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# DO EXCHANGE RATES MATTER FOR ETHIOPIA'S EXPORT?

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By: Samuel Elias Kayamo



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Do exchange rates matter for Ethiopia's export?

A Thesis Submitted in Partial Fulfilment of the Requirement  
for the Award of Msc. Degree in Environmental Sciences  
(Specialization: Environmental Economics and Natural Resources)

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## **Abstract**

*This study estimated the long and short-run effects of the real exchange rate on Ethiopian export earnings by using the ARDL panel approach. The study used balanced annual panel data for the period 1997-2016. The results of the study showed that the real exchange rate has a significant impact on export earnings in the long-run, while it has no effect in the short-run. This implies that the depreciation of the real exchange rate improves export earnings of the country.*

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## **Abbreviations**

**AIC** :Akaike Information Criterion

**AR**:Autoregressive

**ARDL**:Autoregressive Distributed Lag

**BIC**:Bayesian Information Criterion

**CIP**:Consumer Price Index

**ECA**: Economic Commission for Africa

**EPRDF**:Ethiopia People Revolutionary Democratic Front

**ETB**:Ethiopian Birr

**FDRE**:Federal Democratic Republic of Ethiopia

**GDP**:Gross Domestic Product

**IMF**:International Monetary Fund

**NBE**:National Bank of Ethiopia

**OFER**:Official Exchange Rate

**RERI**:Real Exchange Rate Index

**RTC**:Root and Tuber Crops

**UNDP**:United Nations Development Programme

**USA**:United States of America

**USD**:United States Dollar

# Chapter One: Introduction

## 1.1. Background of the study

Ethiopia's economy has been exhibiting sign of robustness with favourable GDP growth rate exceeding 10% over the last decade ([UNDP, 2017](#)). However, the economy is still heavily dependent on the agricultural sector without a structural shift towards other activities. The agricultural sector contributes a large share of GDP at around 36% ([NBE, 2017](#)). Besides, Ethiopian exports are dominated by primary agricultural products. Annual exports earning is below 3.50 billion USD as indicated in Figure 1. Due to the massive expansion of the infrastructure and economic growth in the country for the last decade, imports have increased dramatically to more than USD 16 billion per year as shown in Figure 1. The increasing gap between imports and exports indicates that Ethiopia's economy has a trade deficit. Moreover, the scarcity of foreign currency is becoming severe as the gap between imports and exports is widening. As a result, the Ethiopian economy has become increasingly fragile in terms of trade balance and the country's foreign currency scarcity.

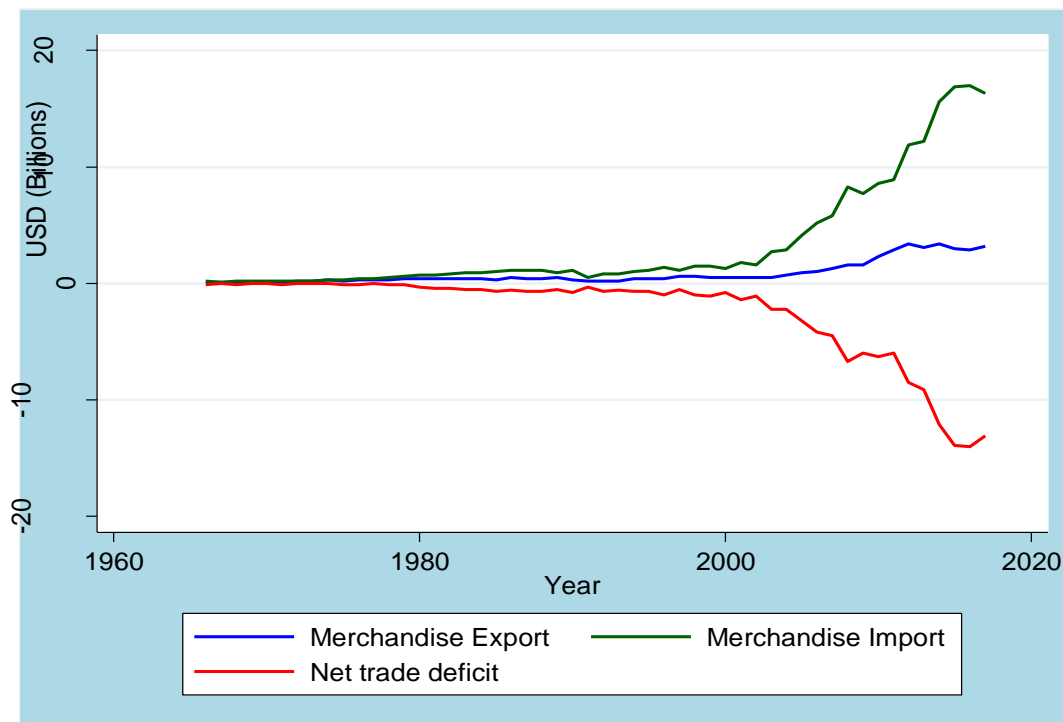


Figure 1. Trends in export, import and trade balance of Ethiopia, 1990-2017.

Data source: World Bank (2018)

Misalignment of the exchange rate is considered as the cause for the shortage of foreign currency. The World Bank also suggested that the Ethiopian exchange rate is overvalued, and it is one of the factors that triggered the chronic trade deficit of the country. The exchange rate not only affects the trade deficit but also the exchange rate movement has effect on the interest rate [Andrieş \*et al.\* \(2017\)](#), and further on price, production and employment levels ([Ahmad \*et al.\*, 2015](#); [Iyoboyi & Muftau, 2014](#)). These macro-economic variables directly or indirectly affect the daily life of the people. The choice of the exchange rate regime and the associated impact on the trade, national income and welfare of a nation are the concerns of policymakers. Many economists emphasized on analyzing the impact of the exchange rate on the trade balance. This is because the change in the exchange rate has a direct impact on the trading position of the country and its trading partner. Modelling the relationship between the exchange rate and the trade balance helps policymakers to predict the outcome of the devaluation or depreciation of the exchange rate on the competitiveness and trade balance of the country.

Devaluation is often used as a policy instrument by countries with large external trade imbalances and low economic growth ([Reinhart, 1995](#)). It is assumed that, as the currency is devalued, the competitiveness of exports in the international market is expected to increase as a result of the lower export prices. Net exports are therefore likely to grow as a result of increased export competitiveness ([Sweidan, 2013](#)). On the other hand, the devaluation increases import prices and reduces the demand for foreign products. The decrease in imports will also help to improve the country's trade balance. That is why policymakers often go for devaluation as a means of encouraging exports and discouraging imports.

The ETB has been devaluated frequently at different times due to chronic foreign currency shortage, slow economic growth and pressure from the IMF and World Bank ([Taye, 1999](#)). The largest devaluation took place in 1992 when the value of the ETB devalued by 141.50%, and the exchange rate jumped from 2.10 to 5 ETB per USD as indicated in Figure 2. Afterwards, the ETB was devalued in 2009 by 23.70% and most recently in 2018 by 15%. The International Monetary Fund (IMF) has warmly welcomed the recent devaluations. Currently, one USD is pegged at ETB 27 with minor fractional up and downs.

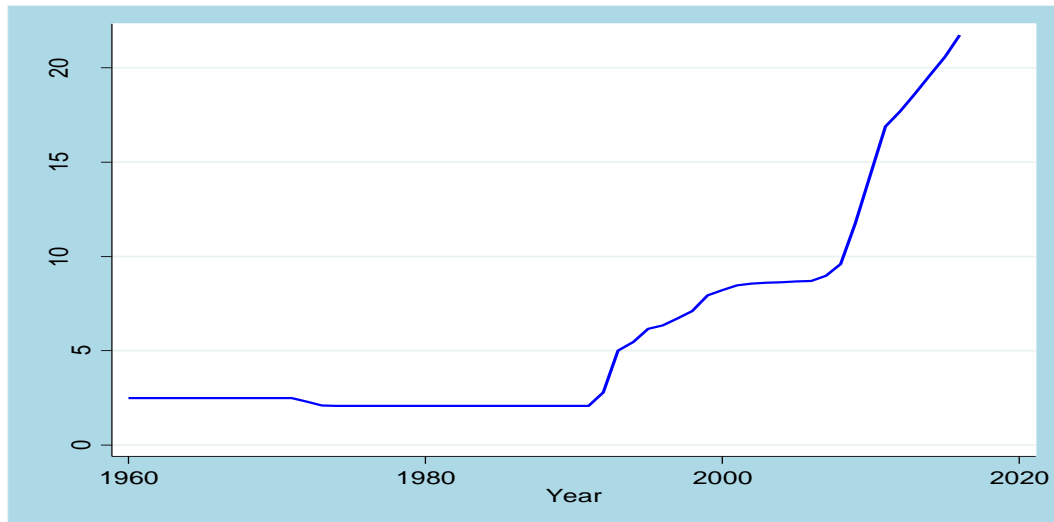


Figure 2. Movement of the official exchange rate (ETB per US\$) for period 1960-2016.

Data source: World Bank (2018)

However, a repeated devaluing of the ETB value in the past has not helped the country to improve the competitiveness of exports and trade balance since the trade deficit is still widening and the shortage of foreign currency reserve is worsening. Higher domestic inflation after devaluation is eroding the positive effects of devaluation. Moreover, lack of export diversification and low productivity of the agricultural sector were considered as the bottleneck to lower the effectiveness of devaluation.

## 1.2. Statement of the problem

Ethiopia's exports are low compared to other sub-Saharan countries ([Anagaw & Demissie, 2001](#)). High dependency of exports on a few primary agricultural products is the fundamental cause for the low export performance ([Menji, 2010](#)). Major Ethiopian export items are coffee, oilseeds, cereals, chat, horticultural crops, hides and other livestock products. Agricultural products account for around 70% of the country's total exports ([UNDP, 2017](#)). Export income of Ethiopia is unstable because of a few crops accounting for a large share of export earnings. In particular, the fluctuation of the coffee price on the world market creates a huge instability of export earnings ([Debello & Gardebroek, 2007](#)). The country's manufacturing sector accounts for less than 13% of total exports ([Oqubay, 2018](#)). The government of Ethiopia is working to improve the overall export performance by providing an incentive for exporters and by encouraging value-added export business ([UNDP, 2017](#)).

Additionally, at several times, the government of Ethiopia has devalued its currency, ETB, to increase the country's export competitiveness as indicated in Figure 2. The [World Bank \(2014\)](#) also proposed devaluing the ETB by projecting that for a 10% ETB devaluation, the export volume increases by 5% and the overall economic growth increases by more than 2%. However, the Ethiopian economy has not shown significant progress in the export performance and diversification so far. The inelasticity of export demand to changes in the exchange rate is considered as a major factor to lower the effectiveness of the devaluation.

Ethiopia is exporting price inelastic agricultural products. Thus, a devaluation may not lead to a significant rise in the volume of export. There are a variety of studies and arguments on the effect of devaluation or depreciation on different economic variables. The conventional belief of currency devaluation impact on trade balance shows that devaluation improves trade by lowering export price ([Meade, 1951](#)). However, the results of studies and claims from economists indicate that there is no agreement on the negative or positive impact of devaluation on the economy and particularly on trade balance and export. [Taye \(1999\)](#) found that devaluation of currency might improve the trade balance; however, the improvement is not due to economic or export growth but decreases in imports. [Lencho \(2013\)](#) in his study proved that depreciation of ETB improved the trade deficit of Ethiopia. According to [Bonsa \(2017\)](#) devaluation of ETB might not help to improve the export 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 backed easy, because agricultural products dominate Ethiopian exports. He also argues that devaluation is most likely to cause inflation due to increased import prices and aggravates the trade deficit. [Benien \(2010\)](#) claims that the depreciation of the ETB may not improve the trade deficit since the overvalued ETB is not the only factor contributing to the trade deficit of Ethiopia. So, devaluation, ETB value alone, without a clear policy approach to macroeconomic stability can be disappointing, at least in the short term. [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. [Ali \(2011\)](#) 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. A study by [Genye \(2011\)](#) proved that devaluation has an adverse effect on the GDP per capita the same year but it has a positive impact in one year lagged GDP per capita. This indicates that the devaluation has a time-varying effect. According

to [Degefe and Moges \(1994\)](#) devaluation is necessary but not sufficient to increase the volume of exportables. An increase in the volume of exportable items also requires investments aimed to increase production, diversification and others.

In general, the claims and empirical evidence on devaluation currency are mixed. It requires more empirical evidence to prove how the real exchange rate affects the every growing trade deficit in Ethiopia and low export earnings in particular. Therefore, this study provides additional empirical evidences by analysing the impact of real exchange rate on Ethiopian export earnings. The outcome of the study serves as input for policymakers in trade and exchange rates.

### **1.3. General Objective**

This thesis aims to analyse whether the real exchange rate has had an effect on the export earnings of Ethiopia with the following specific objectives:

1. To examine the dynamics of short-run linkages between real exchange rate and Ethiopian export earnings.
2. To assess the long-run relationship between the real exchange rate and Ethiopian export earnings.

### **1.4. Organisation of Study**

The study is organized in six main chapters. The second chapter provides brief overviews of the Ethiopian economy and export performance of the country in relation to the real exchange rate. The third chapter gives a thorough review of exchange rate regimes and the theoretical background of the study. It reviews different types of exchange rate regimes and empirical evidence on the impacts of adopting different exchange rate regimes, and it describes the exchange rate policy adopted by Ethiopia. Chapter four presents the data and the research methodology. In this chapter variables used for the analysis are described and a description of the methodology followed is given. The fifth chapter presents the empirical results of the study coupled with the interpretation and discussion by linking with the theoretical arguments and other previous empirical research output. Eventually, chapter six presents conclusions based on the major findings of the study and provides recommendations.

## Chapter Two: Ethiopian Economy and Export performance

In this chapter the Ethiopian economy is briefly described. Next, the importance of export for economic growth and its relationship with the real exchange rate are described. In the end, the Vietnamese export experience is reviewed for comparison.

### 2.1. Ethiopia's Economy

Ethiopia is the second most populous country in Africa with 102 million people after Nigeria. The country is the fastest growing in the horn of Africa ([World Bank \(2017\)](#)) with average economic growth of 10% per year ([World Bank, 2016](#)). However, still Ethiopia remains one of the poorest countries in the world with GDP per capita of \$767 Urban unemployment is declining but still remains high with 17% ([World Bank, 2016](#)). The Ethiopian economy is heavily dependent on the agricultural sector, but most recently the share of agriculture in GDP is slowly decreasing. In 2005/06 the share of agriculture was 48% [NBE \(2005\)](#) and it was reduced to 36% in 2017 ([NBE, 2017](#)). The service sector contributes the largest share, in 2017 it contributed about 39.30%, and the contribution from the manufacturing industry was about 25.60 % ([NBE, 2017](#)). The Ethiopian economy is characterized by a limited competitive position of the manufacturing industry. The contribution of the manufacturing industry remains the lowest among sub-Sahara African countries. But the impressive improvement in the services sector and growth in the agricultural sector contributed largely to the attractive growth registered in the last decade.

The major improvement in economic growth is triggered by increasing industrial activity, major power generation infrastructure, roads and constructions sector. Expansion of railways in the country, telecom expansion and the construction of airports in major cities of the country contributed to the robust economic growth in the last decade. Besides, the massive development of public infrastructures such as education, health and clean water has also contributed much to the success of economic growth. Due to successive economic growth, the poverty level of the country has shown a declining trend but it remains high, 24.60% of people live in poverty ([World Bank, 2016](#)).

The major challenges of the Ethiopian economy are the high government involvement and limited private sector. Political unrest and corruption are becoming an external threat to the economy. Moreover, the slow growth of the export sector with increasing demand for import

products, resulting in a chronic trade deficit and a shortage of foreign currencies [World Bank \(2016\)](#) and most importantly overvalued ETB harming export sectors ([World Bank, 2017](#)).

## **2.2. The role of export for economic growth**

In today's globalised economy, to ensure economic development, the role of export is widely acknowledged. Theoretically, improving the export sector stimulates the economic growth in many directions such as economies of scales due to larger international markets, efficiency due to competition and adoption of technologies embodied in foreign produced capital goods and improvement in productivity due to specialisation activities ([Calamitsis \*et al.\*, 2001](#); [Fosu, 1990](#); [Giles & Williams, 2000](#); [Santos-Paulino, 2002](#)). As the strategy to boost the export sector most Sub-Saharan countries are following export-led growth which provides incentives for the exporting industries. Also, the introduction of export-led growth offers a new opportunity to adopt improved technologies, skill improvement and promotion of entrepreneurial activity in the countries ([Reppas & Christopoulos, 2005](#)).

Despite the theoretical arguments, export-led economic growth is not witnessed in Sub-Saharan African countries. Contrary, there is overwhelming evidence to support the export-led economic growth hypothesis by mentioning the success of four Asian tigers (Hong Kong, South Korea, Singapore and Taiwan) ([Feder \(1983\)](#); [Preston, 1993](#)) and most recently the industrialized countries such as China, India, Indonesia and Brazil. The experience of these countries provides support for the export-led economic growth hypothesis ([Adelman, 1984](#); [Razmi & Hernandez, 2011](#)). However, some literature argues that the success of certain countries can not be duplicated ([Buffie, 1992](#)). The main reasons mentioned for the failure of replicating the fast economic and export growth of the Asia experience in the Sub-Sahara Africa case are geographical factors such as being landlocked, climate change and lack of openness to international markets ([Sachs & Warner, 1997](#)). Thus, increasing trade openness and encouraging private business are found important for the success of export-led economic growth. Empirical evidence also proved that countries opened economies to the international markets registered better economic growth compared to less opened economies ([Masson, 2001](#)).



Ethiopia's export policy before 1992 was part of an inward-looking development strategy with less emphasis on improving the export of the country. As a result, the export performance of the country was not satisfactory. The country has been experiencing a trade deficit since 1953 ([Ofcansky & Berry, 1991](#)).

During the period 1974 / 75-1990 / 1991 the Derg regime (military government before 1992), the economy was most regulated and inward-oriented. The trade policy characterized as highly restricted with limited private participation ([Mcmillan et al., 2003](#)). Moreover, the import was highly restricted by imposing high tariffs and quantitative restrictions.

After the current government came to power in 1991/92, it liberalised and reformed the economy, including trade policy. A major reform was liberalization of foreign trade and exchange regimes. Besides, the government took visible measures to reduce the role of the government in the foreign trade sector and to stimulate adequate private capital participation in the export sector. The government abolished any quantitative restriction and slowly reduced the level and dispersion of tariff rates in 1993 ([Mcmillan et al., 2003](#)). The country has adopted an export promotion strategy with the aim of boosting export performance and thereby encouraging economic growth.

With pressure from international organisations in support of export-led growth, Ethiopia revised the exchange rate policy by the devaluation of currency and adopted a flexible exchange rate policy since 1992 ([Hope, 2004](#)). And the country abolished all export taxes except for the coffee export. Moreover, the government of Ethiopia come up with a subsidy scheme for export-oriented business with the aim of encouraging export and increasing export competitiveness in international markets. The incentive scheme was established by Proclamation 249/2001 entitled as “Export Trade Duty Incentive Scheme Establishing Proclamation No. 249/2001” ([FDRE, 2001](#)). Later on, the proclamation was revised again by another proclamation no.768/2012 with the title of “Export Trade Duty Incentive Schemes” ([FDRE, 2012](#)).

Despite these significant export incentives, the Ethiopian export remains small ([World Bank, 2017](#)). The total merchandise export is below \$3 billion which can only finance for 20% of the total import. The elongated trade deficit resulted in chronic foreign currency shortage.

According to the [World Bank \(2017\)](#), foreign currency reserve of Ethiopia decreased from USD 4 billion or just two and a half months import to USD 3.20 billion or only two months of import.

The export of goods and services as a percentage of GDP is very small compared to other sub-Saharan countries. The share of exports in GDP is even lower than in the neighbouring countries. In fact, the share of exports to GDP is decreasing as indicated in Figure 3. Most recently in 2017 the export goods services as a per cent of GDP is only 7.30 % of the total GDP. According to the global ranking of export of goods and services as a per cent of GDP Ethiopia is in the lowest rank (143). The [World Bank \(2016\)](#) estimated that the export of goods dropped by 3.70 % in 2015/16. The ranking and trend of exports as a percentage of GDP indicate in adequateness of the current government policy to improve the export sector.

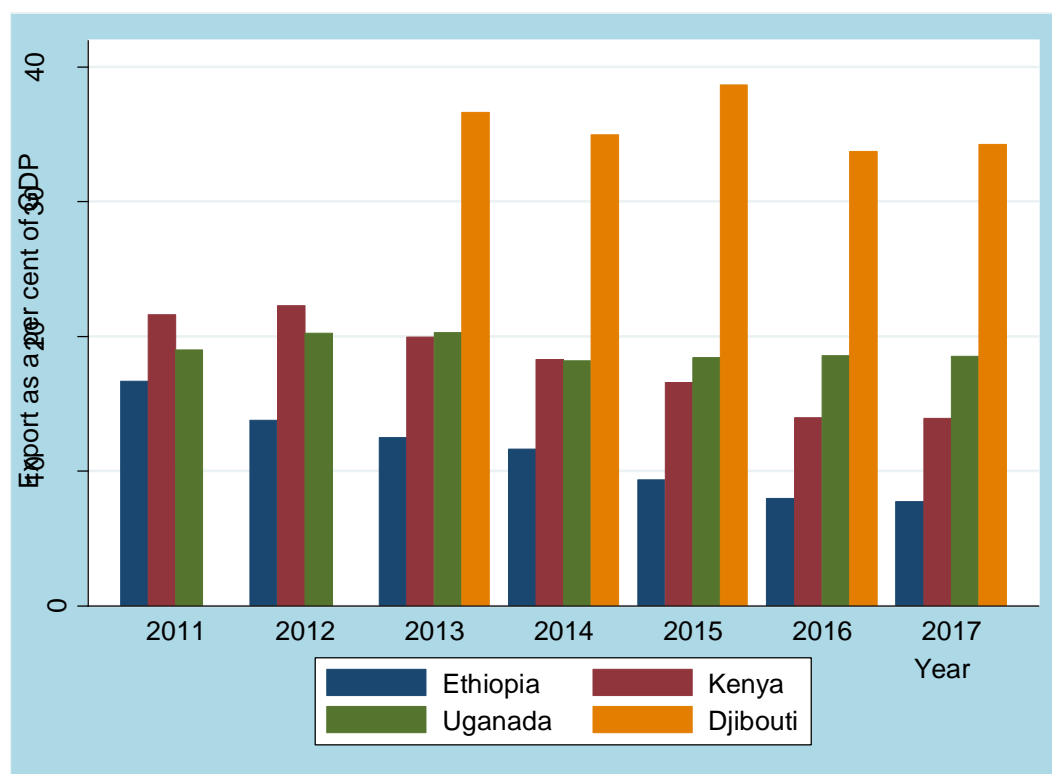


Figure 3. Export of goods and services as a per cent of GDP

Data Source: World Bank (2018)

### 2.2.1 Structure and Composition of Ethiopian Exports

Like other sub-Saharan African countries, Ethiopia's export structure is highly dominated by primary agricultural commodities mainly coffee, oilseeds (sesame), raw hides and skins, cut flowers and vegetables. Manufacturing export contribution is negligible for total export.

Ethiopia's exports lack diversity. Previously, coffee commonly called the green gold had generated on average up to 60-70% of the country's export earnings ([Geda, 1999](#); [Gemechu, 2002](#); [Petit, 2007](#)). Still now, coffee export exclusively contributes around 30.40% of the total exports earnings as indicated in Figure 4. The other major contributors are oilseeds 12.10%, pulses 9.60%, flowers 7.50% and chat (a mild stimulant) 9.40%.

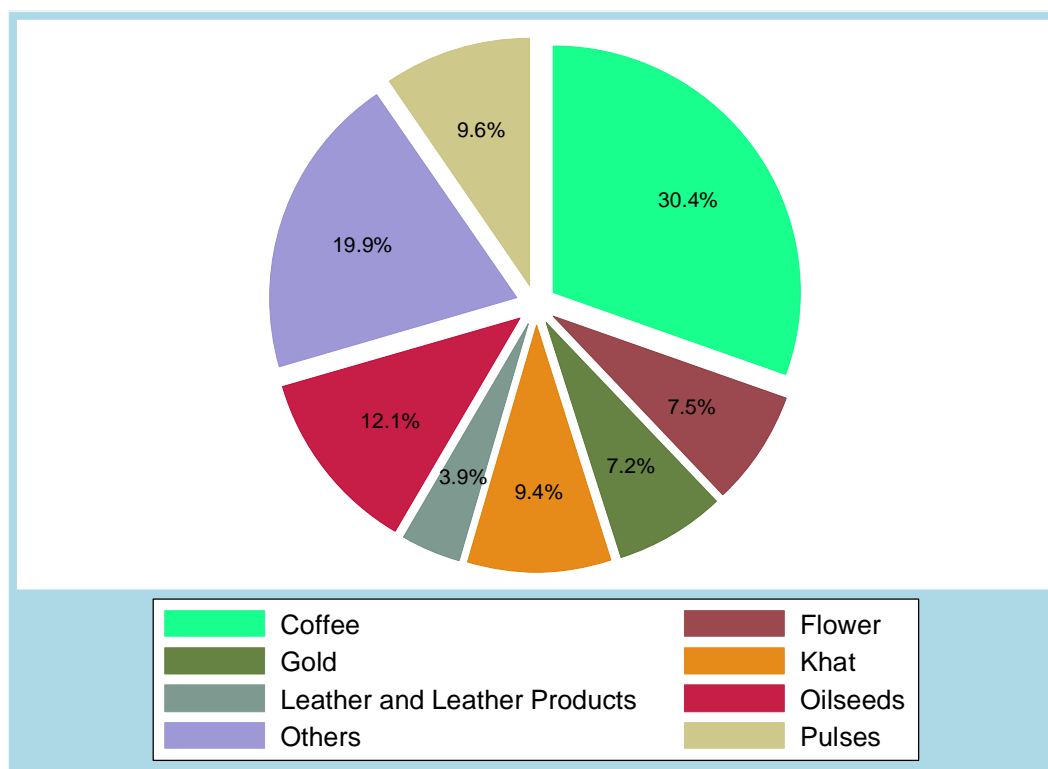


Figure 4. Export share of selected commodities

Data Source: NBE (2017)

The trend of export earnings at commodity level is shown in Figure 5. The fluctuations in export earnings from the export of coffee, vegetables and RTC is observed. Fluctuations in coffee exports have a major impact on the export earnings of Ethiopia. As clearly indicated in Figure 5, the trend of total exports mimics the trend of coffee exports. For the last three, up to four years, the total export is decreasing (Figure 5) this may be due to political instability, an overvalued exchange rate and drought across different parts of the country. This is also logical since most Ethiopian export items are agricultural products while export earnings from rawhide and skin remain relatively stable.

Among the different factors affecting Ethiopian export the overvalued exchange rate is considered an important factor. The ETB was overvalued by 31% in 2010 according to the

[World Bank \(2017\)](#). This overvaluation of ETB has an adverse effect on the export earnings of Ethiopia. [Svedberg \(1991\)](#) also identified overvaluation exchange rates as an important factor for the slower growth of Sub-Saharan countries.

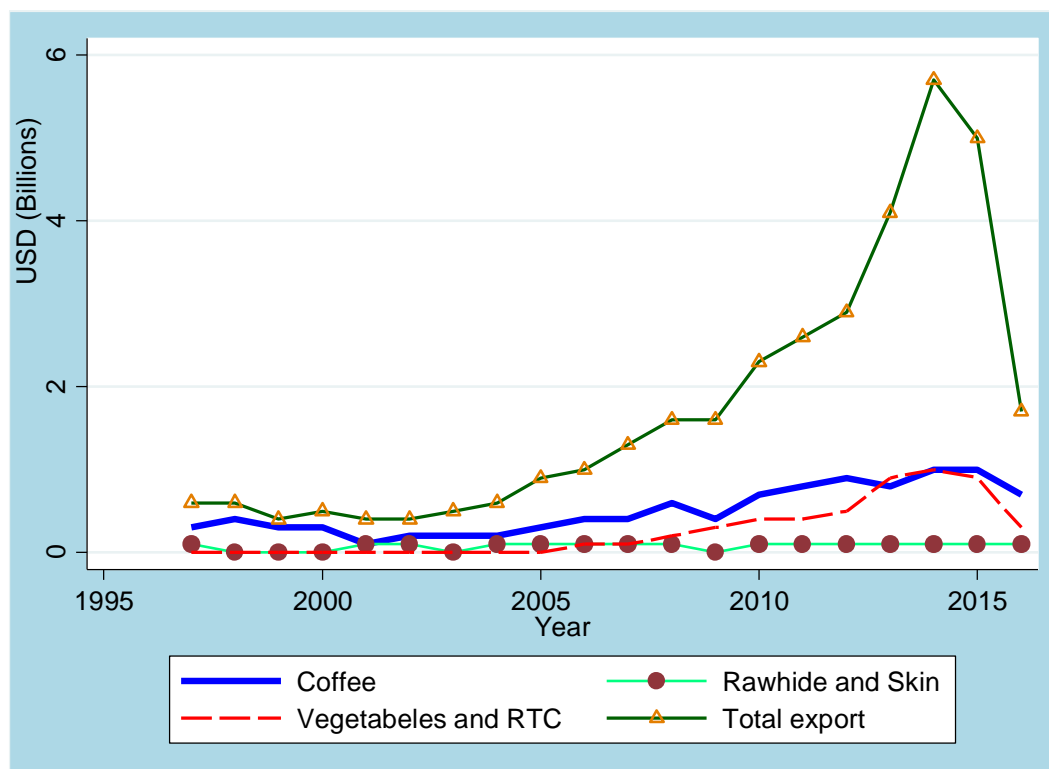


Figure 5. Trend of Ethiopian export earnings

Data source: UNcomtrade (2018)

In general, the composition of Ethiopian export goods is raw products that mainly compete on prices and less on quality. The undifferentiated agricultural products are highly dependent on relative prices. For such kind of export sector, proper management of the exchange rate is found very important.

### 2.2.2. Merchandise export and Real exchange rate

Figure 6. shows the trend between Ethiopian export earnings and the real exchange rate across various countries. The bilateral real exchange rate of Ethiopia was in a downward trend from 1997 to 2002 with most trading partners except the Russian Federation. During that period, the export earnings in Ethiopia were on the rise, confirming a theoretical argument that the depreciation of the real exchange rate improves export earnings. From 2002-2008, the bilateral real exchange rate was appreciating with most countries except the Russian Federation and

Kenya, but Ethiopia's export earnings were still growing. In the period 2008-2010, the real exchange rate was depreciating, and export earnings are increasing. From 2010 onwards, the Ethiopian real exchange rate is appreciating, and bilateral export earnings are either unstable or declining with all selected trading partners.

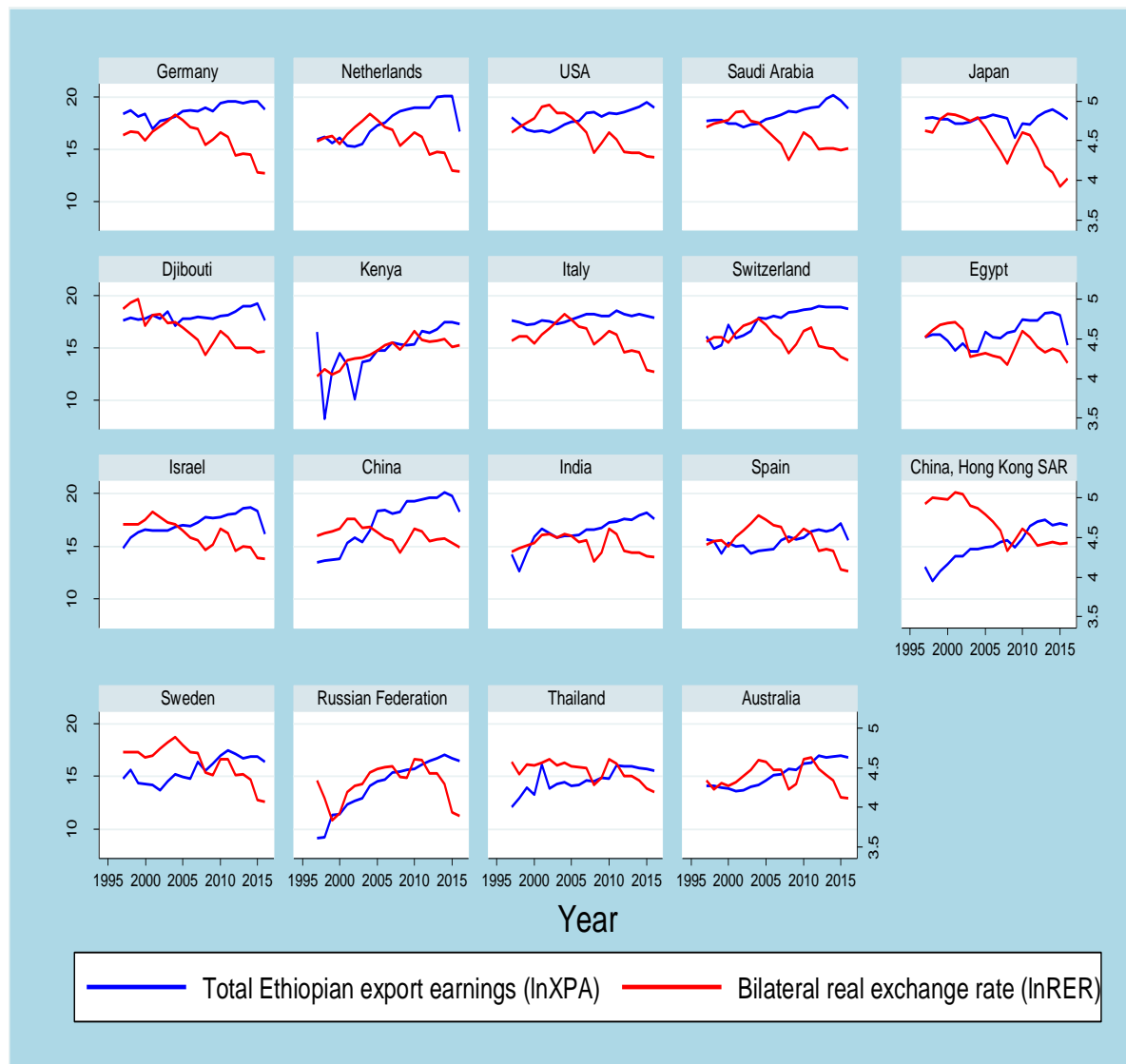


Figure 6. Bilateral export earnings and bilateral real exchange rate  
Data Source: World Bank (2018) and UNcomtrade (2018)

In the case of coffee export earnings since 2010, contrary to the bilateral real exchange rate, the export earnings of coffee with most countries, except Egypt, Sweden and Japan, are increasing or stable (Figure A1). However, the export earnings from rawhide and skin are decreasing or fluctuating with all trading partners selected since 2010 (Figure A2). Ultimately, the trend of export earnings from vegetables and RTC is decreasing or fluctuating since 2010 (Figure A3).

## Chapter Three: Exchange rate regimes and their effects

This chapter is composed of three main sections. The first section reviews different types of exchange rate policies and the effect of the exchange rate on different economic variables. The second section presents the exchange rate policy in Ethiopia. And the third section presents the conceptual framework of the study.

### 3.1. Exchange rate regimes

The exchange rate is defined as the one's country currency expressed in terms of another country's currency ([Krugman, 2008](#)). Exchange rates play an important role in international trade to compare the value products produced in different countries. Countries follow different exchange rate policy across the globe. The choice of exchange rate regime depends on the economic conditions, monetary history, trade openness, major trading partners and political situation ([Wolf, 2002](#)).

#### 3.1.1 The fixed exchange rate regime

Under a fixed exchange rate regime, a country pegs its currency to a major currency commonly the US dollar or Euro ([Johnston & Swinburne, 1999](#)). The national or central bank has a responsibility to manage and announce the exchange rate policy. After monetary authority announces the fixed exchange rate regime it allows trading with an unlimited amount at that fixed rate ([Obstfeld & Rogoff, 1995](#)). A fixed exchange rate regime has various advantages. First, it ensures stability in the economy by avoiding inflationary effects due to the variation of the exchange rate. Thereby, the government can maintain a low inflation rate, and in the long term, it lowers the interest rate to promote investment and trade([Ghosh et al., 2002](#)). Second, fixing at a low level will help to restrain from pressures of domestic inflation such government budget deficit, wage-and-price fluctuation. These will inspire confidence in the “strength” of local currency for investors and other business organisations ([Obstfeld & Rogoff, 1995](#)). Third, a stable exchange rate will become a cause for international trade and flows of foreign direct investment since a fixed exchange rate removes exchange rate risk for traders and investors.

However, a fixed exchange rate also has disadvantages. First, fixed regimes are categorized by lower inflation but more marked with output volatility due to exchange rate misalignment and lack of efficient resource allocations ([Ghosh et al., 1997](#)). Second, to implement a fixed

exchange rate a government needs to build a huge amount of foreign currency reserves. Third, the fixed exchange rate system does not solve the problem of the current account deficit. It aggravates the problem with the exchange rate misalignment.

### **3.1.2 The intermediate regime**

The intermediate regime is the regime which includes soft pegging (crawling peg, and crawling bands) and strictly managed floating exchange rate (authorities heavily manage the movement of the exchange rate) ([Bubula & Otker-Robe, 2003](#)). Other studies defined intermediate regime as all regimes in between fixed and floating exchange rate regimes ([Bubula & Ötoker, 2002](#)). This type of exchange rate regime is adopted by many countries. However, it creates the problem of overvaluation of the currency. This system is adopted in many high inflationary developing countries commonly called “crawling peg” in which the government announces a schedule of small, discrete devaluations ([Obstfeld & Rogoff, 1995](#)). The main point of a crawling peg is to prevent inflation differentials from cumulating which requires a larger devaluation at a time. Some empirical studies confirm that economic growth is best under intermediate exchange-rate regimes, while the relatively lesser growth rate is associated with the flexible exchange rate.

### **3.1.3. The floating exchange rate regime**

Under a floating exchange rate regime, the exchange rate is determined by the demand and supply situations in the market for foreign exchange. It is the type of exchange rate regime favoured by most of the economists. Under a floating exchange rate regime, appreciation and depreciation of local currency bring the balance of payment to equilibrium. According to [Huh et al. \(1987\)](#) many developing countries adopted the market-determined exchange rates. The adoption of flexible exchange rate may be due to pressure from IMF and World Bank.

The floating exchange rate has advantages and disadvantages. The disadvantages of the floating exchange rate regime are the impulses from the international market causing inflation in the local market. Thus, for developing countries internally inflation and uncertainty of the exchange rate harm the investment and local business. Moreover, floating of currency affects the export earnings and cost of the import result in the trade deficit since the transaction of export and import invoiced in the currencies which move against each other in unpredictable ways.

### **3.1.4. Impact exchange rate regimes on different economic variables**

In this section, some empirical evidence on the effects of adopting specific exchange rate regimes on different economic variables are reviewed.

Empirical evidence suggests that in developing countries a pegged exchange rate offers less currency risk, enhancing foreign direct investment and thereby encouraging the economic growth ([Chiu \*et al.\*, 2012](#); [De Vita & Kyaw, 2011](#)). Other studies also claim that higher economic growth is achieved with fixed exchange rate than a floating exchange rate. A study by ([Ashour & Chen Yong, 2018](#)) proved that the growth rate was higher under a fixed exchange regime followed by the intermediate exchange rate regime. Developing countries following the flexible exchange rate lack an advanced financial system which is required for proper functioning of the flexible exchange rate. The absence of the advanced financial system coupled with a flexible exchange rate results in lower economic growth. [Chiu \*et al.\* \(2012\)](#) investigated the effects of different exchange rate regimes and concluded that fixed exchange rate leads to higher economic growth for the countries that adopted this particular policy. ([Ghosh \*et al.\*, 2002](#)) claims that inflation is lower and stable under a fixed exchange rate regime. [Wolf \(2002\)](#) compared different exchange rate regimes and concluded that a floating exchange regime causes comparatively minor problems for much of the time while fixed exchange rate regimes cause monstrous problems occasionally. A study by [De Vita and Kyaw \(2011\)](#) suggests flexible and intermediate exchange rate regimes are more advantageous to economic growth than pegged exchange rates. [Sosvilla-Rivero and Ramos-Herrera \(2014\)](#) investigated the relationship between exchange rate regimes and economic growth based on a data set of 123 countries. Their result indicates that economic growth performance is the best under intermediate exchange rate regimes better than floating and fixed exchange rate regimes



### **3.2. The real exchange rate and empirical evidence on the effect of real exchange rate**

The definition of the real exchange rate is the official exchange rate adjusted for relative national price level differences (Sarno & Taylor, 2002). Under different exchange rate policy, a misalignment of the real exchange rate is considered as a triggering factor the poor economic growth and export of the country. Countries take various measures to reduce the negative effects of overvaluation of the real exchange rate. The most commonly used policy measures to prevent overvaluation of the current exchange rate are devaluation or depreciation of the currency. In this section, empirical evidence is reviewed on the effect of currency devaluation or depreciation on different economic variables. The effect of the real exchange rate is categorized into, negative, ambiguous and positive based on empirical evidence reviewed.

#### **Negative impact**

Devaluation sometimes results in contrast to negative outcome contrary policymakers positive expectation. [Prakash and Maiti \(2016\)](#) examined the impact of devaluation on the trade balance in the case of Fiji. They used annual data over the period 1975-2012. Their results indicate that devaluation triggered strongly domestic inflation but weakly stimulated the aggregate demand. [Tegene \(1991\)](#) investigated the dynamic response of trade flows to price and effective exchange rate changes in Ethiopia using the VAR model for the period 1973M1 to 1985M4. The results indicate that a devaluation may have initially adverse impact on the trade balance. A study by [Kamin and Rogers \(2000\)](#) indicates that real devaluation directed to higher inflation and economic contraction in Mexico. [Sweidan \(2013\)](#) concluded in his study against the devaluation policy in Jordan because the foreign market will be unstable if devaluation is adopted as the policy measure.

#### **Ambiguous effects**

In other occasions, devaluation seems not having any effect on the export of the country. [Miles \(1979\)](#) examined the relationship between devaluation and trade balance for 16 devaluations of 14 countries. He employed a cross-sectional time series analysis to assess the impact of devaluations on the trade balance. In the end, no evidence was found to prove the theoretical hypothesis that devaluation recovers the trade deficit. A study by [Lizondo and Montiel \(1989\)](#) found that devaluation of currency is somehow ambiguous to indicate whether it has a negative or positive effect on the output. Another study by [Christopoulos \(2004\)](#) shows that currency

devaluation does not exert any significant impact on the aggregate output. [Kiptui \(2007\)](#) indicated that devaluing of Kenyan shillings had no significant impact on the volume of Kenyan exports in the short run.

### **Positive effects**

Most economists support the positive effect of devaluation or real exchange rate depreciation. Since they expect undervaluation of currency or depreciation of real exchange rate enhances export growth by improving countries competitiveness in the international market. There is overwhelming empirical support for this in various countries. [Kennedy \(2013\)](#) investigated Kenya's foreign trade balance empirically by using annual data for period 1963-2012. He employed Johansen integration approaches to estimate the long and short run determinants of trade. The results of the study indicated that the real exchange rate depreciation improves the trade balance strongly and significantly. [Taye \(1999\)](#) studied the impact of devaluation on macroeconomic performance in the case of Ethiopia. And the result indicates that devaluation would help to improve the current account balance but the improvement might not be due to an increase in the output or export but most likely due to a decrease in imports. [Veeramani \(2008\)](#) in his study claimed that depreciation of real exchange rate would increase Indian merchandise export earnings. [Eichengreen and Hatase \(2007\)](#) indicated that undervaluation of currency (depreciation of real exchange rate) improves economic growth. A study by [Arslan and Van Wijnbergen \(1993\)](#) claims that the export boom in Turkey is triggered by the reforms in trade policy which led to the depreciation of the Turkish Lira. [Atingi-Ego and Sebudde \(2004\)](#) suggested depreciation of the real exchange significantly boosts the export competitiveness of the non-tradition exports in Uganda. The exchange rate has a positive and significant effect on the Taiwanese exports of agricultural products than other sectors ([Wang & Barrett, 2007](#)). [Sweidan \(2013\)](#), also found that the exchange rate only has a positive effect in the short run, not in the long run.

### **3.3. The exchange rate policy in Ethiopia**

After the breakdown of Bretton Woods system in 1971 the Ethiopian government has been following a fixed exchange rate policy pegging the ETB value to depreciate or appreciate with the dollar ([Taye, 1999](#)). The exchange rate of ETB with the US dollar was stable during the imperial era and appreciated for the short period 1971-1974. After the Derg regime (1974/75-1991/192) took over the imperial era, the exchange rate was 2.07 ETB per USD and stable until

the end of the regime (*Figure 7*). During the Derg regime the foreign earnings had to be channelled through central banks and rationed afterwards for the organisation to be priority sectors of the government ([ECA, 2002](#)). Expenditure on the military was given top priority in the rationing of foreign earnings ([Gashaw, 1992](#)). After 1992 with the major policy reforms the ETB was devalued to ETB 5 per one US dollar exchange rate. In 2001 an auction system was announced to determine the rate of exchange. Since then the exchange rate is determined on a daily basis through market transactions ([ECA, 2002](#)). However, the ETB value was devalued by the government of Ethiopia several times due to misalignment of the exchange rate as indicated in *Figure 7*. And the overvalued exchange rate is considered as triggering factor to a chronic balance of payments problem of a country. The balance of payments of Ethiopia is categorized by increasing current account deficit as indicated in *Figure 8*. A negative trade deficit is considered to be the main caused exhaustion of the foreign reserves of the country.

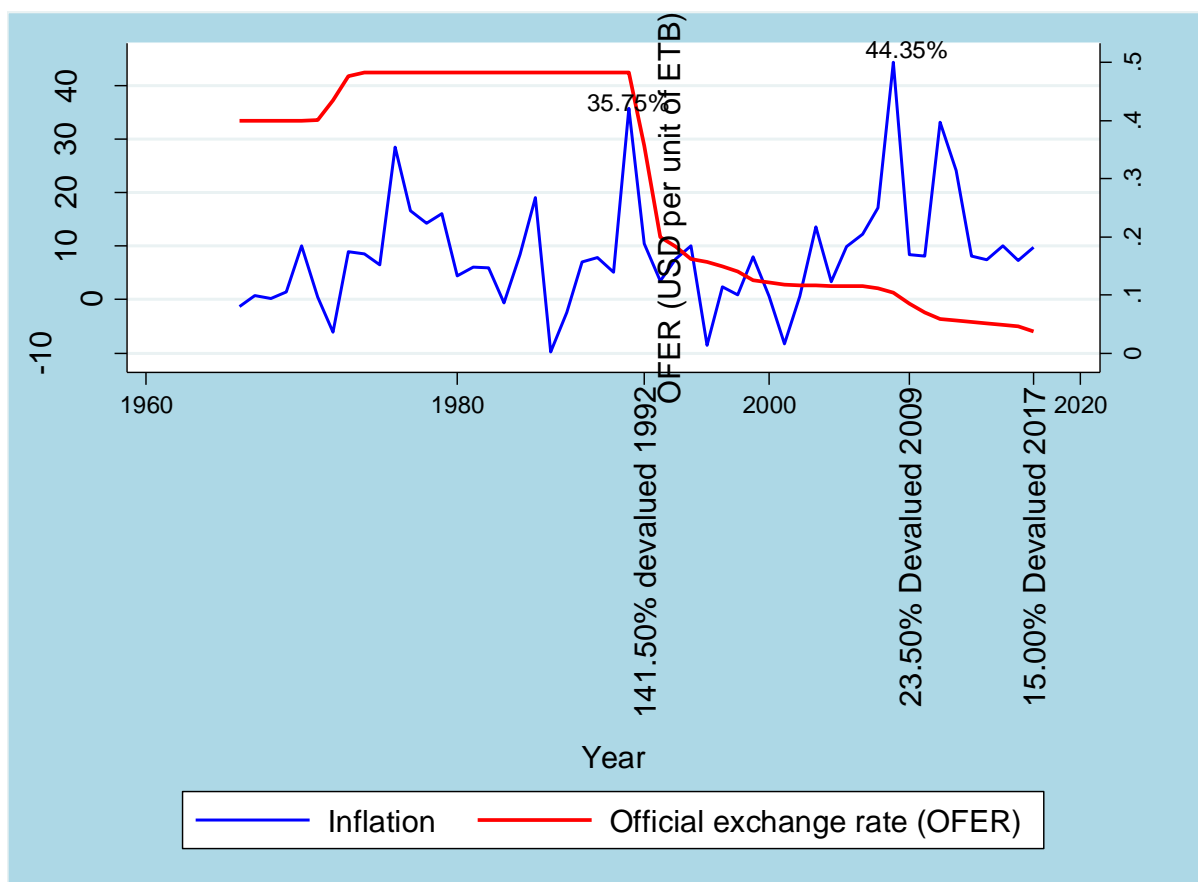


Figure 7. Official exchange rate and inflation

Data source: World Bank (2018)

### 3.3.1. Devaluation, inflation and trade balance of Ethiopia

The main objective of the government adopting devaluation of ETB value is to increase export and reduce trade balance deficit. Despite the devaluation of ETB value in Ethiopia, the trade deficit and the import of a country are increasing Figure 8. The response in the export of the country is not impressive. The main reason for the ineffectiveness of devaluation in Ethiopia may be higher inflation before devaluation of ETB value. For example, Ethiopia devalued ETB value in 1992 by 141.50 %, but in 1991 the inflation rate was highest in the history of the country which is 35.75%. Higher inflation resulted in higher production costs that make devaluation of the currency ineffective, as devaluation cannot improve export competitiveness with higher domestic inflation. Similarly, the ETB value devalued in 2009 by 23.50%, but the highest inflation rate was in 2008 (44.35%) (Figure 7). They all indicate that Ethiopia had a devaluation policy in the period that domestic inflation was at its peak, which could lead the country not to gain a competitive advantage on the international market due to higher domestic production costs. From this one can argue that the Ethiopian exchange rate is not managed properly.

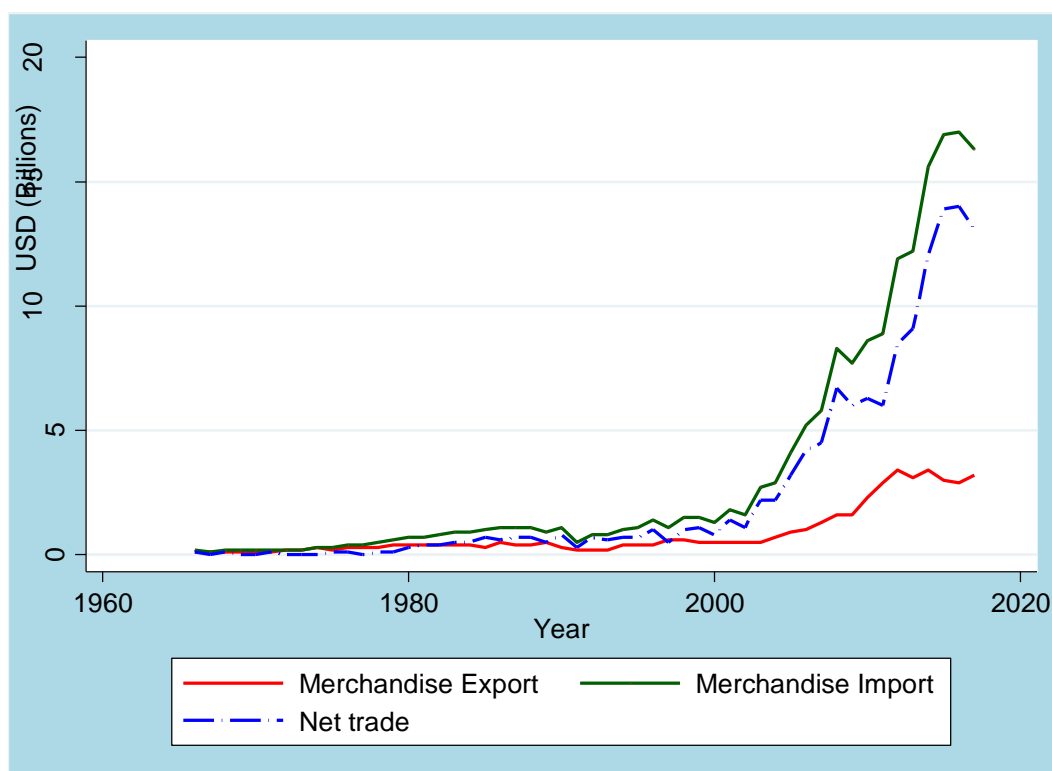


Figure 8. Trend of the merchandise export, import and trade deficit

Source: World Bank (2018)

[Stuart \(2018\)](#) claims that the depreciation of exchange rate does not help to gain a competitive advantage unless it is real depreciation i.e the currency must lose its value at a higher rate than the rising inflation domestically. This can help to avoid the erosion of depreciation benefit due to higher inflation relative to the trading partner of the country. Therefore, the export earnings of the country do not grow as expected due to the higher production costs and the higher domestic price than the prices on the international markets. And again, a higher domestic price led to a country importing more goods because the domestic price is higher than the international market price. This also means depreciation cannot discourage import since foreign products are still cheaper than domestic products. In general, an increase in imports and a slow growth in export earnings result in a negative trade deficit.

Another argument may be the structure and composition of the export sector since most Ethiopia exports products are mainly dominated by primary agricultural crops ([Debello & Gardebroek, 2007](#)) supply response from increased demand due to price change might be low. Supply of export to increased foreign demand due to devaluation become difficult in the short run unless otherwise sufficient stock of export items at devaluing period. But in reality, Ethiopia has experienced higher inflation at the time of devaluation and increasing supply of agricultural products for increased demand in a short period is difficult. This is logical since the elasticity of agricultural products is always lower, making it difficult to meet increased foreign demand in the short term. [Bond \(1983\)](#) calculated lower short- and long-term elasticities for agricultural products for nine Sub-Saharan African countries that were 0.18 and 0.21 respectively. [World Bank \(1987\)](#), however, calculated relatively higher elasticities for Ethiopian agriculture, which were 0.24 and 0.56 for elasticity in the short and long term. Lower elasticity is another reason for the slow growth of agricultural exports. In Ethiopia, the inelastic nature of agricultural products and inflationary economy makes it difficult to exploit the benefit of devaluation.

### **3.4. Theoretical and Conceptual Framework**

In modelling the effect of the real exchange rate on exports, it is common to estimate the demand function by including the real exchange rate as dependent variable. [Batten and Belongia \(1986\)](#) specified the real export demand of all USA agricultural commodities as a function of the foreign real income, index of US agricultural prices, index of US consumer prices and the real exchange rate (trade-valued exchange rate). [Kohler and Ferjani \(2018\)](#) defined Swiss real exports as the gross domestic product of the trading partner and the real effective exchange rate

index. [De Vita and Abbott \(2004\)](#) specified the long-term real exports as the function of real foreign income, the real exchange rate and exchange rate volatility. [Sweidan \(2013\)](#) states that the demand for export depends on the export price, the real foreign income, the gross domestic product of the trading partner, the transfer of employees and the bilateral import.

Most theoretical and different empirical economic literature agree on two important determinants of export demand, such as trade partner economic activities and real exchange rate despite the discrepancy in the number of explanatory variables used as the determinants of export ([Hooy & Choong, 2010](#); [Sweidan, 2013](#)). The economic activities in trading partner countries that are usually represented by the real income of trading partners. The real income of trading partners may have a positive or negative effect on exports demand. The real income may have a positive effect if an increase in foreign real income leads to an increase in demand for export products, while on the other hand, if trading partner goods are competitive enough with exporting country goods, this may have a negative impact on export demand. The real exchange rate is another important economic variable expected to determine the export demand of the country. An appreciated real exchange rate reduces the competitiveness of the country on the international market and lowers export demand, while the depreciation of the real exchange rate improves the competitiveness of the country and improves the export demand of the country. For this particular study, we specify the export earnings as the function of the real income of trading partner of Ethiopia and real exchange rate.

$$XP_t = f(Y_t, RERI_t) \quad (1)$$

Where  $XP_t$  indicate the total Ethiopian export earnings and at the commodity level,  $Y_t$  is the real foreign income, and  $RERI_t$  is the real exchange rate index.

This study estimated both the short and long relationship between export earnings and the real exchange rate and real GDP of trading partners. In the short term, as Ethiopian exports were heavily dominated by agricultural crops, the depreciation of real exchange is expected to have an adverse effect on Ethiopian export earnings, while in the long term it is expected to have a positive effect. And it is expected that the real income of trading partners will have a positive relationship both in the long term and in the short-run.

## Chapter Four: Data and Methodology

This chapter is organized into four main sections. The first section describes the types and sources of data used. The second part provides details on the test of stationarity and co-integration of panel variables. The third section presents the econometric, and empirical models of the study.

### 4.1. Description of the data

For this study, balanced panel data were used to estimate the short-term and long-term relationship between the real exchange rate and the Ethiopian export earnings. The use of panel data has many advantages, especially for developing countries such as Ethiopia, which has no long-term data, making standard time-series analysis difficult. The panel data approaches provide more powerful and efficient estimates by combining both cross-section and time dimensions. The cross-section dimension is obtained by considering multiple trading countries and products. Besides, it increases the number of observations which ultimately increases the degree of freedom and improves the efficiency of the estimates ([Baltagi, 2008](#)). In general, the power of the test increases as the number of observations increases, which validates the use of panel data ([Choi, 2001](#)).

Annual data on the official exchange rate, the GDP of the trading countries, and the consumer price index of Ethiopia and the trading partners have been collected from the World Bank (2018) database. Total export earnings and export earnings of coffee, vegetables and root and tuber crops (henceforth vegetables and RTC), rawhide and skin products from respective trading partners were collected from the (UN Comtrade, 2018) database. The variables included in the analysis are described as follows:

#### *Exports ( $XP_{it}$ )*

The total export and export earnings at the commodity level namely coffee, vegetable, and RTC, and rawhide and skin export were collected from each selected trading partner. The trading partners were selected based on the amount of Ethiopian export earnings from the corresponding trading partner. All the export earnings are expressed in US dollars and the logarithm of the variable is used in the analysis.

### *Foreign real income ( $Y_{it}$ )*

Foreign real income is used as a proxy for the economic activities of trading partners. It is calculated by dividing the GDP of each trading partner by their consumer price index (CPI). It is assumed that increases in foreign real income increase demand for Ethiopian exportable goods. Again, the logarithm of this variable is used in the analysis.

### *Real exchange rate ( $RER_{it}$ )*

The real exchange rate can be obtained by using the amount of ETB per unit of trading partner currency and the relative prices of the two trading countries. It is assumed that an increase in the real exchange rate improves exports by making the exportable goods cheaper for foreigners. It is calculated by using a formula adopted from studies of ([Balassa, 1990](#); [Domac & Shabsigh, 1999](#); [Todani & Munyama, 2005](#)):

$$RER_{it} = ER_{it} * \frac{CPI_i}{CPI_{ET}} \quad (2)$$

where  $CPI_i$  is inflation in foreign country  $i$  and  $CPI_{ET}$  is Ethiopia inflation and  $ER_{it}$  is the official exchange rate determined the amount of ETB per unit of foreign currency. To make the bilateral real exchange rate unit free, it is divided by its own value in a base year (2010) and multiply it by 100 to set it in an index form. Increase in real exchange rate means depreciation whereas a decrease in the real exchange rate is appreciation ([Domac & Shabsigh, 1999](#)).

$$\ln RERI_{it} = \ln\left(\frac{RER_{it}}{RER_{i(2010)}} * 100\right) \quad (3)$$

**Table 1. Descriptive statistics (data in logarithms)**

		$\ln XP$	$\ln Y$	$\ln RERI$
Total export	Mean	16.64	22.41	4.49
	Maximum	20.16	25.85	5.07
	Minimum	8.27	15.45	3.83
	Std. Dev.	1.93	2.03	0.21
Coffee export	Mean	15.81	22.63	4.51
	Maximum	19.38	25.85	5.00
	Minimum	9.95	15.45	3.85
	Std. Dev.	1.97	2.06	0.21
Rawhide and skin export	Mean	14.45	23.19	4.51
	Maximum	17.57	25.29	5.07
	Minimum	5.72	20.59	3.85
	Std. Dev.	1.82	1.25	0.22
Vegetables export	Mean	14.22	22.22	4.53
	Maximum	18.66	24.36	5.00
	Minimum	9.08	15.45	3.85
	Std. Dev.	1.71	2.51	0.21



The descriptive statistics of the variables are presented in Table 1. Values for  $\ln XP$ ,  $\ln Y$ , and  $\ln RERI$  differ for total export and specific product exports because the major exporting countries differ for the various products. The overall mean of the variables is 16.64, 22.41 and 4.49 for  $\ln XP$ ,  $\ln Y$  and  $\ln RERI$  in case of total export earnings, respectively. The low standard deviation of the real exchange rate indicates that the Ethiopian export destinations are majorly Europe countries where the currency used, and CPI rarely vary.

## 4.2. Testing for stationarity and co-integration

The first and foremost issue in any time series analysis is identifying (non-)stationarity of the series before undertaking any econometric analysis. Given the availability of panel data for this particular study, panel unit root tests were used. After identification of the (non-)stationarity of the series, the presences of co-integration was tested by using the Pedroni co-integration test for panel data (2004). Following the co-integration test, the short and long run relationship was estimated by using the pooled mean groups and mean groups with an autoregressive distributed lag (ARDL) model. Eventually, the presence of a short and long-term causal relationship between our target variables real exchange rate and export earnings was tested using panel Granger causality tests.

### 4.2.1. Panel Unit root tests

A variety of panel unit root tests is present nowadays. They usually categorized as the first- and second-generation test depending on allowing dependence of cross sections. A panel unit root test which assumes cross-sectional independence called the first generation, whereas the second-generation test explicitly accounts for some form of cross-sectional dependence. Among different first-generation tests [Levin et al. \(2002\)](#), [Im et al. \(2003\)](#), and [Breitung \(2001\)](#) are commonly used in different literature, whereas the second generation test is ([Pesaran, 2007](#)). For this study panel unit root test by [Im et al. \(2003\)](#) (henceforth IPS), [Levin et al. \(2002\)](#) (henceforth LLC) and [Breitung \(2001\)](#) are used.

The LLC test is considered as an extension of an Augmented Dickey-Fuller (ADF) test. It starts by specifying the ADF regression model including the lagged variables:

$$\Delta y_{it} = \theta_i y_{i,t-1} + \sum_{j=1}^{p_i} \theta_{ij} \Delta y_{i,t-j} + \gamma_i Z_{it} + \varepsilon_{it} \quad (3)$$

Where  $\varepsilon_{it}$  is distributed across the panels independently and follows a stationary invertible autoregressive moving-average process for each panel.  $p_i$  is an optimum lag number. The

optimum number of lags is selected by using the lag selection criterion like AIC or BIC. Because of the unknown lag length, LLC proposed a three-step procedure to analyze their test. First, they carry ADF regressions for each individual series and generate two orthogonal residues. Second, they estimate the standard deviation for each specific unit by taking the ratio from long-term to short-term. Finally, they calculate pooled t-statistics to test the null hypothesis of the LLC test, which assumes that a panel series is non-stationary, while the alternative hypothesis claims that all series are stationary

IPS panel unit test is the extension of LLC test [Maddala and Wu \(1999\)](#) by allowing heterogeneity on the AR coefficient. The IPS estimates the individual ADF regression for N cross-sectional units instead of pooling the data. The IPS test permits different specification of the coefficient for each cross-section ( $\alpha_i$ ), the residual variance and lag length. The null hypothesis of the LLC and IPS test is the same but the alternative hypothesis is different. The alternative hypothesis of the LLC test is more restrictive, which assumes that the autoregressive unit root "ρ" is homogeneous for all observations. However, the IPS test considers the heterogeneity of AR coefficient hence, the IPS is considered to be more powerful than the LLC tests ([Maddala & Wu, 1999](#)). IPS starts by specifying an ADF regression for each series within the panel:

$$\Delta y_{it} = \alpha_i + \beta_i y_{i,t-1} + \sum_{j=1}^{p_i} \rho_{ij} \Delta y_{i,t-j} + \varepsilon_{it} \quad (4)$$

The alternative hypothesis is that the panel series is stationary for at least one series in the panel. The IPS test is commonly used for the heterogeneous panel with serially uncorrelated error terms.

[Breitung \(2001\)](#) presented another panel test that shows a sensitivity of LLC and IPS test statistics by including individual trend. He used Monte Carlo experiments to show that LLC unit and the IPS panel lose their power drastically when individual trends are included ([Baltagi, 2008](#)). To solve this problem, he proposed a test statistic based on the modification of the LLC test. The [Breitung \(2001\)](#) test begins with specifying the AR(1) process that  $y_{it}$  is expressed in the following form:

$$y_{it} = \mu_i + \beta_i t + x_{it} \quad (5)$$

Where  $x_{it}$  is generated by the autoregressive process

$$x_{it} = \sum_{k=1}^{p+1} \alpha_{ik} \Delta x_{i,t-k} + \varepsilon_{it}$$

The null hypothesis is difference stationarity against the alternative of trend stationarity. The Breitung test is usually suggested for samples around  $N=20$  and  $T=30$  since it is assumed to be asymptotically distributed as a standard normal.

#### 4.2.2. Panel Co-integration Tests

After testing the presence of panel unit root in each variable, co-integration among the non-stationary variables is tested. In this study, the co-integration test of the [Pedroni \(2004\)](#) is employed. The Pedroni test of co-integration tests the long run co-integration of panel series among stationary variables. This test is selected because it estimates the residuals from a co-integration after normalising the panel statistics with correction terms. The test is preferred among others because Pedroni takes into account heterogeneity by including specific parameters which are expected to vary across the country. From the residuals of long-run regression Pedroni constructs seven test statistics. Four of them are panel statistic test (within-dimension) which assumes homogeneity of the autoregressive term, whereas the remaining are less restrictive and called between dimension or group statistics test as they allow for heterogeneity of the autoregressive term. It also allows the cross sections interdependence with a different individual effect. Pedroni co-integration test is specified as follows:

$$y_{it} = \alpha_i + \delta_i t + \beta_{it} x_{it} + \varepsilon_{it} \quad (5)$$

where  $y_{it}$  and  $x_{it}$  are variables expressed with time dimension  $t = 1, \dots, T$  and cross-section dimension  $i=1, \dots, N$ .  $x_{it}$  is  $K$ -dimensional column vector for each country  $i$  and  $\beta_{it}$  is  $K$ -dimensional row vector for each member  $i$ .  $\alpha_i$  and  $\delta_i$  represents the country specific intercept which varies across individual cross-sectional units and deterministic trend respectively. The same is true of the slope coefficients and country specific time effects. To test the null hypothesis of no co-integration, Pedroni proposed panel and group panel test statistics for heterogeneous panels. The alternative hypothesis states the presences of co-integration in all test statistics.

### 4.3. Econometric model and Granger causality

#### 4.3.1 Econometric model

To study the short-run and long-run relationship between the real exchange rate and demand for Ethiopia's export products a panel ARDL approach was used. The pooled mean group estimation (PMG) procedure introduced by [Pesaran et al. \(1999\)](#) was used to estimate the long-run relationship between the Ethiopian export earnings and independent variables real exchange and foreign income of selected trading partners. In addition to PMG, the mean group (MG) estimation method developed by [Pesaran and Smith \(1995\)](#) was used in comparison with the PMG model. PMG is modified from the MG by [Pesaran and Smith \(1995\)](#). The main difference between MG and PMG is that the MG estimators seem to be more consistent since it averages the values of the coefficient for each group and it allows both the slope and intercepts to vary across countries. In addition to this, MG assumes the slope parameters and the error variance are homogenous. The PMG estimation allows the short run coefficient, intercept and error variances to vary while keeping the long-run parameters to be identical. In this study, we compare the MG and PMG results. Hausman test selects the best estimate between the MG and PMG based on the consistency and efficiencies and hence this test were used to select the best estimates for this study.

The generalised ARDL (p, q) panel model as specified by [Pesaran et al. \(1999\)](#) where p and q are the optimal lag length for dependent and independent variables;

$$y_{it} = \sum_{j=1}^p \alpha_{ij} y_{i,t-j} + \sum_{j=0}^q \beta'_{ij} x_{i,t-j} + \varphi_i + \varepsilon_{it} \quad (6)$$

where  $y_{it}$  is the dependent variable,  $x_{i,t-j}$  are independent variables that are allowed to be purely I(0) or I(1) integrated,  $\alpha_{ij}$  is the coefficient of lagged dependent variable called scalars;  $\beta'_{ij}$  are  $x_{i,t-j}$  coefficient vectors;  $\varphi_i$  are unit-specific effect,  $i = 1, 2, \dots, N$ ; and  $t = 1, 2, \dots, T$ ; are cross-sectional units and times series in year respectively.  $\varepsilon_{it}$  is the error term. While  $j = 1, \dots, p$  and  $j = 0, \dots, q$  are the optimal lag length for dependent and independent variables respectively.

The long-run ARDL (p, q) error correction model is specified by re-parameterising equation (1) as shown by [Pesaran et al. \(1999\)](#):

$$\Delta y_{it} = \theta_i \Delta y_{i,t-i} + \lambda'_i x_{it} + \sum_{j=1}^{p-1} \alpha_{ij} \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \beta'_{ij} \Delta x_{i,t-j} + \varphi_i + \varepsilon_{it} \quad (7)$$

where  $\theta_i = -(1 - \sum_{j=1}^p \alpha_{ij})$  is group specific speed of adjustment ( $\theta_i < 0$ ),  $\lambda'_i = \sum_{j=0}^q \beta_{ij}$  are vectors of long-run relationships, and  $\alpha_{ij}$  and  $\beta_{ij}$  are the short-run dynamic coefficients.

#### 4.3.2 The empirical model

By following the [Pesaran et al. \(1999\)](#), the ARDL model including the long-run and short-run relationship between the Ethiopian export earnings and independent variables real foreign income and the real exchange rate is specified as:

$$\Delta \ln XP_{it} = \alpha_0 + \sum_{j=1}^{p-1} \delta_{ij} \Delta \ln XP_{i,t-j} + \sum_{j=0}^{q-1} \delta'_{1ij} \Delta \ln Y_{i,t-j} + \sum_{j=0}^{q-1} \delta'_{2ij} \Delta \ln RERI_{i,t-j} + \alpha_i \ln XP_{i,t-1} + \beta'_{1i} \ln Y_{it} + \beta'_{2i} \ln RERI_{it} + \varepsilon_{it} \quad (8)$$

Where  $XP_{it}$  represents the export value of coffee, oilseed, vegetables and rawhide and skins to country  $i$  in year  $t$ . The  $RERI_{it}$  is the real exchange rate, and  $Y_{it}$  represents the real foreign income of country  $i$ .  $\alpha_0$  is an intercept and  $\varepsilon_{it}$  is a white noise error term.  $\delta_i$ ,  $\delta'_{1ij}$  and  $\delta'_{2ij}$  are the short parameters to be estimated. While  $\alpha_i$ ,  $\beta'_{1i}$  and  $\beta'_{2i}$  are the long run parameters to be estimated.

#### 4.3.3 Panel Granger causality

The long-run causality is analysed by using the PMG estimates by taking as dependent variables one another. While short-run co-integration analysed by using the vector error correction model constructed as follows based on Granger causality procedure developed by [Hurlin and Venet \(2001\)](#). The panel Granger causality test improves the efficiency of the test by increasing the number of observations through time dimension and cross-sectional.

$$\Delta \ln XP_{it} = \alpha_o + \sum_{i=1}^p \beta_{ik} \Delta \ln XP_{j,t-i} + \sum_{i=1}^q \varphi_{ik} \ln RERI_{j,t-i} + \varphi_1 ECT_{t-1} + \varepsilon_{1t} \quad (9)$$

$$\Delta \ln RERI_{it} = \alpha_o + \sum_{i=1}^p \beta_{ik} \Delta \ln RERI_{j,t-i} + \sum_{i=1}^q \varphi_{ik} \ln XP_{j,t-i} + \varphi_2 ECT_{t-1} + \varepsilon_{2t} \quad (10)$$

Where  $\varepsilon_{it}$  is independently and normally distributes with zero mean and constant variance. The null hypothesis of no causality is rejected with the significant F-test statistics.

## Chapter Five: Results and Discussion

This chapter presents the results and is organized in four main sections. The first section describes the result of panel unit tests on the variables included in the model. The second section presents the results of the Pedroni panel co-integration tests. The third and fourth sections present the short and long-term estimates of MG and PMG with Hausmann test statistics. The last section of this chapter presents the results of the causality test.

### 4.1. Panel unit root test

Before assessing the presence of co-integration, it is usual to examine the existence of unit roots in each time series data set. The main purpose of performing a stationarity test is to avoid a spurious regression problem and determine the order of integration before testing panel co-integration. For this specific study, three different types of root tests of the panel were used to check the stationarity of the variables before undertaking the analysis.

**Table 2. Panel unit root test results: series in level**

		IPS	LLC	Breitung
Total export	lnXP	-1.64(0.04)	-6.21(0.00)	0.36(0.64)
	lnY	-0.11(0.45)	-3.19(0.00)	-0.40(0.34)
	lnRERI	1.27(0.89)	-0.40(0.34)	-2.07(0.01)
Coffee export	lnXP	1.90(0.97)	0.45(0.67)	-1.79(0.03)
	lnY	0.18(0.57)	-2.61(0.00)	0.19(0.57)
	lnRERI	1.91(0.97)	0.89(0.81)	-1.72(0.04)
Rawhide and skin export	lnXP	-3.26(0.00)	-4.91(0.00)	0.48(0.68)
	lnY	-1.09(0.13)	-2.83(0.00)	-1.27(0.10)
	lnRERI	1.25(0.89)	0.77(0.78)	-1.46(0.07)
Vegetables and RTC export	lnXP	-0.67(0.24)	-2.17(0.01)	-0.81(0.20)
	lnY	0.48(0.68)	-1.43(0.07)	-0.23(0.40)
	lnRERI	2.32(0.99)	1.81(0.96)	-0.17(0.43)

Note: The value in brackets are the p-values

The result of all panel unit root test is presented in Table 2. and Table 3. in level and first difference respectively. From Table 2. the test results shown the mixed evidence of the order of integration of the variables. The IPS test rejects the null hypothesis of unit roots with intercept for *lnXP* in case of total export and export earnings from rawhide and skin at 1% and 5% level of significance, while the *lnY* and *lnRERI* are non-stationary in all cases (total export, coffee,

rawhide and skin, vegetables and RTC). The LLC rejects the presence of unit roots for  $\ln Y$  in all cases at 1% and 10% level of significance, but the  $\ln RERI$  is non-stationary in all cases. The Breitung panel unit rejects the presence of unit root for  $\ln RERI$  in all cases except the vegetables and RTC at 1%, 5% and 10% level of significance, but the  $\ln Y$  is non-stationary in all cases. Variables are stationary in level according to one-panel unit root test and non-stationary with another. This indicates that we have to test further with the first differences to ensure stationarity of variables before analyzing the co-integration of the variables. As indicated in Table 3. all the variables are stationary with first differences according to all panel unit root test and in all cases. Generally, from panel unit root test in level and first difference, some variables are stationary in level ( $I(0)$ ) and other variables are stationary in first differences ( $I(1)$ ).

**Table 3. Panel unit root test results: series in first differences**

		IPS	LLC	Breitung
Total export	$\ln XP$	-7.00(0.00)	-2.72(0.00)	-1.93(0.02)
	$\ln Y$	-6.40(0.00)	-5.92(0.00)	-5.36(0.00)
	$\ln RERI$	-10.3(0.00)	-12.55(0.00)	-7.79(0.00)
Coffee export	$\ln XP$	-7.09(0.00)	-4.98(0.00)	-4.49(0.00)
	$\ln Y$	-5.80(0.00)	-6.78(0.00)	-6.88(0.00)
	$\ln RERI$	-9.07(0.00)	-11.17(0.00)	-4.30(0.00)
Rawhide and skin export	$\ln XP$	-7.48(0.00)	-6.92(0.00)	-2.51(0.00)
	$\ln Y$	-4.20(0.00)	-3.30(0.00)	-3.42(0.00)
	$\ln RERI$	-7.43(0.00)	-8.91(0.00)	-2.46(0.00)
Vegetables and RTC export	$\ln XP$	-4.67(0.00)	-2.28(0.01)	-1.30(0.09)
	$\ln Y$	-4.65(0.00)	-5.80(0.00)	-5.92(0.00)
	$\ln RERI$	-6.99(0.00)	-8.41(0.00)	-1.91(0.02)

Note: The value in brackets are the p-values

## 4.2. Panel co-integration test

The next step is to test for the presence of co-integration among the Ethiopian Export earnings and the explanatory variables of the real exchange rate and trading partner real income by using the Pedroni co-integration test. The results of the Pedroni co-integration test are shown in Table 4. From the result, the null hypothesis of no co-integration is rejected by four test statistics in 1% and 5% level for total exports. We can therefore conclude that there is a long-run co-integration between the total Ethiopian export earnings ( $\ln XP$ ), real income of trading partner ( $\ln Y$ ) and the real exchange rate ( $\ln RERI$ ). In the case of coffee exports, except for the group rho-statistic, the null hypothesis of no co-integration is rejected at 1%, 5% and 10% level.

This also proves the presence of long-run co-integration between the export earnings from coffee ( $\ln XP$ ), real income of trading partner ( $\ln Y$ ) and real exchange rate ( $\ln RERI$ ).

Similarly, in the case of exports of rawhide and skin, a null hypothesis of no co-integration is rejected by four test statistics at 1%, and 5% level, which confirms the presence of long-run co-integration between export earnings from rawhide and skin ( $\ln XP$ ), real income of trading partner ( $\ln Y$ ) and real exchange rate ( $\ln RERI$ ). The Pedroni test of co-integration also proved the presence of long-run co-integration between Ethiopian export earnings from vegetables and RTC, real income of trading partner ( $\ln Y$ ) and real exchange rate ( $\ln RERI$ ), by rejecting the null of no-co-integration with four test statistics at 1%, and 5% level.

**Table 4. Results of Pedroni panel co-integration tests**

	Total export		Coffee export		Rawhide and skin export		Vegetable and RTC export	
	Statistics	P-value	Statistics	P-value	Statistics	P-value	Statistics	P-value
Panel v-statistic	4.94	0.00	3.67	0.00	-0.24	0.38	4.72	0.00
Panel rho-statistic	-0.86	0.19	-1.58	0.05	-0.55	0.34	-1.00	0.23
Panel pp-statistic	-1.18	0.11	-2.45	0.00	-3.76	0.00	-0.6	0.33
Panel ADF-statistic	-5.97	0.00	-2.31	0.01	-6.49	0.00	-2.18	0.03
Group rho-statistic	1.16	0.87	-0.13	0.44	0.12	0.39	0.10	0.39
Group t-statistic	-1.57	0.05	-3.27	0.00	-3.96	0.00	-2.35	0.02
Group ADF-statistic	-3.78	0.00	-2.9	0.00	-2.61	0.01	-2.34	0.02

### 4.3. Panel short and long-run estimates of total export earnings

Table 5. presents the short and long-run estimates of MG and PMG of total Ethiopian earnings with the coefficient of error correction. The error correction term (indicated as ECT) in Table 5. appears to be negative and statistically significant at 1% level in both MG and PGM estimates. This confirms the presence of long-run relationships. A negative and significant error correction term complies with the error correction condition for a stable error correction mechanism according to [Asongu \(2014\)](#). The range of error correction is in between zero and



one in absolute terms. Zero indicates no adjustment, while one indicates full adjustment. The error correction of bilateral export earnings is -0.39, which signals that a variation from a long run is adjusted by 39% per year and for the system to converge to the long-run equilibrium (full adjustment) it takes about 2.58 years. This study employed Hausman test to differentiate the PMG and MG estimation based on the consistency and efficiency of the estimates. According to the Hausman test, the null hypothesis of long-run heterogeneity is not rejected, suggesting that the PMG estimation is more efficient and consistent than MG estimation. Thus, the estimation of PMG results is adapted to interpret the long run effect of bilateral real exchange rate on the total Ethiopian export earnings. The coefficient of the bilateral real exchange rate and real income are insignificant in short-run, which shows that the bilateral real exchange rate and real income have no impact on Ethiopian export earnings. The result is in line with the claim of [Kiptui \(2007\)](#) that the effect of the real exchange rate is more of a long-run impact than a short-term on the Kenyan export.

The long-run coefficient of the real exchange rate is positive and significant in case of total export which shows that the depreciation of the real exchange rate improves Ethiopia's export earnings over the long term. It indicates that a 1% depreciation in the bilateral real exchange rate increases the Ethiopian total export earnings by 1.16%. The coefficient of trading partner's income ( $Y$ ) is significant and positive which shows that a 1% increase in the foreign real income results in a 3% increase in the total Ethiopia export earnings. The [World Bank \(2014\)](#) predicted 0.5 % increases in the volume of export for a 1% devaluation of Ethiopian currency which is less than our estimation.

**Table 5. Short and long-run PMG and MG estimates (total export earnings ( $\ln XP$ ) is the dependent variable)**

		PMG	MG
	Variables	Coefficient	Coefficient
Long-run	$\ln Y$	3.00 (0.23)***	3.37 (0.99)***
	$\ln RERI$	1.16 (0.58)**	1.65 (0.98)*
Error-correction	ECT	-0.39 (0.04)***	-0.61 (0.05)***
Short-run	$\Delta \ln Y$	0.85 (0.75)	-0.23 (0.67)
	$\Delta \ln RERI$	-1.04 (0.69)	-0.69 (0.58)
	constant	-21.63 (2.64)***	-39.97(10.93)***
Hausman (Prob>chi2)		0.84	

Notes: The values in parentheses are the standard errors. \*\*\*, \*\* and \* indicate significance levels 1%, 5% and 10 %, respectively.

According to the results, an appreciation of the real exchange rate hurts the Ethiopian export earnings. Overvaluation of ETB value is considered an important cause for the lower performance of the export sectors besides lower diversification of export items and low contribution of manufacturing sectors for export. According to the [World Bank \(2017\)](#), the ETB was overvalued by 31% in 2010. East Asian countries such as Hong Kong, South Korea, Singapore and Thailand undervalued their corresponding currencies during their economic revolution, which helped them to ensure the phenomenal economic growth within a short period. Ethiopia, on the other hand, may have overvalued the ETB value over a long period.

[Wondemu and Potts \(2016\)](#) [Were \*et al.\* \(2002\)](#) suggest overvalued currency does not help to improve export competitiveness and also claimed that overvalued currencies damage the growth of exports. [Atingi-Ego and Sebudde \(2004\)](#) claim that over-depreciation of real exchange rate boosts the non-traditional export competitiveness in Uganda, however, overvaluation harms export competitiveness.

Our finding also proved that the overvaluation of ETB value hurts Ethiopian export earnings. Thus, to improve export competitiveness in Ethiopia devaluing ETB value is very important. With an elongated chronic trade deficit situation, the export sector has to be stimulated more. Increasing export earnings can help to finance the increasing import of capital goods and allows the country to get rid of the trade deficit. This also helps to address the problem of the foreign currency shortage, thus alleviating the financing burden for companies to trade. Moreover, it will help to improve the efficiency of traders by removing abnormal competition to get foreign currency. Therefore, further real devaluation of ETB value will enhance export competitiveness and hence improves the export earnings.

#### **4.4. Short and long-run estimates of PMG and MG at the commodity level**

The effect of bilateral real exchange rate on selected major export items of Ethiopian was analyzed. Ethiopia is primary known for coffee production in the world and coffee is one of the country's major export items. Therefore, the impact of the real exchange rate on the coffee export earnings was analyzed in addition to other major export items namely rawhide and skin and vegetable and RTC.

#### 4.4.1 Panel short and long-run estimates of coffee export earnings

The short and long-run estimates of coffee earnings are presented in Table 6. The error correction term of coffee export earning is negative and significant at 1% level. According to correction of Ethiopian coffee export earnings, the deviation from long-run equilibrium will be adjusted by 31 % per year. And the result of the Hausman test is not significant, which confirms that the PMG estimate is efficient and consistent compared to the MG estimates. Therefore, PMG is adopted for the explanation of the results. In the short-run, the real exchange rate has a negative but insignificant effect on coffee exports. The result is in accordance with the study by [Were et al. \(2002\)](#) that the real exchange rate has no significant effect on Kenyan coffee exports. The lag value of coffee export earnings has a negative and significant impact on the Ethiopia export earnings from coffee. This may be due to the seasonality of the coffee plant which results in fluctuation in the production and supply of the coffee.

**Table 6. Short and long-run PMG and MG estimates, (coffee export earnings (lnXP) as the dependent variable)**

		PMG	MG
	Variables	Coefficient	Coefficient
Long-run	lnY	5.44 (0.51)***	4.41 (1.46)***
	lnRERI	-2.40 (0.27)***	-0.71 (1.58)
Error-correction	ECT	-0.31 (0.06)***	-0.62 (0.07)***
Short-run	$\Delta \ln XP(-1)$	-0.28 (0.06)***	-0.18 (0.06)
	$\Delta \ln Y$	1.41 (0.88)	0.89 (0.91)***
	$\Delta \ln RERI$	-0.11 (0.42)	0.07 (0.55)
	$\Delta \ln RERI(-1)$	0.74 (0.79)	0.74 (0.87)
	Constant	-31.00 (6.71)***	-31.04(10.76)***
Hausman (Prob>chi2)		0.32	

Notes: The values in parentheses are the standard errors. \*\*\*, indicate significance levels 1% level.

In the long-run the coefficient of the bilateral real exchange rate is negative and significant, suggesting that the depreciation of the real exchange rate has negative effects on the Ethiopian export earnings from coffee. A 1% increase in the real exchange rate reduces coffee export earnings by 2.40%. The result is against the theoretical argument that appreciation of the real exchange rate affects the export earnings negatively. A study by [Genye \(2011\)](#) proved that devaluation has a negative effect on GDP per capita the same year it has a positive effect on one year lagged GDP per capita. This indicates that the devaluation has a time-varying effect. According to [Bonsa \(2017\)](#) devaluation of ETB might not help to improve the export performance, since the demand for export is not the only problem of Ethiopian export but also

the supply side. Therefore, supply constraints to respond to increased export demand results in reduced export earnings due to depreciation. [Degefe and Moges \(1994\)](#) claim that devaluation is necessary but not sufficient to increase the volume of exportable. Since to increase the volume of exportable items it needs to utilize existing opportunity, investments which aim to improve productivity and diversification in agricultural and manufacturing. Therefore, limited response of supply to increased demand due to reduced relative price causes reduction in export earnings. According to this argument, the MG no effect (insignificant) coefficient of real exchange rate is more plausible than the coefficient of real exchange in case PMG estimates. One can also argue that coffee is a perennial crop which production and supply cannot be adjusted quickly with the variation of relative price changes.

[Kiptui \(2007\)](#) claims in his study that the theoretical argument of the adverse effect of real exchange rate appreciation on export is not supported with the result of study due to the real income of trading partner become a dominant explanatory factor for export growth. In this study also, the income trading partner has a significant and positive impact. Furthermore, Ethiopia is considered as the highest consumer of coffee in Africa ([Kabeta, 2017](#)). Thus, maybe due depreciation of real exchange rate exporter of the coffee switch from the international market to the domestic market due to a higher domestic price.

The real income of trading partners has a dominant effect on the Ethiopian export earnings of coffee. An increase of 1% of the real income of trading partners increases the Ethiopian export earnings of coffee by 5.44%. The result is in line with the study of [Were et al. \(2002\)](#) that the real income of the trading partners has a positive and significant effect on the export volume of Kenyan coffee.

#### **4.4.2. Panel short and long-run estimates of rawhide and skin export earnings**

Table 7. presents the result of short- and long-term estimates of Ethiopian export earnings from rawhide and skin. The error correction coefficient of rawhide and skin earnings is relatively higher than coffee export earnings, which shows the variation from long-run equilibriums in case of rawhide and skin takes a shorter time than export earnings from coffee. The percentage of adjustment per year is 53%. The short-run coefficient of the real exchange rate and real income is not significant which confirms that both real exchange rate and real income of trading partner does not affect the Ethiopian export earnings from rawhide and skin. It is plausible that

raw skin and skin are more supply-driven export products, the supply of which in fact depends on the demand for meat and mutton. For instant, in Ethiopia, the supply of rawhide and skin is high during holidays because of the higher demand for the meat and mutton. Therefore, adjusting for increased demand due to a change in the relative price is difficult because the rawhide and skin are more price-inelastic and supply-driven.

The long-run coefficient of the real exchange rate is positive and significant at the 1% significance level. Depreciation of the real exchange rate by 1% increases the Ethiopian export earnings from rawhide and skin by 1.37%. However, contrary to our result [Ali \(2011\)](#) claims that there is no clear indication that the change in the real exchange rate affects the export of hides and skins positively. The real income of trading partners has no influence on the export earnings of rawhide and skin.

**Table 7. Short and long-run PMG and MG estimates, (rawhide and skin earnings (lnXP) is the dependent variable)**

		PMG	MG
	Variables	Coefficient	Coefficient
Long-run	lnY	0.37 (0.31)	2.46 (1.93)
	lnRERI	1.37 (0.38)***	4.37 (2.30)*
Error-correction	ECT	-0.53 (0.09)***	-0.67 (0.08)***
	$\Delta \ln Y$	1.05 (1.29)	0.76 (1.12)
	$\Delta \ln RERI$	-0.06 (0.42)	-0.83 (0.54)
	Constant	-0.31 (0.34)	-16.48(29.45)
Hausman (Prob>chi2)		0.57	

Notes: The values in parentheses are the standard errors. \*\*\*, and \* indicate significance levels 1%, and 10 %, respectively.

#### 4.4.3 Panel short and long-run estimates of Vegetables and RTC export earnings

Vegetables and RTC are horticultural crops that have recently become Ethiopia's important export products. In the case of vegetables and RTC export earnings, the real exchange rate has no significant effect both in short run and long run as indicated in Table 8. While the real income of trading partner plays significant and positive effect on the Ethiopian export earnings from vegetable and RTC in the long run, the real income coefficient is significant and positive, signalling that the real income of trading partners increases by 1% and the export earnings of Ethiopia from vegetables and RTC by 3.19 %. However, in short run real income has a negative and significant effect on the export earnings of Ethiopian from vegetables and RTC, which shows that better economic activities in trading partner harm the Ethiopian export earnings from

vegetables and RTC. This may be due to seasonal demand for Ethiopia vegetables. During the vegetable production season of Europe, the demand for Ethiopian vegetables drops in Europe and the same is true for other countries.

**Table 8. Short and long-run PMG and MG estimates, (vegetables and RTC export earnings (lnXP) is the dependent variable)**

		PMG	MG
	Variables	Coefficient	Coefficient
Long-run	lnY	3.19(0.24)***	2.29 (1.75)
	lnRERI	0.00(0.33)	-2.42 (2.01)
Error-correction	ECT	-0.53(0.10)***	-0.72 (0.11)***
	$\Delta \ln Y$	-1.20(0.72)*	-1.22 (0.69)*
	$\Delta \ln RERI$	-0.18(0.25)	0.39 (0.49)
	Constant	-30.38(5.90)***	-29.19(21.60)
Hausman (Prob>chi2)		0.39	

Notes: The values in parentheses are the standard errors. \*\*\*, and \* indicate significance levels 1%, and 10 %, respectively.

#### 4.5. Panel causality test

The presence of a long-term co-integration relationship between the export earnings, the real GDP of trading partners and the bilateral real exchange rate signals that, there must have a Granger causality between the variables in at least one direction ([Mert & Bölük, 2016](#)). For this specific study, we focus only on the Granger causality between export earnings and the bilateral real exchange rate. Therefore, the summary of the Granger causality between the real exchange rate and the export earnings is shown in Table 9.

In the case of total export, there is unilateral short-run causality between export earnings and real exchange rate which arise from bilateral real exchange rate to total export but not the other way around. The results are in line with the theoretical arguments and similar results were obtained by [Tegene \(1991\)](#). Moreover, there is bi-directional causality between the coffee export earnings and bilateral real exchange rate. This may be due to a larger share of coffee export earning in total export. Furthermore, there is the unilateral causality between rawhide and skin export earnings which causes from rawhide and skin export earnings to the bilateral real exchange rate. While in case of vegetable and RTC export there is no causal relationship between vegetable and RTC export earnings and bilateral real exchange rate.

**Table 9. Results of panel causality**

	Short-run causality		Long-run causalities		
	Direction	p-value	Equations	ECT	p-value
Total export	$\ln RERI \rightarrow \ln XP$	0.02	$F(\ln XPXP/\ln Y, \ln RERI)$	-0.39	0.00
	$\ln XP \rightarrow \ln RERI$	0.61	$F(\ln RERI/\ln Y, \ln XPXP)$	-0.21	0.00
Coffee export	$\ln RERI \rightarrow \ln XP$	0.00	$F(\ln XPXP/\ln Y, \ln RERI)$	-0.31	0.00
	$\ln XP \rightarrow \ln RERI$	0.00	$F(\ln RERI/\ln Y, \ln XPXP)$	-0.35	0.00
Rawhide and skin export	$\ln RERI \rightarrow \ln XP$		$F(\ln XP/\ln Y, \ln RERI)$	-0.53	0.00
		0.45			
	$\ln XP \rightarrow \ln RERI$	0.08	$F(\ln RERI/\ln Y, \ln XP)$	-0.37	0.00
Vegetables and RTC export	$\ln RERI \rightarrow \ln XP$		$F(\ln XP/\ln Y, \ln RERI)$	-0.53	0.00
		0.93			
	$\ln XP \rightarrow \ln RERI$	0.53	$F(\ln RERI/\ln Y, \ln XP)$	-0.32	0.00

For long-run causality export earnings and bilateral real exchange rate are taken as dependent variables on one another. MG or PMG estimates are selected based on the Hausman tests statistics. As indicated in Table 9. the error correction between the export earnings and the bilateral exchange rate are significant in both directions in all cases. These indicates there is bi-directional causality between the bilateral real exchange rate and total Ethiopian export earning and the earning from coffee, rawhide and skin and vegetable and RTC export.

#### 4.6. Assessing country-specific effects of real exchange rate on Ethiopian export earnings

Table 10. shows the country-specific effect of the real exchange rate and real income of trading partner on total Ethiopian export earnings. The change in the real income of Ethiopia's main trading partners, such as Germany, the Netherlands, USA, Italy, China Hong Kong, Sweden, Thailand, Australia and China, significantly and positively affected Ethiopia's total export earnings. The coefficients of all bilateral exchange rates are not significant with all countries except the USA and Kenya in the long term for total export earnings. The error correction coefficient is significant except for a few countries such as the Netherlands, Egypt, Israel, China and India, showing that there is a long-term relationship between the variables. In the short period, only the variation in China real income affected positively total Ethiopian export earnings. This is plausible since in the last decade China became a major trading partner and top investing country in Ethiopia. In the short run, the real exchange rate of Japan affected negatively and significantly Ethiopia export earnings, demonstrating that the appreciation of the real bilateral exchange with Japan negatively affected Ethiopia's export earnings. Whereas

the coefficient of the real exchange rate with Sweden is significant and positive in the short run, suggesting that the depreciation of the real exchange rate has a positive impact on Ethiopian export earnings.

**Table 10. Country-specific effect on total export earning**

Country	Total export earnings				
	Long run		Short run		
	lnY	lnRERI	ADJ	lnY	lnRERI
Germany	3.30***	-0.40	-0.89***	-2.02	-0.82
Netherlands	7.44***	1.70	-0.56	-5.32	-0.87
USA	5.76**	-1.88*	-0.71**	3.05	-0.17
Saudi Arabia	1.61	-1.54	-0.36**	0.11	0.50
Japan	-0.85	-0.41	-0.99***	0.42	-2.67**
Djibouti	0.25	-0.66	-0.75**	-0.77	-0.43
Kenya	1.40	11.56***	-1.03***	-3.56	-9.18
Italy	2.02**	-0.49	-0.57*	-0.15	-0.12
Switzerland	4.07	2.96	-0.73**	-2.63	-2.08
Egypt	5.19	-2.87	-0.49	1.50	2.78
Israel	3.34	3.74	-0.48	0.83	-1.61
China	3.07***	4.23	-0.49	7.88*	1.19
India	2.93	-1.01	-0.29	1.28	0.34
Spain	1.52	-1.03	-0.66*	-2.92	-1.20
China, Hong Kong	17.10**	4.12	-0.47**	2.56	-1.83
Sweden	5.34***	-0.02	-0.65**	-2.86	3.17*
Russian Federation	-5.34	13.12	-0.12**	-0.48	-0.57
Thailand	2.34**	1.44	-0.82***	-1.43	0.22
Australia	3.48***	-1.06	-0.48*	0.03	0.25

Note: \*\*\*, \*\*and \* indicate significance levels 1%, 5% and 10 %, respectively.

Table 11. presents the country-specific effects on coffee export earnings. The coefficient of the error correction term is negative and significant for all countries except USA and Switzerland, which proves the presence of long-run co-integration. The coefficient of real income is positive and significant for most countries except the USA, Belgium, Saudi Arabia, Japan, Switzerland, the Netherlands, and Djibouti in the long run. This indicates that the better economic activities in these respective countries contribute positively to the Ethiopian export earnings from coffee. The coefficient bilateral real exchange rate of USA, Belgium, Canada, United Kingdom, Italy, Egypt, and Israel affected significantly and negatively, indicating that depreciation of corresponding real exchange rate has a negative effect on Ethiopian export earnings from coffee. In the short-run except Japan, all the bilateral real exchange rate with respective countries are not significant.



**Table 11. Country-specific effect on coffee export earning**

Country	Coffee export earning				
	Long run		Short run		
	lnY	lnRERI	ADJ	lnY	lnRERI
Germany	3.10***	0.03	-0.94***	-2.29	-1.12
USA	5.14	-2.42*	-0.63	6.08	-0.68
Belgium	3.13	-1.52**	-0.88***	-0.34	-0.80
Saud Arabia	0.68	-2.58	-0.30**	0.19	0.44
Japan	-1.32	-0.41	-1.11***	1.01	-3.09**
Canada	1.69**	-2.76**	-0.71**	0.75	0.45
United Kingdom	4.44**	-4.90***	-0.50*	2.25	1.05
Italy	2.72**	-1.74***	-0.77**	-0.42	-0.30
Switzerland	-5.23	-17.49	-0.25	8.85***	2.65
Egypt	3.13***	-2.27***	-1.32***	-1.78	1.17
Israel	4.57***	4.05*	-0.83***	-1.19	-2.37
France	2.58**	-0.81	-0.53**	-1.23	0.43
Australia	3.48***	-1.64	-0.63**	-0.41	0.69
Sweden	6.17**	-0.29	-0.44*	-0.34	2.87
Netherlands	0.97	-1.23	-1.02***	0.75	-2.79
Djibouti	-7.89	-7.57	-0.37*	8.54	-0.90

## **Chapter Six: Conclusions and Policy Recommendations**

### **6.1. Conclusions**

This study sought to examine the effect of exchange rates on the export of Ethiopia for 1997-2016 using panel data. The main objectives of the study are to assess the short and long-run relationship between the real exchange rate and major exports of Ethiopia. To achieve the objective of the study data on the total export earnings and selected major export items namely coffee, rawhide and skin, and vegetables and RTC were collected from the UN Comtrade database. In addition to these, data on the official exchange rate, income of trading partners and consumer price index are collected from the World Bank database. An ARDL panel approach was used to analyse the data. Before estimating short and long-run relationship among the variables, panel series were tested for stationarity by using panel unit root test. According to the unit root test, some variables were found to be non-stationary in levels and others in first difference, proving the importance of the panel ARDL approach. Later on, the presence of co-integration of a panel series was tested using Pedroni panel co-integration tests. From the result of Pedroni co-integration tests, a long run co-integration were found in case of total export earnings and selected export items.

An important conclusion from the results is that there is a long-term relationship between bilateral export earnings, the real exchange rate and the real income of the trading partners. From the findings of our study the dominant driver of Ethiopian export earnings is economic growth of trading partner which is external. In addition, the bilateral real exchange rate is also the main determining factor for the competitiveness and performance of Ethiopian exports. The results have insightful policy implications that overvaluation of ETB hurts the export competitiveness and hence the performance. At the commodity level, there is a mix of evidences. In the case of coffee exports, there is negative and significant relationship between the coffee export earnings and the real exchange rate which confirms that the appreciation of the real exchange rate increases Ethiopian export earnings from coffee. This result is against the theoretical arguments that appreciation of the real exchange rate harms export earnings. While there is a positive and significant long-term relationship between the Ethiopian export earnings from rawhide and skin and the real exchange rate. This proves the theoretical arguments that depreciation of real exchange rate improves export earnings. In the case of vegetables and RTC exports, the Ethiopian export earnings from vegetables and RTC are not affected by real exchange rate variations in the long term and in the short term, while the real

income of the trading partner has a significant and positive effect on Ethiopian export earnings from vegetable and RTC in the long term.

The causality analysis shows a unidirectional short-term causality between the real exchange rate and the total Ethiopian export earnings, which arises from the real exchange rate to the total Ethiopian export earnings. The short-run causality analysis at commodity level indicates that the coffee export earnings and the real exchange rate have a bidirectional causality. Whereas there is unidirectional causality in the case of rawhide and skin export which arises from the export of rawhide and skin to the real exchange rate. However, there is no causality between the export earnings of vegetables and RTC and the real exchange rate. In the long-run, there are bi-directional causality in case of total export earnings and selected export items.

## **6.2. Policy Recommendations**

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 and the bilateral real exchange rate have a positive and significant long-run relationship. Therefore, exchange rate policy aimed at depreciating ETB value would be effective to improve Ethiopian export competitiveness and hence increases export earnings. From this one can conclude that a policy aiming to maintain competitive real exchange rate and prudent economic policy which avoids overvaluation of ETB will enhance Ethiopian export competitiveness. This will help to improve ever increasing trade deficit by reviving export and increasing export earnings of the country.

In the short-run, the real exchange rate has no significant impact on the total Ethiopian export earnings and export earnings at the commodity level. This may be due to the fact that Ethiopian export is dominated by agricultural products which cannot be adjusted easily in a short period. Therefore, shifting the historical dominance of agricultural products in the country's export by other sectors such as manufacturing and service are very important to increase export earnings of the country. A policy that encourages labour intensive and skilled manufacturing sectors are needed much more. This has worked in Vietnam after their economic reform. Vietnam switched shortly after reform in 1986 from agricultural export sector to labour-intensive manufacturing export [Martin et al. \(2002\)](#) and currently Vietnam is fifth among the highest export as a percent

of GDP according to global ranking. Moreover, the agricultural development policy aiming at a value-adding process, grading and standardizing the export items can improve export earnings of the country.

The result indicated that the coffee export earnings and the real exchange rate have a negative relationship in the long run with less elasticity. The result is not in line with the theoretical arguments. Maybe limited supply to respond to increased export demand resulted in reduction export earnings due to devaluation. Besides, coffee is a perennial plant, in which the supply cannot be adjusted shortly for increased demand due to change in relative price. Therefore, policy direction in growing coffee productivity and increase the supply of coffee domestically can help to produce excess and reduce the domestic price and to export more. Since Ethiopia coffee export is majorly contributed by smallholder farmers extending coffee specific financial and extension services, will help to increase the production and quality of the coffee. This will help to fix the abnormal negative relationship between the coffee export earnings and the real exchange rate.

In the end, it is good to note that depreciation by itself is not enough to revive Ethiopian export since export demand is not the only problem of Ethiopian export. Thus along with reducing the appreciation of the real exchange rate, other policies measures are required to improve exports supply in Ethiopia, improving the productivity of export product, infrastructure development and technological innovation for the export sector will help to increase export supply and boost the export earnings of the country.

### **6.3. Critical Reflection and Suggestion for future research**

Although our research has important findings providing insightful policy implications, readers should consider certain limitations when referring and using this document for future studies. First, the assessment period for this study is rather short (1997-2016) because the trade data in the Uncomtrade database is only available from 1995 onwards. Besides, long-term data was not found on websites of Ethiopian national banks and revenue and customs authorities. However, by using the panel data, we used sufficient observations for the analysis, because in panel data the number observations can be increased by increasing the number of cross-sections (trading partner in our case) even with shorter time dimensions. In future studies by considering a longer time dimension, the results can be tested if the same conclusion is drawn. Perhaps the inclusion of more explanatory variables such as foreign direct investment, export and import prices could

yield more robust results. Secondly, because of the absence of reliable monthly data on Ethiopian export, we used annual panel data. In future research with access and analysis of reliable monthly data better results and conclusions will be drawn since the impact of relative price changes is better revealed in a short time (monthly) than in the long time (annually). Thirdly, oilseeds, khat, legumes and flowers are currently important export products of Ethiopia, which are not included in this study. These export products are not included in this study due to a lack of sufficient data. Therefore, analyzing the impact of the real exchange rate after including these export items can provide more information and a better conclusion.

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## List of appendices

### Appendix 1. Diagnostics test of the series

**Table A1. Diagnostics test of total export earnings**

Country	bgodfrey	archlm
Germany	0.02 (0.87)	0.27 (0.59)
Netherlands	0.10 (0.75)	2.48 (0.11)
USA	0.34 (0.55)	2.50 (0.11)
Saud Arabia	0.51 (0.47)	1.75 ( 0.18)
Japan	0.61 (0.43)	0.03 (0.84)
Djibouti	0.38 (0.53)	1.73 (0.18)
Kenya	0.74 (0.38)	0.27 (0.60)
Italy	1.76 ( 0.18)	1.75 (0.18)
Switzerland	1.75 (0.18)	0.01 (0.91)
Egypt	0.29 (0.58)	0.90 (0.34)
Israel	2.30 (0.12)	0.15 (0.69)
China	0.31 (0.57)	0.35 (0.55)
India	0.55 (0.45)	4.11 (0.04)
United Kingdom	0.29 (0.58)	2.12 (0.14)
Belgium	0.12 (0.71)	0.55 (0.45)

Note: The value in brackets are the p-values

**Table A2. Diagnostics test of coffee export earnings**

Country	bgodfrey	archlm
Germany	0.26 (0.60)	0.09 (0.75)
Netherlands	0.63 (0.42)	0.30 (0.58)
USA	1.01 (0.31)	0.47 (0.49)
Saud Arabia	0.53 (0.46)	1.75 (0.18)
Japan	1.03 (0.30)	0.10 ( 0.74)
Canada	1.91 (0.16)	0.03 (0.86)
United Kingdom	2.57 (0.10)	0.97 (0.32)
Italy	1.06 (0.30)	0.00 (0.93)
Switzerland	0.74 (0.38)	1.19 (0.27)
Egypt	0.28 (0.59)	0.20 (0.65)
Israel	2.08 (0.14)	0.33 (0.56)

Note: The value in brackets are the p-values

## Appendix 2. Ethiopian export earnings and Bilateral real exchange rate

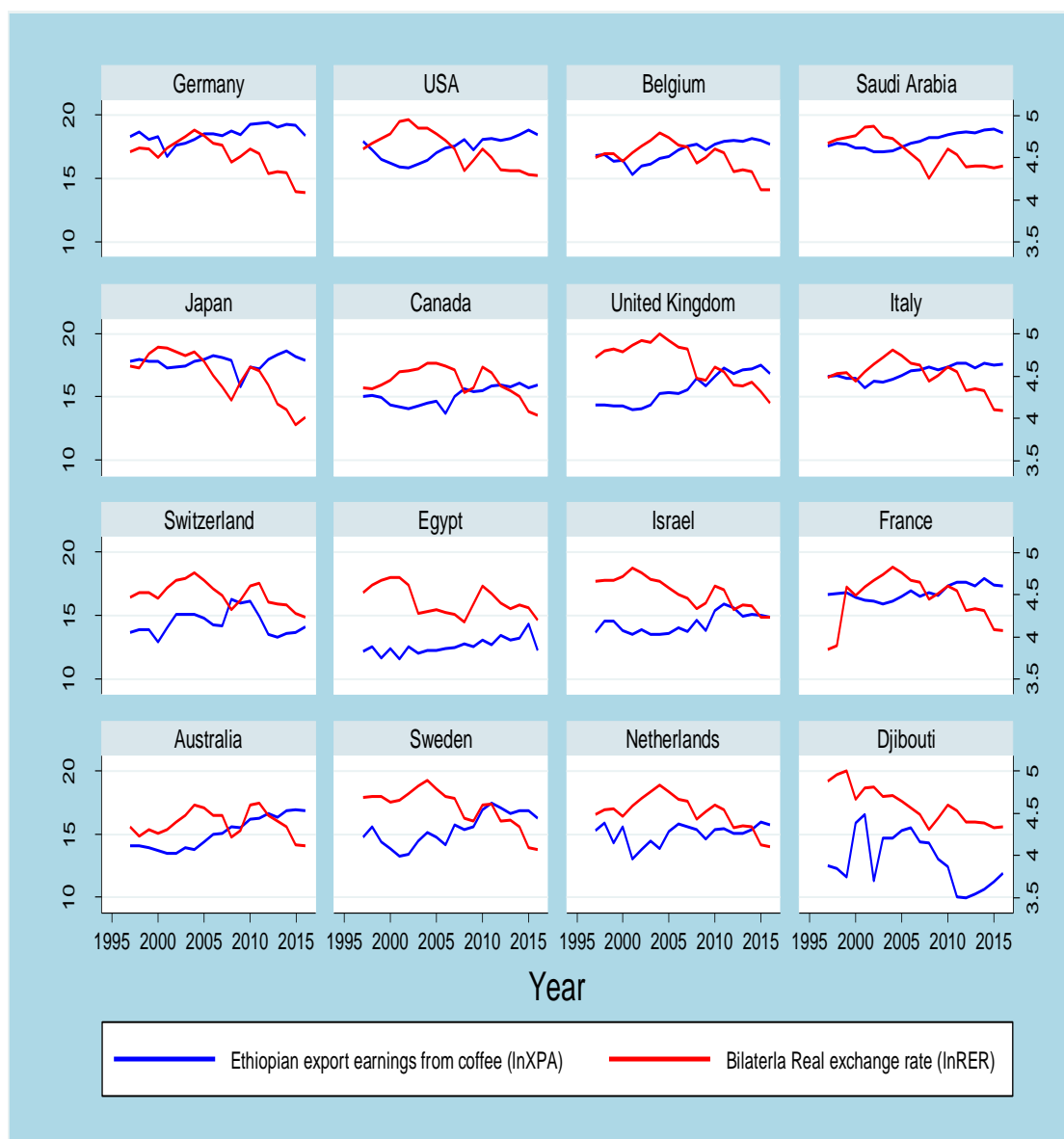


Figure A1. Ethiopian export earnings from coffee and Real exchange rate

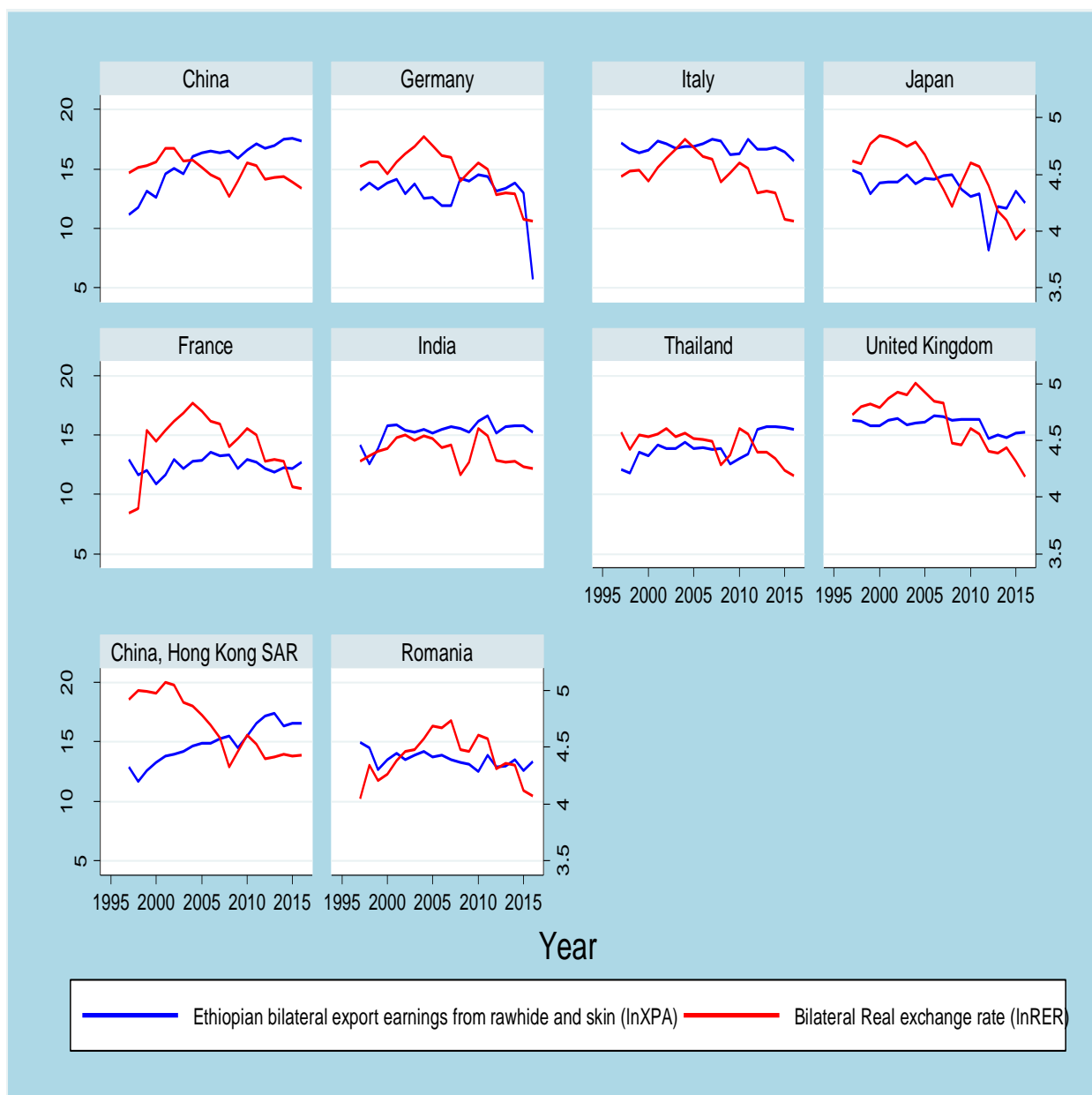


Figure A2. Ethiopian bilateral export earnings from rawhide and skin and Real exchange rate

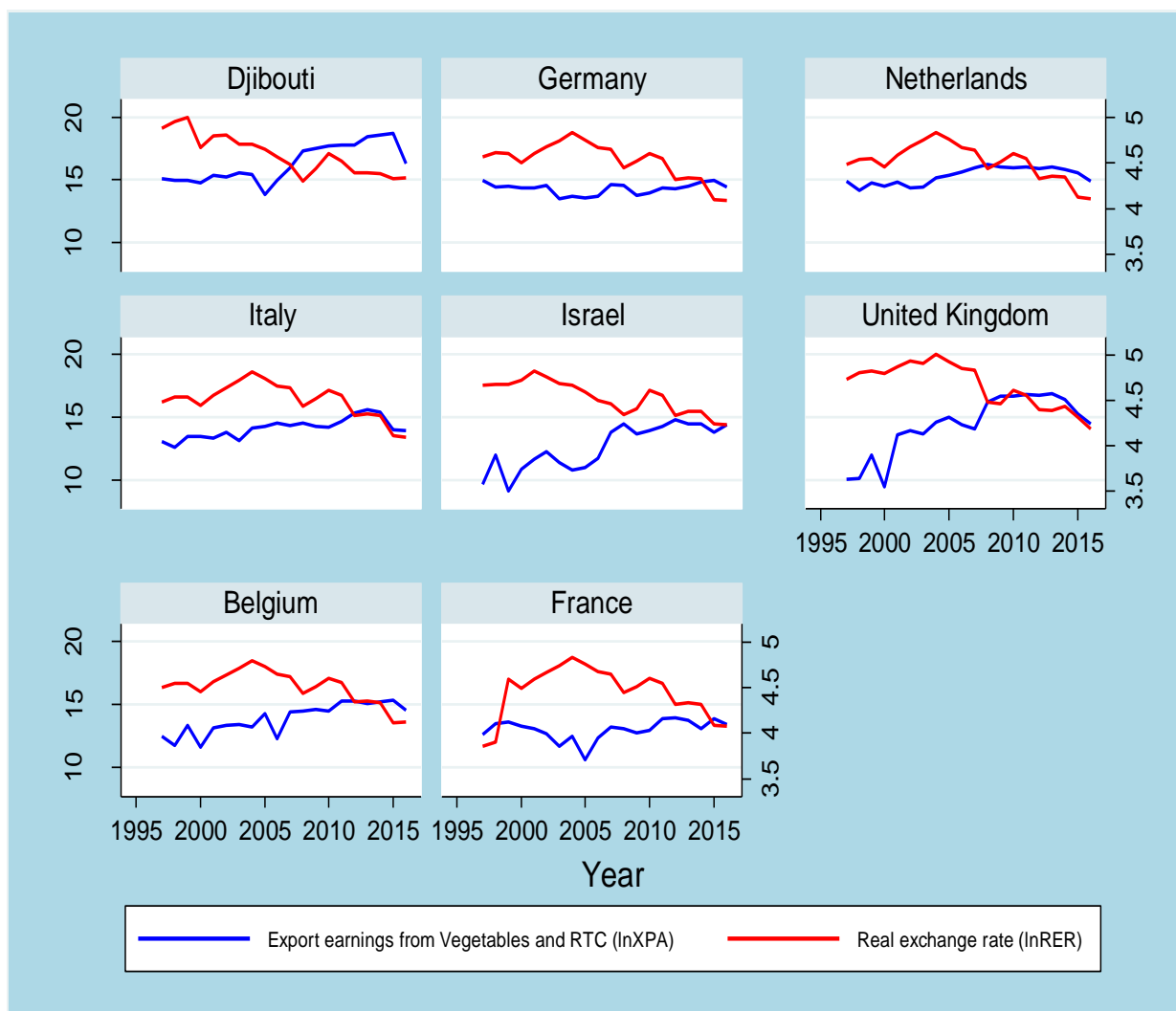


Figure A3. Export earnings from Vegetables and RTC and Real exchange rate