on the effect of devaluation of currency on coffee and khat export performance in Ethiopia at national level will also to provide information about the response of coffee and khat export performance to currency devaluation. Moreover, the study give insights about the demand side factor on export performance of coffee and khat in Ethiopia. Also the study will give a clue for further study about the effect of currency devaluation on exports performance of Ethiopia in the future.

1.6. Research gap

It is obvious that there has been no consensus in terms of sign, significance and long lasting effects of determining factors of export performance in Ethiopia. Second, the majority of studies such as Hailegiorigis (2011), Hassen (2015), Tadese (2015), Zekarias and Degye (2019), Fassil and Degye (2019), and Murad and Beyan (2020) have been concentrated on single export commodities like coffee and oil seeds. Third, authors like Belayneh and Wondaferaw (2013), Ashenafi and Gataneh (2014), Alelign (2014), Abebe (2016), and Israel (2020) are tried to identify the determinants of overall export performance but some of them such as Ashenafi and Getaneh (2014) and Alelign (2014) are restricted to either financial incentives or the link between trade partners. The researcher has observed that the pervious study did not address the effect of currency devaluation on export commodities like coffee and khat in combination and

even they did not address currency devaluation on khat specifically. In that khat today become one of the main sources of foreign exchange earnings and it shows improvement. Most of previous study focuses on the determinants of single commodity export supply like coffee (most) and oilseeds. Therefore, the researcher wants to address such gap in the previous study with the following features.

In this case the study would use the co-integrated VAR method of analysis that differs from most previous study. Moreover, it covered a longer sample period from 1987-2020 with the inclusion of recent devaluation. Second, this study would include foreign income represented by real gross domestic product of Germany as one of important factors that affect the export performance of major commodities in Ethiopia. Foreign income has been represented by real GDP of Germany. Most recent studies focus on only the supply side factors of the export performance, but this study included foreign income and it tried to fill this gap in addition to the above. In the idea behind this is, other things remain constant; an increase in the real GDP of Ethiopia's major trading partners wills causes to increase the demand for our product and the export value of coffee and khat would also increase. In addition to such issue, researcher interested to see or empirically test the effect of the recent devaluation of 2017/18 on the export performance of major commodities in Ethiopia.

In general, the claims and empirical evidence on devaluation currency are mixed. Additionally it requires more empirical evidence to prove that how the currency devaluation of Birr affects the export performance of major commodity in Ethiopia and how export earnings in the country. Thus, this study provides additional empirical evidences by analysing the impact of currency devaluation or depreciation on coffee and khat export performance in Ethiopian.

1.7. Scope and Limitation of the Study

This study is delimited to assessing the effect of devaluation of birr on major export commodities (coffee and khat) performance of Ethiopia. Even if the study peaks a vast topic in the macroeconomic policy, means that the effect of exchange rate movements on export performances, it considers only major export commodities (coffee and khat). Apparently, there

are many factors that affect performance of major exports commodities, some are positive while others are negative. Out of these exchange rate plays a critical role by altering the level of demand for the exports and the supply too.

As a result, the study focused more on the effect of currency devaluation on major export commodities and the study has covered the time span from 1987 to 2020GC. Limitation of this study concerned to data on the Ethiopian economy because it lacks consistency. Different data sources give different information or fact or records for the same variable. To maintain accuracy and consistency, the study used data from the Ministry of Finance and Economic Development, Central Statistics Agency and National Bank of Ethiopia which are more harmonized or agree.

1.8. Organization of the Study

The research paper is organized and classified in to five chapters. The first chapter dealt about the introduction part which contains the back ground of the study, the statement of the problem, objective of the study, hypothesis of the study, significance of the study, Scope and limitation of the study, and organization of the paper as clearly shown above. Chapter two deals about the theoretical and empirical reviews related to the title. When chapter three going to deal about methodology of the study, data sources, econometric model specification and methods of data analysis, whereas chapter four going to dealt with results and discussion. Chapter five going to dealt with conclusion, recommendation and policy recommendation.

CHAPTER TWO
REVIEW OF RELATED LITERATURE

2.1. Theoretical Review of Literature

2.1.1. Devaluation definition

Devaluation is a policy-related activity that reduce the value of a local currency compared to foreign ones; particularly major trade partners. Devaluation means the process under certain circumstances in which currency loses its purchasing power. Devaluation is the official alteration in the value of a currency relative to foreign currencies by a regulatory body usually by the national bank of the country under the circumstance of fixed exchange rate. In floating exchange rate system, the market forces may generate changes in the values of the currency, known as currency depreciation or appreciation (Eshetu, 2017).

Devaluation or depreciation of a country's currency is usually triggered when the country is experiencing an adverse Balance of Payment or trade crisis or by worsening economic conditions transmitted into the domestic economy from the foreign market. When the government devaluate its currency, it is often because of the interaction of market forces and policy decisions that lead to the currency's fixed exchange rate change. In order to sustain a fixed ex-change rate, a country must dispose sufficient foreign exchange reserves, often dollars, gold and be willing to spend them, to purchase all offers of its currency at the established exchange rate. By convention, changes in the value of a currency are measured against the American dollar, so devaluation means a reduction in the dollar price of a unit of foreign currency or, in other words, an increase in the number of units of the foreign currency that can be purchased for a dollar (Tafesse, 2019).

2.1.2. Definition and determination of Exchange Rate

An exchange rate is the price of a country's currency in terms of another country's currency. Thus, exchange rate has two components, the domestic currency and foreign currency, and can be quoted either directly or indirectly. In a direct quotation, the price of a unit of foreign currency expressed in terms of domestic currency. In an indirect quotation, the price of a unit of domestic currency is expressed in terms of foreign currency. Exchange rate is quoted in value against the US dollar. However, exchange rate can also be quoted against another nation's

currency, which is known as across currency or cross rate. The value of a nation's money, like most goods and services can be analysed by looking at its supply and demand. For example, an increase in the demand for the dollar will raise its price (cause an appreciation in its value), while an increase in its supply will lower its price (Lencho, 2013).

The demand for foreign exchange is derived from demand for foreign goods and services that we imports and capital exports. In other word, the demand for foreign exchange arises out of debit transactions in our balance of payments "current and capital accounts.'' The supply of foreign exchange available to a country is made up of the foreign money earned by exporting various goods and services, receiving unilateral transfer payments from abroad and long- and short-term capital imports or inflows. Therefore, supply of foreign exchange is derived from the credit transactions in the balance of payments current and capital accounts of the home country. All the foreign receipts earnings and borrowings constitute foreign exchange supply and all the foreign payments spending and lending constitute our demand for foreign exchange (Pentecost, 1993).

In order to carry out the above balance of payments transactions country's domestic currency has to be converted to foreign currency and foreign currency to domestic one. This gives rise to the importance of price by which we can convert currencies. The amount of domestic currency that must be paid per unit of foreign exchange is, therefore, the foreign exchange rate. If a country is following free market operation where market forces matter in the economy, the external value of the country's currency is determined by the interaction of those market forces. If country's foreign earnings and borrowings are greater than its spending and lending, the country will have much of supply of foreign exchange than the foreign country, and the reverse is true when country's spending and lending exceed its earnings and borrowings. If one country's sales of goods and services are greater than that of the other, the country will possess greater amount of supply of foreign exchange and in the other country the supply of foreign exchange will be lower (Meade, 1951).

It is difficult and riskier to predict exchange rate in the long-run because currency markets are as volatile as stock markets and no one yet has been able to devise a system to consistently forecast exchange rates. Nevertheless, there is ample of evidence that over the very long-run (periods of a decade or more), exchange rates are determined by two main factors. The first is Purchasing Power Parity (PPP) it is also termed as law of one price, states that a currency should buy the

same quantity of goods when converted to another currency as it can buy at home. If a unit of home currency can buy a certain quantity of baskets of goods in the home market, the same unit of home currency converted to its equivalent foreign currency must buy equal quantity of baskets of goods from the foreign market. In other words, the exchange rate should be at a level that keeps the real purchasing power of money constant when it is converted to another currency. The second is differences in productive growth between countries. Faster productivity growth is equivalent to a relative decline in prices and leads to a real appreciation in currency values over the long run (Krugman, 2008).

2.1.3. Exchange rate systems

Exchange rate can simply be defined as the current market price of the home currency exchanged for foreign currency (Obstfeld & Rogoff, 1995). According to Klein & Shambaugh (2012) and other many economists there are three main types of exchange rate regimes such as free floating or flexible exchange rate regime, pegged or fixed exchange rate regime, and pegged floating or managed floating exchange rate regime. The above mentioned once are basic types of exchange rate regimes and they have its own advantages and disadvantages.

2.1.3.1. Fixed (pegged) exchange rate regime

Fixed exchange rate regime is the exchange rate regime in which a country's currency is fixed against the value of another single currency, or to another measure of value, like gold. It is a system in which government plays significant role regarding with deciding the worth of its currency in terms of either a fixed weight of gold, or a fixed amount of another currency. When there is a mismatch between the nation's fixed exchange rate and free market rate of foreign exchange which is determined by the demand and supply of hard currency in the nation, the government obligated to fill the gap by taking from its foreign exchange reserve (Megersa and Cassimon, 2015).

The government may interfere in to the market through two different ways. First, it can interfere through buying or selling of its own currency or foreign currencies. Under the fixed exchange rate system, commercial banks have to buy and sell the domestic currency at the determined rate. But the market equilibrium exchange rate may not coincide with the pre announced spot rate. Due to this reason the central banks always maintain reserves of foreign currencies and gold

which they can sell in order to intervene in to the foreign exchange market to make up the excess demand or take up the excess supply. Second, Government can simply make trading currencies at any other rate is illegal. In fact this method is rarely used because it is hard to enforce and sometimes it leads to a black market in foreign currency. If the nation faces shocks which arise from money demand or supply primarily, the policy of a fixed exchange rate regime looks attractive (Dorn and Egger, 2015).

Advantages of fixed exchange rate regime are reducing both volatility, uncertainty, high inflation, and destabilization of currency market speculation on one hand and facilitating trade and investment on the other hand. A fixed exchange rate enables fluctuations in relative prices and currency volatility to reduce. It provides a nominal anchor to price inflation for internationally traded goods and it leads private sectors to reduce their inflation expectations in the economy (Obstfeld & Rogoff, 1995). It is known fact that stability in real economic activities can be achieved through less fluctuation both in relative prices and currency volatility and also through less expectation of future inflation.

Uncertainty is no longer a problem in fixed exchange rate system since exchange rate is predictable and non-volatility therefore; exchange rate risks that are related with uncertainty will be eliminated (Obstfeld and Rogoff, 1995). Speculation in the currency markets is relatively less destabilizing under a fixed exchange rate system and it is mostly a case for floating exchange rate system. Mostly Investors are investing their huge amount of money on the foreign exchange market when they think that the market is promising and they withdraw the money immediately when some economic inconveniency is occurred. Therefore, fixed exchange regime enables the central bank to control over the inflow and outflow of capital. And in fact, the stability of the economic system is maintained mainly through capital control. Therefore, fixed exchange rate regime can avoid speculative bubbles (Frankel, 2003).

Fixed exchange regime prevents currency appreciation or depreciation by inspiring confidence in the ¨strength¨ of domestic currency which reduces volatility and fluctuations in relative prices. Fixed exchange rates are anti-inflationary; it can make the domestic firms and employees' costs under control in order to remain competitive in international markets. As a result the government maintains low inflation and in a long run reduces interest rate to promote trade and investment (Asmamaw, 2008). It is known fact that the people expectation towards the future price level of

goods and services play a crucial role in determining the actual inflation level of the country. Therefore, fixed exchange rate can avoid high inflation expectation from the people's mind and which enables actual inflation rate of the nation to be minimum.

Even if fixed exchange rate system has so many advantages, it has also disadvantaged and the main criticism is that system cannot automatically adjust itself. It is known fact that fixed exchange rate mainly aims to adjust the balance of trade but when a trade deficit occurs, there will be more demand for the hard currency, rather than the domestic one and which will lead the price of the foreign currency to increase in terms of the domestic currency so that the domestic currency will highly depreciate. Whenever there is a trade deficit additionally appreciation or depreciation is not allowed in the system therefore, in order to keep the exchange rate constant, central bank has to withdraw hard currencies from its reserves and should spend it to the market and which may create some financial inconveniences and this is happen especially in developing countries (Stoykova, 2021).

Another limitation is that the system cannot function in the places where the financial and the banking system did not develop well. The absence of strong financial, monetary and banking institutions may make pegged exchange rate system difficult for emerging countries. Since the system needs much more hard currency reserve and the central bank needs to hold stocks of both foreign and domestic currencies at all times to adjust and maintain the exchange rates and let the system to function as before, it is not appropriate for every country to use. Especially for LDCs whom have a BOP deficit can't solve their economic problems by using fixed exchange rate system. Thailand, Malaysia, South Korea, and other nations in Asia region had kept exchange rates fixed from 1997-98 and face macro-economic crises (Calvo and Mishkin, 2003).

The announced rate of exchange may not coincide with the market equilibrium rate of exchange and this leads to excess demand or excess supply of hard currency and puts heavy burden on the central bank of the nation as well as the government. This is specially the case if the nation's balance of payment (BOP) faces deficit frequently due to the fact that BOP deficit for several years, the central bank can't offer the demanded amount of foreign currency in to the market in order to support the exchange rate of domestic currency and which may results an immediate devaluation of the domestic currency with all its adverse effect of letting the people confidence towards their home currency to evaporate (Asmamaw, 2008).

2.1.3.2. Free floating (flexible) exchange rate regime

It is a type of exchange rate in which the value of a nation's currency is allowed to fluctuate based on the demand and supply of the foreign exchange market. The price is determined by market forces of the demand and supply of the foreign currency without any intervention by the government. Therefore, there is a probability of getting different prices for one currency in terms of the other currency with in some specific time interval, following fluctuations in the demand and supply of foreign currency. Free floating exchange rate works without any government intervention and the market automatically adjusts itself when fluctuation occurs in the demand or supply of foreign currency (Johnson, 2015).

The adjustment process enables the exchange rate to get its new equilibrium price level and which results BOP to react accordingly based on the elasticity of demand and supply of imports and exports and finally end up with getting new equilibrium (Asmamaw, 2008b). According to Mati and Bidinger (1981) floating exchange rate regime has its own advantage for the practicing nation especially if both domestic and international markets for currency are well developed (Calvo and Mishkin, 2003).

Advantages of floating exchange rate regime can be stated as follows; first, the system can automatically adjust Balance of Payment. If there is a balance of payment BOP deficit, currency depreciation will occur and importers will either pay more hard currency in order to import the previous amount of goods or will import less therefore, the demand for import as well as hard currency will decrease as a result, BOP will reach its equilibrium. Second, the system avoids speculative attacks that occurred due to the pegged system, since flexible exchange rate system needs low foreign exchange reserves compared with the pegged one. The central bank not advised to accumulate a huge amount of hard currency in the form of reserve so as to let the system to function properly even though there is an external shock. The floating exchange rate regime allows a nation to re-act accordingly in order to adjust the exchange rate in more flexible manner that is why it is not that vulnerable for crises (Frankel, 2003).

Third advantages is that the system gives independence to the monetary policy therefore, if the nation faces some shocks from the demand side, the government will be flexible to employ any kind of monetary policies so as to alleviate the ongoing demand deterioration problem so that the

nation won't face economic recession in such a system. In addition, the system allows the central bank to retain seignior age income, which is a profit that the central bank earns whenever it prints money or in other words it is the difference of the value of a single unit of money and the cost of making & distributing that single unit of note (Frankel, 2003).

Even if the system has different advantages for once economy, it's not free from criticism and the three main disadvantages of the system are uncertainty, high volatility and unpredictability. Uncertainty: Since there is no guarantee for both importers and exporters in floating exchange rate regime where the values of exchange rate is changing as the demand and supply of foreign currency changes, investors are not certain about the real earnings from exports and the real costs of imports therefore, the uncertain nature of the system leads the investors not to fully employ their resources and produce what they are potentially able to produce (Helpman, 1981).

With the existence of speculators and the increase in the supply of Dollar, free floating exchange rate regime increases the volatility of foreign exchange. In the first case, speculators can invest on any countries financial sector when it seems promising to invest in that nation and they also can withdraw their money whenever they feel unhappy and which disturbs the financial sector. This is a very serious issue for developing economies because, developing countries and third world countries in particular have debts from different international financial institutions and they have to pay back their liabilities in terms of hard currencies like dollar and Euro. This will result the entire economy to be unstable and the financial sector to be in danger (Mohamud, 2015).

Unpredictability is another limitation and thus this nature of the system may hinder international investors from going to invest in different sectors of the country. Since the system is highly vulnerable for shocks, both local and international business men should take the risk when they are planning to invest in the nation's economic sectors and the foreign investors lose their confidence to put their effort in the economy. This is due to the nature of high dynamism of exchange rate in the floating regime (Hakkio, 1984).

2.1.3.3. Managed (Dirty) floating exchange rate regime

Managed floating exchange rate system is a system in which it combines both fixed and floating exchange rates. It allows the market to adjust the exchange rate and arrives at its equilibrium

level and it allows the government to intervene in to the exchange market whenever intervention is needed so as to protect the domestic currency, trade balance and country's economy from external shocks, it might be through buying and selling of currencies or through some other means. In managed floating exchange rate regime, not only the central bank intervenes in to the foreign exchange market but also international agencies such as IMF (Sarno & Taylor, 2001).

As Bofinger (2001) described, "There is nothing in existing theory, for example, that prevents a country from pursuing a managed float in which half of every fluctuation in demand for its currency is accommodated by intervention and half is allowed to be reflected in the exchange rate." Which means in other words, almost all currencies could be considered as the one who is practicing managed floating exchange rate regime as long as central banks or governments intervene to the foreign exchange market in order to influence the value of their currencies. As we can see, whenever the world economy got growing, Nation's become more dependent on international and multilateral trades therefore, exchange rate become extremely vital in affecting the nation's trade balance and economy as well (Bofinger, 2001).

Managed floating exchange rate system has assured that some sort of stability both in the financial market and in the economy as a whole since the government occasionally intervenes in to the foreign exchange market. Therefore, the regime is able to avoid a dramatic currency fluctuations and financial speculations in domestic market. In fact, half- stability can also be attained by implying fixed exchange regime in the economy but while it reaches half stability, it would lose free capital mobility and market independence. Another importance is that it assures some sort of exchange market independence therefore the regime promotes better allocation of resources and improvement of the BOP account. Since the exchange rate is at its appropriate level to promote trade in the nation, the nation's BOP will be improved and resource will also be appropriately allocated (Lu and Zhou, 2019).

The regime integrates an approach of determining the required optimum interest rate level with the optimum exchange rate path simultaneously. This helps the government to control a sudden and massive unemployment problems and financial crisis in an economy; perhaps it could be the case for floating exchange rate regime. Generally, managed floating regime allows capital mobility, monetary autonomy (some sort of independence for the demand and supply interaction

of the foreign exchange market) and exchange rate control as well as occasional intervention to the market simultaneously (Bofinger, 2001).

According to Bofinger (2001), even if Managed floating exchange rate regime has advantages over fixed and floating exchange rate regimes, it has also some weaknesses, and the main weaknesses of this regime are expressed by Primarily, whenever the central bank does not announce the exchange rate path, the private sectors wouldn't predict about the future economic situations by using current exchange rate specially when there is disinflation in the economy. Secondly, if the control over the exchange rate is asymmetric or mismatch with the needed rate of exchange, and huge amount of capital out flow taken place following the misalignment, the central bank may lose its control over the macroeconomic variables (Bofinger, 2001). A dirty floating or Managed floating regime may lead for high volatility of all economic variables as long as there is very active government intervention in to the foreign exchange market (Erformance and Levy-yeyati, 2001).

When we consider the characteristics, advantages and disadvantages of the managed floating exchange rate system, we can conclude that by realizing the regime, nations can affect their BOP account positively on one hand and they can reduce the risk of financial speculation on the other hand. Since the system enables countries to occasionally intervene in to the market and set the exchange rate according to the trading partners, the probability of that particular nation to get a better BOP account is high.

2.1.4. Price Competitiveness and export performance

Real effective exchange rate, REER, is a key macroeconomic relative price, which plays an important role in the board allocation of resources in production and spending. A narrowly defined notion of competitiveness is that of international cost and price competitiveness which measures the comparative prices or costs across countries in a common currency. This measure, the real exchange rate, is calculated as $q = ep/p^*$ where the exchange rate, e, is the foreign currency per unit domestic currency), and p/p^* is the ratio of domestic prices (costs), p, to foreign prices (costs) (Kassie, 2015).

If domestic prices, p, rose faster than foreign prices, p*, the real exchange rate, q, would appreciate (rise) reflecting a decline in competitiveness of domestically produced goods with given imperfect substitutability between traded goods. Thus, the real effective exchange rate (REER), which essentially measures the evolution of relative prices or costs denominated in a single currency, remains the most commonly used measurement of international competitiveness of a nation at different level of income. Its movement may either over or understates changes in country's international competitiveness position, means that a depreciation of real exchange rate has a positive influence on export sector while the real appreciation of the local currency tends to reduce the external competitiveness of a nation (Kassie, 2015).

Therefore, a real exchange rate appreciation tends to make domestic goods more expensive at home than abroad so that it becomes difficult for export producers to sell their goods abroad but more attractive to sell their goods at home. These explain why the real exchange rate is usually used as a measure of international competitiveness and determine export. However, it should be noted that a more competitive exchange rate might improve short run competitiveness and hence export performance while the real exchange rate in the long run is supposed to converge to its equilibrium level so that sustain improvement in competitiveness requires enhanced productivity and resource reallocation to more dynamic sector (Stoykova, 2021).

A misalignment or non-equilibrium movements of a REER suggests either over-valuation or under valuation of the exchange rate of the national currency and competitive stance of the economy may be jeopardized. For instance, REER misalignment in terms of real overvaluation could adversely affect export performance since real overvaluation reflects a loss in country's competitiveness and misallocations of resources toward the non-tradable sector. More precisely, appreciation of a real exchange rate relative to its equilibrium value lowers exports and raises imports, thereby lowering net exports (Kassie, 2015). Proponents of free trade argue that it leads to economic gain and prosperity. Removal of trade barriers creates competitive pressures and opportunities for technological transfer leading to productivity gains and restructuring of the economy. Trade benefits however come with increased specialization where a country produces according to its comparative advantage (Paper et al., 2005).

International trade theory provides a useful framework in analyzing the concept of competitiveness of a nation, an important concept for explaining export performance hence pattern of trade. The potential to trade according to Heckscher- Ohlin (H-O) theory occurs when relative prices differ between countries. According to this theory, the pattern of specialization and trade depends on relative costs. Therefore cost of production is an important determinant of export performance. Countries produce at lower costs will sell cheaper than economies where cost of production is high. Similarly, economies that produce at higher costs will sell at a high cost. Thus according to the model, a country will export a product that uses low production cost where factors of production are abundant. Dornbusch, et al (1977) argues that multiple goods through export diversification increases trade. Goods or products differ across countries which determine competitiveness. These traditional models focus on comparative costs or market participation of countries (Dornbusch et al., 1977).

The new trade theories suggest that product differentiation, economies of scale, and domestic policies influences competitiveness hence export growth of an economy. The models assume that differences in countries are exogenously given which misses the dynamic developments from trade. Theories of international trade should include technical progress and dynamic gains that are endogenous to trade, because these gains are much more significant than any static gains. Echevarria (2008) argues that in the long-run comparative advantage is mostly driven by total factor productivity which measures the output of an economy relative to the size of its primary factor inputs and this explains why most less developed countries are likely to export primary products because of lack of factor inputs in production process (Widodo, 2009).

Porter (1990) argues that in order to understand national competitiveness, it is important to know why some specific industries which are highly successful are located in the same region or even country. According to Porter high living standard is the main goal of nation and to achieve this goal a nation needs to productively employ its resources. Therefore, Porter analysis of competitiveness focuses on productivity and aims at understanding why one country is able to capacity build to achieve high levels of national productivity overtime compared to other countries. The author focuses on national competitiveness at international level in trying to look

at how countries compete with each other through their exports and location of activities abroad (Mudambi, 2002).

2.1.5. Export Performance and its determinants in developing Countries

Export performance is can be defined as the relative success or failure of the efforts of a firm or nation to sell domestically produced goods and services in other world and it can be described in objective terms such as sales, profits, or marketing measures or by objective measures such as distributor or customer satisfaction. Low-income countries face difficulties to take advantage of trade opportunities like by primitive transportation systems, inadequate public institutions, underdeveloped financial systems, low levels of human capital, and weak or non-existent safety nets, which make people particularly vulnerable to shocks. Consequently, despite some success with trade reform, export supply response in many low-income countries has been disappointing. In developing countries the export volumes are generally small and concentrated in a few products, frequently in natural resources, and they commonly have more difficulties than middle-income countries shifting resources into new export activities (Biggs, 2007).

Mold and Prizzon (2008) also tried to indicate that one of the most extensively cited facts of African trade performance is that the continent's share in world merchandise trade, measured in value terms, has declined steadily since 1980, from around 6% to around 2% in the late 1990s, with a subsequent mild recovery in the 2000s to around 3%. That decline in the world share of exports has been particularly marked for Western and Southern Africa. Exports are very important to African countries even if African exports are not very important in the world market. Based on the trade theory of Comparative advantage, Africa continues to produce and export its raw materials or primary goods, where it is said to have the comparative advantage as Amin et al. (2007) identified. But the comparative advantage theory has been disappointing as African countries have been forced in to the role of exporting raw material and other primary commodities with little or no development impact. Most of Sub-Saharan African countries depend almost on primary commodities for their foreign exchange earnings (Amin et al., 2007).

As explained by Ibrahim (2007), in developing countries, especially Sub-Saharan African (SSA) countries, pattern of exportable goods is dominated by primary agricultural products and for export of processed and semi-processed agricultural products there is limited access to the

international markets. Moreover the countries are facing decline in the prices of primary goods in the international market. However, LDCs basic focus was only to solve problems related to supply side bottleneck without paying much attention to the demand side problems or in some cases taking the demand side for granted. The export sector of SSA is highly affected not only by domestic policies but also by international policies including the performance of the world economy and other exogenous factors like institutions, governments' commitment, natural resource and intensity and prevalence of poverty (Hassen, 2007).

Oyejide (2007) identified that many African countries began the process of reforming their trade, investment and exchange rate regimes around the mid-1980s. These reforms constitute of, a shift from an inward-looking and import-substituting industrialization strategy to an out ward-oriented and export-led development strategy. Accordingly, the primary focus of policy gradually began to reflect increased concern for raising the profile of the export sector and more specifically for achieving the goal of significantly expanding and diversifying African exports.

Supply conditions are fundamental in defining the export potential of an economy, and for a given level of access to international markets, countries with better supply conditions are expected to export more. Key determinants of supply side conditions are classified as real gross domestic products, macroeconomic environment/real exchange rate, foreign direct investment and institutional quality. The first major factor that affects export supply capacity is the real exchange rate. The real exchange rate can be an important element in determining export growth, diversification and international competitiveness of goods produced in a country. It is a key variable that requires close government supervision in any effort to expand and diversify exports (Biggs, 2007).

According to Allaro (2010), determinants of export performance can be classified into two broad components. These are internal and external components. According to him external components include market access/entry conditions and a country's location which include foreign markets while internal components are related to supply-side conditions. Typically, countries presents at the centres of fast growing region are more likely to benefit than countries situated outside that region. Second, the determinant is likely to be related to competition and trade policy (the market access/entry component) which could have in principle a similar impact on trade than geography.

Finally both quantity and quality of physical infrastructures (the development component) are expected to play important roles (Rega, 2016).

When we look at specifically the factors affecting export performance of Ethiopia, different researchers have put their effort towards identifying and addressing these constraints. Mekbib (2008) classified factors affecting export performance into two broad categories. These are domestic and external factors. According to him, External factors are factors that are related with international/regional and individual country's trade and related policies. For instance, the rules established by different international organizations such as world trade organization may probably promote external trade in the long run. However such policy pressurizes developing economies to open up without allowing enough time to prepare for the challenges, could have a serious impact on their export performance (Ayalew, 2016).

Also Mouze (2005) identified that the agricultural exports of Ethiopia as a function of real effective exchange rate, terms of trade, infrastructure variable measured by the percentage of paved road to total road, net value of world trade, agricultural input and a dummy to capture the impact of government change. As a result the Error correction model shows that only real effective exchange rate, terms of trade and fertilizer consumption are the significant short-run and long-run determinants of agricultural export supply of the country (Mouze, 2005).

Belayneh and Wondaferaw (2012),with their work, determinants of export performance in Ethiopia as a function of real gross domestic product of trading partners, real output of Ethiopia, real effective exchange rate, openness, public expenditure on transportation and communication and private sector credit. With the help of Johansson co-integration and Vector Error Correction approaches, their findings revealed that the long run export performance has found to be positively influenced by real effective exchange rate, openness, RGDP of home country, infrastructural development and private sector credit. The RGDP of trading partner has found to be statistically insignificant (Anagaw and Demissie, 2012).

By summing up the above literature, the researcher interested to include the following variables in addition to real exchange rate as the determinants of export performance of coffee and khat Ethiopia. Among several factors, real gross domestic product, foreign direct investment and real

gross domestic product of Germany which is the proxy for foreign income to see demand side factor on the export performance of coffee and khat in Ethiopia.

The effect of the exchange rate on exports depends on the price elasticity of export supply because the real exchange rate should incorporate the price effect on exports. Thus, the higher the price elasticity, the more competition face exports of a particular country on the world market. In general, industrial products have a higher price elasticity than primary products, which causes industrial exports to respond perfectly to changes in the exchange rate (Oyejide, 2007). Conversely, the low response to price changes of demand for primary products, which are the main exports of LDCs, implies that LDC exports respond imperfectly to changes in the real exchange rates (means the effect of exchange rate changes on LDCs exports is ambiguous).

Another supply side factor that affects the export performance of major export commodities in Ethiopia is real gross domestic Product (GDP).The higher GDP values in the exporting country imply increased capacities for export. It is expected to have to have a positive impact on exports. For instance, Fenta (2018) in his study of the effect of currency devaluation on major export earnings of commodity (coffee, oilseeds and hides and skin) in Ethiopia confirmed that there is a long-run and significant relationship between export earnings and the foreign real income of the trading partners (Fenta, 2018).

Among the demand side variable that affect the export performance of major commodities of Ethiopia is foreign income which is peroxide by real gross domestic product of Germany to see its relationship with foreign income for major export commodities. Foreign income for exports has been considered as an autonomous factor that affecting exports earning from developing countries because this there is little that the government can do to influence the foreign demand (NBE, 2003). Rather, it is argued, by orienting the export strategy to those products and markets in which the growth in demand is relatively faster, could countries improve their export earnings or performance. Samuel (2019) in his study of the effect of real exchange rates on the export of Ethiopia confirmed that there is a long-term relationship between export earnings and the real income of the trading partners. In this study foreign real GDP has been included in the present

study just to identify the direction of influence of this variable on export performance of Ethiopia's major export commodities.

Foreign direct investment (FDI) is another important factor affecting the export supply capacity of a country. There is a consensus among development economists that FDI inflows are likely to play an important role in explaining growth of recipient countries. By increasing capital stock, FDI can contribute to a more efficient use of existing resources and absorb unemployed resources, and thus, increase a country's output and productivity (Khadaroo, 2007). However, the World Bank (2007) notes that the role of FDI in export promotion depends crucially on the motive for such investment. If the motive behind FDI is to capture the domestic market (tariff-jumping type of investment) it may not contribute to export growth. On the other hand, if the motive is to tap export markets by taking advantage of a country's comparative advantage, then FDI may contribute to export growth. Thus, whether FDI contributes to export growth or not depends on the nature of the policy regime (Sharma, 2000).

2.2 Empirical Literature

There are various studies that carried out by different researchers about the impact of exchange rate devaluation on different macro-economic and micro-economic variables. Most of the times, economists do not agree on the net effect of devaluation on macro-economic variables. While some of them argue that devaluation has a positive effect, others do not support such argument that devaluation has a positive effect. As a result of different argument in the area of devaluation, this study would look at to investigate the effect of currency devaluation on Ethiopia's major export commodities: in case of coffee and khat. In order to examine the effect of currency devaluation on the economy as a general it is important to review the major available studies carried out in other developing countries and Ethiopia because most developing countries have common characteristic with regard to their economy as a whole.

The study undertaken by Bangura et al. (2012)shows exchange rate depreciation is a potential source of inflation in Sierra Leone. Also found they found result that the pass-through to consumer prices is significant. They have employed the Structural Vector Auto regression (SVAR) model for the Sierra Leone economy to estimate the pass-through effects of exchange rate changes to consumer prices.

Bwire et al. (2013) have studied the exchange rate pass-through in Uganda with quarterly data over the period 1999 to 2012 using triangulation of well-specified VECM and SVAR models. They came up with a strong and significant association between the exchange rate movements and inflation in Uganda. The pass-through to domestic inflation, although incomplete, was modest and persistent with a dynamic exchange rate pass through elasticity of 0.48. As a similar case of Sierra Leone, exchange rate movements are a potential source of inflation in Uganda.

Dania and Ogedengbe (2019), empirically investigated the impact of exchange volatility on non-oil export performance in Nigeria for the period 1981-2017, using Augmented Dickey-Fuller (ADF) unit root test, Johansen co-integration test and error correction model (ECM) employed to investigate the speed of adjustment. Their estimation results revealed that exchange rate volatility had negative and significant effect on non-oil export performance in Nigeria. Further, the results indicated that interest rate and foreign direct investment had negative and significant influence on non-oil export while total government expenditure had positive and insignificant impact on non-oil export in the economy.

The study done by Ngondo and Khobai (2018), to investigate the impact of exchange rate on exports in South Africa for the period 1994-2016 by employing the Autoregressive Distributed Lag (ARDL) approach shows that exchange rate has a significant and negative influence on exports while real interest rate and investment had positive and insignificant impact on exports in South Africa. More so, the results indicated that inflation had positive and significant influence on the exports of South Africa.

Osabohien et al.(2019) examined the impact of agricultural export on Nigeria's economic growth for the period from 1986 to 2016, through the application of unit root test, co-integration test and vector error correction model (VECM) technique to analyse the long run impact and short-run dynamics of agricultural exports on Nigeria's economic growth. The variables utilized in the investigation include real gross domestic product (economic growth), agricultural exports, foreign direct investment, real exchange rate, inflation rate and labour force. The results of the unit root test indicated that all the variables were non-stationary at levels; however, all the variables became stationary at first differencing. The results of the co-integration test indicate evidence of long-run equilibrium relationship among the variables. More so, the results from the

VECM technique revealed that an agricultural export has negative and significant impact on Nigeria's economic growth.

The empirical studies regarding the effects of devaluation on the economy that focuses on Ethiopia have been very limited. Mengistu (2014) on the determinants of export performance of Ethiopia by a gravity model with panel data using 30 Ethiopia's trading partners for the period 1995–2007. The model is estimated with the Generalized Two Stages Least Squares (G2SLS) method. Endogeneity of FDI and GDP to exports, heteroscedasticity and serial correlation for AR (1) are given high concern. The results show that good institutional quality and internal transport infrastructure appear to be major determinants, whereas the real exchange rate and FDI have no statistically significant effect on Ethiopia's export performance. Likewise, the growth of domestic national income affects Ethiopian exports positively.

Elias (2011) found that real exchange rate is one of the factors that can affect the level of export of hides and skin but there is no guarantee for its intended long run effect that the change in real exchange rate definitely positively affects the level of export. He concludes that there is no long run tendency for exchange rate and volume of export to settle down to an equilibrium track. His finding indicates that exchange rate is one but not the only factor that affects the export volume of hides and skin. It is obvious that production of hides and skins are subject to many other factors including weather condition, the farmer's attitude, and government effort for improved technology dissemination, type of sheep and goat bear and many other which are not included for estimation.

Tekeste (2012) on his study identified some of the main determinants of agricultural export in Ethiopia for the period 1980-2010. To test empirically the relationship between agricultural export performance and its major selected determinants such as terms of trade, gross domestic product, domestic price, world price, kilometres paved roads and fertilizer input import over a period; co integration and error correction approaches in the regression analysis were used. The results from the co integration and error correction models shows that all the explanatory variables are significantly affect agricultural export performance in the long run except domestic price. In the short run, gross domestic product (GDP) became insignificant and negative in sign which was unexpected. Domestic price was also insignificant like in the case of long run.

However, except these two variables other variables were found to significantly affect the agricultural export performance of the country. On the other hand, out of the variables significantly affected agricultural export both in the long run and short run; terms of trade, world price, fertilizer input import over a period and kilometres of paved roads affected agricultural export positively.

Allaro (2011) examined the determinants of oil seeds export over the period of 1974-2009. His classical linear regression result has shown that export performance is positively influenced by only real output and nominal exchange rate whereas both domestic and foreign price of oil seeds have no influence on oil seed exports. As indicated in the paper, the accuracy of data that he used in his studies was mentioned as a problem but the way that how it was managed was not clear hence the result may not be genuinely showing the reality.

Unlike Hailegiorgis, Anagaw & Demissie (2012) conducted the research on determinants of an aggregate export performance in Ethiopia by using data over 1970/71-2010/11 through Johahanson co-integration and Vector Error Correction approaches. Their result indicates that real effective exchange rate, openness of trade, real GDP of the home country, infrastructure development and private credit to-GDP ratio have positive and significant effect on export performance in the long-run period of time. While the impact of the real GDP of trading partner on export performance is statistically insignificant. Only last year openness of trade is directly affects export performance of current in short-run period. It is more relatively comprehensive to make generalization about Ethiopian export performance.

Fanta and Teshale (2014) also carried out scientific study in similar way with Anagaw and Demissie (2012) in terms of the scope of the export but with different methodological approach, measurement and time intervals. They tried to shed light on whether the financial and fiscal incentives that had been provided by the government have effect on export growth and in what extent they affect it, by using time series data over the period 2003 to 2011. Finally, based on Johanson co-integration test and Vector Error Correction model result, they reached on conclusion that both financial and fiscal incentives have positive and statistically significant

effect on export performance. But the real exchange rate has a statistically significant negative long run effect on export but not in the short run.

Mengistu (2014) studied the link between Ethiopia's export performances with 14 major trade partners during 1995-2010 by employing gravity model analysis. The result indicates that domestic GDP growths, the GDP of trade partners, the population size of Ethiopia and trade partners, and per capita GDP of both countries have positive and significant effect on Ethiopia's export performance whereas the distance between Ethiopia and its trade partners has adverse influence on export supply from Ethiopia.

Mohammed Umer (2015) shows the likely possible relationship between Devaluation and gross domestic product in the Ethiopian Economy. In his study he employed the OLS model and co-integration test to assure or reject the theory. Theoretically, following devaluation the nations import will be negatively affected and export will be positively affected so that output will increase to some extent in order to meet the increase in export. The Johansen co-integration test empirically indicates as there is no long run co-integration between the variables of both the export and import equation such as (export, world income, and real exchange rate) and (import, domestic income, and real exchange rate) respectively. Hence, changing the nation's exchange rate will not affect both the nation's imports and exports in the long run as a result, output, as well as trade balance, will not be affected in the long run whether devaluation applied in the economy or not.

Hussien (2015) was conducted study on the determinants of coffee export over the period 1965 to 2005 by Error correction modeling approach. Ethiopian coffee export supply, in the long run, negatively and significantly affected by relative domestic price, real exchange rate and term of trade but foreign capital flow is insignificant. Whereas real income in the long run has positive and significant elasticity's in the short run, it has negatively determined by real exchange rate while foreign capital inflow, real income and term of trade determine positively. As he mentioned in his paper, he was made some adjustment on his data due to lack of data availability might jeopardized the regression result.

Gebreyesus (2015) investigated the major determinants of coffee export supply in Ethiopia for the period of 1981-2011 via Vector Auto Regressive and Error Correction approach. The empirical result obtained from his study indicates that the supply of coffee export responds positively to the change in real export price of coffee, openness to trade and infrastructure growth. It has also reacted negatively to world supply of coffee but statistically insignificant to exchange rate.

Sawore (2015) also examined the determinants of export trade over the period 1974-2014 using three-stage-least square approaches in the simultaneous equation framework. The regression result shows that real GDP of home country, infrastructure, term of trade, real exchange rate and openness of trade have significant and positive effect on export. But GDP of trading partners is insignificant and relative price is negatively and significantly related to the export. Tadesse & Brar (2016) had taken a look at the sources of Ethiopia's export growth during the post reform period of 1995-2014 by employing a constant market shares decomposition analysis. According to their analysis, the total world trade and competitiveness of the Ethiopian export are the most important drivers in Ethiopian export growth.

Bassa & Goshu (2019) analyzed the determinants of coffee export over 1977-2016 by using co-integration and Vector Error Correction Models. The result has shown that, in the long run, the coffee export inversely relates with the coffee production and world coffee supply, and directly relates to export price and labour force

Eshetu & Goshu (2019) examined the export determinants of Ethiopian coffee to 31 trade partner's countries over 1998 to 2016. According to system generalized moment method analysis, factors such as trade openness, population size of Ethiopia, foreign direct investment, and institutional quality index of Ethiopia have positive and significant effect on coffee export while population of partner countries, weighted distance, lagged export volume and real exchange rate have negative and significant influence on it. This study has tried to identify the determinants of coffee export by taking very big numbers of trade partners which make it more relevant when compared to studies held by Alelign (2014) and Murad and Beyan (2020), but like other it was restricted to single export commodity

Bereket (2020) study identified the determinants of export supply in Ethiopia over 1977-2016 by using ARDL model. According his ARDL output, in the long run, economic variables such as real GDP, Terms of trade, trade openness, trade partners GDP and investments are important determinants to promote export while real exchange rate has divesting effect on it. His study has been more recent, comprehensive and well organized compared to all others studies than those presented above.

Baker & Yuya (2020) held study on determinants of Sesame export performance in Ethiopia by using 13 years panel date from 13 Ethiopian Sesame importer countries during 2002 to 2014. The random effect panel gravity model result indicates that the domestic and partners real GDPs have positive and strong effect on Ethiopia's Sesame export supply. On the other hand, real exchange rate and weighted distance between Ethiopia and its partners have significant and negative effect on Sesame export. This study, just like Alelign study's, has fixed to a single commodity and some limited Sesame importing countries without mentioning their total share in Ethiopia's Sesame export.

2.3. Devaluation background in the context of Ethiopia

In Ethiopia the exchange rate policy has passed through different form of government which is obvious. According to national bank of Ethiopia before 1992, the country was exercising a fixed exchange rate regime, in which the rate was solely determined by the central government. Since 1992 the country started implementing an exchange rate policy which is closer to managed floating, where there is a government intervention whenever necessary to stabilize the foreign exchange market (Tafesse, 2019).

The Ethiopian Birr, after almost two decades was slightly devalued to 2.50 *Birr* per US dollar in 1January1964. In 1971 following the floating of dollar and ceasing of its convertibility to gold, the *Birr* was revalued to 2.30 *Birr* per US dollar (by 8.75%) on 21 December 1971. This rate served until 1972. Not so long after, however, the U.S dollar price again was devaluated by 10 %. The subsequent 10% devaluation of the US dollar had temporarily brought about under valuation of the *Birr*. The Ethiopian *Birr*, it was revalued to 2.07 *Birr* per US dollar in February 1973. As the price level increased and shortage of foreign exchange become acute, the real

exchange rate appreciated and an alternative unofficial foreign currency market became widespread, and the un-official exchange rates averaged about 6 to 7 *Birr* per US dollar (Taye, 1999). However, this fixed official exchange rate was left unaltered for two decades despite the floating of the major world currencies including the US dollar (1974-1991).

Then on October 1992 the transitional government of Ethiopia made a massive devaluation of the currency by 142 % from its pegged rate of 2.07 *Birr* per US dollar to 5 *Birr* per US dollar, showing the first major change on the value of *Birr.* According to Eshetu (2017), this measure was made for combating current account as a new economic reform program designed to stimulate the external imbalance, boost output growth in general and export growth in particular. After the devaluation in 1992 the exchange rate is changed from fixed to flexible rate in order to control overvaluation through a gradual depreciation of domestic currency. However, during the fiscal year 2007/08 the rate of depreciation against other foreign currencies increased compared to the previous years (Fassil, 2017).

In the 2009/10 and September 2010/2011 the Ethiopian *Birr* was depreciated to 23.7% and 16.5% respectively against the US dollar (Genye, 2011). On September 2010, the currency devaluated by 16.7 % from a value of 13.63 to the US dollar to 16.35 was aimed to boost export performance and bring about structural change in the economy (Wundes et al., 2010). Consequently, this devaluation of the Ethiopian currency against major foreign currencies resulted in price inflation rising into the double-digits on both imported and locally manufactured goods. After seven years, the Ethiopian's central bank devalued *Birr* by 15 % on October 10, 2017. The *Birr* was quoted by the National Bank of Ethiopia (NBE) at a weighted average of 23.41 against the US dollar to be 26.92 *Birr* per US dollar. The central bank also announced that it has raised the main interest rate to 7 percent from 5 percent to stimulate savings as well as to counter the inflation (Hailu and Saliya, 2020).

2.4. Conceptual framework

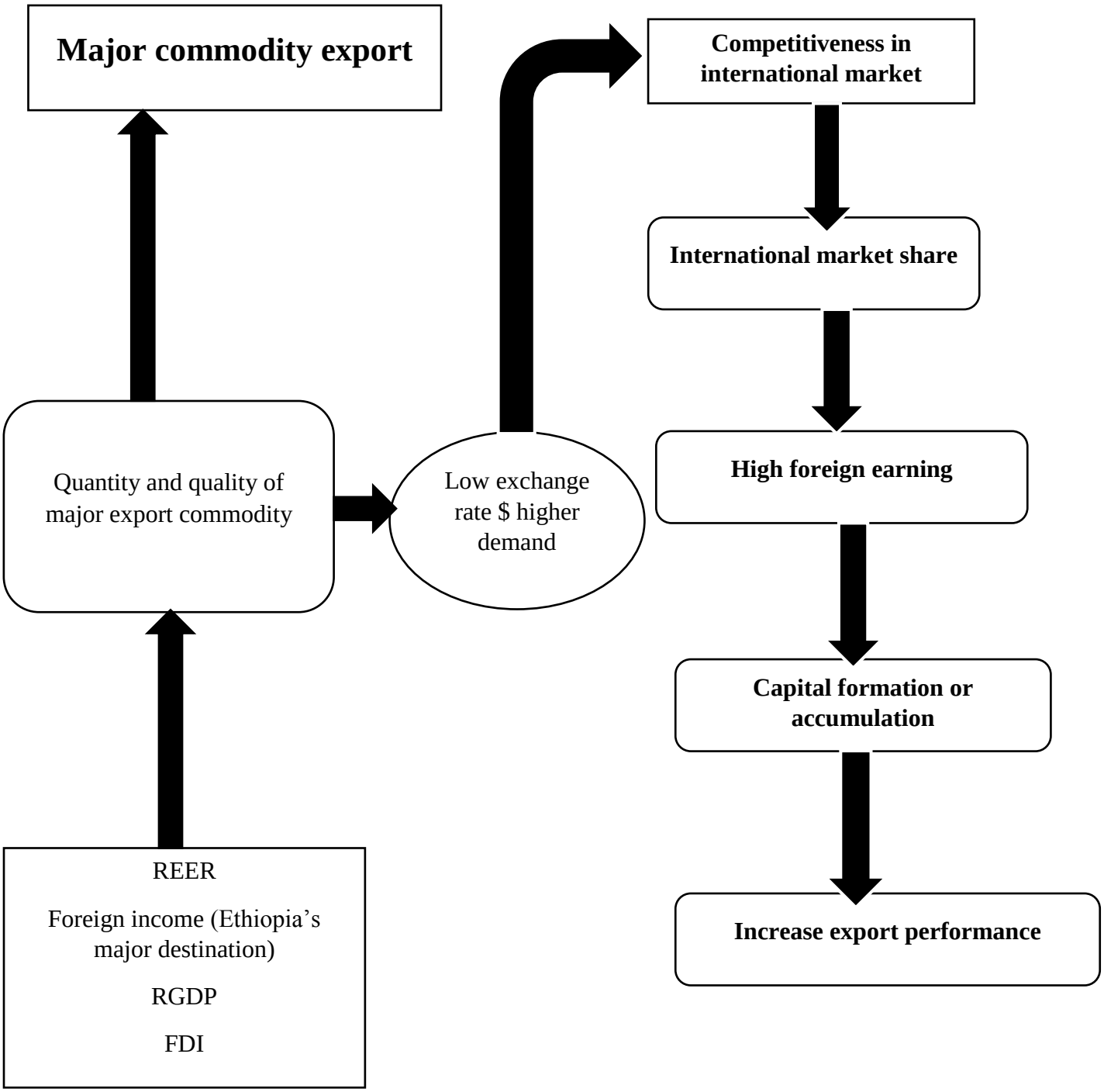
Developing countries such as Ethiopia have only two abundant factors of production that are labour and land, with little capital. Due to these characteristics, the dominance of agriculture is one of the major distinguishing features their economy. In their trade, export tends to be dominated by the primary that comes from agricultural sector. As true for Ethiopia, the balance

of payment position is against to the developed 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 performance of export. The main factors are generally investigated as internal and external (demand side) factors. Based on available theoretical literature the variables such as real gross domestic product, foreign direct investment, and foreign income and real effective exchange rate are called supply and demand side determinants of export performance. Ethiopia is one of the countries whose export performance depends on international market economic situation.

As the economy is a small open price taker economy in the world market World market forces, generally determine the prices of its exports. Hence, the demand for Ethiopia's export in the world market is influenced by fluctuations in developed countries income especially our major export destination. The supply side factors in the study include foreign direct investment and real gross domestic product. If the volume and quality of the agricultural product is in the country improved, the competitiveness in international market and the share of the international market will increase. When the foreign earning that comes from agricultural commodities increase, the country will have high chance for capital formation and thus positive impact on performance of export.

Figure 2.1: Conceptual frame work



Source: own conceptualization

CHAPTER THREE
RESEARCH DESIGN AND METHODOLOGY

3.1. Research approach and design

This research paper aimed to identify and analyze the relationship between the dependent variable which is the export performance of major products, and the independent variable that is currency devaluation of real exchange rate and intervening variables that are real gross domestic product, foreign income which is represented by real income of Germany and foreign direct investment. So, to achieve the desired objectives, quantitative approach is more appropriate to fulfill the purpose of this research. And those variables can be easily quantified. In quantitative research it is possible to compare and study several determinants and analyzing and testing them empirically will prove if there are relationships to be found in order to draw conclusions on the research (Kothari, 2004).

This research study would be designed with a Causal research, also called explanatory research. It is the investigation of (research into) cause-and-effect relationships. To determine causality, it is important to observe variation in the variable assumed to cause the change in the other variable(s) and then measure the changes in the other variable(s). Other confounding influences (is a variable that influences both the dependent variable and independent variable causing a spurious association.) must be controlled for so they don't distort the results, either by holding them constant in the experimental creation of data, or by using statistical methods.

3.2. Data Source and Type

The quality and significance of output is highly reliant and depend on the quality and availability of its inputs. Therefore, the quality of any macroeconomic analysis can be determined by the accuracy, consistency and availability of any macroeconomic variables in question. The study has used secondary annual time series data for all the variables under consideration from 1987 to 2020, which is for about 34 years. The data would have been sourced from both the domestic and external organizations. Among the main domestic sources, Ministry of Finance and Economic Cooperation (MoFEC), National Bank of Ethiopia (NBE), Central Statistics Agency (CSA) and

the Ethiopian Economic Association (EEA) are the major one. External sources include; World Bank (WB) data base and International Monetary Fund (IMF).

3.3. Method of Data Analysis

Descriptive as well as Econometric methods were employed to discuss and analyse different issues. In the Econometric method of analysis part, the researcher employed Johansen co-integration, Vector Error Correction Model and impulse responses to investigate the effect of the effects of real effective exchange rate, domestic income, foreign income and foreign direct investment on the Ethiopian major export commodity in case of coffee and khat. The data is analysed using Eviews 10 software. The nature of the model is given in natural logarithmic form to make the analysis and interpretation of the results easier. In descriptive statistics, tools like simple statistical tools, tables and percentage were employed in the analysis part.

3.4. Econometrics Model Specification

The response of export performance of major commodities to changes in macroeconomic variables depends primarily on whether those changes are transitory or permanent. Therefore, it is important that this decomposition is performed in the case of econometrics estimation. Now, the researcher specifies an econometric model that distinguishes between the permanent (trend) or transitory (short-run) components of export earnings and its macroeconomic determinants. To identify, let Y_{Et} be the export earnings for Ethiopia in year t and X_{Et} be a set of its Economic determinants of major export commodity. According to Calderon et al (2000), the permanent and transitory effects are given by

$$Y_{Et} = Y^{T}_{Et} + Y^{P}_{Et} \text{ and } X_{Et} = X^{T}_{Et} + X^{P}_{Et} \quad \ldots\ldots\ldots\ldots (3.1)$$

Where, the superscripts T represent the transitory and p represent permanent components. A transitory fluctuation implies the deviations from the trend or permanent components. Empirically, the transitory component represents short lived fluctuations and also the permanent component represents movements in the (long run) tendency of a variable. This study focuses on demand and supply side factors of Ethiopian export performance in case of major export commodities. Here, the study shows the effect of currency devaluation on Ethiopia's major export commodity performance. And it is a function of real GDP, real effective exchange rate, foreign direct investment and foreign income. In relation to approaches followed by other

empirical works on export responses to currency devaluation, in this research paper, the researcher regresses the export to other explanatory variables. The empirical formulation of the model to be used in this study is given by the following function.

Total value of major commodity (TEV) =f (RGDP, REER, FRGDP FDI)…… (3.2)

Thus to determine Ethiopian major commodity export performance, a log-linear form export performance model is employed by incorporating both supply and demand-side related variables. The model is therefore similar to the one who used by Anagaw & Demissie (2012) in estimating determinant of export performance in Ethiopia and Hailegiorgis (2011) in estimating export performance of oil seeds in Ethiopia. Therefore the regression equation can be expressed as follows. But in measuring the variables, log normalization has been applies and hence the natural logarithm forms have been taken for each variable.

$$\text{LnTEV}t = \alpha + \text{L}nREERt + \text{L}nRGDPt + \text{LnFRGDP}_t + \text{LnFDI}_t + \Sigma t \ldots\ldots\ldots \textbf{(3.3)}$$

Where LnTEV: Total export value of major export products in the year t in log form

LnREER_t : Real Effective Exchange Rate in log form (which is found by trade weighted Birr/foreign currency

LnRGDPt : Real gross domestic product in the log form which is a proxy for domestic national income.

LnFRGDPt: Foreign real gross domestic product in the log form which is represented by the real gross domestic product of Germany as our export destination in case of major export commodity.

LnFDI_t : The net inflow of foreign direct investment in the log form in the year t

3.5. Description of the Variables and Their Expected Sign

The endogenous variable in this study is export performance of major commodities (coffee and Khat). Export performance can be measured by different mechanisms. It may be measured by the total values of goods and services sold abroad in a constant price, by the total volume of goods and services sold in the external market, by its annual percentage growth or by the relative share of exported goods to a country's total GDP. In this study, export performance of major export commodities would have been measured by its total annual values in the form of natural logarithm of values has been taken.

LnREERT: In our study, the real effective exchange rate is defined as the units of the home currency per a unit of foreign currency taking accounts of trade partner countries trade weight and relative inflation Put differently, an increase in the REER of the Birr (depreciation) leads to an improvement in the export performance of major commodity in Ethiopia in the long run, while a decrease in the REER of the Birr (appreciation) leads to a deterioration in the major commodity export performance in the long run. Real effective exchange rate is the most important variable of interest in this study because it is the variable which is usually used to measure the degree of international competitiveness of the country in the external involvement of both bilateral and multilateral trade with the rest of the world. The real exchange rate can be obtained by using the amount of Ethiopian Birr per unit of trading partner's currency and relative price of two trading countries'. From this fact it is assumed that an increase in real effective exchange rate has positive effect on export performance of major export commodity in Ethiopia.

LnR*GDP*: Higher RGDP values in the exporting country imply increased capacities for export. It is expected to have a positive impact on exports. For instance, Kumar (1998) in his study on the determinants of export growth in developing countries confirmed that GDP has a significant positive impact on export volume. He also underlined that higher level of production is the main cause of export expansion. So, a higher GDP implies a higher production and hence larger volume of exports. However, if the increase in real income induced the consumption of export commodities by residents, it will decrease export performance. In this case real GDP is expected to have negative effect on export performance in the long-run. Therefore, the expected sign of RGDP on TEV is indeterminate.

LnFRGDP: As explained above foreign national income is represented by the real gross domestic product of Germany and it is expected to be an important variable to examine the demand side factor of export performance in case of major export product of Ethiopia. The researcher has employed real gross domestic product of Germany to capture the effect of foreign income on export performance of major commodity. Based on NBE report from 2010 up to present, the major export destination for Ethiopian major commodity especially for (coffee) is Germany. Ethiopia is one of the countries whose export performance depends on the external

factors and economic situation it faces. As the country is a small open price taker economy in international market, international market forces, generally determine the prices of its exports. Hence, the demand for Ethiopia's export in the international market is influenced by fluctuations in power developed countries income particularly that of our export destination. The sign of foreign income is expected to be positive because other things remain constant as the income of foreigners' rise the demand for domestic goods will tend to rise, which will have a positive impact on domestic export performance in case of major commodity.

***LnFDI*:** Foreign direct investment does contribute to the technological upgrading and structural evolution of the export sector, the structure and effectiveness of the sector is an important force to increase the export performance and foreign earnings. Thus, export performance positively responds to FDI in the long run. The experience in a number of countries suggests that FDI strongly contributes to the transformation of the composition of exports. For instance, it has been well documented that FDI inflows to Singapore or more recently China, have helped to increase significantly the technological content of exports by supporting strongly the development of export supply capacity. A lot of economists really like FDI, especially when it's flowing from rich countries into poorer countries. The idea is that when international companies come in, they can either shake up an existing industry, because they're bringing competition for the domestic companies that already exist, or can create entirely new industries. FDI can also strengthen local economies by creating new jobs and boosting government tax revenues (WB, 2017).

3.6. Model Estimation Procedure

Initially examining the characteristics (stationarity and long run behaviors of variables) of the time series data is mandatory before any model estimation. Before performing or running any time series regression analysis, testing variable stationarity is very required. Main objective of stationarity test is to get variable which has a constant mean, variance and covariance because regression results from time series data may generate spurious regression if the variables are non-stationary. To check whether long run relationship between all variables exist or co-integration test has applied and Augmented Dickey Fuller (ADF) was used for test of stationarity or unit root test based on the null hypothesis that a unit root is exist in the time series data.

3.6.1. Unit Root Test

It is fundamental to test for the statistical properties of variables when dealing with time series data. Time series data are rarely stationary in level forms. Regression involving non-stationary (variables that have no clear tendency to return to a constant value or linear trend) time series often lead to the problem of spurious regression. This occurs when the regression results reveal a high and significant relationship among variables when in fact, no relationship exist. Before conducting the simultaneous tests with in the model or regression, the variables must be found to be individually stationary. Several tests are usually can be employed to test whether time series variables are stationary or non-stationary. The Dickey-Fuller (DF), the Augmented Dickey-Fuller (ADF) test, Phillips-Peron test and Auto-Correlation Function (ACF) test. In this study, the Augmented Dickey-Fuller (ADF) test had applied to determine the existence of a unit root. Augmented Dickey Fuller (ADF) is a test developed by Dickey and Fuller in cases where the u's are correlated. It involves estimating the following regression:

$$\mathbf{Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha i \Delta Y t - i + \varepsilon t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \mathbf{(3.4)}$$

Where **εt**is a pure white noise error term, Δ is the first difference operator while Y_t is non-stationary, its first difference is stationary where $\mathbf{Y_{t-1} = (Y_{t-1} - Y_{t-2})}$, $\mathbf{Y_{t-2} = (Y_{t-2} - Y_{t-3})}$, **et**c. To perform test, the number of lagged difference terms to include is often determined empirically, since it is required to include enough terms so that the error term in equation is serially uncorrelated. Determining whether a time series is stationary or not involves testing the null hypothesis $\delta = 0$; (i.e. there is a unit root) the time series is non-stationary against the alternative hypothesis $\delta<0$; that is, the time series is stationary. The name unit root came from stationary series case whether the coefficient is unity or less than unity. If the null hypothesis is rejected, it means that Y_t is stationary.

If dependent and independent variables fail the stationary test, as a result data generating process of these variables are non-stationary. These tests are performed on both level form and first differences of both variables. The Implication of the unit root test result on the estimation procedures is that if all variables in the equation are found to be non-stationary at level form, I (0), but stationary at first difference I (1), then co-integration test will be conducted to find the existence of a long-run equilibrium relationship.

3.6.2. Co-integration Analysis

Co-integration means in spite the fact that the series is not stationary at a level and if there is a linear combination between two or more variables the series can be stationary and there exist a long-run equilibrium relationship among them (Gujarati, 2003). If the series are co-integrated, modeling of the long run relationship among variables is necessary. The model to be applied for such a case is VECM, to reconcile the static long-run equilibrium relationship of co-integration with its dynamic short-run equilibrium in time series (In-Moo Kim, 2006).

Two approaches are used to test the co-integration among variables are Engel and Granger (1987) and the Johansen and Juselius (1990). The Johansen and Juselius (1990) define maximum likelihood estimation to establish the rank of the co-integrating vector and it is considered superior to Engel and Granger (19787) approach (Shao 2009). The normality test was undertaken on the basis of this assumption. Thus, the Johansen co-integration approach would be applied in this study. Therefore, the Johansen approach is working with the formulation of a VAR system, with a vector of K variables and is generated by k-order of vector autoregressive process with Gaussian errors.

$$\mathbf{Z_t = A_t Z_t + A_k Z_{t-1} + \mu + \varepsilon_t = 1, 2, 3 \ldots T} \quad \ldots\ldots \quad \mathbf{(3.5)}$$

Whereas $\mathbf{Z_t}$ is Px1 a vector of endogenous variables, $\mathbf{A_k}$ are the coefficient estimates and $\boldsymbol{\mu}$ is the vector of Px1 constants and $\boldsymbol{\varepsilon_t}$ is error term with (0, δ).

Moreover, in the case where variables are difference stationary, it is possible to estimate the model by first difference. However, this gives only the short run dynamics in which case valuable information concerning the long run equilibrium properties of the data could be lost. In order to obtain both the short run and long run relationship one can appeal to what is known as co-integration. Co integration among the variables reflects the presence of long run relationship in the system. In general, we need to test for co-integration because differencing the variables to attain stationarity generates a model that does not show the long run behavior of the variables. Hence, testing for Co-integration is the same as testing for long run relationship (Gujarati, 2003). There are two basic ways of testing the existence of Co-integration between variables of interest and estimating the co-integrating vector: one by Engle-Granger (1987) approach and the other by

Johansen (1998) approach. But in the case of this study, Johansen (1998) approach was employed because it out performs Engle-Granger (1987) approach.

3.6.2.1The Johansen Approach

An alternative approach was proposed by Johansen (1988), a person who developed a maximum likelihood estimation procedure, which also allows one to test for the number of co-integrating relations. The procedure suggested by Johansen (1988) basically depends on direct investigation of co-integration in the vector autoregressive (VAR) representation. The analysis yield maximum likelihood estimators of the unconstrained co-integration vectors, but it allows one to explicitly test for number of co-integration vectors so that the weakness of Engle-Granger (1987) two step procedure are overcome.

Moreover, Johansen test enables to perform estimating and testing for the presence of multiple co-integration relationships in a single-step procedure. The Johansen method does not require a priori endogenous-exogenous distinction among variables and it can also identify multiple co-integration vectors. The Johansen procedure sets out a maximum likelihood procedure for the estimation and determining the presence of co-integrating in VAR system. VAR is one form of multivariate modeling where no variable in the system is assumed to be exogenous a priori. Based up on this procedure, the variables of the model are represented by defining a vector of potentially endogenous variables (Anderson and Maggiora, 2009).

3.6.3. VAR Lag Length Selection

VAR Lag Length Selection Criteria Before estimating the VAR, we will have to decide the maximum lag lengths, to generate the white noise error terms. To determine the optimal lag length different information criteria can be employed. The objective of the information criteria (IC) method is to select the number of parameters which minimize the value of the IC. The most popular ICs are the Akaike (1974) information criterion (AIC), Schwarz's Bayesian information criterion (SBIC) and the Hanna-Quinn information criterion (HQIC). However, to determine the possible optimal lag length looking for the major criteria at which the model selects than other criteria would be the number of lag length.

3.6.4. Vector Auto Regressive and Vector Error Correction Models

3.6.4.1. Vector Auto Regressive (VAR)

VAR describes the dynamic evaluation of the Variables from their common history. It considers the variables in the model simultaneously and thus it reduces the number of lags and also more accurate forecasting is possible because the included information set is extended to include the history of the other variables. One important characteristic of VAR process is, it generates the stationary time series with time invariant means, Variance and Co-variance given sufficient starting values.

The VAR approach does not require structural modeling because it treats every variable as endogenous in the system as a function of the lagged values of all endogenous variables in the system.With the objective of this study, which has to do with the interrelationship between the variables, functional relationship can be formulated in form of Vector Auto-regressive (VAR) equation and VAR equations must be identified in their level form, not in its difference form. All variables have transformed in to their logarithmic form for the matter of appropriateness. Hence, Log-log VAR equations can be constructed as follow:

$$\text{LogEVt}= \beta o+\sum_{i=1}^{k}\beta 1i\ \text{logRGDPt-i} + \sum_{i=1}^{k}\beta 2i\text{logEVt-i} +\sum_{i=1}^{k}\beta 3i\text{logREERt-i} + \sum_{i=1}^{k}\beta 4i\text{logFDIt-i} + \sum_{i=1}^{k}\beta 5i\ \text{logFRGDPt-i} + \mu t \ldots\ldots\ldots\ldots T(3.6)$$

$$\text{logREERt}=\alpha o +\sum_{i=1}^{k}\alpha 1i\text{logRGDPt-i} +\sum_{i=1}^{k}\alpha 2i\ \text{logREERt-i} + \sum_{i=1}^{k}\alpha 3i\ \text{logFDIt-i}+\sum_{i=1}^{k}\alpha 4i\ \text{logEVt-i}+\sum_{i=1}^{k}\alpha 5i\text{logFRGDPt-i}+ \varepsilon t \ldots\ldots\ldots\ldots\ldots\ldots\ldots T(3.7)$$

$$\text{LogRGDPt} =\gamma o+ \sum_{i=1}^{k}\gamma 1i\text{logREERt-i} + \sum_{i=1}^{k}\gamma 2i\text{logEVt-i} + \sum_{i=1}^{k}\gamma 3i\text{logRGDPt-i}+ \sum_{i=1}^{k}\gamma 4i\text{logFDIt-i} +\sum_{i=1}^{k}\gamma 5i\text{logFRGDPt-i} + \nu t \text{----------T (3.8)}$$

$$\text{LogFDIt} = \delta o+ \sum_{i=1}^{k}\delta 1i\ \text{logRGDPt-i} + \sum_{i=1}^{k}\delta 2i\ \text{logEVt-i}+ \sum_{i=1}^{k}\delta 3i\text{logREERt-i} + \sum_{i=1}^{k}\delta 4i\text{logFDIt-i} + \sum_{i=1}^{k}\delta 5i\text{logFRGDPt-i} + \eta t \text{----------T(3.9)}$$

$$\text{LogFRGDPt} =\lambda o+ \sum_{i=1}^{k}\lambda 1i\text{logRGDPt-i} +\sum_{i=1}^{k}\lambda 2i\ \text{logEVt-i} + \sum_{i=1}^{k}\lambda 3i\text{logREERt-i}+ \sum_{i=1}^{k}\lambda 4i\text{logFDIt-i} + \sum_{i=1}^{k}\lambda 5i\text{logFRGDPt-i} +U_t \ldots\ldots\ldots\ldots T\ (3.10)$$

Where; αi, βi γi, δi, λi and Ɗi are parameters to be estimated. “i” represents individual time lag and K represent an optimal level of lag which will be determined based on lag selection

information criterion. While, εt, μt,vt, ηt, Uˊtand Бt represents white noise, innovations, shocks or sometimes called impulse. The above equation can be formulated in matrix representation for the sake of simplicity as shown below:

$$\begin{matrix} logREERt \\ logEVt \\ logRGDPt = \\ logFDIt \\ logFRGDPt \end{matrix} \quad . \quad \begin{matrix} \alpha o \\ \beta o \\ \gamma o + \sum_{i=1}^{k} \\ \delta o \\ \lambda o \end{matrix} \quad \begin{matrix} \alpha 1i & \alpha 2i & \alpha 3i & \alpha 4i & \alpha 5i \\ \beta 1i & \beta 2i & \beta 3i & \beta 4i & \beta 5i \\ \gamma 1i & \gamma 2i & \gamma 3i & \gamma 4i & \gamma 5i \\ \delta 1i & \delta 2i & \delta 3i & \delta 4i & \delta 5i \\ \lambda 1i & \lambda 2i & \lambda 3i & \lambda 4i & \lambda 5i \end{matrix} \begin{matrix} logREERt-i \\ logEVt-i \\ logRGDPt-i \\ logFDIt-i \\ logFRGDPt-i \end{matrix} \begin{matrix} \varepsilon t \\ \mu t \\ \text{□}t \\ \eta t \\ Uˊt \end{matrix}$$

logyt = θ+βiLogXt-i +Uti

And its compact form can be expressed as follows

Logyt = $\theta + \sum_{i=1}^{k} \beta i$ LogXt-i + ϋti---------- (3.11)

Where $Logy_t$ is (n x 1) vector of macroeconomic variables of interest, θ is (n x 1) vector of constants, is (n x n) matrix of coefficients, LogXt-i is (n x n) the lags of endogenous variables and et is (n x 1) vector of white noise, innovations or shocks. And the equation can be estimated by using standard ordinary least square method (OLS).

3.6.4.2. Vector error correction model

The VAR model is a general framework used to show the dynamic interrelationship among stationary variables. However, the time series is not stationary the VAR specified above needs to be modified to allow consistent estimators of the relation among the variables. After testing the long run relationship among the variables by Johansson co-integration test, the next task is developing a vector error correction model (VECM). In order to capture both short run and long run relations in the models the study will use Vector error correction Model (VECM), a special case of the VAR for variables in their first differences. VECM also takes co-integration among the variables under consideration. If there is a long run relation among the variables, an ECM can be formulated to show the long run interaction between variables (Verbeek, 2008). Once the long run co-integration test is confirmed the vector error correction model (VECM) that indicates the short run dynamics parameters (the speed of adjustments by which any shocks in the short run is converged to long-run equilibrium) is followed.

In order to derive vector error correction model from the VAR model, we change the above VAR equations into their respective first difference and the lag of error correction term. The VECM for the purpose of the study can be set up as:

$\Delta Logy_t = \theta + \sum_{i=1}^{k-1} \beta i \ \Delta LogX_{t-i} + \Omega ETC_{t-k} + ut$…… (3.12)

Where, k-1=shows that the lag length is reduced by1 from the VAR model ßi=short run dynamic coefficients of the model adjustment to long-run equilibrium. Ω=speed of adjustment parameter. ETCt-1=the error correction term is the lagged value of the residual obtained from the co-integrating regression of the dependent variables on the repressors. Ut= residual and often called white noise, stochastic error terms, Impulses, innovations or shock. The above equation is obtained by subtracting y_{t-i} from both sides of reduced form of VAR equation. This VECM is composed by first differenced variables on the LHS, and k-1 lags of the dependent variables (differences) on the RHS, each with a ß short-run coefficient matrix. Ω consist on a long-run coefficient matrix, because in equilibrium, all $\Delta y_{t-i}= 0$, and establishing ut with the expected value of zero it implies that $\Omega ETC_{t-k}= 0$.

$\Delta logEV_t = \beta o + \sum_{i=1}^{k-1} \beta 1i \ \Delta logRGDPt\text{-}i + \sum_{i=1}^{k-1} \beta 2i \ \Delta logEVt\text{-}i + + \sum_{i=1}^{k-1} \beta 3i \ \Delta logREERt\text{-}i +$
$\sum_{i=1}^{k-1} \beta 4i \ \Delta logFDIt\text{-}i + \sum_{i=1}^{k-1} \beta 5i \ \Delta logFRGDPt\text{-}i + \Omega_2 ETCt\text{-}i + U2t$……..… (3.13)

$\Delta logREERt = \alpha o + \sum_{i=1}^{k-1} \alpha 1i \ \Delta logRGDPt\text{-}i + \sum_{i=1}^{k-1} \alpha 2i \ \Delta logREERt\text{-}i + \sum_{i=1}^{k-1} \alpha 3i \ \Delta logFDIt\text{-}$
$i + \sum_{i=1}^{k-1} \alpha 4i \ \Delta \ logEVt\text{-}i + \sum_{i=1}^{k-1} \alpha 5i \ \Delta logFRGDPt\text{-}i + \Omega_1 ETCt\text{-}i + U1t$……..… (3.14)

$\Delta logRGDPt = \gamma o + \sum_{i=1}^{k-1} \gamma 1i \ \Delta logREERt\text{-}i + \sum_{i=1}^{k-1} \gamma 2i \ \Delta logEVt\text{-}i + \sum_{i=1}^{k-1} \gamma 3i \ \Delta logRGDPt\text{-}i +$
$\sum_{i=1}^{k-1} \gamma 4i \ \Delta logFDIt\text{-}i + \sum_{i=1}^{k-1} \gamma 5i \Delta logFRGDPt\text{-}i + \Omega_3 ETCt\text{-}i + U3t$…… (3.15)

$\Delta logFDIt = \delta o + + \sum_{i=1}^{k-1} \delta 1i \ \Delta logRGDPt\text{-}i + \sum_{i=1}^{k-1} \delta 2i \ \Delta logEVt\text{-}i + + \sum_{i=1}^{k-1} \delta 3i \ \Delta logREERt\text{-}i +$
$\sum_{i=1}^{k-1} \delta 4i \Delta logFDIt\text{-}i + \sum_{i=1}^{k-1} \delta 5i \Delta logFRGDPt\text{-}i + \Omega_4 ETCt\text{-}i + U4t$…… (3.16)

$\Delta logFRGDPt = \lambda o + \sum_{i=1}^{k-1} \lambda 1i \ \Delta logRGDPt\text{-}i + \sum_{i=1}^{k-1} \lambda 2i \ \Delta logEVt\text{-}i + \sum_{i=1}^{k-1} \lambda 3i \ \Delta logREERt\text{-}i +$
$\sum_{i=1}^{k-1} \lambda 4i \ \Delta logFDIt\text{-}i + + \sum_{i=1}^{k-1} \lambda 5i \Delta logFRGDPt\text{-}i + \Omega_5 ETCt\text{-}i + U5t$……..… (3.17)

Where, ETCt-1 is the lagged error correction term departure from the long-run co-integrating relations between these five variables. The above equations constitute a vector auto-regression

model (VAR) in its first difference, which is a VAR type of ECM. Therefore, a VECM is a VAR in its first difference form with the addition of a vector of co-integrating residuals

3.7. VEC Diagnostic Tests

After estimating the VEC model there are some diagnostic tests will be checked which are vital for ensuring whether the results obtained from VEC estimation used for forecasting policy. The most important post-estimation tests in time series analysis mostly performed on the residual of the VEC model are LM tests for residual serial correlation, Jarque-Bera test for residual test of multivariate normality, Brush-Pagan –Godfrey for the presence of heteroscedasticity of the residuals and stability of the model.

3.7.1 Autocorrelation or serial correlation test

In simple regression models, one of the assumptions of the classical linear regression is that, the $(\mathbf{u_i uj})$ =0, for i ≠ j, which implies that successive values of disturbance term are temporarily independent, means that disturbance occurring at one point of observation is not related to any other disturbance. This means that when observations are made over time, the effect of disturbance occurring at one period does not carry over into another period. If the above assumption is not satisfied, that is, if the value of error term in any particular period is correlates with its own preceding value(s), we say there is autocorrelation of the random variables.

The serial correlation test can be done using the Durbin-Watson test or the Lagrange multiplier (LM) test. It helps to identify the relationship that may exist between the current value of the regression residuals and lagged values. The study used the LM test to investigate serial correlation. The null-hypothesis of the LM test that the residuals are not serially correlated is accepted at 5% level of significance. Hence, autocorrelation is defined as a ‘correlation’ between members of series of observations ordered in time or space.

The null hypothesis of the test is: no serial correlation in residual and Alternative hypothesis is: there is a serial correlation in residual. Decision rule: if the probability value is less than 5 percent, then we can reject the null hypothesis, meaning that the model has serial correlation and vice versa. However, we have to remove serial correlation from the model. Therefore, what will be done is to create one period lag of the dependent variable. Alternatively, we have to change all the variables into the first difference (Gujarati, 2012).

3.7.2. Normality test

Normality tests are used to determine if a data set is well modeled by a normal distribution and to compute how likely it is for a random variable underlining data set to be normally distributed. More generally, the tests are a form of model selection and can be interpreted in several ways depending on one's interpretation of probability. The test would use Jarque-Bera test and the Jarque-Bera test is goods of fit test of whether sample data have the skewness and kurtosis matching a normal distribution. The test was named after the well-known Carlos Jarque and Anil.K.Bera. In its application to decide whether the null hypothesis is rejected or accepted, we compare the value of Jarque-Bera (JB) with the value of chi-square with 2 degrees of freedom. Decision rule: if the probability value of Jarque-Bera statistics is less than 5 percent, then the residuals are not normally distributed and vice-versa.

3.7.3. Heteroscedasticity Test

This study had used the Breush-Pagan-Godfrey test to test the presence of Heteroscedasticity and its hypothesis is that the Null hypothesis said that the residual are homoscedasticity and the Alternative hypothesis claims that the residuals are Heteroscedasticity. In other words it says that Null hypothesis (H0) says the residuals are homoscedastic and the alternative hypothesis (H1) says residuals are heteroscedasticity. Decision rule: if the probability value is less than 5 percent, then we can reject the null hypothesis, meaning that the model has Heteroscedasticity and vice versa.

3.7.4. Stability test

This test will be engaged by the researcher to identify the position of root where it occupies. The stability test is vital if the system is supposed to use for forecasting and policy analysis. The stability test can be detected by a cumulative sum (CUSUM) test. Stability test checks whether the root characteristics polynomials lay inside the unit circle or not. If all roots lie inside the unit circle the model is considered as the stable it can be used for policy analysis.

3.8. Granger causality test

Granger causality test is performed in the study to identify the direction of causality. The term granger causality has been used in the context of testing the existence of causality from exchange

rate to total value of major export commodities, Real gross domestic product, Foreign direct investment, Foreign income and vice versa and from all these variables to exchange rate itself. For this, the study uses Granger Causality test for testing the direction of causation between real effective exchange rate (REER) and total value of coffee and khat export in Ethiopia (TEV). The Granger procedure is selected because it consists the more powerful and simpler way of testing causal relationship (Granger, 1986). This test in the VAR framework formulates the null and alternative hypotheses as:

H_0 : No causal relation between REER and TEV

H_1 : There is causal relationship between REER and TEV

The above hypotheses are tested in the context of the VAR of the form:

$$\ln TVE_t = \alpha_1 + \sum_{i=1}^{p} \beta_i \ln TEV_{t-i} + \sum_{i=1}^{p} \delta_i \ln REER_{t-i} + \varepsilon_{1t} \text{ ---------- (3.18)}$$

$$\ln REER_t = \alpha_2 + \sum_{i=1}^{p} \lambda_i \ln REER_{t-i} + \sum_{i=1}^{p} \psi_i \ln TEV_{t-i} + \varepsilon_{2t} \text{ ---------- (3.19)}$$

Where, t is the sample size and p is the lag length of the unrestricted VAR model. According to Seddighi et.al (2000), there exists a unidirectional causality if only $\{\delta_{11}, \delta_{12}, ..., \delta_{1k}\} \neq 0$) and $\{\psi_{21}, \psi_{22}, ..., \psi_{2k}\} \neq 0$ in equation (3.18) and (3.19) and bi-directional causality if both $\{\delta_{11}, \delta_{12}, ..., \delta_{1k}\} \neq 0$ and $\{\psi_{21}, \psi_{22}, ..., \psi_{2k}\} \neq 0$ in the two equations, respectively (Seddighi et al., 2000). The decision rule is that if the probability of the significance level is less than 5 percent, we can reject the null hypothesis which claims no Granger causality and if not, we accept the null hypothesis.

3.9. Impulse response function and variance decomposition

Variance decomposition analysis is will be used to provide some information about the relative importance of random innovations (Maddala & Lahiri, 1992). Impulse response functions show the effects of shocks on the adjustment path of the variables. The decomposition of forecast error variance measures the contribution of each type of shock to the forecast error variance. Both computations are useful in assessing how shocks to economic variables resound through a system. Impulse response functions (IRFs) and forecast error variance decompositions (FEVD) can be produced after using the VECM or VAR commands.

CHAPTER FOUR
RESULTS AND DISCUSSION

As noted in the methodology part, before doing the econometric investigation, statistical or quantitative examination shall be carried out for selected variable. For better understanding, this study starts from the benchmark by looking at export performance of coffee and khat in Ethiopia. Then in the first part we are going to see the effect of currency devaluation on coffee and khat and the trends of real effective exchange rate in Ethiopia. The aim of the trend analysis is to have a basic knowledge about the behaviour of variables over time. Next, we have going to present the general overview of the performance of the Ethiopian coffee and khat and their contribution to the economy. In the second part of this chapter the researcher going to discuss the econometric analysis such as stationarity of data, optimal lag length, integration test, vector error correction results, diagnostic tests, Granger causality test, variance decomposition and impulse response functions.

4.1. Descriptive Analysis

4.1.1. Coffee Export Performance in Ethiopia

Coffee is a major popular beverage and an important commodity cash crop in the world. It is also the second most valuable commodity next to fuel. According Fair trade Foundation, each day more than 2.25 billion cups of coffee are consumed in the world. 90 percent of coffee production takes place in developing countries. Coffee has grown mostly by small farmers all over the world. Around 25 million small producers rely on coffee for a living worldwide. From this population Tens of millions of small producers exist in developing countries (Ethiopian Coffee and Tea, 2017).

Ethiopia is widely known to be the birth place of coffee Arabica, which is demonstrated by its variety and quality of beans. Coffee accounts the lion's share of Ethiopian export earnings. It plays an important role in the economy and livelihoods of Ethiopia's rural population. The total area coverage of coffee land in the country is 1.2million hectare. Of which 900,000 hectare of land is estimated to be productive. According to some studies about 92-95% of coffee is produced by 4.7 million small scale farmers and 5-8 % large scale plantations. An annual coffee

production in the country is 500,000-700,000 tones and an average national productivity is 7quintal per hectare (CSA, 2018).

The coffee industry is the driving force of the economy, ecology, socio-cultural and spiritual life of people. Nationally it is estimated that there are around 5,270,777 households are participated in coffee production activities. However, an estimated over 25 million people are engaged at least on coffee production, distribution, trading, processing, exporting and other support and downstream activities. It also accounts for 25-30 percent of Ethiopia's total export earnings and 5 per cent of GDP are derived from coffee exports. The country uses about 50% of the total production for domestic consumption. Coffee production has been increasing for the last 10 years. In 1995/96 total coffee production was 312,777 metric tons but in 2009/10 total production has increased to 449,230 metric tons, it shows 136,453 metric tons' increment for the last 10 years. Similarly, an export volume also has increased from 148,680.00 metric tons in 1995/96 to 238,465.55 metric tons in 2009/10. So, it shows a 89,785.55 metric tons increment, too (CSA, 2018).

Producers, Exporters, unions, associations, commercial exporters, roasters, etc. have a great contribution to the development of the Ethiopian economy. For example in 2009 coffee producers exported 11,857.35 tons of coffee and earned 63.08 million US dollar. Similarly in 2010 they exported 13,736.97 tons of coffee and earned 67.33 million US dollar. Price per ton is 5,320.27 in 2009 and 4,901.12 in 2010. It has 8% shares from the total volume. Coffee Arabica, the only type of coffee grows in Ethiopia and Ethiopia produces varieties of coffee that have rich original flavours and exports coffee of different types and grades. Recently, Ethiopia has been exporting several specialty coffee types, such as, Sidama, Guji, Djimmma, Lekemti, Harrar, Yirgacheffe, Limmu and etc.

Table 4.1: Ethiopian Coffee export destination by Volume and Value from 2012/13 to 2016/17

No	Countries	2012/13		2013/14		2014/15		2015/16		2016/17	
		Volume/ton	1000 USD	volume/ton	1000 USD	volume/ton	1000 USD	volume/ton	1000 USD	volume/ton	1000 USD

1	**Germany**	56,863	191,445	42,210	152,805	36,309	141,547	41,910	135,919	40,292	139,995
2	**S/Arabia**	27,461	108,981	31,503	118,054	35,880	131,960	37,543	112,012	36.551	132,914
3	**N/America**	14545	70539	17753	86628	18646	109364	18552	99527	20697	116712
4	**Japan**	23447	81375	18685	62968	22040	87639	16722	52236	26784	87248
5	**Belgium**	15727	60903	14751	53985	9622	45012	13484	54664	19546	82717
6	**S/Korea**	4662	19399	5586	23020	6412	31117	9208	40743	11437	49749
7	**Italy**	8836	35234	9768	37666	6481	32177	8254	34274	10720	46900
8	**Britain**	3775	19312	4881	21620	4715	22842	4566	24409	6237	33456
9	**France**	9925	32387	10766	35288	8310	32656	12110	34312	10575	32153
10	**Sudan**	7565	18537	9380	23936	10486	30117	7849	16444	11237	24474

Source: Ethiopian Coffee and Tea Authority, 2016/7

From the table we claim that Germany is on the first position that brings much US dollar to Ethiopia since 2012/13. That is 191,445 USD in 2012/13, 152,805 USD in 2013/14, 141,547 USD in 2014/15, 135,919 USD in 2015/2016 and 139,995 USD in 2016/17. Saudi Arabia and North America are on the second and third position to bring much US dollar to Ethiopia next to Germany for the last consecutive five years.

Generally, Ethiopia's organic coffee is looked-up by an international market. If farmers produce high amount of coffee with high-quality, it is very profitable and advantageous business for Ethiopia's producers, exporters and the country as well. There is a need to educate farmers about the economic importance of coffee, as well as about the new technology. This education campaign should be complemented with the availability of high-quality planting materials and the provision of other services (especially extension) to stop the declining productivity and export earnings of our 'green gold'. Educate farmers and coffee bean collectors on how to keep the quality of coffee and increase the product and productivity is an important asset. Increasing the volume as well as the quality of the coffee product through-out coffee potential areas may bright the future of coffee.

4.1.1.1. Value of Coffee Exports as a Share of Total Exports

Coffee is the country's top export commodity among the export items in Ethiopia. According to Ethiopia trade data, 2016/17 exports reached a record of almost 232,000 metric tons, valued at $897 million. Coffee accounts for nearly one-third of total exports by value. Major export destinations are Germany, Saudi Arabia, the United States, and Japan (Network, 2020).

Table 4.2: Value of Coffee Exports as a Share of Total Exports

	2013/14	2014/15	2015/16	2016/17	2017/18
Total export value	$2.54 billion	$2.75 billion	$2.65 billion	$2.76 billion	$2.74 billion
Total value of agricultural export	**$2.17 billion**	**$2.35 billion**	**$2.27 billion**	**$2.32 billion**	**$2.13 billion**
Agricultural share of total export	86	86	86	84	78
Coffee export	**$0.749 billion**	**$0.812 billion**	**$0.722 billion**	**$0.897 billion**	**$0.917 billion**
Coffee share of total agri export	35	35	32	39	43
Coffee export share of total export	30	30	27	33	34

Source: Ethiopia Revenue Custom Authority data 2020

4.1.2. Khat Export performance in Ethiopia

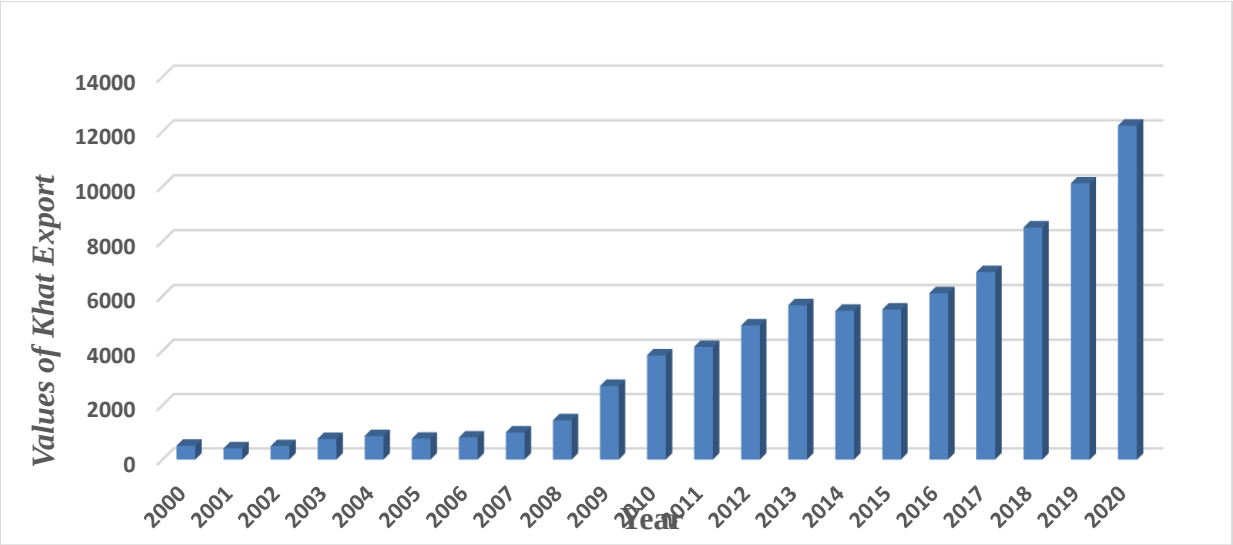
Agriculture is one of the dominant sectors in the Ethiopian economy and its share of GDP is 36.3% and above 70% of Ethiopia's population is employed in the sector (CSA, 2018). The Khat industry is one of the leading agricultural sectors. The industry constitutes 4% of the country's export earnings and shares 9.4% of total merchandise export (NBE, 2017/18). Khat (Catha edulis) is an evergreen tree cultivated for the production of fresh leaves that are chewed for their euphoric properties. The plant is well-known and controversial in the eastern part of Africa and the Arabian Peninsula due to its adverse impact on the hand and preferred crop on the other (U.S. Department of Justice, 2017). It mostly grows in East Africa and southern Arabia and often known as chat but also goes by different names such as Khat, Qat, Kat, Abyssinian tea, African tea, and African salad (Al-Mugahed, 2008). In Ethiopia, there are also other names given for Khat such as Aweday, Beleche, Abo Mismar, Wondo, Bahirdar, Gelemso, Hirna, etc., which based on the source of the plant.

Currently, Ethiopia is the leading Khat producer in Africa and worldwide. Most of the Khat is produced in the South Eastern part of the country. Even if, the Khat export in some countries is banned and unpermitted to transact within and outside the country, Ethiopia constitutes one of the major earnings from Khat consumption within a country and its export. The volume of Khat export increases steadily from 60 tons in 1998 to 157 tons in 2000. However, due to the shortage in supply the revenue declines from 618.8 million ETB in 2000 to 510.5 million ETB in 2001, and 418.7 million ETB in 2002. Revenue from Khat export continues to decline from 61 tons and 78 tons in 2003 and 2004, respectively for the reason that there is drought and high domestic consumption which creates a shortage in supply of the plant (Tolcha, 2020).

The value of Khat is the most dynamic over time. The value received from exported Khat increased from 15.9 million ETB in 1985s to 618.8 million ETB in 2000 and continues to rise and reached 6.1 billion ETB in 2017. The revenue of Khat export also increased from 138 tons in 1985 to 156 tons in 2000 and reached 488 tons in 2017. This is mainly attributed to increased demand from Somalia. Somaliland is becoming the largest importer of Khat replacing Djibouti, the traditional largest importer of Khat products and it accounts for the largest share of export earnings. Khat shows remarkable growth from time to time as compared to other exported

commodities. Though, the plant is termed as a drug of abuse the market for the plant is worldwide. It exported too many countries including some parts of Europe, North America, Colombia, Afghanistan, Somalia, and Djibouti (Dessein et al., 2005).

Figure 4.1: The values of Khat export in million Birr



Source: National Bank of Ethiopia and author's computation, 2021

Khat was the most revenue-generating export in Ethiopia in 1999/2000 which generates 618.8 million ETB. It is well known due to its high-income elasticity and its export earnings share rise from year to year continuously as compared to other export commodities. The revenue that Ethiopian government got from khat export and it ranked the second after coffee export for the last six consecutive years of 1998 to 2003. According to NBE report, its share of Khat export in total merchandise export went up to 9.4% in 2016/17. The revenue gained from Khat export reaches 1448 million ETB in 2008/09. Even if the income of khat export increases from year to year, there is no policy direction taken by the government of Ethiopia towards encouraging farmers and producers.

4.1.3. Currency devaluation's effect on the volume of coffee and khat export

The level of development of the economy, resource endowments, policies and development strategies pursued are some of the determining factors of the export structure of a country. Being underdeveloped economy that `heavily depends on agriculture, the structure of Ethiopian export is dominated by agricultural products which used to account for more than 90% over a long

period of time. Having this fact, the Ethiopian government has devalued its currency three times in large percentage in order to increase export and improve current account disequilibrium. As it was mentioned in the introductory part, these devaluations were taken place: First, On October1,1992 from 2.07 Birr to 5 Birr per a dollar by 142 percent, second, on September1,2010 from 13.62 to 16.35 by 16.7 percent and third, on October10, 2017 from 23.4 Birr to 26.91 Birr per dollar by 15 percent.

Table 4.3: The volume of coffee and khat export after devaluation in Ethiopia

year	Coffee Volume in metric ton	Khat Volume in metric ton
The first devaluation and its effects on Volume of commodity (in 1992 by 142 percent)		
1991/92	32,249.00	251
1992/93	673,7452	1,936.40
1993/94	69,160	2,808.48
1994/95	82,198.64	4,073.27
1995/96	97,578.82	3,698.29
The second devaluation and its effects on volume of commodity (in 2010 by 19702.076.7 percent)		
2010/11	172,217.23	40,971.74
2011/12	169,408.06	41,052.87
2012/13	199,127.77	47,163.67
2013/14	189,669.31	51,689.76
2014/15	183,870.70	49,204.18
The last period of devaluation and its effects on volume of commodity (in 2017 by 15 percent)		
2017/18	238,572.83	47,023.94
2018/19	230,931.42	53,565.13
2019/20	271,111.52	57,136.13

Source: National Bank of Ethiopia, 2020

Did the volume of coffee and khat export increased after devaluation policy was applied on the economy? From the table we can understand that whether the volume of coffee and khat export increased or decreased. The outcomes of initial large devaluation shows that after the application

of devaluation policy, the volume of coffee export increased by 6705203 tons in 1992 when it compared to that of 1991. We understand that the export volume of khat also increased by 1685.17 ton in 1992 when compared to that of 1991.

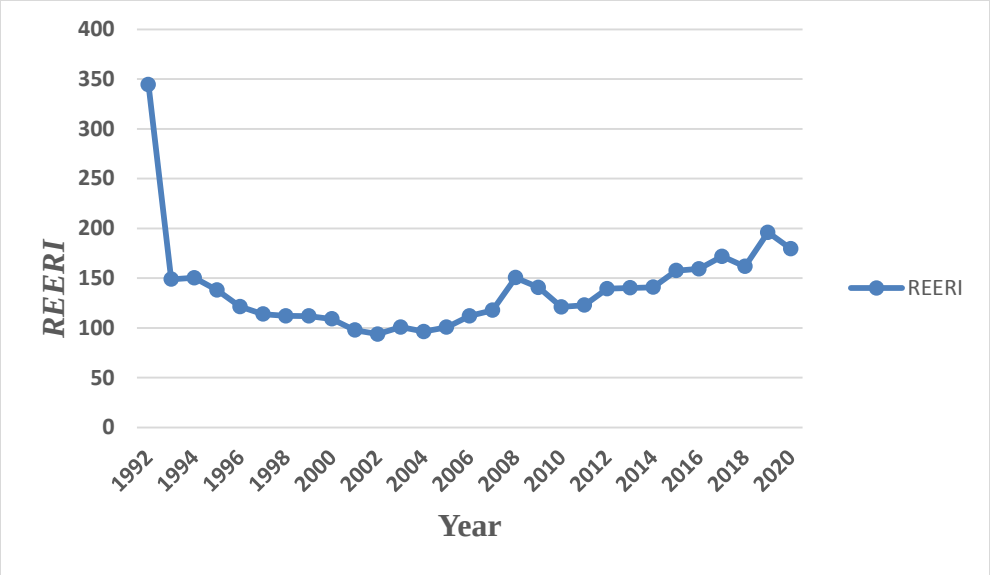
The outcomes of second large devaluation: As shown in the above table the export volume of Ethiopian coffee decrease by 2809.17 after devaluation policy was applied. This may happen due to the problems that coffee growers cannot find a good profit from their farm for the last decades. And there was no concerned strong coffee institution, lack of commitment to support the coffee sector, extreme and uncontrolled illegal market, extensive (long) coffee value chain, etc. The result for the volume of khat export after second devaluation shows that improvement by 81.13 ton.

The outcomes of final devaluation: The result of the last devaluation reveals that in 2018 while the export volume of coffee export decreased by 7641.41 ton after devaluation policy have been employed by the government. This may be due to the fact that coffee is one of agricultural commodity in that the exporters cannot able to response for international demand within short period of time. In case of Khat, the export volume of khat increased by 6541.2 ton, but in the long run both commodity shows improvement.

4.1.4. Trends of Real effective exchange rate in Ethiopia

The real effective exchange rate is defined as the units of home currency per a unit of foreign currency taking accounts of trade partner countries trade weight and relative inflation, the appreciation (an increase in REER) is expected to have a positive sign and encourage export. Real effective exchange rate is the most important variable of interest in this study because it is this variable which is usually used to measure the degree of international competitiveness of the country in the involvement of both bilateral and multilateral trade with the rest of the world. It follows according to this argument that a reduction in the real value of one country's currency improves international trade competitiveness by making relatively the value of export cheaper. As a consequence, import becomes expensive and the combined effect of these things leads to the improvement of trade competitiveness and discourage import is expected to improve the trade balance.

Figure 4.2: Trends of Real Effective Exchange Rate



Source: National Bank of Ethiopia and author's computation, 2021

From the figure we have seen that the real effective exchange rate sharply decreased from 1992 to 1993 then slowly decrease from up the year of 2000.After 2007 tried to increase to the year of 2009 then almost remain the same between 2010 and 2011. The real effective exchange rate trends move up and down due to the price movement currency devaluation. This is because the real effective exchange rate is a measure of the value of a domestic currency against a weighted average of several foreign currencies divided by a price deflator or index of costs.

4.2. Econometric Analysis

4.2.1. Stationery of Data

Stationary is an important concept that plays an important role when estimating time series analysis. Proper estimation of a time series model requires a stationary data. Conducting time series analysis on non-stationary data will result in what is called "spurious" or "nonsense" regression. This occurs when the regression results reveal a high and significant relationship among variables when in fact, there is no relationship exist. Before conducting the simultaneous tests with in the model or regression, the variables must be found to be individually stationary. So the initial task we must undertake before any regression in secondary time series data is

testing for stationarity of data. In the following table, the Augmented Dickey-Fuller (ADF) test has used to check whether data at hand get stationary or not.

Table 4.4: Augmented Dickey-Fuller unit root test

Augmented Dickey-Fuller Test							
	At Level			At First Difference			Order of Integration
Variables	T-test	Critical value	P-Value	T-test	Critical Value	P-Value	
lnTEV	-1.22623	-2.95402	0.6511	-7.29019	-2.95711	0.0000	I(1)
lnREER	-1.85786	-2.95402	0.3472	-5.21319	-2.95711	0.0002	I(1)
lnRGDP	1.880279	-2.95402	0.9997	-4.67119	-2.95711	0.0007	I(1)
lnFRGDP	-2.43018	-2.95402	0.1416	-5.23389	-2.95711	0.0002	I(1)
lnFDI	-2.39337	-2.95402	0.1512	-4.80380	-2.95711	0.0005	I(1)

Sources: The results are calculated by the author using Eviews 10.0 software, 2021

As we can see from table, the ADF results of lnTEV, lnREER, lnRGDP, ln FRGDP and lnFDI, the absolute value of each of the t statistics is smaller than the absolute values of each of the critical value at a level. For instance, in the case of lnTEV, the t-statistic is equals -1.226233 which is less than -2.954021 in addition the t-static, the p-value of the variable is not significant since its value is greater than 5 percent therefore, it is possible to accept the null hypothesis which was claiming that variables have unit root at level. The same is true in case of lnREER, lnRGDP, lnFRGDP and lnFDI as shown in left-hand side of above table.

Since the variables have unit root, it is impossible to estimate the model directly and we need to fix the problem by taking the first difference of the variables and check again if they are stationary. The original data need to be changed into its first difference and ADF test need to be checked once again. Hence, we continue the analysis by taking the first difference, so that we can determine in which order the variables become stationary. Constant, and constant and trend are included in the above test, with minimum differences between the two cases, all data became stationery after its first differences. When we look at the results of ADF tests conducted on the difference of the variables on the right hand side of table, the null hypothesis of unit root is strongly rejected. Thus we can conclude that all variables are stationary at first difference. Since

all variables are I (1), it is possible to use the Johansen co-integration approach. Once the stationarity test is checked and confirmed, the next step is choosing the optimal lag selection which determines the number of the co-integrating equation.

4.2.2 Determination of Optimal Lag Length

Before going to check for the multivariate time series analysis, choosing the optimal lag length for the basic VAR model in advance is needed. It is obvious that the result of the Johansen co-integration test is very quiet sensitive to optimal lag length. To determine the optimal lag length different information criteria has been employed. The objective of the information criteria (IC) method is to select the number of parameters which minimize the value of the IC. The most popular information ICs is Akaike information criterion (AIC), Schwarz's Bayesian information criterion (SIC) and the Hannan- Quinn information criterion (HQIC). Practically the optimal lag length which is selected by most of these criteria going to be included in the VAR system.

Table 4.5: VAR optimal lag selection

VAR Lag Order Selection Criteria Endogenous variables: LTEV LREER LRGDP LFRGDP LFDI Exogenous variables: C, Sample: 1987 2020, Included observations: 30						
Lag	logL	LR	FPE	AIC	SC	HQ
0	-35.10675	NA	0.000159	2.607117	2.793943	2.666884
1	85.56044	201.1120	1.50e-07	-4.370696	-3.436565*	-4.071859
2	106.5806	29.42817*	1.15e-07	-4.705371	-3.023934	-4.167465
3	128.0060	24.28212	9.46e-08*	-5.067064*	-2.638322	-4.290088*
4	143.6500	13.55821	1.39e-07	-5.043336	-1.867289	-4.027292

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

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Source: Author's own computation using Eviews 10 software, 2021.

** indicates lag order selected by the criterion*

In order to test co-integration test, it is necessary to specify the number of lags to be included in the model. As stated above the optimal lag length must be determined by lag selected by most

information criterion. According to Table, almost all criterions choose three lags and only LR and SC choose two lags and one lags respectively. Therefore, the optimal lag for the underlying VAR model is three.

4.2.3 Co-integration Test

After completion of unit root test and determination of optimal lags to be included in the model, the third step is testing for co-integration. If the variables are found be co-integrated, that there is exists a linear, stable and long-run relationship among variables, such that the dis-equilibrium errors would tend to fluctuate around zero mean. The thesis used Johansen's technique in order to establish how many co-integrating equations exist between variables.

The Johansen test can be seen as a multivariate generalization of the augmented Dickey-Fuller test. The generalization is the examination of linear combinations of variables for unit roots. The Johansen test and estimation strategy is maximum likelihood this makes it possible to estimate all co-integrating vectors when there are more than two variables. If there are three variables each with unit roots, there are at most two co-integrating vectors. More generally, if there are n variables which all have unit roots, there are at most n− 1co-integrating vectors.Accordingly, the trace and maximum eigenvalue test statistics have rejected the null of no-co-integration among the series of interest: while confirming the existence of long-run relationships among them. The summary statistics of both tests have reflected in the tables below;

Table 4.6: Johansen co-integration test (Trace statistics Test)

Maximum rank	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
0	0.939820	188.9517	69.81889	0.0000
1	0.837771	104.6390	47.85613	0.0000
2	0.612410	50.07664	29.79707	0.0001
3	0.482756	21.64245	15.49471	0.0052
4	0.060282	1.865253	3.841466	0.1720

***Sources**: The results are calculated by the author using Eviews 10 software, 2021.*

The table above revealed that the existence of co-integration by trace statistics test at 5% level. According to Johansen co-integration, maximum rank represents a number of co-integrating equations in the system. At maximum rank zero, the null hypothesis says no co-integration among the variables whereas the alternative hypothesis says there is at least a co-integration among them. To determine the presence of co-integration, the trace statistics must be compared with the critical value at 5% significance level. In the above-computed table, the trace statistics is greater than the critical value at 5% level of significance and thus confidently we can reject the null hypothesis of no co-integration. At maximum rank 4 however the trace statistics is less than the critical value at 5 percent level of significance, and hence we accept the null hypothesis.

Table 4.7: Johansen co-integration test (maximum Eigen value)

Maximum rank	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
0	0.939820	84.31268	33.87687	0.0000
1	0.837771	54.56235	27.58434	0.0000
2	0.612410	28.43419	21.13162	0.0039
3	0.482756	19.77720	14.26460	0.0061
4	0.060282	1.865253	3.841466	0.1720

Source: Author's computation using EVIEWS 10 software, 2021.

Maximum Eigenvalue revealed that at the maximum rank of zero, one, two and three their maximum Eigen values are greater than critical value at 5% level of significance. Therefore, these two tests confirm a co-integrating relationship among total export value, real effective exchange rate, real gross domestic product, foreign real gross domestic product and foreign direct investment. That model should be considered as the target model and the dependent variable of that model should be the target variable of this study. Therefore, from the evidence of the long run associations, we can run a vector error correction model (VECM).

4.2.4 Vector error correction model (VECM) Results and Analysis

After the evidence of co-integration relationship among the variables have been checked, the next step is obviously running the vector error correction model (VECM) using one less lag

length (p-1). Where p is the optimal lag length determined with vector autoregressive (VAR), hence the optimal, lag length of the model was 3 and therefore vector error correction model (VECM) requires 2 lag length to run a regression.

4.2.4.1 The Long-run Model

Given the finding from the Johansen's co-integration test we understand that LTEV, LRGDP, LREER, LFRGDP and FDI are co-integrated in the long run, we utilize the co-integrating vector to construct the vector error correction model (VECM). Table 5.5 shows the Vector Error Correction Estimates of total export value as endogenous variable. In the long run elasticities have been exactly identified and the Johnson normalization restrictions were imposed too. The following table depicts the long run result relation.

Table 4.8: Long run relationship of co-integrated vector

Target Variable lnTEV,			
Regressors	Coefficient	Standard deviation	t-statistics
lnREER(-1)	4.620439	1.43315	-3.22397*
lnRGDP(-1)	-0.558702	0.27724	2.01525*
lnFRGDP(-1)	0.007214	0.05042	-0.14308
lnFDI(-1)	0.288340	0.07894	-3.65247*
C	-2.747368		

Source: Author's computation using EVIEWS 10 software, 2021.
**indicates the significance of the coefficients (the rejection of the null hypothesis) at 5%*

Hence, total export value is of interest, the above table shows the Vector Error Correction Estimates of total export value as an endogenous variable. Long run elasticity's were exactly identified with their respective p-value in the bracket. The result in the above table shows that except lnFRGDP, all variables are statistically affecting the total export value of major export commodity in Ethiopia. Each variable except foreign income in the long run significantly affect the export performance of major export commodity. In general, the long run equation of the model between the Regressors and total export value would be written with the respective t-ratio in parenthesis as follows.

$$LnTEV = -2.747368 + 4.620439lnREER - 0.558702lnRGDP + 0.007214lnFRGDP +$$

P-value = [3.22397] [-2.01525] [0.14308]

$$0.288340lnFDI \quad (18)$$

[3.65247]

The result of this equation shows that real effective exchange rate is positive as expected in the literature part and significantly affects the total export value of Ethiopia. This implies that policy measures regarding the exchange rate have paramount importance in improving major commodity exports. The result is in line with the findings of Kayamo (2019), in that he claims real effective exchange rate has positive effect on the export earnings in Ethiopia. Also the result is similar to that of Dube et al.(2018) that exchange rate positively and significantly affects the export performance of agricultural export in Ethiopia. Therefore, keeping the effect of other things as constant, increasing the exchange rate or devaluation of domestic currency by 1% improves total export value of Ethiopia's major export commodity by 4.62% in the long run.

The impact of the foreign real GDP on export performance of major export commodity is statistically insignificant. The result is in line with Agengaw and Demmissie (2012) for Ethiopia where the increase in trading partner's real gross domestic product for Ethiopian export performance was statistically insignificant. Moreover, the finding is similar to the result of Amin (2007) for Ethiopia where the increase in the per capita incomes of our trading partners has no impact on the demand for exports. However, the result is inconsistent with that of Samuel (2019) in that the real income of trading partners has a dominant effect on the Ethiopian export earnings of coffee. This implies that good foreign policy which facilitates relationship between Ethiopia and its trading partners is very important so as to improve export performance of coffee and khat.

There is significant relationship between foreign direct investment and export value in Ethiopia. The result reveals that where FDI does contribute to the technological upgrading and structural evolution of the export sector, the structure of the sector is an important ingredient at any stage. Thus, export performance positively responds to FDI in the long run. The finding is in line with that of Fenta (2018) who claims of the positive relationship between FDI and the export earnings in the long run. Therefore, keeping the effect of other things remain the same, the one percent

increase in foreign direct investment will 0.29% increase total export value of major export commodity in the long run.

In case of real domestic income, the sign of real gross domestic product is opposite sign from the anticipated, but it is statistically significant. This negative relationship might be justified in such a way that when GDP of the country increases, domestic absorption will definitely increase. If domestic absorption increases, it is obvious that export of major export products will decrease. It implies that other things being constant, one percent increases in real gross domestic product leads to 0.5587% decrease in the export performance of Ethiopia's major export commodity. This finding is also similar to that of Fenta (2018) in that real gross domestic product has statistically significant negative impact in explaining export performance in the long-run. The implication of negative and statistical effect of domestic real income on coffee and khat export performance in Ethiopia is that when the domestic real income increases, domestic consumers will increase their consumption of exported goods.

4.2.4.2 The Short run Dynamics for Vector Error Correction Model

After the estimation of long run coefficients, the next step is estimating the short run ECM model. The coefficient of error correction term (ECM) as discussed in the methodology part indicates the speed by which any deviation in the short-run from equilibrium is restored to its equilibrium in the dynamic model. The coefficient of the ECM obtained from the regression of one lagged period residual of the dynamic long-run model. The coefficient of the error correction (ECM) term thus, indicates how quickly variables converge to their equilibrium. Moreover, it should have a negative sign and statistically significant at 1% level of significance.

The short-run relationship between the exchange rate devaluation, total export value, foreign real gross domestic product, real gross domestic product and foreign direct investment can be shown by the Vector error correction model. Moreover, to have this function it should have a negative sign and statistically significant at standard significant level that means its p-value (probability value) must be less than 1% level of significance.

Table 4.9: Short run dynamics of VECM

Target variable : TEV, Vector error correction model, Sample: 1990-2020 (after adjustment)				
Model, VECM	Coefficients	Standard error	t-Statistic	P-value
cointEq1	-0.308818*	0.101640	-3.038364	0.0068*
D(LTEV(-1))	-0.164813	0.198783	-0.829109	0.4173
D(LTEV(-2))	0.202650	0.213683	0.948368	0.3548
D(LREER(-1))	-0.604585	0.480026	-1.259482	0.2231
D(LREER(-2))	-0.176349	0.332505	-0.530367	0.6020
D(LRGDP(-1))	0.188690	0.464295	0.406402	0.6890
D(LRGDP(-2))	0.487889	0.491414	0.992827	0.3333
D(LFRGDP(-1))	0.052183*	0.019279	2.706727	0.0140*
D(LFRGDP(-2))	0.0074226	0.026398	0.281290	0.7815
D(LFDI(-1))	0.091497*	0.040163	-2.278151	0.0345*
D(LFDI(-2))	-0.014983	0.046140	-0.324720	0.7489
C	0.006749	0.046555	0.144972	0.8863

R-squared	0.632171	Mean dependent var	0.021339
Adjusted R-squared	0.419217	S.D. dependent var	0.138280
S.E. of regression	0.105382	Akaike info criterion	-1.377811
Sum squared resid	0.211000	Schwarz criterion	-0.822720
Log likelihood	33.35608	Hannan-Quinn criter.	-1.196865
F-statistic	2.968581	Durbin-Watson stat	1.873040
Prob(F-statistic)	0.018123		

Sources: Author's computation, 2021.

According to Banerjee et al. (2003) the highly significant error correction term further confirms the existence of a stable long-run relationship. Based on the above result, the error correction coefficient of estimated result -0.3088 which is statistically significant and it has the desired negative sign and implying a moderate speed of adjustment in which the system restored to its long-run equilibrium. The coefficient of the speed of adjustment is negative and as desired statistically significant which shows that the deviation by any of explanatory variables in the short-run would be corrected by the speed of 30.88% in the long run per year. Means, the shocks/deviation of each explanatory variable on total export value would move towards long-run equilibrium by 30.88%.

In other words, the error correction term, which measures the speed of adjustment to long-run equilibrium, is important to analyses in the VECM's results. The error correction term is significant, has the correct negative sign (stable adjustment coefficients that moves back to

equilibrium) and the value of the term lies within the relevant range of 0 and -1 as required. The results based on the above, result of error correction term show that about 30.88 percent of the dis-equilibrium in the total export value is corrected each year. This means any deviation in the short run from equilibrium level of total export value in the current period is converge to equilibrium by 30.88% per annum to bring back equilibrium when there is a shock to a steady state relationship. All coefficients whose probability denoted by the * symbol indicates the significance of coefficients at 5 percent significance level.

According to the estimation result, there is positive and significant association between export performance of major commodity and foreign real income in that when the demand for Ethiopian major commodity increases with their income of trading countries, the export earnings and performance also increased. The result is in line with the study by Kayamo (2019) in that real income of trading countries has significant relation on export earnings in Ethiopia and Also with that of Were et al. (2002) that the real income of the trading partners has a positive and significant effect on the export volume in Kenya.

Foreign direct investment also positively and significantly affects the export earning of major export commodity in Ethiopia by its first period lags as theoretical expectation. It was revealed to be significant in both the short-run and long-run. Foreign direct investment (FDI) is statistically significant at 5 % significant level. A positive and significant relationship between export performance of major commodity and FDI in Ethiopia indicates that the contribution of FDI to capital formation which helps to increase the performance exports in Ethiopia. Thus, export performance positively responds to FDI in the short-run. The finding is similar to the finding of Dube et al (2018) in that both in the short run and long run export performance is affected by foreign direct investment in Ethiopia.

Moreover, there is positive relationship between real income and total export value of major export commodity as expected sign that implies the higher income the citizens have the more able to produce and export which it leads to higher export earnings, however it is statistically insignificant. The study came up with the result that there is a negative short-run and a positive long-run relationship between the total export value of export in Ethiopia and real exchange rate. This may reflects the existence of the J-curve effect, as the Ethiopian major commodity export value first deteriorates after currency depreciation and then it improved in the long run.

However the J-curve effect is maintained, the impact of real effective exchange rate on export performance is negative though statistically insignificant in the short run. This result is similar to the findings of Kayamo (2019) in that exchange rate exhibit J-curve effect on export earnings of Ethiopia. Moreover, the result is inconsistent with those of Fanta & Teshale (2014) in that their Johanson co-integration test and Vector Error Correction model proved that real exchange rate has a statistically significant negative long run effect on export but not in the short run.

Generally, most of the exports of Ethiopia are primary commodities produced by the agricultural sector. It is true that the production or supply of agriculture sector is not elastic in responding to changes in exchange rate as it takes some time to produce the commodities and the Ethiopian export sector cannot responds foreign demand immediately with in short period of time.

4.2.5 Diagnostic Tests

4.2.5.1 Serial correlation LM test

Serial correlation is a case where one period error term is correlated with that of the other period. The study used the Breusch-Godfrey test to check whether data experienced between time variant mean, variance that is whether they serially correlated or not them (Gujarati, 2003).

The following hypothesis test can be inferred for autocorrelation of residuals:

H0=There is no autocorrelation among residuals

H1=Residual are correlated

The decision rule is that if the p-value of the Chi-Square is greater than 5 percent we accept the null hypothesis of no autocorrelation otherwise we forced to reject the null hypothesis and accept the alternative one.

Table 4 .10: Autocorrelation (Breusch-Godfrey) Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.270656	Pro F(2, 12)	0.7661
Obs*R-squared	0.956636	Pro Chi-square(2)	0.6198

Source: Author's Computation Eviews software result, 2021.

Hence from the above result, the probability of Chi-Square (2) is greater than 5 percent, so we are confident to accept the null hypothesis of no autocorrelation because its p-value is 0.6198, therefore, confidently we feel that the model has no autocorrelation problem and the residuals are not correlated.

4.2.5.2 Heteroscedasticity test

Heteroscedasticity refers to when the variance of residual from each explanatory variable is not constant (no homoscedastic). In this study, heteroscedasticity problem is detected by the Breusch-Pagan –Godfrey test. Hypothesis test of the heteroscedasticity problem is given below.

Hypothesis: H0: Residuals are homoscedastic

H1: Residuals are not homoscedastic

Thus, based on this hypothesis if the probability value of R-squared is greater than 5 percent then we cannot reject the null hypothesis of no heteroscedasticity otherwise we enforced to reject the null hypothesis and accept the alternative hypothesis.

Table 4.11: Breusch-Pagan-Godfrey heteroscedasticity test

Heteroscedasticity Test: Breusch-Pagan-Godfrey			
			P-value
F-statstic	2.016020	Prob F(15, 15)	0.0930
Obs*R-squared	20.72155	Prob Chi-squared(15)	0.1460
Scaled explained SS	5.561105	Pro Chi-squared(15)	0.9862

Source: Author's Computation using EVIEWS 10 software, 2021.

From the table the result of estimation indicates that the p-value of the R-squared is 14.6% which is greater than 5 percent, so we cannot reject the null hypothesis of homoscedasticity. Therefore, in this model, there is no heteroscedasticity problem and hence the variance of the residuals is homoscedastic.

4.2.5.3 Normality test

In testing for normality, of the error term, the Jarque-Bera test was used and the result of the test could be shown in table 5.9.

Hypothesis testing: H0: Error term is not normally distributed

H1: where Errors are normally distributed

Decision rule: based on the probability value if the p-value is greater than 5 % we can reject the null hypothesis which says that errors are not normally distributed unless we are forced to accept.

Table 4.12: Normality test of the residual

Component	Jarque-Bera	df	Prob.
1	0.472548	2	0.7896
2	0.656034	2	0.7204
3	4.450418	2	0.1080
4	2.275452	2	0.3205
5	0.020865	2	0.9896
Joint	7.875318	10	0.6410

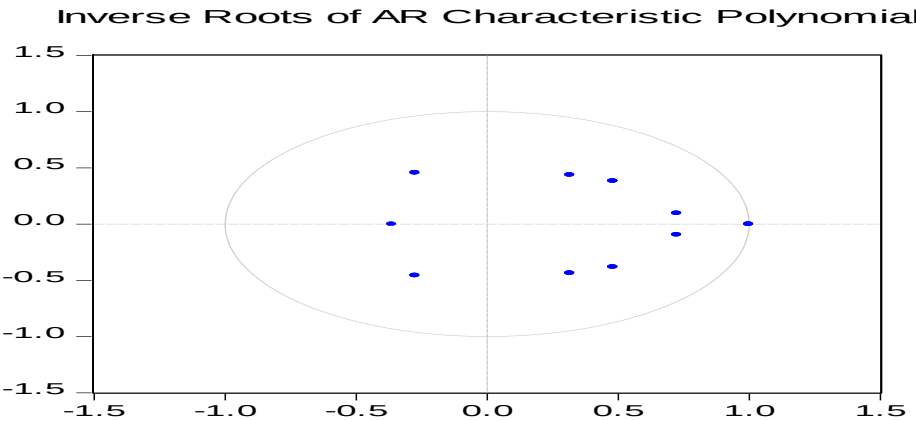
Source: Own computation, 2021.

According to the decision rule of the normality test, the errors are normally distributed if the p-value of the Jarque-Bera greater than 5 percent. Based on the above table, because the p-value is 0.641 and the result revealed that errors are normally distributed. Therefore, the normality test of the errors at 5 percent level of significance is fully achieved. Also, we can conclude and we feel confident to say that variables are normally distributed in the model which is desirable.

4.2.5.4 The stability of the VAR model

The stability of VAR model is tested by an inverse root of autoregressive characteristic polynomial. The result of the test is shown by a graphical representation on the following figure. It shows that the VAR model is stable as the entire modulus lie inside the circle showing that all the values are less than unity except the one.

Figure 4.3: Inverse Root of AR Characteristics Polynomial

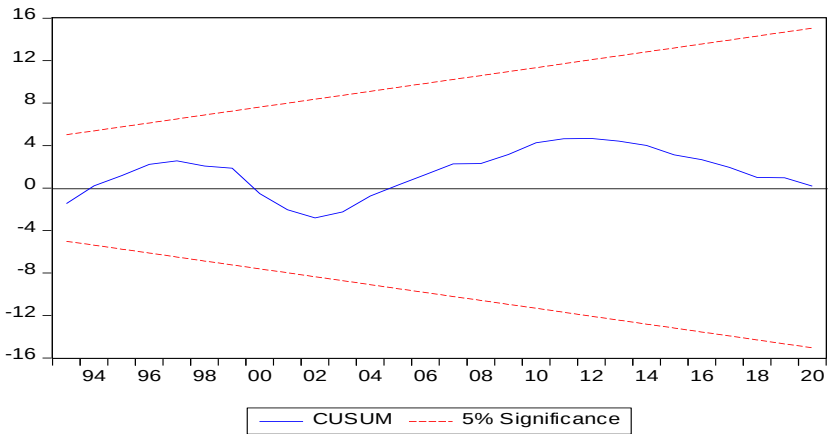


Source: Own computation using Eviews 10 software, 2021.

4.2.5.5 Stability of the VEC Model

Stability diagnostics to measure parameter reliability or uniformity is a critical issue for total export value equations. In particular, to be able to interpret the estimated equation as an export performance equation, it is necessary to assure that the parameters are stable over the estimation period. To achieve this, the study implemented the cumulative sum (CUSUM) tests. The decision about the parameter stability relies on the position of the plot relative to the 5 % critical bound. The CUSUM test is based on the cumulative sum of recursive residuals given below in the following figure. For stability of the short-run dynamics and the long-run parameters of the model, it is important that the blue trend line has to be lied between the two red lines as shown in the figure bellow. Therefore, the model is said to dynamically stable because the blue trend line lies between the red lines and also the blue trend line far away from the border line.

Figure 4.4: The stability of VEC model



Source: Own computation, 2021.

4.2.6 Granger Causality Test

Granger causality test is a statistical hypothesis test for determining the usefulness of one-time series in forecasting another time series. The causality test is used to measure the ability to predict the future values of a time series on the basis of the previous values of another time series. Granger causality in a VAR model implies a correlation between current values of one variable and the past values of other variables. Recall that although there is co-integration between two variables does not specify the direction of a causal relationship between variables, economic theory guarantees that there is always Granger causality in at least one direction.

Researchers verify the direction of Granger causality between variables. The study used chi-square statistics and probability to measure causality between variables.

Hypothesis testing: H_0 : No causal relation between REER and TEV

H_1 : There is causal relationship between REER and TEV

Statistically, significant probability value indicates the rejection of the null hypothesis at 5 percent. There are two types of causality running: unidirectional causality and bi-directional causality. If real effective exchange rate (REER) granger causes total export value (TEV) but total export value does not cause real effective exchange rate, we say there is only unidirectional causality from real effective exchange rate to total export value at the appropriate significance level. On the other hand, the bi-causality would be the case if there is causality from real effective exchange rate (REER) to total export value (TEV) and vice versa. In this study, the estimation results for Granger causality between each variable is presented in the table.

Table 4.13: Pairwise Granger Causality Test

Null hypothesis	Observation	F-statistic	P-value
LnREER does not Granger Cause LTEV	32	0.38439	0.6835
LnTEV does not Granger Cause LREER		8.78624	0.0012*
LnRGDP does not Granger Cause LTEV	32	1.78930	0.1863
LnTEV does not Granger Cause LRGDP		4.28973	0.0241*
LnFRGDP does not Granger Cause LTEV	32	5.26309	0.0117*
LnTEV does not Granger Cause LFRGDP		0.10127	0.9040
LnFDI does not Granger Cause LREER	32	16.7888	2.E-05*
LnREER does not Granger Cause LFDI		0.88193	0.4256
LnFDI does not Granger Cause LRGDP	32	3.83526	0.0342*
LnRGDP does not Granger Cause LFDI		0.96470	0.3938
LnFRGDP does not Granger cause LnREER	32	1.26605	0.2982
LnREER des not Granger cause LnFRGDP		0.11524	0.8916
LnFRGDP does not Granger cause LnRGDP	32	2.19489	0.1308
LnRGDP does not Granger cause LnFRGDP		2.8218	0.0771

Source: Own computation using EVIEWS 10 software, 2021.

From the above table we can understand that LnREER does not Granger causes LnTEV as the shown that probability value of F-statistics significant because it is greater than 5% level. Therefore, we can accept the null hypothesis (H0) that state real effective exchange rate does not Granger cause total export value variable and we reject alternative hypothesis that real effective exchange rate Granger causes the total export value. Also we can judge that LnFDI Granger causes LnRGDP in that its probability value of F- statistics less than 5% level. Generally we can conclude that in this model there are only uni-directional causality between variables and no bi-directional causality.

4.2.7 Variance Decomposition (VD)

The variance decomposition provides information about the relative importance of each orthogonal zed random innovation in affecting the variation of the variables in each forecast error. The forecast error variance decomposition for each variable reveals the proportion of the movement in these variables due to their own shocks versus the shocks in other variables. In other words, variance decomposition gives the proportion of the movements in the dependent variables that are due to their 'own' shocks (innovations), versus shocks to the other variables (Tursoy, 2019). Based on the result, the variance decomposition of total export value as variable endorsed to its own innovation and to shocks in the other variables for a forecast horizon of 1 through 10 years is presented below under the table.

Table 4.14: Variance Decomposition of Total export Value

Period	S.e	LTEV	LREER	LRGDP	LFRGDP	LFDI
1	0.105382	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.138768	82.61380	5.525700	0.940336	10.90801	0.012155
3	0.193070	77.29081	6.153133	1.240613	10.14045	5.174996
4	0.230832	71.07031	5.586979	1.754849	12.41516	9.172696
5	0.280758	68.36372	4.019843	1.200397	15.91898	10.49705
6	0.319491	66.33599	3.632886	1.005472	17.40309	11.62256
7	0.358304	67.31343	3.028538	0.941199	17.40962	11.30721

8	0.390854	67.12782	2.716545	0.942781	18.13774	11.07511
9	0.422307	67.32937	2.566819	0.888909	18.01373	11.20117
10	0.449410	66.96576	2.492646	1.003907	18.15241	11.38527

Source: Own computation using EVIEWs software, 2021.

This result showed, in the short run 100% of forecast error variance in total export value explained by itself we can say that it is strongly endogenous. In other words the variation in the total export value is caused by its own innovation and which accounts is 100%.This decreases to about 82.61%in the second year and continues to decline gradually over time as this is offset by the importance of other independent variables in the system. In the second period real effective exchange rate explaining only 5.527% of forecast error variation in the total export value and the source of variation is foreign income which covers about 10.90% whereas domestic income and foreign direct investment have limited percentage of a shock to the variation in the total export value.

In the third period, the shock of the exchange rate on total export value forecast variation is 6.153% whereas foreign income shock to the total export value is about 10.14%. In this period, both domestic income and foreign direct investment comprises 1.24% and 5.17% respectively. At the 10th year, in Ethiopia, the significant source of variation in the total export value forecast error is its own innovations and its average of progress is 66.96%% in the forecast horizon. The real exchange rate innovation explains about an average of 2.49% of the variation in the total export value of Ethiopia's major export commodity whereas innovation on foreign real income causes the variation on total export value by 18.15%.

In general, the result of the model suggested that the effect of the foreign direct investment and foreign income on the export performance of Ethiopia's major export commodity appears to be significant. The series of foreign direct investment and foreign income are increasing throughout years, thus they put strong endogenous influence on total export value.

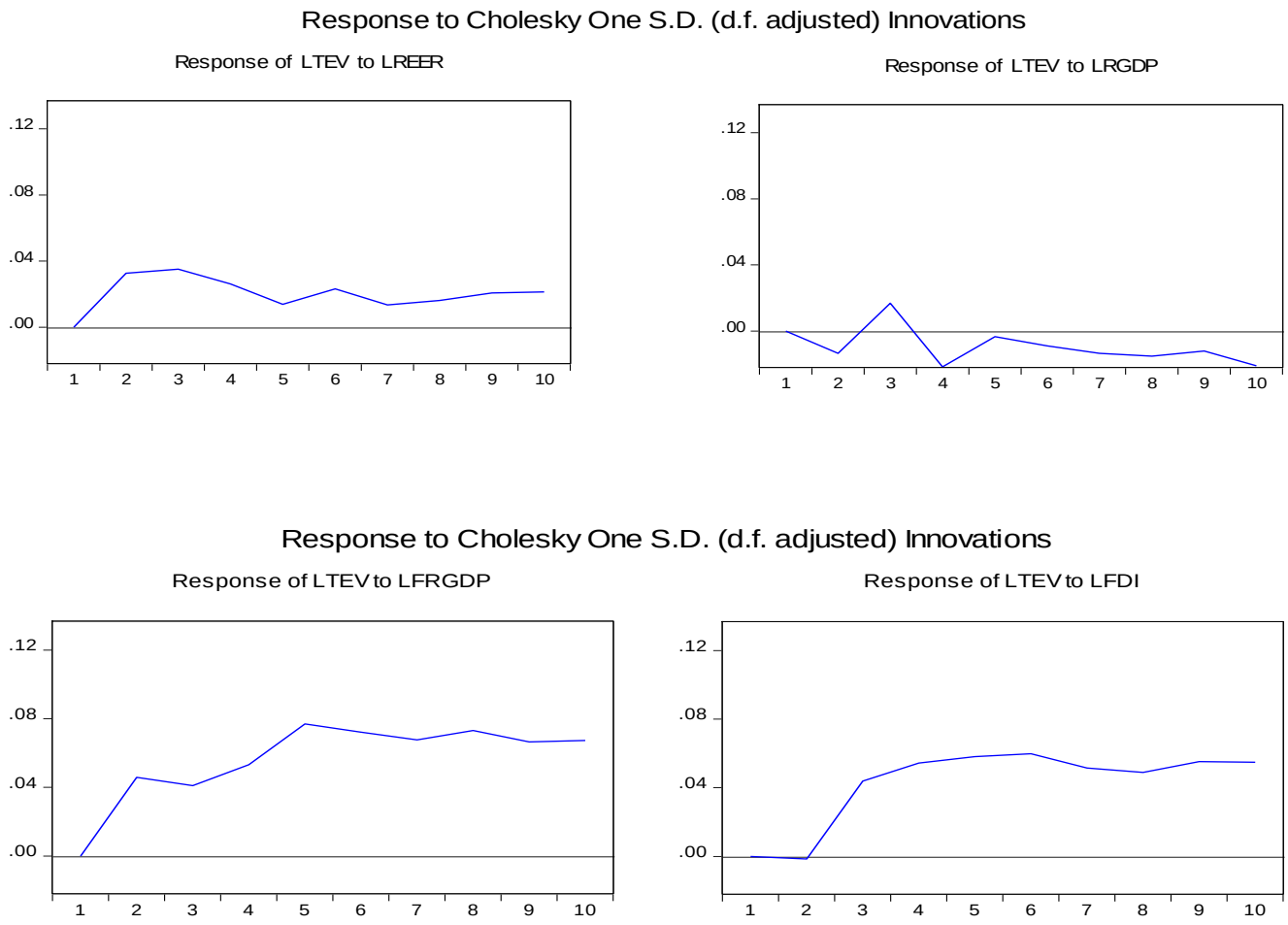
4.2.8 Impulse Response Function

Impulse response functions are performed to provide more insights into the dynamics of the explanatory variables. It used to point out the effect of a one standard deviation shock to one of the innovations on current and future values of the endogenous variables. In this study especial attention given to real exchange rate, which is a key independent variable that affects export performance of total export values of commodity. The following Cholesky ordering is employed. Figure (5.3) below shows that how total export value of major commodity responds to a one standard deviation of the independent variables at any point in time.

As the figure depicts after the shock of REER, the total export value of major commodity improves up to second year and remain the same between third and fourth year. After seventh year, it starts to improve when the number of years increased. On average, a one percent real depreciation of Ethiopian Birr in relative to trading country's currency has a long-run positive impact on the export performance of major commodity.

However, the total export value of major commodity responds negatively to a shock in real gross domestic product up to second year and it starts to improve very few years in that the increase in this year does not offset the deterioration of the coming years. This implies that the effect of real income on the export performance of major commodity is negative and it confirms the long-run results of VEC model. As the figure clearly shows the response of export performance of major commodity is positive to a shock of both foreign income and foreign direct investment. It revealed that, the effects of foreign income and foreign direct investment on the export performance of major commodity in Ethiopia are positive and significant in the long-run.

Figure 4.5: Impulse response of total export value



Sources: Author's computation using Eviews 10.0 software, 2021.

Overall, the estimated long-run coefficients obtained from the co-integrating equations confirm the results that correspond to the long-run findings of the impulse response functions so that positive relationships exist between the total export value of major export commodity and the REER, as well as the total export value and foreign direct investment. The findings are also similar in estimating the negative relationship found between the total export value and domestic income.

CHAPTER FIVE
CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Devaluation of currency has been stipulated and utilized increasingly as a main stabilization device in developing countries, as part of International Monetary Fund (IMF) mainstream adjustment programs. The policy measure of currency devaluation has aimed to make export products more competitive and permutes demand towards domestically produced goods eventually boosting the overall output of the country. Further, devaluation or depreciation of exchange rate is expected to improve the international competitiveness of the devaluing or depreciating country by changing the relative price of home and foreign goods. Based on this obvious fact, governments of Ethiopia engaged on different policies like currency devaluation policies in order to improve its export performance. That is the main reason that this study has made an attempt to examine the effect of currency devaluation on major export commodity (coffee and khat) in Ethiopia.

Moreover, the main finding that has been investigated in this study is whether currency devaluation significantly affects the export performance of major export commodities in Ethiopia. In order to achieve this objective, time series data ranging from the year 1987 up to 2020 from different source has been employed. In this study values of major export commodity was used as dependent variable and variables like real effective exchange rate, foreign real gross domestic product, real gross domestic product and foreign direct investment were used as explanatory variable.

Employing Johansen co-integration, VECM and impulse responses the study found that the short-run effects of the REER on the export value of major commodity are different from the long-run effects. In particular, it is found that the REER is negatively and insignificantly related to the total export value of major export commodity in the short run, while a positive and significant relationship exists in the long run. It implies that decrease in the external value of the domestic currency initially leads to deterioration; however, short-run currency devaluation is not significant in the export performance of major commodity in Ethiopia and an improvement thereafter.

The movement in real effective exchange rate has also appears to have a positive relationship with export performance. Real effective exchange rate movements are positively related with the growth in export performance in long run. An increase in the real effective exchange rate means a real depreciation of the domestic currency, which makes exportable items cheap. Thus, according to this research output as a one percent change in real effective exchange rate results 4.62 percent change in the total export earnings. It is well known that exports of developing countries are price inelastic in the international market due to nature of the product that LDCs produces. Hence this result is consistent with this fact. It follows that devaluation of birr in terms of foreign currency improves price competitiveness of export and hence leads to an increased export performance of Ethiopia in case of major commodity in the long run.

The study further came with the finding that long-run negative and significant relationship between real domestic income and export performance, indicating that a rise in real domestic income leads to a decrease in export performance of major commodity in Ethiopia. The negative sign of the coefficient of real domestic income supports the Keynesian view or absorption approach that increases in domestic real income will encourage citizens to buy more imported goods and thus decrease export performance in the long run. This means, higher domestic income will lead to higher demand for foreign goods and thereby low saving in the country which results in low investment and low export. The main reason is that import demands for developing countries like Ethiopia, are inelastic as their imports are primarily composed of capital goods, semi-finished goods, fuels and the like of which, a nation cannot cut their imports.

In contrast, a long-run positive relationship was found between total export value and foreign real income and foreign direct investment as expected. Foreign direct investment (FDI) is statistically significant at 5 % significance level. A positive and significant relationship between export performance of major commodity and FDI in Ethiopia indicates that there is high contribution of FDI to capital formation which helps to increase the performance exports in Ethiopia. Thus, export performance positively responds to foreign direct investment in the long-run. The VECM estimation revealed that that about 30.88% of short-run deviation in the total export value is corrected each year. Shocks in the foreign direct investment and foreign income on the export performance of Ethiopia’s major export commodity are shown to impact greatly in the short-run.

5.2 Recommendation

The Ethiopia's trade deficit is widening with increasing import and sluggish export growth. The trade deficit problem can be addressed by enhancing export competitiveness and performance. Export competitiveness can be achieved by maintaining competitive exchange rate. This study found that Ethiopian export earnings from coffee and khat, and the real exchange rate have a positive and significant long-run relationship. Therefore, it implies that policy intervention in the form of depreciating the value of the domestic currency aimed at improving the ability to export is important in that such a policy intervention could be effective at long run in improving the export performance of coffee and khat. The empirical result suggests that an increase in the country's real effective exchange rate (devaluation of Birr) cause international gain in foreign earning and competitiveness of that country in international trade. Thus, a conducive and stable exchange rate policy has to be ensured.

The Ethiopian government should encourage the flow of foreign direct investment in the country as it is an important factor and positively influencing the export performance of major product both in the long run and short run. Foreign direct investment is one of the main sources of knowledge diffusion in Ethiopia and product diversification in the export sector. Therefore Ethiopian government should have to create conducive environment so as to attract foreign investors.

In order to achieve what it supposed through devaluation policy, the Ethiopian government has to control up rising movement of domestic price and allow further nominal depreciation of local currency in longer run to encourage more agricultural export. Based on the reason that inflation significantly affects output in general and export performance in particular negatively through increasing the cost of input, the Ethiopia government should have to manage the rate of inflation through adopting appropriate policies to encourage export earnings as desired and to maintain international competitiveness as policy goal.

5.3 policy implication

Exchange rate policy aimed at depreciating value of domestic currency would be effective to improve Ethiopian export competitiveness and hence increases export earnings at international trade. From this we can draw that a policy aiming to maintain competitive real exchange rate and

effective economic policy which avoids overvaluation of currency (ETB) will enhance Ethiopian competitiveness of major export commodity in international trade. In the short-run, the real exchange rate has no significant impact on the export earnings of Ethiopian major export commodity. This may be due to the fact that Ethiopian export is dominated by agricultural products which cannot be adjusted easily in a short period of time. Therefore, shifting the dominance of agricultural products in the Ethiopia's export by other sectors like manufacturing and service are very important to increase export earnings of the country as it desired.

Generally, it is good to note that depreciation by itself is not enough to revive Ethiopian export performance (major commodity) because export demand is not the only problem of Ethiopian export. Therefore, along with reducing the appreciation of the real exchange rate, other important policies measures that are very essential to improve exports supply in Ethiopia, improving the productivity of agricultural sector, infrastructure development and technological innovation for the export sector are required to increase export supply and raise the export earnings from international trade.

6.4 Direction for future researchers

This study is limited in the sense that it is not easy to include all of the relevant variables that can determine the export performance of major product. This is because of the existing of limited time to gather data on other variables and partly because of difficulties to obtain statistical information for these variables. Further, the study did not consider the political stability and infrastructure development. The directions for future research suggested in this study as to incorporate above important variables and to use alternative econometric techniques so as to get more information about the export performance in Ethiopia.

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APPENDIXES

APPENDIX 1: AUGMENTED DICKEY-FULLER TEST OF UNIT ROOTS (STATIONARITY TEST)

APPENDIX 1.1: For LTEV

Null Hypothesis: LTEV has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.226233	0.6511
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

APPENDIX 1.2: D (LTEV)

Null Hypothesis: D(LTEV) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.290187	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

APPENDIX 1.3 :LREER

Null Hypothesis: LREER has a unit root
Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.857856	0.3472
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

APPENDIX 1.4: D (LREER)

Null Hypothesis: D(LREER) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.213193	0.0002
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

APPENDIX 1.5: LRGDP

Null Hypothesis: LRGDP has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.880279	0.9997
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	

	10% level	-2.615817

*MacKinnon (1996) one-sided p-values.

APPENDIX 1.6: D (LRGDP)

Null Hypothesis: D(LRGDP) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.671192	0.0007
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

APPENDIX 1.7: LFRGDP

Null Hypothesis: LFRGDP has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.430179	0.1416
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

APPENDIX 1.8: D (LFRGDP)

Null Hypothesis: D(LFRGDP) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.233899	0.0002
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

APPENDIX 1.9: LFDI

Null Hypothesis: LFDI has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.393373	0.1512
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

APPENDIX 1.10: D (LFDI)

Null Hypothesis: D(LFDI) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.803801	0.0005
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Appendix 2: VAR optimal lag selection

VAR Lag Order Selection Criteria
Endogenous variables: LTEV LREER LRGDP LFRGDP LFDI
Exogenous variables: C
Date: 05/26/21 Time: 09:30
Sample: 1987 2020
Included observations: 30

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-35.10675	NA	0.000159	2.607117	2.793943	2.666884
1	85.56044	201.1120	1.50e-07	-4.370696	-3.436565*	-4.071859
2	106.5806	29.42817*	1.15e-07	-4.705371	-3.023934	-4.167465
3	128.0060	24.28212	9.46e-08*	-5.067064*	-2.638322	-4.290088*
4	143.6500	13.55821	1.39e-07	-5.043336	-1.867289	-4.027292

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Appendix 3: Co-integration Test

Date: 05/26/21 Time: 09:14
Sample (adjusted): 1991 2020
Included observations: 30 after adjustments
Trend assumption: Linear deterministic trend
Series: LTEV LREER LRGDP LFRGDP LFDI
Lags interval (in first differences): 1 to 3

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.939820	188.9517	69.81889	0.0000
At most 1 *	0.837771	104.6390	47.85613	0.0000
At most 2 *	0.612410	50.07664	29.79707	0.0001
At most 3 *	0.482756	21.64245	15.49471	0.0052
At most 4	0.060282	1.865253	3.841466	0.1720

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.939820	84.31268	33.87687	0.0000
At most 1 *	0.837771	54.56235	27.58434	0.0000
At most 2 *	0.612410	28.43419	21.13162	0.0039
At most 3 *	0.482756	19.77720	14.26460	0.0061
At most 4	0.060282	1.865253	3.841466	0.1720

Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

APPENDIX 4: LONG RUN MODEL OF VECM

Vector Error Correction Estimates
Date: 05/26/21 Time: 09:39
Sample (adjusted): 1990 2020
Included observations: 31 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LTEV(-1)	1.000000
LREER(-1)	-4.620439 (1.43315) [-3.22397]
LRGDP(-1)	0.558702 (0.27724) [2.01525]
LFRGDP(-1)	-0.007214 (0.05042) [-0.14308]
LFDI(-1)	-0.288340 (0.07894)

	[-3.65247]				
C	-2.747368				

Error Correction:	D(LTEV)	D(LREER)	D(LRGDP)	D(LFRGDP)	D(LFDI)
CointEq1	-0.308818	0.149215	-0.030527	2.015639	-1.333289
	(0.10164)	(0.04040)	(0.04846)	(0.89693)	(0.78077)
	[-3.03836]	[3.69376]	[-0.62990]	[2.24726]	[-1.70766]
D(LTEV(-1))	-0.164813	-0.190092	0.201773	0.267435	-3.477572
	(0.19878)	(0.07901)	(0.09478)	(1.75418)	(1.52700)
	[-0.82911]	[-2.40606]	[2.12877]	[0.15246]	[-2.27739]
D(LTEV(-2))	0.202650	-0.088279	0.246991	1.194679	-1.050491
	(0.21368)	(0.08493)	(0.10189)	(1.88567)	(1.64146)
	[0.94837]	[-1.03946]	[2.42414]	[0.63356]	[-0.63997]
D(LREER(-1))	-0.604585	0.159323	-0.098778	18.68487	-4.629985
	(0.48003)	(0.19079)	(0.22889)	(4.23605)	(3.68744)
	[-1.25948]	[0.83509]	[-0.43156]	[4.41092]	[-1.25561]
D(LREER(-2))	-0.176349	0.014654	0.060015	-2.815280	-1.338071
	(0.33250)	(0.13215)	(0.15854)	(2.93423)	(2.55421)
	[-0.53037]	[0.11089]	[0.37853]	[-0.95946]	[-0.52387]
D(LRGDP(-1))	0.188690	0.186460	-0.030127	12.60946	-1.290221
	(0.46430)	(0.18453)	(0.22139)	(4.09723)	(3.56659)
	[0.40640]	[1.01045]	[-0.13608]	[3.07756]	[-0.36175]
D(LRGDP(-2))	0.487889	0.342621	0.034516	-14.15577	1.450357
	(0.49141)	(0.19531)	(0.23432)	(4.33654)	(3.77491)
	[0.99283]	[1.75423]	[0.14731]	[-3.26430]	[0.38421]
D(LFRGDP(-1))	0.052183	0.005133	-0.008122	0.271645	0.470254
	(0.01928)	(0.00766)	(0.00919)	(0.17013)	(0.14810)
	[2.70673]	[0.66992]	[-0.88349]	[1.59669]	[3.17533]
D(LFRGDP(-2))	0.007426	0.008662	0.013282	-0.514281	0.045443
	(0.02640)	(0.01049)	(0.01259)	(0.23295)	(0.20278)
	[0.28129]	[0.82558]	[1.05523]	[-2.20766]	[0.22410]
D(LFDI(-1))	-0.091497	0.000146	-0.017945	1.202668	-0.049341
	(0.04016)	(0.01596)	(0.01915)	(0.35442)	(0.30852)
	[-2.27815]	[0.00912]	[-0.93704]	[3.39333]	[-0.15993]
D(LFDI(-2))	-0.014983	0.026913	-0.022380	0.657338	-0.413354
	(0.04614)	(0.01834)	(0.02200)	(0.40717)	(0.35444)
	[-0.32472]	[1.46758]	[-1.01726]	[1.61442]	[-1.16623]
C	0.006749	-0.038781	0.067730	-0.441545	0.501944
	(0.04655)	(0.01850)	(0.02220)	(0.41083)	(0.35762)
	[0.14497]	[-2.09593]	[3.05113]	[-1.07477]	[1.40356]
R-squared	0.632171	0.848149	0.535118	0.635205	0.600554
Adj. R-squared	0.419217	0.760235	0.265976	0.424008	0.369296
Sum sq. resids	0.211000	0.033331	0.047972	16.43143	12.45095

S.E. equation	0.105382	0.041884	0.050248	0.929953	0.809514
F-statistic	2.968581	9.647485	1.988238	3.007638	2.596900
Log likelihood	33.35608	61.95954	56.31519	-34.14783	-29.84815
Akaike AIC	-1.377811	-3.223196	-2.859044	2.977280	2.699881
Schwarz SC	-0.822720	-2.668104	-2.303953	3.532371	3.254972
Mean dependent	0.021339	-0.001016	0.066158	0.039216	0.302740
S.D. dependent	0.138280	0.085537	0.058649	1.225329	1.019323

Determinant resid covariance (dof adj.)	1.04E-08
Determinant resid covariance	8.95E-10
Log likelihood	102.9859
Akaike information criterion	-2.450706
Schwarz criterion	0.556041
Number of coefficients	65

Appendix 5: Short run model of VECM

Dependent Variable: D(LTEV)
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 05/26/21 Time: 08:56
Sample (adjusted): 1990 2020
Included observations: 31 after adjustments
D(LTEV) = C(1)*(LTEV(-1) - 4.62043919718*LREER(-1) + 0.558701992564 *LRGDP(-1) - 0.00721377955657*LFRGDP(-1) - 0.288339608212 *LFDI(-1) - 2.74736816834) + C(2)*D(LTEV(-1)) + C(3)*D(LTEV(-2)) + C(4)*D(LREER(-1)) + C(5)*D(LREER(-2)) + C(6)*D(LRGDP(-1)) + C(7) *D(LRGDP(-2)) + C(8)*D(LFRGDP(-1)) + C(9)*D(LFRGDP(-2)) + C(10) *D(LFDI(-1)) + C(11)*D(LFDI(-2)) + C(12)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.308818	0.101640	-3.038364	0.0068
C(2)	-0.164813	0.198783	-0.829109	0.4173
C(3)	0.202650	0.213683	0.948368	0.3548
C(4)	-0.604585	0.480026	-1.259482	0.2231
C(5)	-0.176349	0.332505	-0.530367	0.6020
C(6)	0.188690	0.464295	0.406402	0.6890
C(7)	0.487889	0.491414	0.992827	0.3333
C(8)	0.052183	0.019279	2.706727	0.0140
C(9)	0.007426	0.026398	0.281290	0.7815
C(10)	0.091497	0.040163	2.278151	0.0345
C(11)	-0.014983	0.046140	-0.324720	0.7489
C(12)	0.006749	0.046555	0.144972	0.8863

R-squared	0.632171	Mean dependent var	0.021339
Adjusted R-squared	0.419217	S.D. dependent var	0.138280
S.E. of regression	0.105382	Akaike info criterion	-1.377811
Sum squared resid	0.211000	Schwarz criterion	-0.822720
Log likelihood	33.35608	Hannan-Quinn criter.	-1.196865
F-statistic	2.968581	Durbin-Watson stat	1.873040
Prob(F-statistic)	0.018123		

APPENDIX 6: RESIDUAL DIAGNOSIS TEST

APPENDIX6. 1: Autocorrelation test

Breusch-Godfrey Serial Correlation LM Test:

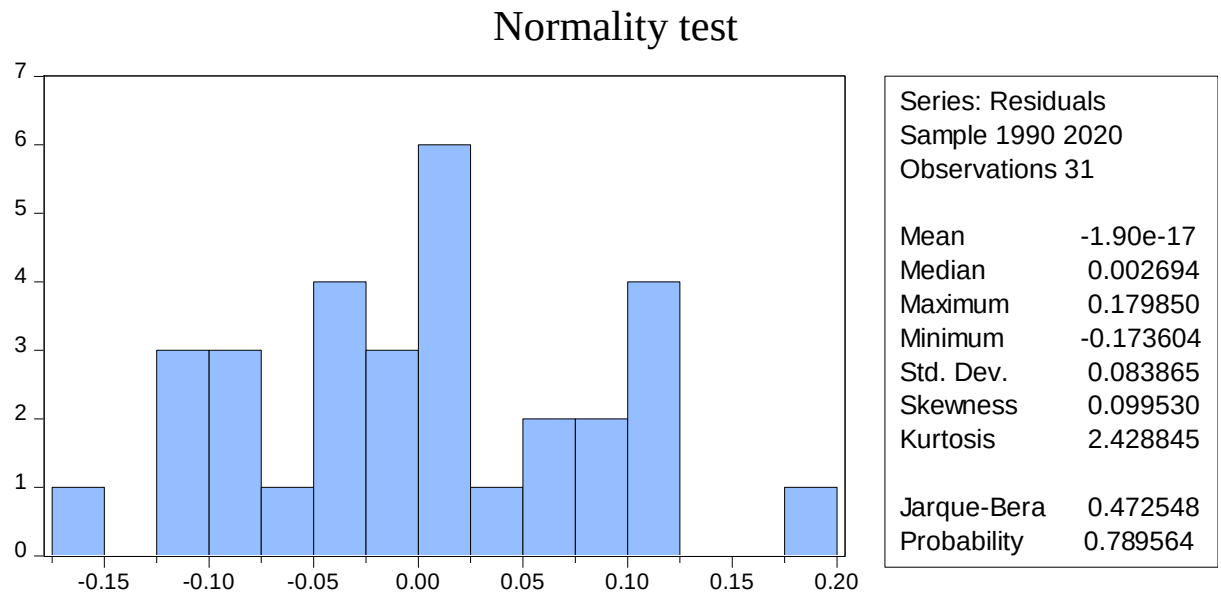
F-statistic	0.270656	Prob. F(2,17)	0.7661
Obs*R-squared	0.956636	Prob. Chi-Square(2)	0.6198

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/21 Time: 12:15
Sample: 1990 2020
Included observations: 31
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.093996	0.171220	-0.548980	0.5902
C(2)	-0.301012	0.473415	-0.635831	0.5334
C(3)	-0.046050	0.306603	-0.150193	0.8824
C(4)	-0.373004	0.713475	-0.522799	0.6079
C(5)	-0.178047	0.473252	-0.376221	0.7114
C(6)	0.094229	0.528098	0.178431	0.8605
C(7)	0.095397	0.561569	0.169877	0.8671
C(8)	-0.006716	0.026913	-0.249542	0.8059
C(9)	0.024507	0.046260	0.529767	0.6031
C(10)	0.030474	0.059862	0.509076	0.6172
C(11)	-0.029596	0.064000	-0.462435	0.6496
C(12)	0.010040	0.050415	0.199147	0.8445
RESID(-1)	0.487234	0.678524	0.718079	0.4825
RESID(-2)	0.002229	0.460311	0.004842	0.9962

R-squared	0.030859	Mean dependent var	-1.90E-17
Adjusted R-squared	-0.710248	S.D. dependent var	0.083865
S.E. of regression	0.109676	Akaike info criterion	-1.280125
Sum squared resid	0.204489	Schwarz criterion	-0.632517
Log likelihood	33.84193	Hannan-Quinn criter.	-1.069021
F-statistic	0.041639	Durbin-Watson stat	2.070603
Prob(F-statistic)	1.000000		

APPENDIX 6. 2: Normality test



APPENDIX6. 3: Heteroscedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.016020	Prob. F(15,15)	0.0930
Obs*R-squared	20.72155	Prob. Chi-Square(15)	0.1460
Scaled explained SS	5.561105	Prob. Chi-Square(15)	0.9862

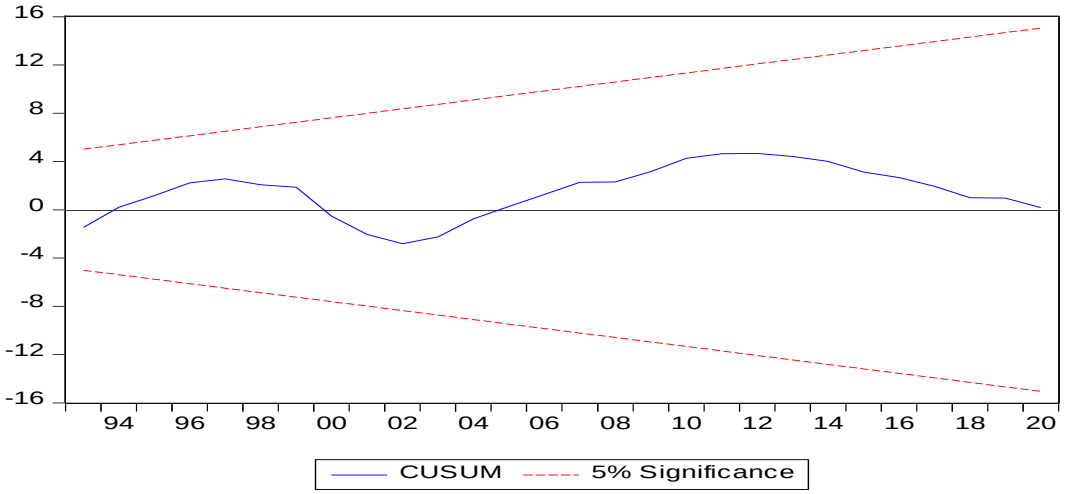
Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/21 Time: 12:16
Sample: 1990 2020
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.042270	0.101427	0.416754	0.6828
LTEV(-1)	0.012681	0.016426	0.771964	0.4521
LREER(-1)	-0.011748	0.043828	-0.268041	0.7923
LRGDP(-1)	-0.055253	0.030861	-1.790380	0.0936
LFRGDP(-1)	0.001657	0.001762	0.940195	0.3620
LFDI(-1)	-0.005023	0.002694	-1.864781	0.0819
LTEV(-2)	-0.033970	0.021917	-1.549935	0.1420

LTEV(-3)	0.030539	0.016383	1.864096	0.0820
LREER(-2)	0.023563	0.045583	0.516937	0.6127
LREER(-3)	-0.022751	0.024561	-0.926293	0.3690
LRGDP(-2)	0.005404	0.052038	0.103857	0.9187
LRGDP(-3)	0.041331	0.045791	0.902596	0.3810
LFRGDP(-2)	0.000825	0.002521	0.327480	0.7478
LFRGDP(-3)	-0.002589	0.002210	-1.171431	0.2597
LFDI(-2)	0.008124	0.003879	2.094098	0.0536
LFDI(-3)	-0.001525	0.003203	-0.475967	0.6410

R-squared	0.668437	Mean dependent var	0.006806
Adjusted R-squared	0.336874	S.D. dependent var	0.008271
S.E. of regression	0.006735	Akaike info criterion	-6.856701
Sum squared resid	0.000680	Schwarz criterion	-6.116579
Log likelihood	122.2789	Hannan-Quinn criter.	-6.615439
F-statistic	2.016020	Durbin-Watson stat	3.310463
Prob(F-statistic)	0.093048		

APPENDIX6. 4: Model stability is reserved and Residual variance is stable



The line is not outside 5% level of significance line and it is desirable.

APPENDIX 7: GRANGER CAUSALITY TEST

Pairwise Granger Causality Tests
Date: 05/26/21 Time: 19:33
Sample: 1987 2020
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LREER does not Granger Cause LTEV	32	0.38439	0.6835

LTEV does not Granger Cause LREER		8.786240	0.0012
LRGDP does not Granger Cause LTEV	32	1.78930	0.1863
LTEV does not Granger Cause LRGDP		4.28973	0.0241
LFRGDP does not Granger Cause LTEV	32	5.26309	0.0117
LTEV does not Granger Cause LFRGDP		0.10127	0.9040
LFDI does not Granger Cause LTEV	32	2.72591	0.0835
LTEV does not Granger Cause LFDI		1.14657	0.3327
LRGDP does not Granger Cause LREER	32	2.91507	0.0714
LREER does not Granger Cause LRGDP		1.05050	0.3636
LFRGDP does not Granger Cause LREER	32	1.26605	0.2982
LREER does not Granger Cause LFRGDP		0.11524	0.8916
LFDI does not Granger Cause LREER	32	16.7888	2.E-05
LREER does not Granger Cause LFDI		0.88193	0.4256
LFRGDP does not Granger Cause LRGDP	32	2.19489	0.1308
LRGDP does not Granger Cause LFRGDP		2.82128	0.0771
LFDI does not Granger Cause LRGDP	32	3.83526	0.0342
LRGDP does not Granger Cause LFDI		0.96470	0.3938
LFDI does not Granger Cause LFRGDP	32	0.27253	0.7635
LFRGDP does not Granger Cause LFDI		6.03140	0.0068

Appendix 8: Variance decomposition

Appendix 8.1 :Variance Decomposition of LTEV:

Period	S.E.	LTEV	LREER	LRGDP	LFRGDP	LFDI
1	0.105382	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.138768	82.61380	5.525700	0.940336	10.90801	0.012155
3	0.193070	77.29081	6.153133	1.240613	10.14045	5.174996
4	0.230832	71.07031	5.586979	1.754849	12.41516	9.172696
5	0.280758	68.36372	4.019843	1.200397	15.91898	10.49705
6	0.319491	66.33599	3.632886	1.005472	17.40309	11.62256
7	0.358304	67.31343	3.028538	0.941199	17.40962	11.30721
8	0.390854	67.12782	2.716545	0.942781	18.13774	11.07511
9	0.422307	67.32937	2.566819	0.888909	18.01373	11.20117
10	0.449410	66.96576	2.492646	1.003907	18.15241	11.38527

Appendix 8.2: Variance Decomposition of LREER:

Period	S.E.	LTEV	LREER	LRGDP	LFRGDP	LFDI
1	0.041884	0.069396	99.93060	0.000000	0.000000	0.000000
2	0.062099	10.10073	52.53770	17.80320	1.001286	18.55709
3	0.088677	6.178881	27.24450	43.39557	1.471125	21.70992
4	0.114055	6.720980	16.50732	38.35672	1.186416	37.22856
5	0.145225	8.258116	11.30548	37.64218	0.780243	42.01399
6	0.166202	8.616707	10.53326	39.93845	0.640142	40.27145
7	0.180714	10.20973	9.524479	41.17381	0.574078	38.51791
8	0.194880	11.33880	8.749193	42.69832	1.219327	35.99436
9	0.209410	13.07848	8.124154	43.82654	1.586995	33.38383
10	0.223125	14.90674	7.387313	43.73167	1.902677	32.07160

Appendix 8.3:Variance Decomposition of LRGDP:

Period	S.E.	LTEV	LREER	LRGDP	LFRGDP	LFDI
1	0.050248	0.388129	22.79462	76.81725	0.000000	0.000000
2	0.073071	1.874077	18.36034	78.47457	0.681742	0.609268
3	0.093595	6.660486	11.88506	74.89738	1.494069	5.063014
4	0.117831	9.543816	7.500552	76.13903	2.675158	4.141445
5	0.137851	13.97805	5.677208	74.31186	3.004010	3.028865
6	0.158129	18.13083	4.731789	69.45967	5.375573	2.302134
7	0.180259	21.40653	3.747041	65.60248	7.438290	1.805655
8	0.199443	24.65437	3.175652	62.27702	8.385531	1.507429
9	0.218092	27.35167	2.874233	59.04965	9.452880	1.271568
10	0.235785	29.29152	2.570383	56.77869	10.23270	1.126708

Appendix 8.4:Variance Decomposition of LFRGDP:

Period	S.E.	LTEV	LREER	LRGDP	LFRGDP	LFDI
1	0.929953	9.582727	0.102254	8.847766	81.46725	0.000000
2	1.624220	25.58574	0.056091	2.942705	65.71711	5.698349
3	2.150585	33.08885	1.654901	3.541467	56.07694	5.637842
4	2.758495	39.17108	3.317250	3.196716	50.57781	3.737143
5	3.188431	42.29057	2.815805	3.085972	48.63039	3.177263
6	3.549715	44.62336	2.460090	3.798108	46.12692	2.991518
7	3.874893	44.40679	2.304718	4.464387	45.70322	3.120882
8	4.170228	44.13404	2.166013	4.740917	45.26182	3.697209
9	4.439229	43.64710	2.119873	5.309070	44.92929	3.994671
10	4.696183	43.39999	2.164273	5.570435	44.81027	4.055031

Appendix 8.5:Variance Decomposition of LFDI:

Period	S.E.	LTEV	LREER	LRGDP	LFRGDP	LFDI
1	0.809514	19.18098	0.983160	19.78794	0.654753	59.39317
2	1.398183	7.039588	0.333294	31.92351	5.305990	55.39762
3	1.873420	4.361501	0.185646	26.24951	6.991964	62.21138
4	2.277102	2.988863	0.558142	28.42490	5.677399	62.35070
5	2.576948	2.572633	1.806053	30.94155	5.386075	59.29369
6	2.795802	2.200495	1.986297	32.92390	4.941672	57.94763
7	2.996734	1.915403	1.956328	35.36405	4.310752	56.45347
8	3.194573	1.805834	1.934633	37.42390	3.815020	55.02061
9	3.386795	1.799529	1.863340	38.23053	3.404180	54.70242
10	3.578629	1.897977	1.810955	39.11539	3.052138	54.12354

Cholesky Ordering: LTEV LREER LRGDP LFRGDP LFDI

Appendix 9: Impulse Response Function

Appendix 9.1:Response of LTEV:

Period	LTEV	LREER	LRGDP	LFRGDP	LFDI
1	0.105382	0.000000	0.000000	0.000000	0.000000
2	0.069306	0.032620	-0.013456	0.045831	-0.001530
3	0.113588	0.035065	0.016774	0.040981	0.043894
4	0.095172	0.026140	-0.021739	0.053247	0.054392
5	0.126567	0.013846	-0.003342	0.077026	0.058196
6	0.117578	0.023230	-0.008951	0.072222	0.059911
7	0.136770	0.013410	-0.013491	0.067725	0.051505
8	0.127008	0.016183	-0.015229	0.073197	0.049018
9	0.132393	0.020682	-0.012044	0.066466	0.055294
10	0.123179	0.021369	-0.021030	0.067350	0.054939

Appendix 9.2:Response of LREER:

Period	LTEV	LREER	LRGDP	LFRGDP	LFDI
1	-0.001103	0.041869	0.000000	0.000000	0.000000
2	-0.019705	0.016522	0.026202	0.006214	-0.026751
3	0.009817	-0.010789	0.052210	-0.008779	-0.031489
4	0.019708	-0.002226	0.039714	-0.006217	-0.055997
5	0.029451	0.015395	0.054307	0.003197	-0.063388

6	0.025269	0.022919	0.055618	-0.003503	-0.047575
7	0.030888	0.014172	0.049133	0.003264	-0.038141
8	0.031178	0.014572	0.052629	0.016601	-0.033032
9	0.037802	0.015487	0.054799	0.015260	-0.031138
10	0.041061	0.010728	0.050523	0.015853	-0.036429

Appendix 9.4: Response of LRGDP:

Period	LTEV	LREER	LRGDP	LFRGDP	LFDI
1	-0.003130	-0.023990	0.044040	0.000000	0.000000
2	0.009501	-0.020120	0.047440	-0.006033	-0.005704
3	0.021986	-0.007798	0.048693	0.009720	-0.020273
4	0.027232	-0.000490	0.063326	0.015509	-0.011466
5	0.036485	-0.006119	0.059583	0.014122	-0.000754
6	0.043329	-0.010215	0.056982	0.027808	-0.000275
7	0.049215	-0.005862	0.062834	0.032754	0.003328
8	0.053396	-0.006757	0.058786	0.030308	0.003592
9	0.056592	-0.010193	0.057568	0.034068	0.002278
10	0.057228	-0.007868	0.058988	0.034535	0.004646

Appendix 9.5:Response of LFRGDP:

Period	LTEV	LREER	LRGDP	LFRGDP	LFDI
1	0.287876	-0.029737	-0.276616	0.839368	0.000000
2	0.769482	-0.024402	0.033387	1.014465	0.387721
3	0.924873	-0.273970	-0.293534	0.927303	0.332300
4	1.204275	-0.419380	-0.281876	1.120289	0.153685
5	1.148327	-0.183951	-0.265472	1.046516	0.196553
6	1.150416	-0.154031	-0.406026	0.931880	0.232254
7	1.022171	-0.189910	-0.437880	1.024712	0.302735
8	1.003830	-0.175038	-0.392639	1.004565	0.417589
9	0.962374	-0.202660	-0.470916	0.991317	0.379797
10	0.984920	-0.244036	-0.426926	1.014106	0.327234

Appendix 9.6: Response of LFDI:

Period	LTEV	LREER	LRGDP	LFRGDP	LFDI
1	0.354536	-0.080267	-0.360101	-0.065503	0.623868
2	0.109190	-0.008535	-0.703139	0.315336	0.832926
3	0.124329	0.000130	-0.545163	0.376390	1.049027
4	0.043618	-0.149750	-0.743374	0.221330	1.024485
5	0.125943	-0.301651	-0.762127	0.251569	0.839339
6	0.034090	-0.187950	-0.720262	0.169101	0.769409
7	0.003025	-0.142924	-0.776104	0.029275	0.735032

8	-0.110813	-0.147474	-0.802111	0.047018	0.738418
9	-0.148735	-0.127660	-0.752308	0.033740	0.812133
10	-0.191450	-0.134868	-0.790037	0.020057	0.810433

Cholesky Ordering: LTEV LREER LRGDP LFRGDP LFDI

Appendix 10: Impulse response function

Response to Cholesky One S.D. (d.f. adjusted) Innovations